2014

Quality/Level of Service Training

SOLUTION SET

FDOT

Data Sources Workshop Problem

Answers

- Area Type = Other Urbanized
- AADT = 16,647
- K-Factor = 9.0
- D-Factor = 52.3
- Peak Direction = NB
- % Heavy Vehicles = 1.0

GSVT Example #1

Determine the max. service volume for LOS E:

- In terms of AADT
- In a core urbanized area
- For a 10-lane freeway

FREEWAYS

Core Urbanized

Lanes	B	C	D	E
4	47,400	64,000	77,900	84,600
6	69,900	95,200	116,600	130,600
8	92,500	126,400	154,300	176,600
10	115,100	159,700	194,500	222,700
12	162,400	216,700	256,600	268,900

LOS E → 222,700

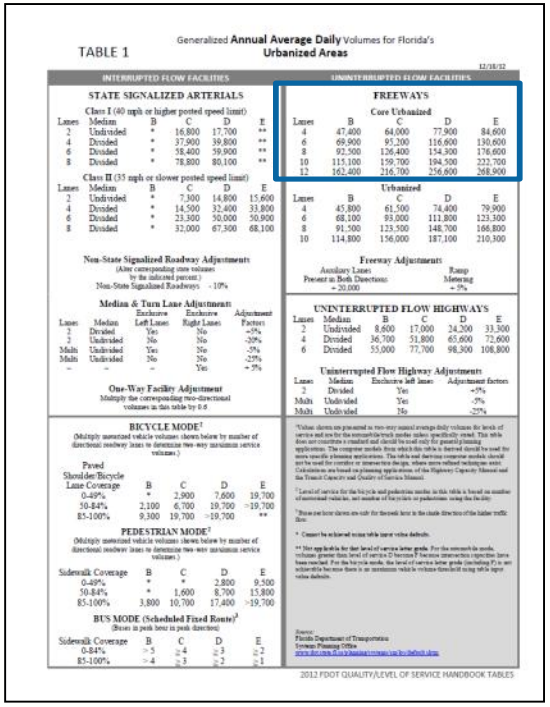


TABLE 1

Generalized **Annual Average Daily** Volumes for Florida's **Urbanized Areas**

12/18/12

INTERRUPTED FLOW FACILITIES

STATE SIGNALIZED ARTERIALS

Class I (40 mph or higher posted speed limit)

Lanes	Median	B	C	D	E
2	Undivided	*	16,800	17,700	**
4	Divided	*	37,900	39,800	**
6	Divided	*	58,400	59,900	**
8	Divided	*	78,800	80,100	**

Class II (35 mph or slower posted speed limit)

Lanes	Median	B	C	D	E
2	Undivided	*	7,300	14,800	15,600
4	Divided	*	14,500	32,400	33,800
6	Divided	*	23,300	50,000	50,900
8	Divided	*	32,000	67,300	68,100

Non-State Signalized Roadway Adjustments
(Alter corresponding state volumes by the indicated percent.)
Non-State Signalized Roadways - 10%

Median & Turn Lane Adjustment

Lanes	Median	Exclusive Left Lanes	Exclusive Right Lanes	Adjustment Factors
2	Divided	Yes	No	-5%
2	Undivided	No	No	-20%
Multi	Undivided	Yes	No	-5%
Multi	Undivided	No	No	-25%
-	-	-	Yes	+ 5%

One-Way Facility Adjustment
Multiply the corresponding two-directional volumes in this table by 0.6

BICYCLE MODE[1]
(Multiply motorized vehicle volumes shown below by number of directional roadway lanes to determine two-way maximum service volumes.)

Paved Shoulder/Bicycle Lane Coverage	B	C	D	E
0-49%	*	2,900	7,600	19,700
50-84%	2,100	6,700	19,700	>19,700
85-100%	9,300	19,700	>19,700	**

PEDESTRIAN MODE[2]
(Multiply motorized vehicle volumes shown below by number of directional roadway lanes to determine two-way maximum service volumes.)

Sidewalk Coverage	B	C	D	E
0-49%	*	*	2,800	9,500
50-84%	*	1,600	8,700	15,800
85-100%	3,800	10,700	17,400	>19,700

BUS MODE (Scheduled Fixed Route)[3]
(Buses in peak hour in peak direction)

Sidewalk Coverage	B	C	D	E
0-84%	> 5	≥ 4	≥ 3	≥ 2
85-100%	> 4	≥ 3	≥ 2	≥ 1

UNINTERRUPTED FLOW FACILITIES

FREEWAYS

Core Urbanized

Lanes	B	C	D	E
4	47,400	64,000	77,900	84,600
6	69,900	95,200	116,600	130,600
8	92,500	126,400	154,300	176,600
10	115,100	159,700	194,500	222,700
12	162,400	216,700	256,600	268,900

Urbanized

Lanes	B	C	D	E
4	45,800	61,500	74,400	79,900
6	68,100	93,000	111,800	123,300
8	91,500	123,500	148,700	166,800
10	114,800	156,000	187,100	210,300

Freeway Adjustments

Auxiliary Lanes Present in Both Directions	Ramp Metering
+ 20,000	+ 5%

UNINTERRUPTED FLOW HIGHWAYS

Lanes	Median	B	C	D	E
2	Undivided	8,600	17,000	24,200	33,300
4	Divided	36,700	51,800	65,600	72,600
6	Divided	55,000	77,700	98,300	108,800

Uninterrupted Flow Highway Adjustments

Lanes	Median	Exclusive left lanes	Adjustment factors
2	Divided	Yes	+5%
Multi	Undivided	Yes	-5%
Multi	Undivided	No	-25%

*Volume shown are presented as two-way annual average daily volumes for levels of service and are for automobile/truck modes unless specifically stated. This table does not constitute a standard and should be used only for general planning applications. The computer models from which this table is derived should be used for more specific planning applications. The tables and derived computer models should not be used for corridor or intersection design, where more refined techniques exist. Calculations are based on planning applications of the Highway Capacity Manual and the Transit Capacity and Quality of Service Manual.

[1] Level of service for the bicycle and pedestrian modes in this table is based on number of motorized vehicles, not number of bicyclists or pedestrians using the facility.

[2] Buses per hour shown are only for the peak hour in the peak direction of the higher traffic flow.

[3] Cannot be achieved using table input value defaults.

** Not applicable for that level of service letter grade. For the research mode, volumes greater than level of service D become F because interaction capacities have been reached. For the bicycle mode, the level of service letter grade (including F) is not achievable because there is no maximum vehicle volume threshold using table input value defaults.

Source:
Florida Department of Transportation
Systems Planning Office
www.dot.state.fl.us/planning/systems/sm/los/default.shtm

2012 FDOT QUALITY/LEVEL OF SERVICE HANDBOOK TABLES

GSVT Example #2

Answer → LOS C

Determine the auto LOS:

- In terms of peak hour directional volumes
- In an undeveloped rural area
- For an uninterrupted flow highway with
  - 2 lanes (one in each direction)
  - No median/undivided
  - No passing lanes
  - Peak hour directional volume is 400

UNINTERRUPTED FLOW HIGHWAYS

Rural Undeveloped

Lanes	Median	B	C	D	E
1	Undivided	240	430	740	1,490
2	Divided	1,340	2,100	2,660	3,020
3	Divided	2,020	3,150	4,000	4,530

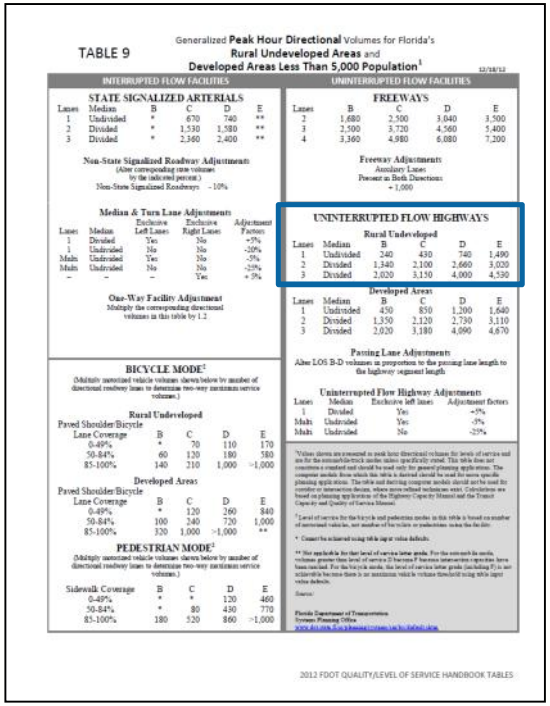


TABLE 9

Generalized **Peak Hour Directional** Volumes for Florida's **Rural Undeveloped Areas** and **Developed Areas Less Than 5,000 Population**[1]

INTERRUPTED FLOW FACILITIES

STATE SIGNALIZED ARTERIALS

Lanes	Median	B	C	D	E
1	Undivided	*	670	740	**
2	Divided	*	1,530	1,580	**
3	Divided	*	2,360	2,400	**

Non-State Signalized Roadway Adjustment
(Alter corresponding state volumes by the indicated percent.)
Non-State Signalized Roadways -10%

Median & Turn Lane Adjustments

Lanes	Median	Exclusive Left Lanes	Exclusive Right Lanes	Adjustment Factors
1	Divided	Yes	No	+5%
1	Undivided	No	No	-20%
Multi	Undivided	Yes	No	-5%
Multi	Undivided	No	No	-25%
–	–	–	Yes	+ 5%

One-Way Facility Adjustment
Multiply the corresponding directional volumes in this table by 1.2.

BICYCLE MODE[2]
(Multiply motorized vehicle volumes shown below by number of directional roadway lanes to determine two-way maximum service volumes.)

Rural Undeveloped

Paved Shoulder/Bicycle Lane Coverage	B	C	D	E
0-49%	*	70	110	170
50-84%	60	120	180	580
85-100%	140	210	1,000	>1,000

Developed Areas

Paved Shoulder/Bicycle Lane Coverage	B	C	D	E
0-49%	*	120	260	840
50-84%	100	240	720	1,000
85-100%	320	1,000	>1,000	**

PEDESTRIAN MODE[2]
(Multiply motorized vehicle volumes shown below by number of directional roadway lanes to determine two-way maximum service volumes.)

Sidewalk Coverage	B	C	D	E
0-49%	*	*	120	460
50-84%	*	80	430	770
85-100%	180	520	860	>1,000

UNINTERRUPTED FLOW FACILITIES

FREEWAYS

Lanes	B	C	D	E
2	1,680	2,500	3,040	3,500
3	2,500	3,720	4,560	5,400
4	3,360	4,980	6,080	7,200

Freeway Adjustments
Auxiliary Lanes
Present in Both Directions:
+ 1,000

UNINTERRUPTED FLOW HIGHWAYS

Rural Undeveloped

Lanes	Median	B	C	D	E
1	Undivided	240	430	740	1,490
2	Divided	1,340	2,100	2,660	3,020
3	Divided	2,020	3,150	4,000	4,530

Developed Areas

Lanes	Median	B	C	D	E
1	Undivided	430	850	1,200	1,640
2	Divided	1,350	2,120	2,730	3,110
3	Divided	2,020	3,180	4,090	4,670

Passing Lane Adjustments
Alter LOS B-D volumes in proportion to the passing lane length to the highway segment length

Uninterrupted Flow Highway Adjustments

Lanes	Median	Exclusive left lanes	Adjustment factors
1	Divided	Yes	+5%
Multi	Undivided	Yes	-5%
Multi	Undivided	No	-25%

[1] Values shown are presented in peak hour directional volumes for levels of service and are for the automobile/truck modes unless specifically stated. This table does not constitute a standard and should be used only for general planning applications. The computer models from which this table is derived should be used for more specific planning applications. The table and derived computer models should not be used for corridor or intersection design, where more refined techniques exist. Calculations are based on planning applications of the Highway Capacity Manual and the Transit Capacity and Quality of Service Manual.

[2] Level of service for the bicycle and pedestrian modes in this table is based on number of motorized vehicles, not number of bicyclists or pedestrians using the facility.

* Cannot be achieved using table input value defaults.

** Not applicable for that level of service letter grade. For the motorized mode, volumes greater than level of service D become intersection capacities have been reached. For the bicycle mode, the level of service letter grade (including F) is not achievable because there is no maximum vehicle volume threshold using table input value defaults.

Source:

Florida Department of Transportation
Systems Planning Office
www.dot.state.fl.us/planning/systems/sm/los/default.shtm

2012 FDOT QUALITY/LEVEL OF SERVICE HANDBOOK TABLES

GSVT Example #3

Answer → LOS B ?

25,900 * 0.95 ≈ 24,600

24,600 < 25,000

Answer → LOS C

Determine the auto LOS:

- In terms of AADT
- In a developed rural area (pop. 3,000)
- For an uninterrupted flow highway with
  - 4 lanes
  - 25,000 AADT
  - No median
  - Exclusive left turn lanes

Developed Areas

Lanes	Median	B	C	D	E
2	Undivided	8,700	16,400	23,100	31,500
4	Divided	25,900	40,700	52,400	59,600
6	Divided	38,800	61,000	78,400	89,500

Uninterrupted Flow Highway Adjustments

Lanes	Median	Exclusive left lanes	Adjustment factors
2	Divided	Yes	+5%
Multi	Undivided	Yes	-5%
Multi	Undivided	No	-25%

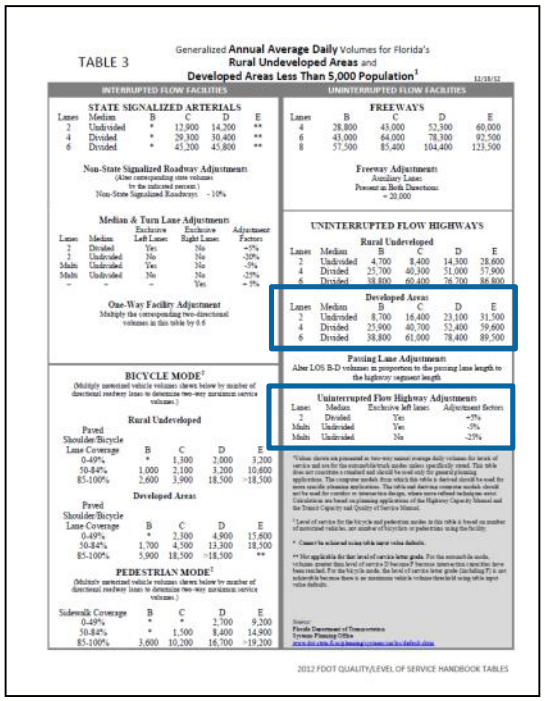


TABLE 3

Generalized Annual Average Daily Volumes for Florida's Rural Undeveloped Areas and Developed Areas Less Than 5,000 Population[1]

INTERRUPTED FLOW FACILITIES

STATE SIGNALIZED ARTERIALS

Lanes	Median	B	C	D	E
2	Undivided	*	12,900	14,200	**
4	Divided	*	29,300	30,400	**
6	Divided	*	45,200	45,800	**

Non-State Signalized Roadway Adjustments
(Alter corresponding state volumes by the indicated percent.)
Non-State Signalized Roadways: -10%

Median & Turn Lane Adjustments

Lanes	Median	Exclusive Left Lanes	Exclusive Right Lanes	Adjustment Factors
2	Divided	Yes	No	+5%
2	Undivided	No	No	-20%
Multi	Undivided	Yes	No	-5%
Multi	Undivided	No	No	-25%
–	–	–	Yes	+5%

One-Way Facility Adjustment
Multiply the corresponding two-directional volumes in this table by 0.6

BICYCLE MODE[2]
(Multiply motorized vehicle volumes shown below by number of directional roadway lanes to determine two-way minimum service volumes.)

Rural Undeveloped

Paved Shoulder/Bicycle Lane Coverage	B	C	D	E
0-49%	*	1,300	2,000	3,200
50-84%	1,000	2,100	3,200	10,600
85-100%	2,600	3,900	18,500	>18,500

Developed Areas

Paved Shoulder/Bicycle Lane Coverage	B	C	D	E
0-49%	*	2,300	4,900	15,600
50-84%	1,700	4,500	13,300	18,500
85-100%	5,900	18,500	>18,500	**

PEDESTRIAN MODE[3]
(Multiply motorized vehicle volumes shown below by number of directional roadway lanes to determine two-way minimum service volumes.)

Sidewalk Coverage	B	C	D	E
0-49%	*	*	2,700	9,200
50-84%	*	1,500	8,400	14,900
85-100%	3,600	10,200	16,700	>19,200

UNINTERRUPTED FLOW FACILITIES

FREEWAYS

Lanes	B	C	D	E
4	28,800	43,000	52,300	60,000
6	43,000	64,000	78,300	92,500
8	57,500	85,400	104,400	123,500

Freeway Adjustments
Auxiliary Lanes:
Present in Both Directions:
= 20,000

UNINTERRUPTED FLOW HIGHWAYS

Rural Undeveloped

Lanes	Median	B	C	D	E
2	Undivided	4,700	8,400	14,300	28,600
4	Divided	25,700	40,300	51,000	57,900
6	Divided	38,800	60,400	76,700	86,800

Developed Areas

Lanes	Median	B	C	D	E
2	Undivided	8,700	16,400	23,100	31,500
4	Divided	25,900	40,700	52,400	59,600
6	Divided	38,800	61,000	78,400	89,500

Passing Lane Adjustments
Alter LOS B-D volumes in proportion to the passing lane length to the highway segment length.

Uninterrupted Flow Highway Adjustments

Lanes	Median	Exclusive left lanes	Adjustment factors
2	Divided	Yes	+5%
Multi	Undivided	Yes	-5%
Multi	Undivided	No	-25%

*Values shown are presented as two-way annual average daily volumes for levels of service and are for the automobile/truck modes unless specifically stated. This table does not constitute a standard and should be used only for general planning applications. The computer models from which this table is derived should be used for more specific alternative analyses. The vehicle and daytime computer models should not be used for corridor or intersection design, where more refined techniques exist. Calculations are based on planning applications of the Highway Capacity Manual and the Transit Capacity and Quality of Service Manual.

[1] Level of service for the bicycle and pedestrian modes in this table is based on number of motorized vehicles, not number of bicyclists or pedestrians using the facility.

* Cannot be achieved using this input value defaults.

** Not applicable for that level of service letter grade. For the outermost lanes, volumes greater than level of service D become interruption capacities have been reached. For the bicycle mode, the level of service letter grade (including F) is not achievable because there is no maximum vehicle volume threshold using this input value defaults.

Source:
Florida Department of Transportation
System Planning Office
www.dot.state.fl.us/planning/systems/sm/los/default.shtm

2012 FDOT QUALITY/LEVEL OF SERVICE HANDBOOK TABLES

GSVT Example #4

Bicycle Mode

Determine the bicycle, pedestrian, and bus LOS:

- In terms of AADT
- In an urbanized area
- For a state signalized arterial with
  - 2 lanes
  - AADT=13,000
  - 3 buses/hour
  - 40% bike lane coverage
  - 90% sidewalk coverage

BICYCLE MODE[2]

(Multiply motorized vehicle volumes shown below by number of directional roadway lanes to determine two-way maximum service volumes.)

Paved Shoulder/Bicycle Lane Coverage	B	C	D	E
0-49%	*	2,900	7,600	19,700
50-84%	2,100	6,700	19,700	>19,700
85-100%	9,300	19,700	>19,700	**

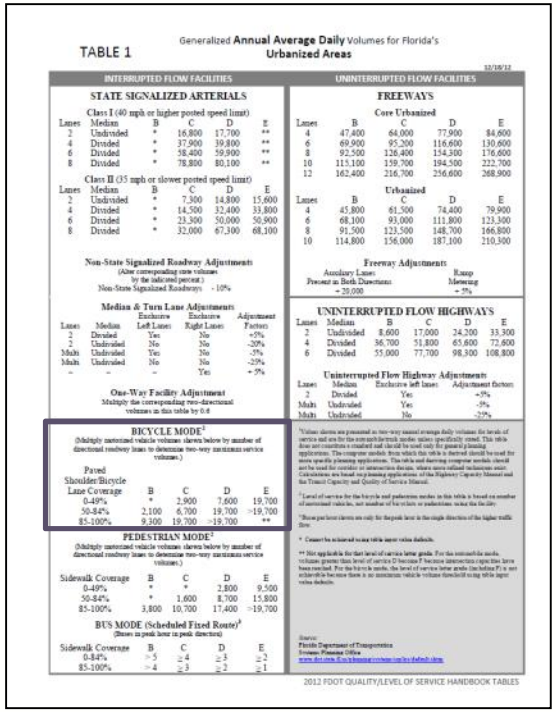


TABLE 1

Generalized **Annual Average Daily** Volumes for Florida's **Urbanized Areas**

12/10/12

INTERRUPTED FLOW FACILITIES

STATE SIGNALIZED ARTERIALS

Class I (40 mph or higher posted speed limit)

Lanes	Median	B	C	D	E
2	Undivided	*	16,800	17,700	**
4	Divided	*	37,900	39,800	**
6	Divided	*	58,400	59,900	**
8	Divided	*	78,800	80,100	**

Class II (35 mph or slower posted speed limit)

Lanes	Median	B	C	D	E
2	Undivided	*	7,300	14,800	15,600
4	Divided	*	14,500	32,400	33,800
6	Divided	*	23,300	50,000	50,900
8	Divided	*	32,000	67,300	68,100

Non-State Signalized Roadway Adjustments

(Alter corresponding core volumes by the indicated percent.)

Non-State Signalized Roadways - 10%

Median & Turn Lane Adjustments

Lanes	Median	Exclusive Left Lanes	Exclusive Right Lanes	Adjustment Factors
2	Divided	Yes	No	+5%
2	Undivided	No	No	-20%
Multi	Undivided	Yes	No	-5%
Multi	Undivided	No	No	-25%
-	-	-	Yes	+ 5%

One-Way Facility Adjustment

Multiply the corresponding two-directional volumes in this table by 0.6

BICYCLE MODE[2]

(Multiply motorized vehicle volumes shown below by number of directional roadway lanes to determine two-way maximum service volumes.)

