Minimum Grid Maximum Potential

a CityLAB Project

CityLAB HAMILTON

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WHAT IS CITY LAB & WHO WE ARE

CityLAB HAMILTON

CityLAB Semester in Residence is an innovation hub that brings together students, academic and civic leaders to co-create a better Hamilton!

Who We Are

A group of interdisciplinary students in the CityLAB Semester in Residence program from McMaster University working on a project on what it means to have a Minimum Grid in Hamilton.

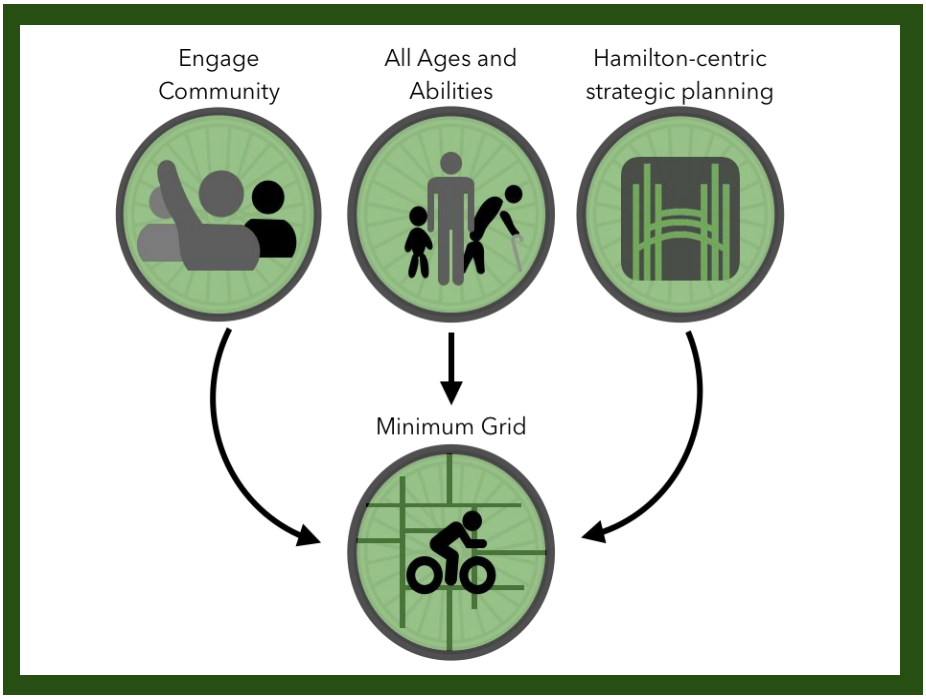
To learn more about CityLAB visit https://www.citylabhamilton.com/

PROJECT OVERVIEW

As the city has declared a Climate Emergency, Hamilton has had an interest in increasing cycle-based transportation through creating a Minimum Grid network. The goal of this project was to inform future change within the existing cycling network to increase accessibility for all ages and abilities through community engagement.

Challenge is to understand what the community believes Minimum Grid is and to determine a definition for Hamilton!

Working towards a Minimum Grid has been fully aligned with the City of Hamilton's six strategic priorities as well as its vision to " be the best place to raise a child and age successfully" (Verlinden et al, 2019).



Overview of Outcomes

The process of establishing a Minimum Grid in Hamilton prioritized incorporating All Ages and Abilities, community feedback and stakeholder input. As a result of this, the outcomes of this project have been designed to address these aspects in formulating the foundation of a Minimum Grid.

OUTPUTS

Understood what constitutes a Minimum Grid in Hamilton

Engaged the community in identifying current gaps in cycling infrastructure

Factored in accessibility for **All Ages and Abilities** (AAA) to create guidelines consistent with **Complete-Livable-Better Streets** (CLB Streets) planning

Worked within the context of existing Municipal Plans, initiatives and overarching provincial Policies

OUTCOMES

Converted the subway-style map into an interactive tool online using Google MyMaps

Created a **prototypical wayfinding app** specialized for Hamilton Cyclers attempting to pathfind using Javascript and PHP

Planned and facilitated a workshop to evaluate the subway style map and the infrastructure within its routes

Created a **publicly accessible database** with community feedback regarding the state of cycling in Hamilton (using data from aforementioned workshop)

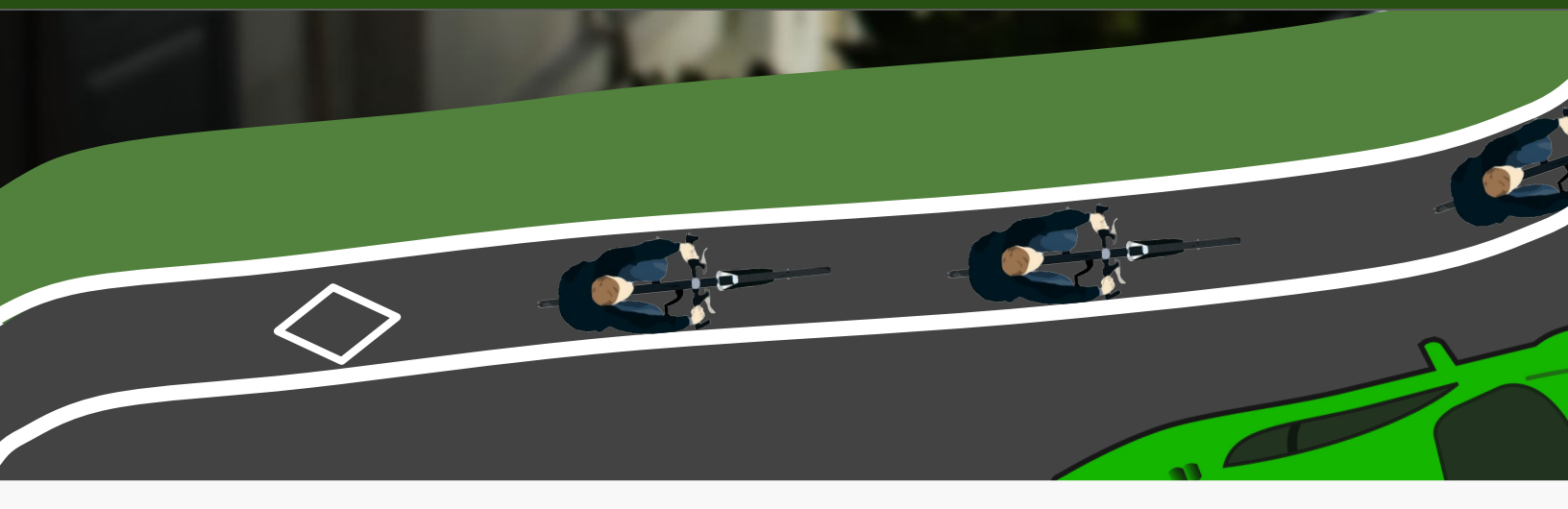
Created a master guiding framework as a practical toolkit for taking Minimum Grid to the next level, adhered towards the forwarding the Minimum Grid project.

