Presentation Outline

- Study Approach
- Why BIKEIRONBOUND
- Community Involvement
- Existing Conditions
- Proposed Improvements
Where is Newark?
Where is the Ironbound?
Study Approach
Why don’t some people bicycle?
What changes can be made to get more people to bicycle?
4 Types of Riders

- 60% Interested but Concerned
- 33% No Way, No How
- <1% Strong and Fearless
- 7% Enthused and Confident

Source: Portland, OR DOT
The 5 C’s

Continuous
The 5 C’s

Continuous

Connected
The 5 C’s

Continuous

Connected

Convenient
The 5 C’s

Continuous

Connected

Convenient

Complete
The 5 C’s

Continuous

Connected

Convenient

Complete

Comfortable
Why BIKE IRONBOUND
Why BIKE IRONBOUND

- No existing bicycle facilities + busy roads and high traffic speeds = Unfriendly bicycling environment
- Difficult connections to Penn Station and downtown
- High potential for demand
  - Dense neighborhood – 54K residents (11K/SQ Mile)
  - Significant new residential development and population growth in recent years, between 2000 and 2012 the district gained 6,365 new residents
  - Bustling business district
  - Access to transit, downtown, parks, schools
Plan Goals

- Develop safe, convenient, and continuous network of bicycle facilities for bicyclists of all abilities
- Encourage higher rates of bicycling
- Improve safety for all users
Community Involvement

- Public Meetings
- Steering Committee
- Focus Groups
- Online Interactive Mapping
Online Interactive Mapping

90 USERS
115 COMMENTS
Existing Conditions

- Bicycle level of traffic stress
- Bicycle demand analysis
Bicycle Level of Traffic Stress

Methodology
Bicycle Level of Traffic Stress

- **Stress Level 1:**
  All Users (children, seniors)

- **Stress Level 2:**
  Most Adults

- **Stress Level 3:**
  Enthusiastic Rides

- **Stress Level 4:**
  Experienced Riders
### Criteria for Level of Traffic Stress (LTS) in Mixed Traffic

<table>
<thead>
<tr>
<th>Speed Limit</th>
<th>2-3 Lanes</th>
<th>4-5 Lanes</th>
<th>6+ Lanes</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;25 mph</td>
<td>LTS 1 or 2</td>
<td>LTS 3</td>
<td>LTS 4</td>
</tr>
<tr>
<td>30 mph</td>
<td>LTS 2 or 3</td>
<td>LTS 4</td>
<td>LTS 4</td>
</tr>
<tr>
<td>35+ mph</td>
<td>LTS 4</td>
<td>LTS 4</td>
<td>LTS 4</td>
</tr>
</tbody>
</table>
## Bicycle Level of Traffic Stress Criteria

### Criteria for Bike Lanes NOT Alongside a Parking Lane

<table>
<thead>
<tr>
<th></th>
<th>LTS $\geq$ 1</th>
<th>LTS $\geq$ 2</th>
<th>LTS $\geq$ 3</th>
<th>LTS $\geq$ 4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Street width (through lanes per direction)</strong></td>
<td>1</td>
<td>2, if separated by raised median</td>
<td>More than 2, or 2 without a separating median</td>
<td>(no effect)</td>
</tr>
<tr>
<td><strong>Bike lane width (includes marked buffer and paved gutter)</strong></td>
<td>6 ft. or more</td>
<td>5.5 ft. or less</td>
<td>(no effect)</td>
<td>(no effect)</td>
</tr>
<tr>
<td><strong>Speed limit or prevailing speed</strong></td>
<td>30 mph or less</td>
<td>(no effect)</td>
<td>35 mph</td>
<td>40 mph or more</td>
</tr>
<tr>
<td><strong>Bike lane blockage (typically applies in commercial areas)</strong></td>
<td>rare</td>
<td>(no effect)</td>
<td>frequent</td>
<td>(no effect)</td>
</tr>
</tbody>
</table>
## Bicycle Level of Traffic Stress Criteria