Paved Shoulder/Bicycle Lane Coverage	B	C	D	E
0-49%	*	2,900	7,600	19,700
50-84%	2,100	6,700	19,700	>19,700
85-100%	9,300	19,700	>19,700	**

PEDESTRIAN MODE[2]

(Multiply motorized vehicle volumes shown below by number of directional roadway lanes to determine two-way maximum service volumes.)

Sidewalk Coverage	B	C	D	E
0-49%	*	*	2,800	9,500
50-84%	*	1,600	8,700	15,800
85-100%	3,800	10,700	17,400	>19,700

BUS MODE (Scheduled Fixed Route)[3]

(Buses in peak hour in peak direction)

Sidewalk Coverage	B	C	D	E
0-84%	>5	≥4	≥3	≥2
85-100%	>4	≥3	≥2	≥1

UNINTERRUPTED FLOW FACILITIES

FREEWAYS

Core Urbanized

Lanes	B	C	D	E
4	47,400	64,000	77,900	84,600
6	69,900	95,200	116,600	130,600
8	92,500	126,400	154,300	176,600
10	113,100	159,700	194,500	222,700
12	162,400	216,700	256,600	268,900

Urbanized

Lanes	B	C	D	E
4	45,800	61,500	74,400	79,900
6	68,100	93,000	111,800	123,300
8	91,500	123,500	148,700	166,800
10	114,800	156,000	187,100	210,300

Freeway Adjustments

Auxiliary Lanes: Present in Both Directions - 20,000

Ramp Metering - 5%

UNINTERRUPTED FLOW HIGHWAYS

Lanes	Median	B	C	D	E
2	Undivided	8,600	17,000	24,200	33,300
4	Divided	36,700	51,800	65,600	72,600
6	Divided	55,000	77,700	98,300	108,800

Uninterrupted Flow Highway Adjustments

Lanes	Median	Exclusive left lanes	Adjustment factors
2	Divided	Yes	+5%
Multi	Undivided	Yes	-5%
Multi	Undivided	No	-25%

[1] Volume shown are presented in two-way annual average daily volumes for levels of service and are for the non-peak/off-peak modes unless specifically noted. This table does not constitute a standard and should be used only for general planning applications. The computer models from which this table is derived should be used for more specific planning applications. The vehicle and observing computer models should not be used for corridor or intersection design, where more refined mechanisms exist. Calculations are based on planning applications of the Highway Capacity Manual and the Transit Capacity and Quality of Service Manual.

[2] Level of service for the bicycle and pedestrian modes in this table is based on number of motorized vehicles, not number of bicyclists or pedestrians, so let the file.

[3] Bus per hour shown are only for the peak hour in the single direction of the higher traffic flow.

* Cannot be achieved using table input value defaults.

** Not applicable for that level of service letter grade. For the motorized mode, volumes greater than level of service D become F because intersection capacities have been reached. For the bicycle mode, the level of service letter grade (including F) is not achievable because there is no maximum vehicle volume threshold using table input value defaults.

Source:
Florida Department of Transportation
Systems Planning Office
www.dot.state.fl.us/planning/systems/sm/los/default.shtm

2012 FDOT QUALITY/LEVEL OF SERVICE HANDBOOK TABLES

Bike Mode → LOS E

GSVT Example #4

Pedestrian Mode

Determine the bicycle, pedestrian, and bus LOS:

- In terms of AADT
- In an urbanized area
- For a state signalized arterial with
  - 2 lanes
  - AADT=13,000
  - 3 buses/hour
  - 40% bike lane coverage
  - 90% sidewalk coverage

PEDESTRIAN MODE[2]

(Multiply motorized vehicle volumes shown below by number of directional roadway lanes to determine two-way maximum service volumes.)

Sidewalk Coverage	B	C	D	E
0-49%	*	*	2,800	9,500
50-84%	*	1,600	8,700	15,800
85-100%	3,800	10,700	17,400	>19,700

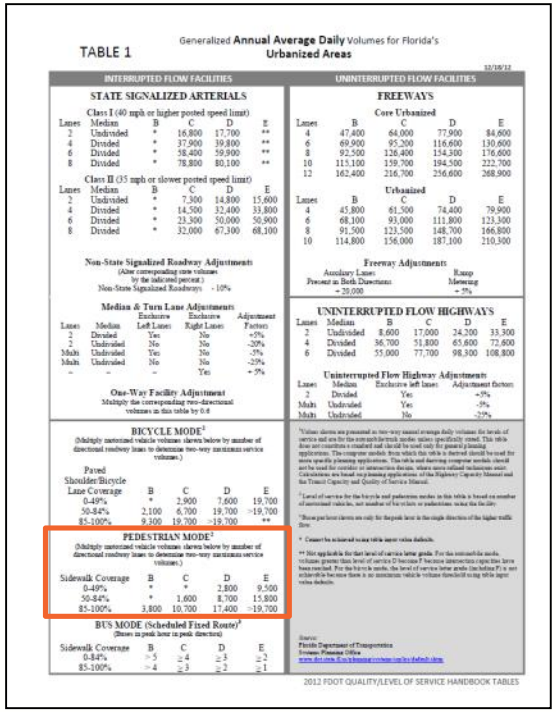


TABLE 1

Generalized Annual Average Daily Volumes for Florida's Urbanized Areas

INTERRUPTED FLOW FACILITIES

STATE SIGNALIZED ARTERIALS

Class I (40 mph or higher posted speed limit)

Lanes	Median	B	C	D	E
2	Undivided	*	16,800	17,700	**
4	Divided	*	37,900	39,800	**
6	Divided	*	58,400	59,900	**
8	Divided	*	78,800	80,100	**

Class II (35 mph or slower posted speed limit)

Lanes	Median	B	C	D	E
2	Undivided	*	7,300	14,800	15,600
4	Divided	*	14,500	32,400	33,800
6	Divided	*	23,300	50,000	50,900
8	Divided	*	32,000	67,300	68,100

Non-State Signalized Roadway Adjustments

(Alter corresponding core volumes by the indicated percent.)

Non-State Signalized Roadways - 10%

Median & Turn Lane Adjustments

Lanes	Median	Exclusive Left Lanes	Exclusive Right Lanes	Adjustment Factors
2	Divided	Yes	No	+5%
2	Undivided	No	No	-20%
Multi	Undivided	Yes	No	-5%
Multi	Undivided	No	No	-20%
-	-	-	Yes	+ 5%

One-Way Facility Adjustment

Multiply the corresponding two-directional volumes in this table by 0.6

BICYCLE MODE[1]

(Multiply motorized vehicle volumes shown below by number of directional roadway lanes to determine two-way maximum service volumes.)

Paved Shoulder/Bicycle Lane Coverage	B	C	D	E
0-49%	*	2,900	7,600	19,700
50-84%	2,100	6,700	19,700	>19,700
85-100%	9,300	19,700	>19,700	**

PEDESTRIAN MODE[2]

(Multiply motorized vehicle volumes shown below by number of directional roadway lanes to determine two-way maximum service volumes.)

Sidewalk Coverage	B	C	D	E
0-49%	*	*	2,800	9,500
50-84%	*	1,600	8,700	15,800
85-100%	3,800	10,700	17,400	>19,700

BUS MODE (Scheduled Fixed Route)[3]

(Buses in peak hour in peak direction)

Sidewalk Coverage	B	C	D	E
0-84%	>5	≥4	≥3	≥2
85-100%	>4	≥3	≥2	≥1

UNINTERRUPTED FLOW FACILITIES

FREEWAYS

Core Urbanized

Lanes	B	C	D	E
4	47,400	64,000	77,900	84,600
6	69,900	95,200	116,600	130,600
8	92,500	126,400	154,300	176,600
10	113,100	159,700	194,500	222,700
12	162,400	216,700	256,600	268,900

Urbanized

Lanes	B	C	D	E
4	45,800	61,500	74,400	79,900
6	68,100	93,000	111,800	123,300
8	91,500	123,500	148,700	166,800
10	114,800	156,000	187,100	210,300

Freeway Adjustments

Auxiliary Lanes: Present in Both Directions - 20,000

Ramp Metering - 5%

UNINTERRUPTED FLOW HIGHWAYS

Lanes	Median	B	C	D	E
2	Undivided	8,600	17,000	24,200	33,300
4	Divided	36,700	51,800	65,600	72,600
6	Divided	55,000	77,700	98,300	108,800

Uninterrupted Flow Highway Adjustments

Lanes	Median	Exclusive left lanes	Adjustment factors
2	Divided	Yes	+5%
Multi	Undivided	Yes	-5%
Multi	Undivided	No	-20%

[1] Volume shown are presented in two-way annual average daily volumes for levels of service and are for the non-peak direction unless specifically noted. This table does not constitute a standard and should be used only for general planning applications. The computer models from which this table is derived should be used for more specific planning applications. The vehicle and showing computer models should not be used for corridor or intersection design, where more refined mechanisms exist. Calculations are based on planning applications of the Highway Capacity Manual and the Transit Capacity and Quality of Service Manual.

[2] Level of service for the bicycle and pedestrian modes in this table is based on number of motorized vehicles, not number of bicyclists or pedestrians, using the facility.

[3] Bus per hour shown are only for the peak hour in the single direction of the higher traffic flow.

* Cannot be achieved using table input value defaults.

** Not applicable for that level of service letter grade. For the motorized mode, volumes greater than level of service D become F because intersection capacities have been reached. For the bicycle mode, the level of service letter grade (including F) is not achievable because there is no maximum vehicle volume threshold using table input value defaults.

Source: Florida Department of Transportation Systems Planning Office www.dot.state.fl.us/planning/systems/sm/los/default.shtm

2012 FDOT QUALITY/LEVEL OF SERVICE HANDBOOK TABLES

Pedestrian Mode → LOS D

GSVT Example #4

Bus Mode

Determine the bicycle, pedestrian, and bus LOS:

- In terms of AADT
- In an urbanized area
- For a state signalized arterial with
  - 2 lanes
  - AADT=13,000
  - 3 buses/hour
  - 40% bike lane coverage
  - 90% sidewalk coverage

BUS MODE (Scheduled Fixed Route)[3]

(Buses in peak hour in peak direction)

Sidewalk Coverage	B	C	D	E
0-84%	> 5	≥ 4	≥ 3	≥ 2
85-100%	> 4	≥ 3	≥ 2	≥ 1

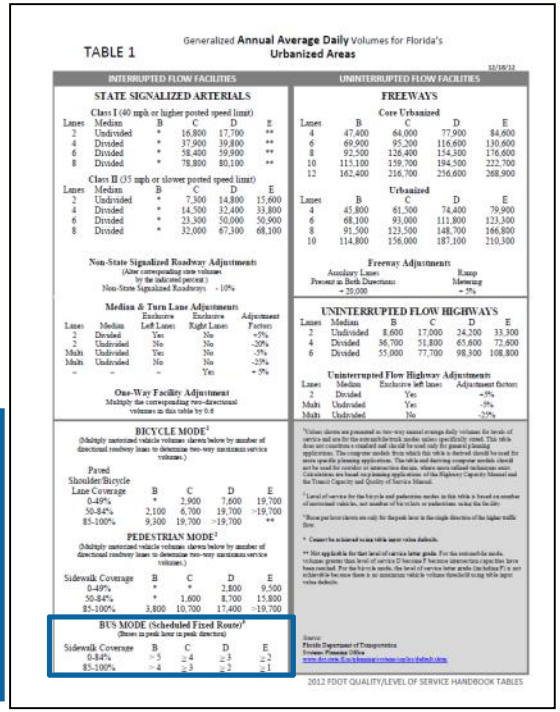


TABLE 1

Generalized **Annual Average Daily** Volumes for Florida's **Urbanized Areas**

12/10/12

INTERRUPTED FLOW FACILITIES

STATE SIGNALIZED ARTERIALS

Class I (40 mph or higher posted speed limit)

Lanes	Median	B	C	D	E
2	Undivided	*	16,800	17,700	**
4	Divided	*	37,900	39,800	**
6	Divided	*	58,400	59,900	**
8	Divided	*	78,800	80,100	**

Class II (35 mph or slower posted speed limit)

Lanes	Median	B	C	D	E
2	Undivided	*	7,300	14,800	15,600
4	Divided	*	14,500	32,400	33,800
6	Divided	*	23,300	50,000	50,900
8	Divided	*	32,000	67,300	68,100

Non-State Signalized Roadway Adjustments

(Alter corresponding core volumes by the indicated percent.)

Non-State Signalized Roadways - 10%

Median & Turn Lane Adjustments

Lanes	Median	Exclusive Left Lanes	Exclusive Right Lanes	Adjustment Factors
2	Divided	Yes	No	+5%
2	Undivided	No	No	-20%
Multi	Undivided	Yes	No	-5%
Multi	Undivided	No	No	-20%
-	-	-	Yes	+ 5%

One-Way Facility Adjustment

Multiply the corresponding two-directional volumes in this table by 0.6

BICYCLE MODE[2]

(Multiply motorized vehicle volumes shown below by number of directional roadway lanes to determine two-way maximum service volumes.)

Paved Shoulder/Bicycle Lane Coverage	B	C	D	E
0-49%	*	2,900	7,600	19,700
50-84%	2,100	6,700	19,700	>19,700
85-100%	9,300	19,700	>19,700	**

PEDESTRIAN MODE[2]

(Multiply motorized vehicle volumes shown below by number of directional roadway lanes to determine two-way maximum service volumes.)

Sidewalk Coverage	B	C	D	E
0-49%	*	*	2,800	9,500
50-84%	*	1,600	8,700	15,800
85-100%	3,800	10,700	17,400	>19,700

BUS MODE (Scheduled Fixed Route)[3]

(Buses in peak hour in peak direction)

Sidewalk Coverage	B	C	D	E
0-84%	> 5	≥ 4	≥ 3	≥ 2
85-100%	> 4	≥ 3	≥ 2	≥ 1

UNINTERRUPTED FLOW FACILITIES

FREEWAYS

Core Urbanized

Lanes	B	C	D	E
4	47,400	64,000	77,900	84,600
6	69,900	95,200	116,600	130,600
8	92,500	126,400	154,300	176,600
10	113,100	159,700	194,500	222,700
12	162,400	216,700	256,600	268,900

Urbanized

Lanes	B	C	D	E
4	45,800	61,500	74,400	79,900
6	68,100	93,000	111,800	123,300
8	91,500	123,500	148,700	166,800
10	114,800	156,000	187,100	210,300

Freeway Adjustments

Auxiliary Lanes: Present in Both Directions - 20,000

Ramp Metering - 5%

UNINTERRUPTED FLOW HIGHWAYS

Lanes	Median	B	C	D	E
2	Undivided	8,600	17,000	24,200	33,300
4	Divided	36,700	51,800	65,600	72,600
6	Divided	55,000	77,700	98,300	108,800

Uninterrupted Flow Highway Adjustments

Lanes	Median	Exclusive left lanes	Adjustment factors
2	Divided	Yes	+5%
Multi	Undivided	Yes	-5%
Multi	Undivided	No	-20%

[1] Volume shown are presented in two-way annual average daily volumes for levels of service and are for the non-truck/truck modes unless specifically noted. This table does not constitute a standard and should be used only for general planning applications. The computer models from which this table is derived should be used for more specific planning applications. The vehicle and shared-use computer models should not be used for corridor or intersection design, where more refined mechanisms exist. Calculations are based on planning applications of the Highway Capacity Manual and the Transit Capacity and Quality of Service Manual.

[2] Level of service for the bicycle and pedestrian modes in this table is based on number of motorized vehicles, not number of bicyclists or pedestrians, to be the life.

[3] Bus per hour shown are only for the peak hour in the single direction of the higher traffic flow.

* Cannot be achieved using table input value defaults.

** Not applicable for that level of service letter grade. For the motorized modes, volumes greater than level of service D become F because intersection capacities have been reached. For the bicycle mode, the level of service letter grade (including F) is not achievable because there is no maximum vehicle volume threshold using table input value defaults.

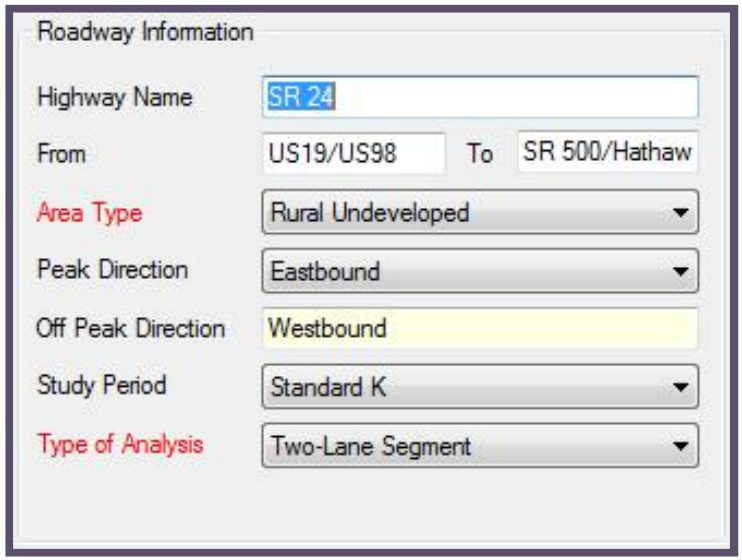
Source:
Florida Department of Transportation
Systems Planning Office
www.dot.state.fl.us/planning/systems/sm/los/default.shtm

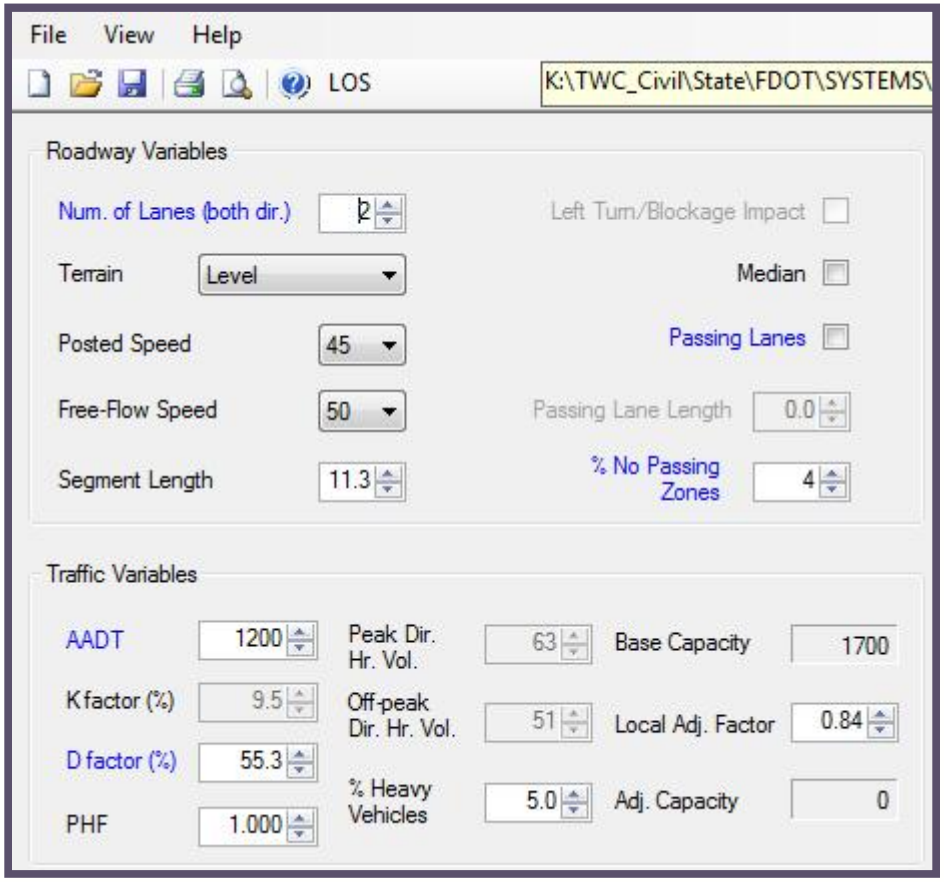
2012 FDOT QUALITY/LEVEL OF SERVICE HANDBOOK TABLES

Bus Mode → LOS C

HIGHPLAN

Example #1: Model Inputs





HIGHPLAN

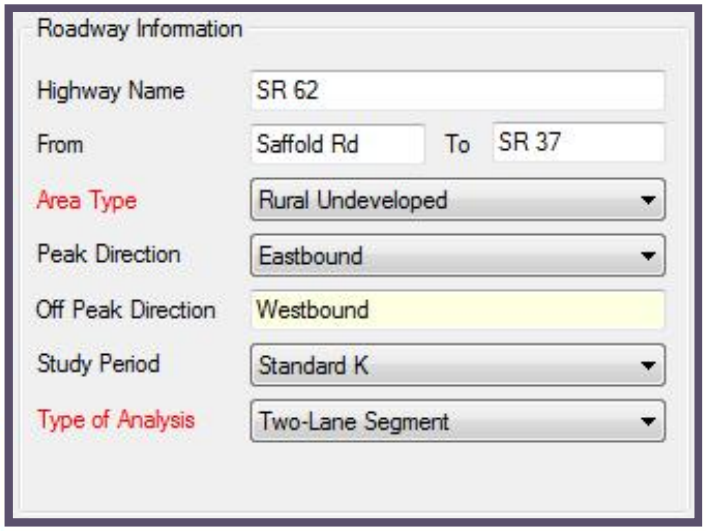
Example #1: Model Results

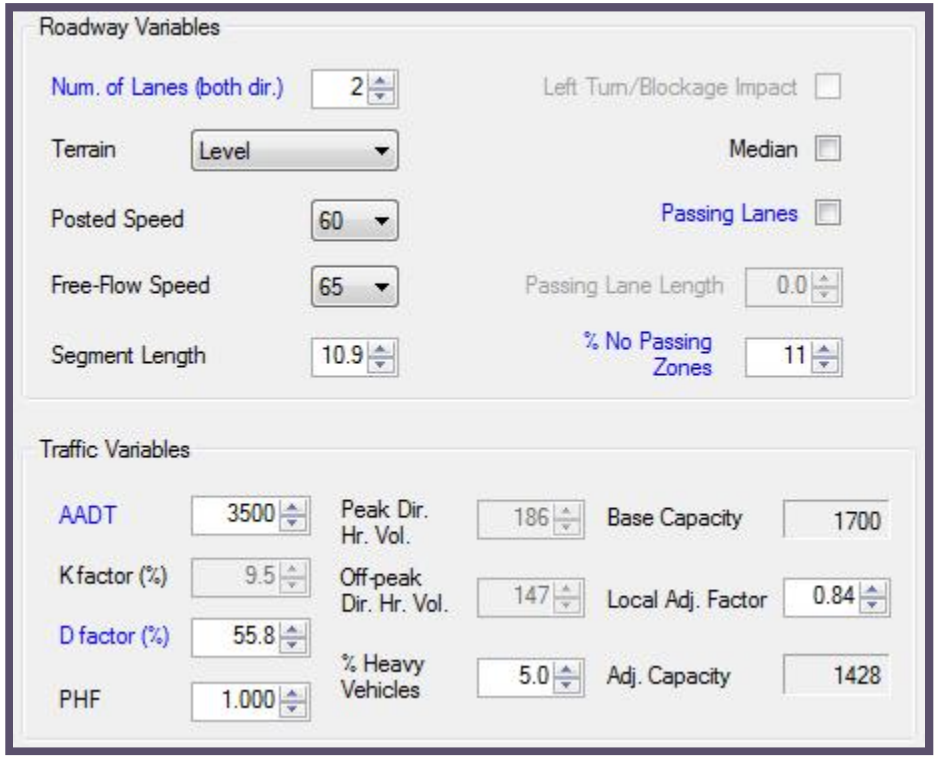
LOS Results

v/c Ratio	0.05
% Time Spent Following	16.7
Average Speed (mi/h)	48.7
% Free Flow Speed	97.4
Free-Flow Delay (sec/veh)	21.7
LOS Threshold Delay (sec/veh)	21.7
LOS	C

