pennsylvania
DEPARTMENT OF TRANSPORTATION

Mn/DOT Flexible Design Forum
February 23, 2009

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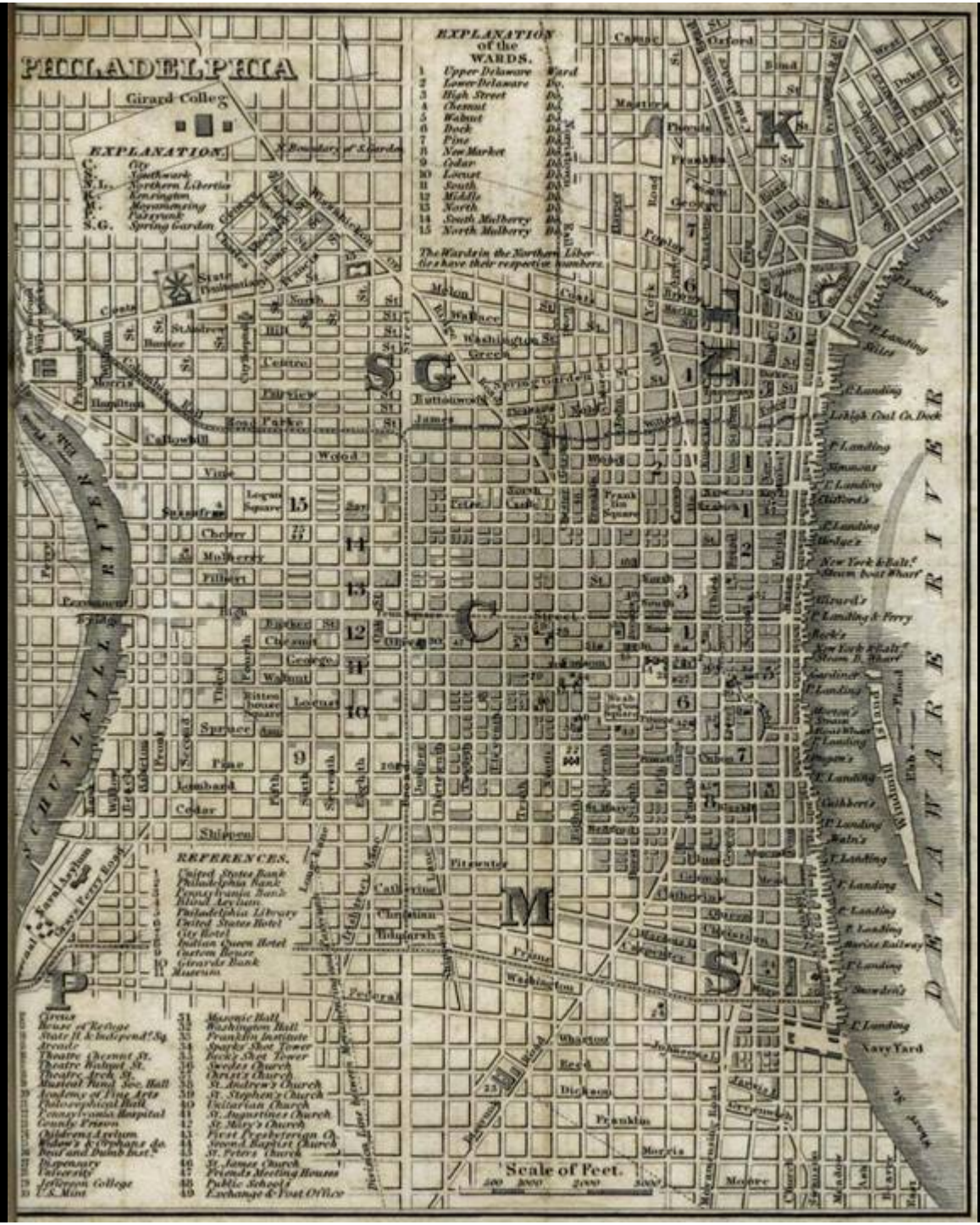
Bureau of Design
PennDOT

Smart **Transportation**
it starts with me

1

Why is transportation changing?

