Pedestrian & Bike Data Collection and Analysis

Heels and Wheels March 21, 2014

Delaware Department of Transportation

UD

WR&A

WILMAPCO

Dover/Kent County MPO

Data Collection Efforts:

1) Bike / Pedestrian Data

National Data
Delaware Survey
Results

2) Bike / Pedestrian Analysis

Applications

VICTORIA Transport Policy INSTITUTE
EFFICIENCY • EQUITY • CLARITY

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Short and Sweet

Analysis of Shorter Trips Using National Personal Travel Survey Data

26 July 2012

Table 1 **Walk Mode Share By National Travel Surveys** (Hu 2004, Table 9)

	1990	1995	2001	2009
Walk Mode Share	7.2%	5.5%	8.6%	11.1%

The 2009 NHTS shows higher walking mode share than previous national surveys, which probably reflects a combination of actual changes in travel activity and more comprehensive data collection.

Table 3 **Shorter Trip Mode Share**

Trip Distance	Portion of Total Trips	Walk	Bike	Transit	POV	Totals
0.5 or less	10%	61%	3.1%	1.5%	34%	100%
1.0 or less	19%	51%	3.3%	3.0%	42%	100%
3.0 or less	41%	27%	2.2%	3.9%	67%	100%

Bike – Pedestrian Data

Figure 1 Share of Trips By Mileage Category

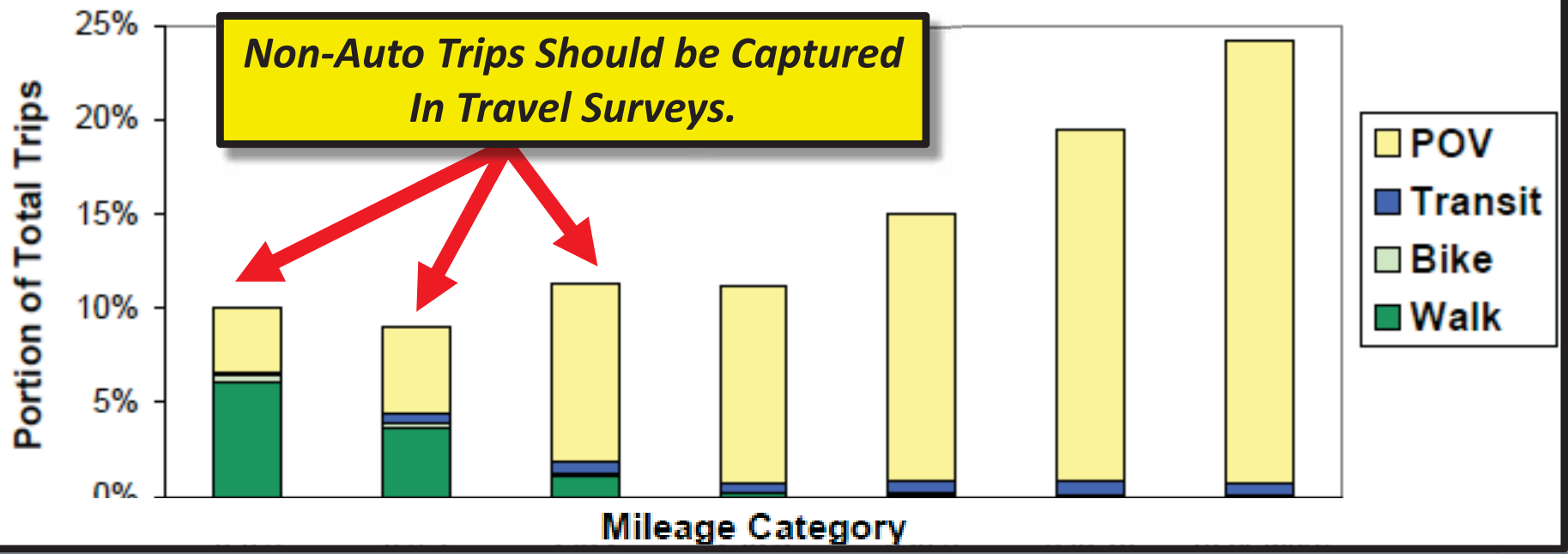
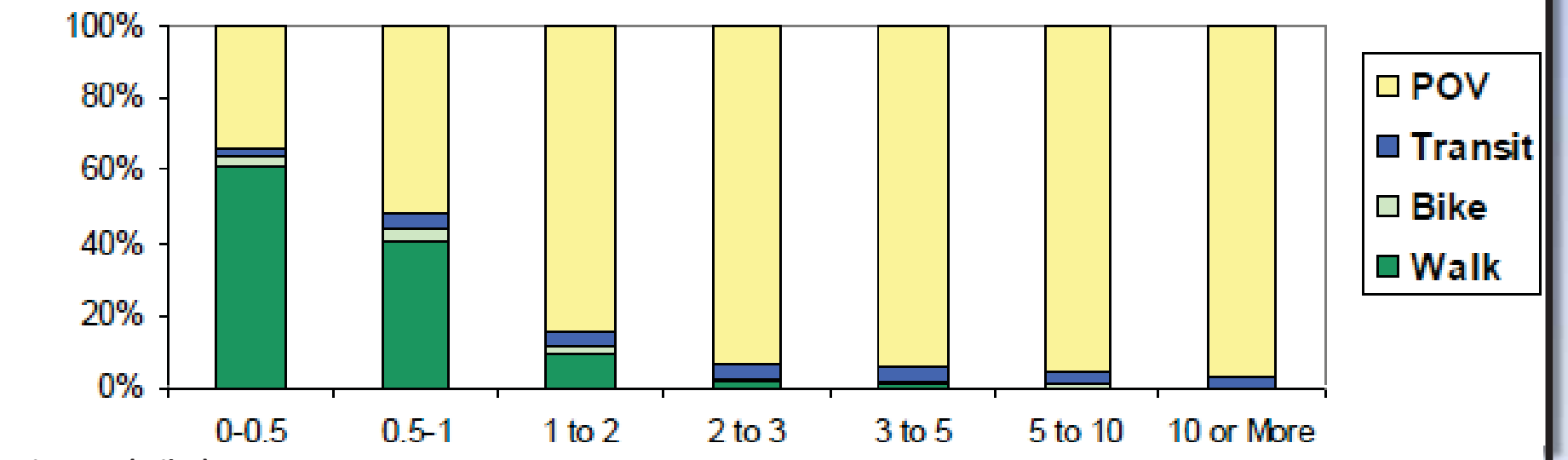


