



TOWARD A BIKEABLE FUTURE

Bicycle Network Master Plan

Cambridge, MA

December 2014



The following is an overview to provide general background to the
Draft Bicycle Network Plan.

For more details on any of the topics go to:
www.cambridgema.gov/bike

Which Future?



What is our vision?



Environmental Benefits



Sustainable transportation is key to solving our climate change and air quality challenges.

Health Benefits



Active transportation is an effective way of keeping ourselves healthy.

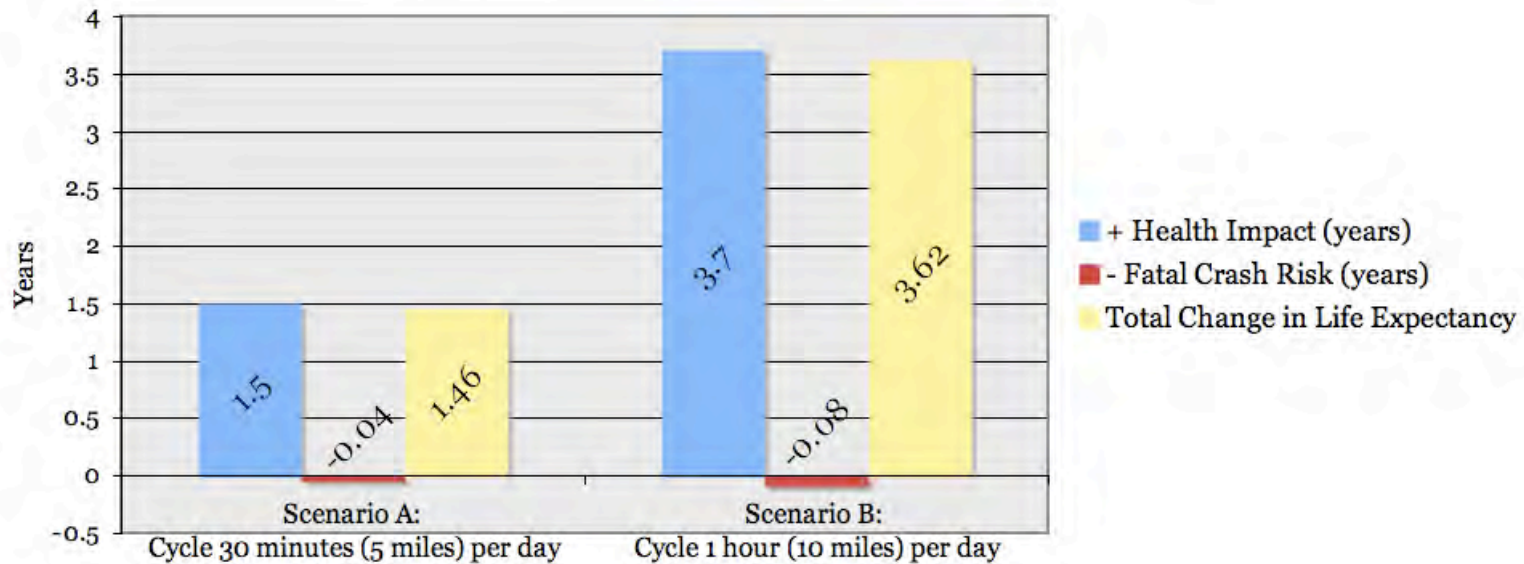
You Choose!



If people can easily bike and walk as part of their daily routines, they don't need to take extra time to be fit.

Health Benefits of Bicycling

Cycling's Impact on Life Expectancy



Studies show that people who bicycle regularly are healthier, providing economic benefits to employers and society as well as health benefits to themselves.

Health Benefits of Separated Bike Facilities



Cyclists on separate facilities
have markedly lower exposure to pollutants

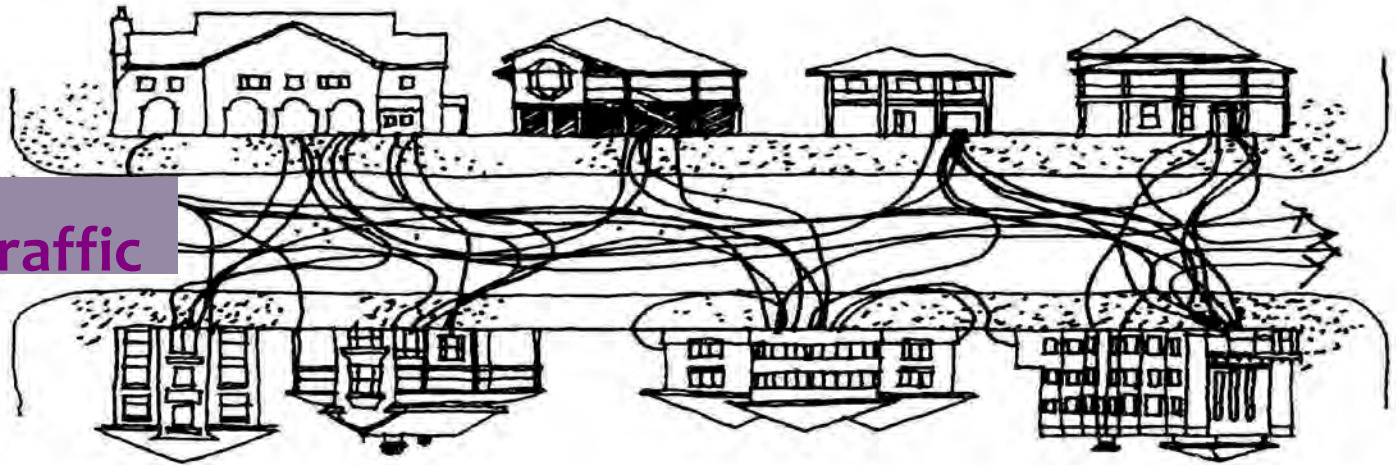
Community Benefits



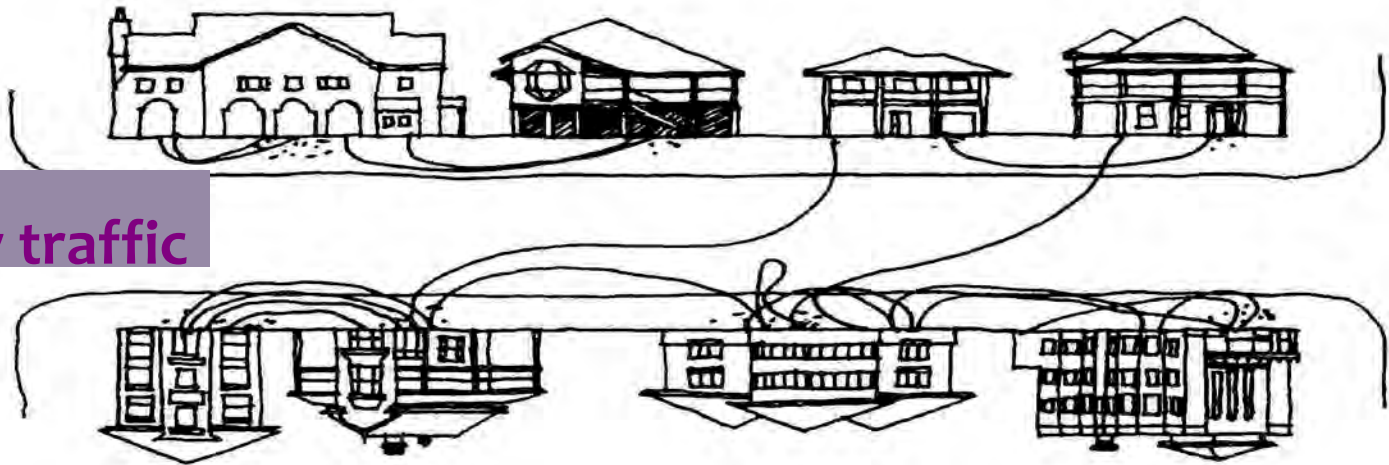
It's easier to meet your neighbors if you are on bike or on foot!

Community Benefits

Light traffic



Heavy traffic



People who live on streets with less traffic are more likely to know their neighbors. Lines on the diagram represent social connections.

Economic Benefits

People who shop by bike spend more money locally

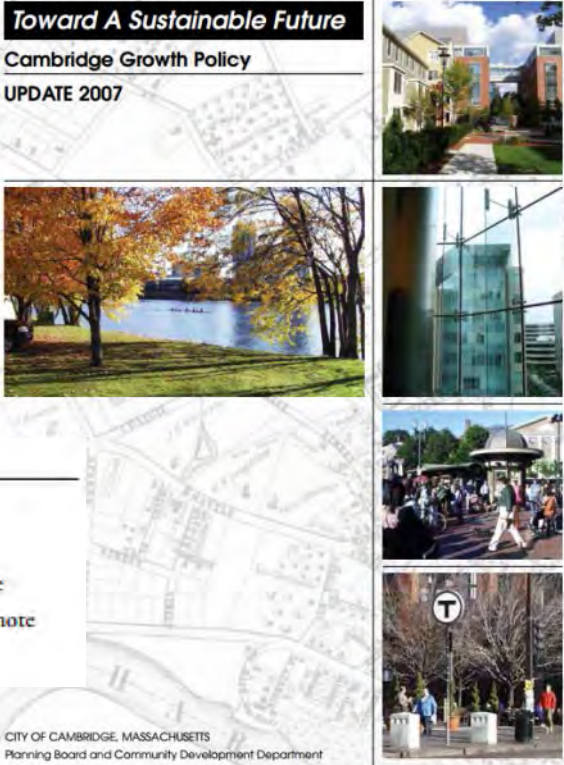


<http://www.peopleforbikes.org/statistics/category/protected-bike-lane-statistics>

<http://www.citylab.com/commute/2012/12/cyclists-and-pedestrians-can-end-spending-more-each-month-drivers/4066/>

Policies

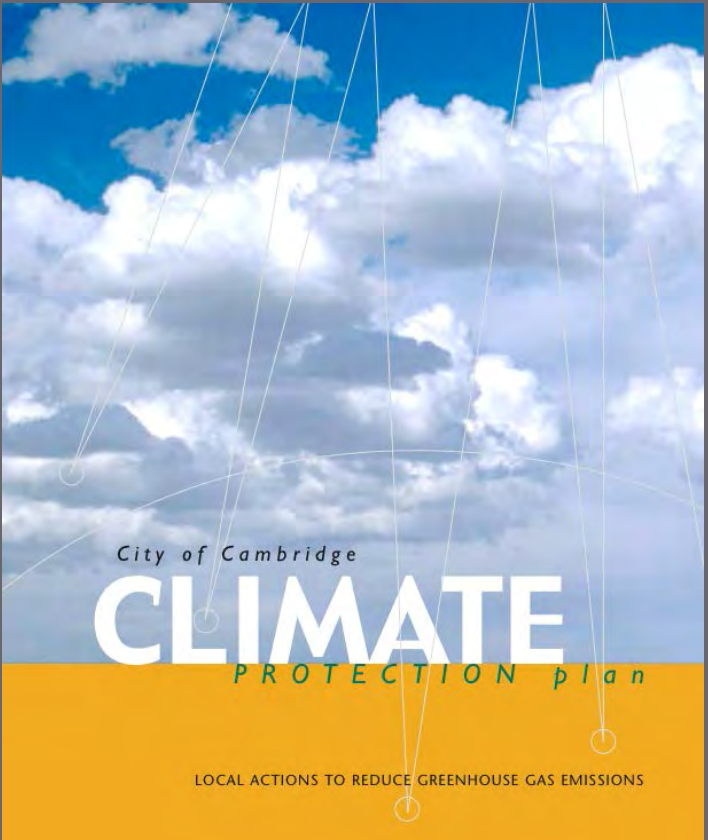
Toward A Sustainable Future
Cambridge Growth Policy
UPDATE 2007



CITY OF CAMBRIDGE, MASSACHUSETTS
Planning Board and Community Development Department

POLICY 23

Encourage all reasonable forms of nonautomobile travel including, for example, making improvements to the city's infrastructure which would promote bicycling and walking.



City of Cambridge
CLIMATE
PROTECTION plan
LOCAL ACTIONS TO REDUCE GREENHOUSE GAS EMISSIONS

Improve facilities for walking and cycling. Install more bicycle lanes and parking facilities; create and improve off-road paths including railroad rights-of-way; expand efforts to retrofit streets and intersections to better accommodate bicycles and pedestrians.

Cambridge has numerous policies that emphasize the importance of bicycle transportation.

The Vision of an

“8 – 80 City”



Goal:

To create a city that's safe for anyone from the ages of 8 to 80* to be able to walk or bike independently.

This will mean the city is safe for all.

* approximately!

Goal is a City for Everyone



Cycling for All Trip Purposes



Cycling for All Ages

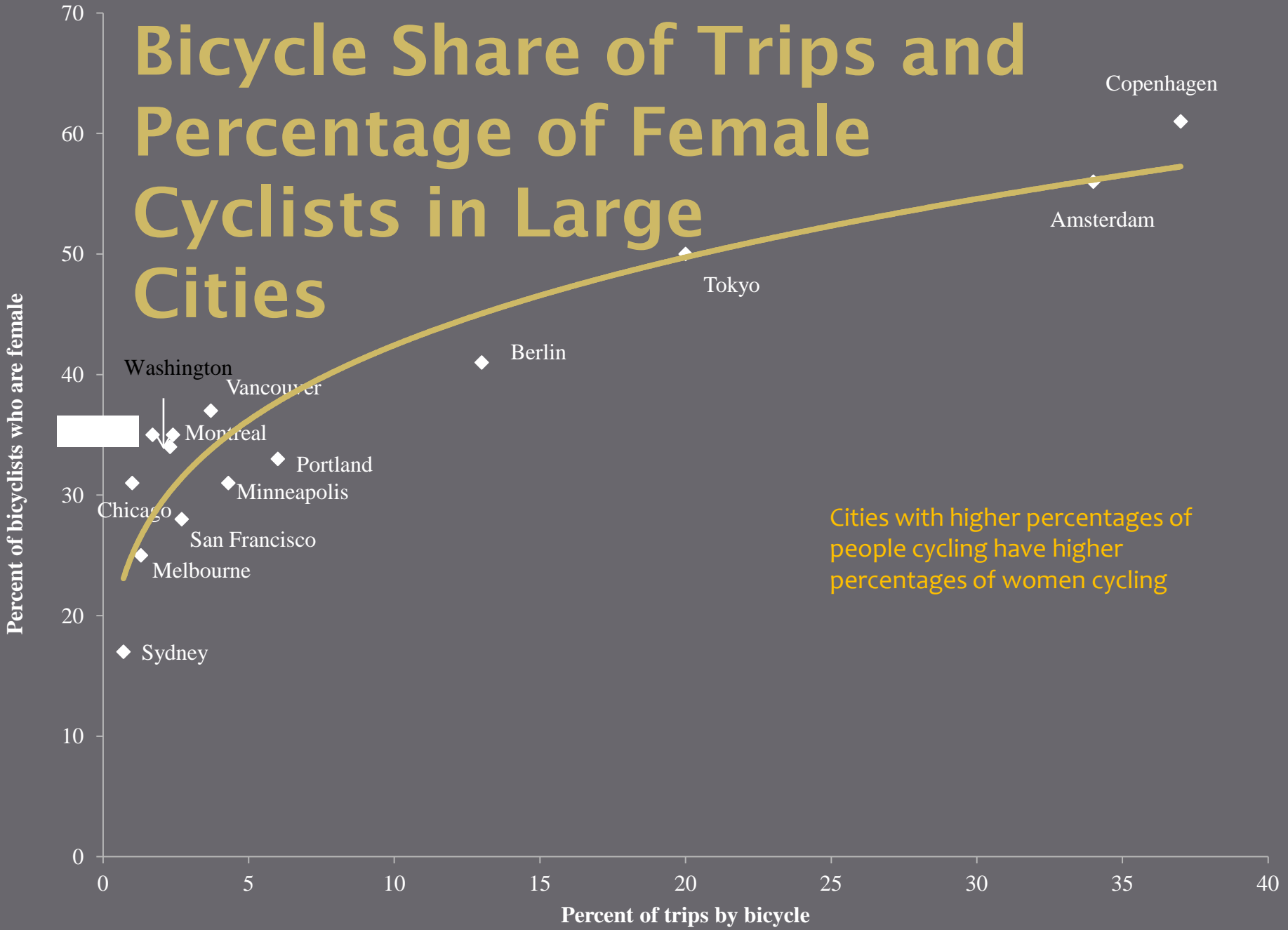


Cycling for All Genders



Where do women bike?