Transportation is Always Changing


PHILADELPHIA
Girard College
EXPLANATION
EXPLANATION of the WARDS.
1 Upper Delaware Ward
2 Lower Delaware Do.
3 High Street Do.
4 Chesnut Do.
5 Walnut Do.
6 Dock Do.
7 Pine Do.
8 New Market Do.
9 Cedar Do.
10 Locust Do.
11 South Do.
12 Middle Do.
13 North Do.
14 South Mulberry Do.
15 North Mulberry Do.
The Wards in the Northern Liberties have their respective numbers.
REFERENCES.
Scale of Feet.
DELAWARE RIVER
SCHUYLKILL RIVER

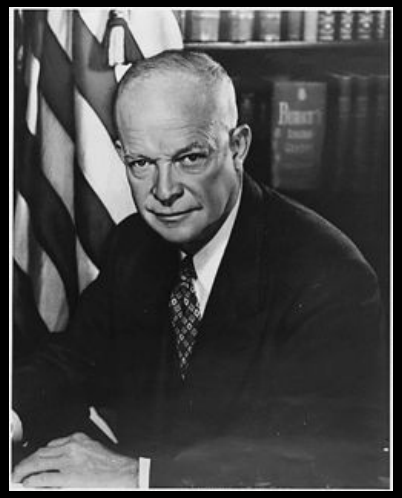
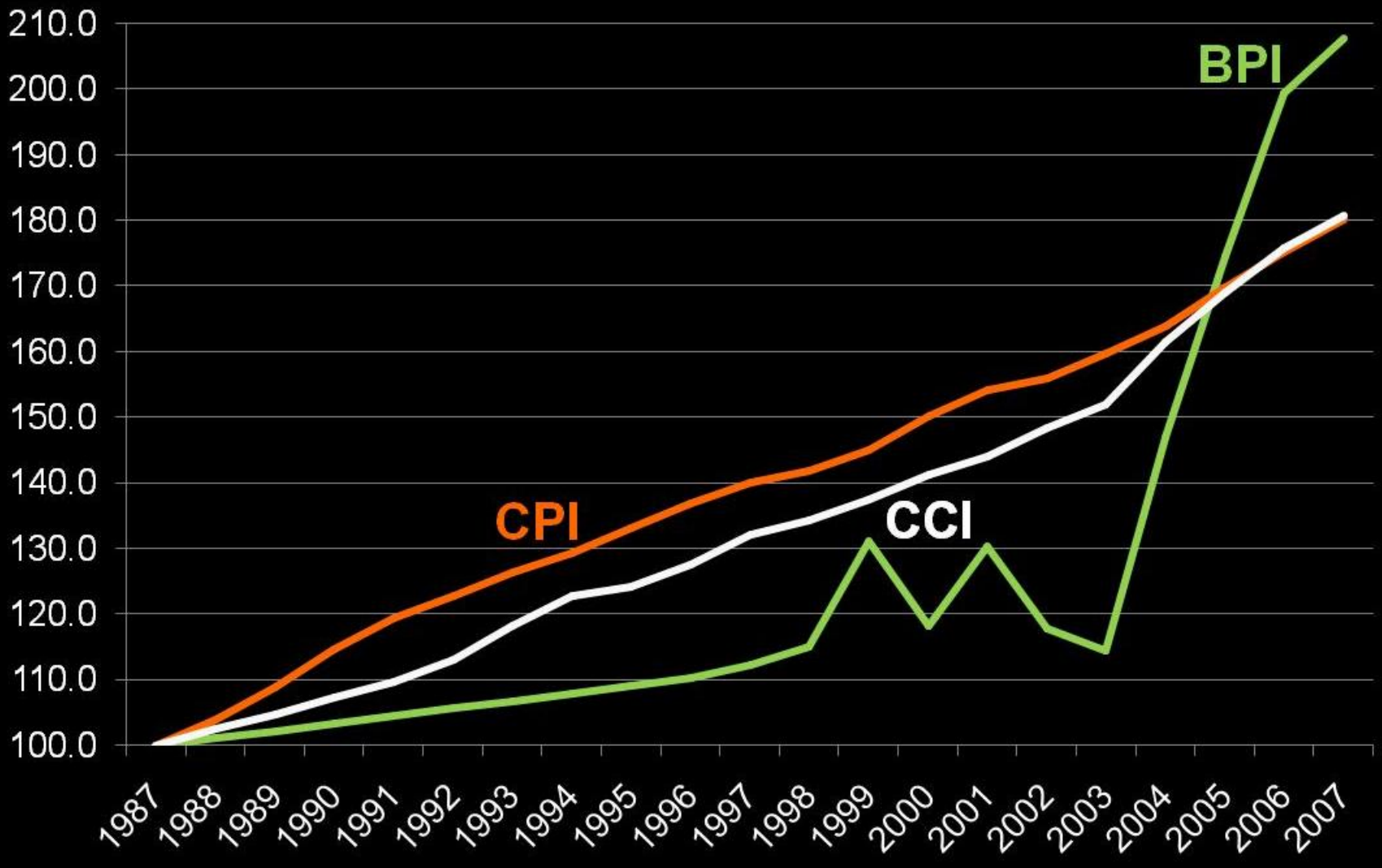


Photo Source: Used with permission from Orange County Regional History Center


McDonald's
Restaurant
STAPLES


TO 76 WEST
Valley Forge
LEFT 1½ MILES
TO 76 EAST
Whitman Br.