Figure 2 Mode Share By Mileage Category



Source: NPTS, Victoria Transport Policy Institute

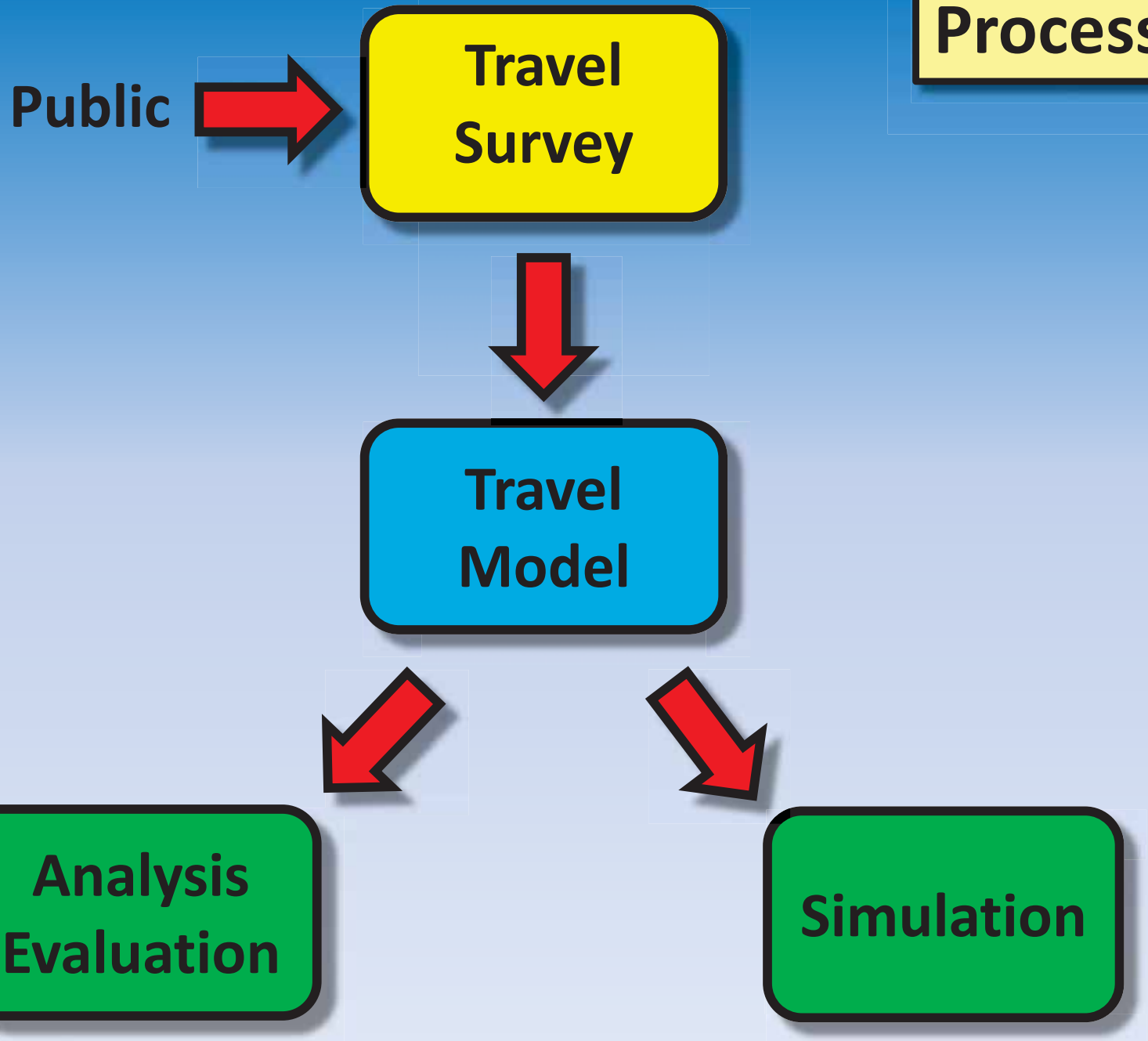
According to National Personal Travel Survey:

About 12% of total trips are non-motorized.
(About 2X values reported by DOT/MPO travel surveys).

Over 60% of trips of 1 mile or less are walking & biking.

Over 30% of trips of 2 miles or less are walking & biking.

Process:


Public
Travel Survey
Travel Model
Analysis Evaluation
Simulation

Sample Script:

University of Delaware
2014 DelDOT Travel Survey

INTRODUCTION Hello, I'm calling from the University of Delaware. We are conducting a survey of Delaware residents for the Delaware Department of Transportation to collect information on different types of traveling people do, including walking and biking, to help determine current and future transportation needs and services.

Your phone number has been chosen randomly by the computer to be Included in the survey.

INFORMATION For each of the trips you made YESTERDAY, even those you walked or biked, we need to know:

- where the trip began and ended,
- start time and end time,
- trip purpose.

Let's go through each trip, and I will record the information.

Sample Script:

WALK 1: Did you walk anywhere yesterday?

YES

NO (Go to BIKE1)

Include any walks taken within your neighborhood, to places outside the neighborhood (such as going to the store) or walks started from another location (such as from work to lunch). EVEN SHORT WALKING TRIPS, WALKING FOR EXERCISE, OR WALKING THE DOG ARE OF INTEREST.

BIKE 1: Did you bike anywhere yesterday?

YES

NO (Go to DRIVE1)

Include any bike taken within your neighborhood, to places outside the neighborhood (such as going to work or the store) or bike started from another location (such as from work to lunch). EVEN SHORT BIKING TRIPS OR BIKING FOR EXERCISE ARE OF INTEREST.

Sample Script:

WALK 2: From what ORIGIN LOCATION did you BEGIN YOUR FIRST WALKING TRIP ?

( ) HOME
( ) WORK
( ) Store
( ) School
( ) Drop off / Pick up a person
( ) Social (Neighbor, friend or family's house)
( ) Recreational (Exercise or Pleasure)
( ) Park / Playground / Basketball Court / Tennis Court
( ) Gym / YMCA
( ) Restaurant
( ) Child Care Facility
( ) Doctor's / Medical
( ) Bank / Post Office
( ) DART / Public Transportation
( ) Barber / Hairstylist
( ) Church / Worship
( ) OTHER _____
( ) DON'T KNOW
( ) REFUSED

Survey Results:

Mode, by Year

Mode	1997 – 2011	2012	2013
Car	96.5%	83.8%	89.0%
Transit	1.5%	1.5%	1.1%
Walk	1.3%	**13.6%**	**9.1%**
Bike	0.7%	**1.0%**	**0.8%**

1997 – 2011: Script #1

2012 – 2014: Script #2 Emphasis on Bike/Ped Data Collection

Bike – Pedestrian Data

Survey Results:

Trip Purpose by Mode

Purpose	Car	(Pass)	Bus	Walk	Bike
Work	92.0%	4.2%	1.7%	1.9%	0.2%
Store	79.1%	15.4%	0.5%	4.5%	0.5%
School	83.5%	9.1%	3.3%	4.1%	
Drop off/Pick up a person	92.1%	6.2%		1.7%	
Social (visit neighbor, friend or family)	66.6%	18.9%	0.3%	13.7%	0.6%
Recreational (walked for exercise/pleasure)	10.2%	3.0%	0.2%	81.6%	5.0%
Park/Playground/Basketball Court/Tennis Crt, etc.	60.9%	14.5%		24.6%	
Gym/YMCA	92.6%			5.9%	1.5%
Restaurant	62.5%	30.8%	0.3%	6.4%	
Child Care Facility	100.0%				
Doctor_s (medical)	71.0%	25.7%	2.2%	1.1%	
Bank or Post Office	70.4%	12.2%	1.0%	13.3%	3.1%
Public Transportation Stop (Train/Bus)	40.0%		33.3%	20.0%	6.7%
Barber/Hairdresser	85.2%	11.1%			3.7%
Church/House of Worship	76.5%	21.3%		1.5%	0.7%

Survey Results:

