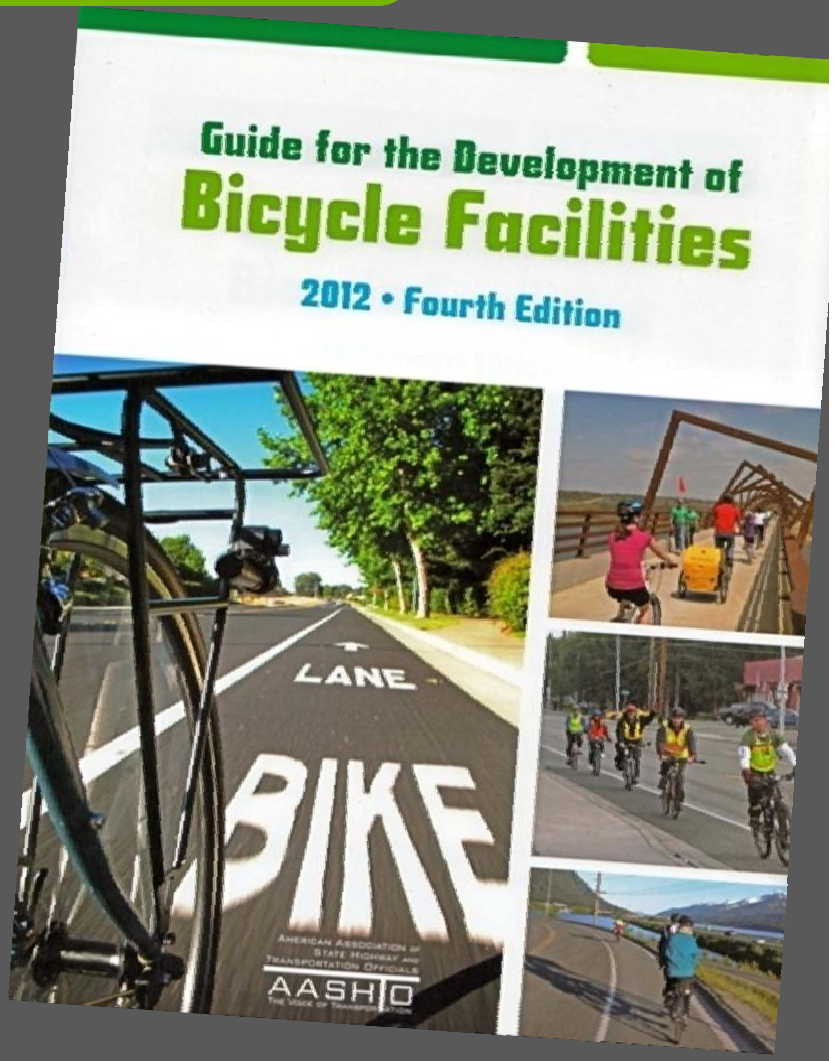
U.S. Department of Transportation
Federal Highway Administration

AASHTO
THE VOICE OF TRANSPORTATION

Pedestrian and Bicycle Information Center

Planning Guidance in the 2012 AASHTO Bike Guide



Presentation by:
RJ Eldridge
Peter Lagerwey
August 22, 2012

Toole Design Group

WEBINAR 2: PLANNING GUIDANCE IN THE 2012 AASHTO BIKE GUIDE

Today's Webinar

- Significant Updates & New Content
  - Why planning is important
  - Types of bicyclists
  - User skill & comfort
  - Types of planning
  - Choosing appropriate facility
  - Data collection & analysis
  - Technical analysis tools
  - Integrating bikes and transit
  - Bicycle operations and safety (Chapter 3)

