Electric-assist bicycle use on multi-use paths

City Council
Public Hearing
November 18, 2014
E-bike Pilot Project

- E-bike pilot is Living Lab phase I project
- In place since Feb 2014
- Authorized by Ordinance 7491
Ordinance 7491

- Excludes e-bikes from definition of a motor vehicle
- Adds section 7-5-26
  - Enable City manager rulemaking authority
- Establishes a sunset date of Dec. 31, 2014
E-Bike Pilot Study

Evaluation
- Includes e-bikes and non-motorized bicyclists
- Evaluated speed, volume, and gender
- Interactions between multiuse path users
- Public input and feedback

Observational study details
- 7 hours of field observation
  - Weekday and weekend observations
- 4 locations
  - Two locations along Boulder Creek Path
  - Broadway Boogie
  - South Boulder Creek Trail
- Confidence level based on sample size: 95%
Observational study

Key Findings
> Less than 1% of all cyclists were riding e-bikes
> 16 mph is the 85th percentile speed
> Minimal “conflicts” between trail users

By the numbers
> 4 locations
> 7 hours
> Weekday and weekend
> Over 1,000 bicycles
> Over 500 pedestrians
Etiquette campaign

- Over 330 pledges
- Online blog
- Weekly surveys
- Ambassador appearances
**Intercept Survey responses**

**Have you encountered an e-bike on multi-use paths?**
- Yes: 34
- No: 74
- Unsure: 13

**Do you support e-bike use on multi-use paths?**
- Yes: 45
- No: 25
- Unsure: 51
Transportation Advisory Board

- Unanimous recommendation to City Council to remove sunset date to Ordinance 7491
- Expressed desire to continue monitoring
First Reading Questions

1. How is electric-assisted bicycle use on open space lands being addressed?

2. What control mechanisms are permissible?

3. Should we do additional outreach and education on the operation of electric-assisted bicycles?
TMP objectives for biking

- Bicycle Mode Share of more than 15%
- Bicycle Friendly Community in support of our modal goals
- Attract interested but concerned cyclists
- Increase trips by older adults, women and families with children
Next Steps

> Dec. 18: New e-bikes ordinance enacted
> Continue Way of the Path Campaign
> Outreach on e-bikes benefits and use
> On-going monitoring
Council Consideration

Adopt ordinance to remove sunset date to Ordinance 7491

> E-bike use would be allowed on hard surface multi-use paths

> Continue to be prohibited:

  • OSMP trails and sidewalks, except those designated as multi-use paths
Additional Slides for Q & A, if needed
E-Bike Pilot Study - Locations

- Boulder Creek (near BHS)
- Boulder Creek (near SCP)
- Broadway Boogie (near NOAA)
- S. Boulder Creek (near Bobolink Trailhead)
Intercept Survey locations

- Elmers Two Mile at Goose Creek
- Boulder Creek Path at Boulder HS Underpass
- Arapahoe Path East of 48th St.
- S Boulder Creek South of Baseline Rd.
E-Bike Pilot Study - Locations

> Boulder Creek Trail (near Boulder High School)
  • Thursday 7:39-9AM
  • Saturday 11AM-12PM
> Boulder Creek Trail (near Scott Carpenter Park)
  • Thursday 4:30-5:30PM
  • Sunday 8:20-9:50AM
> South Boulder Creek Trail (near Bobolink Trailhead)
  • Saturday 9-10AM
> Broadway Boogie (near NOAA)
  • Monday 7:30-9AM
Colorado State Law definition of an e-bike

Colorado State Law* CRS 42-1-102 (28.5)

> "Electrical assisted bicycle" means a vehicle having two tandem wheels or two parallel wheels and one forward wheel, fully operable pedals, an electric motor not exceeding seven hundred fifty watts of power, and a top motor-powered speed of twenty miles per hour.

* Denver and Fort Collins use this definition
How Much Faster Are E-bikes?

> **Speeds of bikes**

<table>
<thead>
<tr>
<th>Facility</th>
<th>Mean (mph)</th>
<th>Max (mph)</th>
<th>Min (mph)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bike path</td>
<td>12.6</td>
<td>24.4</td>
<td>2.7</td>
</tr>
<tr>
<td>Bicycle lane</td>
<td>15.5</td>
<td>25.4</td>
<td>2.5</td>
</tr>
<tr>
<td>Sidewalk</td>
<td>11.5</td>
<td>18.7</td>
<td>2.1</td>
</tr>
<tr>
<td>No facility</td>
<td>11.8</td>
<td>22.9</td>
<td>5.0</td>
</tr>
</tbody>
</table>

Opiela et al., 1980

<table>
<thead>
<tr>
<th></th>
<th>Mean (mph)</th>
<th>85th Pert.</th>
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</thead>
<tbody>
<tr>
<td>E-bikes</td>
<td>8.3</td>
<td>12.4</td>
</tr>
<tr>
<td>Conventional bikes</td>
<td>6.5</td>
<td>10.6</td>
</tr>
</tbody>
</table>