HIGHPLAN

Workshop #1: Model Inputs





HIGHPLAN

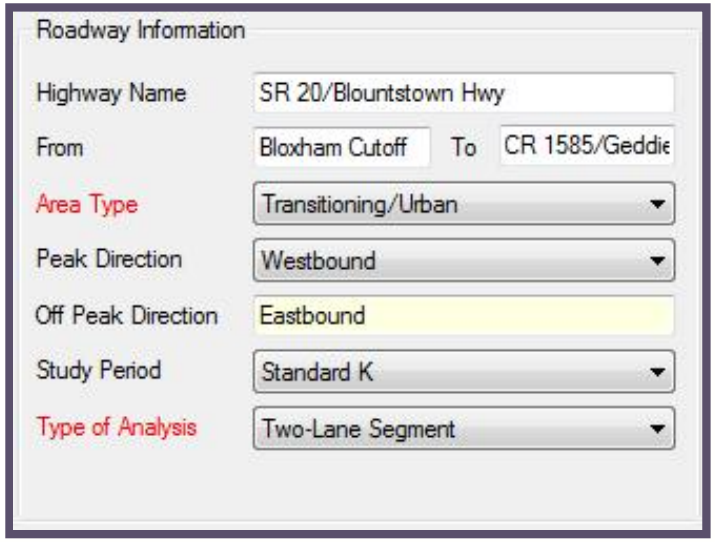
Workshop #1: Model Results

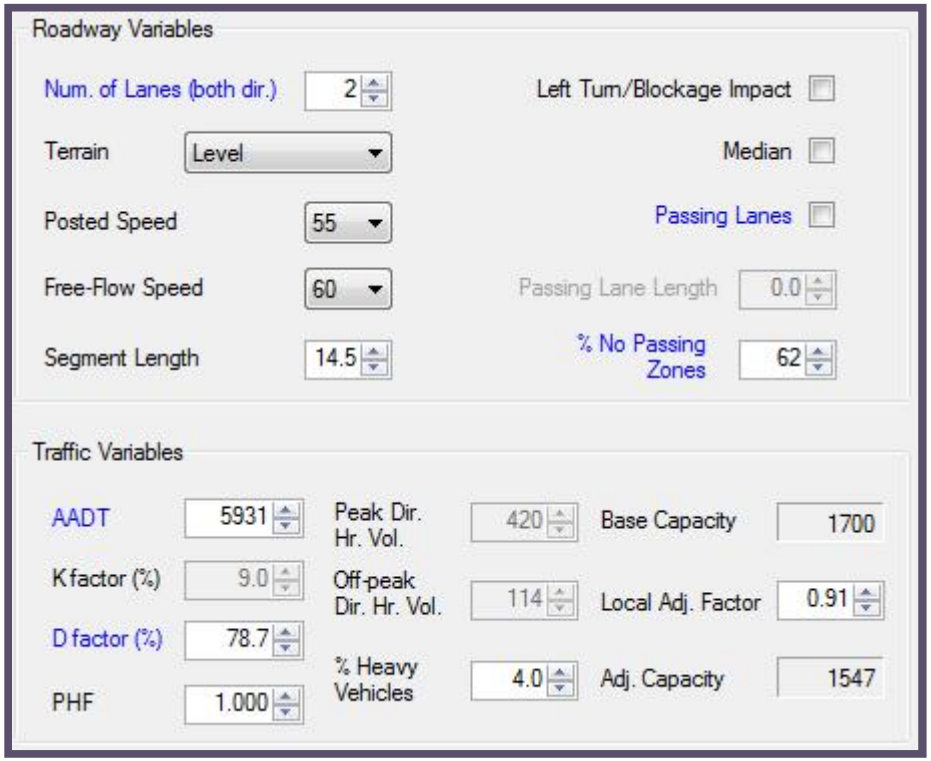
LOS Results

v/c Ratio	0.13
% Time Spent Following	42.2
Average Speed (mi/h)	59.9
% Free Flow Speed	92.1
Free-Flow Delay (sec/veh)	51.8
LOS Threshold Delay (sec/veh)	0.0
LOS	B

HIGHPLAN

Workshop #2: Model Inputs





HIGHPLAN

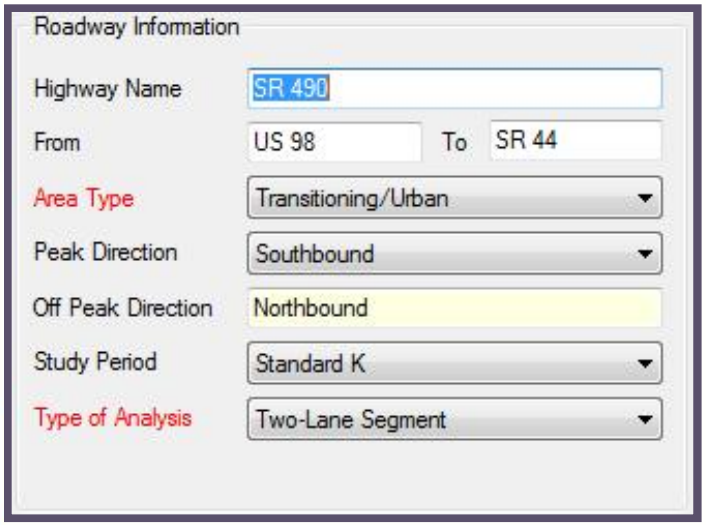
Workshop #2: Model Results

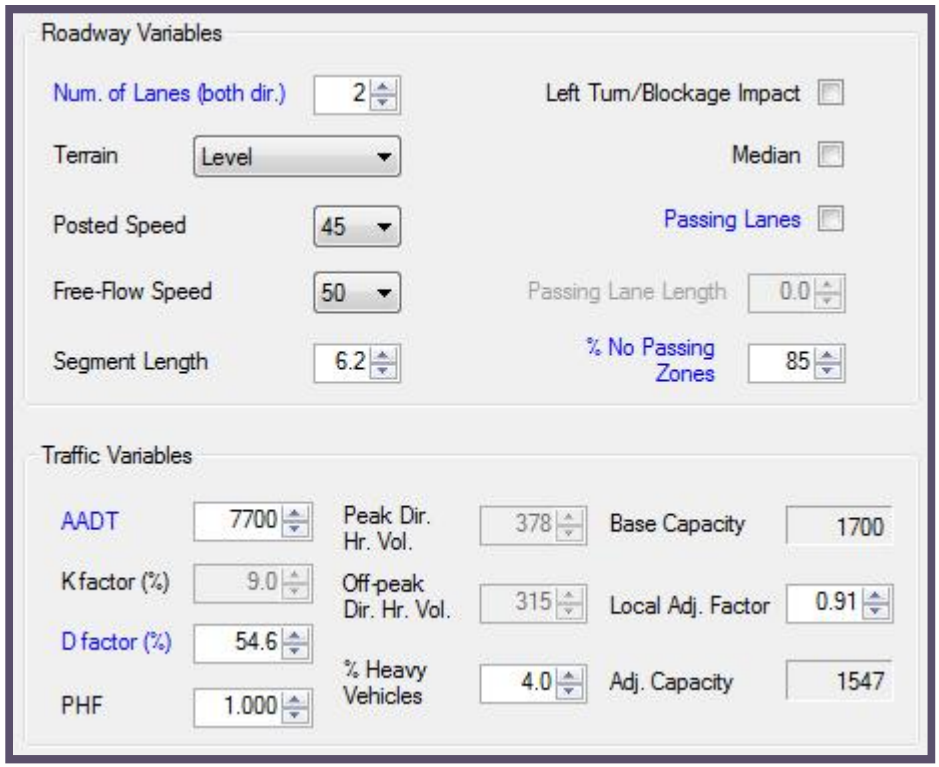
LOS Results

v/c Ratio	0.27
% Time Spent Following	73.0
Average Speed (mi/h)	52.5
% Free Flow Speed	87.5
Free-Flow Delay (sec/veh)	124.3
LOS Threshold Delay (sec/veh)	0.0
LOS	B

HIGHPLAN

Workshop #3: Model Inputs





HIGHPLAN

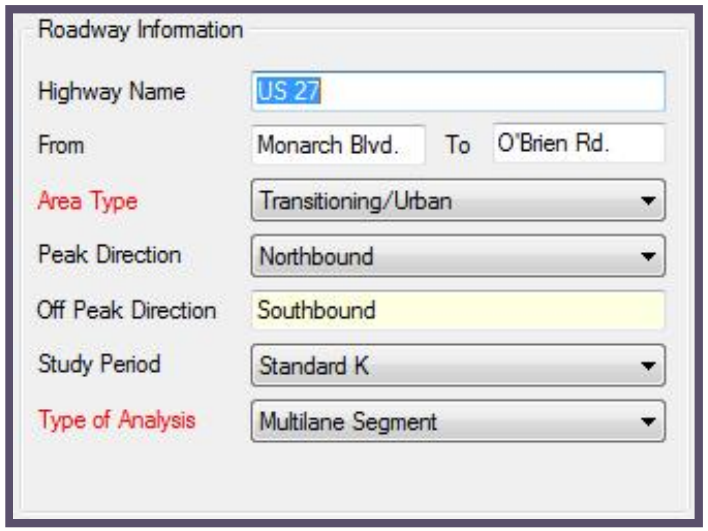
Workshop #3: Model Results

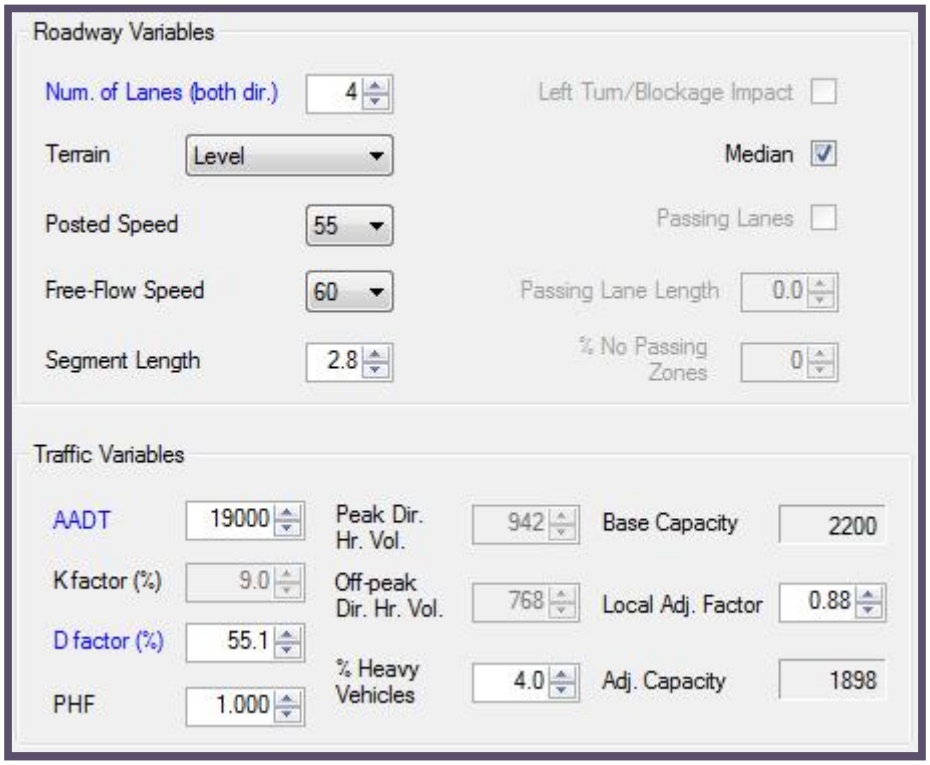
LOS Results

v/c Ratio	0.25
% Time Spent Following	67.7
Average Speed (mi/h)	41.1
% Free Flow Speed	82.1
Free-Flow Delay (sec/veh)	97.0
LOS Threshold Delay (sec/veh)	97.0
LOS	C

HIGHPLAN

Example #2: Model Inputs





HIGHPLAN

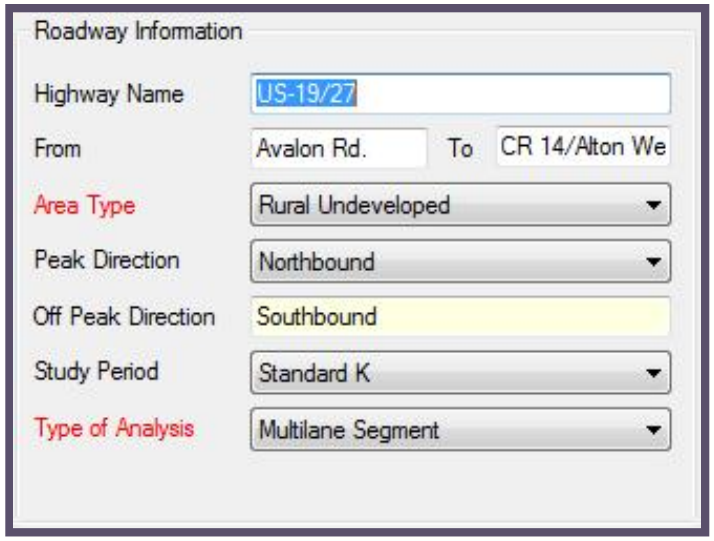
Example #2: Model Results

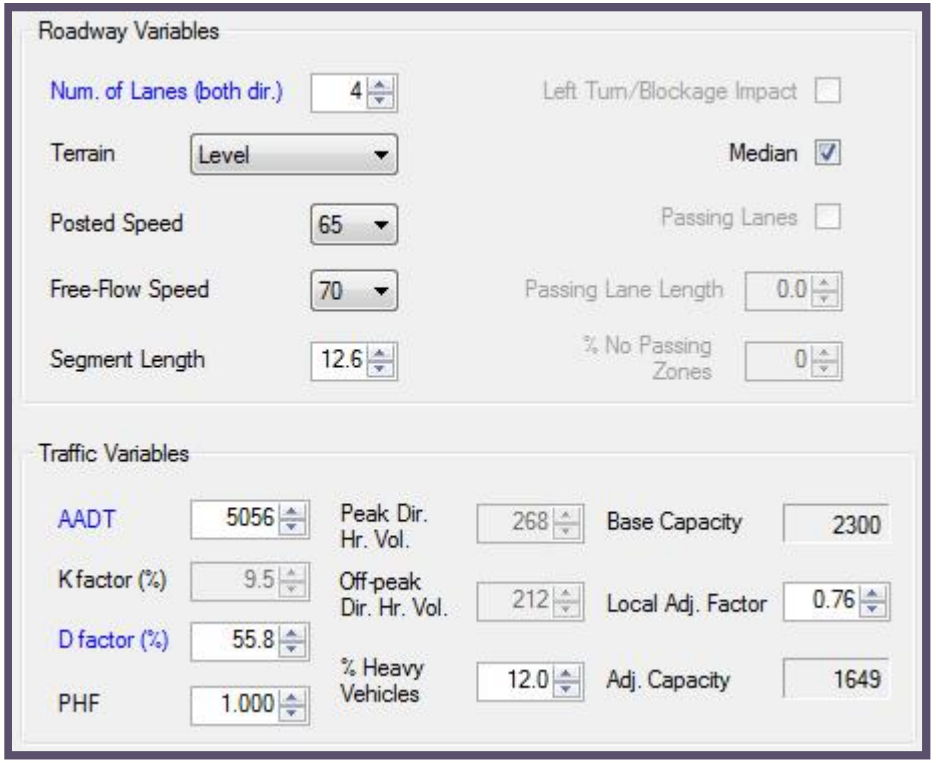
LOS Results

v/c Ratio	0.25
Density	9.1
Average Speed (mi/h)	60.0
% Free Flow Speed	100.0
Free-Flow Delay (sec/veh)	0.0
LOS Threshold Delay (sec/veh)	0.0
LOS	A

HIGHPLAN

Workshop #4: Model Inputs





HIGHPLAN

Workshop #4: Model Results

LOS Results

v/c Ratio	0.08
Density	2.7
Average Speed (mi/h)	70.0
% Free Flow Speed	100.0
Free-Flow Delay (sec/veh)	0.0
LOS Threshold Delay (sec/veh)	0.0
LOS	A

HIGHPLAN

Workshop #5: Model Inputs

Roadway Information

Highway Name	SR 289		
From	Fairfield Dr	To	Bayou Blvd
Area Type	Large/Other Urbanized		
Peak Direction	Northbound		
Off Peak Direction	Southbound		
Study Period	Standard K		
Type of Analysis	Multilane Segment		

Roadway Variables

Num. of Lanes (both dir.)	4	Left Turn/Blockage Impact	☐
Terrain	Level	Median	☐
Posted Speed	40	Passing Lanes	☐
Free-Flow Speed	45	Passing Lane Length	0.0
Segment Length	1.3	% No Passing Zones	0

Traffic Variables

AADT	26500	Peak Dir. Hr. Vol.	1338	Base Capacity	1900
K factor (%)	9.0	Off-peak Dir. Hr. Vol.	1047	Local Adj. Factor	0.88
D factor (%)	56.1	% Heavy Vehicles	2.0	Adj. Capacity	1573
PHF	1.000				

HIGHPLAN

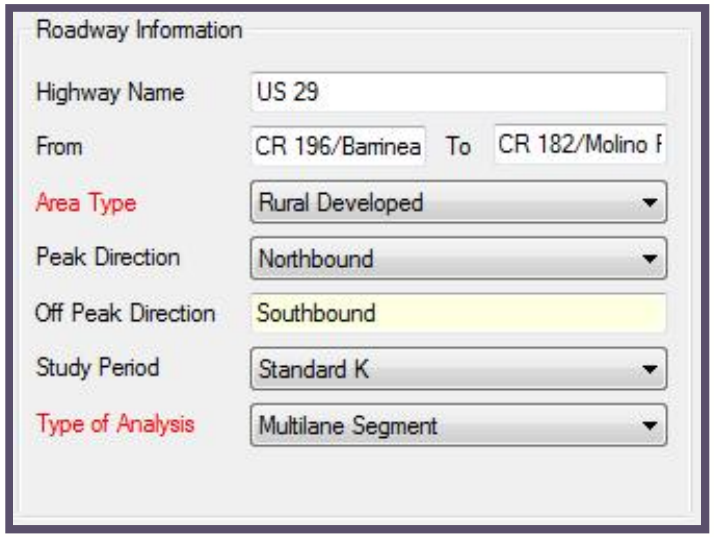
Workshop #5: Model Results

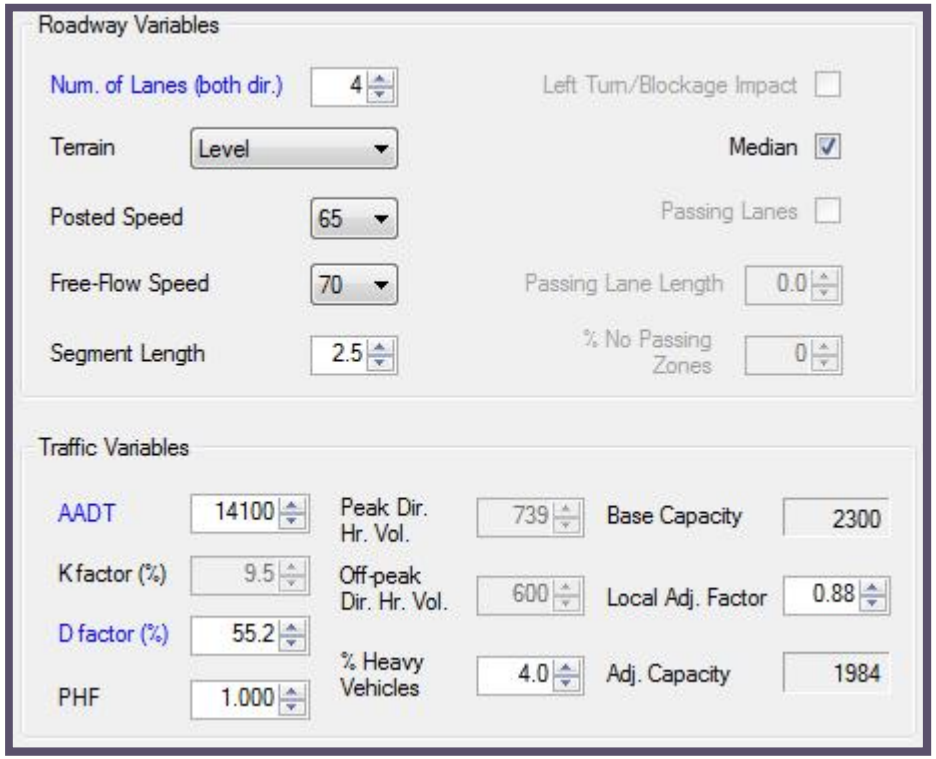
LOS Results

v/c Ratio	0.43
Density	18.0
Average Speed (mi/h)	45.0
% Free Flow Speed	100.0
Free-Flow Delay (sec/veh)	0.0
LOS Threshold Delay (sec/veh)	15.7
LOS	C