### Criteria for Level of Traffic Stress (LTS) for Unsignalized Crossings Without a Median Refuge

<table>
<thead>
<tr>
<th>Speed Limit</th>
<th>Up to 3 Lanes</th>
<th>4-5 Lanes</th>
<th>6+ Lanes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 25 mph</td>
<td>LTS 1</td>
<td>LTS 2</td>
<td>LTS 4</td>
</tr>
<tr>
<td>30 mph</td>
<td>LTS 1</td>
<td>LTS 2</td>
<td>LTS 4</td>
</tr>
<tr>
<td>35 mph</td>
<td>LTS 2</td>
<td>LTS 3</td>
<td>LTS 4</td>
</tr>
<tr>
<td>40+ mph</td>
<td>LTS 3</td>
<td>LTS 4</td>
<td>LTS 4</td>
</tr>
</tbody>
</table>
LTS WITHOUT Intersection Effect
LTS WITH Intersection Effect
Integration into Planning Process

**Traditional Planning Process**

I. Identify and Diagnose

- Bicycle Level of Traffic Stress analysis of roadways
- Analysis of roadway characteristics
- Develop list of potential bicycle improvements
- Analyze potential improvements impacts on Level of Traffic Stress
- Recommend improvements to improve low stress connectivity

II. Prescribe Solutions

III. Evaluate Impact

- Analyze Level of Traffic Stress of roadways with assumed implementation of recommendations
Bicycle LTS Enhancements

- Added variables:
  - Slope
  - Motor Vehicle Volume

- Measures of Connectivity:
  - Bicycle Penalty
  - Bicycle Connectivity Index
Measuring Connectivity: Bike Penalty

9 by 9 Grid = 80 squares reached on one-mile drive (587 ft squares)

Low Stress Network = 59 squares reached on one-mile bike ride (587 ft squares)
Measuring Connectivity: Bike Penalty

\[ \text{Bike Penalty} = \frac{(\text{area accessible by car}) - (\text{area accessible by bike})}{(\text{area accessible by car})} \]
Measuring Connectivity: Bike Penalty

Bike Penalty = \frac{(80) - (59)}{(80)}
Measuring Connectivity: Bike Penalty

Bike Penalty = \frac{(80) - (59)}{(80)}

= 26\% \text{ bike penalty}
Sample Bike Penalty: Princeton
Sample Bike Penalty: Princeton

LTS 1 & 2
Bicycle Level of Traffic Stress
In the Ironbound
Bicycle Level of Traffic Stress

Level 1 Only
Bicycle Level of Traffic Stress

Level 1 and 2
Bicycle Level of Traffic Stress

Level 1, 2 and 3
Bicycle Level of Traffic Stress

All Levels
Bicycle Demand Analysis
Bicycle Demand Analysis

- Quantify potential need
- Not reliant on existing bike usage data
- Helps identify:
  - Priorities for improvement based on demand
  - Routes to connect areas of high demand
# Bicycle Demand Analysis Inputs

<table>
<thead>
<tr>
<th>Factor</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Population Density</strong></td>
<td>18%</td>
</tr>
<tr>
<td><strong>Job Density</strong></td>
<td>18%</td>
</tr>
<tr>
<td><strong>Key Destinations</strong></td>
<td>35%</td>
</tr>
<tr>
<td>Schools</td>
<td>4%</td>
</tr>
<tr>
<td>Universities</td>
<td>8%</td>
</tr>
<tr>
<td>Parks</td>
<td>4%</td>
</tr>
<tr>
<td>Commercial</td>
<td>8%</td>
</tr>
<tr>
<td>Bus Stops</td>
<td>3%</td>
</tr>
<tr>
<td>Train Stations</td>
<td>8%</td>
</tr>
<tr>
<td><strong>Equity Factors</strong></td>
<td>29%</td>
</tr>
<tr>
<td>Under 18</td>
<td>6%</td>
</tr>
<tr>
<td>No Car Access</td>
<td>8%</td>
</tr>
<tr>
<td>Income &lt;125% Poverty</td>
<td>5%</td>
</tr>
<tr>
<td>Bike to Work</td>
<td>6%</td>
</tr>
<tr>
<td>Walk or Transit to Work</td>
<td>4%</td>
</tr>
</tbody>
</table>
Bicycle Demand Analysis