Minimum Grid Today:

Project Background and endeavours

This section includes:

- Context
- The Strategic Plan
- Why Hamilton Should have a Minimum Grid
- Relevance
- Research



Hamilton currently has been developing a network of cycling infrastructure that is ever growing. With the help of Social Bicycles (SOBI), cycling has been made an even more accessible mode of transportation.

Hamilton Today

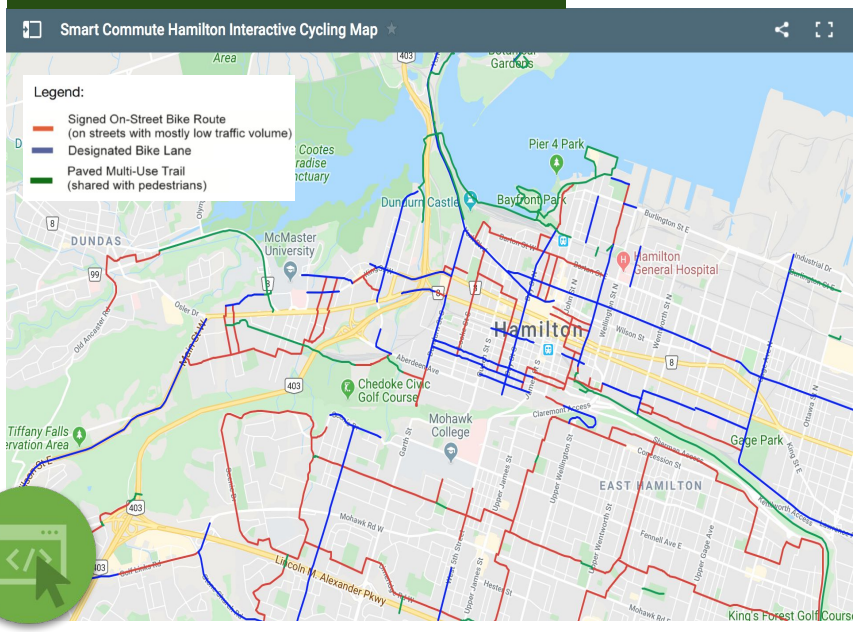
Working on the development of more protected cycling infrastructure to create a minimum grid network.

Improving existing infrastructure to ensure maximum safety and accessibility for all.

Established a SOBI network, a shared bicycle program, available 24/7 that is available in Dundas, stretching towards the East End.

Communicating a holistic vision of cycling transportation to the public that encompasses environmental, economic and health benefits

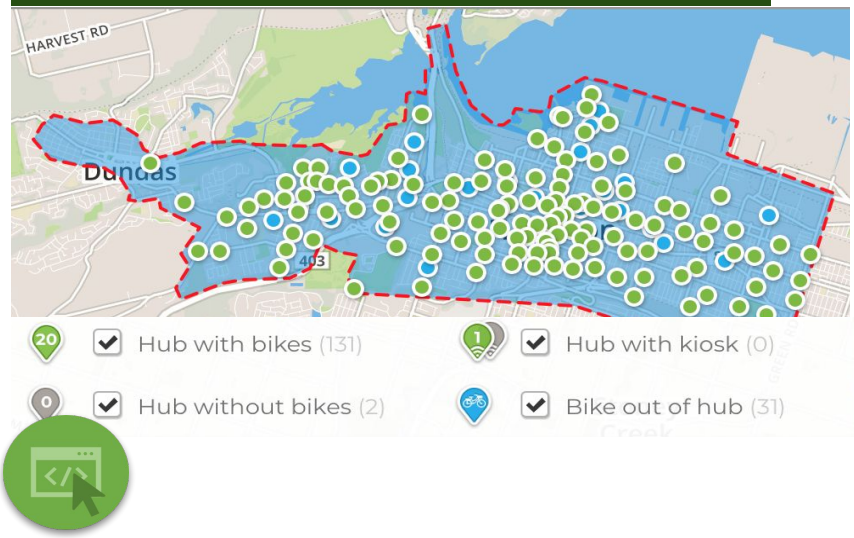
Interactive Cycling Map[1]



Social Bicycles (SOBI)

Hamilton has established a Social Bicycle (SOBI) network that allows anyone to ride anywhere within the available service area.The system notifies users in real time of available hubs with bikes and without bikes. Through SOBI, Hamiltonians are able to conveniently and sustainably ride from one destination to another.