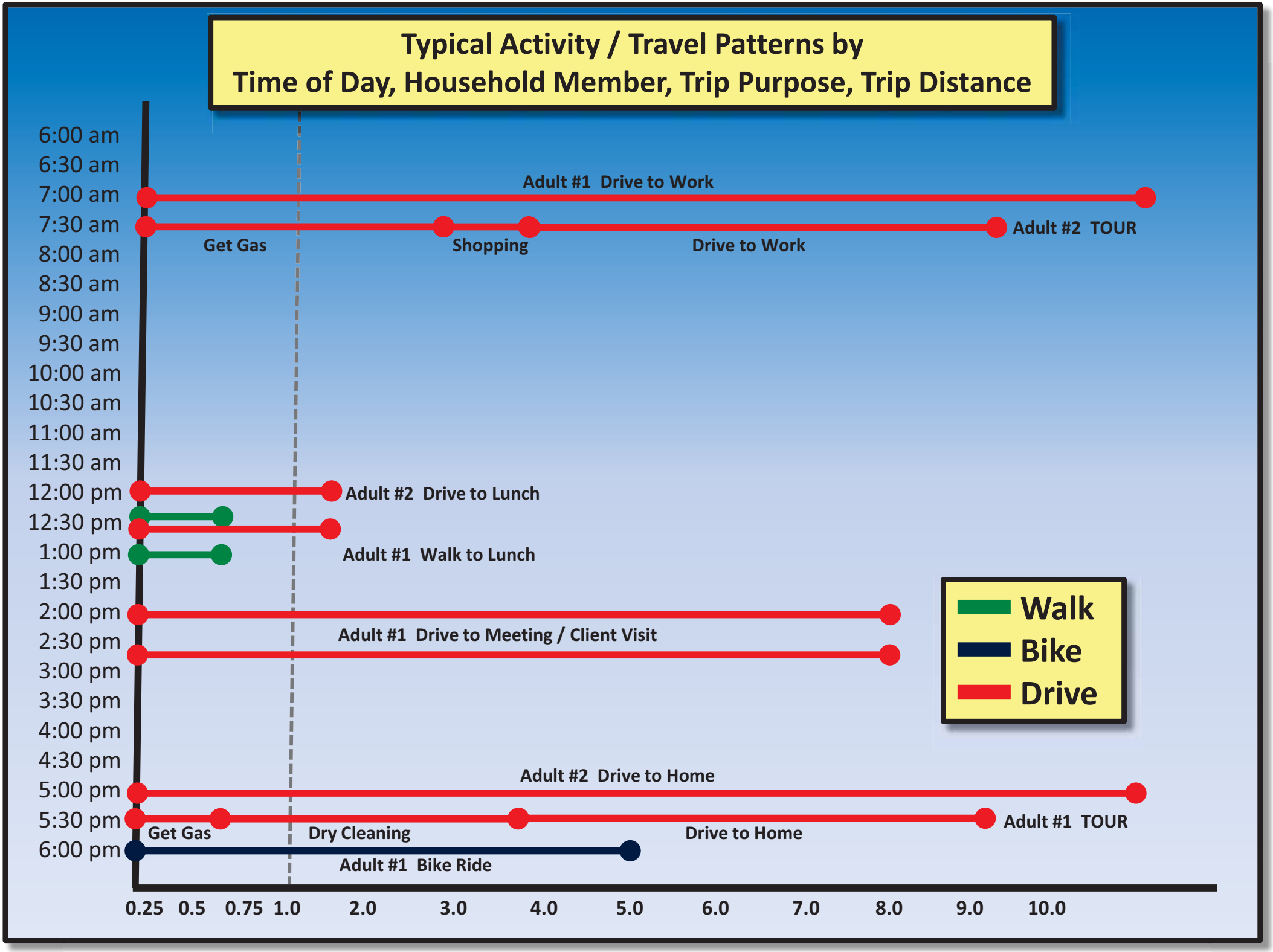
Attitudinal Questions

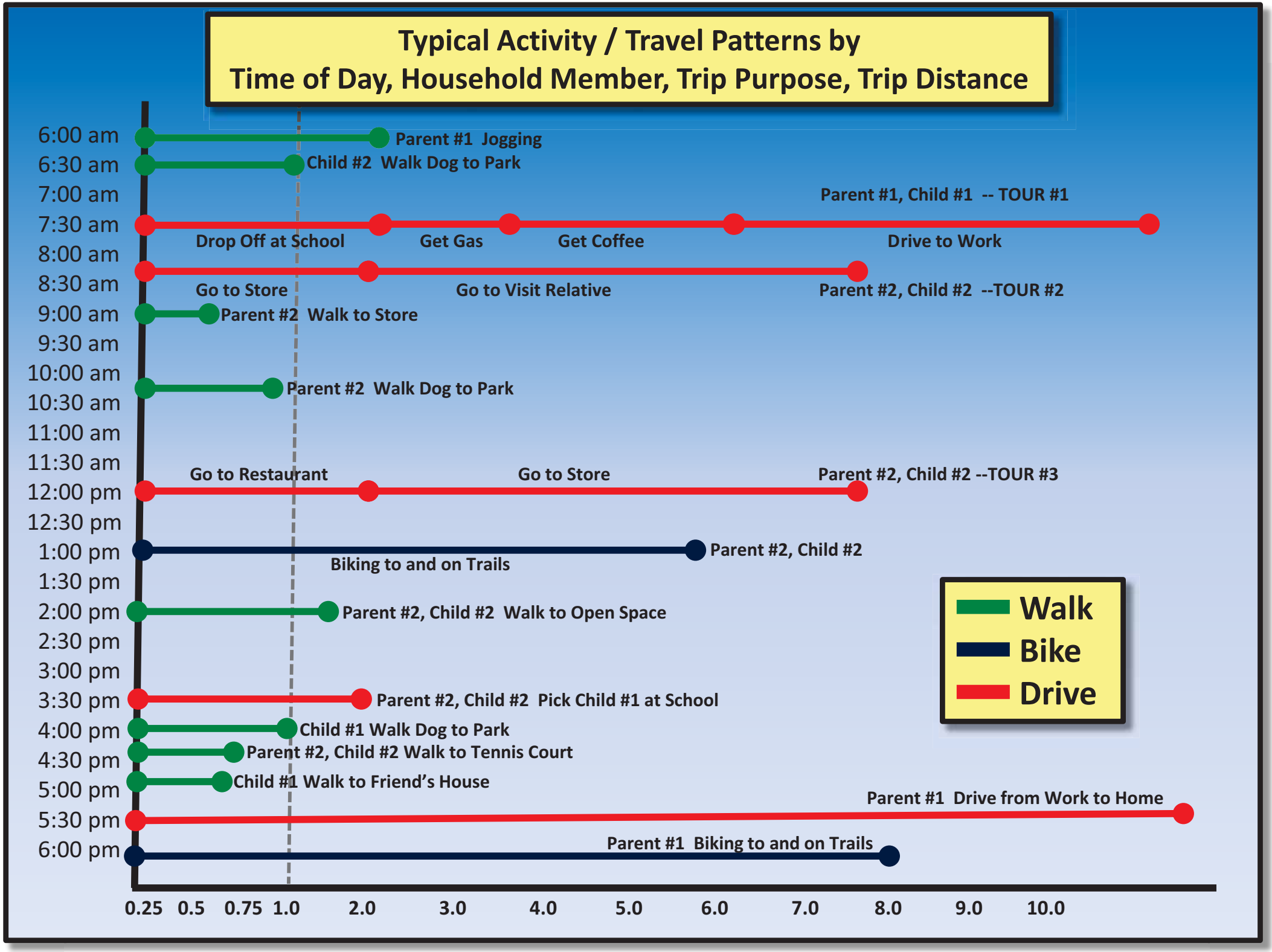
ATT 5: How Far do You Feel Comfortable WALKING or BIKING ?