HIGHPLAN

Workshop #6: Model Inputs





HIGHPLAN

Workshop #6: Model Results

LOS Results

v/c Ratio	0.19
Density	6.1
Average Speed (mi/h)	70.0
% Free Flow Speed	100.0
Free-Flow Delay (sec/veh)	0.0
LOS Threshold Delay (sec/veh)	0.0
LOS	B

FREEPLAN

Example #1: Model Inputs

Roadway Information

Freeway Name	I-4		
From	Princeton St	To	Lee Rd
Area Type	Large Urbanized		
Peak Direction	Northbound		
Off Peak Direction	Southbound		
Study Period	Kother		

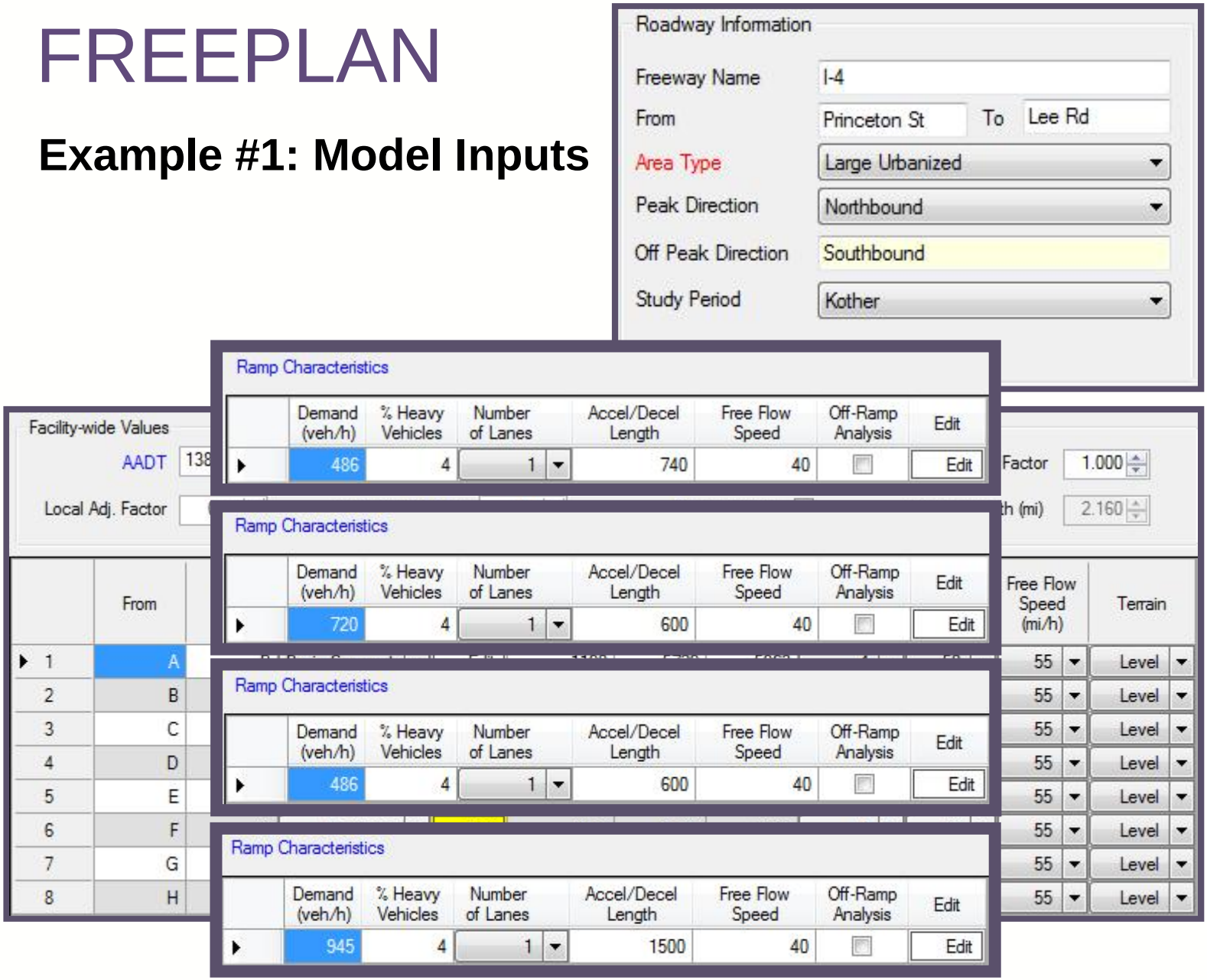
Facility-wide Values

AADT	138250	K Factor (%)	8.0	D Factor (%)	51.8	Peak Hour Factor	1.000
Local Adj. Factor	0.98	% Heavy Vehicles	4.0	Ramp Metering	☐	Facility Length (mi)	2.160

	From	To	Input Segment Type	Edit Segment	Segment Length (ft)	Hourly Demand Volume (veh/h)	Analysis Flow Rate (pc/h)	Number Thru Lanes	Posted Speed (mi/h)	Free Flow Speed (mi/h)	Terrain
1	A	B	Basic Segment	Edit	1190	5729	5963	4	50	55	Level
2	B	C	Off-Ramp	Edit	1500	5729	5963	4	50	55	Level
3	C	D	Basic Segment	Edit	3060	5243	5457	4	50	55	Level
4	D	E	Off-Ramp	Edit	1500	5243	5457	4	50	55	Level
5	E	F	Basic Segment	Edit	1620	4523	4707	4	50	55	Level
6	F	G	On-Ramp	Edit	1035	5009	5213	4	50	55	Level
7	G	H	Ramp Overlap	Edit	465	5009	5213	4	50	55	Level
8	H	I	Off-Ramp	Edit	1035	5009	5213	3	50	55	Level

FREEPLAN

Example #1: Model Inputs



FREEPLAN

Example #1: Model Results

	Segment	Input Segment Type	Analysis Segment Type	Analysis Flow Rate (pc/h)	Adj. Capacity (pc/h)	v/c Ratio	Average Speed (mi/h)	Density (pc/mi/ln)	Segment LOS (density)	Additional Off-Ramp/Toll Outputs
1	A-B	Basic	Basic	5963	9000	0.66	55.0	27.1	D	View
2	B-C	OffRamp	OffRamp	5963	8600	0.69	53.8	24.4	C	View
3	C-D	Basic	Basic	5457	9000	0.61	55.0	24.8	C	View
4	D-E	OffRamp	OffRamp	5457	8600	0.63	53.7	22.7	C	View
5	E-F	Basic	Basic	4707	9000	0.52	54.9	21.4	C	View
6	F-G	OnRamp	OnRamp	5213	8800	0.59	51.3	23.7	C	View
7	G-H	RampOverlap	RampOverlap	5213	7916	0.66	52.5	24.0	C	View
8	H-I	OffRamp	OffRamp	5213	7916	0.66	52.5	24.0	C	View

Length (mi) 2.1600 | Free Flow Delay (sec/veh) 2.8 | LOS Threshold Delay (sec/veh) 2.0 | Avg. Speed (mi/h) 53.9 | Density (pc/mi/ln) 24.0 | LOS D

FREEPLAN

Workshop #1: Model Inputs

Roadway Information

Freeway Name	I-295		
From	St. Johns Bluff R	To	Town Center Pk
Area Type	Large Urbanized		
Peak Direction	Southbound		
Off Peak Direction	Northbound		
Study Period	Standard K		

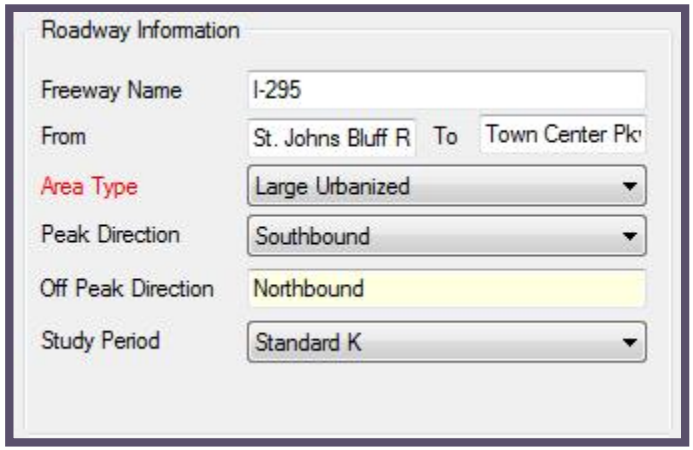
Facility-wide Values

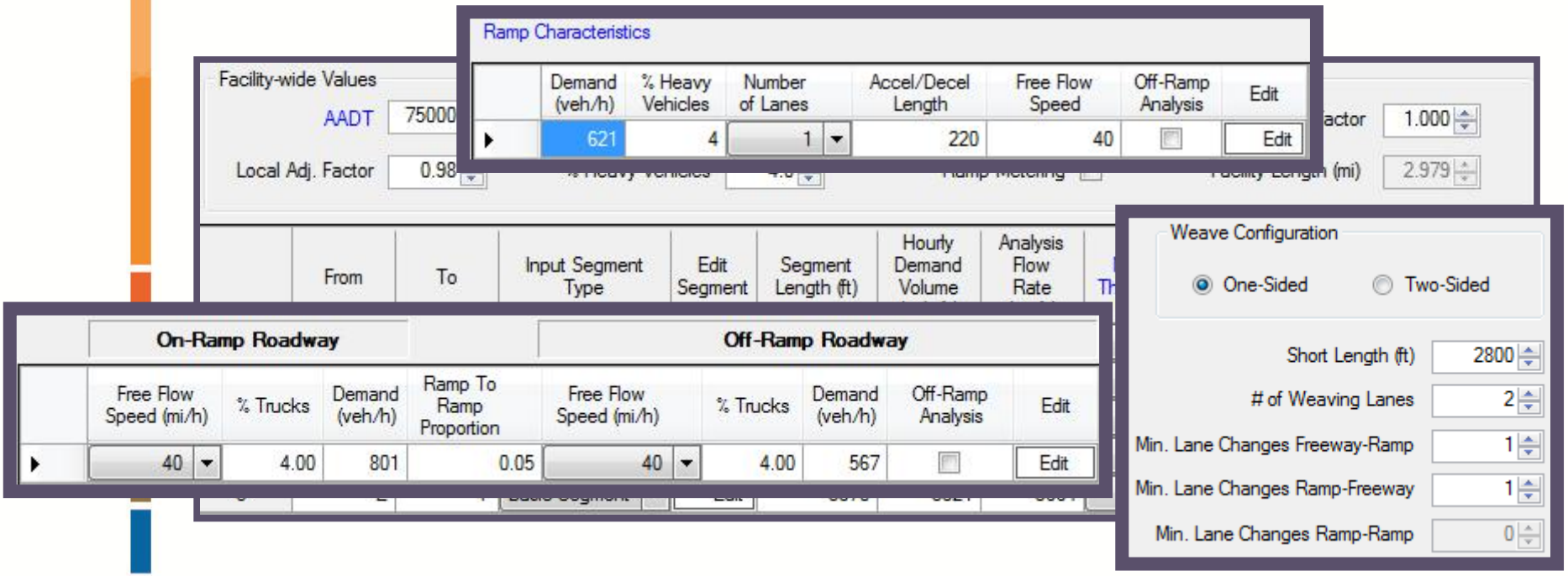
AADT	75000	K Factor (%)	9.0	D Factor (%)	57.9	Peak Hour Factor	1.000
Local Adj. Factor	0.98	% Heavy Vehicles	4.0	Ramp Metering	☐	Facility Length (mi)	2.979

	From	To	Input Segment Type	Edit Segment	Segment Length (ft)	Hourly Demand Volume (veh/h)	Analysis Flow Rate (pc/h)	Number Thru Lanes	Posted Speed (mi/h)	Free Flow Speed (mi/h)	Terrain
1	A	B	Basic Segment	Edit	4450	3908	4068	2	65	70	Level
2	B	C	Off-Ramp	Edit	1500	3908	4068	2	65	70	Level
3	C	D	Basic Segment	Edit	2900	3287	3421	2	65	70	Level
4	D	E	Weaving	Edit	3310	4088	4254	3	65	70	Level
5	E	F	Basic Segment	Edit	3570	3521	3664	2	65	70	Level

FREEPLAN

Workshop #1: Model Inputs





FREEPLAN

Workshop #1: Model Results

	Segment	Input Segment Type	Analysis Segment Type	Analysis Flow Rate (pc/h)	Adj. Capacity (pc/h)	v/c Ratio	Average Speed (mi/h)	Density (pc/mi/ln)	Segment LOS (density)	Additional Off-Ramp/Toll Outputs
1	A-B	Basic	Basic	4068	4800	0.85	61.9	32.8	D	View
2	B-C	OffRamp	OffRamp	4068	4400	0.92	58.2	37.2	E	View
3	C-D	Basic	Basic	3421	4800	0.71	67.0	25.5	C	View
4	D-E	Weaving	Weaving	4254	6525	0.65	55.2	25.7	C	View
5	E-F	Basic	Basic	3664	4800	0.76	65.4	28.0	D	View

Length (mi) 2.9792 | Free Flow Delay (sec/veh) 21.0 | LOS Threshold Delay (sec/veh) 0.0 | Avg. Speed (mi/h) 61.6 | Density (pc/mi/ln) 29.0 | LOS D

FREEPLAN

Workshop #2: Model Inputs

Roadway Information

Freeway Name	I-75		
From	CR 673	To	CR 470
Area Type	Rural		
Peak Direction	Northbound		
Off Peak Direction	Southbound		
Study Period	Standard K		

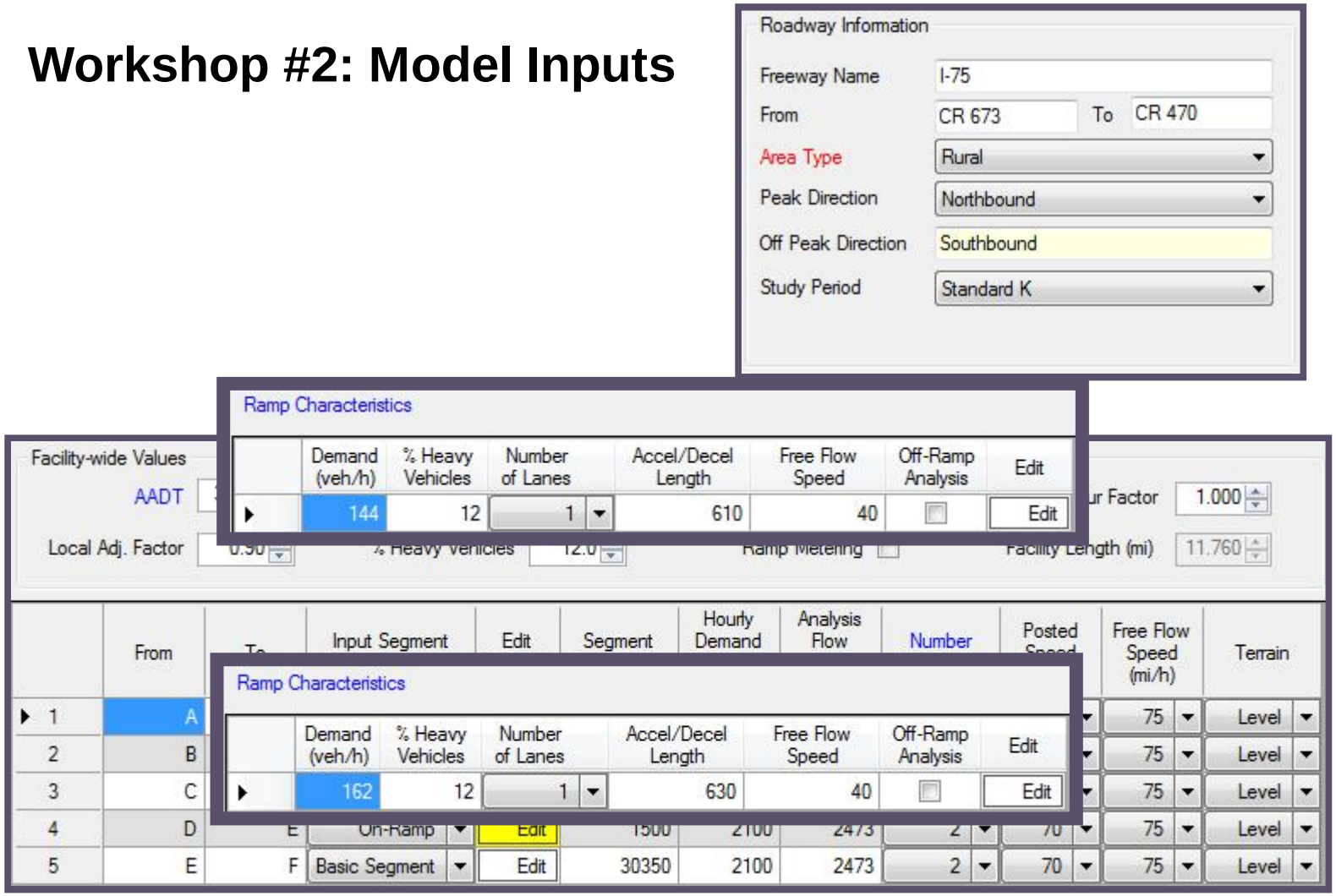
Facility-wide Values

AADT	35351	K Factor (%)	10.5	D Factor (%)	56.1	Peak Hour Factor	1.000
Local Adj. Factor	0.90	% Heavy Vehicles	12.0	Ramp Metering		Facility Length (mi)	11.760

	From	To	Input Segment Type	Edit Segment	Segment Length (ft)	Hourly Demand Volume (veh/h)	Analysis Flow Rate (pc/h)	Number Thru Lanes	Posted Speed (mi/h)	Free Flow Speed (mi/h)	Terrain
1	A	B	Basic Segment	Edit	26815	2082	2452	2	70	75	Level
2	B	C	Off-Ramp	Edit	1500	2082	2452	2	70	75	Level
3	C	D	Basic Segment	Edit	1930	1938	2282	2	70	75	Level
4	D	E	On-Ramp	Edit	1500	2100	2473	2	70	75	Level
5	E	F	Basic Segment	Edit	30350	2100	2473	2	70	75	Level

FREEPLAN

Workshop #2: Model Inputs



FREEPLAN

Workshop #2: Model Results

	Segment	Input Segment Type	Analysis Segment Type	Analysis Flow Rate (pc/h)	Adj. Capacity (pc/h)	v/c Ratio	Average Speed (mi/h)	Density (pc/mi/ln)	Segment LOS (density)	Additional Off-Ramp/Toll Outputs
1	A-B	Basic	Basic	2452	4800	0.51	74.4	16.5	C	View
2	B-C	OffRamp	OffRamp	2452	4400	0.56	62.5	19.8	B	View
3	C-D	Basic	Basic	2282	4800	0.48	74.2	15.4	C	View
4	D-E	OnRamp	OnRamp	2473	4600	0.54	64.5	20.7	C	View
5	E-F	Basic	Basic	2473	4800	0.52	74.4	16.6	C	View

Length (mi) 11.760 | Free Flow Delay (sec/veh) 9.3 | LOS Threshold Delay (sec/veh) 0.0 | Avg. Speed (mi/h) 73.8 | Density (pc/mi/ln) 16.7 | LOS C

FREEPLAN

Workshop #3: Model Inputs

Roadway Information

Freeway Name	I-95		
From	FL 104	To	FL 102
Area Type	Large Urbanized		
Peak Direction	Northbound		
Off Peak Direction	Southbound		
Study Period	Standard K		

