AGENDA
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• Welcome (5 min)

• Project Updates & Design Considerations (25 min)
  • Project Timeline
  • Project Objectives
  • Bicycle Highways Design Considerations
  • Prioritization Methodology

• Corridor Group Discussion (55 min)
  • Conceptboard
  • Breakout Groups

• Report Back (10 min)

• Next Steps (5 min)

Photos: Alta Planning+ Design; Sergio Ruiz
PROJECT TIMELINE
Timeline

- **INVESTIGATE**: What Makes a Good Bike Highway?
- **ANALYZE**: Where Should Bike Highways Go?
- **ANALYZE**: Where Can Bike Highways Go?
- **DESIGN**: What Should Bike Highways Look Like?
- **REPORT**: How Can Bike Highways be Implemented?

Working Group Meeting

Community Survey

Community feedback on priority corridors

Outreach to communities living near proposed corridors

Public Draft Study

|-----------|--------------------|-------------|-------------|-----------|--------------------|

WE ARE HERE
STUDY OBJECTIVES
UPDATE
Bike Highway Objectives Update

- Identify a **network of bike highways** on Caltrans ROW
- **Provide a set of tools** to jurisdictions to assist with implementation
- **Provide conceptual design best practices and example typologies** across a diversity of land uses, regions and populations
- **Identify appropriate terminology** for this facility type

*Bike Highway in Denmark. Photo: Maurits Lopez Cardozo*
BIKE HIGHWAYS
DESIGN CONSIDERATIONS
In the Bay Area and California, Bike Highways may best be thought as a route “overlay” intended for a specific type of user (i.e., higher speed, longer distance cycling), rather than a single specific facility type.
## User Speed and Needs*

- **People Bicycling**
- **People Walking**
- **Other Rolling Users**

<table>
<thead>
<tr>
<th>User Type</th>
<th>Average Speed of Travel</th>
<th>Dimensional Needs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>WALKERS</strong></td>
<td>1 to 3 mph</td>
<td>1'-40&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5'-0&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4'-6&quot; - 5'-10&quot;</td>
</tr>
<tr>
<td><strong>RUNNERS</strong></td>
<td>5 to 9 mph</td>
<td>2'-6&quot;</td>
</tr>
<tr>
<td><strong>WHEELCHAIR USERS</strong></td>
<td>1 to 3 mph (non-motorized)</td>
<td>2'-6&quot;</td>
</tr>
<tr>
<td></td>
<td>3-5 mph (motorized)</td>
<td>3'-0&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4'-0&quot;</td>
</tr>
<tr>
<td><strong>CASUAL AND NEW CYCLISTS</strong></td>
<td>6 to 12 mph</td>
<td>2'-8&quot;</td>
</tr>
<tr>
<td><strong>EXPERIENCED CYCLISTS</strong></td>
<td>12 to 25 mph</td>
<td>2'-6&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3'-6&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5'-0&quot;</td>
</tr>
<tr>
<td><strong>E-BIKE USERS</strong></td>
<td>16 to 28 mph</td>
<td>3'-8&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5'-0&quot; - 5'-10&quot;</td>
</tr>
<tr>
<td><strong>E-SCOOTER USERS</strong></td>
<td>Up to 20 mph</td>
<td>3'-6&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3'-8&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4'-6&quot; - 5'-10&quot;</td>
</tr>
</tbody>
</table>

*Class 1, 2 and 3 luse, access and equipment restrictions apply to Class 3: electric tricycles, electric cargo bikes, and pedalless e-bikes. Class 1 and 2 e-bikes are limited to 20 mph. *Based on HDM Guidance.
Facility Design | Design Speed

Selected speed used to determine the geometric features of the facility

- Increase in e-bikes = increase in design speed
- International average: 18-25 mph

Recommended Design Speed for BHs

- Separated facility: 25 mph
- Shared facility: 20 mph
Facility Design | Width

Based on user demand, separations of users and modes, and physical constraints

- International minimums: 10 ft (bidirectional) and 6.5-8.5 ft (unidirectional)

**Recommended Widths for Bidirectional BHs**

- Preferred for Bike/Rolling/Fast path: 14 ft.
- Preferred for Ped/Slow path: 14 ft.
- Minimum for shared path: 8 ft.
- Preferred for shared path: 16 ft.
Facility Design | Grade

Slope - affects safety and comfort

- Maximum of 5% if pedestrian route
- International maximum: 6%

Recommended Grade for BHs

- Maximum: 5%
- Sustained grades: Limited to 2%

Bike Highway in Bogotá. Photo: Maurits Lopez Cardozo
Facility Design | Route Identification and Wayfinding

Provides sense of safety, security and comfort, and improves coherency of network
Facility Design | Lighting

Increases actual and perceived safety

• Particularly important at crossings

Recommended Illumination for BHs

• Minimum: 7 lux*
Facility Design | Materials and Surface

Important for user comfort and safety

- International guidance: smooth, well-drained surfaces free of inconsistencies (often concrete/asphalt)

Recommended Surfaces for BHs

- Stable, firm, slip resistant
- Well-drained

Bike Highway in Amsterdam utilizes different surfaces to delineate user areas. Photo: Maurits Lopez Cardozo
Facility Design | Intersections and Crossings

Important for efficient, low-effort BHs

International guidance:

• Advance bicycle detection
• Green wave signal timing
• Protected intersections
• Grade separated crossings