	DELAWARE	New Castle	Kent	Sussex
Walking	4.3	4.7	3.7	3.6
Walking with Sidewalk	5.3	5.5	5.4	4.9
Biking	10.0	11.6	8.9	7.3
Biking with Trail	12.0	13.4	11.0	10.0

ATT 6: If SIDEWALKS AND/OR TRAILS WERE AVAILABLE for Your Trips, Would This Change How Far You Would Be Willing to WALK or BIKE ?

	DELAWARE	New Castle	Kent	Sussex
YES	49%	45%	51%	52%
NO	51%	55%	49%	48%


Typical Activity / Travel Patterns by
Time of Day, Household Member, Trip Purpose, Trip Distance
6:00 am
6:30 am
7:00 am
7:30 am
8:00 am
8:30 am
9:00 am
9:30 am
10:00 am
10:30 am
11:00 am
11:30 am
12:00 pm
12:30 pm
1:00 pm
1:30 pm
2:00 pm
2:30 pm
3:00 pm
3:30 pm
4:00 pm
4:30 pm
5:00 pm
5:30 pm
6:00 pm
Adult #1 Drive to Work
Adult #2 TOUR
Get Gas
Shopping
Drive to Work
Adult #2 Drive to Lunch
Adult #1 Walk to Lunch
Adult #1 Drive to Meeting / Client Visit
Adult #2 Drive to Home
Adult #1 TOUR
Get Gas
Dry Cleaning
Drive to Home
Adult #1 Bike Ride
Walk
Bike
Drive
0.25
0.5
0.75
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0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6:00 am
6:30 am
7:00 am
7:30 am
8:00 am
8:30 am
9:00 am
9:30 am
10:00 am
10:30 am
11:00 am
11:30 am
12:00 pm
12:30 pm
1:00 pm
1:30 pm
2:00 pm
2:30 pm
3:00 pm
3:30 pm
4:00 pm
4:30 pm
5:00 pm
5:30 pm
6:00 pm
Parent #1 Jogging
Child #2 Walk Dog to Park
Parent #1, Child #1 -- TOUR #1
Drop Off at School
Get Gas
Get Coffee
Drive to Work
Go to Store
Go to Visit Relative
Parent #2, Child #2 --TOUR #2
Parent #2 Walk to Store
Parent #2 Walk Dog to Park
Go to Restaurant
Go to Store
Parent #2, Child #2 --TOUR #3
Parent #2, Child #2
Biking to and on Trails
Parent #2, Child #2 Walk to Open Space
Parent #2, Child #2 Pick Child #1 at School
Child #1 Walk Dog to Park
Parent #2, Child #2 Walk to Tennis Court
Child #1 Walk to Friend's House
Parent #1 Drive from Work to Home
Parent #1 Biking to and on Trails
Walk
Bike
Drive
0.25
0.5
0.75
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0

Elements of Accessibility:

"Frequency" (Land Use)	"Proximity" (Transportation)
Number of Opportunities	***Time / Distance***

Number of Stores within 10 minute WALK.
Number of Parks within 30 minute BIKE.
Number of Homes within 20 minutes WALK of Each Store.
Number of Jobs within 30 minute WALK of Each Home.

INDEX Pedestrian Accessibility

SMART GROWTH INDEX®

A Sketch Tool for Community Planning

Reference Guide

June 2001

Prepared for the
U.S. ENVIRONMENTAL PROTECTION AGENCY
by
Criterion Planners/Engineers
with
Fehr & Peers Associates

INDEX PlanBuilder

Planning Support System
Release 9.2

User Notebook

CRITERION PLANNERS

CRITERION

www.crit.com

INDEX Pedestrian Accessibility

Definition and Units: Average percent of user-defined origins within 15-minute walk time to user-designated destination points, weighted by pedestrian trip generation and attraction capacity of origins and destinations.

Illustrative Scores: Varies by study area and distribution of user-defined points.

General formula:

$$\frac{\sum_{d}\left(\frac{\sum_{aod} W_{aod}}{\sum_{iod} W_{iod}} * W_{d}\right)}{\sum_{d} W_{d}} * 100$$

Source: INDEX User's Guide, p. 71.

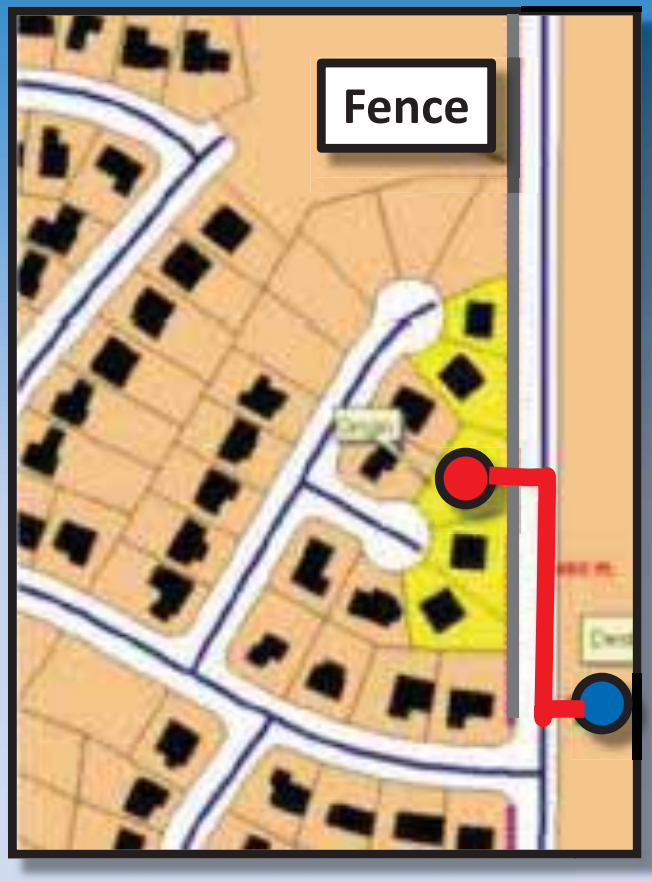
T_{od} = shortest network travel time in feet from origin point o to nearest destination point d.

W_{aod} = pedestrian accessibility weight for accessible origin point aod, where an origin point o is "accessible" if it has a $T_{od} \leq 15$.

W_{iod} = pedestrian accessibility weight for origin point iod, if iod is within ¼ r linear distance in miles of destination point d, where r is the maximum walking speed in miles per hour.

W_{d} = pedestrian accessibility weight for destination point d.