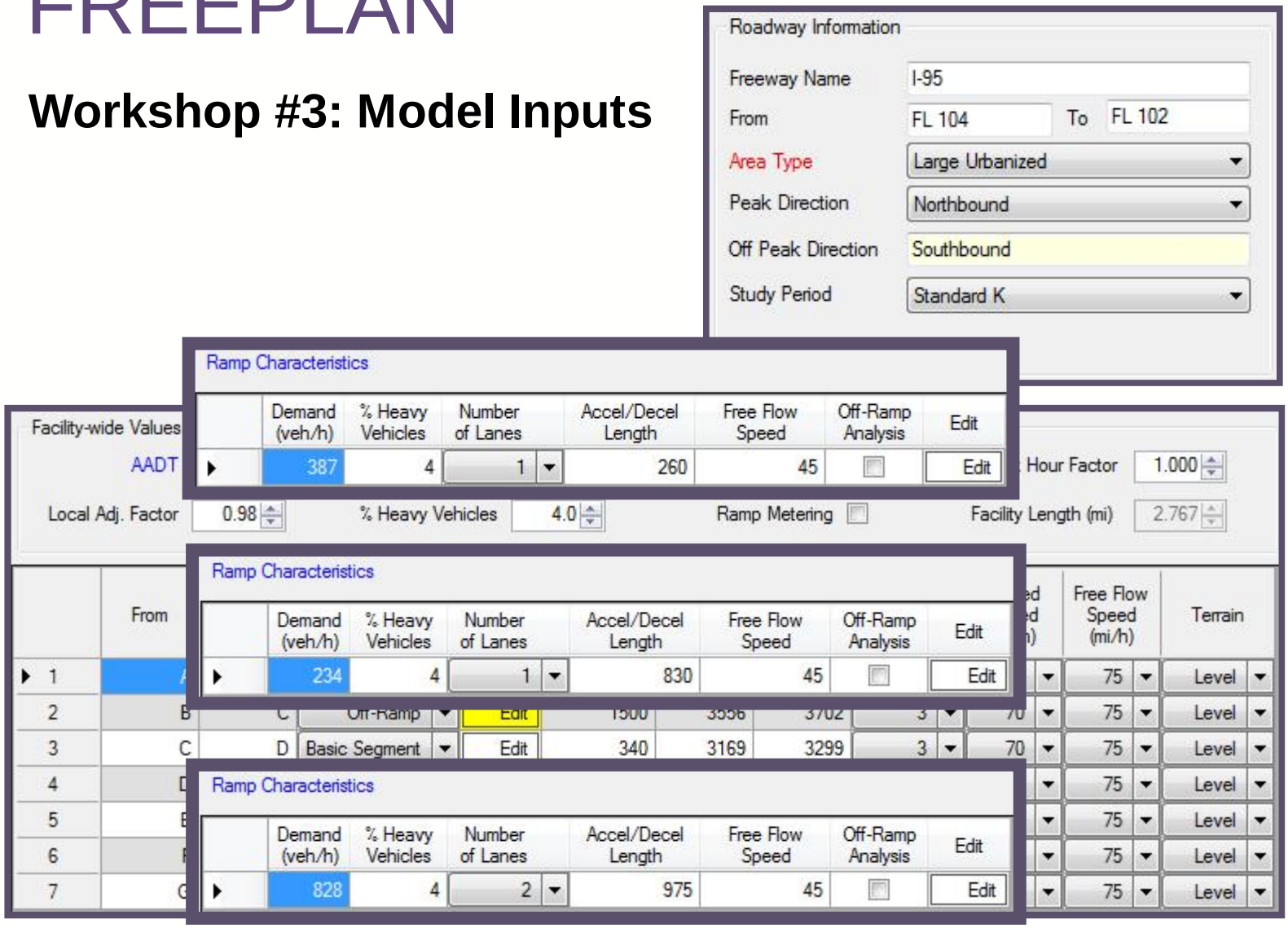
Facility-wide Values

AADT	72500	K Factor (%)	9.0	D Factor (%)	54.5	Peak Hour Factor	1.000
Local Adj. Factor	0.98	% Heavy Vehicles	4.0	Ramp Metering	☐	Facility Length (mi)	2.767

	From	To	Input Segment Type	Edit Segment	Segment Length (ft)	Hourly Demand Volume (veh/h)	Analysis Flow Rate (pc/h)	Number Thru Lanes	Posted Speed (mi/h)	Free Flow Speed (mi/h)	Terrain
1	A	B	Basic Segment	Edit	5100	3556	3702	3	70	75	Level
2	B	C	Off-Ramp	Edit	1500	3556	3702	3	70	75	Level
3	C	D	Basic Segment	Edit	340	3169	3299	3	70	75	Level
4	D	E	Off-Ramp	Edit	1500	3169	3299	3	70	75	Level
5	E	F	Basic Segment	Edit	1670	2935	3055	3	70	75	Level
6	F	G	On-Ramp	Edit	1500	3763	3917	4	70	75	Level
7	G	H	Basic Segment	Edit	3000	3763	3917	4	70	75	Level

FREEPLAN

Workshop #3: Model Inputs



FREEPLAN

Workshop #3: Model Results

	Segment	Input Segment Type	Analysis Segment Type	Analysis Flow Rate (pc/h)	Adj. Capacity (pc/h)	v/c Ratio	Average Speed (mi/h)	Density (pc/mi/ln)	Segment LOS (density)	Additional Off-Ramp/Toll Outputs
1	A-B	Basic	Basic	3702	7200	0.51	74.4	16.6	B	View
2	B-C	OffRamp	OffRamp	3702	6800	0.54	68.6	20.6	C	View
3	C-D	Basic	Basic	3299	7200	0.46	73.6	14.9	B	View
4	D-E	OffRamp	OffRamp	3299	6800	0.49	68.3	15.3	B	View
5	E-F	Basic	Basic	3055	7200	0.42	74.5	13.7	B	View
6	F-G	OnRamp	Basic	3917	9600	0.41	75.0	13.1	B	View
7	G-H	Basic	Basic	3917	9600	0.41	75.0	13.1	B	View

Length (mi) 2.7670 | Free Flow Delay (sec/veh) 3.2 | LOS Threshold Delay (sec/veh) 0.0 | Avg. Speed (mi/h) 73.3 | Density (pc/mi/ln) 15.2 | LOS B

FREEPLAN

Workshop #4: Model Inputs

Roadway Information

Freeway Name	Interstate-75
From	Royal Palm Blvd. To Sheridan St.
Area Type	Large Urbanized
Peak Direction	Southbound
Off Peak Direction	Northbound
Study Period	Standard K

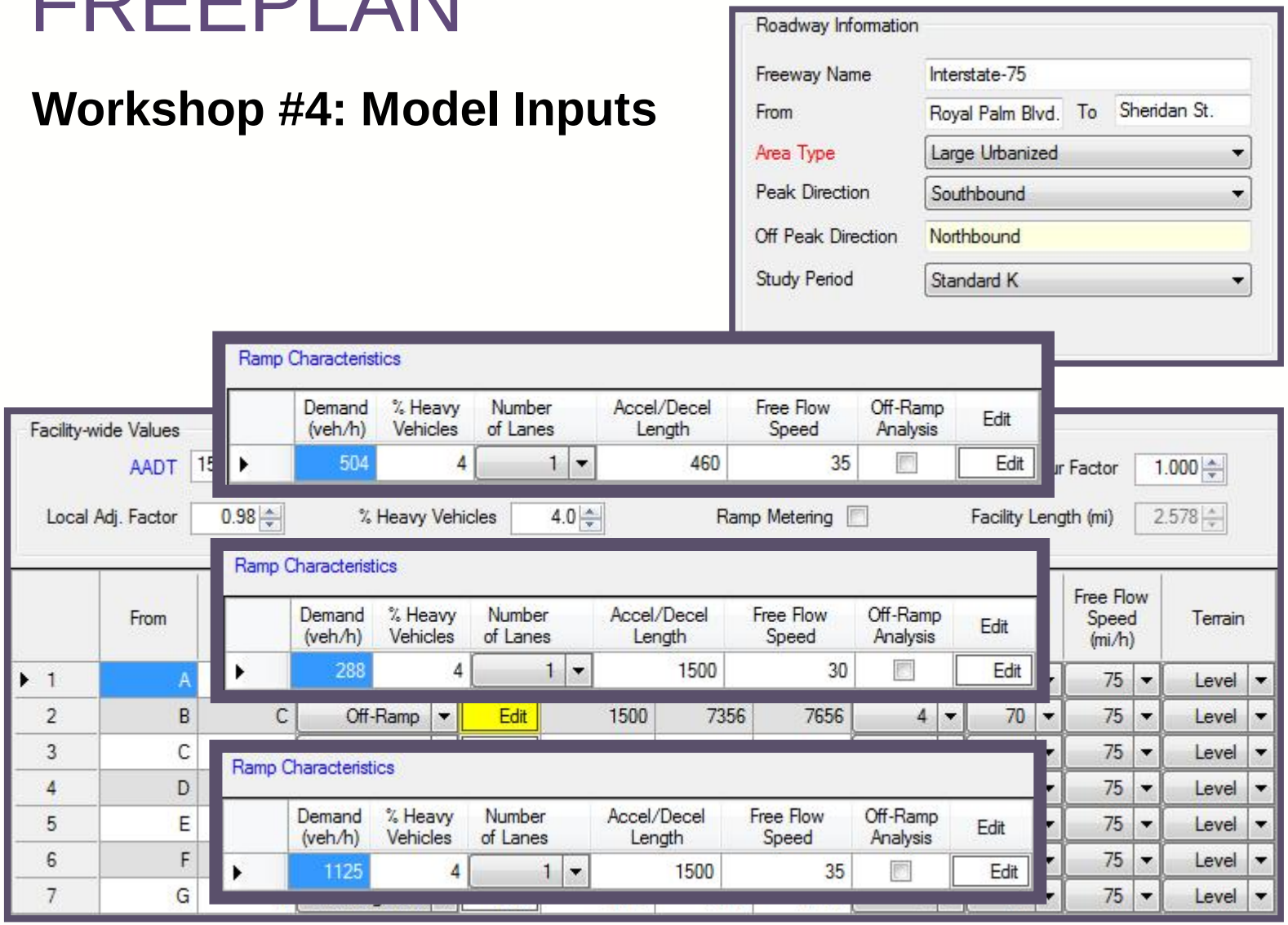
Facility-wide Values

AADT	150250	K Factor (%)	9.0	D Factor (%)	54.4	Peak Hour Factor	1.000
Local Adj. Factor	0.98	% Heavy Vehicles	4.0	Ramp Metering		Facility Length (mi)	2.578

	From	To	Input Segment Type	Edit Segment	Segment Length (ft)	Hourly Demand Volume (veh/h)	Analysis Flow Rate (pc/h)	Number Thru Lanes	Posted Speed (mi/h)	Free Flow Speed (mi/h)	Terrain
1	A	B	Basic Segment	Edit	1950	7356	7656	4	70	75	Level
2	B	C	Off-Ramp	Edit	1500	7356	7656	4	70	75	Level
3	C	D	Basic Segment	Edit	940	6852	7132	4	70	75	Level
4	D	E	Off-Ramp	Edit	1500	6852	7132	4	70	75	Level
5	E	F	Basic Segment	Edit	2190	6564	6832	4	70	75	Level
6	F	G	On-Ramp	Edit	1500	7689	8003	4	70	75	Level
7	G	H	Basic Segment	Edit	4030	7689	8003	4	70	75	Level

FREEPLAN

Workshop #4: Model Inputs



FREEPLAN

Workshop #4: Model Results

	Segment	Input Segment Type	Analysis Segment Type	Analysis Flow Rate (pc/h)	Adj. Capacity (pc/h)	v/c Ratio	Average Speed (mi/h)	Density (pc/mi/ln)	Segment LOS (density)	Additional Off-Ramp/Toll Outputs
1	A-B	Basic	Basic	7656	9600	0.80	65.8	29.1	D	View
2	B-C	OffRamp	OffRamp	7656	9200	0.83	68.0	28.5	D	View
3	C-D	Basic	Basic	7132	9600	0.74	68.2	26.1	D	View
4	D-E	OffRamp	OffRamp	7132	9400	0.76	67.5	21.7	C	View
5	E-F	Basic	Basic	6832	9600	0.71	69.5	24.6	C	View
6	F-G	OnRamp	OnRamp	8003	9500	0.84	66.1	28.3	D	View
7	G-H	Basic	Basic	8003	9600	0.83	63.9	31.3	D	View

Length (mi) 2.5777 | Free Flow Delay (sec/veh) 16.1 | LOS Threshold Delay (sec/veh) 0.0 | Avg. Speed (mi/h) 66.4 | Density (pc/mi/ln) 27.9 | LOS D

FREEPLAN

Workshop #5: Model Inputs

Roadway Information

Freeway Name	I-4		
From	CR 557	To	CR 532
Area Type	Transitioning		
Peak Direction	Eastbound		
Off Peak Direction	Westbound		
Study Period	Standard K		

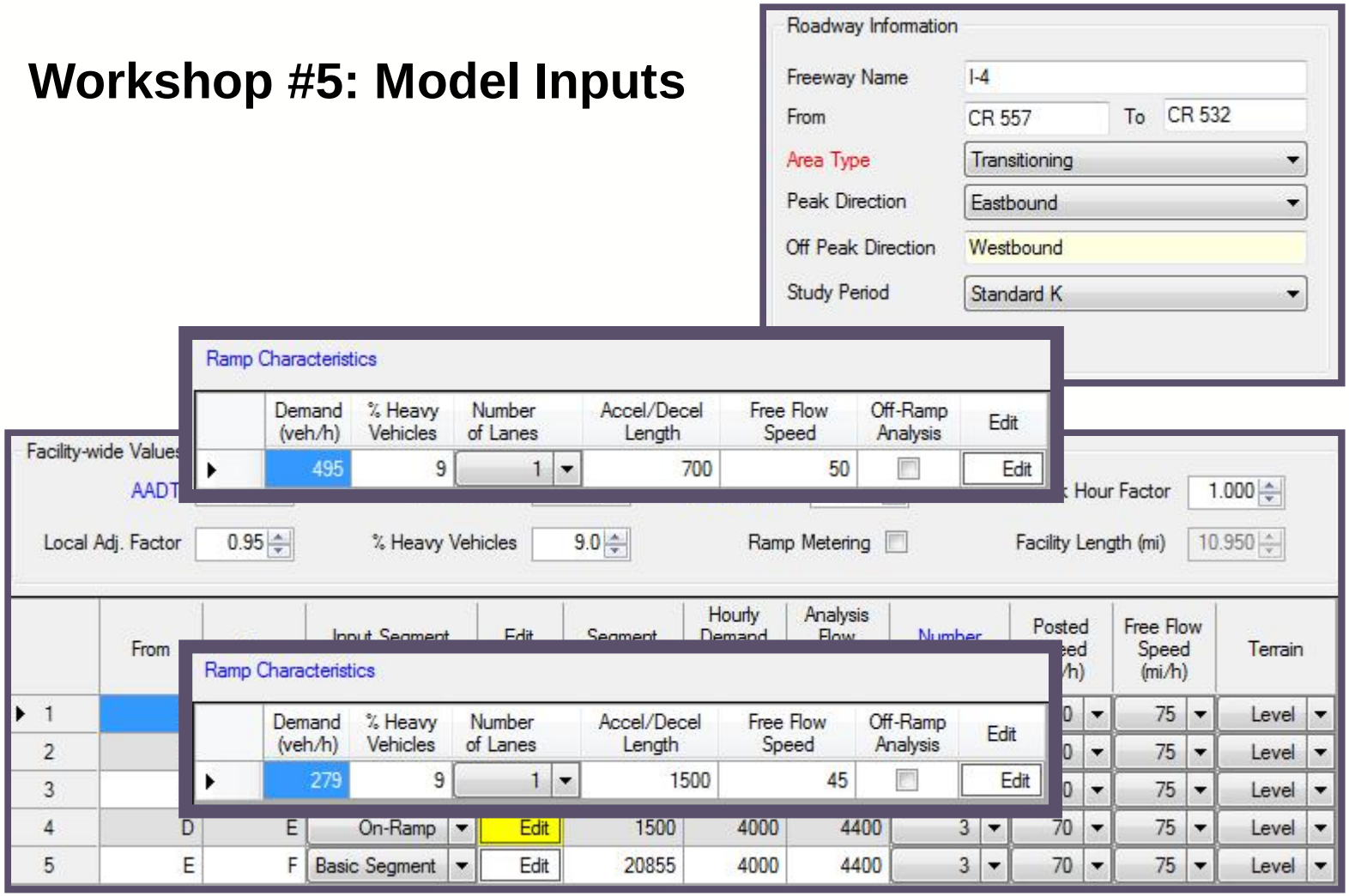
Facility-wide Values

AADT	90250	K Factor (%)	9.0	D Factor (%)	51.9	Peak Hour Factor	1.000
Local Adj. Factor	0.95	% Heavy Vehicles	9.0	Ramp Metering	☐	Facility Length (mi)	10.950

	From	To	Input Segment Type	Edit Segment	Segment Length (ft)	Hourly Demand Volume (veh/h)	Analysis Flow Rate (pc/h)	Number Thru Lanes	Posted Speed (mi/h)	Free Flow Speed (mi/h)	Terrain
1	A	B	Basic Segment	Edit	31800	4216	4638	3	70	75	Level
2	B	C	Off-Ramp	Edit	1500	4216	4638	3	70	75	Level
3	C	D	Basic Segment	Edit	2160	3721	4093	3	70	75	Level
4	D	E	On-Ramp	Edit	1500	4000	4400	3	70	75	Level
5	E	F	Basic Segment	Edit	20855	4000	4400	3	70	75	Level

FREEPLAN

Workshop #5: Model Inputs



FREEPLAN

Workshop #5: Model Results

	Segment	Input Segment Type	Analysis Segment Type	Analysis Flow Rate (pc/h)	Adj. Capacity (pc/h)	v/c Ratio	Average Speed (mi/h)	Density (pc/mi/ln)	Segment LOS (density)	Additional Off-Ramp/Toll Outputs
1	A-B	Basic	Basic	4638	7200	0.64	71.7	21.6	C	View
2	B-C	OffRamp	OffRamp	4638	6800	0.68	69.9	22.8	C	View
3	C-D	Basic	Basic	4093	7200	0.57	73.5	18.6	C	View
4	D-E	OnRamp	OnRamp	4400	7100	0.62	68.2	19.3	B	View
5	E-F	Basic	Basic	4400	7200	0.61	72.6	20.2	C	View

Length (mi) 10.949 | Free Flow Delay (sec/veh) 22.4 | LOS Threshold Delay (sec/veh) 0.0 | Avg. Speed (mi/h) 71.9 | Density (pc/mi/ln) 20.9 | LOS C

ARTPLAN

Example #1: Model Inputs

Roadway Information

Road Name	Mahan Drive
Peak Direction	Westbound
Off Peak Direction	Eastbound
Area Type	Other Urbanized
Class	1

Analysis Information

Modal Analysis	Auto Only
Type of Analysis	Peak Direction
Study Period	Standard K

Facility-wide Values

Control Type: FullyActuated

Base Saturation Flow Rate (pc/h/ln): 1950

Peak Direction | Off-Peak Direction

	Cross Street Name	Cycle Length	Thru g/C	Arrival Type	# Thru Lanes	% Left Turns	% Right Turns	Excl. Left Turn Lane	LT Phasing	Number LT Lanes	Total Left Turn Storage	Left g/C	Excl. Right Turn Lane
1								☐					☐
2	Dempsey Mayo Rd	150	0.55	3	2	5	0	☑	Prot.	1	135	0.1	☐

ARTPLAN

Example #1: Model Inputs

Facility-wide Values

Arterial Length (mi) 0.324 | K Factor (%) 9.0 | D Factor (%) 71.3 | Peak Hour Factor 1.000 | % Heavy Vehicles 1.0

Peak Direction | Off-Peak Direction

	Segment	Length	AADT	Adj. Dir. Hourly Volume	# of Thru Lanes	Posted Speed	Free Flow Speed	Median Type	On-Street Parking	Parking Activity
1	-Dempsey Mayo Rd	1650	18100	1161	2	45	50	Restrictive		

ARTPLAN

Example #1: Model Results

Peak Direction | Off-Peak Direction

	Segment	Thru Mvmt Flow Rate (veh/h)	Adj. Sat. Flow Rate (veh/h)	v/c	Control Delay (s/veh)	Thru Mvmt Intersection LOS	Queue Storage Ratio	Average Speed (mi/h)	Segment LOS
1	-Dempsey Mayo Rd	1103	3647	0.550	21.9	C	0.44	24.8	C

Facility Length (mi) 0.324

Free Flow Delay (sec/veh) 24.6 LOS Threshold Delay (sec/veh) 0.0 Wtd. g/C 0.55 Avg. Speed (mi/h) 24.8 LOS C

ARTPLAN

Example #2: Model Inputs

Roadway Information

Road Name	SR 924
Peak Direction	Eastbound
Off Peak Direction	Westbound
Area Type	Large Urbanized
Class	1

Analysis Information

Modal Analysis	Multimodal
Type of Analysis	Peak Direction
Study Period	Standard K

Facility-wide Values

Arterial Length (mi): 0.263 | K Factor (%): 9.0 | D Factor (%): 55.7 | Peak Hour Factor: 0.960 | % Heavy Vehicles: 1.0

Peak Direction | Off-Peak Direction

	Segment	Length	AADT	Adj. Dir. Hourly Volume	# of Thru Lanes	Posted Speed	Free Flow Speed	Median Type	On-Street Parking	Parking Activity
1	-US 441	1330	37500	1880	3	40	45	Restrictive		

Facility-wide Values

Control Type: Pretimed | Base Saturation Flow Rate (pc/h/ln): 1950

Peak Direction | Off-Peak Direction

	Cross Street Name	Cycle Length	Thru g/C	Arrival Type	# Thru Lanes	% Left Turns	% Right Turns	Excl. Left Turn Lane	LT Phasing	Number LT Lanes	Total Left Turn Storage	Left g/C	Excl. Right Turn Lane
1													
2	US 441	100	0.38	3	3	15	10	✓	Prot....	1	160	0.07	

ARTPLAN

Example #2: Model Inputs

Multimodal Inputs

Peak Direction | Off-Peak Direction

	Segment	Auto Outside Lane Width	Specific Lane Width	Bike Pavement Condition	Paved Shoulder / Bike Lane	Side Path	Side Path Separation	Sidewalk	Sidewalk/ Roadway Separation	Sidewalk/ Roadway Barrier	Bus Frequency	Passenger Load Factor	Amenities	Bus Stop
1	-US 441	Typ...		Typ...	☐	☐		☑	Adj...	☐	2	0.8	Fair	Typical

Peak Direction | Off-Peak Direction

	Segment	Pct. Sublink Length (1)	Pct. Sublink Length (2)	Pct. Sublink Length (3)	Sidewalk (1)	Sidewalk (2)	Sidewalk (3)	Sidewalk/ Roadway Separation (1)	Sidewalk/ Roadway Separation (2)	Sidewalk/ Roadway Separation (3)	Sidewalk/ Roadway Protective Barrier (1)	Sidewalk/ Roadway Protective Barrier (2)	Sidewalk/ Roadway Protective Barrier (3)
1	-US 441	50	50		☑	☑	☐	Adja...	Typical		☐	☐	☐

ARTPLAN

Example #2: Model Results

Peak Direction | Off-Peak Direction

	Segment	Thru Mvmt Flow Rate (veh/h)	Adj. Sat. Flow Rate (veh/h)	v/c	Control Delay (s/veh)	Thru Mvmt Intersection LOS	Queue Storage Ratio	Average Speed (mi/h)	Segment LOS
1	-US 441	1665	5288	0.828	30.0	C	3.07	17.8	E