Inflation Indices



Sources: FHWA Bid Price Index for PA (BPI), Engineering News Record Construction Cost Index (CCI), Bureau of Labor and Statistics Consumer Price - Index (CPI), compared to 3% Annual Increase Base Line (Calendar Year)

Revenue sources for financing transportation projects are severely limited.

Photographer: penywise. Used through license agreement with morguefile.com

Nearly 25% of Pennsylvania's bridges are structurally deficient.

Pennsylvania ranks last in the nation in this statistic.

Gas Prices

	Jan 2003	Sept 22 2008	Increase
Gasoline	$1.41	$3.71	**???**
Diesel	$1.50	$3.95	**???**

18% of an average household budget spent on transportation

In automobile-dominated regions, this figure can exceed 30% - often more than a family spends on housing

Source: U.S. Department of Energy; Bureau of Labor Statistics

Our Environment and Quality of Life

Revenue Limitations

Increased Construction Costs

Increased Energy Costs

Economic Revitalization

Environmental Concerns

Quality of Life

We Must Do Transportation Differently in Pennsylvania

Photographer: heyjude. Used through license agreement with morguefile.com

2

What is Smart Transportation?

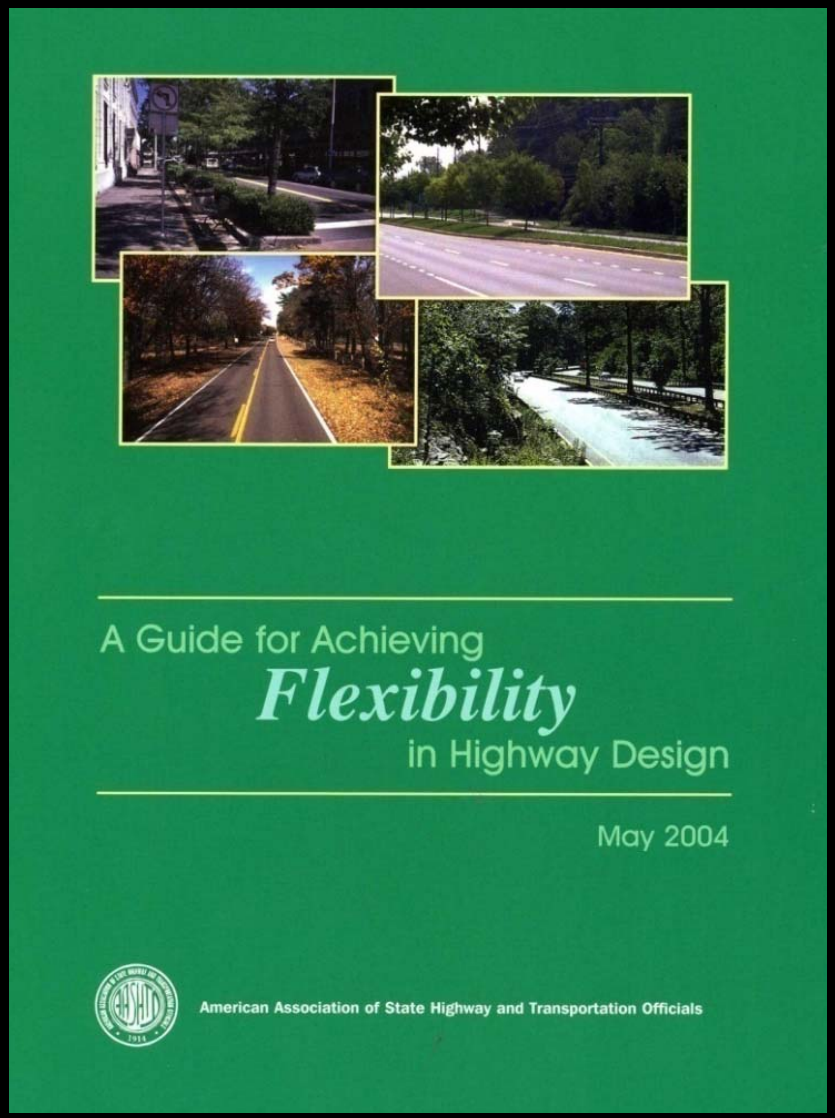
Smart Transportation Themes

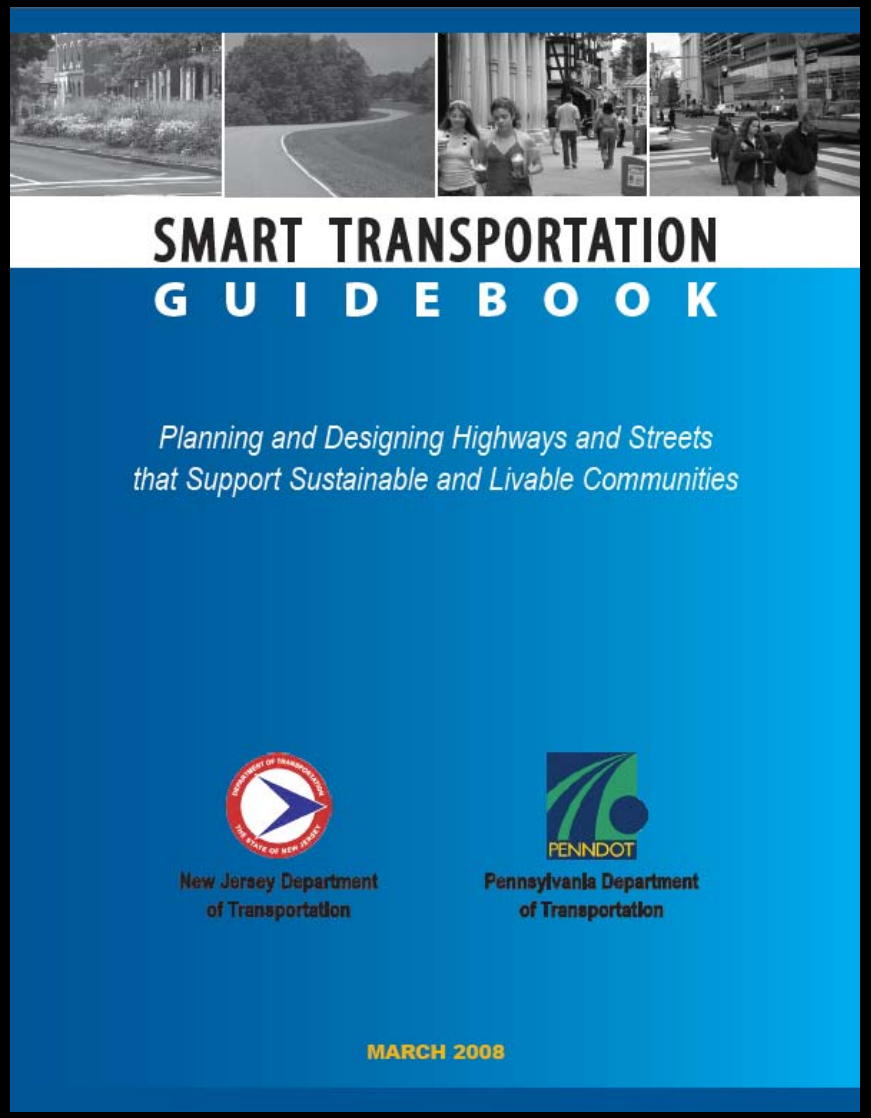
- Money counts
- Choose projects with high value/price ratio
- Enhance the Local Network
- Look beyond level-of-service
- Safety first and maybe safety only
- Accommodate all modes
- Leverage and preserve existing investments
- Build towns not sprawl
- Develop local governments as strong land use partners
- Understand the context; plan and design within the context

Smart Transportation