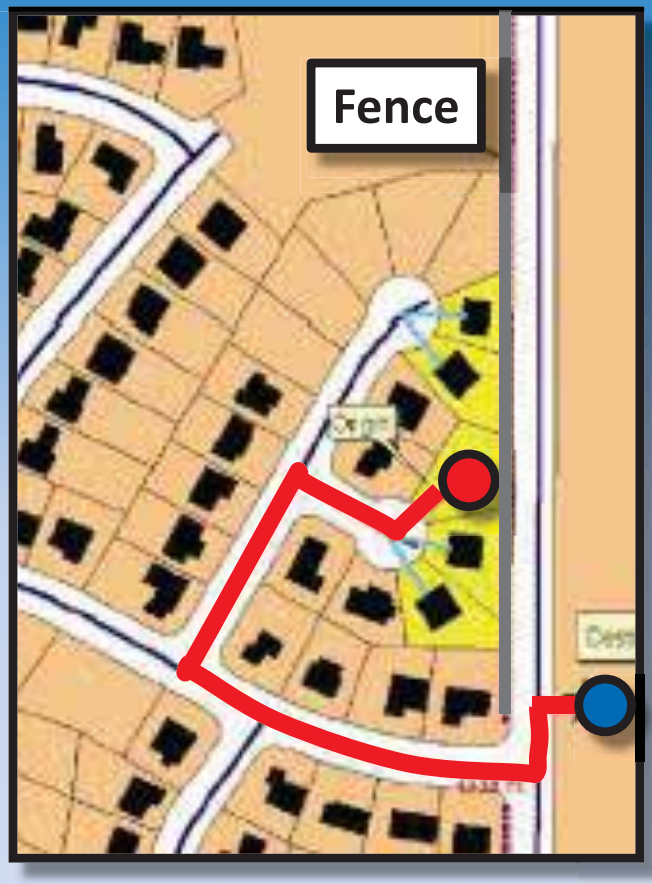
INDEX Pedestrian Accessibility



Path: Center-of-Road
"Shortest Route"

Crosses Barrier

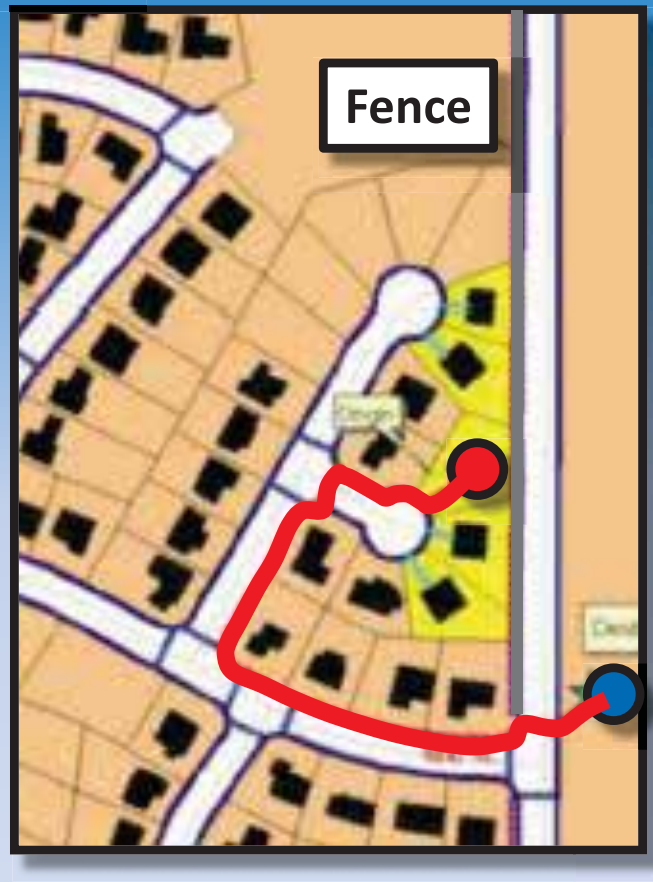
410 Feet



Path: Center-of-Road

Does Not Cross Barrier

1,240 Feet



Path: Sidewalks & Crosswalks

Does Not Cross Barrier

1,050 Feet

Development of a Comprehensive, Multi-Modal Travel Accessibility System at the Tax Parcel Level

David P. Racca

Center for Applied Demography & Survey Research
College of Arts and Sciences

Newark, Delaware

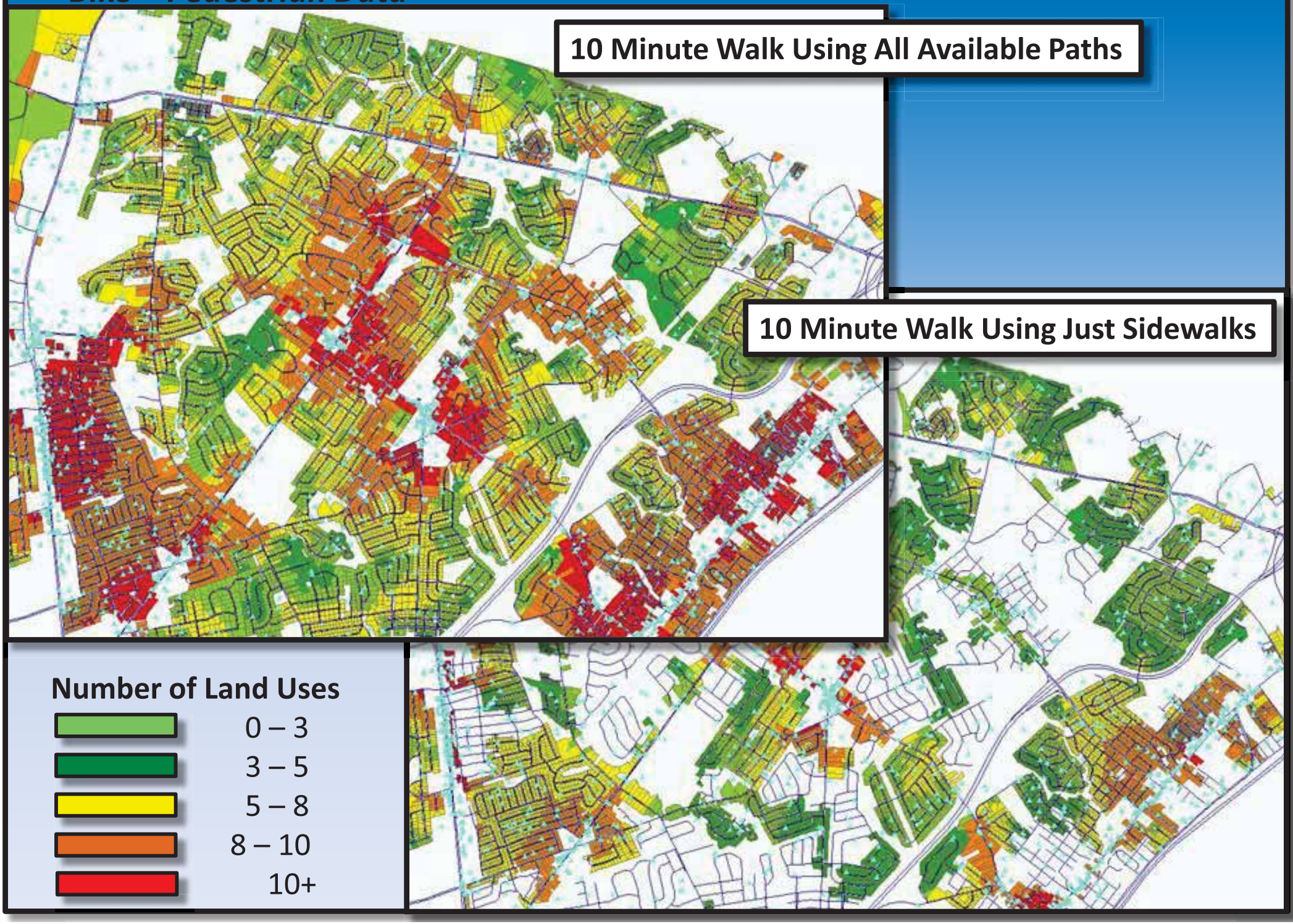
September 2013

Statewide Accessibility Factor for Each Residential Parcel.