Facility Length (mi) 0.263

Free Flow Delay (sec/veh) 33.0 | LOS Threshold Delay (sec/veh) 0.5 | Wtd. g/C 0.38 | Avg. Speed (mi/h) 17.8 | LOS E

Peak Direction | Off-Peak Direction

	Segment	Bike Link Score	Bike Link LOS	Bike Side Path Score	Bike Side Path LOS	Ped SubLink (1) LOS	Ped SubLink (2) LOS	Ped SubLink (3) LOS	Ped Link Score	Ped Link LOS	Bus Mod. Freq.	Bus LOS	Bike Int Score	Bike Int LOS	Bike Seg Score	Bike Seg LOS	Ped Int Score	Ped Int LOS	Ped Seg Score	Ped Seg LOS
1	-US 441	4.14	D	NA	N/A	D	D		3.63	D	1.80	E	3.55	D	4.16	D	2.96	C	3.41	C

Bike Score 4.14 | Pedestrian Score 3.63 | Bus Mod. Freq. 1.80

Bike LOS D | Pedestrian LOS D | Bus LOS E

ARTPLAN

Workshop #1: Model Inputs

Roadway Information

Road Name	Tyndall Parkway
Peak Direction	Northbound
Off Peak Direction	Southbound
Area Type	Transitioning/Urban
Class	1

Analysis Information

Modal Analysis	Auto Only
Type of Analysis	Peak Direction
Study Period	Standard K

Facility-wide Values

Control Type: FullyActuated

Base Saturation Flow Rate (pc/h/ln): 1950

Peak Direction | Off-Peak Direction

	Cross Street Name	Cycle Length	Thru g/C	Arrival Type	# Thru Lanes	% Left Turns	% Right Turns	Excl. Left Turn Lane	LT Phasing	Number LT Lanes	Total Left Turn Storage	Left g/C	Excl. Right Turn Lane
1								☐					☐
2	SR 22	120	0.40	3	2	15	15	☑	Prot.	1	410	0.15	☑

ARTPLAN

Workshop #1: Model Inputs

Facility-wide Values

Arterial Length (mi) 0.516 | K Factor (%) 9.0 | D Factor (%) 53.7 | Peak Hour Factor 1.000 | % Heavy Vehicles 3.0

Peak Direction | Off-Peak Direction

	Segment	Length	AADT	Adj. Dir. Hourly Volume	# of Thru Lanes	Posted Speed	Free Flow Speed	Median Type	On-Street Parking	Parking Activity
1	-SR 22	2690	30500	1474	2	45	50	Restrictive		

ARTPLAN

Workshop #1: Model Results

Peak Direction | Off-Peak Direction

	Segment	Thru Mvmt Flow Rate (veh/h)	Adj. Sat. Flow Rate (veh/h)	v/c	Control Delay (s/veh)	Thru Mvmt Intersection LOS	Queue Storage Ratio	Average Speed (mi/h)	Segment LOS
1	-SR 22	1032	2986	0.864	35.6	D	0.60	24.8	C

Facility Length (mi) 0.516

Free Flow Delay (sec/veh) 38.4 | LOS Threshold Delay (sec/veh) 0.0 | Wtd. g/C 0.40 | Avg. Speed (mi/h) 24.8 | LOS C

ARTPLAN

Workshop #2: Model Inputs

Roadway Information

Road Name	SR 22
Peak Direction	Eastbound
Off Peak Direction	Westbound
Area Type	Transitioning/Urban
Class	1

Analysis Information

Modal Analysis	Auto Only
Type of Analysis	Peak Direction
Study Period	Standard K

Facility-wide Values

Control Type: FullyActuated

Base Saturation Flow Rate (pc/h/ln): 1950

Peak Direction | Off-Peak Direction

	Cross Street Name	Cycle Length	Thru g/C	Arrival Type	# Thru Lanes	% Left Turns	% Right Turns	Excl. Left Turn Lane	LT Phasing	Number LT Lanes	Total Left Turn Storage	Left g/C	Excl. Right Turn Lane
1								☐					☐
2	Transmitter Road	120	0.55	3	1	5	5	☑	Prot.	1	325	0.1	☐
3	Bob Little Road	120	0.55	3	1	5	5	☑	Prot.	1	125	0.1	☐

ARTPLAN

Workshop #2: Model Inputs

Facility-wide Values

Arterial Length (mi) 1.028 | K Factor (%) 9.0 | D Factor (%) 53.7 | Peak Hour Factor 1.000 | % Heavy Vehicles 2.0

Peak Direction | Off-Peak Direction

	Segment	Length	AADT	Adj. Dir. Hourly Volume	# of Thru Lanes	Posted Speed	Free Flow Speed	Median Type	On-Street Parking
1	-Transmitter Road	2735	10500	507	1	45	50	None	
2	Transmitter Road-Bob Little Road	2620	11300	546	1	45	50	None	

ARTPLAN

Workshop #2: Model Results

Peak Direction | Off-Peak Direction

	Segment	Thru Mvmt Flow Rate (veh/h)	Adj. Sat. Flow Rate (veh/h)	v/c	Control Delay (s/veh)	Thru Mvmt Intersection LOS	Queue Storage Ratio	Average Speed (mi/h)	Segment LOS
1	-Transmitter Road	482	1568	0.559	17.9	B	0.06	32.9	B
2	Transmitter Road-Bob Little Road	519	1574	0.599	18.8	B	0.18	31.9	B

Facility Length (mi) 1.028

Free Flow Delay (sec/veh) 41.1 LOS Threshold Delay (sec/veh) 0.0 Wtd. g/C 0.55 Avg. Speed (mi/h) 32.4 LOS B

ARTPLAN

Workshop #3: Model Inputs

Roadway Information

Road Name	SR 222
Peak Direction	Eastbound
Off Peak Direction	Westbound
Area Type	Other Urbanized
Class	1

Analysis Information

Modal Analysis	Auto Only
Type of Analysis	Peak Direction
Study Period	Standard K

Facility-wide Values

Control Type: CoordinatedActuated

Base Saturation Flow Rate (pc/h/ln): 1950

Peak Direction | Off-Peak Direction

	Cross Street Name	Cycle Length	Thru g/C	Arrival Type	# Thru Lanes	% Left Turns	% Right Turns	Excl. Left Turn Lane	LT Phasing	Number LT Lanes	Total Left Turn Storage	Left g/C	Excl. Right Turn Lane
1								☐					☐
2	SR 121 / 34th St	150	0.40	4	2	15	15	☑	Prot.	1	510	0.15	☐
3	29th Terrace	150	0.55	4	2	5	5	☑	Prot.	1	150	0.1	☐
4	24th Blvd	150	0.55	4	2	5	5	☑	Prot.	1	175	0.1	☐
5	19th St	150	0.55	4	2	5	5	☑	Prot.	1	150	0.1	☐
6	US 441 / SR 25	150	0.40	4	2	15	15	☑	Prot.	1	135	0.15	☑

ARTPLAN

Workshop #3: Model Inputs

Facility-wide Values

Arterial Length (mi) 3.055 | K Factor (%) 9.0 | D Factor (%) 52.5 | Peak Hour Factor 1.000 | % Heavy Vehicles 1.0

Peak Direction | Off-Peak Direction

	Segment	Length	AADT	Adj. Dir. Hourly Volume	# of Thru Lanes	Posted Speed	Free Flow Speed	Median Type	On-Street Parking	Parking Activity
1	-SR 121 / 34th St	5270	27000	1276	2	45	50	Non-Restrictive		
2	SR 121 / 34th St-29th Terrace	2020	27000	1276	2	45	50	Non-Restrictive		
3	29th Terrace-24th Blvd	2415	25000	1181	2	45	50	Non-Restrictive		
4	24th Blvd-19th St	3500	25000	1181	2	45	50	Non-Restrictive		
5	19th St-US 441 / SR 25	2625	25500	1205	2	45	50	Non-Restrictive		

ARTPLAN

Workshop #3: Model Results

Peak Direction | Off-Peak Direction

	Segment	Thru Mvmt Flow Rate (veh/h)	Adj. Sat. Flow Rate (veh/h)	v/c	Control Delay (s/veh)	Thru Mvmt Intersection LOS	Queue Storage Ratio	Average Speed (mi/h)	Segment LOS
1	-SR 121 / 34th St	1003	3584	0.699	30.2	C	0.41	34.2	B
2	SR 121 / 34th St-29th Terrace	1212	3661	0.602	13.0	B	0.40	32.7	B
3	29th Terrace-24th Blvd	1122	3639	0.561	12.7	B	0.35	34.9	B
4	24th Blvd-19th St	1122	3639	0.561	12.7	B	0.40	38.1	B
5	19th St-US 441 / SR 25	758	3195	0.593	28.3	C	1.54	27.3	C

Facility Length (mi) 3.055

Free Flow Delay (sec/veh) 112.8 LOS Threshold Delay (sec/veh) 0.0 Wtd. g/C 0.46 Avg. Speed (mi/h) 33.5 LOS B

ARTPLAN

Workshop #4: Model Inputs

Roadway Information

Road Name	SR 924 / NW 119th St.
Peak Direction	Eastbound
Off Peak Direction	Westbound
Area Type	Large Urbanized
Class	1

Analysis Information

Modal Analysis	Multimodal
Type of Analysis	Peak Direction
Study Period	Standard K

Facility-wide Values

Control Type: FullyActuated

Base Saturation Flow Rate (pc/h/ln): 1950

Peak Direction | Off-Peak Direction

	Cross Street Name	Cycle Length	Thru g/C	Arrival Type	# Thru Lanes	% Left Turns	% Right Turns	Excl. Left Turn Lane	LT Phasing	Number LT Lanes	Total Left Turn Storage	Left g/C	Excl. Right Turn Lane
1								☐					☐
2	NW 27th Ave	100	0.35	3	3	12	12	☑	Prot.	1	195	0.11	☑
3	Westview CC	100	0.96	3	3	1	0	☑	Prot.+...	1	155	0.1	☐
4	NW 22nd Ave	100	0.40	3	3	11	13	☑	Prot.	1	185	0.1	☐
5	NW 17th Ave	100	0.48	3	3	9	10	☑	Prot.	1	450	0.1	☐

ARTPLAN

Workshop #4: Model Inputs

Facility-wide Values

Arterial Length (mi) 1.165 | K Factor (%) 9.0 | D Factor (%) 55.7 | Peak Hour Factor 0.923 | % Heavy Vehicles 1.0

Peak Direction | Off-Peak Direction

	Segment	Length	AADT	Adj. Dir. Hourly Volume	# of Thru Lanes	Posted Speed	Free Flow Speed	Median Type	On-Street Parking	Parking Activity
1	-NW 27th Ave	540	41500	2080	3	40	45	Non-Restrictive		
2	NW 27th Ave-Westview CC	1050	41500	2080	3	40	45	Restrictive		
3	Westview CC-NW 22nd Ave	1685	41500	2080	3	40	45	Restrictive		
4	NW 22nd Ave-NW 17th Ave	2635	41500	2080	3	40	45	Restrictive		

ARTPLAN

Workshop #4: Model Inputs

Multimodal Inputs

Peak Direction | Off-Peak Direction

	Segment	Auto Outside Lane Width	Specific Lane Width	Bike Pavement Condition	Paved Shoulder / Bike Lane	Side Path	Side Path Separation	Sidewalk	Sidewalk/ Roadway Separation	Sidewalk/ Roadway Barrier	Bus Frequency	Passenger Load Factor	Amenities	Bus Stop
1	-NW 27th Ave	Typi...		Typi...	☐	☐		☑	Adja...	☐	3	0.8	Fair	Typical
2	NW 27th Ave-Westview CC	Typi...		Typi...	☐	☐		☑	Adja...	☐	3	0.8	Fair	Typical
3	Westview CC-NW 22nd Ave	Typi...		Typi...	☐	☐		☑	Adja...	☐	3	0.8	Fair	Typical
4	NW 22nd Ave-NW 17th Ave	Typi...		Typi...	☐	☐		☑	Adja...	☐	3	0.8	Poor	Typical

Peak Direction | Off-Peak Direction

	Segment	Pct. Sublink Length (1)	Pct. Sublink Length (2)	Pct. Sublink Length (3)	Sidewalk (1)	Sidewalk (2)	Sidewalk (3)	Sidewalk/ Roadway Separation (1)	Sidewalk/ Roadway Separation (2)	Sidewalk/ Roadway Separation (3)	Sidewalk/ Roadway Protective Barrier (1)	Sidewalk/ Roadway Protective Barrier (2)	Sidewalk/ Roadway Protective Barrier (3)
1	-NW 27th Ave	100			☑	☐	☐	Adjac...			☐	☐	☐
2	NW 27th Ave-Westview CC	100			☑	☐	☐	Adjac...			☐	☐	☐
3	Westview CC-NW 22nd Ave	100			☑	☐	☐	Adjac...			☐	☐	☐
4	NW 22nd Ave-NW 17th Ave	100			☑	☐	☐	Adjac...			☐	☐	☐

ARTPLAN

Workshop #4: Model Results

Peak Direction | Off-Peak Direction

	Segment	Thru Mvmt Flow Rate (veh/h)	Adj. Sat. Flow Rate (veh/h)	v/c	Control Delay (s/veh)	Thru Mvmt Intersection LOS	Queue Storage Ratio	Average Speed (mi/h)	Segment LOS
1	-NW 27th Ave	1713	4927	0.993	38.0	D	2.63 !	8.2	F
2	NW 27th Ave-Westview CC	2231	5414	0.429	0.1	A	0.09	39.2	B
3	Westview CC-NW 22nd Ave	2006	5330	0.941	37.1	D	2.41 !	18.0	D
4	NW 22nd Ave-NW 17th Ave	2051	5348	0.799	22.3	C	0.57	27.8	C

Facility Length (mi) 1.165

Free Flow Delay (sec/veh) 111.9 LOS Threshold Delay (sec/veh) 0.0 Wtd. g/C 0.48 Avg. Speed (mi/h) 20.8 LOS D

Peak Direction | Off-Peak Direction

	Segment	Bike Link Score	Bike Link LOS	Bike Side Path Score	Bike Side Path LOS	Ped SubLink (1) LOS	Ped SubLink (2) LOS	Ped SubLink (3) LOS	Ped Link Score	Ped Link LOS	Bus Mod. Freq.	Bus LOS	Bike Int Score	Bike Int LOS	Bike Seg Score	Bike Seg LOS	Ped Int Score	Ped Int LOS	Ped Seg Score	Ped Seg LOS
1	-NW 27th Ave	4.12	D	NA	N/A	D			3.71	D	2.57	D	3.72	D	3.96	D	3.12	C	3.47	C
2	NW 27th Ave-Westview CC	4.20	D	NA	N/A	D			3.87	D	2.09	D	3.72	D	4.24	D	2.64	B	3.42	C
3	Westview CC-NW 22nd Ave	4.23	D	NA	N/A	D			3.93	D	2.99	D	3.72	D	4.25	D	3.11	C	3.54	D
4	NW 22nd Ave-NW 17th Ave	4.24	D	NA	N/A	D			3.96	D	2.69	D	3.72	D	4.25	E	3.01	C	3.53	D

Bike Score 4.22 Pedestrian Score 3.91 Bus Mod. Freq. 2.66

Bike LOS D Pedestrian LOS D Bus LOS D

Additional GSVT Problems

Workshop A-1

Answer → LOS D

Determine the auto LOS:

- In terms of AADT
- In an urban area (pop. 12,000)
- For an undivided state arterial with
  - 30 mph speed limit
  - 2 lanes
  - 10,000 AADT

Class II (35 mph or slower posted speed limit)

Lanes	Median	B	C	D	E
2	Undivided	*	6,500	13,300	14,200
4	Divided	*	9,900	28,800	31,600
6	Divided	*	16,000	44,900	47,600

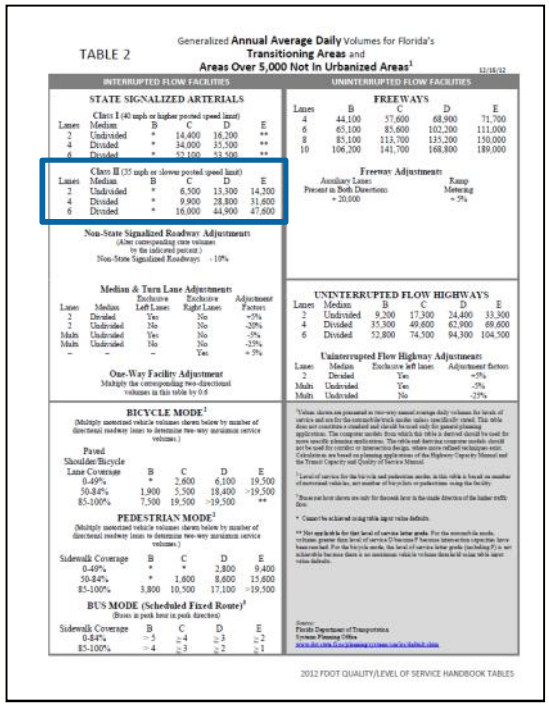


TABLE 2

Generalized **Annual Average Daily** Volumes for Florida's **Transitioning Areas** and **Areas Over 5,000 Not In Urbanized Areas**[1]

12/18/12

INTERRUPTED FLOW FACILITIES

STATE SIGNALIZED ARTERIALS

Class I (40 mph or higher posted speed limit)

Lanes	Median	B	C	D	E
2	Undivided	*	14,400	16,200	**
4	Divided	*	34,000	35,500	**
6	Divided	*	53,100	53,500	**

Class II (35 mph or slower posted speed limit)

Lanes	Median	B	C	D	E
2	Undivided	*	6,500	13,300	14,200
4	Divided	*	9,900	28,800	31,600
6	Divided	*	16,000	44,900	47,600

Non-State Signalized Roadway Adjustments
(Alter corresponding raw volumes by the indicated percent.)
Non-State Signalized Roadways : 10%

Median & Turn Lane Adjustments

Lanes	Median	Exclusive Left Lanes	Exclusive Right Lanes	Adjustment Factors
2	Divided	Yes	No	+5%
2	Undivided	No	No	-20%
Multi	Undivided	Yes	No	-5%
Multi	Undivided	No	No	-25%
–	–	–	Yes	+ 5%

One-Way Facility Adjustment
Multiply the corresponding two-directional volumes in this table by 0.6

UNINTERRUPTED FLOW FACILITIES

FREEWAYS

Lanes	B	C	D	E
4	44,100	57,600	68,900	71,700
6	65,100	85,600	102,200	111,000
8	85,100	113,700	135,200	150,000
10	106,200	141,700	168,800	189,000

Freeway Adjustments

Auxiliary Lanes: Present in Both Directions	Ramp Metering
+ 20,000	+ 5%

UNINTERRUPTED FLOW HIGHWAYS

Lanes	Median	B	C	D	E
2	Undivided	9,200	17,300	24,400	33,300
4	Divided	35,300	49,600	62,900	69,600
6	Divided	52,800	74,500	94,300	104,500

Uninterrupted Flow Highway Adjustments

Lanes	Median	Exclusive left lane:	Adjustment factors
2	Divided	Yes	+5%
Multi	Undivided	Yes	-5%
Multi	Undivided	No	-25%

BICYCLE MODE[1]
(Multiply motorized vehicle volumes shown below by number of directional roadway lanes to determine two-way maximum service volumes.)

Paved Shoulder/Bicycle Lane Coverage	B	C	D	E
0-49%	*	2,800	6,100	19,500
50-84%	1,900	5,500	18,400	>19,500
85-100%	7,500	19,500	>19,500	**

PEDESTRIAN MODE[1]
(Multiply motorized vehicle volumes shown below by number of directional roadway lanes to determine two-way maximum service volumes.)

Sidewalk Coverage	B	C	D	E
0-49%	*	*	2,800	9,400
50-84%	*	1,600	8,600	15,600
85-100%	3,800	10,500	17,100	>19,500

BUS MODE (Scheduled Fixed Route)[3]
(Buses in peak hour in peak direction)

Sidewalk Coverage	B	C	D	E
0-84%	> 5	≥ 4	≥ 3	≥ 2
85-100%	> 4	≥ 3	≥ 2	≥ 1

[1] Volumes shown are presented as two-way annual average daily volumes for levels of service and are for the non-peak hour in the peak direction, unless specifically stated. This table does not constitute a standard and should be used only for general planning applications. The computer models from which this table is derived should be used for more specific planning applications. The table and derived computer models should not be used for corridor or intersection design, where more refined techniques exist. Calculations are based on planning applications of the Highway Capacity Manual and the Transit Capacity and Quality of Service Manual.

[2] Level of service for the bicycle and pedestrian modes, in this table is based on number of motorized vehicles, not number of bicyclists or pedestrians using the facility.

[3] Buses are best shown on only for the peak hour in the peak direction of the higher traffic flow.

* Cannot be achieved using table input value defaults.

** Not applicable for that level of service letter grade. For the motorized modes, volumes greater than level of service D become F because interaction caps the have been reached. For the bicycle mode, the level of service letter grade (including F) is not achievable because there is no maximum vehicle volume threshold exists with the input value defaults.