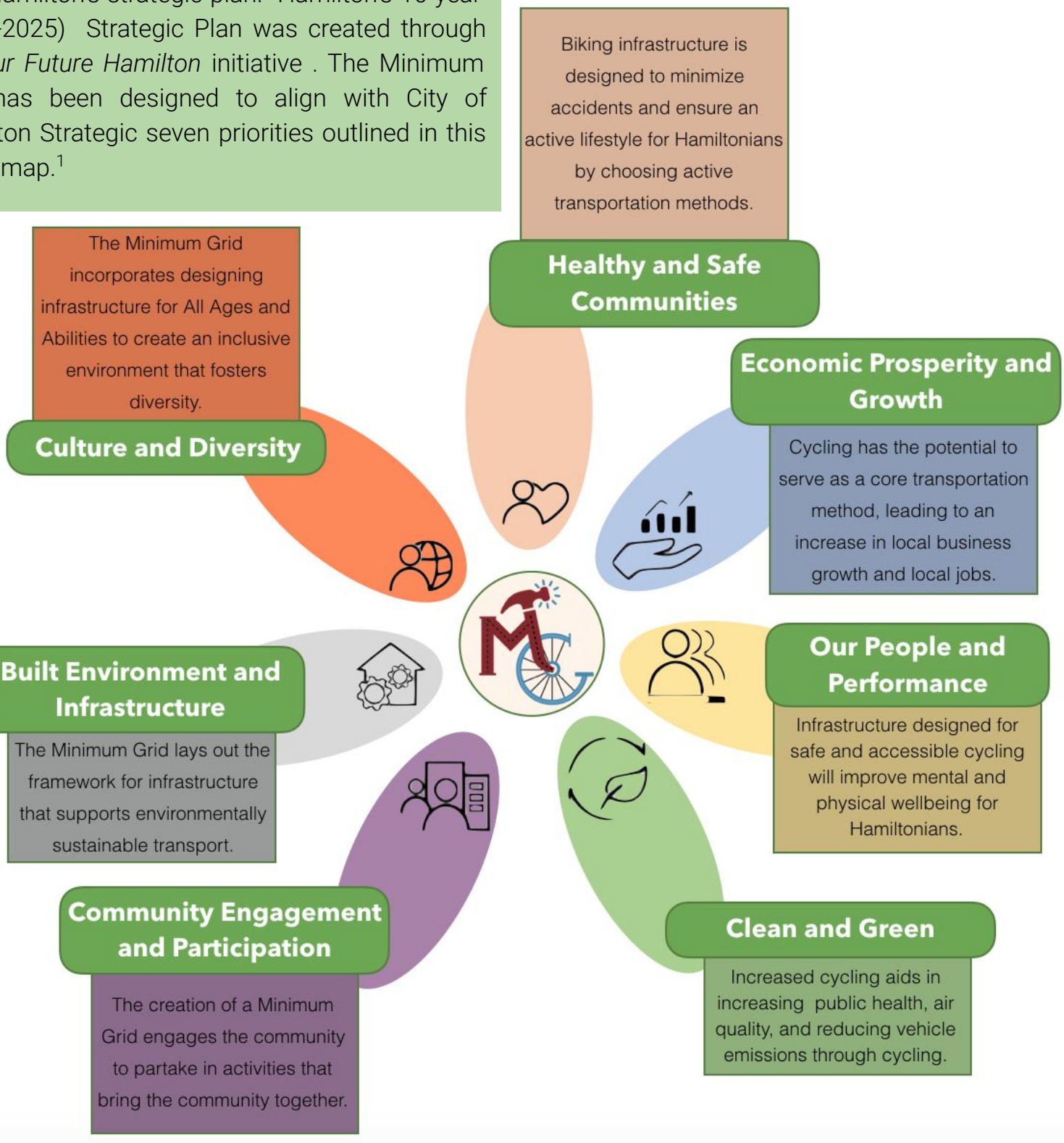
Current Social Bicycles (SOBI) Infrastructure[2]



[1]Hamilton's Interactive Cycling Map (2019)
[2]Hamilton's Bike Share Program: SOBI (2019)

ALIGNMENT WITH STRATEGIC PLAN

The Minimum Grid cycling network facilitates Hamilton's vision "to be the best place to raise a child and age successfully" through its alignment with Hamilton's strategic plan. Hamilton's 10-year (2016-2025) Strategic Plan was created through the *Our Future Hamilton* initiative . The Minimum Grid has been designed to align with City of Hamilton Strategic seven priorities outlined in this visual map.[1]



[1]Hamilton's Strategic Priorities (2019)

WHY SHOULD HAMILTON HAVE A MINIMUM GRID

With an increased emphasis on active transportation being pertinent to future mobility solutions across the globe, cycling has come to the forefront of future development. In the most recent Transportation Master Plan of Hamilton, cycling was determined to be a vital aspect of future strides towards sustainable mobility.

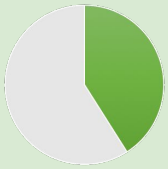
With the development of a prototype Subway-Style Cycling Map to be used for wayfinding and advertising Hamilton's cycling infrastructure, the city is working on increasing cyclists. However, in 2018, Hamilton was given a Silver rating (based on engineering, education, encouragement, enforcement, and evaluation and planning) by Share the Road and was informed that they needed to develop a "Minimum Grid" of cycling infrastructure.

RELEVANCE

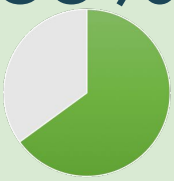
The following graphics demonstrate the variety of reasons Hamilton needs a Minimum Grid of Cycling Infrastructure. These reasons include but are not limited to interest among Ontarians as well as environmental, health and economic benefits.

INTEREST

41% of Ontarians would like to cycle more than they currently do



65% of Ontarians report they would cycle more if there was better cycling infrastructure.[1]



Share the Road evaluated Hamilton as a **Silver level** Bicycle Friendly Communities

One recommendation to "develop a **Minimum Grid** of **All Ages and Abilities** (AAA) cycling infrastructure"[2]

CYCLING BENEFITS

0.25kg of CO_2 emission are avoided per 1km cycled rather than driven[3]

Frequent cycling reduces the risk of **heart disease**

and is associated with improved **mental health**[4]

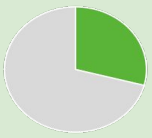
Support local business

cyclists spend less per trip but make **more trips**[5]

HAMILTON

Seeing ad Hamilton Has declared a Climate Emergency, cycling as a form of transportation is an important part of the City's Climate mitigation strategy.