Langford & Cherry 2013

> **AASHTO 2012 design criteria – bike facilities**

- 8-15 mph pave level terrain; 20-30 mph downhill; 5-12 uphill; 15 mph avg. operational speed
A Naturalistic Cycling Study in Sweden

Dozza, et al. 2013

Traditional Bicycles
- Average 14 km/h
- Speed Distribution
- Cumulative Distribution

8.7 mph

Electrical Bicycles
- Average 23 km/h
- Speed Distribution
- Cumulative Distribution

14 mph
Different types of the e-bikes

Throttle

Powered bicycle (PB)

Pedelec

Powered-assisted bicycle (PAB)
E-Bike Pilot Study - Findings

> Less than 1% of all cyclists were riding e-bikes
  • Only seen on Boulder Creek Path (weekend)
  • Wearing casual clothing and not riding in a group
  • Recorded speed was below 15MPH speed limit
Local Retailer information

> Less than 100 e-bikes have sold in 2014
> Typical buyer is
  • 40’s ~ 50’s
  • Back into exercise
> Not increase in sales when pilot project began
> E-bike sales increasing each year
E-Bike Pilot Study - Locations

- Boulder Creek Trail (near Boulder High School)
  - Thursday 7:39-9AM
  - Saturday 11AM-12PM
- Boulder Creek Trail (near Scott Carpenter Park)
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- South Boulder Creek Trail (near Bobolink Trailhead)
  - Saturday 9-10AM
- Broadway Boogie (near NOAA)
  - Monday 7:30-9AM
Observations: Boulder creek Path (at Boulder High School)

> 500 cyclists observed
  • 64% male cyclists
  • 36% female cyclists

> 16 MPH 85th Percentile Speed

> 82% of cyclists were traveling at or below the 15 MPH speed limit
Observations: Boulder creek Path (at Boulder High School)

Saturday 11AM-12PM, Thursday 7:30-9AM

Number of cyclists observed

Speed (MPH)

15 MPH Speed Limit

Observations: Boulder creek Path (at Boulder High School)
Observations: Boulder creek Path (at Scott Carpenter Park)

> 335 cyclists observed
  • 73% male cyclists
  • 27% female cyclists
> 16 MPH 85\textsuperscript{th} Percentile Speed
> 64% of cyclists were traveling at or below the 15 MPH speed limit
Observations: Boulder creek Path (at Scott Carpenter Park)

*Thursday 4:30-5:30PM, Sunday 8:20-9:50AM*

15 MPH Speed Limit
Observations: S. Boulder creek Path (near Bobo Link Trailhead)

> 50 cyclists observed
  • 54% male cyclists
  • 46% female cyclists
> 17 MPH 85th Percentile Speed
> 80% of cyclists were traveling at or below the 15 MPH speed limit
Observations: S. Boulder creek Path (near Bobo Link Trailhead)

Saturday 9-10AM

Number of cyclists observed: 15 MPH Speed Limit

Female
Male

Speed (MPH)

Number of cyclists observed: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25
Observations: Broadway Path
(near Rayleigh Road/NOAA entrance)

> 130 cyclists observed
  • 66% male cyclists
  • 34% female cyclists

> 16 MPH 85th Percentile Speed

> 82% of cyclists were traveling at or below 15MPH speed limit
Observations: Broadway Path (near Rayleigh Road/NOAA entrance)

Monday 7:30-9AM

Number of cyclists observed

Speed (MPH)

15 MPH Speed Limit

Female
Male
What is an e-bike?

- A bicycle with an integrated motor.
- Helps propel a rider up to a 20 mph limit.
- 250 ~ 1,000 Watt motor capacity
Success Lies at the Intersection

World Class Bicycle City

Encouragement
Education
Enforcement
Evaluation

Engineering
## Key Findings from Public Input

<table>
<thead>
<tr>
<th>Against testing E-Bike</th>
<th>Support testing E-Bike</th>
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<tbody>
<tr>
<td>- Paths are too congested</td>
<td>- Helps aging generations stay active and healthy</td>
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<td>- Speed and safety</td>
<td>- Makes longer distance commutes viable by bike</td>
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<tr>
<td>- Behavior and Enforcement</td>
<td>- Economic &amp; Less Polluting alternative to automobiles</td>
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<td></td>
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<tr>
<td>- Separation between Pedestrians and Bicyclists</td>
<td>- Support amending definition of e-bike</td>
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What is an e-bike?

- A bicycle with an integrated motor.
- Helps propel a rider up to a 20 mph limit.
- 250 ~ 1,000 Watt motor capacity
E-bikes regulations if current ordinance sunsets

Allowed
> In on-street bicycle lanes
> On roadways

Prohibited
> On any multi-use paths
  • Hard-surface
  • Soft-surface (crusher fine)
> On any single track trails
> On any sidewalk
The Five Es

Living Laboratory
Evaluation methods for e-bike pilot

• Modal traffic volume, vehicle speeds, and collision experience
• Field observations
• Intercept surveys
• Bike and Walk Audits / Focus Groups
• Community Feedback Panel / Inspire Boulder