Walking, Bicycling and Trails: Innovations in Transportation

Spring 2007

State University of New York at Albany
Department of Geography and Planning
UAlbany - USA

Bicycle and Pedestrian Transportation - PLN 549

http://www.albany.edu/gp/

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“America’s first university course in bicycle and pedestrian transportation”
SECTION 1.

Introduction
### BIKEWAY & WALKWAY STANDARDS

#### QUICK REFERENCE TABLE & METRIC CONVERSION

<table>
<thead>
<tr>
<th>BIKEWAYS</th>
<th>&quot;ENGLISH&quot;</th>
<th>METRIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bike lane</td>
<td>6 feet</td>
<td>1.8 meters</td>
</tr>
<tr>
<td>Shoulder bikeway</td>
<td>6 feet</td>
<td>1.8 meters</td>
</tr>
<tr>
<td>Wide lane</td>
<td>14-15 feet</td>
<td>4.2-4.5 meters</td>
</tr>
<tr>
<td>Multi-use path</td>
<td>10 feet</td>
<td>3 meters</td>
</tr>
<tr>
<td>(high use)</td>
<td>12 feet</td>
<td>3.6 meters</td>
</tr>
<tr>
<td>Bike lane stripe</td>
<td>8 inches</td>
<td>200 millimeters</td>
</tr>
<tr>
<td>Shoulder stripe</td>
<td>4 inches</td>
<td>100 millimeters</td>
</tr>
<tr>
<td>Vertical clearance</td>
<td>10 feet</td>
<td>3 meters</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>WALKWAYS</th>
<th>&quot;ENGLISH&quot;</th>
<th>METRIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sidewalk*</td>
<td>6 feet</td>
<td>1.8 meters</td>
</tr>
<tr>
<td>(on bridge)</td>
<td>7 feet</td>
<td>2.1 meters</td>
</tr>
<tr>
<td>(high use)</td>
<td>8 feet</td>
<td>2.4 meters</td>
</tr>
<tr>
<td>Shy distance</td>
<td>2 feet</td>
<td>0.6 meters</td>
</tr>
<tr>
<td>Sign height</td>
<td>7 feet</td>
<td>2.1 meters</td>
</tr>
</tbody>
</table>

*Clear dimensions, exclusive of curb and obstructions*
This course will present an overview of transportation systems both in the United States and globally with an emphasis on the growing role that walking, bicycling and trails can play in mobility, sustainable development and quality of life.
Key Questions

- How Many of us Walked to School as kids?
- How Many of our kids Walk to School?
- Who knows somebody hit by a car?
- Who lives in a place where you have to walk more than 10 minutes to get milk?
- Who drives an SUV to the gym?
- Do you take the elevator to use the stair master?
- What is the fastest growing sport in the US?
The End Of Nature?
The Environment
The Road to Nowhere
The Transportation “Food Pyramid”

Fats, Oils & Sweets
USE SPARINGLY

Milk, Yogurt, & Cheese Group
2-3 SERVINGS

Meat, Poultry, Fish, Dry Beans, Eggs, & Nuts Group
2-3 SERVINGS

Vegetable Group
3-5 SERVINGS

Fruit Group
2-4 SERVINGS

Bread, Cereal, Rice, & Pasta Group
6-11 SERVINGS
Can Transportation Get Us Back on our Feet?

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SECTION 2.

A Global Perspective for Local Action

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What’s Wrong with this Picture?
The Developing World
Developing the World
Shanghai ends reign of the bicycle
By Tim Luard
BBC News Online

Tuesday, 9 December, 2003, 14:23 GMT

Succumbing at last to the worldwide love affair with the car, China - of all places - is officially turning up its nose at the humble bicycle. Its biggest city, Shanghai, plans to ban bikes from all major roads next year to ease congestion, state-run newspapers said on Tuesday.
The Price of Gas v. the Cost of Gas

- It’s only $2.65 / gallon…
- Who needs conservation? We’ve got the Marines!
- Energy Dependence v. Freedom
- Support for Terrorists
- Physical Inactivity
- Air Pollution
City + Center = Life
Gaviotas and Bogota
Better Roads - 1890

Bicycle club at Ausable Chasm, 1890. The frogman's sign reads “We need good roads - we can't swim all the time.” A reference to the “Good Roads” movement led by the League of American Wheelmen, a nationwide cycling group.

Photograph by O. M. Salzwohl. Courtesy of the Adirondack Museum, Blue Mountain Lake.
Transportation Re-Defined

People Movers.
Moving People and Goods
Sustainable Technology

The Windway

Human powered vehicle street, HPV's (bicycles, rollerbladers, skateboarders, wheelchairs and others.)