is partnering to build great
communities for future
generations of Pennsylvanians
by linking transportation
investments and land use
planning and decision making.

Smart Transportation Means Listening

Smart Transportation Means Flexibility





Smart Transportation Means Choice

Smart Transportation Means Safety

Fundamentally,
smart transportation is about
linking land use & transportation
decisions and investments.

3

How will PennDOT do this?

SMART TRANSPORTATION GUIDEBOOK

Planning and Designing Highways and Streets that Support Sustainable and Livable Communities

New Jersey Department of Transportation

Pennsylvania Department of Transportation

MARCH 2008

Integrating Smart Transportation

Understand the Context

Must be determined in Planning – Pre TIP

Context **MUST** consider:

- Land Use
- Community
- Environment
- Transportation
- Financial

Integrating Smart Transportation

Scale Solutions to the Problem (right-sizing)

- **Establish the Right Program**
  - **Program must address urgent problems**
- **Establish the Right Projects**
  - **Needs must focus on problems**

Smart Transportation Strike-Off Letter

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION

DATE: September 18, 2008 432-08-12

SUBJECT: Smart Transportation Interim Policy

TO: **District Executives**

FROM: Brian G. Thompson, P.E. /s/ David J. Azzato, P.E.
Director
Bureau of Design

The recent release of PennDOT's Smart Transportation Guidebook is intended to guide the design of roadways and bridges that fit within the existing and planned contexts of the communities through which they pass, and to develop the best and most affordable transportation solutions.