>1/3



Of trips in the Greater Toronto Hamilton Area are considered conveniently cyclable at <5km[6]

1. Nanos. Share the Road Cycling Coalition; 2018Apr
2. Share the Road. 2018
3. Greenhouse Gas Emissions from a Typical Passenger Vehicle [Internet]. Environmental Protection Agency; 2018.
4. Celis-Morales CA, Lyall DM, Welsh P, Anderson J, Steell L, Guo Y, et al. 2017;
5. Clifton K, Muhs C, Morrissey S, Morrissey T, Currans K, Ritter C. Examining Consumer Behavior and Travel Choices. (OTREC). 2012
6. Mitra R, Lea NS, Cantello I, Hanson G. CYCLING BEHAVIOUR AND POTENTIAL IN THE GREATER TORONTO AND HAMILTON AREA. 2016.

RESEARCH

Several documents were researched in order to understand what consists of a cycling infrastructure that is adequate and well connected. These documents provided a better understanding of what a Minimum Grid would need to include. The following documents are:

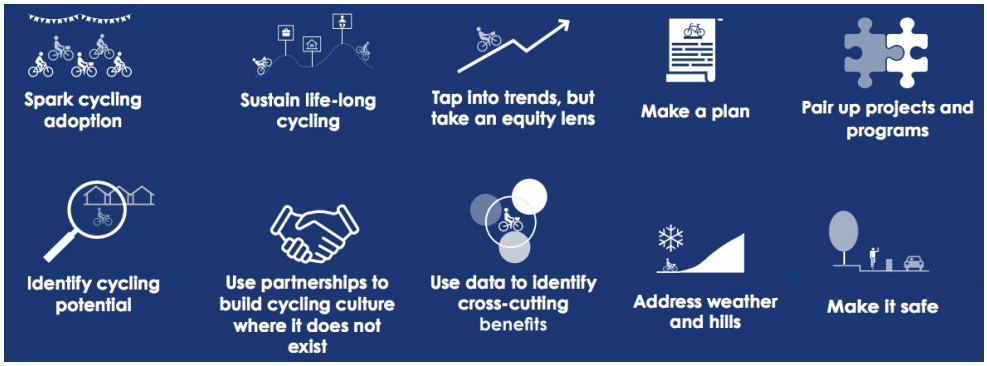
Increasing Cycling in Canada

Bringing in new cyclists to consider cycling as a transportation method

The environment, both natural and build affects cycling

Tourism often increases cycling for transportation in small towns

10 key actions to increase cycling [1]



All Ages and Abilities

Achieving growth of cycling in Hamilton involves the inclusion of everyone in the city, covering a broad spectrum of people throughout Hamilton.

Among are some other categories such as Children, People Riding Bike Share, People of Colour, and Confident Cyclists.[2]

Ontario's Cycling Strategy

Vision 2033 overview goal: that cycling in Ontario is a core mode of transportation

Building an environment in which Ontario communities will support and promote cycling for all trips under 5km[3]

CITY IN MOTION

Guiding Principles → Safety + Accessibility and Connectivity + Partnership

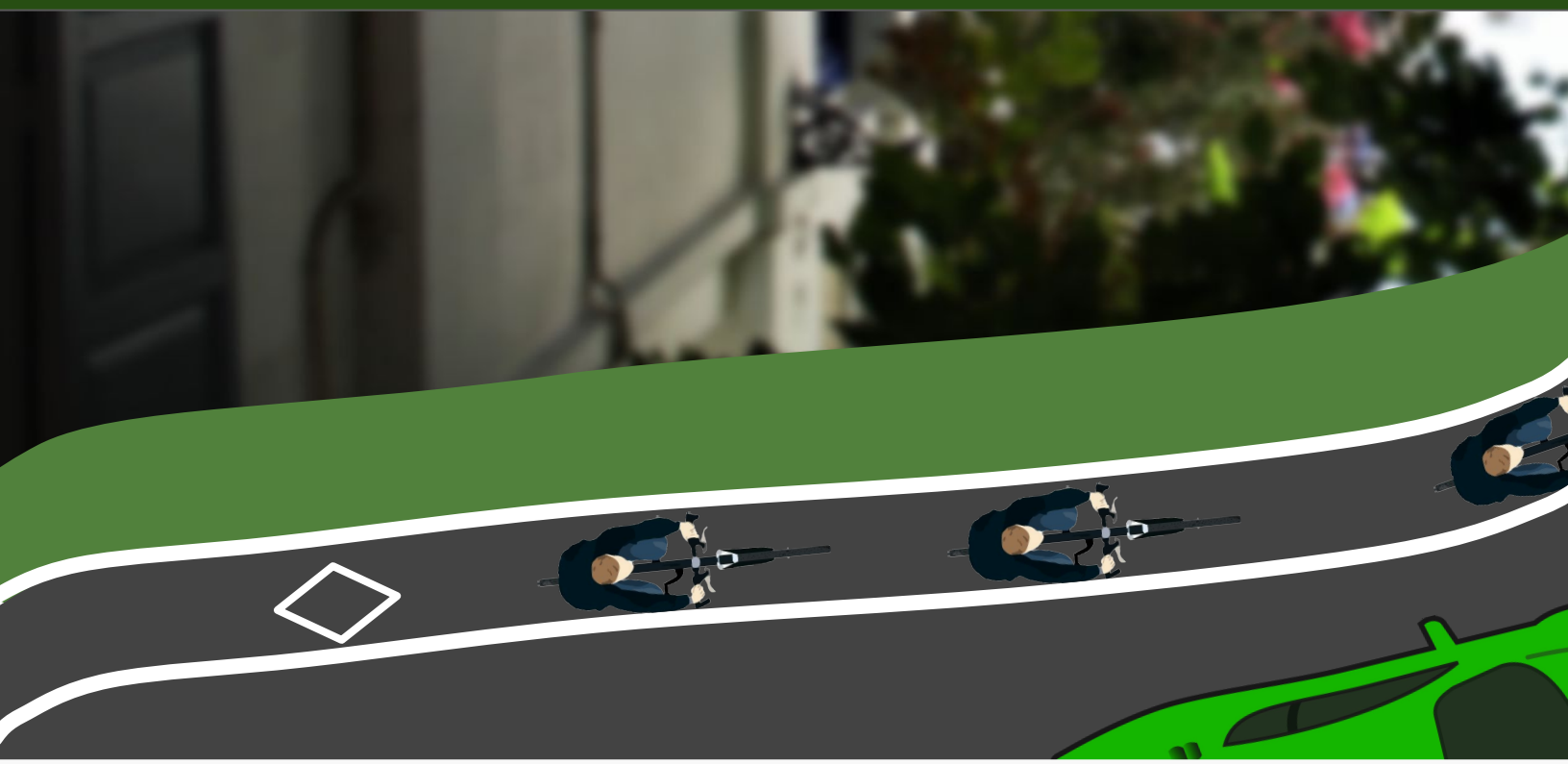
[1]Increasing Cycling in Canada (2019)
[2]NACTO Designing for All Ages and Abilities (2017)
[3]Ontario Cycling Strategy (2013)