No space, no alternatives
We need safe space for alternatives to grow

Broadway Corridor

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Global Culture
SECTION 3. The American Experience

ISTEA and TEA-21

The Transportation Planning Process

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U.S.A.
“America the Beautiful”
The National Trend

Prevalence of Obesity* among U.S. Adults  
BRFSS, 1991

(*Approximately 30 pounds overweight)

Obesity Trends* Among U.S. Adults  
BRFSS, 2001

(\(^{+}\)BMI ≥ 30, or ~30 lbs overweight for 5’4” woman)
Fast Food Nation
Recreation

Obesity Among NYS Adults, By Ethnicity
2001, BRFSS

- White: BMI > 30 = 18%, BMI 25-30 = 37%
- Black: BMI > 30 = 32%, BMI 25-30 = 35%
- Hispanic: BMI > 30 = 23%, BMI 25-30 = 38%
Fitness

Overweight and Obesity Among NYS Adults (2001 BRFSS)

56% of NY Adults are Overweight or Obese

- 21% of Males have BMIs >30
- 29% of Females have BMIs 25-30
- 20% of Total have BMIs 25-30
- 36% of Total have BMIs 25-30

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The Colorado Connection

Denver’s Greenway System

- Mayor’s Greenway Initiative
- Urban Redevelopment / Brownfields Infill
- New REI, Stadium, Amusement Park
- Platte River re-creation (10,000 Trees)
- High Quality Construction
- Comprehensive Management Program
Phoenix Growth

Population Distribution
Since 1970, there have been more people in U.S. suburbs than in central cities or rural areas.

<table>
<thead>
<tr>
<th>Year</th>
<th>Central Cities</th>
<th>Suburbs</th>
<th>Rural Areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>1940</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1950</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>1960</td>
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<td>1970</td>
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<td></td>
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<td>1980</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1990</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The Expanding Metropolis
Phoenix has sprawled almost tenfold since 1950.

- **1994**
  - Area of city: 449.8 sq. mi.
  - Population: 1,052,000
- **1970**
  - Area of city: 247.9 sq. mi.
  - Population: 584,000
- **1950**
  - Area of city: 17.1 sq. mi.
  - Population: 107,000

Source: Bureau of the Census

Source: City of Phoenix Planning Dept.
ISTEA, TEA-21, SAFETEA...

“Show me the Money”
SAFETEA:
The Safe, Accountable, Flexible and Efficient Transportation Equity Act of 2005

- Passed in 2005 after multiple extensions and delays
- New Safe Routes to Schools Program
- Enhancements, CMAQ strengthened
- No “Complete Streets”
- More “Earmarks”
The Highways v. Transit Problem

- What facility does a bus drive on?
- Is a person who walks to the transit stop a pedestrian or a transit rider?
- How should we fund on-street bike lanes that lead to a transit station that has buses with bike racks?
- If we’re spending Highway funding on bike/ped facilities, why aren’t we part of the “highway lobby?”
THE PLANNING PROCESS
Planning Model

The four 'layers':
- Greenways
- On-street improvements
- Pedestrian facilities
- Transit linkages

The key triangle for bicycle and pedestrian planning

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The Third Mode

TOTAL PERSONAL TRIPS BY TRAVEL MODE
WITHIN NYMTC AREA*

- PERSONAL VEHICLES (63.81%)
- TRANSIT (14.80%)
- WALK/BIKE (20.72%)
- AIRPLANE (0.09%) AMTRAK (0.24%)
- OTHER (0.35%)

Source: Planning Data Analysis Group
Data Source: Nationwide Personal Transportation Survey
August 1995

* Residence Based
Physical Inactivity

- Inactive
- Regular Sustained
- Both Regular Vigorous and Regular Sustained
- Regular Vigorous — 20 minutes 3 times per week of vigorous intensity
- Regular Sustained — 30 minutes 5 times per week of any intensity

Safety Data

Frequency of Hospitalizations, Charges and Deaths
Due to Traffic-Related Injuries
0 to 15 Year Olds, New York State, 1990 - 1993

- Bicycle
- Motorcycle
- Motor Vehicle Crash
- Pedestrian

Traffic Hospitalizations (N=13,660)
- 24.5%
- 39.6%
- 2.3%
- 33.7%

Traffic Charges ($82.6 Million)
- 52.4%
- 22.4%
- 2.6%

Traffic Deaths (N=589)
- 37.2%
- 11.4%
- 50.3%
- 1.2%

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Crash Typing

Motorist failed to yield right-of-way at a junction (21.7 percent of all crashes).