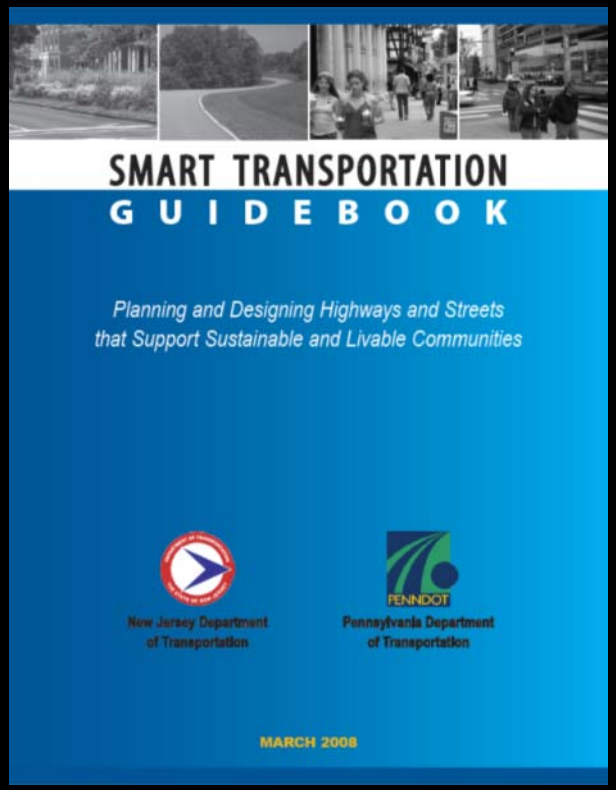
The purpose of this Strike-Off Letter is to implement policy for the design of roadways that better reflect their context within the larger transportation network. These changes immediately implement the recommended design values from the Smart Transportation Guidebook into our design policy, and provide more flexibility for our designs. This time-

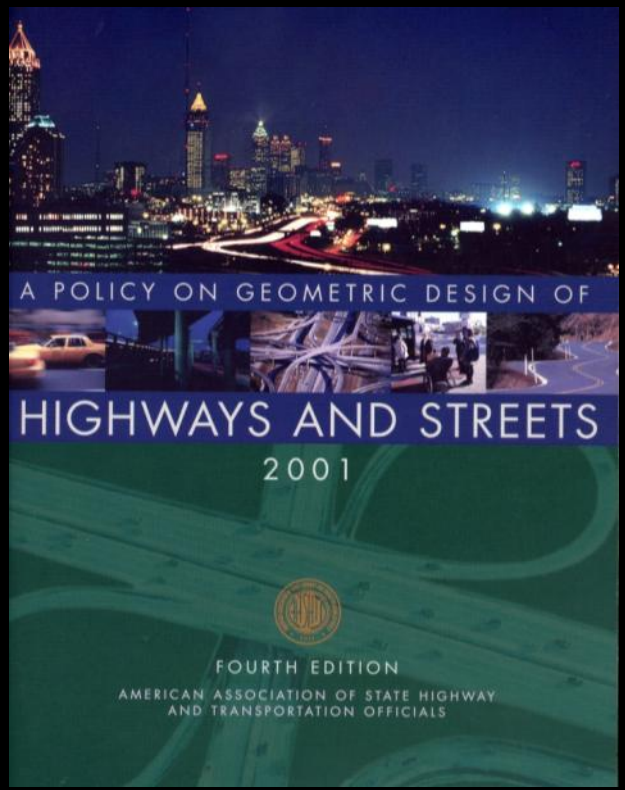
Integrating Smart Transportation

Revisions to Design Manuals

- Interim Design Policy – Issued September 18, 2008
  - Roadway/Context Typologies
  - Expanded Bridge Width Criteria
  - Design Speed
  - Highway Occupancy Permit Policy
- Design Manuals Under Revision
  - Design Manual Part 1
  - Design Manual Part 2

The Smart Transportation Guidebook is fully compatible and consistent with AASHTO.





Defining the Contexts

	RURAL	SUBURBAN			URBAN		
							
	Rural	Suburban Neighborhood	Suburban Corridor	Suburban Center	Town/Village Neighborhood	Town Center	Urban Core
DENSITY UNITS	1 DU/ac - 8DU/ac	1 DU/ac – 8DU/ac	2 – 30 DU/ac	3 – 20 DU/ac	4 – 30 DU/ac	8 – 50 DU/ac	16 – 75 DU/ac
BUILDING COVERAGE	NA	<20%	20% - 35%	35% - 45%	35% - 50%	50% - 70%	70% - 100%
LOT SIZE/AREA	20 acres	5,000 – 80,000 sf	20,000 - 200,000 sf	25,000 – 100,000 sf	2,000 – 12,000 sf	2,000 – 20,000 sf	25,000 – 100,000 sf
LOT FRONTAGE	NA	50 to 200 feet	100 to 500 feet	100 to 300 feet	18 to 50 feet	25 to 200 feet	100 to 300 feet
BLOCK DIMENSIONS	NA	400 wide x varies	200 wide x varies	300 wide x varies	200 by 400 feet	200 by 400 feet	200 by 400 feet
MAX. HEIGHT	1 to 3 stories	1.5 to 3 stories	retail-1 story; office 3-5 stories	2 to 5 stories	2 to 5 stories	1 to 3 stories	3 to 60 stories
MIN./MAX. SETBACK	Varies	20 to 80 feet	20 to 80 feet	20 to 80 feet	10 to 20 feet	0 to 20 feet	0 to 20 feet

Roadways in Context

Figure 5.1 Roads in Context

The photos enclosed in a yellow box indicate the Town Center and Core City streets that also operate as a local or regional Main Street.