Community Workshop:

Community, locality, and expanding horizons - how an initiative for change ultimately changed us

This section includes:

- Community Engagement Overview
- Workshop Results
- Workshop Data



COMMUNITY ENGAGEMENT OVERVIEW

Overview

A **workshop** was held at CityLAB on November 19th, 2019 from 4:30-6:30, with an attendance of **35 people** from various cycling backgrounds. This workshop aimed to utilize the principles of community engagement to collect ideas and feedback of what a **Minimum Grid** should entail for Hamilton. This **feedback** was received through a **MentiMeter**, a sticky note and **mapping activity**, and group table **discussion**. The engagement resulted in feedback on the design of the *Subway-Style Cycling Map*, recommendations for infrastructure improvements, and the Minimum Grid definition in Hamilton. The attendees included interested **community members**, **City Staff** from Transportation and Public Health departments, as well as representatives from **Mobility Lab, Mac Changers, Evergreen, Hamilton Street Rail (HSR), Cycle Hamilton and Friendly Streets**. The structure involved both informative presentations and facilitated dialogue components outlined in the following structure:

Goals

To Inform and update the community on Mobility Lab, and Minimum Grid plans. Determine the understanding of Minimum Grid from Hamilton Residence.

Photo from Workshop November 19th, 2019

WORKSHOP OUTCOMES OVERVIEW

The workshop had two key results being the MentiMeter Wordcloud and the data collected through the mapping activity. The Wordcloud provides a visual representation of the community engaged definition of Minimum Grid. The data collected 35 participants contributed to 28 comments providing feedback about the subway style map design and 198 note relating to to areas of improvement and positive features in Hamilton's current infrastructure

1. MentiMeter WordCloud

141 results on the questions **"What is Important in creating a connected cycling network in Hamilton?"** The largest words representing the most submitted words.

2. Data Collected Through the Mapping Activity

The data from mapping was collected in four key ways

1. **A website** **(pg 16)**
2. **A pie chart overview** **(Page 17)**
3. **Bubble graphs with Key recommendations** **(Page 18-22)**
4. **Google MyMaps** **(Page 23)**

WORKSHOP: PUBLIC COMMENT REPOSITORY

Minimum Grid Workshop: The Public Database of Preliminary Comments and Concerns

KEY FINDINGS FROM DATA

198 responses aggregated from mapping activity

Responses categorized into 16 categorized from the comments of workshop attendees

Custom Webpage written in PHP and developed for displaying and filtering responses adequately

Filterable by simple yet effective metrics and criteria

39	General Observations ::⇒ Issues
32	Existing Infrastructure ::⇒ Updates ::⇒ Hazards/Safety Fixes
25	Map Design
22	Municipal Inquiries ::⇒ General
17	New Proposed Infrastructure ::⇒ New Routes
16	Existing Infrastructure ::⇒ Additions ::⇒ Accessibility/Connectivity
14	General Observations ::⇒ Celebrated Features
10	Defining Minimum Grid
5	Questions/Inquiries
4	Existing Infrastructure ::⇒ Additions ::⇒ Convenience
3	Map Usability
3	Existing Infrastructure ::⇒ Updates ::⇒ Completion
2	Municipal Inquiries ::⇒ Seasonal
2	New Proposed Infrastructure ::⇒ Other
2	Initiatives ::⇒ Increasing Ridership
2	Existing Infrastructure ::⇒ Additions ::⇒ Wayfinding

Raw data preliminary categorizations

See website: http://ayani.io/public-data

WORKSHOP DATA - OVERVIEW

Participant feedback regarding conflict and positive features were analyzed and categorized according to their major underlying theme: Connectivity, Safety, Wayfinding, Accessibility and Minimum Grid key features. Within these themes, responses were further categorized into the specific features identified as outlined below.

KEY FINDINGS FROM DATA

Throughout the workshop many expressed their concern regarding the safety and connectivity of current cycling infrastructure in Hamilton

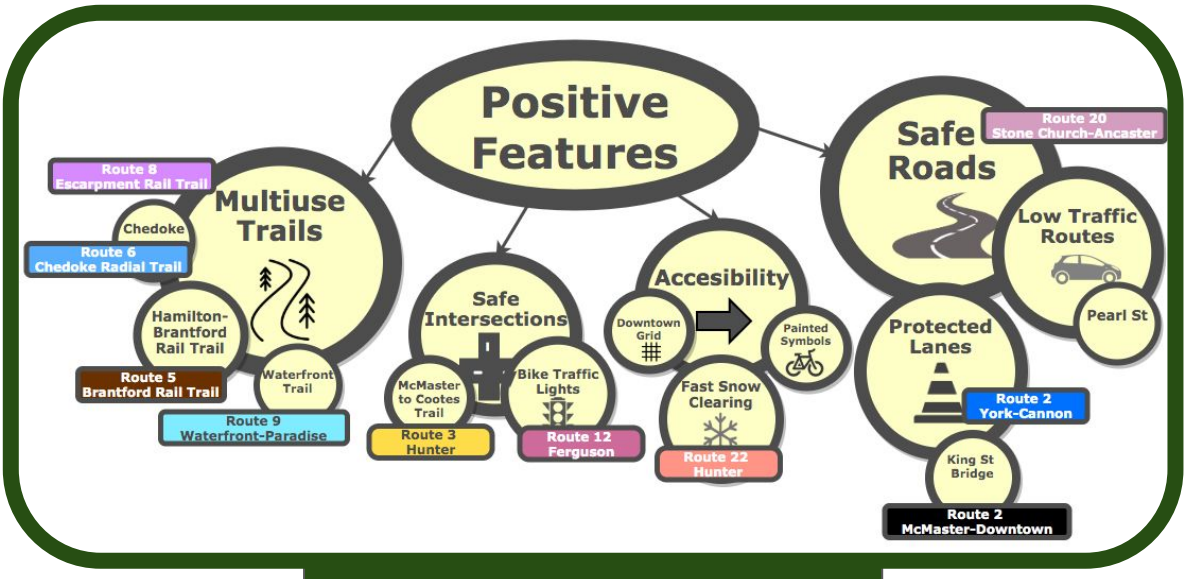
Top priorities were intersections, highway crossings, North-to-South connectivity and Gaps in Current Routes