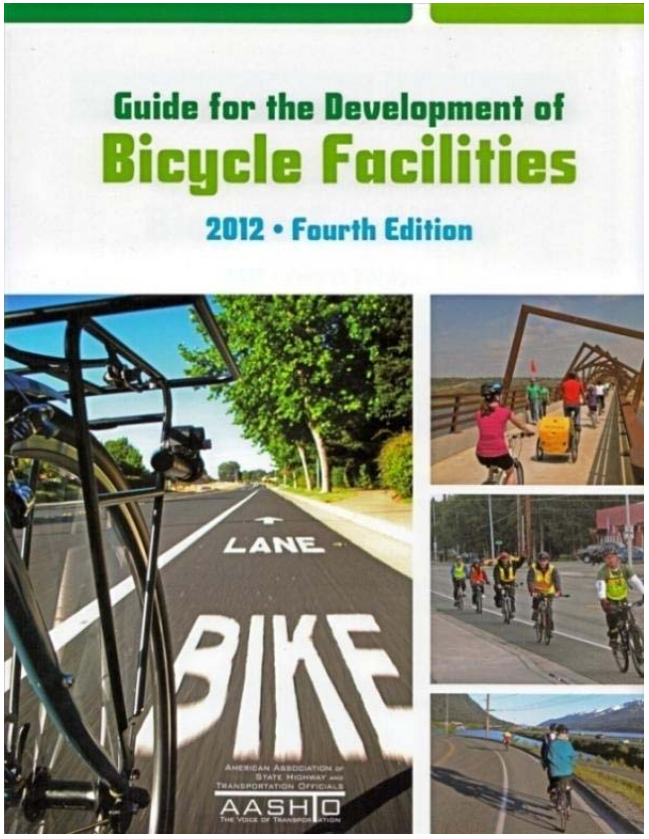
FUTURE WEBINARS

- August 10: Overview
- August 22: Planning Chapter
- September 4: On-Road Bikeways
  - Bike Lanes (including Intersections)
- September 18: On-Road Bikeways
  - Shared lanes
  - Bicycle boulevards & signing
  - Signals
- October 9: Shared Use Paths
  - General design principles
  - Pathway geometry
- October 23: Shared Use Paths
  - Intersection Design
  - Mid-block crossings
- November 6: Bikeway Maintenance and Operation

DISCOUNT FOR WEBINAR PARTICIPANTS

http://www.walkinginfo.org/training/pbic/AASHTO_Promo_Flyer.pdf

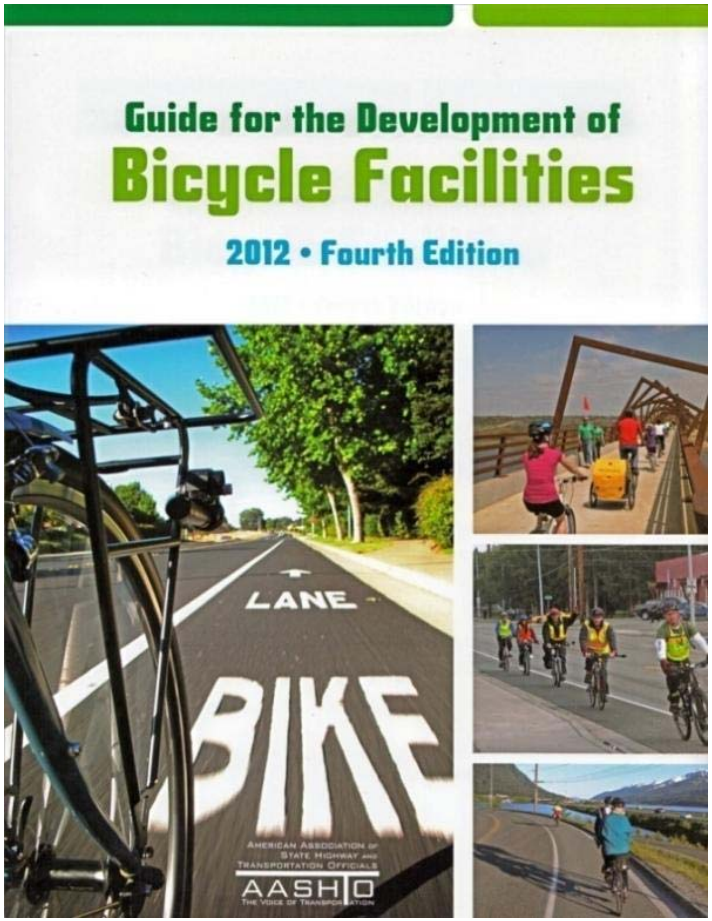
Link will be emailed to webinar attendees