Source:
Florida Department of Transportation
System Planning Office
www.dot.state.fl.us/planning/systems/sm/los/default.htm

2012 FDOT QUALITY/LEVEL OF SERVICE HANDBOOK TABLES

Additional GSVT Problems

Workshop A-2

Determine the auto LOS:

Answer → LOS F

- In terms of AADT
- In a developed rural area (pop. 4,500)
- For an uninterrupted flow highway with
  - 2 lanes
  - No median
  - Annual average daily volume of 32,000

Developed Areas

Lanes	Median	B	C	D	E
2	Undivided	8,700	16,400	23,100	31,500
4	Divided	25,900	40,700	52,400	59,600
6	Divided	38,800	61,000	78,400	89,500

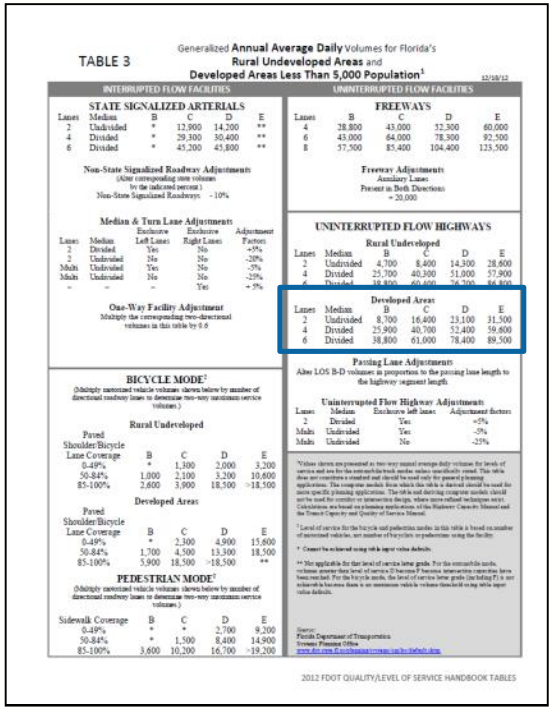


TABLE 3

Generalized **Annual Average Daily** Volumes for Florida's **Rural Undeveloped Areas** and **Developed Areas Less Than 5,000 Population**[1]

12/18/12

INTERRUPTED FLOW FACILITIES

STATE SIGNALIZED ARTERIALS

Lanes	Median	B	C	D	E
2	Undivided	*	12,900	14,200	**
4	Divided	*	29,300	30,400	**
6	Divided	*	45,200	45,800	**

Non-State Signalized Roadway Adjustments
(Alter corresponding state volumes by the indicated percent.)
Non-State Signalized Roadways - 10%

Median & Turn Lane Adjustments

Lanes	Median	Exclusive Left Lanes	Exclusive Right Lanes	Adjustment Factors
2	Divided	Yes	No	+5%
2	Undivided	No	No	-20%
Multi	Undivided	Yes	No	-5%
Multi	Undivided	No	No	-25%
–	–	–	Yes	+ 5%

One-Way Facility Adjustment
Multiply the corresponding two-directional volumes in this table by 0.6

BICYCLE MODE[2]
(Multiply motorized vehicle volumes shown below by number of directional roadway lanes to determine two-way maximum service volumes.)

Rural Undeveloped

Paved Shoulder/Bicycle Lane Coverage	B	C	D	E
0-49%	*	1,300	2,000	3,200
50-84%	1,000	2,100	3,200	10,600
85-100%	2,600	3,900	18,500	>18,500

Developed Areas

Paved Shoulder/Bicycle Lane Coverage	B	C	D	E
0-49%	*	2,300	4,900	15,600
50-84%	1,700	4,500	13,300	18,500
85-100%	5,900	18,500	>18,500	**

PEDESTRIAN MODE[2]
(Multiply motorized vehicle volumes shown below by number of directional roadway lanes to determine two-way maximum service volumes.)

Sidewalk Coverage	B	C	D	E
0-49%	*	*	2,700	9,200
50-84%	*	1,500	8,400	14,900
85-100%	3,600	10,200	16,700	>19,200

UNINTERRUPTED FLOW FACILITIES

FREEWAYS

Lanes	B	C	D	E
4	28,800	43,000	52,300	60,000
6	43,000	64,000	78,300	92,500
8	57,500	85,400	104,400	123,500

Freeway Adjustments
Auxiliary Lanes
Present in Both Directions
= 20,000

UNINTERRUPTED FLOW HIGHWAYS

Rural Undeveloped

Lanes	Median	B	C	D	E
2	Undivided	4,700	8,400	14,300	28,600
4	Divided	25,700	40,300	51,000	57,900
6	Divided	38,800	60,600	76,300	86,800

Developed Areas

Lanes	Median	B	C	D	E
2	Undivided	8,700	16,400	23,100	31,500
4	Divided	25,900	40,700	52,400	59,600
6	Divided	38,800	61,000	78,400	89,500

Passing Lane Adjustments
Alter LOS B-D volumes in proportion to the passing lane length to the highway segment length.

Uninterrupted Flow Highway Adjustments

Lanes	Median	Exclusive left lanes	Adjustment factors
2	Divided	Yes	+5%
Multi	Undivided	Yes	-5%
Multi	Undivided	No	-25%

[1] Volumes shown are presented as two-way annual average daily volumes for levels of service and are for the non-metropolitan/rural areas unless otherwise noted. This table does not constitute a standard and should be used only for general planning applications. The computer models from which this table is derived should be used for more specific planning applications. The tables and driving computer models should not be used for corridor or intersection design, where more refined techniques exist. Calculations are based on planning applications of the Highway Capacity Manual and the Transit Capacity and Quality of Service Manual.

[2] Level of service for the bicycle and pedestrian modes in this table is based on number of motorized vehicles, not number of bicyclists or pedestrians using the facility.

* Cannot be achieved using table input value defaults.

** Not applicable for that level of service letter grade. For the motorized modes, volumes greater than level of service F because intersection capacities have been reached. For the bicycle mode, the level of service letter grade (including F) is not achievable because there is no maximum vehicle volume threshold using table input value defaults.

Source:
Florida Department of Transportation
Systems Planning Office
www.dot.state.fl.us/planning/systems/sm/los/default.htm

2012 FDOT QUALITY/LEVEL OF SERVICE HANDBOOK TABLES

Additional GSVT Problems

Workshop A-3

Determine the auto LOS:

- In terms of peak hour two-way volumes
- In a transitioning area
- For an 8-lane freeway with
  - Peak hour two-way volume is 12,400
  - Ramp metering

12,170 * 1.05 ≈ 12,780

12,400 < 12,780

Answer → LOS D

FREEWAYS

Lanes	B	C	D	E
4	3,970	5,190	6,200	6,460
6	5,860	7,710	9,190	9,990
8	7,660	10,230	12,170	13,500
10	9,550	12,750	15,190	17,010

Freeway Adjustments

Auxiliary Lanes Present in Both Directions	Ramp Metering
+ 1,800	+ 5%

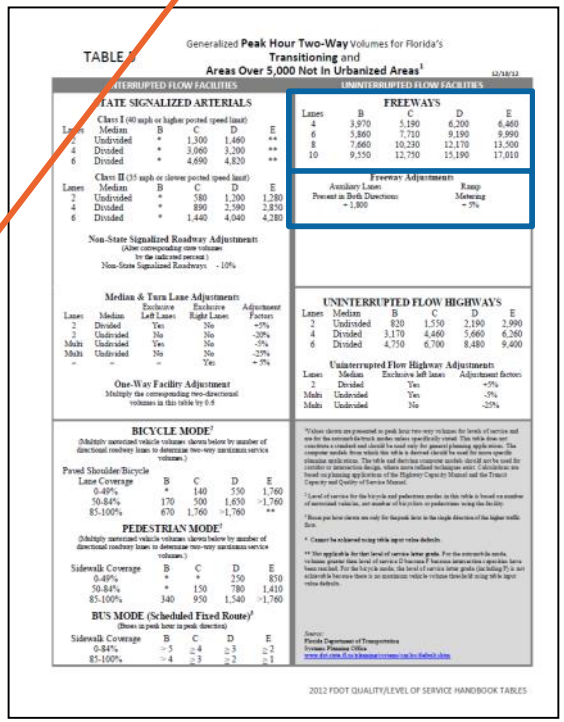


TABLE 1

Generalized Peak Hour Two-Way Volumes for Florida's Transitioning and Areas Over 5,000 Not In Urbanized Areas[1]

12/18/12

INTERRUPTED FLOW FACILITIES

STATE SIGNALIZED ARTERIALS

Class I (40 mph or higher posted speed limit)

Lanes	Median	B	C	D	E
2	Undivided	*	1,300	1,460	**
4	Divided	*	3,060	3,200	**
6	Divided	*	4,690	4,820	**

Class II (35 mph or slower posted speed limit)

Lanes	Median	B	C	D	E
2	Undivided	*	580	1,200	1,280
4	Divided	*	890	2,590	2,850
6	Divided	*	1,440	4,040	4,280

Non-State Signalized Roadway Adjustments
(Alter corresponding core volumes by the indicated percent.)
Non-State Signalized Roadways - 10%

Median & Turn Lane Adjustments

Lanes	Median	Exclusive Left Lanes	Exclusive Right Lanes	Adjustment Factor
2	Divided	Yes	No	+5%
2	Undivided	No	No	-20%
Multi	Undivided	Yes	No	-5%
Multi	Undivided	No	No	-25%
-	-	-	Yes	+ 5%

One-Way Facility Adjustment
Multiply the corresponding two-directional volumes in this table by 0.6

UNINTERRUPTED FLOW FACILITIES

FREEWAYS

Lanes	B	C	D	E
4	3,970	5,190	6,200	6,460
6	5,860	7,710	9,190	9,990
8	7,660	10,230	12,170	13,500
10	9,550	12,750	15,190	17,010

Freeway Adjustments

Auxiliary Lanes Present in Both Directions	Ramp Metering
+ 1,800	+ 5%

UNINTERRUPTED FLOW HIGHWAYS

Lanes	Median	B	C	D	E
2	Undivided	820	1,550	2,190	2,990
4	Divided	3,170	4,460	5,660	6,260
6	Divided	4,750	6,700	8,480	9,400

Uninterrupted Flow Highway Adjustments

Lanes	Median	Exclusive left lanes	Adjustment factors
2	Divided	Yes	+5%
Multi	Undivided	Yes	-5%
Multi	Undivided	No	-25%

BICYCLE MODE[7]
(Multiply motorized vehicle volumes shown below by number of directional roadway lanes to determine two-way maximum service volumes.)

Paved Shoulder/Bicycle Lane Coverage	B	C	D	E
0-49%	*	140	550	1,760
50-84%	170	500	1,650	>1,760
85-100%	670	1,760	>1,760	**

PEDESTRIAN MODE[7]
(Multiply motorized vehicle volumes shown below by number of directional roadway lanes to determine two-way maximum service volumes.)

Sidewalk Coverage	B	C	D	E
0-49%	*	*	250	850
50-84%	*	150	780	1,410
85-100%	340	950	1,540	>1,760

BUS MODE (Scheduled Fixed Route)[7]
(Buses in peak hour in peak direction)

Sidewalk Coverage	B	C	D	E
0-84%	> 5	≥ 4	≥ 3	≥ 2
85-100%	> 4	≥ 3	≥ 2	≥ 1

*Values shown are presented in peak hour two-way volumes for levels of service and are for the outermost daytrack modes unless specifically stated. This table does not constitute a standard and should be used only for general planning applications. The computer models from which this table is derived should be used for more specific planning applications. The table and derived computer models should not be used for corridor or intersection design, where more refined techniques exist. Calculations are based on planning applications of the Highway Capacity Manual and the Transit Capacity and Quality of Service Manual.

[7] Level of service for the bicycle and pedestrian modes in this table is based on number of motorized vehicles, not number of bicyclists or pedestrians using the facility.

* Cannot be achieved using table input value defaults.

** Not applicable for that level of service letter grade. For the motorized mode, volumes greater than level of service D but less F because interrupted operations have been reached. For the bicycle mode, the level of service letter grade (including F) is not achievable because there is no maximum vehicle volume threshold using table input value defaults.

Source:
Florida Department of Transportation
Systems Planning Office
www.dot.state.fl.us/planning/systems/sm/los/default.shtm

2012 FDOT QUALITY/LEVEL OF SERVICE HANDBOOK TABLES

Additional GSVT Problems

Workshop A-4

2,670 * 0.9 ≈ 2,400

2,500 > 2,400

Answer → LOS D

Determine the auto LOS:

- In terms of peak hour directional volumes
- In an urban area
- For a non-state signalized roadway with
  - 45 mph speed limit
  - 6 lanes (3 in each direction)
  - Peak hour directional volume of 2,500

STATE SIGNALIZED ARTERIALS

Class I (40 mph or higher posted speed limit)

Lanes	Median	B	C	D	E
1	Undivided	*	710	800	**
2	Divided	*	1,740	1,820	**
3	Divided	*	2,670	2,740	**

Non-State Signalized Roadway Adjustments
(Alter corresponding state volumes by the indicated percent.)
Non-State Signalized Roadways - 10%

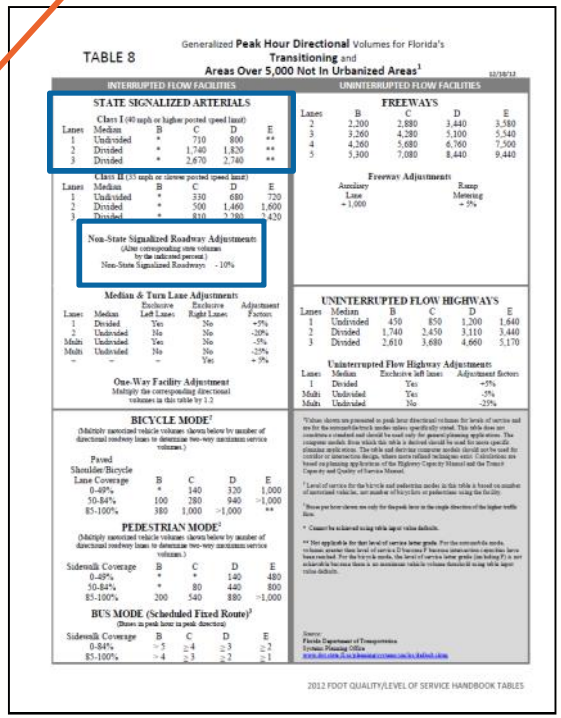


TABLE 8

Generalized Peak Hour Directional Volumes for Florida's Transitioning and Areas Over 5,000 Not In Urbanized Areas[1]

INTERRUPTED FLOW FACILITIES

STATE SIGNALIZED ARTERIALS

Class I (40 mph or higher posted speed limit)

Lanes	Median	B	C	D	E
1	Undivided	*	710	800	**
2	Divided	*	1,740	1,820	**
3	Divided	*	2,670	2,740	**

Class II (35 mph or slower posted speed limit)

Lanes	Median	B	C	D	E
1	Undivided	*	330	680	720
2	Divided	*	500	1,460	1,600
3	Divided	*	810	2,380	2,420

Non-State Signalized Roadway Adjustments
(Alter corresponding state volumes by the indicated percent.)
Non-State Signalized Roadways - 10%

Median & Turn Lane Adjustments

Lanes	Median	Exclusive Left Lanes	Exclusive Right Lanes	Adjustment Factors
1	Divided	Yes	No	+5%
2	Undivided	No	No	-20%
Multi	Undivided	Yes	No	-5%
Multi	Undivided	No	No	-25%
–	–	–	Yes	+ 5%

One-Way Facility Adjustment
Multiply the corresponding directional volumes in this table by 1.2

UNINTERRUPTED FLOW FACILITIES

FREEWAYS

Lanes	B	C	D	E
2	2,200	2,880	3,440	3,580
3	3,260	4,280	5,100	5,540
4	4,360	5,680	6,760	7,500
5	5,300	7,080	8,440	9,440

Freeway Adjustments

Auxiliary Lane	Ramp Metering
+ 1,000	+ 5%

UNINTERRUPTED FLOW HIGHWAYS

Lanes	Median	B	C	D	E
1	Undivided	450	850	1,200	1,640
2	Divided	1,740	2,450	3,110	3,440
3	Divided	2,610	3,680	4,660	5,170

Uninterrupted Flow Highway Adjustments

Lanes	Median	Exclusive left lanes	Adjustment factors
1	Divided	Yes	+5%
Multi	Undivided	Yes	-5%
Multi	Undivided	No	-25%

BICYCLE MODE[2]
(Multiply motorized vehicle volumes shown below by number of directional roadway lanes to determine two-way maximum service volumes.)

Paved Shoulder/Bicycle Lane Coverage	B	C	D	E
0-49%	*	140	320	1,000
50-84%	100	280	940	>1,000
85-100%	380	1,000	>1,000	**

PEDESTRIAN MODE[2]
(Multiply motorized vehicle volumes shown below by number of directional roadway lanes to determine two-way maximum service volumes.)

Sidewalk Coverage	B	C	D	E
0-49%	*	*	140	480
50-84%	*	80	440	800
85-100%	200	540	880	>1,000

BUS MODE (Scheduled Fixed Route)[3]
(Buses in peak hour in peak direction)

Sidewalk Coverage	B	C	D	E
0-84%	> 5	≥ 4	≥ 3	≥ 2
85-100%	> 4	≥ 3	≥ 2	≥ 1

[1] Values shown are presented in peak hour directional volumes for levels of service and are for the non-peak direction only. This table does not consider a standard and should be used only for general planning applications. The computer models from which this table is derived should be used for more specific planning applications. The table and the computer models should not be used for corridor or intersection design, where more refined techniques exist. Calculations are based on planning applications of the Highway Capacity Manual and the Transit Capacity and Quality of Service Manual.

[2] Level of service for the bicycle and pedestrian modes in this table is based on number of motorized vehicles, not number of bicyclists or pedestrians using the facility.

[3] Buses per hour shown are only for the peak hour in the single direction of the higher traffic flow.

* Cannot be achieved using table input value defaults.

** Not applicable for that level of service letter grade. For the motorized mode, volumes greater than level of service D become F because intersection capacities have been reached. For the bicycle mode, the level of service letter grade (including F) is not achievable because there is no maximum vehicle volume threshold using table input value defaults.

Source: Florida Department of Transportation, Systems Planning Office

2012 FDOT QUALITY/LEVEL OF SERVICE HANDBOOK TABLES

Additional GSVT Problems

Workshop A-5

Determine the max. service volume for LOS E:

- In terms of AADT
- In an urbanized area
- For a state signalized arterial with
  - One-way
  - 30 mph speed limit
  - 2 lanes in travel direction

Class II (35 mph or slower posted speed limit)

Lanes	Median	B	C	D	E
2	Undivided	*	7,300	14,800	15,600
4	Divided	*	14,500	32,400	33,800
6	Divided	*	23,300	50,000	50,900
8	Divided	*	32,000	67,300	68,100

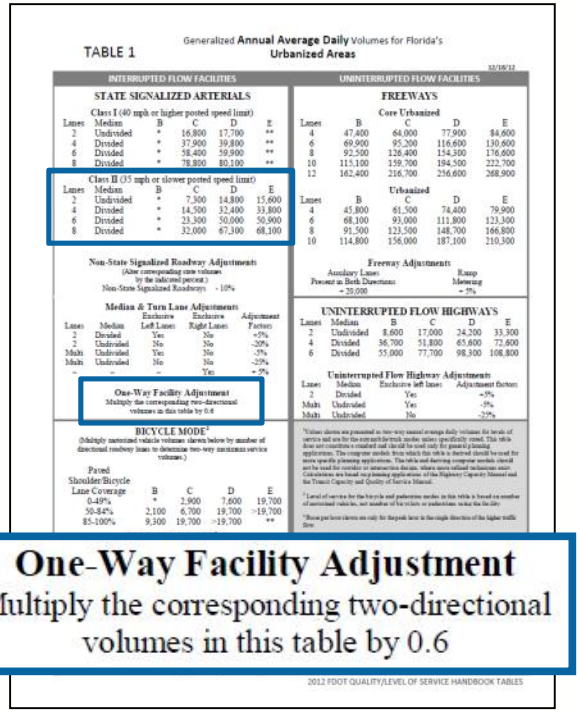


TABLE 1

Generalized **Annual Average Daily** Volumes for Florida's **Urbanized Areas**

INTERRUPTED FLOW FACILITIES — STATE SIGNALIZED ARTERIALS

Class I (40 mph or higher posted speed limit)

Lanes	Median	B	C	D	E
2	Undivided	*	16,800	17,700	**
4	Divided	*	37,900	39,800	**
6	Divided	*	58,400	59,900	**
8	Divided	*	78,800	80,100	**

Class II (35 mph or slower posted speed limit)

Lanes	Median	B	C	D	E
2	Undivided	*	7,300	14,800	15,600
4	Divided	*	14,500	32,400	33,800
6	Divided	*	23,300	50,000	50,900
8	Divided	*	32,000	67,300	68,100

Non-State Signalized Roadway Adjustments (Alter corresponding core volumes by the indicated percent.)

Non-State Signalized Roadways - 10%

Median & Turn Lane Adjustments

Lanes	Median	Exclusive Left Lanes	Exclusive Right Lanes	Adjustment Factors
2	Divided	Yes	No	+5%
2	Undivided	No	No	-20%
Multi	Undivided	Yes	No	-5%
Multi	Undivided	No	No	-25%
-	-	-	Yes	+5%

One-Way Facility Adjustment: Multiply the corresponding two-directional volumes in this table by 0.6

BICYCLE MODE[2] (Multiply motorized vehicle volumes shown below by number of directional roadway lanes to determine two-way maximum service volumes.)

Paved Shoulder/Bicycle Lane Coverage	B	C	D	E
0-49%	*	2,900	7,600	19,700
50-84%	2,100	6,700	19,700	~19,700
85-100%	9,300	19,700	~19,700	**

UNINTERRUPTED FLOW FACILITIES — FREEWAYS

Core Urbanized

Lanes	B	C	D	E
4	47,400	64,000	77,900	84,600
6	69,900	95,200	116,600	130,600
8	92,500	126,400	154,300	176,600
10	113,100	159,700	194,500	222,700
12	162,400	216,700	256,600	268,900

Urbanized

Lanes	B	C	D	E
4	45,800	61,500	74,400	79,900
6	68,100	93,000	111,800	123,300
8	91,500	123,500	148,700	166,800
10	114,800	156,000	187,100	210,300

Freeway Adjustments

Auxiliary Lanes: Present in Both Directions - 20,000

Ramp Metering - 5%

UNINTERRUPTED FLOW HIGHWAYS

Lanes	Median	B	C	D	E
2	Undivided	8,600	17,000	24,200	33,300
4	Divided	36,700	51,800	65,600	72,600
6	Divided	55,000	77,700	98,300	108,800

Uninterrupted Flow Highway Adjustments

Lanes	Median	Exclusive left lanes	Adjustment factors
2	Divided	Yes	+5%
Multi	Undivided	Yes	-5%
Multi	Undivided	No	-25%

[1] Volume shown are presented as two-way annual average daily volumes for levels of service and are for the non-arterial/truck modes unless specifically noted. This table does not constitute a standard and should be used only for general planning applications. The computer models from which this table is derived should be used for more specific planning applications. The vehicle and driving computer models should not be used for corridor or intersection design, where more refined mechanisms exist. Calculations are based on planning applications of the Highway Capacity Manual and the Transit Capacity and Quality of Service Manual.