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Pedestrian Deaths:
New York State's "Hidden Killer"
An Examination with Legislative Recommendations

A Report to the Legislature by the Legislative Commission on Critical Transportation Choices
Senator Norman J. Levy, Chairman

February 1990
L.O.S. Analytical Approach

\[ \text{BLOS} = a_1 \ln(\text{PCEVol15}/L) + a_2\ln(S(1 + HV)^3) + a_3\ln(\text{COM15NCA}) + a_4(2/\text{PR10})^2 - a_3\text{We2} - c \]
Florida DOT’s new multimodal model integrating walking, bicycling, transit, car and other modes of travel is available online at www.dot.state.fl.us
10 Planning Solutions

- 1. Corner Stores
- 2. Sidewalks & Crossings
- 3. Bike Parking Ordinance
- 4. In Law Apartments
- 5. Access Management
- 6. Streamlined Permits
- 7. Road Diets
- 8. Telecommuting
- 9. Alternate Work Hours
- 10. Mixed Use
SECTION 4.
The Four Layers

Greenways
On-Street Bike Improvements
Pedestrian Facilities
and
Intermodal Connections.
1. GREENWAYS
Toronto
Manhattan’s West Side - 1994
NYC Greenways
San Francisco

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KATY Trail
Missouri, USA
Acadia Trails Forever
Trail Design
A Green Infrastructure

NATIONAL CYCLE NETWORKS IN EUROPE

The Danish Government opened 2,000 kilometres of new national cycle route in 1993, linked with extensive local traffic calming measures. A Danish cyclist is now ten times safer than their counterpart in Britain. Cycling now accounts for nearly 20% of all journeys there - compared to only 2% in Britain.

Holland is well-known for its thousands of miles of national and local cycle network. 60% of Dutch children cycle to school - compared to only 2% in Britain.

Extensive networks of named national routes exist and are being greatly extended in both Germany and Switzerland. Despite higher levels of car ownership than Britain, all these countries are beginning to provide a real choice for those who choose to cycle.

The results are less congestion, less pollution, better health and more attractive town centres for everyone.
New Urban Life
2. ON - STREET BIKE IMPROVEMENTS
It’s the LAW!

The Definition of Traffic

New York State Vehicle and Traffic Law

Section 152. Traffic
Pedestrians...vehicles, bicycles and other conveyances either singly or together while using any highway for the purposes of travel.
Typical Street Sections

BICYCLE ROUTE  INTEGRATED WITH TRAFFIC

BICYCLE LANE  DISTINCT BIKE LANE  bike only lane designated by painted line

BICYCLE PATH  SEPARATED BIKE PATH

BICYCLE AND PEDESTRIAN FACILITIES - TYPICAL SECTIONS
(source: Ottawa, Ontario Bicycle and Pedestrian Program)
Urban Bike Lane
Intersections for Bicyclists

Figure 103: Signalized intersection sensitive to bicycles

1. Loop detectors in bike lane on side street
2. Loop detectors in bike lane prolongs green phase
3. Stencil placed to indicate most sensitive area of loop
4. Push-buttons placed close to the roadway
Advanced Stop Line
Paved shoulders
Route Signs
Dutch Stairway

Figure 94: Stairway provides easy access for bicycles and pedestrians

Grooves in ramps for pushing bicycles
3. PEDESTRIAN FACILITIES
The Safety Standard

The guilty party in traffic accidents?
Liability
Test Vehicles
Information
Keep It Simple
4. INTERMODAL CONNECTIONS
Bikes on Buses
Bikes on CARS
Multimodal Transport
Toronto – Mixed Use Lane
Intermodal Center: Delft
It’s Cheap, It’s Easy, It Works

LOW COST WAYS TO MAKE YOUR FACILITY SAFE AND ACCESSIBLE FOR BICYCLISTS & PEDESTRIANS

- BIKE PARKING RACKS
- BIKE ROUTE SIGNAGE
- HIGH VISIBILITY CROSSWALKS
- BIKE & WALKING MAPS
- BIKE / PED SAFETY RODEO
- 'SHARE THE ROAD' SIGNS
- STRIPED BIKE LANES
- ROUTINE MAINTENANCE
- POLICE ON BIKES
- INTEGRATE IN CAPITAL PROJECTS
Section 6.