COVERED IN PREVIOUS WEBINAR

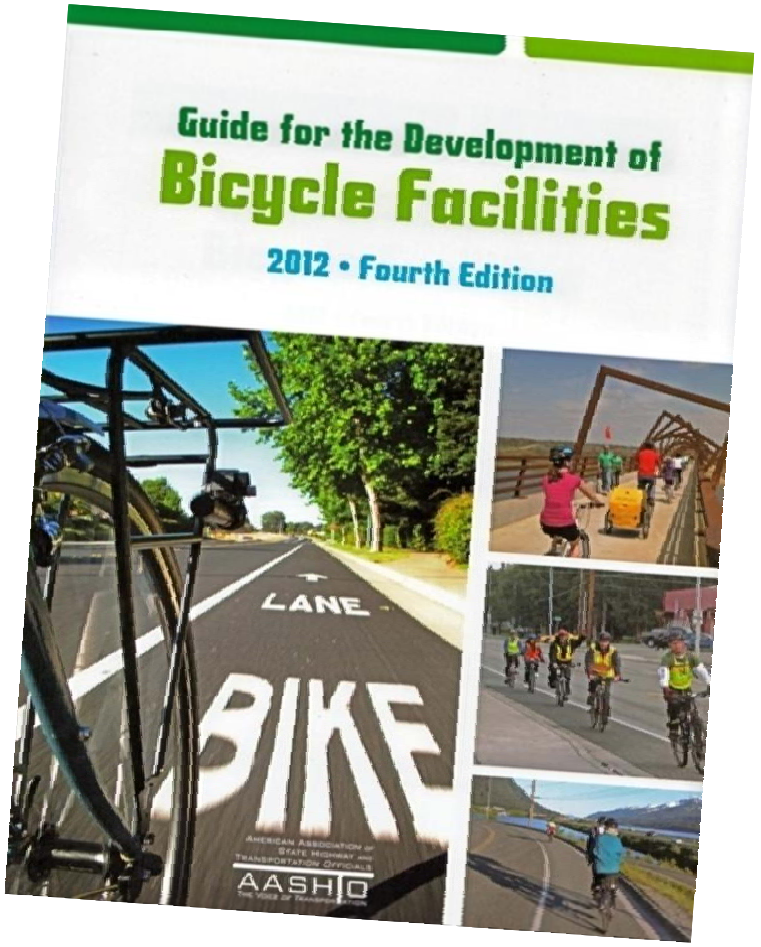
Webinar #1: Overview

- Background on how the Guide was developed
- Difference between AASHTO & NACTO Guides
- High level overview of major changes in 2012 Guide



RELEASE OF THE GUIDE – JUNE 2012

- Sold 1200 copies in the first month
- Guide expanded from 75 pages to over 200 pages
- 3 chapters to 7 chapters



WHY PLANNING FOR BICYCLING IS IMPORTANT

- Flexible, convenient, affordable travel option
- Trips under 2 miles; jobs, school, shopping and recreation
- Economic development
- Transit compatibility
- Reduce congestion
- Public Health
- Reduces transportation-related environmental impacts

WHY PLANNING FOR BICYCLING IS IMPORTANT

Bicycle improvements often benefit other modes

- Bike lanes increase motorist comfort
- Bike lanes provide buffer for pedestrians
- Bike lanes improve site lines for all, especially at driveways
- Shoulders improve safety for all roadway users

TRIP PURPOSE

- Utilitarian/Nondiscretionary
  - Everyday trips; work, school, etc.
- Recreation/Discretionary
  - Wide range of trips and riders
- Utilitarian vs. Recreation
  - Difficult to differentiate
  - Many trips a combination
  - Design bicycle facilities to accommodate all trip types (same as for motor vehicles)

TYPES OF BICYCLING AND BICYCLISTS

- Age – Children Bicyclists
- Experienced and Confident
- Casual and less Confident

TYPES OF BICYCLING AND BICYCLIST

Casual/Less Confident Riders
Prefer shared use paths, bike boulevards, or bike lanes along low-volume, low-speed streets
May have difficulty gauging traffic and may be unfamiliar with rules of the road as they pertain to bicyclists. May walk bike across intersections
May use less direct route to avoid arterials with heavy traffic volumes
If no on-street facility is available, may ride on sidewalks
May ride at speeds around 8 to 12 mph
Cycle shorter distances: 2 to 5 miles is a typical trip distance