[2] Level of service for the bicycle and pedestrian modes in this table is based on number of motorized vehicles, not number of bicycles or pedestrians using the facility.

[3] Shown per lane (lanes are only for the peak hour in the single direction of the higher traffic flow.

2012 FDOT QUALITY/LEVEL OF SERVICE HANDBOOK TABLES

One-Way Facility Adjustment
Multiply the corresponding two-directional volumes in this table by 0.6

33,800 * 0.6 = 20,280

LOS E → 20,280

Additional GSVT Problems

Workshop A-6

Determine the max. service volume for LOS E:

- In terms of peak hour two-way volumes
- In an undeveloped rural area
- For an uninterrupted flow highway with
  - 6 lanes
  - No median
  - No exclusive lefts

UNINTERRUPTED FLOW HIGHWAYS

Rural Undeveloped

Lanes	Median	B	C	D	E
2	Undivided	440	790	1,350	2,710
4	Divided	2,440	3,820	4,840	5,500
6	Divided	3,680	5,730	7,280	8,240

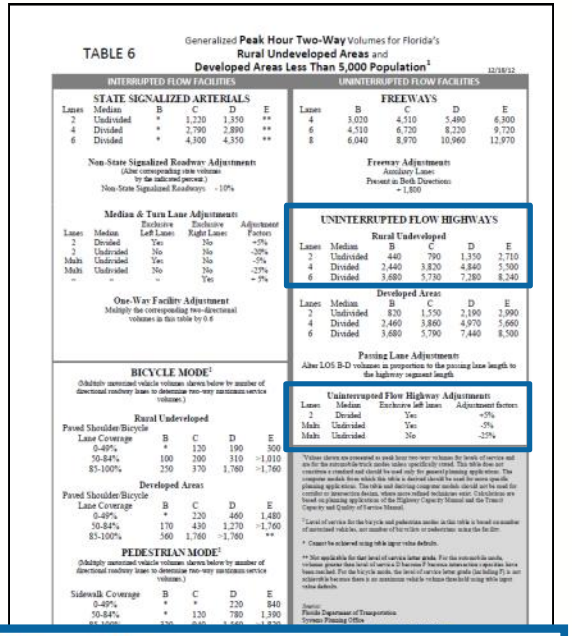


TABLE 6

Generalized Peak Hour Two-Way Volumes for Florida's Rural Undeveloped Areas and Developed Areas Less Than 5,000 Population[1]

12/18/12

INTERRUPTED FLOW FACILITIES

STATE SIGNALIZED ARTERIALS

Lanes	Median	B	C	D	E
2	Undivided	*	1,220	1,350	**
4	Divided	*	2,790	2,890	**
6	Divided	*	4,300	4,350	**

Non-State Signalized Roadway Adjustments
(Alter corresponding state volumes by the indicated percent.)
Non-State Signalized Roadways: -10%

Median & Turn Lane Adjustments

Lanes	Median	Exclusive Left Lanes	Exclusive Right Lanes	Adjustment Factors
2	Divided	Yes	No	+5%
2	Undivided	No	No	-20%
Multi	Undivided	Yes	No	-5%
Multi	Undivided	No	No	-25%
–	–	–	Yes	+ 5%

One-Way Facility Adjustment
Multiply the corresponding two-directional volumes in this table by 0.6

BICYCLE MODE[1]
(Multiply motorized vehicle volumes shown below by number of directional roadway lanes to determine two-way maximum service volumes.)

Rural Undeveloped

Paved Shoulder/Bicycle Lane Coverage	B	C	D	E
0-49%	*	120	190	500
50-84%	100	200	310	>1,010
85-100%	250	370	1,760	>1,760

Developed Areas

Paved Shoulder/Bicycle Lane Coverage	B	C	D	E
0-49%	*	220	460	1,480
50-84%	170	430	1,270	>1,760
85-100%	560	1,760	>1,760	**

PEDESTRIAN MODE[2]
(Multiply motorized vehicle volumes shown below by number of directional roadway lanes to determine two-way maximum service volumes.)

Sidewalk Coverage	B	C	D	E
0-49%	*	*	220	840
50-84%	*	120	780	1,390

UNINTERRUPTED FLOW FACILITIES

FREEWAYS

Lanes	B	C	D	E
4	3,020	4,510	5,490	6,300
6	4,510	6,720	8,220	9,720
8	6,040	8,970	10,960	12,970

Freeway Adjustments
Auxiliary Lanes:
Present in Both Directions:
+ 1,800

UNINTERRUPTED FLOW HIGHWAYS

Rural Undeveloped

Lanes	Median	B	C	D	E
2	Undivided	440	790	1,350	2,710
4	Divided	2,440	3,820	4,840	5,500
6	Divided	3,680	5,730	7,280	8,240

Developed Areas

Lanes	Median	B	C	D	E
2	Undivided	820	1,550	2,190	2,990
4	Divided	2,460	3,860	4,970	5,660
6	Divided	3,680	5,790	7,440	8,500

Passing Lane Adjustments
Alter LOS B-D volumes in proportion to the passing lane length to the highway segment length

Uninterrupted Flow Highway Adjustments

Lanes	Median	Exclusive left lanes	Adjustment factors
2	Divided	Yes	+5%
Multi	Undivided	Yes	-5%
Multi	Undivided	No	-25%

[1] Values shown are converted to peak hour two-way volumes for levels of service and are for the motorcycle/truck modes unless specifically noted. This table does not constitute a standard and should be used only for general planning application. The computer models from which this table is derived should be used for more specific planning application. The table and derived computer models should not be used for corridor or intersection design, where more refined techniques exist. Calculations are based on planning applications of the Highway Capacity Manual and the Transit Capacity and Quality of Service Manual.

[2] Level of service for the bicycle and pedestrian modes in this table is based on number of motorized vehicles, not number of bicyclists or pedestrians, as in the far-left.

* Cannot be achieved using table input value defaults.

** Not applicable for that level of service letter grade. For the motorcycle mode, volumes greater than level of service D increase F because interaction capacities have been reached. For the bicycle mode, the level of service letter grade (including F) is not achievable because there is no maximum vehicle volume threshold using table input value defaults.

Source:
Florida Department of Transportation
Systems Planning Office

8,240 * 0.75 = 6,180

LOS E → 6,180

Uninterrupted Flow Highway Adjustments

Lanes	Median	Exclusive left lanes	Adjustment factors
2	Divided	Yes	+5%
Multi	Undivided	Yes	-5%
Multi	Undivided	No	-25%

Additional GSVT Problems

Workshop A-7

Determine the auto LOS:

- In terms of peak hour directional volumes
- In an urbanized area
- For a freeway with
  - 6 lanes (3 in each direction)
  - Auxiliary lane
  - Peak hour directional volume of 4,000

3,360 + 1,000 = 4,360

4,000 < 4,360

Answer → LOS B

FREEWAYS

Lanes	B	C	D	E
2	2,260	3,020	3,660	3,940
3	3,360	4,580	5,500	6,080
4	4,500	6,080	7,320	8,220
5	5,660	7,680	9,220	10,360
6	7,900	10,320	12,060	12,500

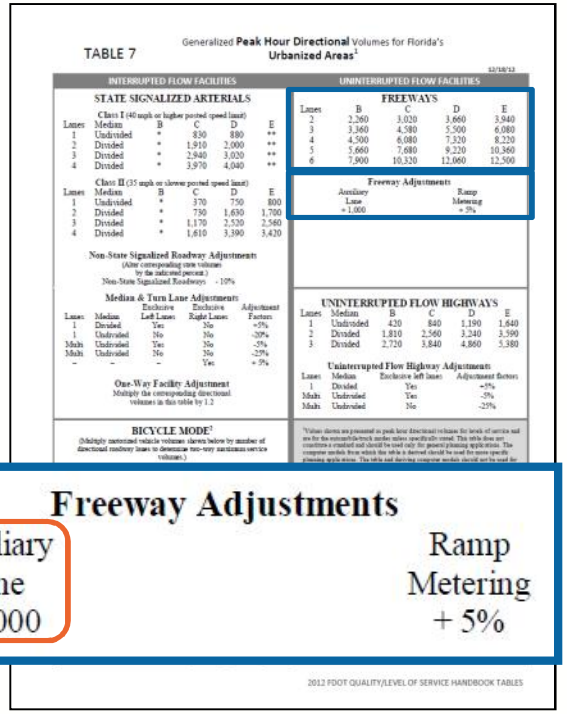


TABLE 7

Generalized **Peak Hour Directional** Volumes for Florida's **Urbanized Areas**[1]

INTERRUPTED FLOW FACILITIES

STATE SIGNALIZED ARTERIALS

Class I (40 mph or higher posted speed limit)

Lanes	Median	B	C	D	E
1	Undivided	*	830	880	**
2	Divided	*	1,910	2,000	**
3	Divided	*	2,940	3,020	**
4	Divided	*	3,970	4,040	**

Class II (35 mph or slower posted speed limit)

Lanes	Median	B	C	D	E
1	Undivided	*	370	750	800
2	Divided	*	750	1,630	1,700
3	Divided	*	1,170	2,520	2,560
4	Divided	*	1,610	3,390	3,420

Non-State Signalized Roadway Adjustments
(Alter corresponding cmv volumes by the indicated percent.)
Non-State Signalized Roadways - 10%

Median & Turn Lane Adjustments

Lanes	Median	Exclusive Left Lanes	Exclusive Right Lanes	Adjustment Factors
1	Divided	Yes	No	+5%
1	Undivided	No	No	-20%
3&4h	Undivided	Yes	No	-5%
3&4h	Undivided	No	No	-25%
–	–	–	Yes	+ 5%

One-Way Facility Adjustment
Multiply the corresponding directional volumes in this table by 1.2

BICYCLE MODE[3]
(Multiply motorized vehicle volumes shown below by number of directional roadway lanes to determine two-way maximum service volumes.)

UNINTERRUPTED FLOW FACILITIES

FREEWAYS

Lanes	B	C	D	E
2	2,260	3,020	3,660	3,940
3	3,360	4,580	5,500	6,080
4	4,500	6,080	7,320	8,220
5	5,660	7,680	9,220	10,360
6	7,900	10,320	12,060	12,500

Freeway Adjustments

Auxiliary Lane	Ramp Metering
+ 1,000	+ 5%

UNINTERRUPTED FLOW HIGHWAYS

Lanes	Median	B	C	D	E
1	Undivided	420	840	1,190	1,640
2	Divided	1,810	2,560	3,240	3,590
3	Divided	2,720	3,840	4,860	5,380

Uninterrupted Flow Highway Adjustment

Lanes	Median	Exclusive left lanes	Adjustment factors
1	Divided	Yes	+5%
3&4h	Undivided	Yes	-5%
3&4h	Undivided	No	-25%

[1]Values shown are presented as peak hour directional volumes for levels of service and are for the outermost/curb/truck another unless specifically stated. This table does not constitute a standard and should be used only for general planning applications. The computer models from which this table is derived should be used for more specific planning applications. The table and derived computer models should not be used for

2012 FDOT QUALITY/LEVEL OF SERVICE HANDBOOK TABLES

Freeway Adjustments

Auxiliary Lane	Ramp Metering
+ 1,000	+ 5%

Additional Problems

-0.10 + 0.05 = -0.05
1,280 * 0.95 = 1,220
1,220 < 1,240
Answer → LOS F

Workshop A-8

Determine the auto LOS:

- In terms of peak hour two-way volumes
- In an urban area
- For a non-state signalized roadway with
  - 30 mph speed limit
  - Exclusive left turn lanes
  - Peak hour two-way volume of 1,240
  - 2 lanes
  - Median

Class II (35 mph or slower posted speed limit)

Lanes	Median	B	C	D	E
2	Undivided	*	580	1,200	1,280
4	Divided	*	890	2,590	2,850
6	Divided	*	1,440	4,040	4,280

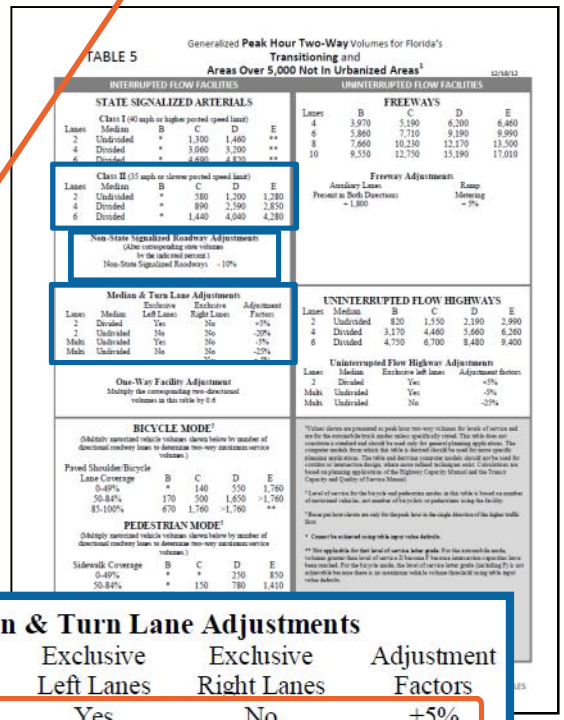


TABLE 5

Generalized **Peak Hour Two-Way** Volumes for Florida's **Transitioning** and **Areas Over 5,000 Not In Urbanized Areas**[1]

INTERRUPTED FLOW FACILITIES

STATE SIGNALIZED ARTERIALS

Class I (40 mph or higher posted speed limit)

Lanes	Median	B	C	D	E
2	Undivided	*	1,300	1,460	**
4	Divided	*	3,060	3,200	**
6	Divided	*	4,690	4,820	**

Class II (35 mph or slower posted speed limit)

Lanes	Median	B	C	D	E
2	Undivided	*	580	1,200	1,280
4	Divided	*	890	2,590	2,850
6	Divided	*	1,440	4,040	4,280

Non-State Signalized Roadway Adjustments
(Alter corresponding state volumes by the indicated percent.)
Non-State Signalized Roadways - 10%

Median & Turn Lane Adjustments

Lanes	Median	Exclusive Left Lanes	Exclusive Right Lanes	Adjustment Factors
2	Divided	Yes	No	+5%
2	Undivided	No	No	-20%
Multi	Undivided	Yes	No	-5%
Multi	Undivided	No	No	-25%

One-Way Facility Adjustment
Multiply the corresponding two-directional volumes in this table by 0.6

BICYCLE MODE[2]
(Multiply motorized vehicle volumes shown below by number of directional roadway lanes to determine two-way maximum service volumes.)

Paved Shoulder/Bicycle Lane Coverage	B	C	D	E
0-49%	*	140	550	1,760
50-84%	170	500	1,650	>1,760
85-100%	670	1,760	>1,760	**

PEDESTRIAN MODE[3]
(Multiply motorized vehicle volumes shown below by number of directional roadway lanes to determine two-way maximum service volumes.)

Sidewalk Coverage	B	C	D	E
0-49%	*	*	250	850
50-84%	*	150	780	1,410

UNINTERRUPTED FLOW FACILITIES

FREEWAYS

Lanes	B	C	D	E
4	3,970	5,190	6,200	6,460
6	5,860	7,710	9,190	9,990
8	7,660	10,230	12,170	13,500
10	9,550	12,750	15,190	17,010

Freeway Adjustments

Auxiliary Lanes Present in Both Directions	Ramp Metering
+ 1,800	+ 5%

UNINTERRUPTED FLOW HIGHWAYS

Lanes	Median	B	C	D	E
2	Undivided	820	1,550	2,190	2,990
4	Divided	3,170	4,460	5,660	6,260
6	Divided	4,750	6,700	8,480	9,400

Uninterrupted Flow Highway Adjustments

Lanes	Median	Exclusive left lanes	Adjustment factors
2	Divided	Yes	+5%
Multi	Undivided	Yes	-5%
Multi	Undivided	No	-25%

[1] Values shown are presented in peak hour two-way volumes for levels of service and are for the outermost truck modes unless specifically stated. This table does not constitute a standard and should be used only for general planning applications. The computer models from which this table is derived should be used for more specific planning analysis. The table and derivative computer models should not be used for corridor or intersection design, where more refined techniques exist. Calculations are based on planning applications of the Highway Capacity Manual and the Transit Capacity and Quality of Service Manual.

[2] Level of service for the bicycle and pedestrian modes in this table is based on number of motorized vehicles, not number of bicyclists or pedestrians using the facility.

[3] These per hour values are only for the peak hour in the single direction of the higher traffic flow.

* Cannot be achieved using table input value defaults.

** Not applicable for that level of service letter grade. For the outermost lanes, volumes greater than level of service D become unrealistic to operate have been reached. For the bicycle mode, the level of service letter grade (including F) is not achievable because there is no maximum vehicle volume threshold using table input value defaults.

Non-State Signalized Roadway Adjustments
(Alter corresponding state volumes by the indicated percent.)
Non-State Signalized Roadways - 10%

Median & Turn Lane Adjustments

Lanes	Median	Exclusive Left Lanes	Exclusive Right Lanes	Adjustment Factors
2	Divided	Yes	No	+5%
2	Undivided	No	No	-20%
Multi	Undivided	Yes	No	-5%
Multi	Undivided	No	No	-25%
–	–	–	Yes	+ 5%

Additional GSVT Problems

Workshop A-9

Answer 1 → LOS C

Answer 2 → LOS F

Determine the auto LOS:

- In terms of peak hour directional volumes
- In an urbanized area
- For a divided state signalized arterial with
  - 4 lanes (2 in each direction)
  - 45 mph speed limit
  - Peak hour directional volume of
    1. 1,000
    2. 3,000

STATE SIGNALIZED ARTERIALS

Class I (40 mph or higher posted speed limit)

Lanes	Median	B	C	D	E
1	Undivided	*	830	880	**
2	Divided	*	1,910	2,000	**
3	Divided	*	2,940	3,020	**
4	Divided	*	3,970	4,040	**

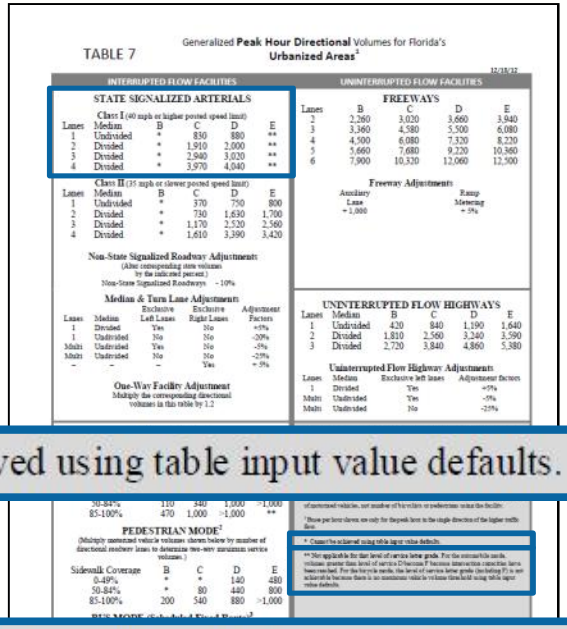


TABLE 7

Generalized **Peak Hour Directional** Volumes for Florida's **Urbanized Areas**

INTERRUPTED FLOW FACILITIES

STATE SIGNALIZED ARTERIALS

Class I (40 mph or higher posted speed limit)

Lanes	Median	B	C	D	E
1	Undivided	*	830	880	**
2	Divided	*	1,910	2,000	**
3	Divided	*	2,940	3,020	**
4	Divided	*	3,970	4,040	**

Class II (35 mph or slower posted speed limit)

Lanes	Median	B	C	D	E
1	Undivided	*	370	750	800
2	Divided	*	730	1,630	1,700
3	Divided	*	1,170	2,520	2,560
4	Divided	*	1,610	3,390	3,420

Non-State Signalized Roadway Adjustments

(Alter corresponding state volumes by the indicated percent.)

Non-State Signalized Roadways -10%

Median & Turn Lane Adjustments

Lanes	Median	Exclusive Left Lanes	Exclusive Right Lanes	Adjustment Factors
1	Divided	Yes	No	+5%
1	Undivided	No	No	-20%
Multi	Undivided	Yes	No	-5%
Multi	Undivided	No	No	-25%
-	-	-	Yes	+ 5%

One-Way Facility Adjustment

Multiply the corresponding directional volumes in this table by 1.2

UNINTERRUPTED FLOW FACILITIES

FREEWAYS

Lanes	B	C	D	E
2	2,260	3,020	3,660	3,940
3	3,360	4,580	5,500	6,080
4	4,500	6,080	7,320	8,220
5	5,660	7,680	9,220	10,360
6	7,900	10,320	12,060	12,500

Freeway Adjustments

Auxiliary Lane	Ramp Metering
+ 1,000	+ 5%

UNINTERRUPTED FLOW HIGHWAYS

Lanes	Median	B	C	D	E
1	Undivided	420	840	1,190	1,640
2	Divided	1,810	2,560	3,240	3,590
3	Divided	2,720	3,840	4,860	5,380

Uninterrupted Flow Highway Adjustments

Lanes	Median	Exclusive left lanes	Adjustment factors
1	Divided	Yes	+5%
Multi	Undivided	Yes	-5%
Multi	Undivided	No	-25%

PEDESTRIAN MODE[2]

(Multiply motorized vehicle volumes shown below by number of directional roadway lanes to determine two-way maximum service volume.)

Sidewalk Coverage	B	C	D	E
0-49%	*	*	140	480
50-84%	*	80	440	800
85-100%	200	540	880	>1,000

* Cannot be achieved using table input value defaults.

** Not applicable for that level of service letter grade. For the automobile mode, volumes greater than level of service D become F because intersection capacities have been reached. For the bicycle mode, the level of service letter grade (including F) is not achievable because there is no maximum vehicle volume threshold using table input value defaults.