Bicycle Share of Trips and Percentage of Female Cyclists in Large Cities



Source: Pucher, J., Buehler, R. (eds.), *City Cycling*. Cambridge, MA: MIT Press, 2012

Cambridge is a **GOLD** rated Bicycle Friendly Community



Highest Bike Score in the Country

Bike Score 92 **Cambridge is a Biker's Paradise**
Daily errands can be accomplished on a bike.

A map of the Cambridge and Boston area. The Cambridge area is highlighted in green, indicating a high bike score. The map shows major roads, water bodies, and city boundaries. A legend on the right side of the map includes: "Bike Score" (represented by a bicycle icon), "Bike Lanes" (represented by a dashed line), "Hills" (represented by a line graph), and "Bike Commuters" (represented by a person on a bicycle).

Bike Score

Bike Lanes

Hills

Bike Commuters

Bike sharing is available from Hubway.



Being bike friendly is more than just the facility network; here are just a few examples of other important elements of being a Bicycle Friendly Community.

For more details on any of the topics go to:
www.cambridgema.gov/bike

Hubway Bike Share



Bike Parking



Community Bike Rides

Wayfinding



Photo Credit: Britta Hope Carlson - www.brittahope.com

Saturday, May 18th, 2013

Start: 10:00am
Cambridge Public Library,
Main Branch, 449 Broadway

Depart: 10:15am Sharp - Ride starts

End: Cambridge Public Library

Ride Distance: Approximately 12 miles

Ride Time: Approximately 2.5 hours

Workshops



The City of Cambridge proudly presents:

FREE Bicycle Workshops

For Cambridge residents and employees!

February 11 – **Winter Cycling**, 7pm

344 Broadway, 2nd Floor

February 12 – **Urban Cycling Basics**, 12pm

449 Broadway – Main Library

March 11 – **Bike Maintenance Basics**, 7pm

344 Broadway, 2nd Floor

April 30 – **Urban Cycling Basics/Hubway**, 7pm

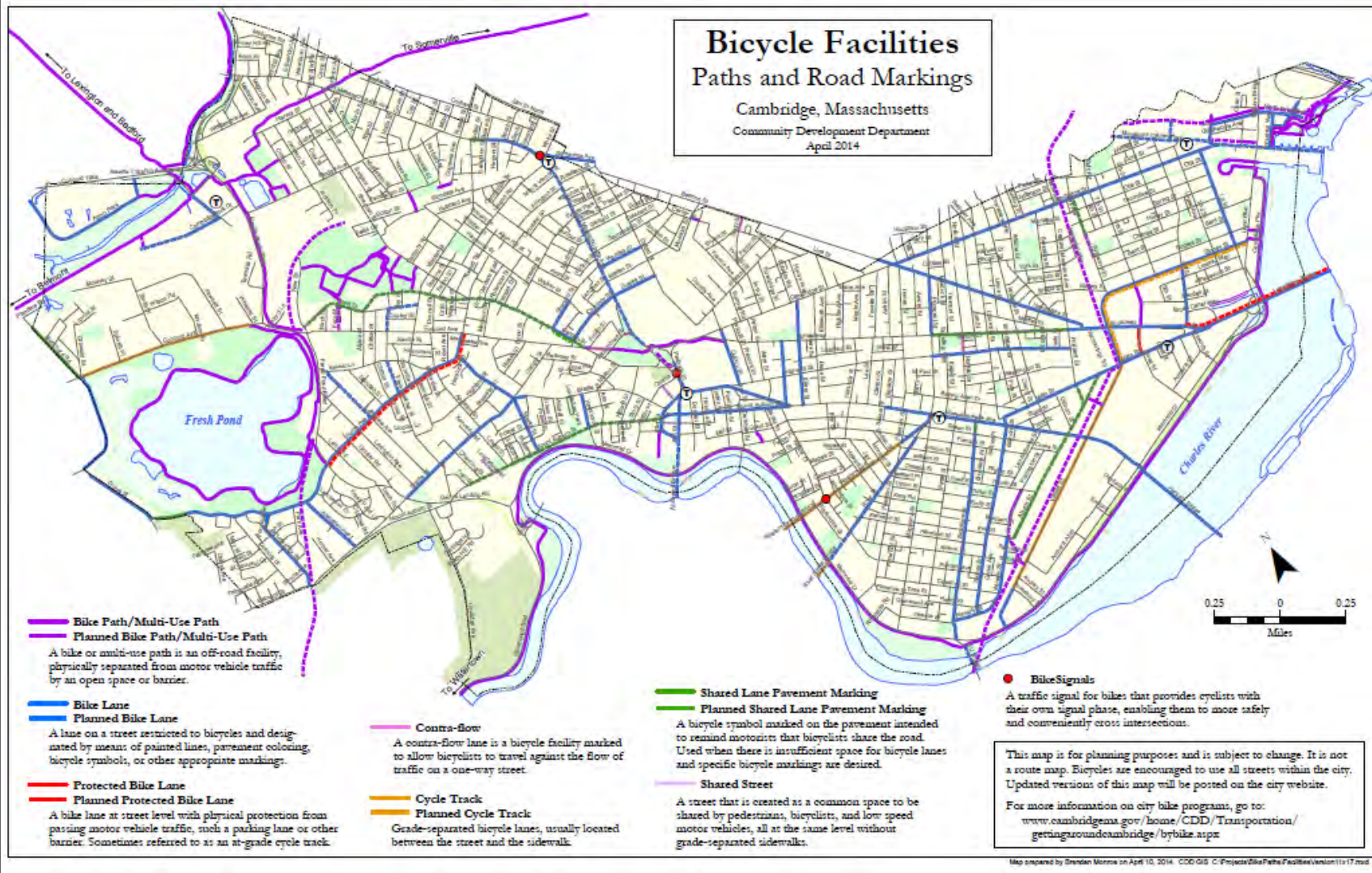
449 Broadway – Main Library

May 10 – **On-bike Training**, 2pm (at the Alewife Bike Cage)

Please RSVP to Jennifer Lawrence, jlawrence@cambridgema.gov, 617-349-4671



Increasing Amount of Facilities



There are 60+ miles of Bicycle Facilities in the city.



Here are a few of the important
bicycle facility types.

For more details on the full range of bicycle facilities:

<http://www.cambridgema.gov/CDD/Transportation/bikesincambridge/biketoolbox.aspx>

Bike Lanes Invite Cycling



[Click here for the Bicycle Toolbox](#)

Buffered Bike Lanes Provide More Space



[Click here for the Bicycle Toolbox](#)

Protected Bike Lanes are Safer and More Comfortable



[Click here for the Bicycle Toolbox](#)

Protected Bike Lanes (Cycle Tracks) with Enhanced Streetscape Elements



[Click here for the Bicycle Toolbox](#)

Vassar Street



Western Ave.



Protected Bikeways: Off Road Paths



[Click here for the Bicycle Toolbox](#)

Bridges and Underpasses



[Click here for the Bicycle Toolbox](#)

Bike Signals Help with Challenging Crossings



[Click here for the Bicycle Toolbox](#)

Traffic Calming Make Streets Better for All Users



[Click here for the Bicycle Toolbox](#)

Shared Lane Markings



[Click here for the Bicycle Toolbox](#)

Bicycle Boulevards/ Bicycle Priority Streets



[Click here for the Bicycle Toolbox](#)

Shared Streets



Winthrop Street
Before



Winthrop Street
After

[Click here for the Bicycle Toolbox](#)

Toward a Bikeable Future: Cambridge Bicycle Plan

cambridge bicycle network plan

Welcome

cambridge bicycle network plan

Cambridge is a great place for bicycling and we are working on a plan to make it even better! We would like your input on this plan, particularly focusing on these issues:

- Infrastructure or programs that would make it easier or more enticing for you to bicycle
- Specific improvements that you would like to see regarding children bicycling
- Street segments or intersections in Cambridge that you think work well
- Street segments or intersections in Cambridge that need improvement
- Examples of great streets or bicycle facilities from around the world that you would like to see in Cambridge (please share photos as well as words!)

We encourage you to **THINK BIG!!!**

For issues requiring immediate attention (potholes, bike rack requests, etc.) please visit the project website for the appropriate contact information.

To use this, you will need to either [login](#) or [register](#).

base map

- great routes
- routes needing improvement
- spot improvement
- shared-use path
- cycle track
- protected bike lane
- buffered bike lane
- bike lane
- shared-lane marking
- shared-street

describe your route or point in the pop-up survey after drawing.

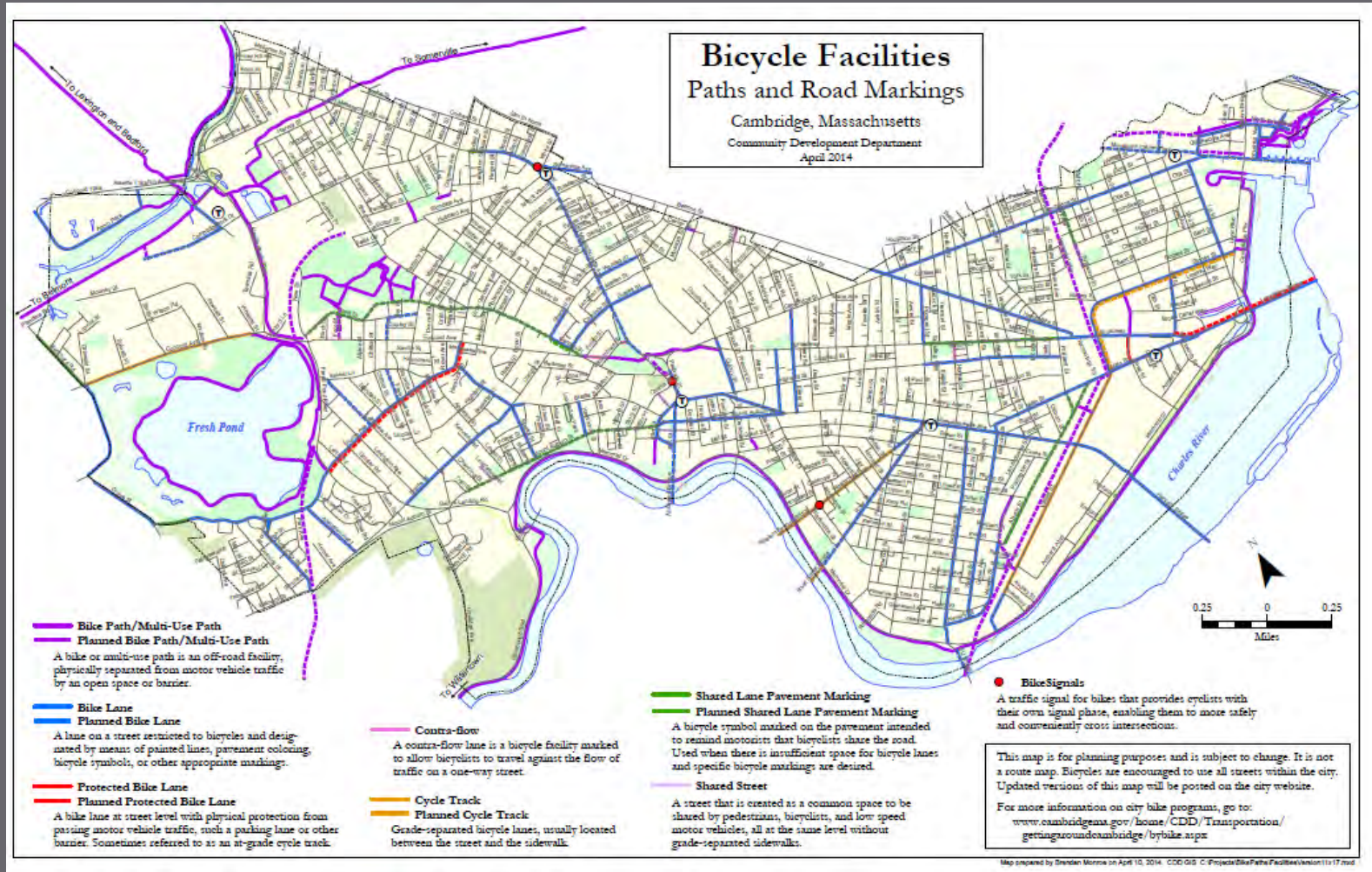
upload photos to the pop-up survey.

comment on others' input. go to [about & help](#) view options turn on/off other people's responses to view it.

allowed facilities are: [dotted](#)

selected items show in ["about & help"](#)

Expanding the Network



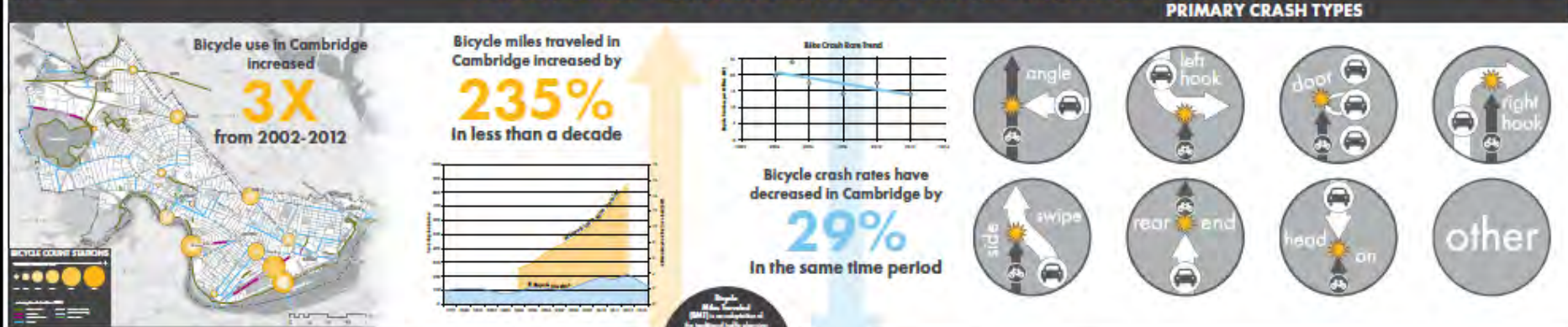
What are the next steps?



What analysis and input is being used to develop the Draft Bicycle Network Plan?

Following are some of the key steps.