TYPES OF BICYCLING AND BICYCLIST

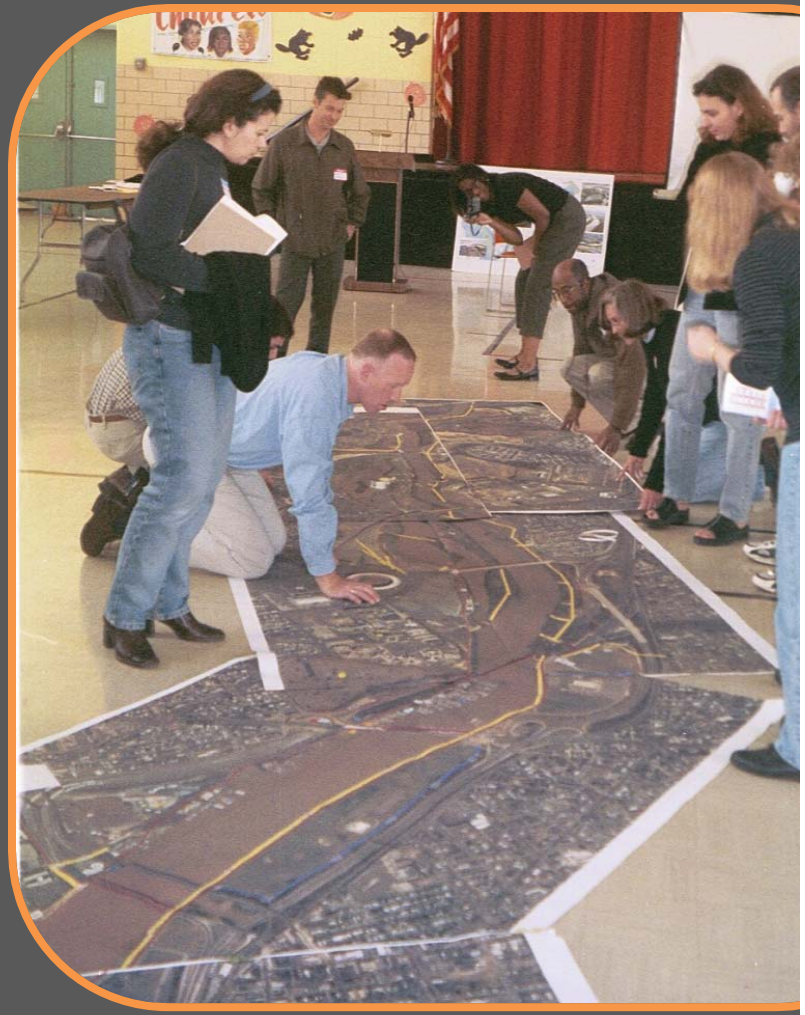
Experienced/Confident Riders
Most are comfortable riding with vehicles on streets, and are able to negotiate streets like a motor vehicle, including using the full width of a narrow travel lane when appropriate and using left-turn lanes
While comfortable on most streets, some prefer on-street bike lanes, paved shoulders or shared-use paths when available
Prefer a more direct route.
Avoid riding on sidewalks. Ride with the flow of traffic on streets
May ride at speeds up to 20 mph on flat ground, up to 45 mph on steep descents
May cycle longer distances

TYPES OF TRANSPORTATION PLANNING PROCESSES

- Comprehensive Transportation and Recreation Plans
- Bicycle Master Plans
  - Public process
  - Coordination with other plans
  - Phasing of infrastructure
  - Typical plan contents
- Transportation Impact/Traffic Studies
- Small Area and Corridor Level Planning
- Project Level Planning

KEY ELEMENTS OF PLANNING BICYCLE TRANSPORTATION NETWORKS

- Bicyclists need accommodation on ALL roadways
- Deciding and prioritizing where improvements are needed
- The practical approach of network planning
- Choosing an appropriate facility type



PHASING OF INFRASTRUCTURE PROJECTS

- Short-term projects
  - East to implement (e.g. restriping when road is repaved)
- Medium-term projects
  - Part of another capital project (e.g. widening shoulder)
- Long-term projects
  - Complex & high cost (e.g. bicycle bridge)

PHASING PLAN: ISSUES TO CONSIDER

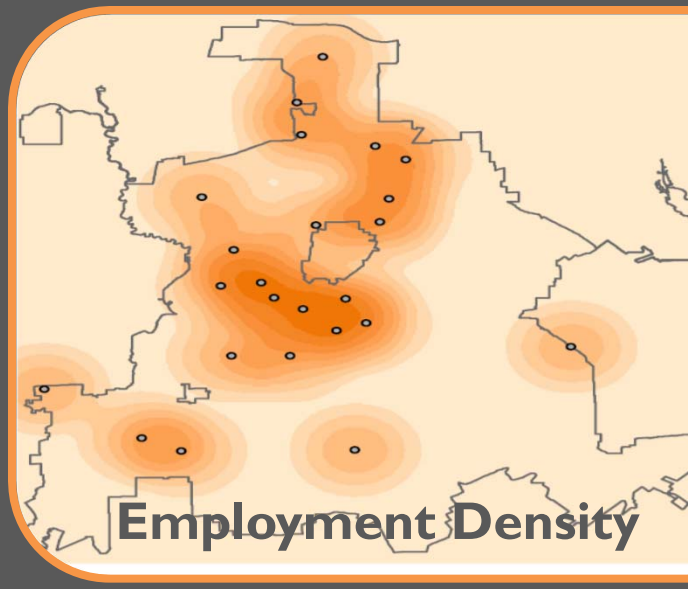
- Bicycle travel demand
- Route connectivity and directness
- Crash/conflict analysis
- Barriers
- Ease of implementation
- System integration

DECIDING WHERE IMPROVEMENTS ARE NEEDED

- Bicyclists need accommodation on ALL roadways
  - Prioritize most important improvements
- Revised guidance explains:
  - The practical approach of network planning
  - Choosing an appropriate facility type
  - Multiple facilities on a single corridor
  - Wayfinding

DECIDING WHERE IMPROVEMENTS ARE NEEDED

- User needs – all types
- Overcoming barriers
- Connection to land uses (e.g. employment centers)
- Directness of route
- Logical route
- Intersections
- Aesthetics
- Spacing or density of Bikeways
- Safety
- Security
- Overall feasibility