Map design, Minimum Grid features as well as wayfinding were also some big themes that were discussed thoroughly

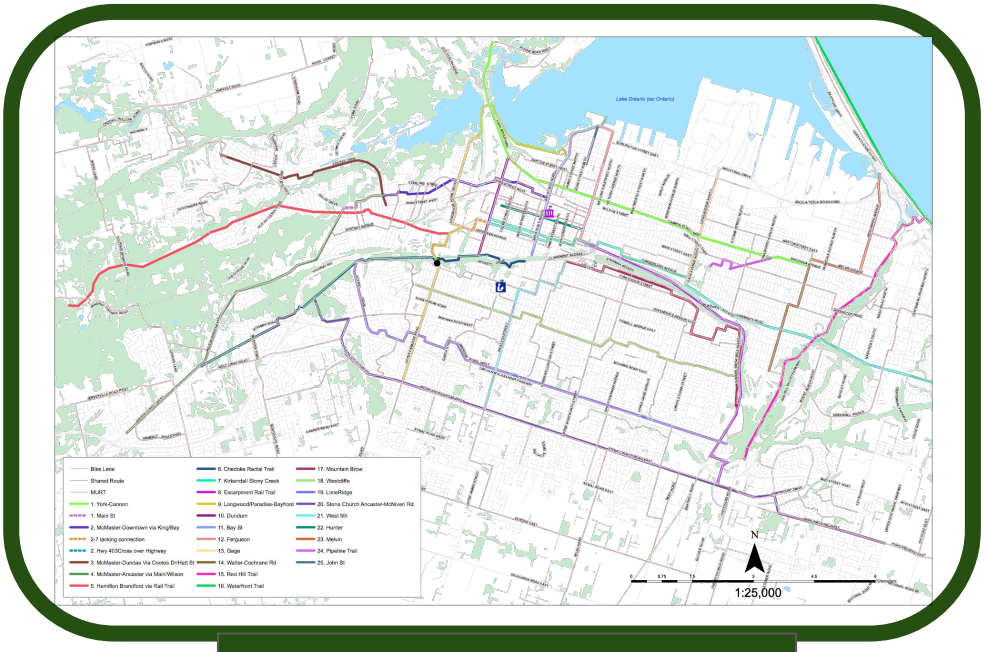
Within this we were able to pull key features such as route descriptions on the subway style map, snow removal and communicate road signage

Workshop participants took a multi-pronged approach to how cycling could be increased in Hamilton. Ideas addressed marketing of the Subway Style Map, updates and improvements for current infrastructure, new route suggestions and current positive features. Major themes surfaced surrounding Connectivity, Safety, Accessibility and Wayfinding.