Bicycle Crash Analysis

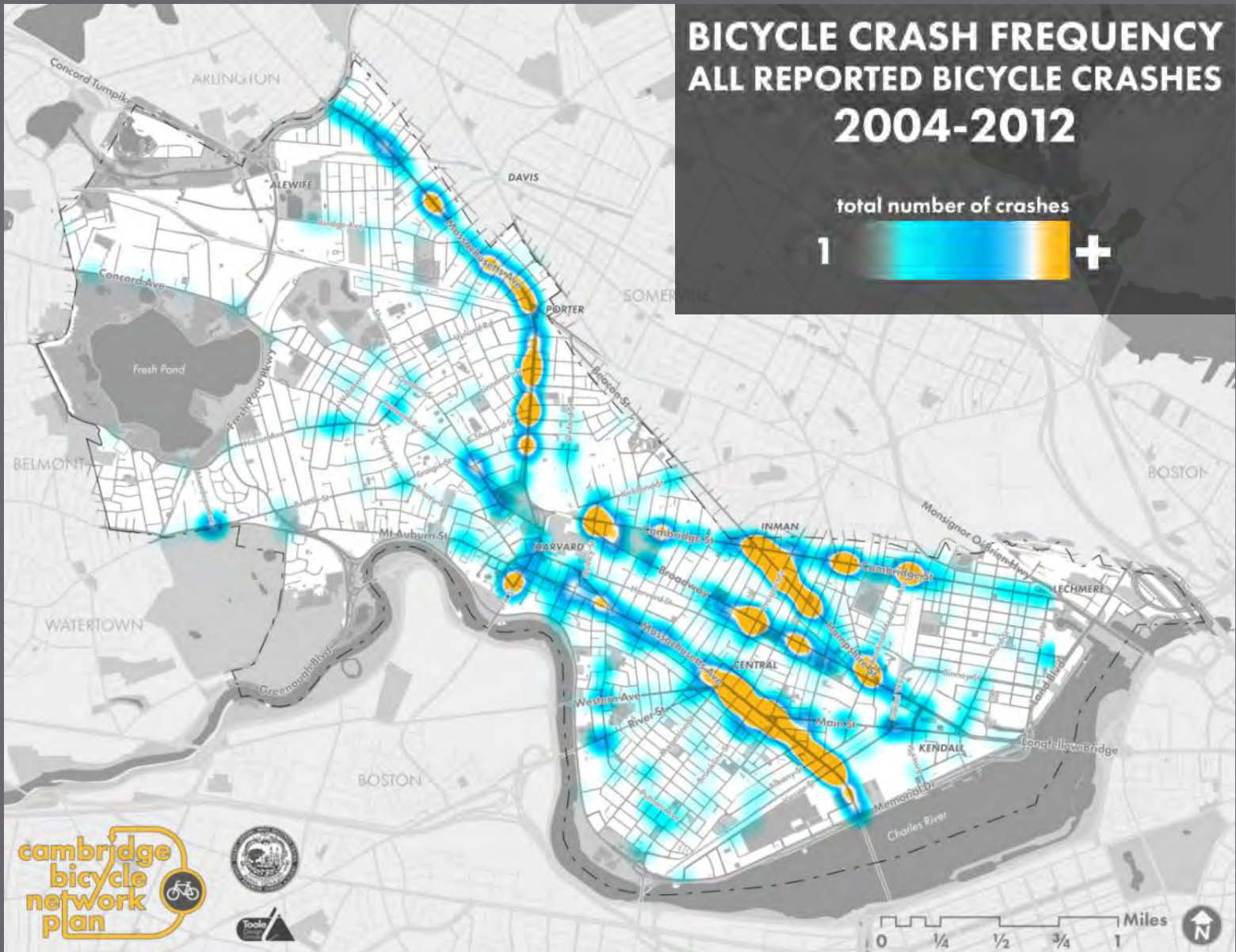


For more detail on the bicycle crash analysis:

<http://www.cambridgema.gov/CDD/Transportation/bikesincambridge/bicyclecrashinformation.aspx>

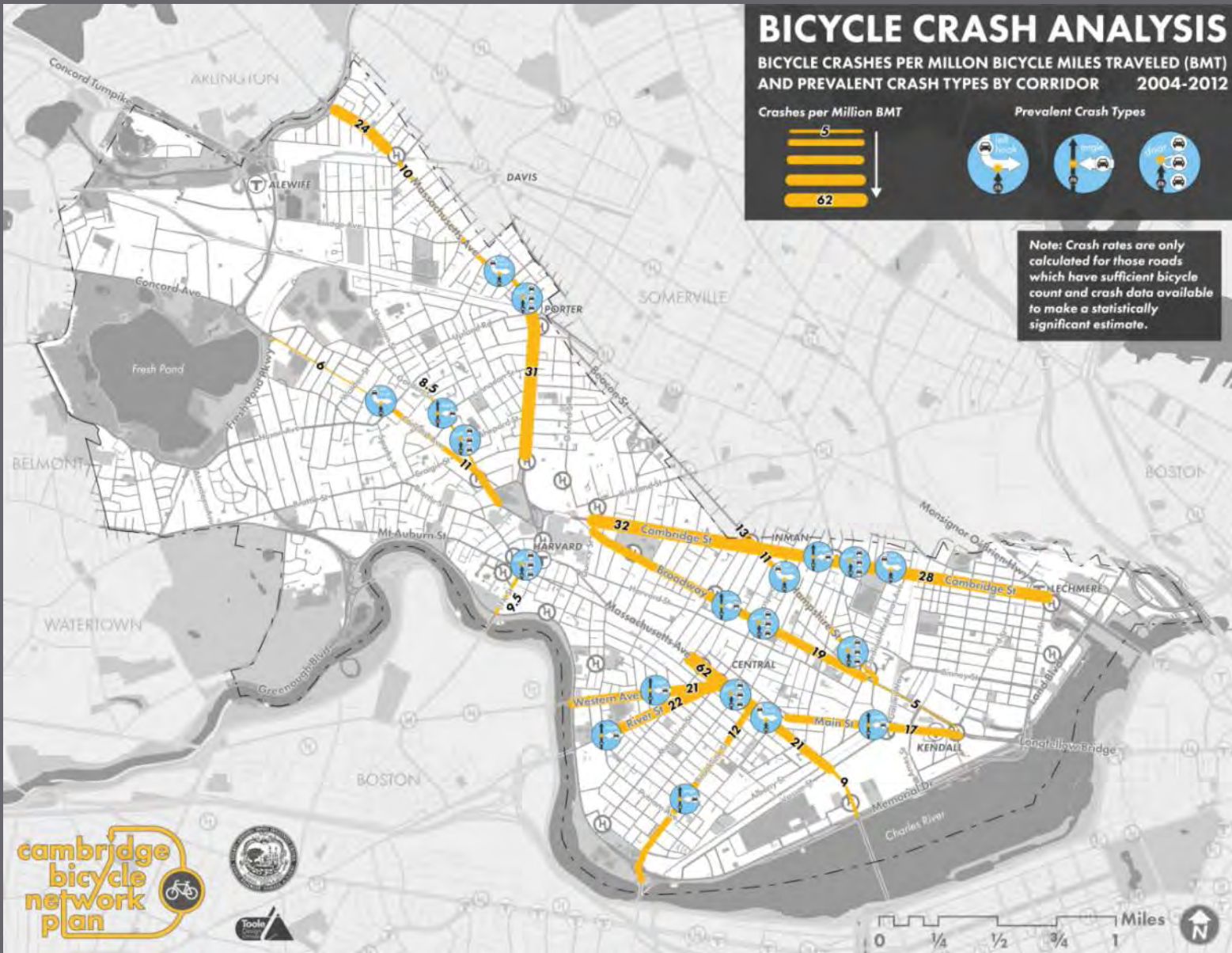
BICYCLE CRASH FREQUENCY ALL REPORTED BICYCLE CRASHES 2004-2012

total number of crashes



For more detail on the bicycle crash analysis:

<http://www.cambridgema.gov/CDD/Transportation/bikesincambridge/bicyclecrashinformation.aspx>



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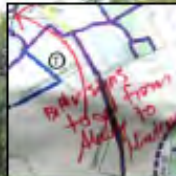
60+
Open House
attendees



570
WikiMap
users



730
Survey
respondents



20
Events with
paper maps



2000
Flyers

cambridge
bicycle
network
plan 



2000+
Comments
from all sources

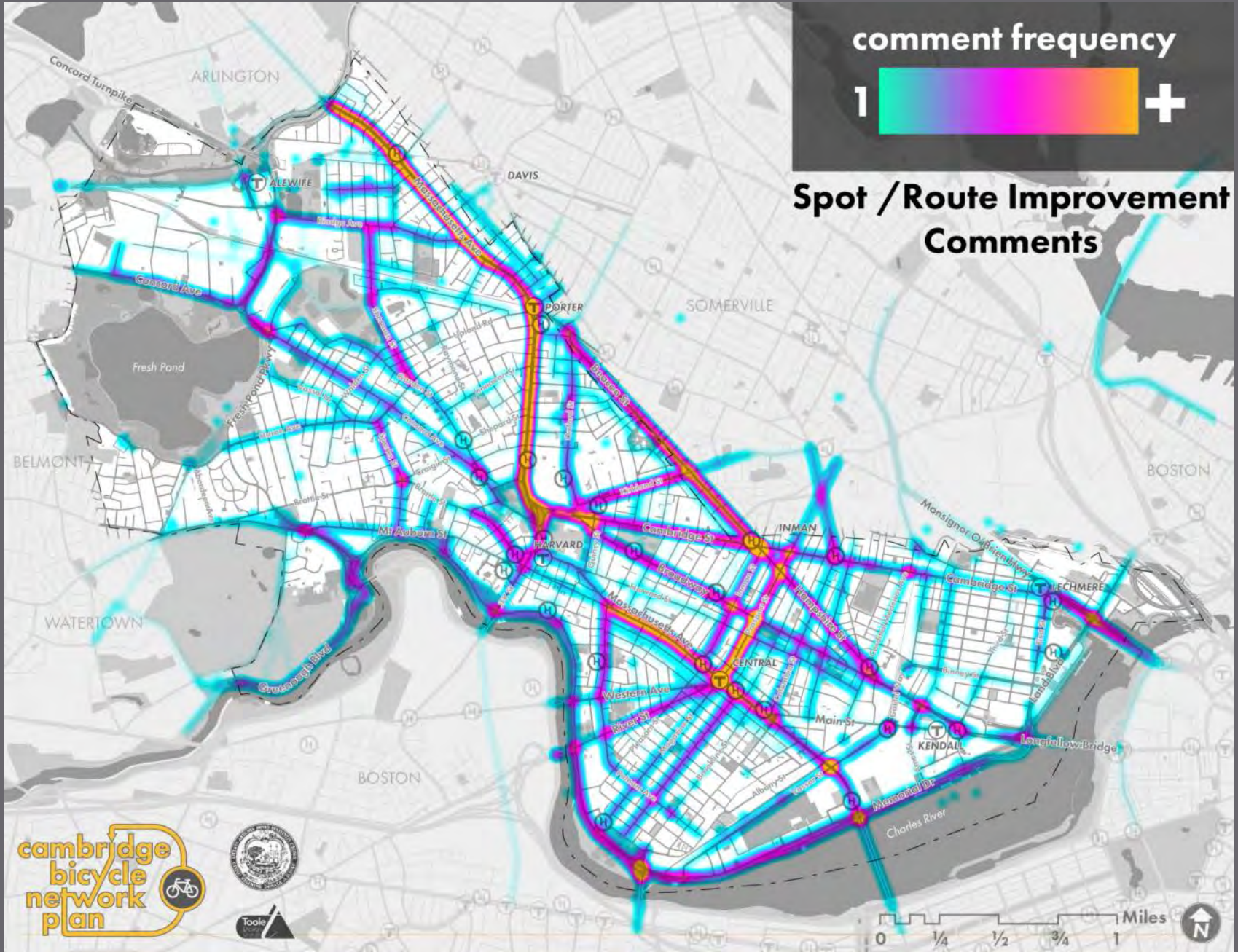


OUTREACH

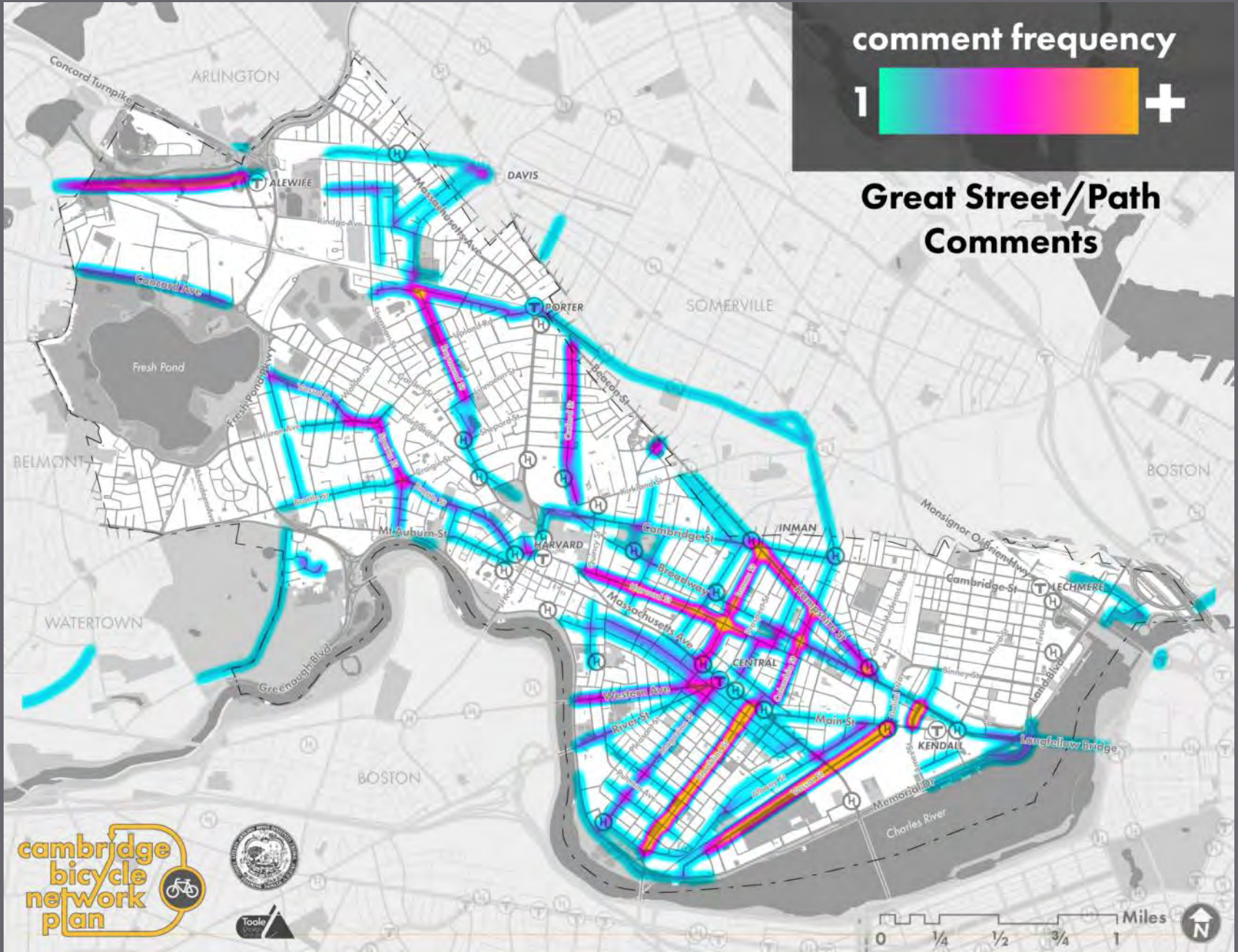
May - July 2014

Public input into the Draft Plan was collected in a variety of ways.

Public Comments – Needed Improvements



Public Comments – Good Infrastructure



Short Term Action Items



WIKIMAP ACTION ITEMS

DECEMBER
2014

What are WikiMap Action Items?

As a direct result of your comments on the Spring 2014 online WikiMap, on paper maps at numerous public input sessions, through the online survey, and at the June Open House, we were able to identify a variety of suggested improvements throughout the city on which action could be taken. The table and map below identify many of your great ideas, indicating the status of investigation or implementation. Many improvements are being evaluated or planned for next year, while others have already been implemented!



A variety of suggested improvements were made through the initial public input process. Here (Map on this slide and table on next) are some of the projects that will be implemented or evaluated.