CHOOSING AN APPROPRIATE FACILITY TYPE

Facility Types

- Shared lanes
- Marked shared lanes
- Paved shoulders
- Bike lanes
- One-way lanes (cycle tracks)
- Bicycle boulevards
- Shared use paths

Considerations

- Road function (arterial, local)
- Traffic volume
- Speed
- Traffic mix (e.g. truck %)
- Expected users
- Road conditions
- Driveways, access points, parking
- Topography
- Adjacent land uses
- Costs

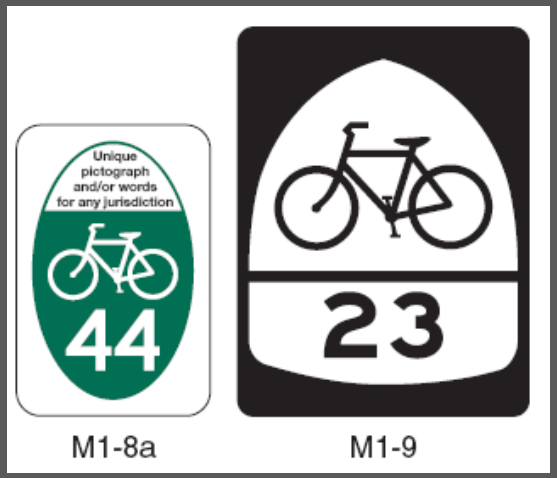
CHOOSING AN APPROPRIATE FACILITY TYPE

- Considerations for different facility types
- Multiple facility types in same corridor

Type of bikeway	Best use	Motor vehicle design speed	Traffic volume	Classification or intended use	Other considerations
Paved shoulders	Rural highways that connect town centers and other major attractors	Typical posted rural highway speeds (generally 40-55 mph)	Variable. May be as low as 250 vehicles per day up to 4,000 vehicles per day or greater	Rural 2-lane roadways, inter-city highways	Provides more shoulder width for roadway stability. Shoulder width should be dependent on characteristics of the adjacent motor vehicle traffic, i.e. wider shoulders on higher speed roads
Bike lanes	Major streets that provide direct, convenient, quick access to major land-uses. Also can be used on collector roadways and busy urban streets with slower speeds	Use as the speed differential between bicyclists and motorists increases. Generally, any roadway where the design speed is more than 25 mph	Variable. Speed differential is generally a more important factor in the decision to provide bike lanes than traffic volumes	Arterials and collectors intended for major motor vehicle traffic movements	Where motor vehicles allowed to park adjacent to bike lane, ensure width of bike lane sufficient to reduce probability of conflicts due to opening vehicle doors and other hazards. Analyze intersections to reduce bicyclist/motor vehicle conflicts. Sometimes bike lanes are left "undesignated" (i.e. bicycle symbol and signs are not used) in urban areas as an interim measure