Positive Features of Hamilton's Cycling Infrastructure

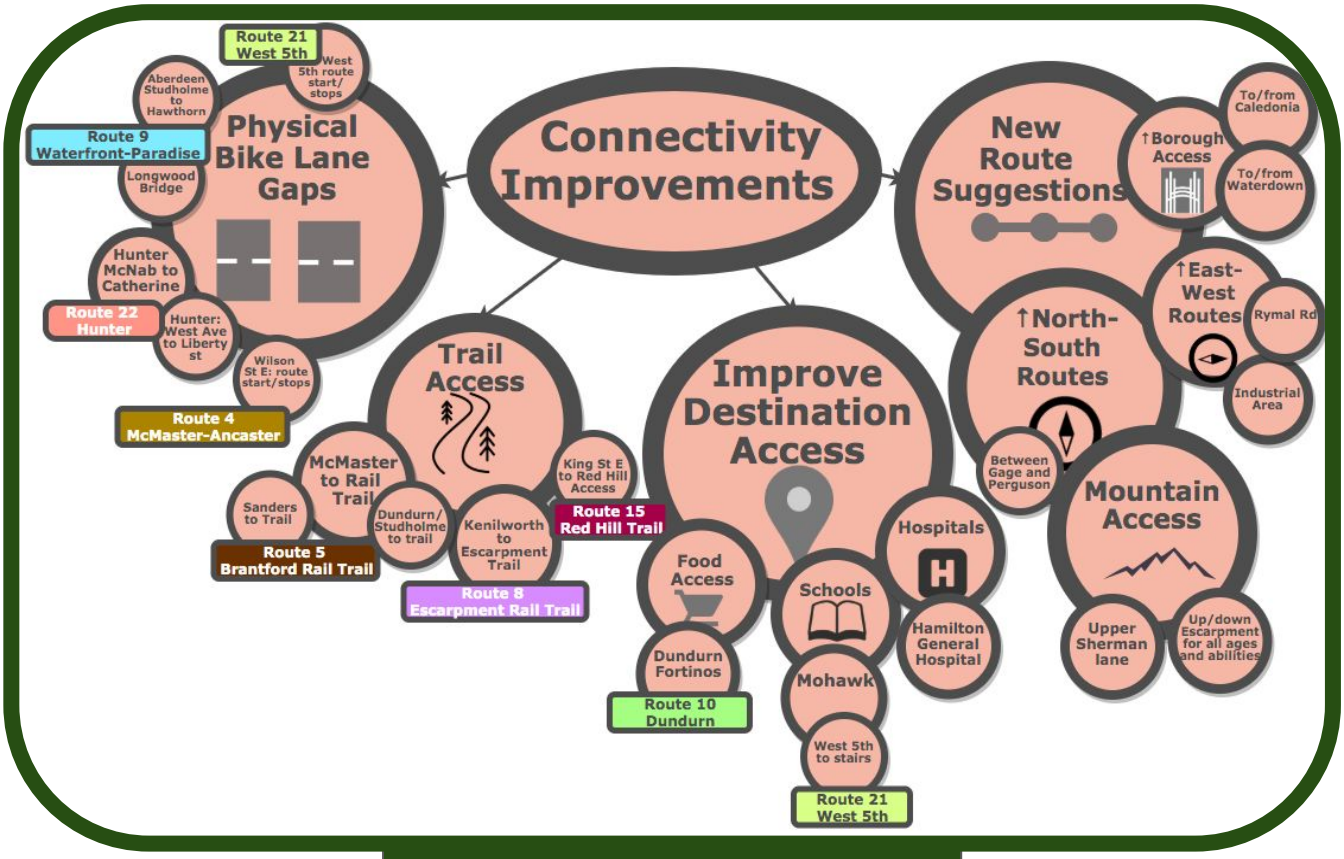


This graphic outlines the positive features community members recognized and the routes associated with specific features



This is the map used for noting positive and conflict features with a legend in the bottom left corner

Connectivity Concerns

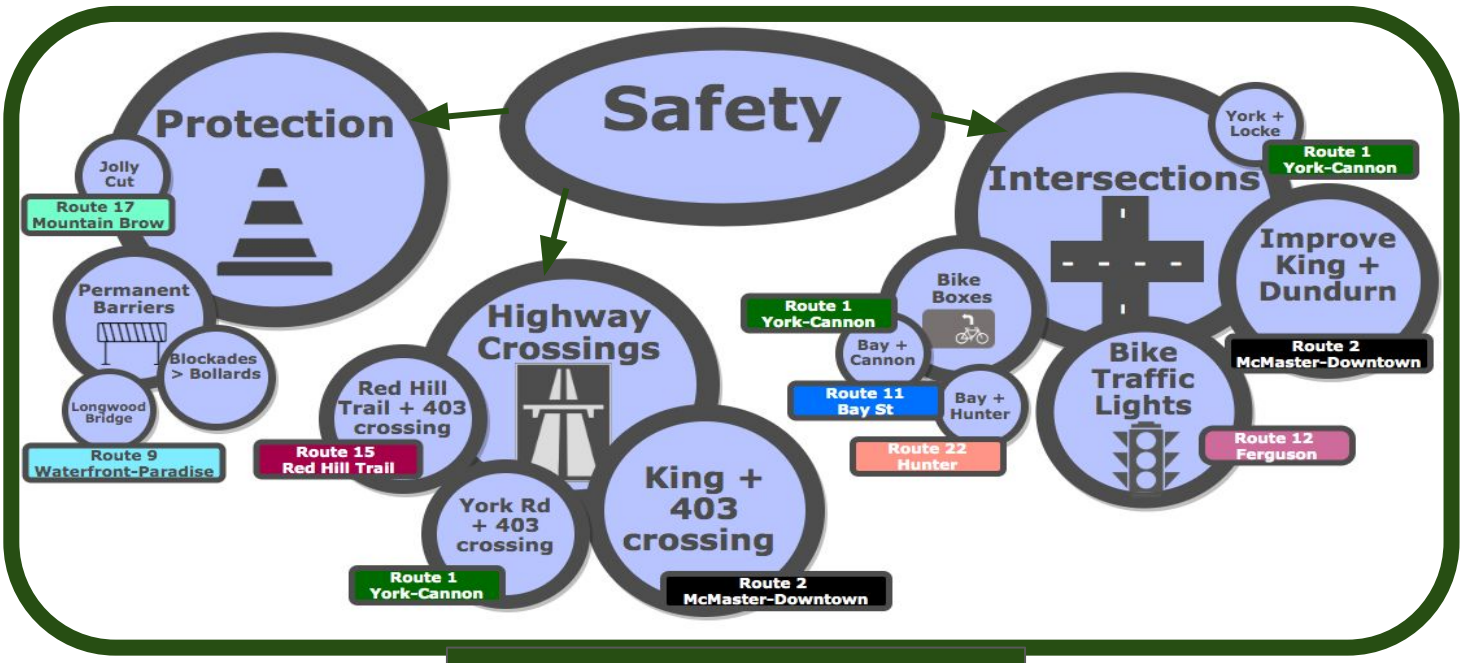


A major aspect of the Minimum Grid identified in the workshop is connectivity of cycling infrastructure for all people, in throughout all areas across Hamilton. Major concerns preventing connectivity were related to the abrupt stop of cycling infrastructure.

An image of King St W displaying a physical gap that is of high risk for inexperienced cyclists. *(photo by: Gabriella Christopher)*