Bike Highway crossing in Rotterdam. Photo: Maurits Lopez Cardozo
Facility Design | Transitions

Moving from a BH to another facility

- Must be intuitive for users

**Recommended Transition Principles**

- Minimize conflict exposure
- Reduce speeds at conflict points
- Communicate ROW priority
- Provide adequate sight distances

*Bike Highway in Denmark. Photo: Maurits Lopez Cardozo*
Facility Design | Amenities

Increase attractiveness, comfort and enjoyment

International examples:

• Bicycle tools and lockers
• Seating and water fountains
• Trash and recycling receptacles
• Shared mobility resources
• Landscaping

Bike parking along a Bike Highway in the Netherlands.
Photo: Maurits Lopez Cardozo
PRIORITIZATION METHODOLOGY
Alameda: 29 corridors
Contra Costa: 17 corridors
Marin: 10 corridors
Napa: 10 corridors
San Francisco: 6 corridors
San Mateo: 27 corridors
Santa Clara: 23 corridors
Solano: 17 corridors
Sonoma: 14 corridors
PRIORITIZATION METHODOLOGY

HOW DID WE PICK THESE ROADWAYS?
Read on to learn how we identified which Caltrans roadways could become bike highways.

1. **Who are we serving?**
   **SUITABILITY ANALYSIS**
   First, we identified roadways that provide the most access to those with the greatest need (equity) and to those who are most likely to use (demand) a bike highway.
   
   50% *equity* + 25% *pedestrian demand* + 25% *existing demand*.

2. **Where should bike highways go?**
   **GEOGRAPHIC BALANCING**
   Second, we looked at the top-scoring corridors from urban areas, suburban areas, and rural areas. This helped to make sure all parts of the Bay Area were represented in the analysis.

3. **Where can bike highways go?**
   **FEASIBILITY ANALYSIS**
   Third, we examined each roadway to make sure there is enough room (available space), and that it isn’t too technically challenging (engineering complexity) to build a bike highway.
   
   25% *available space* + 50% *engineering complexity: bridges & sensits* + 25% *engineering complexity: number of conflict points*.

4. **Which roadways have the highest score?**
   **FINAL SCORING**
   Finally, we added up the scores to see which roadways rose to the top. Roadways with the highest scores are best suited to become bike highways and are most feasible to build.

The result:

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3 Geographic Balancing does not produce a numerical score for inclusion in the final selection. Therefore, it is not included in the equation.
Who are we serving?

SUITABILITY ANALYSIS

First, we identified roadways that provide the most access to those with the greatest need (equity) and to those who are most likely to use (demand) a bike highway.

50% equity + 25% potential demand* + 25% existing demand*
Suitability Analysis

High
26 corridors
Moderate-High
24 corridors
Moderate
33 corridors
Moderate Low
34 corridors
Low
36 corridors
Where should bike highways go?

GEOGRAPHIC BALANCING

Second, we looked at the top-scoring corridors from urban areas, suburban areas, and rural areas. This helped to make sure all parts of the Bay Area were represented in the analysis.
**Geographic Balancing**

**Selected to move forward**
83 corridors

**Not selected to move forward**
70 corridors
Where can bike highways go?

FEASIBILITY ANALYSIS

Third, we examined each roadway to make sure there is enough room (available space), and that it isn't too technically challenging (engineering complexity) to build a bike highway.

- 25% available space
- 50% engineering complexity: elevated structures & tunnels
- 25% engineering complexity: number of conflict points
Feasibility Analysis

High 13 corridors
Moderate-High 13 corridors
Moderate 13 corridors
Moderate Low 23 corridors
Low 14 corridors
Not selected due to geographic balancing 70 corridors
Which roadways have the highest score?

FINAL SCORING

Finally, we added up the scores to see which roadways rose to the top! Roadways with the highest scores are best suited to become bike highways and are most feasible to build.

1 + 3 = score

† Geographic Balancing does not produce a numerical score for inclusion in the final selection. Therefore, it is not included in this equation.
Total Scores

- High: 20 corridors
- Moderate-High: 11 corridors
- Moderate: 17 corridors
- Moderate Low: 14 corridors
- Low: 21 corridors
- Not selected due to geographic balancing: 70 corridors
DISCUSSION
Concept Board

https://tinyurl.com/336frdv5

Instructions for Access

Ensure you are able to log-in as a Guest:

1. Go to website
2. Click on Guest access
Concept Corridor Selection

• Corridors that are most illustrative of different attributes of typologies in Bay Area

• Corridors selected will serve as examples to key design considerations (i.e., range of design treatments, overlay facilities)

*Photos: Alta; Maurits Lopez Cardoza; Sergio Ruiz*
Discussion

Breakout Groups

1. North Bay
2. East Bay
3. Peninsula+ SF

Parameters and considerations for concept corridor selection?

How can the concept development task facilitate region-wide implementation?

Photos: Sergio Ruiz
NEXT STEPS
Next Steps

• Selection of example corridors for typology development

• Public Outreach around Selected Corridors

• Concept Development

Photos: Sergio Ruiz; Maurits Lopez Cardozo
Public Outreach

- Targeted outreach
- Request for feedback on connectivity, connecting facilities, barriers, amenities
- Potential typologies
- Branding, wayfinding, and naming

Photos: Alta Planning + Design
Concept Development

- Candidate corridor typologies
- Network connection concepts
- Visual Simulations
- Cost estimates
thank you!