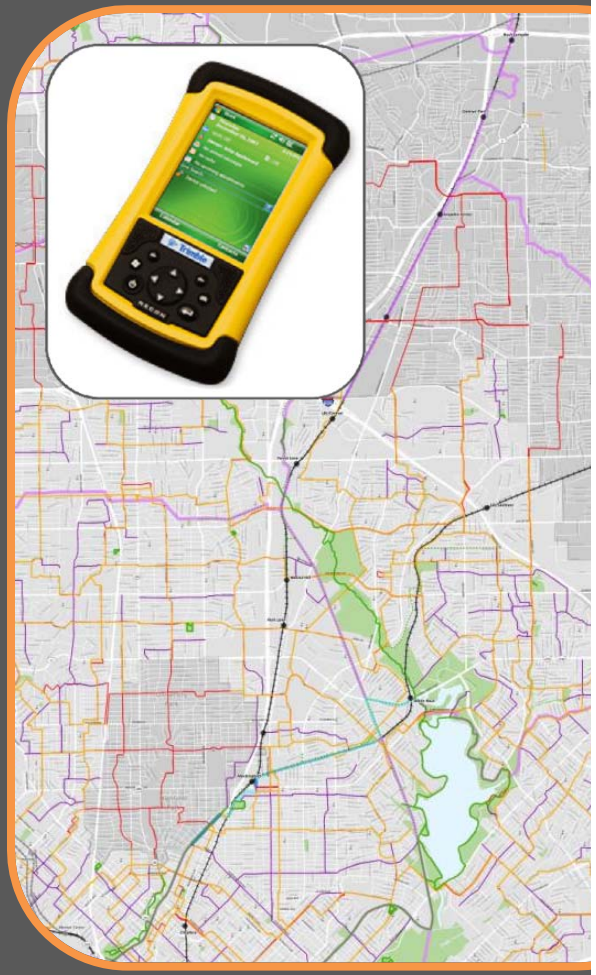
WAYFINDING FOR BICYCLES

- Considerations
- Standard signs
- Part 9 of the MUTCD



TECHNICAL ANALYSIS TOOLS

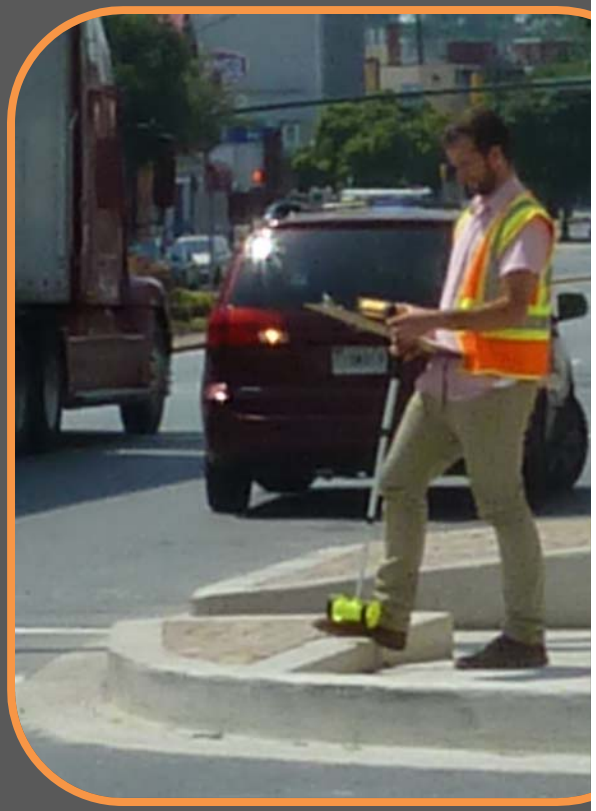
- Data collection: bike counts
- Quality (level) of service
- Safety analysis
- GIS-based network planning
- Bicycle travel demand analysis
- Cost benefit analysis



DATA COLLECTION AND FLOW ANALYSIS

Data for planning and operating bicycle network

- Identify high demand corridors
- Before & after data (new facility)
- Forecast bicycle travel demand
- Track use over time
- Project increases in bicycle use
- Track travel patterns
- Analyze equipment trends (e.g. helmets)
- Analyze demographic trends



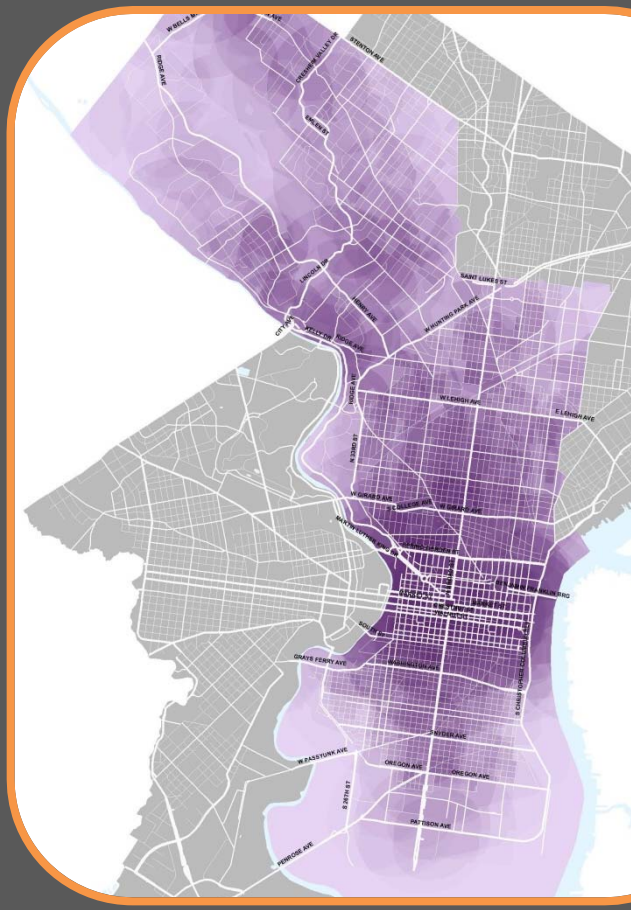
QUALITY (LEVEL) OF SERVICE

- Evaluates bicyclists' perceived safety and comfort with respect to motor vehicle traffic
- Can be used to:
  - Inventory and evaluate existing bicycling conditions
  - Forecast conditions under different design scenarios
  - Prioritize corridors for bicycle improvements

Road Width	Travel Lane Width	Bicycle Lane Width	Parking Lane Width w/Gutter	Resulting Bicycle Level of Service (LOS Score)
50	13	5	7	C (2.79)
50	12	5	8	C (2.61)
50	11	6	8	B (2.43)