Bike Ironbound

Bicycle Demand

- High
- Medium
- Low

Bicycle demand includes the following factors:
- Population Density
- Employment Density
- Key Destinations
  - Schools, Universities, Parks, Businesses
  - Transit
- Demographics and Equity Factors
  - Young people; low income; no access to a car; commute by bike, foot, or transit
Proposed Improvements

- Bicycle Facility Types
- Proposed network
- Measuring Success
Bicycle Facility Types
Bicycle Lane
Two-Way Street

Minimum Cartway Widths
Without parking: 30’
With parking on one side: 38’
With parking on two sides: 46’
Buffered Bicycle Lane

Two-Way Street

Minimum Cartway Widths
Without parking: 33’
With parking on one side: 41’
With parking on two sides: 49’
Separated Bicycle Lane
Two-Way Street

Minimum Cartway Widths
Without parking: 36'
With parking on one side: 44'
With parking on two sides: 52'
Two Way Separated Bicycle Lane

Minimum Cartway Widths
(one travel lane)
Without parking: 21.5’
With parking on one side: 31’
With parking on two sides: 39’
Shared Lane Markings

*no minimum cartway width
*not recommended treatment for multi-lane roads
Bicycle Boulevard

- Traffic calmed street
- Low volume/speeds
Why Build
Separated Facilities
NYC's Prospect Park West protected bike lane saw a 190 percent increase in weekday ridership, with 32 percent of those biking under age 12.

NYCDOT 2012
After NYC installed a protected bike lane on Columbus Ave, bicycling increased 56 percent on weekdays, crashes decreased 34 percent, speeding decreased, sidewalk riding decreased, and traffic flow remained similar.

New York City Department of Transportation, 2011
Where protected lanes were installed in New York and Washington D.C., the number of bikes on sidewalks immediately fell by an average of 56 percent. 

NYCDOT and DDOT, 2010-2014
Proposed Network
Bicycle Improvement
Photosimulations
Adams Street
One-Way Separated Bicycle Lane
Raymond Boulevard
Two-Way Separated Bicycle Lanes
Raymond Boulevard
Gateway Treatment
Bicycle + Pedestrian Access Improvements
Newark Penn Station +
Peter Francisco Park

- Provide separated bicycle lanes on either side of Edison Place between railroad tracks and McCarter HWY.
- Remove a travel lane and provide separated bike lanes in both travel directions.
- Install bike signal at intersection of Edison Place and McCarter HWY.
- Provide separated bike lanes in both directions to Prudential Center along Edison Place and to Market Street along Raymond Plaza East.
- Stripe bike lane along NJ Railroad Avenue.
- Remove two travel lanes and increase the size of the park. Retain one lane in either direction and shorten crossing distance to park.
- Reconfigure bollards to maintain restricted motor vehicle access but accommodate bicycle access.
- Stripe shared-lane markings between Market Street and Raymond Boulevard to provide and indicate connection between proposed bicycle facilities.
- Stripe lane as bus storage.
- Stripe shared-lane markings along Ferry Street.
Measuring Success
Bicycle Level of Traffic Stress

BEFORE
Bicycle Level of Traffic Stress

AFTER

*assumes separated facilities where possible
Bicycle Level of Traffic Stress

BEFORE

AFTER
Bicycle Level of Traffic Stress

AFTER

Low Stress Connections to Newark Penn

*assumes separated facilities where possible
Bicycle Level of Traffic Stress

BEFORE – LTS 1
Bicycle Level of Traffic Stress

AFTER – LTS 1
Existing Conditions

14% of roadway network LTS 1
With Proposed Network

30% of roadway network LTS 1
27% of Ironbound census blocks intersect LTS 1 roadway
With Proposed Network

55% of Ironbound census blocks intersect LTS 1 roadway
Questions & Discussion

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Bicycle Parking
Bike Corral – Halsey @ Warren
Transit Connection
Transit Connection

Newark Penn Station

Broad Street Station
Transit Connection

Study Objective:

To create a separated bike facility to connect Broad Street Station and Penn Station within the City of Newark
Pilot
Projects
Pilot Projects

Pilot Implementation Project

- 2 Way Separated Bike Lane
- Buffered Bicycle Lane
- Bike Lane
- Shared-Lane Markings
- Bike Corral

Other Proposed Route
Existing Riverfront Park Entrance