TRAFFIC CALMING
Speed Kills

Pedestrians’ chances of death if hit by a motor vehicle

SOURCE: Killing Speed and Saving Lives, UK Department of Transportation

15% 45% 85%
32 km/h 50 km/h 65 km/h
20 MPH 30 MPH 40 MPH

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Traffic Calming

Traffic Calming Devices

Narrowing the Street
- Strips lanes

Deflecting the Vehicle Path
- Chicane

Sharing the Pavement
- Centered Mid-block Yield Point
- Offset Yield Point
- Intersection Yield Point
- On-Streets, Parking One Side
Arterial Streets

Existing Arterial Through Hamlet - 52' Width Discourages Pedestrian Crossing
- 6-Lane Wide Appearance Promotes Speeding

Pedestrian Friendly Main Street - Crosswalk Shortened with Flared Sidewalks
- Street Trees and On-Street Parking serve as Buffer Zone between Sidewalk and Traffic
- Median Acts as Pedestrian Refuge Island
- 2-Lane Boulevard Slows Traffic in Hamlet
Roundabouts

Figure 112: Modern urban roundabout
Woonerf

Figure 1. A Model "Woonerf"
Integrated Design: Complete Streets
Las Vegas Strip

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Intersection Problem
Intersection Solution
Section 7.

RE: DEVELOPING SUBURBIA
A Cartoon World
The Suburban Strip
Toys Are U.S.
Suburban Streets
Cars on Vacation
New Suburbanism

Discouraged: Winding streets and cul-de-sacs exacerbate traffic.

Preferred: Streets converge on transit and commercial center.

SOURCE: "THE NEXT AMERICAN METROPOLIS," BY PETER CALTHORPE

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Infill on the Strip
Section 8.
Main Streets
Miracle on 34th St.
Main Street - USA
Main Street – The Netherlands
Economic Development
The Art of Public Places
The “Main Street” Way of Life

“...The community is committed to maintaining this unique harmony through wise long term planning and by pursuing development that is environmentally and economically sustainable...”

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Street Crossings
The Corning Plan

Centerway Square involves implementation of the approved plan for streetscape and landscape improvements around the old Centerway Clocktower. The new square will effectively link Market Street with the parking garage, Centerway Bridge, the Corning Glass Corporate Building and the proposed Intown Park.

Canfield Park Residential proposes conversion of a portion of Canfield Park to new luxury townhouse and condominium residential units and provides an opportunity for creating new housing for the Intown area.

Intown Park involves the conversion of the existing 2.6-acre parking lot into a major new Intown urban park. This park will provide a beautifully landscaped focal point in the heart of Intown Corning, and space for outdoor entertainment activities and public functions.
Corning Square
Chicago O’Hare
SECTION 9.
TOOLS OF THE TRADE
IMPORTANT RESOURCES


The Dutch Bicycle Master Plan: Description and Evaluation in an Historical Context, MINISTRY OF TRANSPORT, PUBLIC WORKS and WATER MANAGEMENT, The Netherlands, 1999

MUTCD
Vision
Kodak Moment?
A New Way to Visit
Grand Canyon Greenway

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Millennium Trails
National Leadership
October 5, 1998
Connections

www.millenniumtrails.org or call 1-877-MIL-TRLS.
Make no Small Plans...
Sustrans
Art on the Tracks

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EuroVelo
SECTION 10.
Creating a Balanced Program:
Beyond Engineering, Education and Enforcement
ENGINEERING:
The Delta Work
EDUCATION: Safety Info

Getting There Safely
by foot, by bike, by bus, by car

A traffic safety booklet for young persons (and grown-ups)

Cornell Cooperative Extension

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ENCOURAGEMENT

NEW YORK STATE

Bike & Walk Week '96

the healthy way to go!

FUN
HEALTHY
INEXPENSIVE
NON-POLLUTING
RELIEVES CONGESTION
CONSERVES RESOURCES
EVERY SEAT'S A WINDOW SEAT

Tuesday  May 21, 1996  12:00 Noon
Empire State Plaza (State Street side North)

RAIN DATE - May 22, 1996

For more information contact:
New York State Department of Transportation, Statewide Bicycle and Pedestrian Program, 457-8307
New York State Department of Health, Bureau of Community Relations, 474-5370

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ENFORCEMENT

- Targeted / Specific
- It worked for DWI!
- The Rules of the Road
- The Rule of Law
Safe Routes to Schools
BIG PICTURE ISSUES
Advocacy

Texas Bicycle Coalition
P.O. Box 1121, Austin, Texas 78767 (512) 476-7433

The Texas Bicycle Coalition is a not-for-profit, membership organization that advocates the advancement of bicycling access, safety and education in Texas.
Quality of Life
Social Life
Tools You Can Use

- Walk / Bike Audit
- Pedestrian Safety Roadshow
- NYBC.net
- Quality Communities
- Healthy Heart Program
- Bicycle Friendly Communities
- Safe Routes to Schools
- The President’s Council
Tourism (eco, heritage, cultural)
Smart Growth
Beauty
It’s Fun

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The Future?
Section 10.

MID – TERM EXAM
SECTION 11/12.

“Charrette”:
Redevelopment of a Placeless Context
Thank You