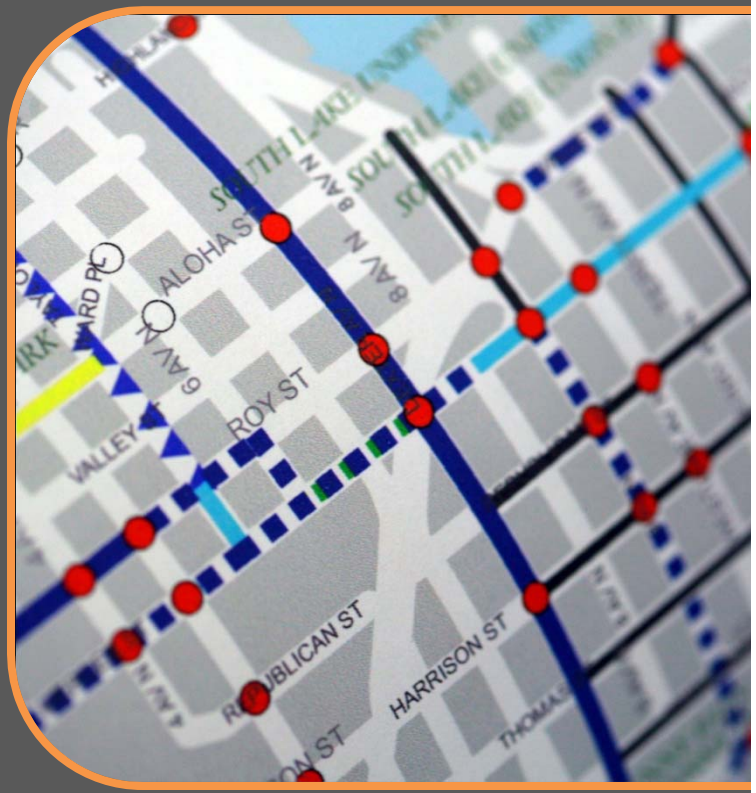
SAFETY ANALYSIS

- Crash data analysis can be used to:
  - Inform selection and design of appropriate bicycle facility
  - Target specific areas (e.g. intersections, corridors, neighborhoods)
  - Understand conditions that could contribute to high crash rates
  - Focus attention most effectively



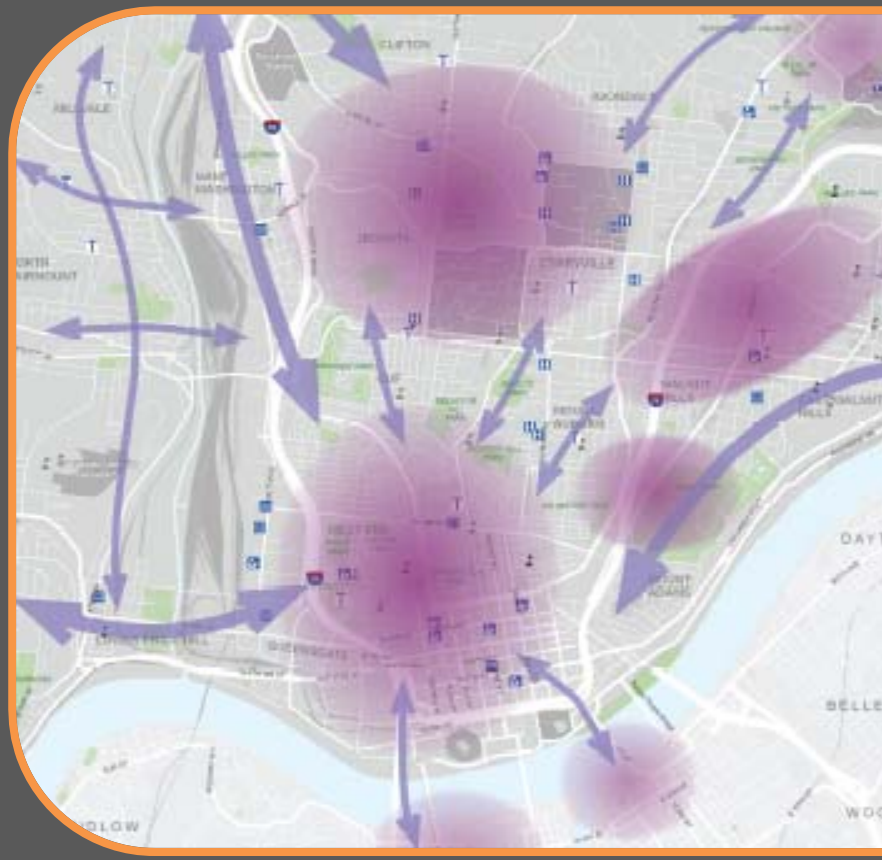
GIS DATA COLLECTION/NETWORK PLANNING

- Visual representation of information (e.g. bicycle networks, demand, etc.)
- Efficient analysis of large quantities of data (e.g. crash data, ADT, speed, roadway widths, etc.)
- Essential for systematic evaluation tools such as Bicycle LOS, or system-wide crash analysis