Why rethink functional classification?

Just a few reasons…

- Some arterials carry predominantly local traffic and have many access points
- The design speed for the arterial class can be too high for an arterial serving as the "Main Street" of a community
- As land uses change, so should roadway design

Both of these roadways are principal arterials

Regional Arterial

	Regional Arterial	Rural	Suburban Neighborhood	Suburban Corridor	Suburban Center	Town/Village Neighborhood	Town/Village Center	Urban Core
Roadway	Lane Width[1]	11' to 12'	11' to 12' (14' to 15' outside lane if no shoulder or bike lane)	11' to 12' (14' to 15' outside lane if no shoulder or bike lane)	11' to 12' (14' outside lane if no shoulder or bike lane)	10' to 12' (14' outside lane if no shoulder or bike lane)	10' to 12' (14' outside lane if no shoulder or bike lane)	10' to 12' (14' outside lane if no shoulder or bike lane)
	Paved Shoulder Width[2]	8' to 10'	8' to 10'	8' to 12'	4' to 6' (if no parking or bike lane)	4' to 6' (if no parking or bike lane)	4' to 6' (if no parking or bike lane)	4' to 6' (if no parking or bike lane)
	Parking Lane[3]	NA	NA	NA	8' parallel	8' parallel; see 7.2 for angled	8' parallel; see 7.2 for angled	8' parallel
	Bike Lane	NA	5' to 6' (if no shoulder)	6' (if no shoulder)	5' to 6'	5' to 6'	5' to 6'	5' to 6'
	Median	4' to 6'	16' to 18' for LT; 6' to 8' for pedestrians only	16' to 18' for LT; 6' to 8' for pedestrians only	16' to 18' for LT; 6' to 8' for pedestrians only	16' to 18' for LT; 6' to 8' for pedestrians only	16' to 18' for LT; 6' to 8' for pedestrians only	16' to 18' for LT; 6' to 8' for pedestrians only
	Curb Return	30' to 50'	25' to 35'	30' to 50'	25' to 50'	15' to 40'	15' to 40'	15' to 40'
	Travel Lanes	2 to 6	2 to 6	4 to 6	4 to 6	2 to 4	2 to 4	2 to 6
Roadside	Clear Sidewalk Width	NA	5'	5' to 6'	5' to 6'	6' to 8'	6' to 10'	6' to 12'
	Buffer[4]	NA	6'+	6' to 10'	4' to 6'	4' to 6'	4' to 6'	4' to 6'
	Shy Distance	NA	NA	NA	0' to 2'	0' to 2'	2'	2'
	Total Sidewalk Width	NA	5'	5' to 6'	9' to 14'	10' to 16'	12' to 18'	12' to 20'
Speed	Desired Operating Speed	45-55	35-40	35-55	30-35	30-35	30-35	30-35

1 12' preferred for regular transit routes, and heavy truck volumes > 5%, particularly for speeds of 35 mph or greater.
2 Shoulders should only be installed in urban contexts as a retrofit of wide travel lanes to accommodate bicyclists.
3 Buffer is assumed to be planted area (grass, shrubs and/or trees) for suburban neighborhood and corridor contexts; street furniture/car door zone for other land use contexts. Min. of 6' for transit zones.
4 Curb return radius should be as small as possible. Number of lanes, on street parking, bike lanes, and shoulders should be utilized to determine effective radius.