Number of Destinations for 15-Minute Walk or Bike.

"Cumulative Opportunity" ArcGIS Network Analyst O-D Cost Matrix

Bike – Pedestrian Data



Bike – Pedestrian Data

Number of Destinations, Within 15-Minute Walk

- 2- 25
- 25- 50
- 50 - 75
- 75 - 100
- 100 - 181

Estimated Result of Adding New Path

Sample
Trip Generation Rates for
AM Peak Home-to-Work Trips:

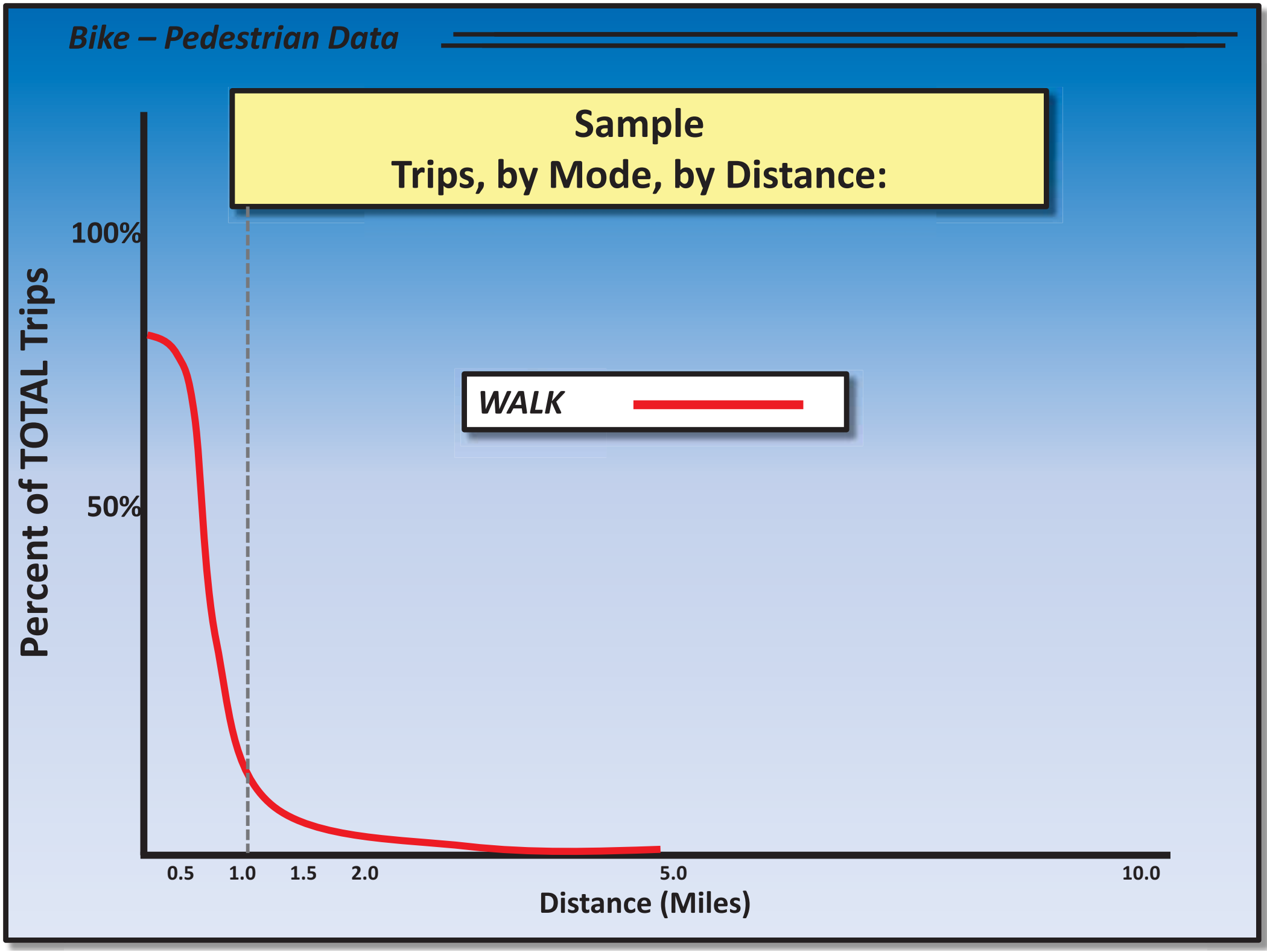
More Auto Trips

	Access Level 1	Access Level 2	Access Level 3	Access Level 4	Access Level 5
Auto	**2.50**		3.25		**4.20**
Transit	0.25		0.05		0.02
Bike	0.50		0.15		0.10
Walk	**1.55**		0.50		**0.10**