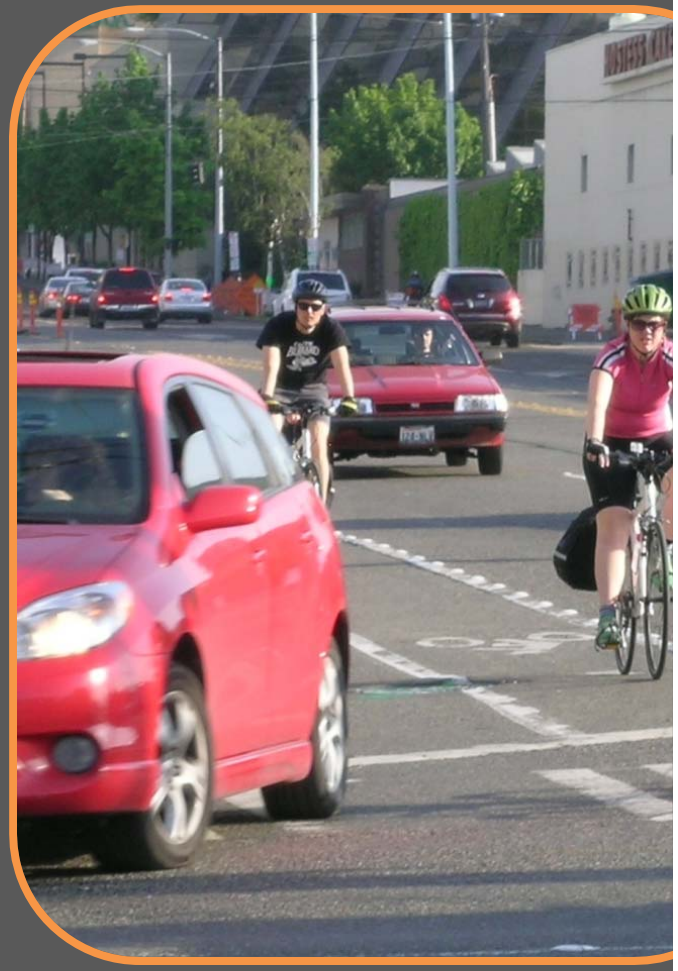
BICYCLE TRAVEL DEMAND ANALYSIS

- Latent demand
- Types of travel demand analysis
  - Comparison studies
  - Sketch plan
  - Market analysis/land use models
  - Discrete choice survey models



COST BENEFIT ANALYSIS

- One-time capital construction costs + on-going maintenance costs
- Allows comparison to motor vehicle and transit projects
- Aids in prioritization of bicycle projects



INTEGRATING BICYCLE FACILITIES WITH TRANSIT

- Main components to bicycle-transit integration:
  - Bikeways to transit locations
  - Bicycle parking at transit locations
  - Bicycle access on transit vehicles
  - Education on bicycle-transit connections
- Considerations for combined bicycle/transit facilities
  - Bus/bike lanes, bike lanes on bus corridors, etc.

CHAPTER 3: BICYCLE OPERATION AND SAFETY

- Design Vehicle
  - Typical bicycle dimensions
  - Key performance criteria
- Traffic Principles for Bicyclists
  - Position on roadway
  - Changing lanes
  - Intersection approach
  - Left turns

CHAPTER 3: BICYCLE OPERATION AND SAFETY

- Bicyclist Crash Studies
  - Urban vs. rural
  - Youth vs. adult
  - Bicyclist vs. driver error
  - Nighttime vs. daytime
  - Riding on sidewalk vs. roadway

CHAPTER 3: BICYCLE OPERATION AND SAFETY

- Bicyclist-Motor Vehicle Crashes - Causes and Countermeasures
  - Wrong-way riding
  - Sidewalk riding
  - "Dooring"
  - Nighttime riding
  - Crashes involving children
  - Bicyclist struck from behind
  - Bicyclist/motorist failing to yield

QUESTIONS?

Contact Information:

RJ Eldridge

Toole Design Group

reldridge@tooledesign.com

Peter Lagerwey

Toole Design Group

plagerwey@tooledesign.com

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  - Mid-block crossings
- November 6: Bikeway Maintenance and Operation

WEBINAR 3: ON-ROAD BIKEWAYS (BIKE LANES)

- Focus primarily on bike lanes, including bike lane widths, signs and markings, intersection considerations
- Standard bike lanes, buffered bike lanes, bike lanes adjacent to reverse angled parking, green bike lanes, left-side bike lanes and contra-flow bike lanes
- Bicycle facility transitions, including bike lanes at intersections