Community Arterial

	Community Arterial	Rural	Suburban Neighborhood	Suburban Corridor	Suburban Center	Town/Village Neighborhood	Town/Village Center	Urban Core
Roadway	Lane Width[1]	11' to 12'	10' to 12' (14' outside lane if no shoulder or bike lane)	11' to 12' (14' to 15' outside lane if no shoulder or bike lane)	10' to 12' (14' outside lane if no shoulder or bike lane)	10' to 12' (14' outside lane if no shoulder or bike lane)	10' to 12' (14' outside lane if no shoulder or bike lane)	10' to 12' (14' outside lane if no shoulder or bike lane)
Roadway	Paved Shoulder Width[2]	8' to 10'	4' to 8' if no parking	8' to 10'	4' to 6' (if no parking or bike lane)	4' to 6' (if no parking or bike lane)	4' to 6' (if no parking or bike lane)	4' to 6' (if no parking or bike lane)
Roadway	Parking Lane[3]	NA	7' to 8' parallel	NA	8' parallel; see 7.2 for angled	7' to 8' parallel; see 7.2 for angled	7' to 8' parallel; see 7.2 for angled	7' to 8' parallel; see 7.2 for angled
Roadway	Bike Lane	NA	5' to 6' (if no shoulder)	5' to 6' (if no shoulder)	5' to 6'	5' to 6'	5' to 6'	5' to 6'
Roadway	Median	4' to 6'	12 to 18; for LT; 6' to 8' for pedestrians	12 to 18 for LT; 6' to 8' for pedestrians	12 to 18 for LT; 6' to 8' for pedestrians	12 to 18 for LT; 6' to 8' for pedestrians	12 to 18 for LT; 6' to 8' for pedestrians	12 to 18 for LT; 6' to 8' for pedestrians only
Roadway	Curb Return	25' to 50'	25' to 35'	25' to 50'	20' to 40'	15' to 30'	15' to 35'	15' to 40'
Roadway	Travel Lanes	2 to 4	2 to 4	2 to 4	2 to 4	2 to 4	2 to 4	2 to 4
Roadside	Clear Sidewalk Width	NA	5'	5' to 6'	6'	6' to 8'	6' to 10'	8' to 14'
Roadside	Buffer[4]	NA	6'+	5' to 10'	4' to 6'	4' to 6'	4' to 6'	4' to 6'
Roadside	Shy Distance	NA	NA	NA	0' to 2'	0' to 2'	2'	2'
Roadside	Total Sidewalk Width	NA	5'	5' to 6'	10' to 14'	10' to 16'	12' to 18'	14' to 22'
Speed	Desired Operating Speed	35-55	30-35	35-50	30	25-30	25-30	25-30

1 12' preferred for reguar transit routes, and heavy truck volumes > 5%, particularly for speeds of 35 mph or greater.
2 Shoulders should be installed in urban contexts only as part of a retrofit of wide travel lanes, to accommodate bicyclists.
3 7' parking lanes on this roadway type to be considered in appropriate conditions.
4 Buffer is assumed to be planted area (grass, shrubs and/or trees) for suburban neighborhood and corridor contexts; street furniture/car door zone for other land use contexts. Min. of 6' for transit zones.

Sources for values in matrix: AASHTO Green Book (2001), and ITE "Context Sensitive Solutions in Designing Major Urban Thoroughfares for Walkable Communities" (2006).

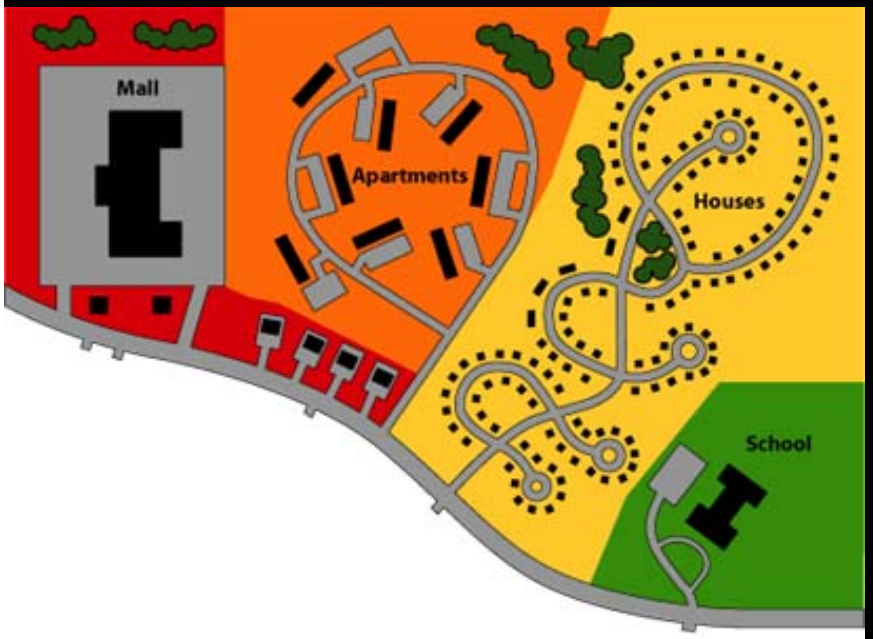
Desired Operating Speed

Also Known as "Design To" or "Target Speed"

Definition: The speed of traffic that, in the expert judgments of the highway engineer and community planner, best reflects the function of the roadway and the surrounding land use context.

Simple Definition: The speed at which we would like vehicles to travel.