Short Term Action Items

ID	CATEGORY	LOCATION	STATUS	DESCRIPTION
1	Signs, Markings	Mass Ave and Cambridge St	Will Be Looked At	Signage to aid in merge coming out of tunnel from Mass Ave onto Cambridge St
2	Signs, Markings	Main St and Columbia St	Done	Bike Box on Main St at Columbia St to facilitate turns toward Mass Ave
3	Signs, Markings	Norfolk St	Done	Add double yellow line of Norfolk St contraflow lane
4	Signs, Markings	Waterhouse St Contraflow	Will Be Looked At	Better signage for Waterhouse St contraflow lane
5	Construction, Paving	Multiple	Sent to Public Works	Reported potholes and poor pavement conditions
6	Construction, Paving	Fort Washington Park	Will Be Done	Pave access path to the at-grade railroad crossing
7	Construction, Paving	Vassar St and Pacific St	Identify Funding and Who will Implement	Provide a pedestrian and bicycle crossing on Vassar St at the Pacific St railroad crossing to connect with eastbound Vassar St cycle track
8	Construction, Paving	Webster Ave and Lincoln St	Will Be Done	Remove the intersection pavers at the intersection of Webster Ave and Lincoln St
9	Signals	Trowbridge St at Harvard St	*	Add bike detection at Trowbridge St at Harvard St
10	Signals	Huron Ave and Garden St	*	Bike detection at Huron Ave and Garden St
11	Bike Parking, Fix-its	Alewife T Station	Will Be Looked At	Bicycle Fix-It Station at Alewife T
12	Bike Parking, Fix-its	Tobin School	Added to 2015 List	Bike Parking needed: Tobin School
13	Bike Parking, Fix-its	Graham and Parks	Added to 2015 List	Bike Parking needed: Graham and Parks
14	Bike Parking, Fix-its	Mass Ave and Western Ave/River St	Added to 2015 List	Bike Parking needed: Mass Ave at Western Ave/River St
15	Bike Parking, Fix-its	Broadway at Portland St	Added to 2015 List	Bike Parking needed: Broadway at Portland St
16	Bike Parking, Fix-its	Main Library	Added to 2015 List	Bike Parking needed: Main Library
17	Bike Parking, Fix-its	Galleria	Done	Bike Parking needed: Galleria
18	Bike Parking, Fix-its	Mass Ave and Cedar St	Will Be Looked At	Bike Parking needed: Mass Ave and Cedar St
19	Hubway	Multiple	Will Be Looked At	All Hubway suggestions recorded for consideration
20	Longer Term Potential	Bolton St and Walden Square Rd	Determining Public Easements	Pave an existing gravel path between Bolton St and Walden Square Rd
21	Longer Term Potential	Inman Square	Major Planning Study Underway	Several comments about signal improvements at Inman Square
22	Longer Term Potential	Ames St	Planning Stages	Remove the existing curb extensions on Ames Street to continue the cycle track to the south
23	Longer Term Potential	Mass Ave and Western Ave	Planning Stages	Intersection improvements on Mass Ave to connect bicyclists to the Western Avenue cycle track
24	Longer Term Potential	Alewife Linear Park and Mass Ave		Add signage and/or bike boxes at Alewife Linear Park and Mass Ave indicating how to transition from path to road
25	Longer Term Potential	Russell Field	Done by others?	Improvements to paths around and through Russell Field
26	Need More Evaluation	Linear Path at Westley Ave	Evaluation	Provide connection to Linear Path at the end of Westley Ave
27	Need More Evaluation	Alewife T Station Access Road		Convert wide sidewalk to cycle track and pedestrian path on Alewife T Station Access Road
w28	Need More Evaluation	Linear Path, Mass Ave, Cedar St	Planning Stages	Provide direction on how bicyclist's should cross at the intersection of Linear Path/Mass Ave/Cedar Street
29	Need More Evaluation	Mass Ave and Putnam St		Bicyclists traveling westbound on Mass Ave would like to be able to turn left onto Putnam St
30	Need More Evaluation	Sidney St, Mass Ave, Main St		Allow bicyclists traveling northbound on Sidney St to cross Mass Ave onto Main St
31	Need More Evaluation	Webster Ave and Hampshire St		Improve visibility for turns from Webster Ave to Hampshire St
32	Need More Evaluation	Mass Ave and Somerville Ave	Evaluation	Improved signal timing at Mass Ave and Somerville Ave
33	Need More Evaluation	Galileo and Broadway		Bike box for left turns from Galileo (N Bound) to Broadway
34	Not Anticipated to Advance	Grove St and Huron Ave	Outside Limits	Add intersection treatment for bicyclists turning left from Grove St to Huron Ave
35	Not Anticipated to Advance	Minuteman Path and Discovery Park Path	Outside Limits	Add crosswalk and curb ramp from Minuteman path to Discovery Park path, It appears this part of the path may be in Arlington

*All loops are intended to function for bicycles. Reported loops will be checked for sensitivity. Some bicycles will not be detected because of their material (carbon fiber bikes, for example)

**Outside Limits = not in the City limits and/or not under City control

Bicycling Survey



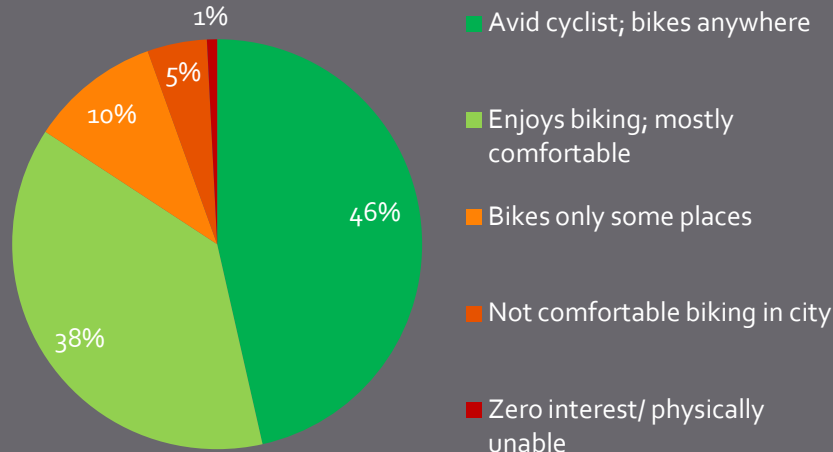
- Although most people who responded to the on-line survey about bicycling in Cambridge ride frequently and everywhere, they report that they are not comfortable on many of the existing streets and would like to see more protected bicycle facilities and bicycle friendly street designs.
- A few findings follow.
- [Click here for summary report.](#)



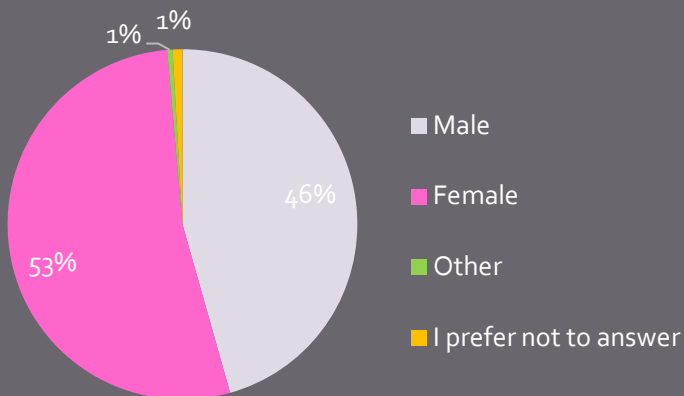
Bicycling Survey



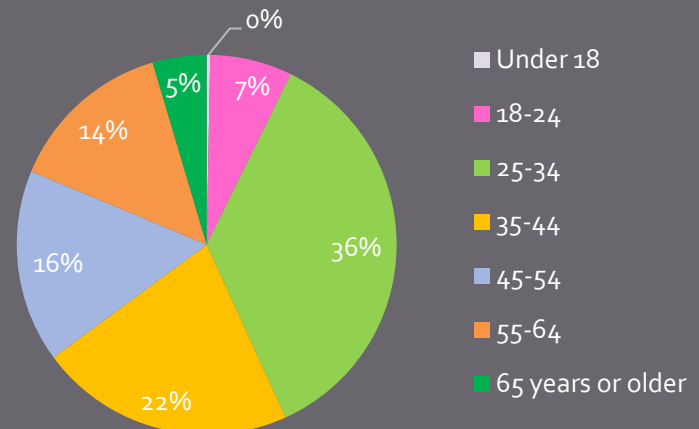
How would you describe yourself?



What do you identify as your gender?



As of your most recent birthday, what is your age?



Bicycling Survey

Photos of Bicycle Facilities on Busy, Commercial Streets

Street with Shared Lane Markings



Street with Shared Lane Markings



Conventional Bike Lane



Conventional Bike Lane



Buffered Bike Lane



Buffered Bike Lane



Photos of Bicycle Facilities on Non-Commercial Streets

Street with Shared Lane Markings



Street with Shared Lane Markings



Bicycle Boulevard



Bicycle Boulevard



Street with Traffic Calming

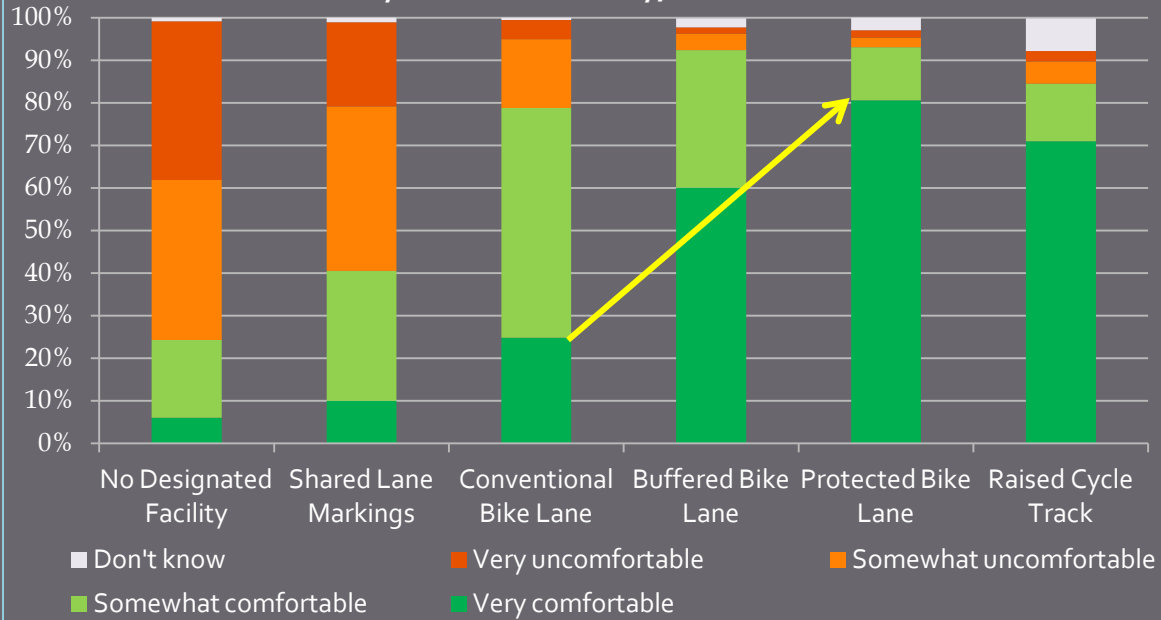


Street with Traffic Calming

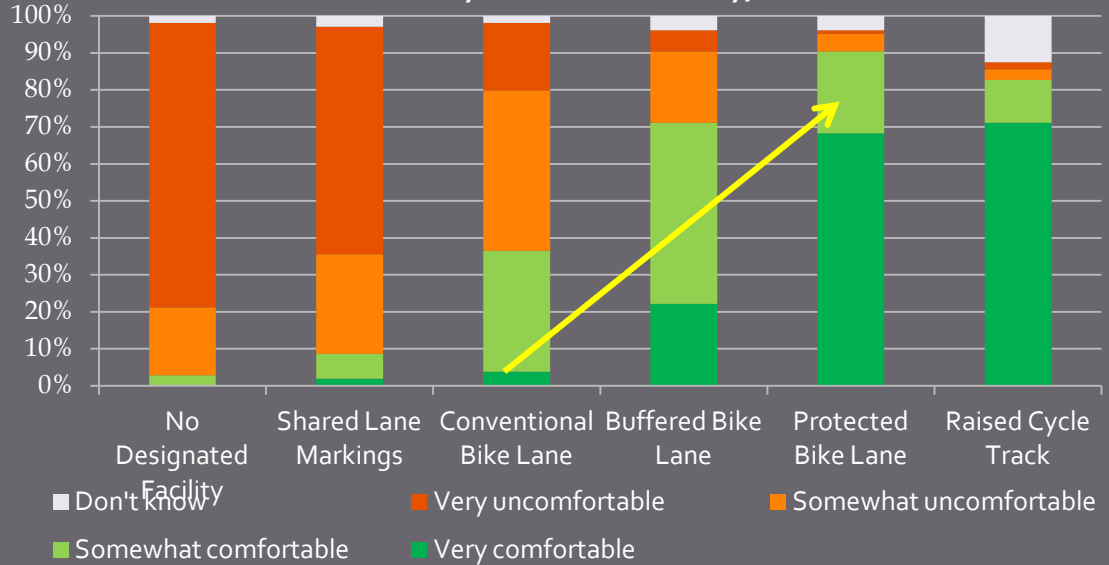


People were asked about their comfort levels on various facilities and street types.

ALL RESPONDENTS: How comfortable do you feel with these bicycle facilities on busy, commercial streets?



CONCERNED CYCLISTS*: How comfortable do you feel with these bicycle facilities on busy, commercial streets?



*Concerned cyclists are defined as survey respondents who reported that they bike only some places or are not comfortable biking in the city

Bicycling Survey – “Very Comfortable”