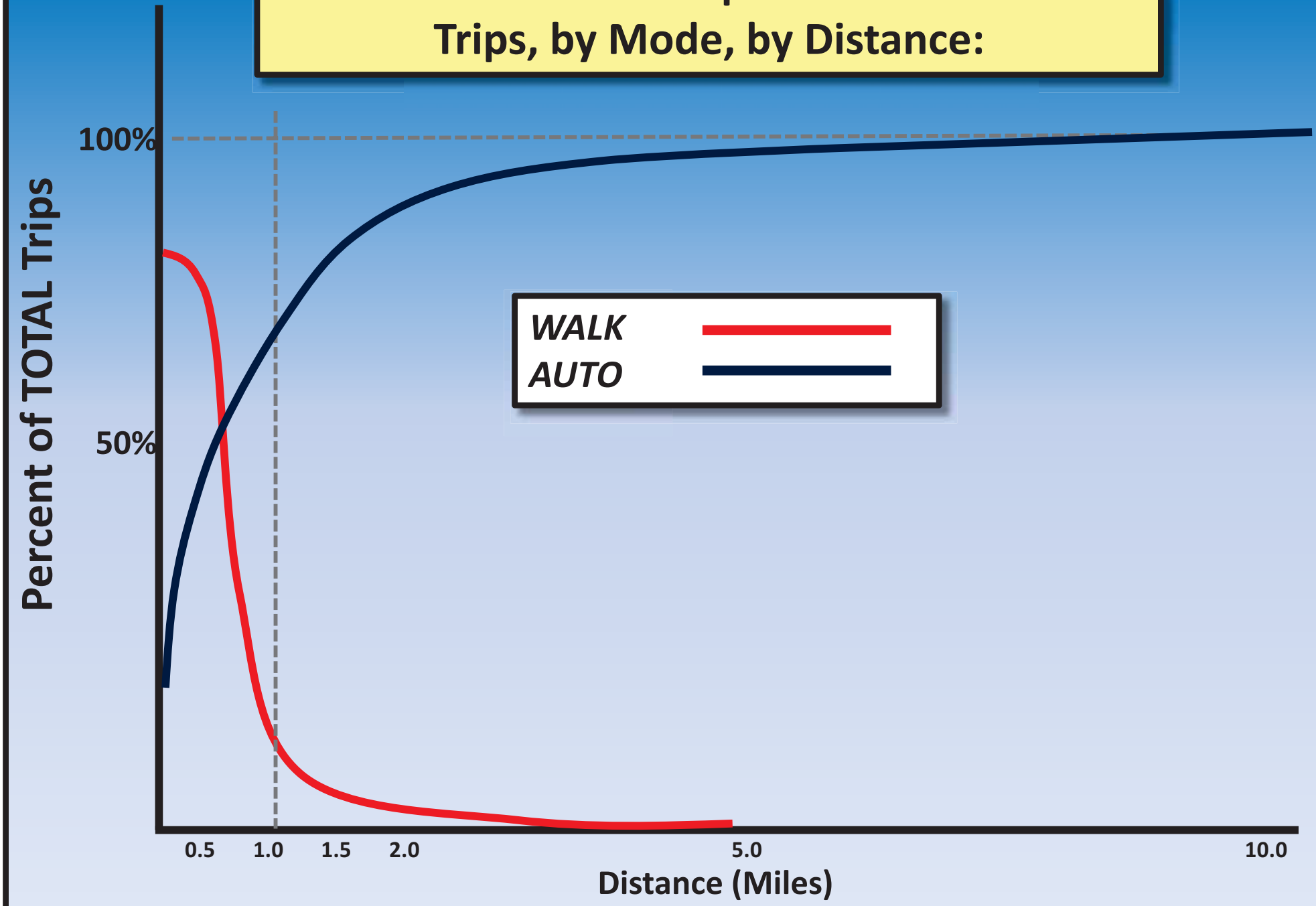
More Bike/Ped Trips

More Accessible ⟷ ***Less Accessible***

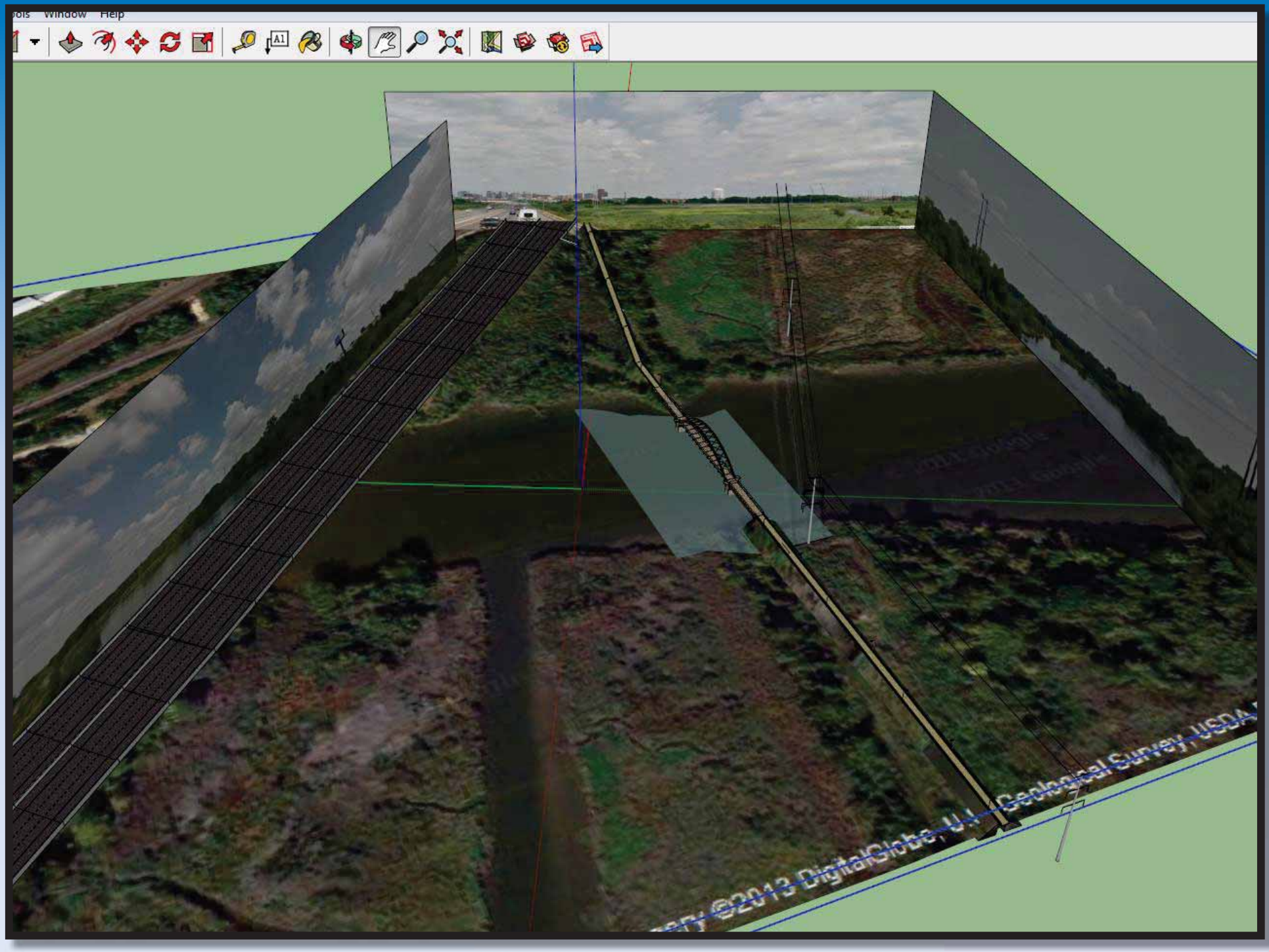
AFTER IMPROVEMENTS


Sample
Trips, by Mode, by Distance:
100%
50%
Percent of TOTAL Trips
WALK
0.5
1.0
1.5
2.0
5.0
10.0
Distance (Miles)

Sample
Trips, by Mode, by Distance:



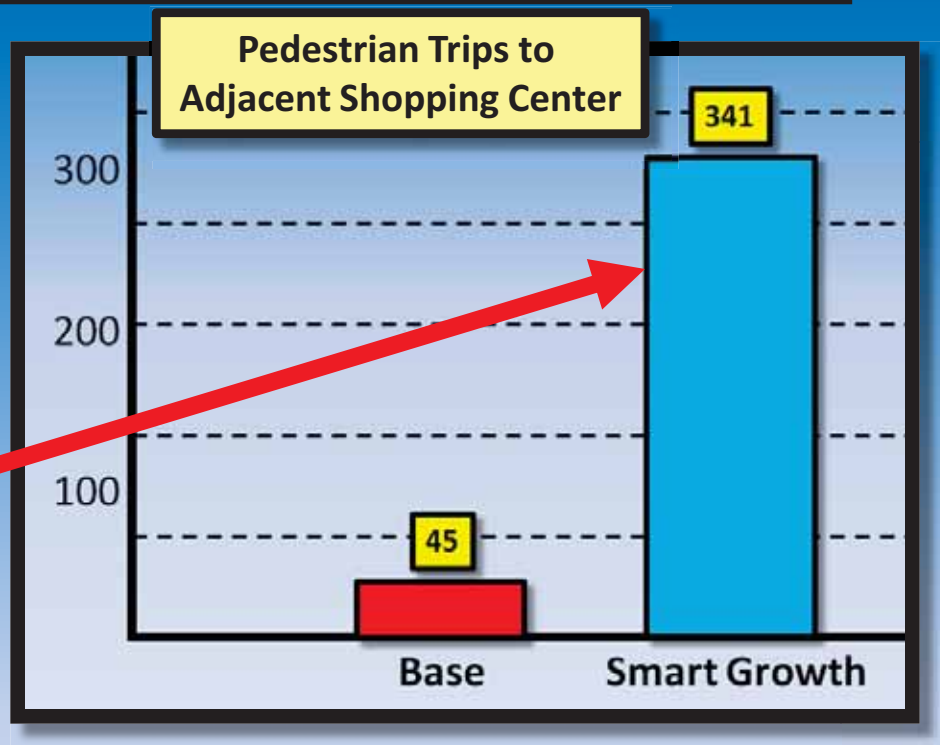
Bike – Pedestrian Data

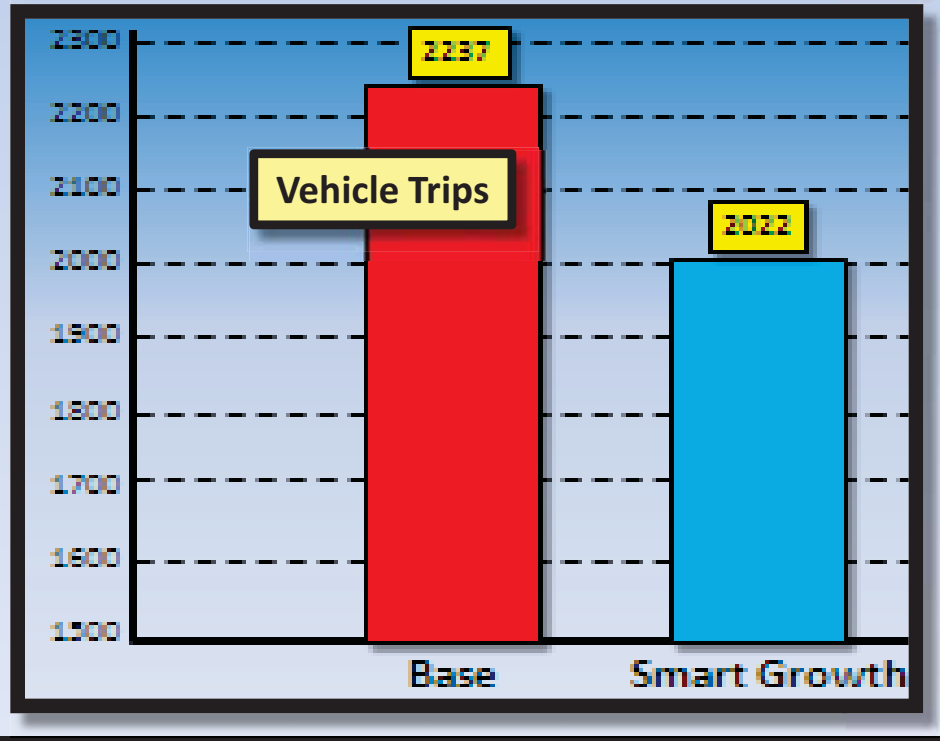


Applications:

Applications:

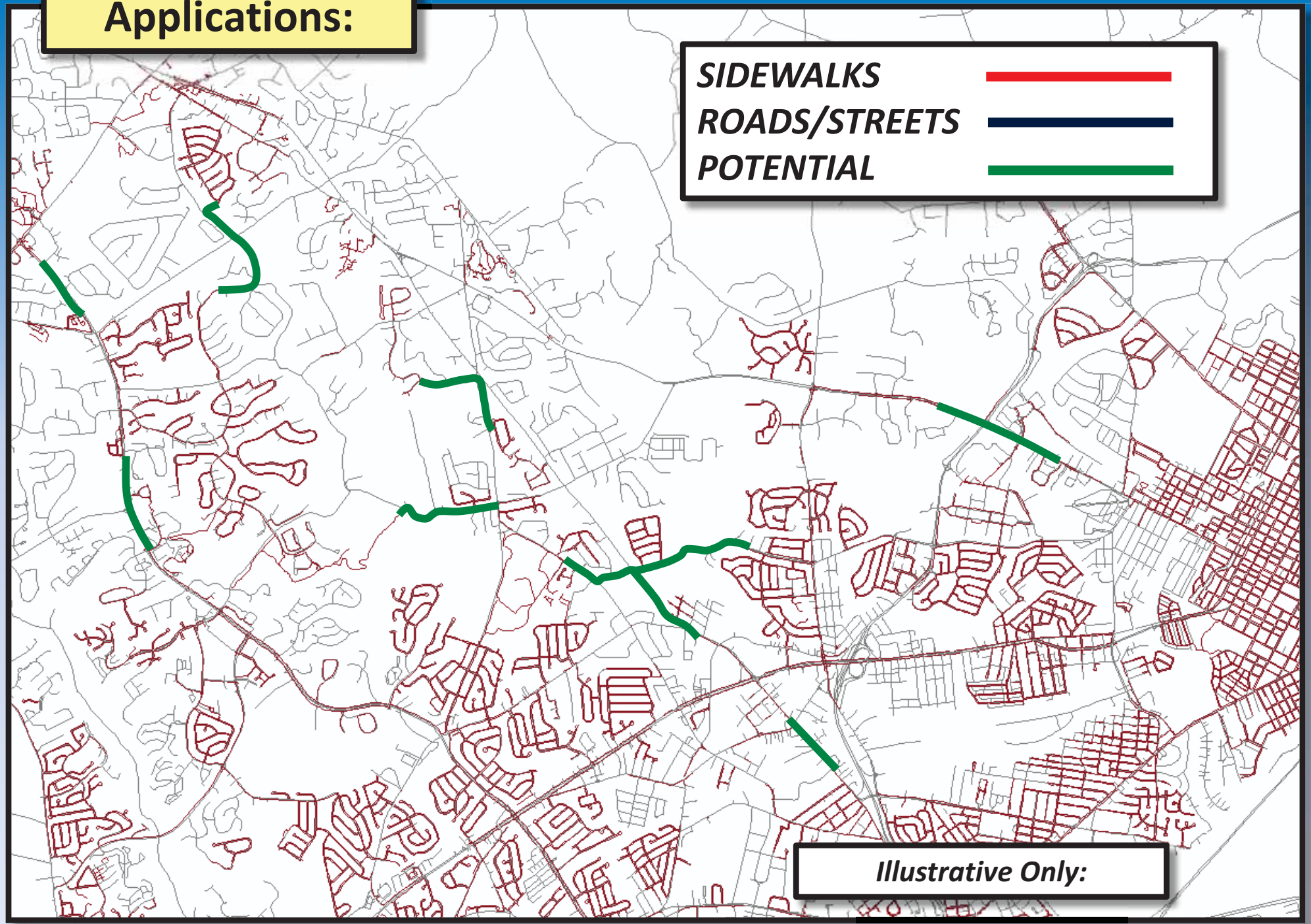
- **Significant Increase in Bike/Walk Trips**
- **10% Decrease in Auto Trips to Shopping**
- **Less Travel on Arterials & Key Intersections**
- **11% Less Emissions / Unit**





Bike – Pedestrian Data

Applications:



THANK YOU !!!

STREETSCAPE IMPROVEMENTS
PEDESTRIAN CROSSING IMPROVEMENTS
CROSSWALK MARKINGS