Which Type of Network is Best?



- *Hint: One network offers more flexibility in designing individual roadways, and gives more choices to motorists, bicyclists and pedestrians alike.*

Bicycle Facilities

What is the best means of accommodating bicyclists?

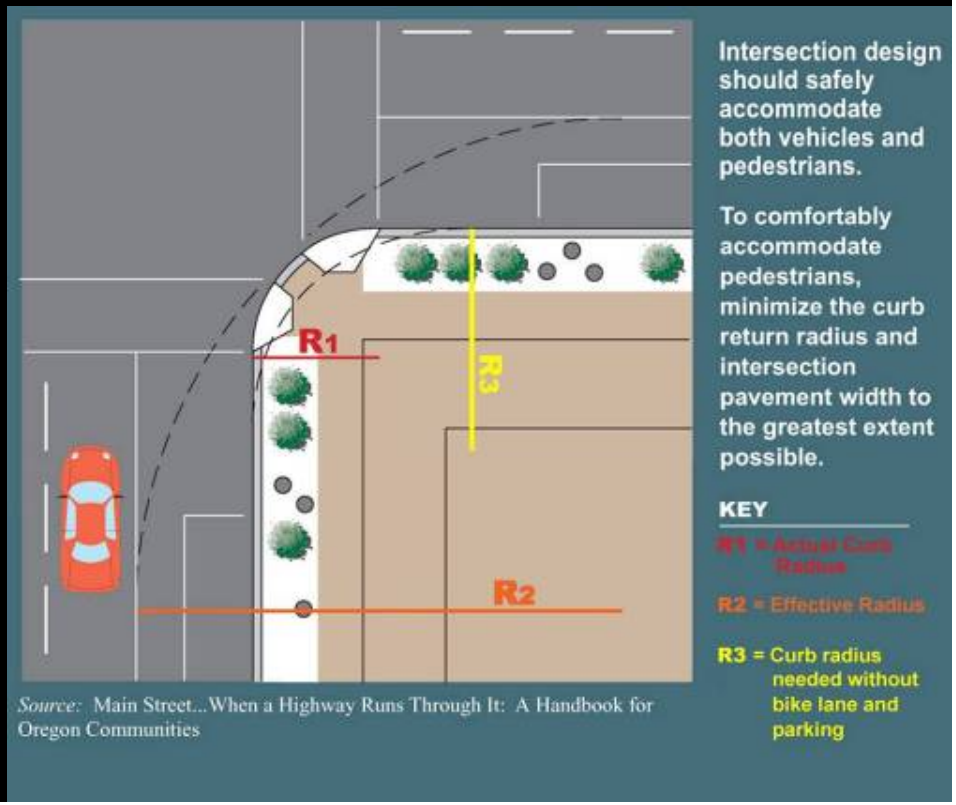
Bike lane

Wide curb lane

Roadway with shoulders

Intersections

- In urban contexts, choose the smallest curb radius that can accommodate the design vehicle
  - Balance the need to accommodate truck turning movements with the benefit of smaller crossings for pedestrians
- Add width of parking and bike lanes when determining effective curb radius



Pedestrian Facilities

- Sidewalk network is the best gauge of community's "walkability"
- Provide sidewalks along both sides of all roadways in commercial areas, and along all arterials and collectors in residential areas
- Strive for "clear sidewalk width" of 5 to 8 ft.
- Provide more intensive crosswalk treatments for major roadways

Public Transit

- "Farside" bus stops are preferred to "nearside" bus stops
  - Pedestrian crashes at bus stops are more associated with nearside stops
  - Farside bus stops are shorter, giving more room for on-street parking
- Be prepared for greater interest in public transit!

Access Management

- Encourage municipalities to pass access management ordinances, focusing on arterials.
- Preserves the taxpayers investment in their transportation system.

Poor access management on suburban corridor

Design Using the Principles

- Understand the context
- Consider the role of the roadway within the network
- Know the roadway type
- Set the desired operating speed
- Refer to the Matrix for the starting design values

Requisite for process: understand the flexibility
provided by the AASHTO Green Book

Integrating Smart Transportation

Revisions to HOP Process

- Tiger Teams were initiated
- Mitigation – Flexibility is Under Development
- Pre-Meetings and Correspondence
- Recommendations for Department and Local approval
- Expedited Reviews
- Education and Outreach
  - District workshops
  - Website

Integrating Smart Transportation

Local Outreach

- Statewide Meeting Presentations
- Guidebook Distribution/Web Site Information
- Coordinated through Municipal Advisory Committee
  - PA Association of Township Supervisors
  - PA Association of Boroughs
  - League of Cities and Municipalities
  - Association of County Commissioners
- Outreach to Developers

For more information,
please visit:
www.smart-transportation.com