Bike Lanes

25% all cyclists

4 % concerned cyclists



Protected Bike Lanes

81% all cyclists

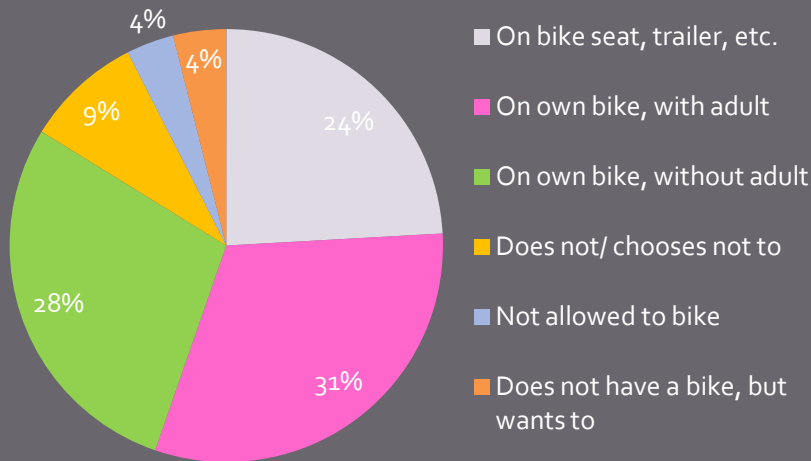
68 % concerned cyclists



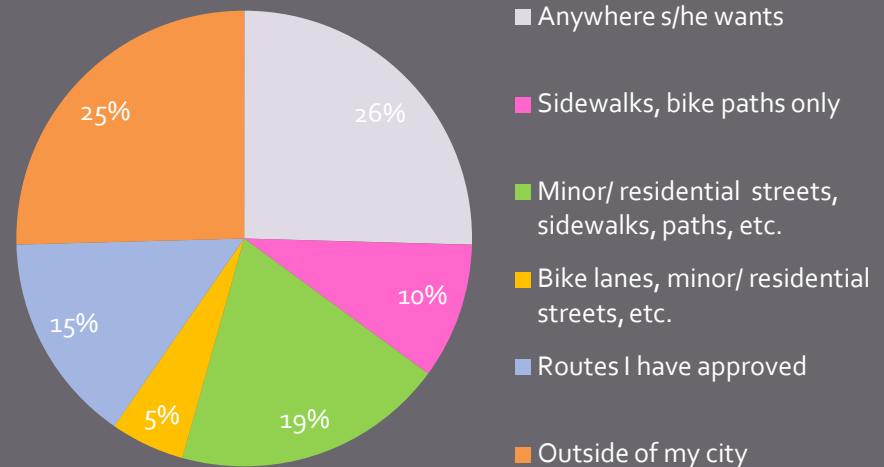
Survey

Bicycling with Children

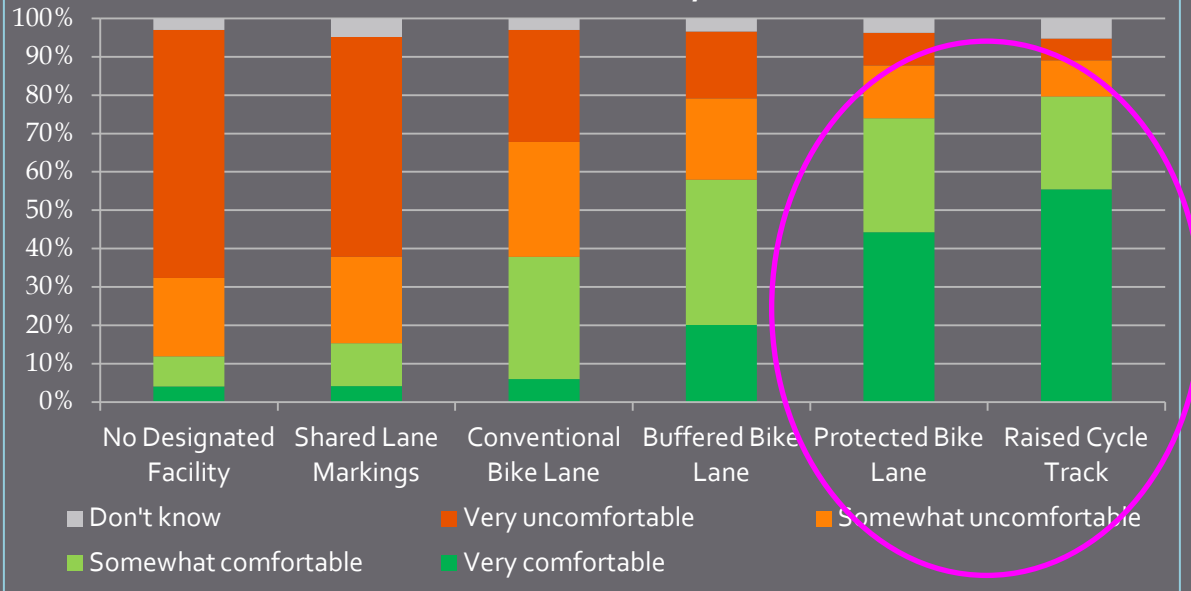
Do you bicycle with your children or do your children bike?



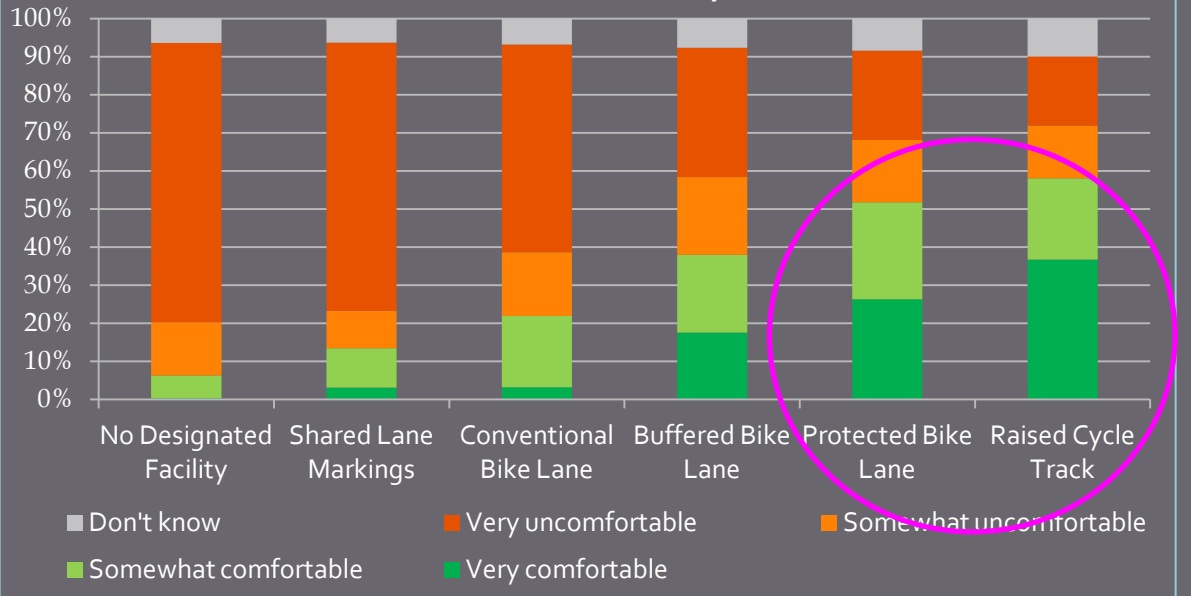
If your child bikes on his/her own without an adult, where does she/he bike?



How comfortable do you feel about your children on these bicycle facilities on commercial streets, **ALONG WITH AN ADULT?**



How comfortable do you feel about your children on these bicycle facilities on commercial streets, **WITHOUT AN ADULT?**



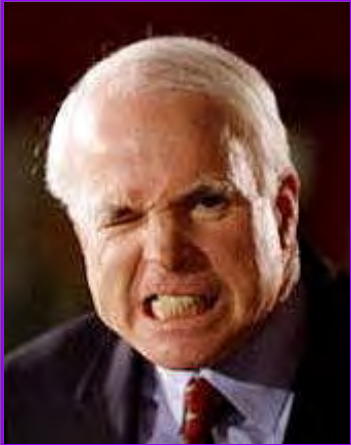
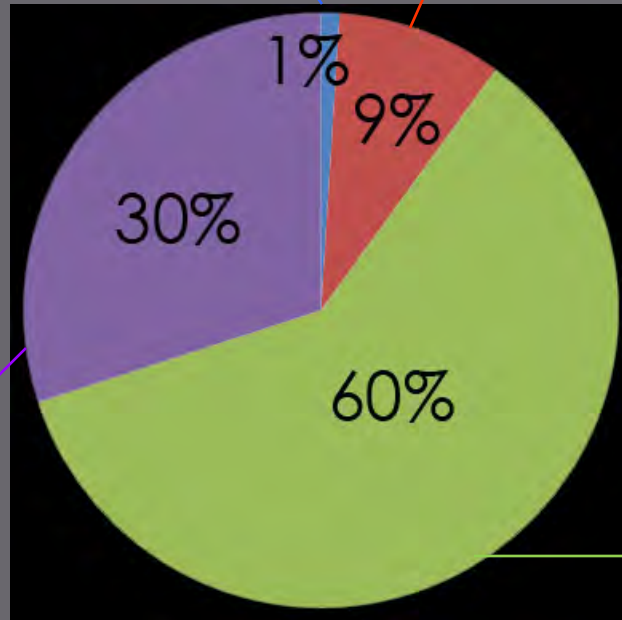
Types of (Potential) Cyclists



Strong and fearless



Enthusied and confident

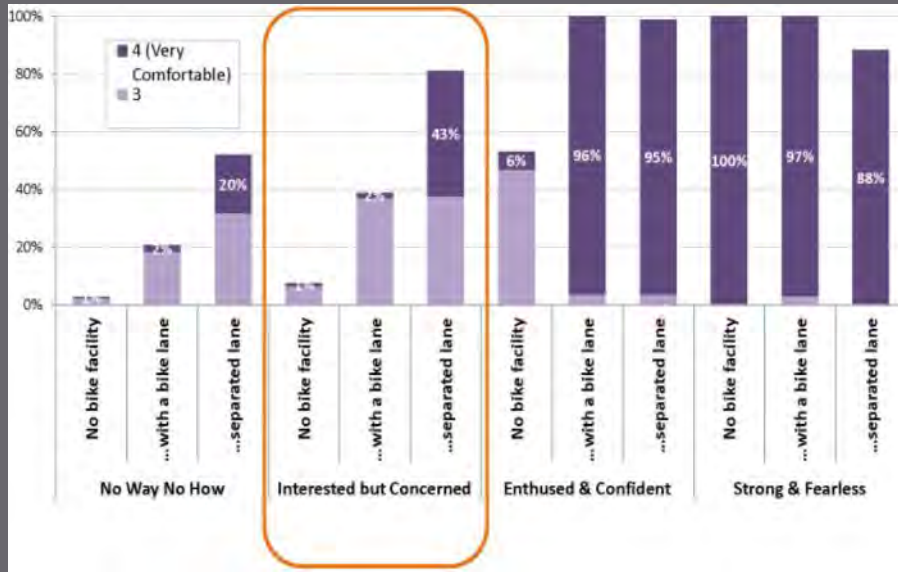


“No Way No How!”



Interested but concerned

More People Feel Comfortable on Protected Bicycle Facilities



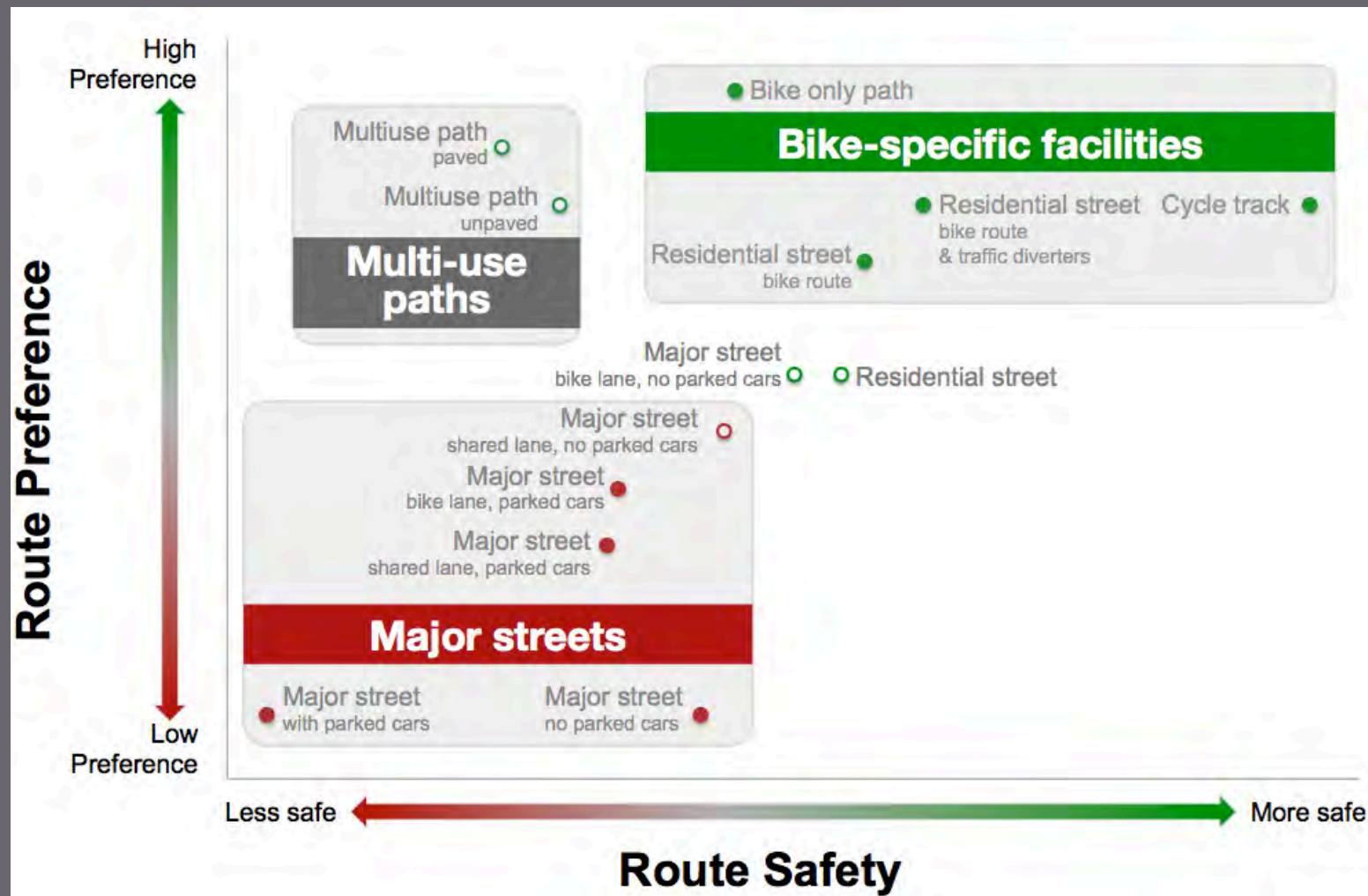
Source: Dill, J. (2012). Categorizing Cyclists: What Do We Know? Insights from Portland, OR.

Cyclists AND Motorists Prefer Protected Bicycle Facilities



Bicycle-specific facilities

= lowest risk of crashes and injuries



How Comfortable is Your Route?

BICYCLE LEVEL OF COMFORT CONCEPT

Bicyclists have varying levels of tolerance for traffic stress created by volume, speed, and proximity of adjacent traffic. Their tolerance may vary by time of day or trip purpose. A person's tolerance is likely to change over time and with bicycling experience.

The Cambridge Bicycle Level of Comfort analysis is based on the Dutch concept of increased separation from traffic as volume and speed increase and the provision of safe crossings of major roadways.



The Draft Bicycle Network Plan for Cambridge is being developed with an aspiration of having cyclists able to travel throughout the city on streets that are categorized as a Bicycle Level of Comfort 1 or 2, which meet the “8-80” Goal. These categories are explained in the next series of slides.

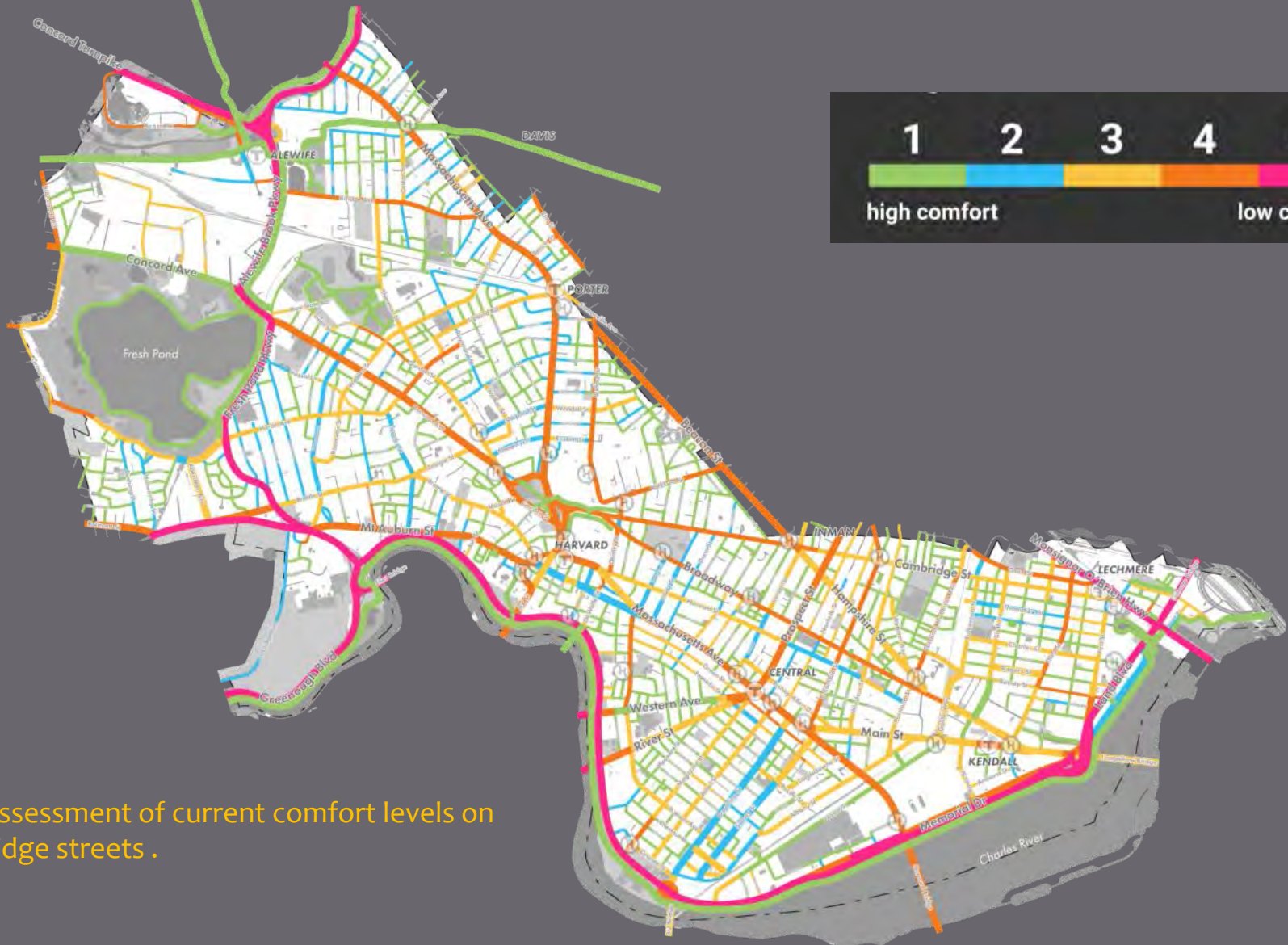
http://www.cambridgema.gov/~media/Files/CDD/Transportation/Bike/Bicycle_Comfort_Levels_20140612.ashx

Bicycle Level of Comfort (draft)



Bicycle Level of Comfort	Typical Criteria	Examples		
1	Protected/Separated or Shared with ADT <2K or Shared with Speed <30 mph			
2	Wide/Buffered Bike Lane or Bike Lane without Adjacent Parking or Shared with ADT 2-4K or Shared with Speed <30 mph			
3	Bike Lane Adjacent to Parking or Shared with Speed 30 mph or Shared with ADT 4-6K or Narrow Operating Space			
4	Shared with Speed 30+ mph or Shared with ADT 6-15K or High Frequency Bus			
5	Shared with Speed 35+ mph or Shared with ADT 15K+			

Bicycle Level of Comfort – Current Conditions (draft)



Draft assessment of current comfort levels on Cambridge streets .

Building the Bicycle Network

How is this being done?

- 1. Consider who the network is for: the “8-80” goal
- 2. Which facilities are safest/where do changes need to be made based on the crash analysis?
- 3. Which facility types are preferred – surveys and Level of Comfort Analysis
- 4. What have users identified as either preferred streets/routes or ones that need improvement
- 5. What are the key destinations/land uses that we need to connect (schools, universities, employment, retail, etc.)
- 6. What are the regional connections
- 7. Where are the opportunities (projects underway)
- 8. Where are the missing links
- 9. What short-term improvements can be made
- 10. Further input on the Draft Plan

Level of Accommodations (draft)

Accommodations supporting the 8-80 Goal.

Shared-use Path



Raised Cycle Track



Protected Bike Lane



BLC 1

Two-way Cycle Track



Bicycle Boulevard



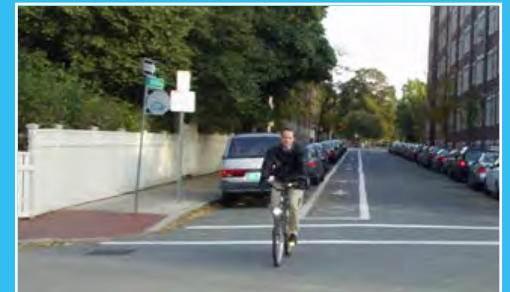
Buffered Bike Lane



Bike Lane without Parking

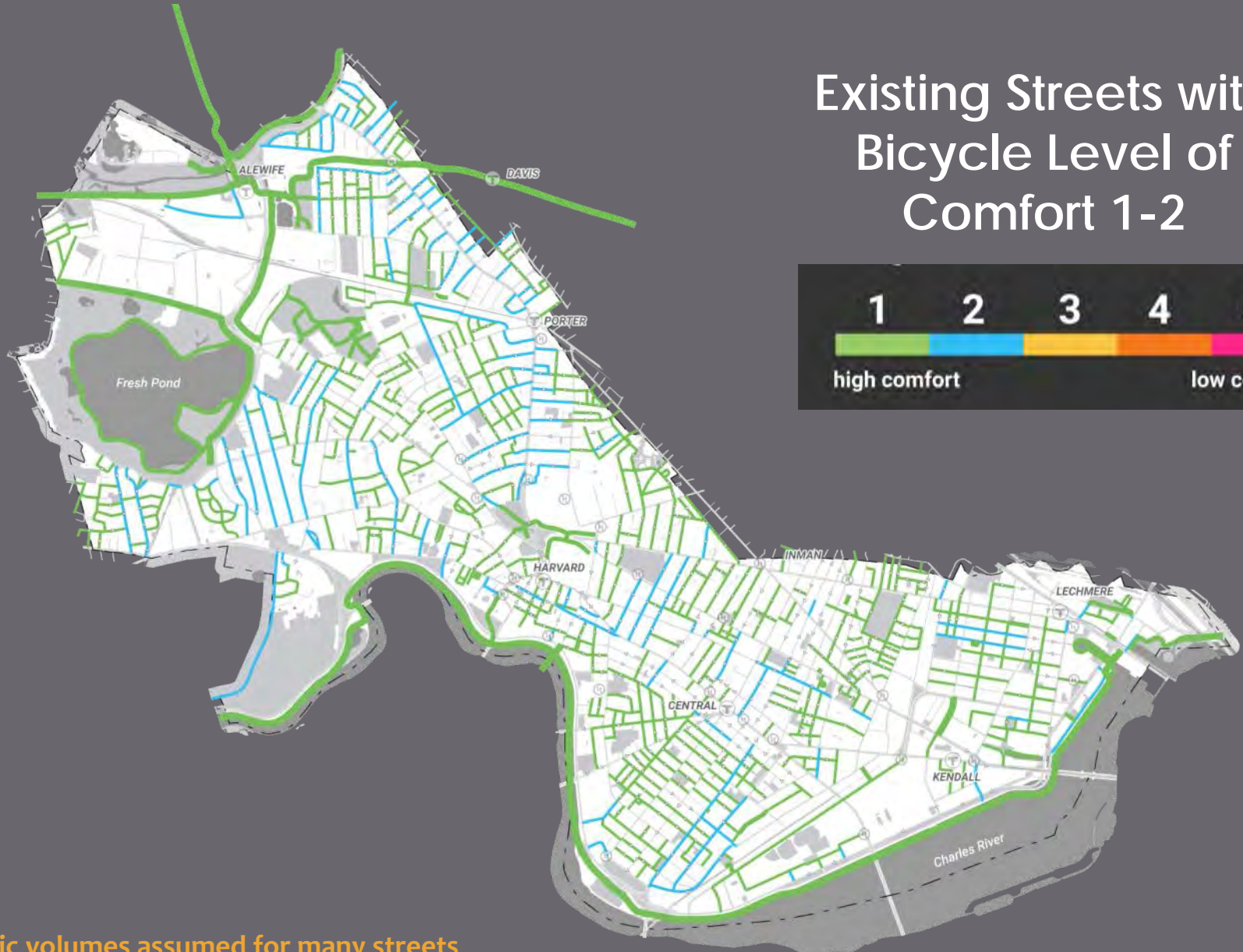


Contra-flow Bike Lane



BLC 2

Draft Network Plan: Building the Network



NB: traffic volumes assumed for many streets

Draft Network Plan: Building the Network

Next Step:

Determine which streets will be added to the priority network with the goal of having a more integrated system where most key destinations can be reached on streets where the Bicycle Level of Comfort is proposed to be 1 or 2



Note that all streets in Cambridge are considered “bicycle routes;” this draft network proposes a plan for which streets are give particular priority for improvements.

Draft Network Plan

1. Green Lines

- Off-Street Paths
- Primarily through parks and open space and along linear corridors such as rail lines and rivers

2. Purple Lines

- Bicycle comfort through increased separation from traffic with protected bike lanes, cycle tracks, etc.
- Primarily along major through street streets with higher traffic volumes and speeds
- Focus on providing access to shopping, jobs, neighboring communities, regional trail network

3. Orange Lines

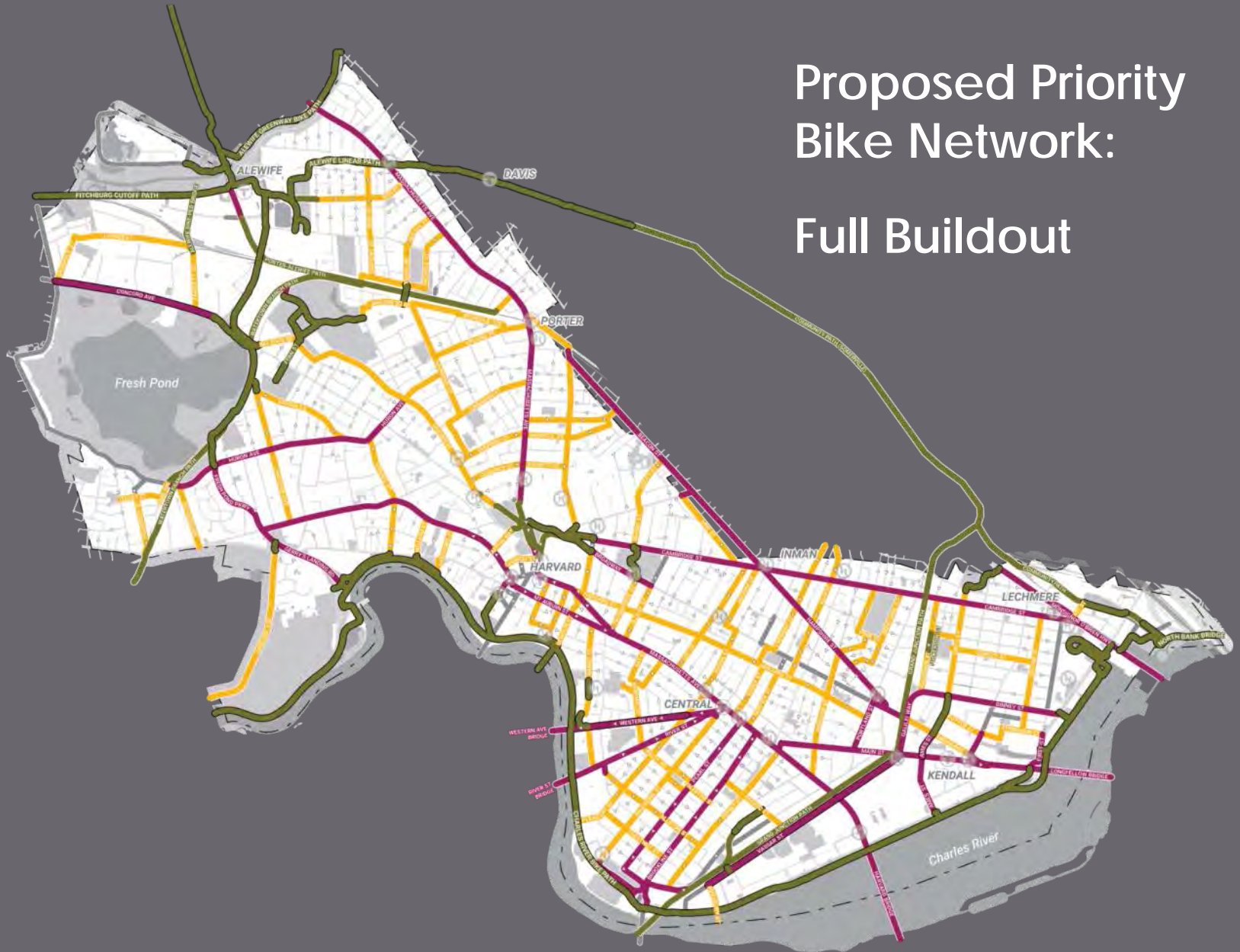
- Bicycle comfort through lower vehicle volume and/or speed with bicycle-friendly traffic calming, priority crossing treatments at major streets, etc.
- Primarily along residential and less busy through streets
- Focus on providing access within and between neighborhoods and to local parks and schools



Draft Network Plan: Building the Network

Proposed Priority
Bike Network:

Full Buildout

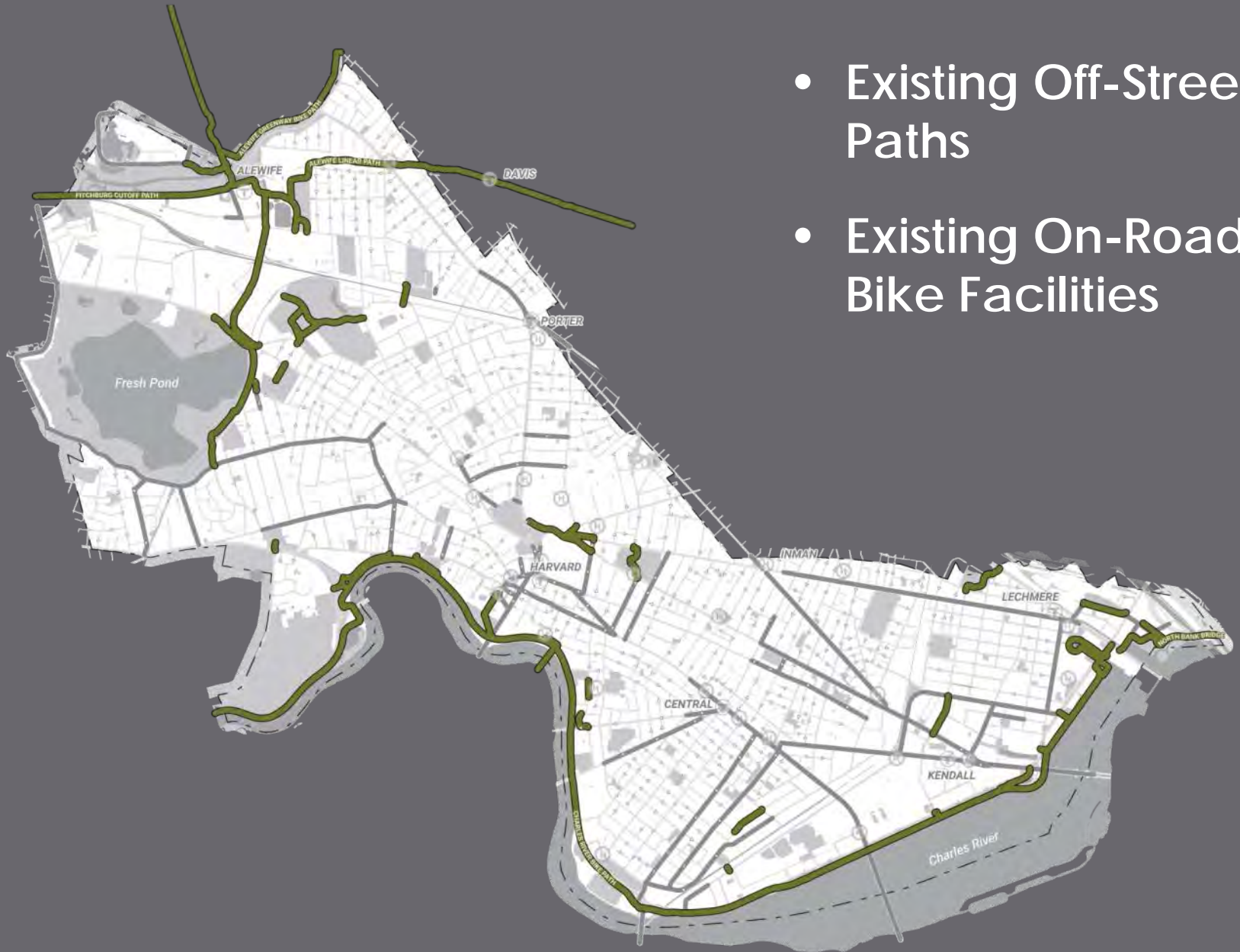


Draft Network Plan: Building the Network

- Existing Off-Street Paths



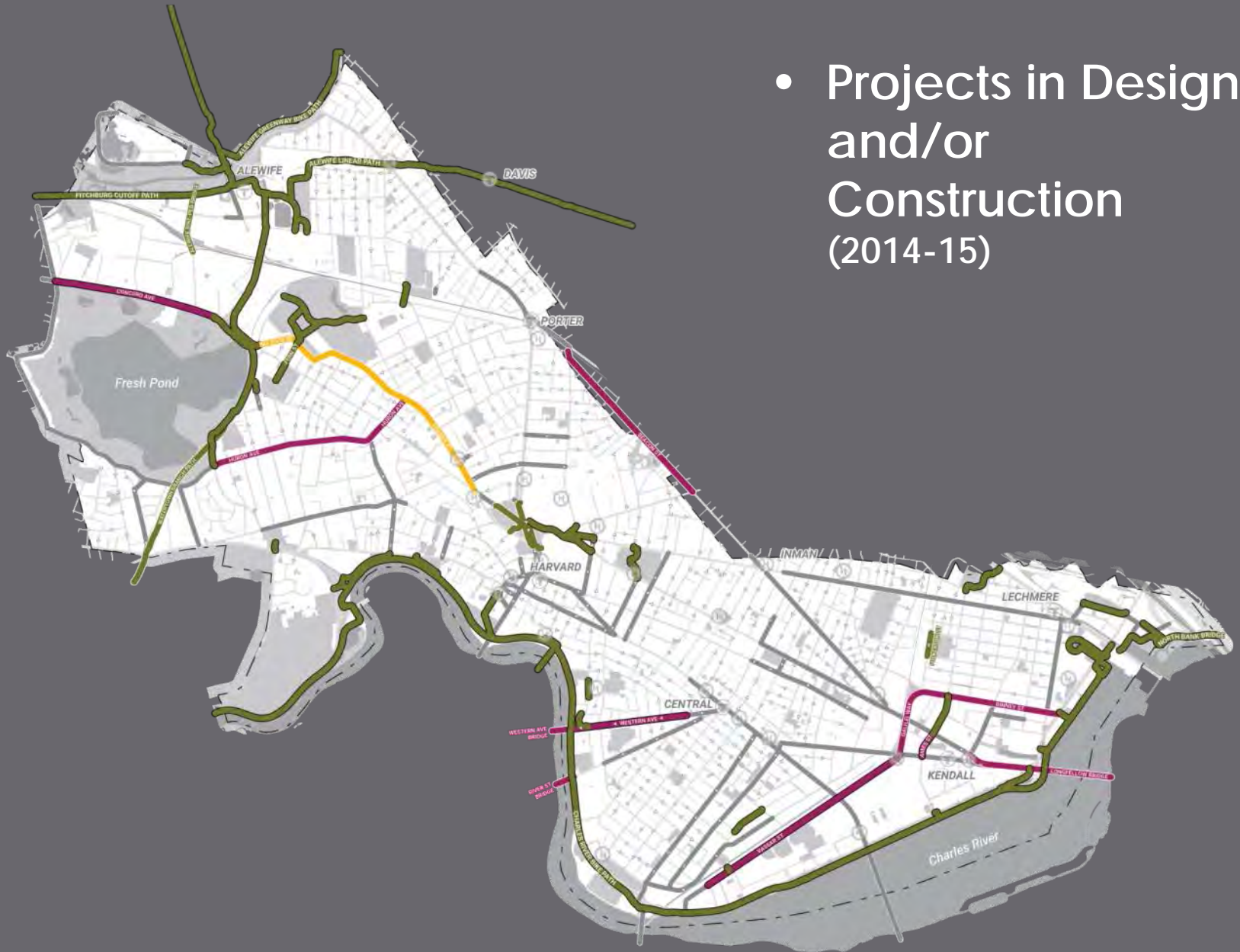
Draft Network Plan: Building the Network



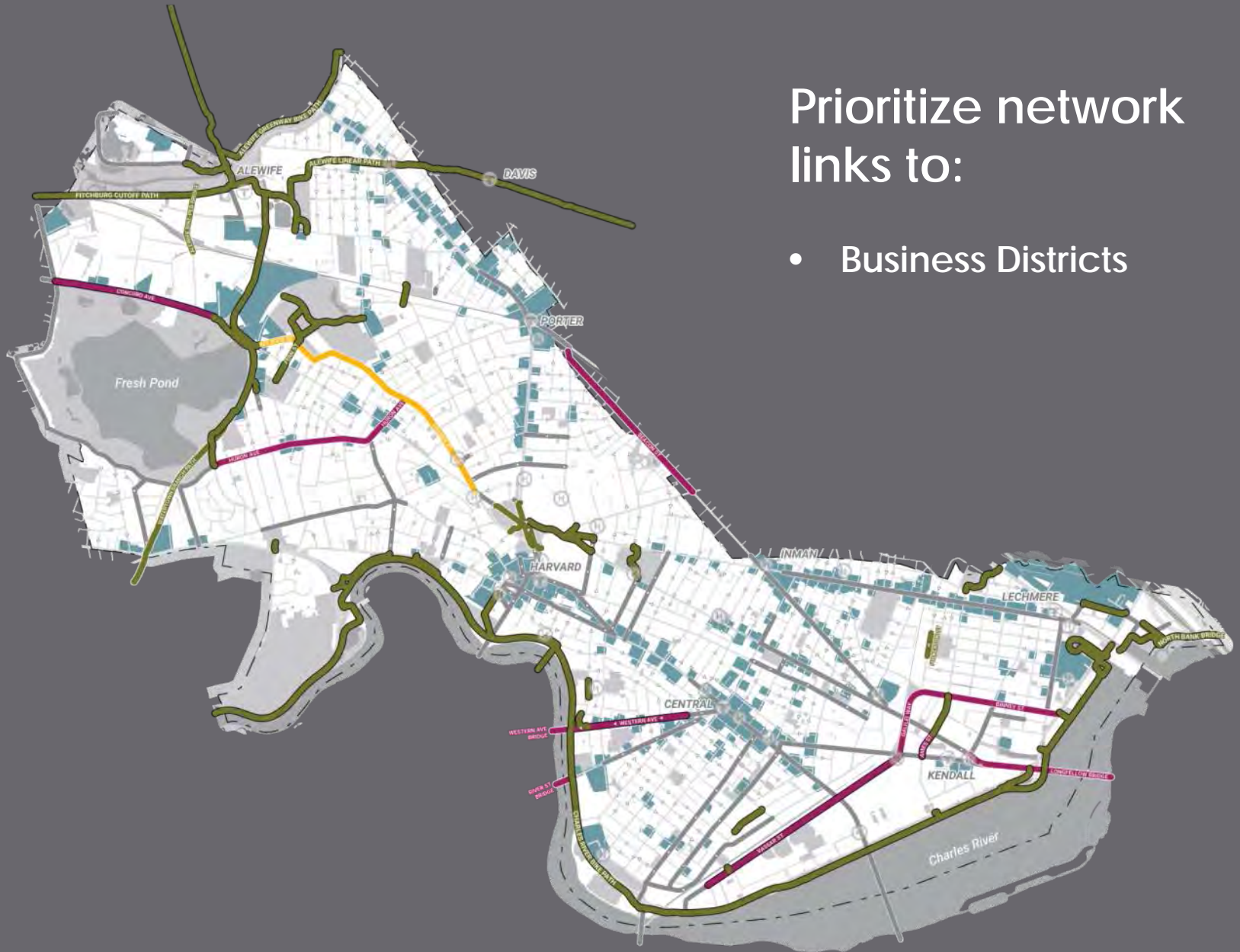
- Existing Off-Street Paths
- Existing On-Road Bike Facilities

Draft Network Plan: Building the Network

- Projects in Design and/or Construction (2014-15)



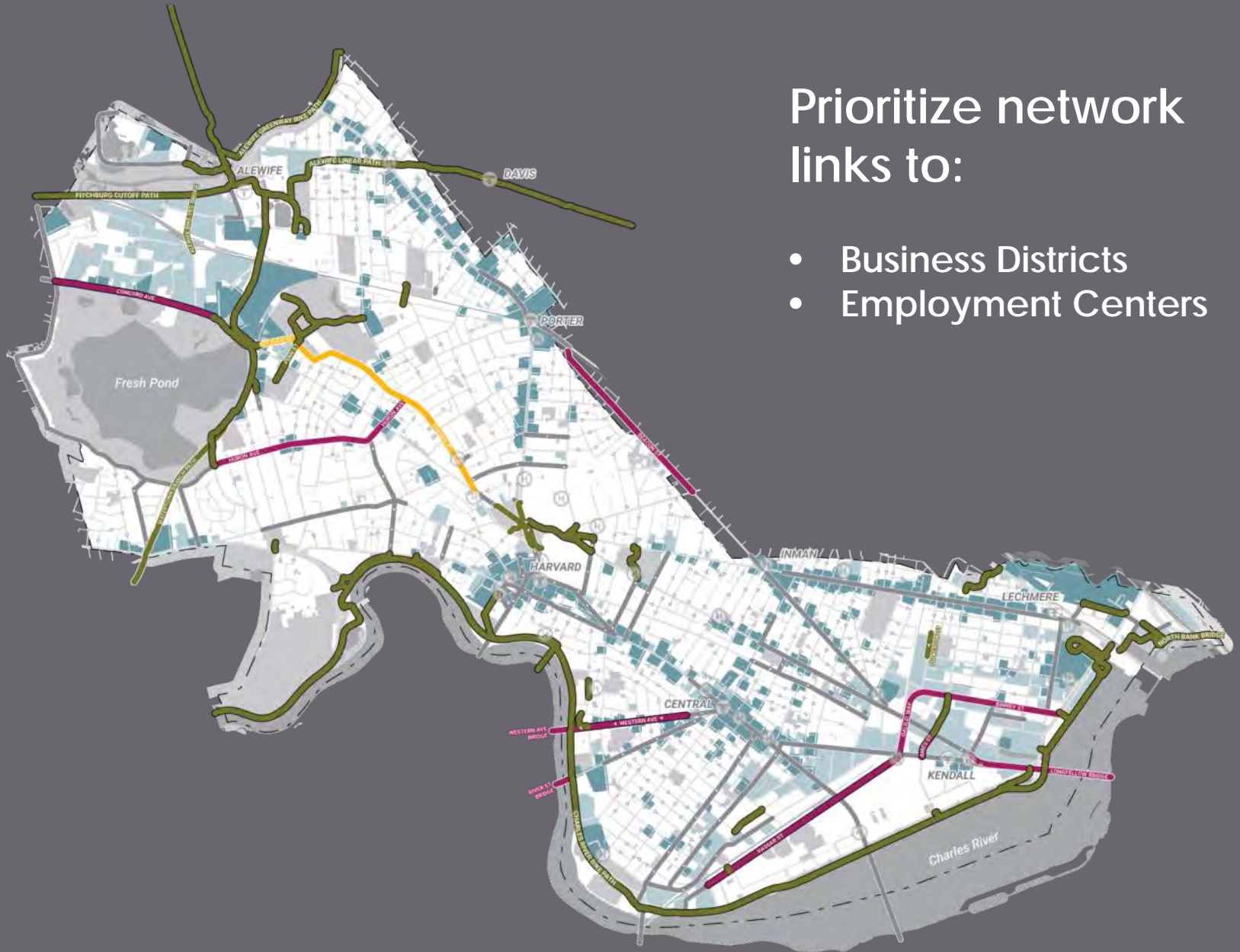
Draft Network Plan: Building the Network



Prioritize network links to:

- Business Districts

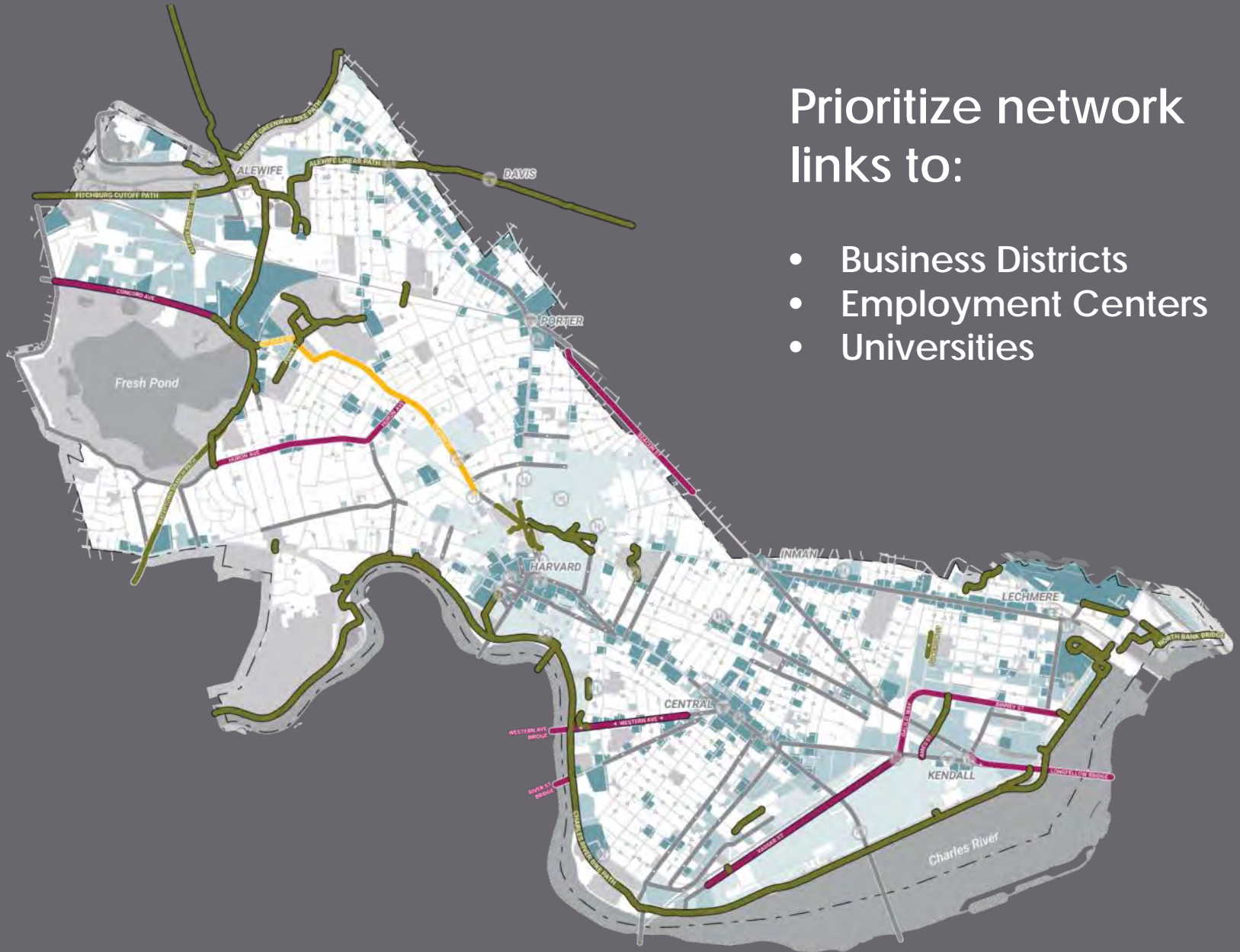
Draft Network Plan: Building the Network



Prioritize network links to:

- Business Districts
- Employment Centers

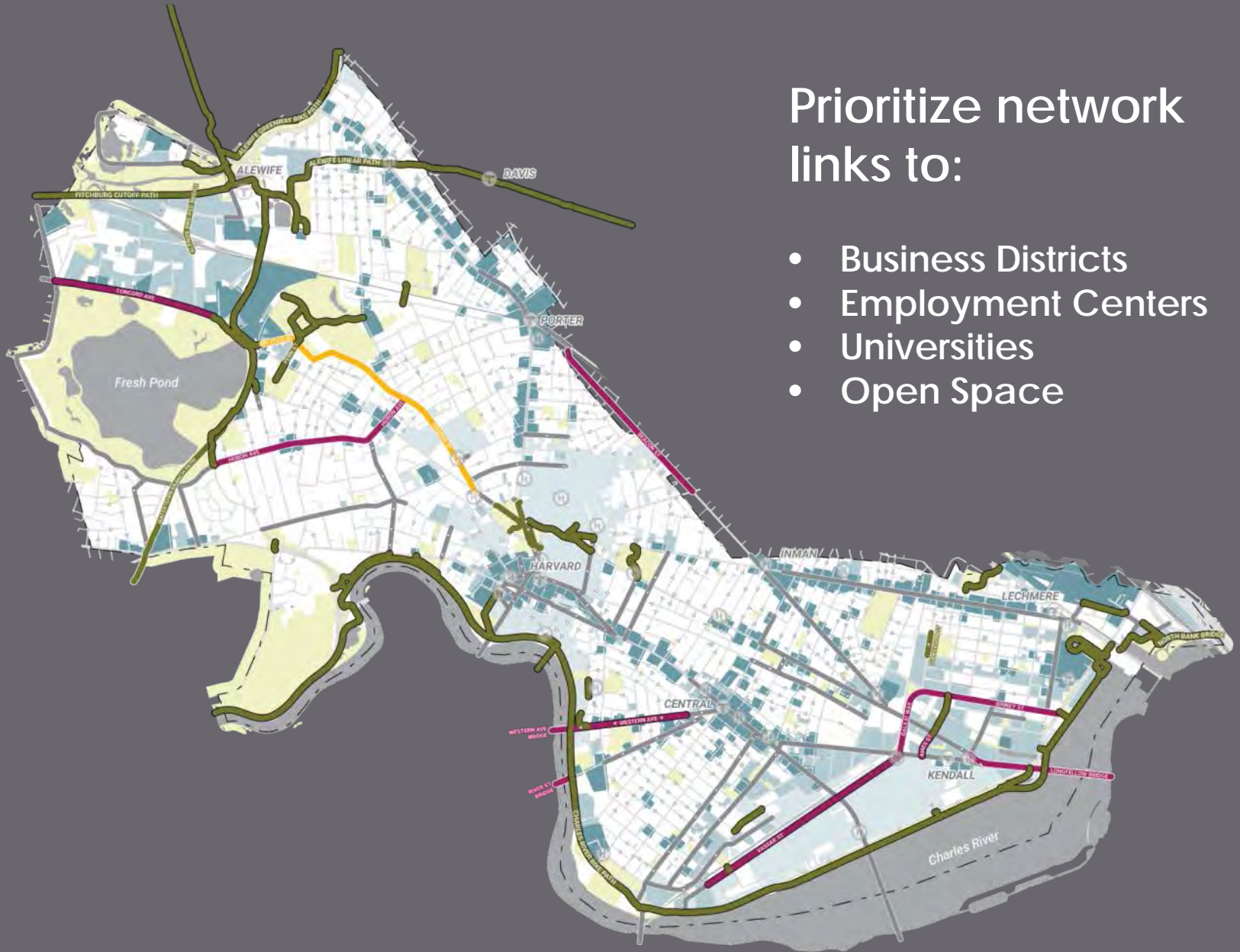
Draft Network Plan: Building the Network



Prioritize network links to:

- Business Districts
- Employment Centers
- Universities

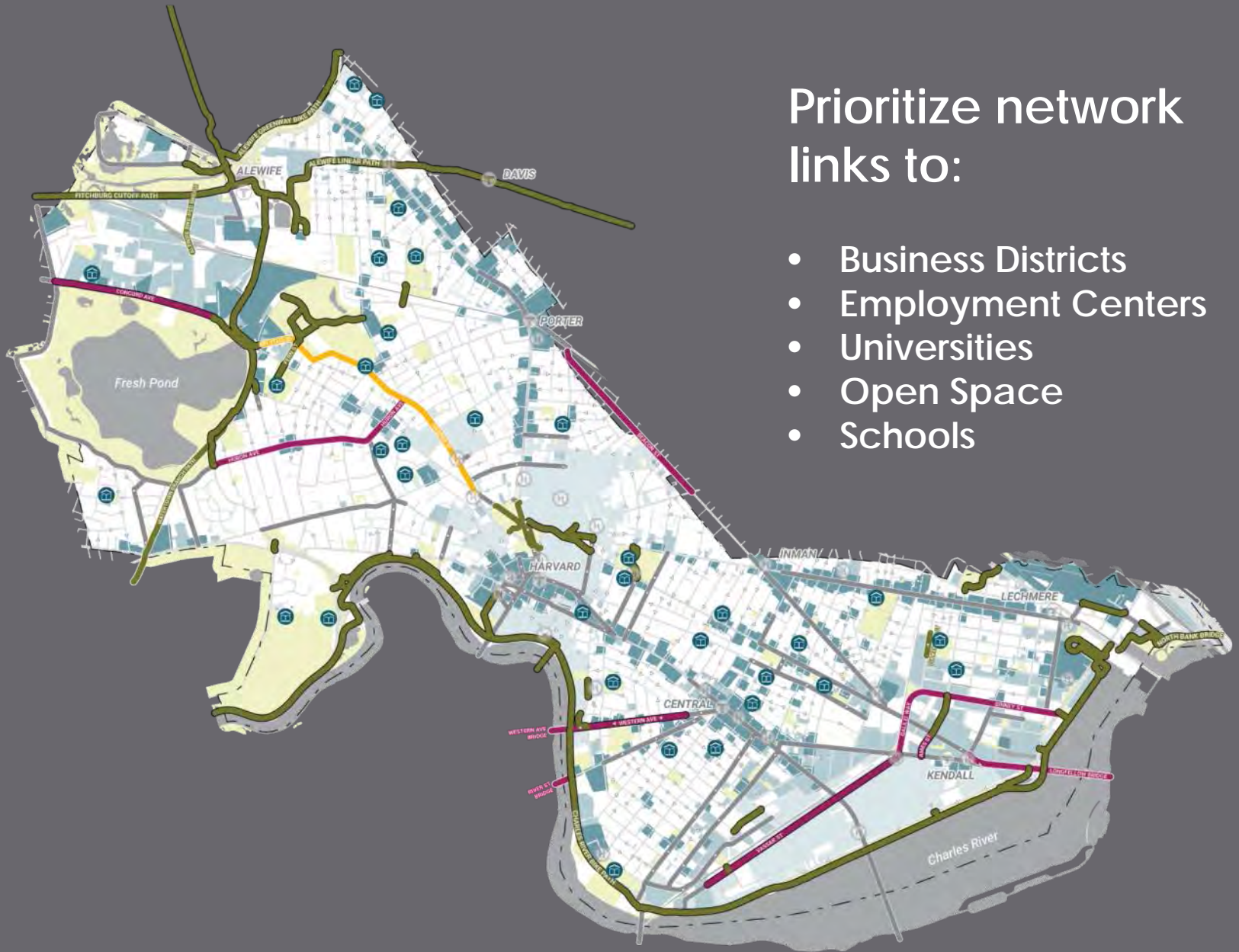
Draft Network Plan: Building the Network



Prioritize network links to:

- Business Districts
- Employment Centers
- Universities
- Open Space

Draft Network Plan: Building the Network



Prioritize network links to:

- Business Districts
- Employment Centers
- Universities
- Open Space
- Schools

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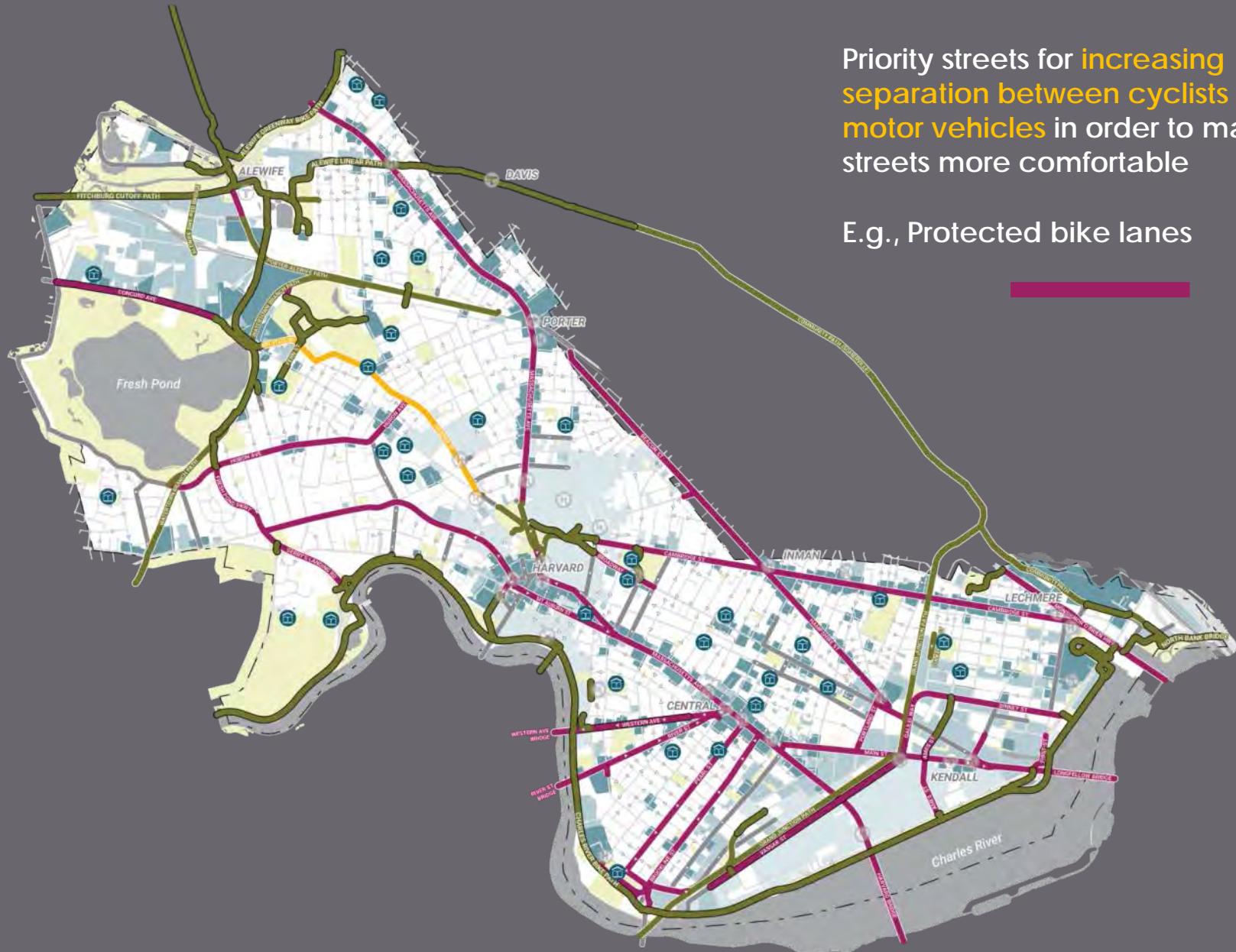
Priority off-street paths



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Priority streets for **increasing separation between cyclists and motor vehicles** in order to make streets more comfortable

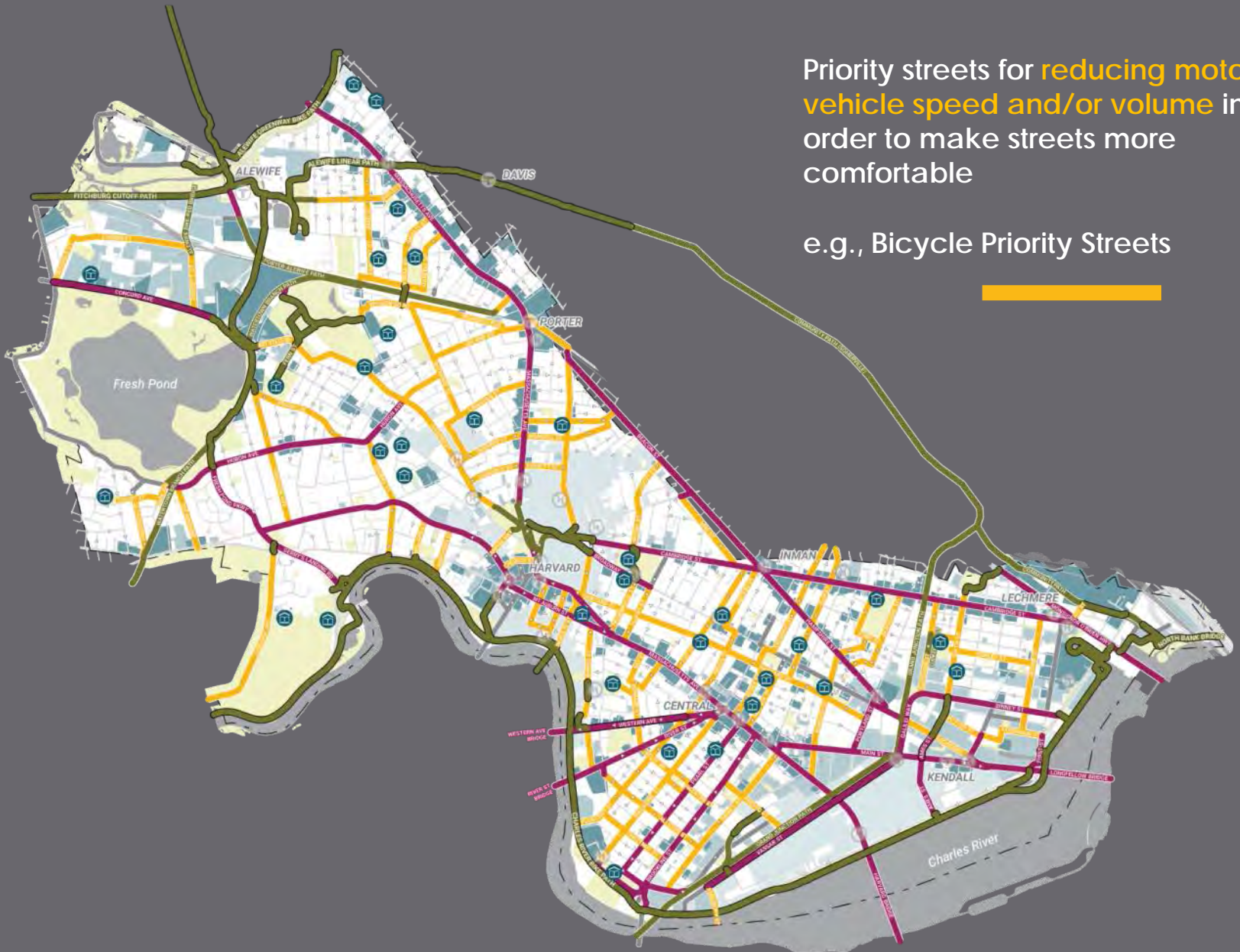
E.g., Protected bike lanes



Draft Network Plan: Building the Network

Priority streets for **reducing motor vehicle speed and/or volume** in order to make streets more comfortable

e.g., Bicycle Priority Streets



Draft Bike Priority Network Plan

Priority streets and paths for improvement to build a comprehensive bike network



How will this be used?
Next →

Draft Bike Priority Network Plan

How will this be used?

This work will be used as the City plans for the redesign and reconstruction of infrastructure through the DPW [Five Year Plan for Street & Sidewalk Reconstruction](#). It also will be used to identify priorities for undertaking special projects (e.g., seeking grants, state funding, etc.). It will be a “living” plan, which will be regularly updated as new opportunities and ideas emerge.



Next Steps

- Now it is your turn to provide feedback on the Draft Bicycle Priority Plan.
- Add your comments to the WikiMaps Page:
- [WikiMaps Page](#)
- Attend the December 4 Open House:
- [December 4 Open House](#)

Thank you!