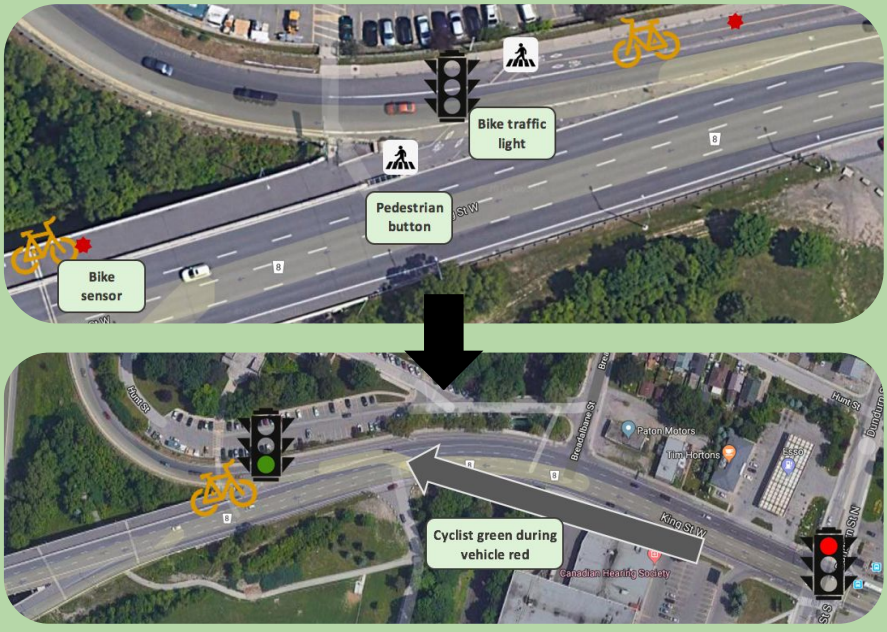
Suggestions included addressing high collision risk areas such as Hunter St, King St W, Longwood Rd, West 5th St, Dundurn St S, Wilson St W, John St and Hatt St among others.

Safety Concerns in Cycling Infrastructure



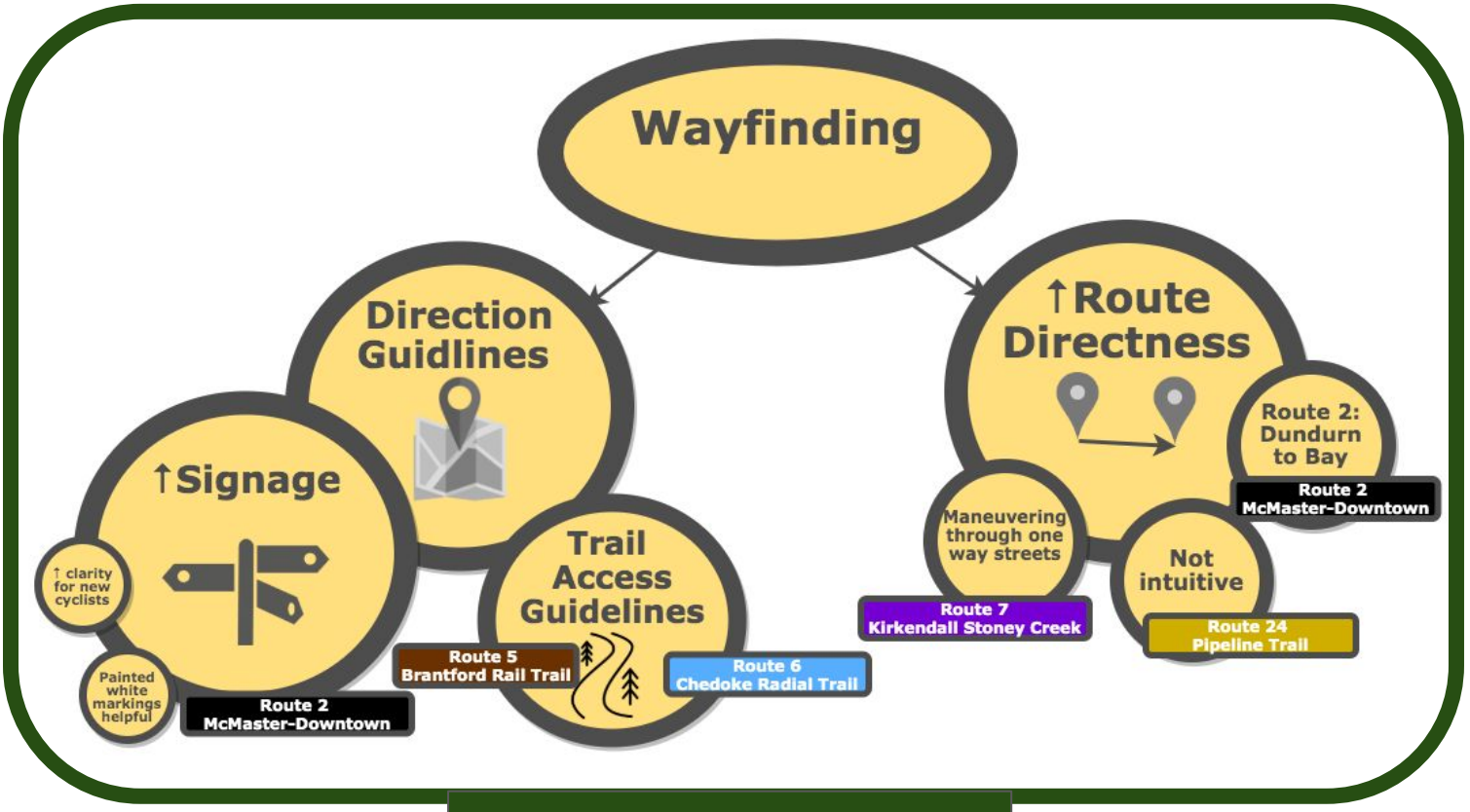
A summary of the feedback on how to improve safety features

Highway crossings surfaced as a major safety concern and deterrent from cycling and the community proposed a solution:

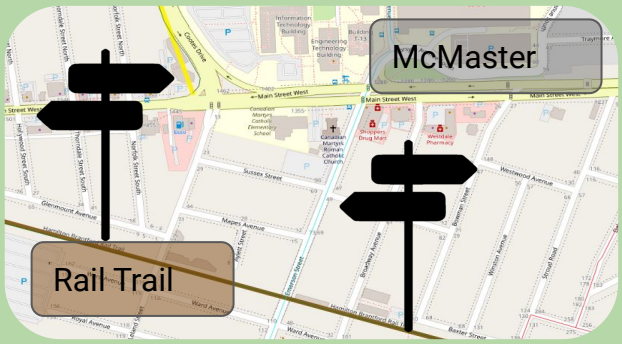


One example is the Highway 403 on-ramp crossing on King St W. One suggestion included a sensored cyclist traffic light timed with the red light for eastbound traffic at King and Dundurn.

Wayfinding Recommendations



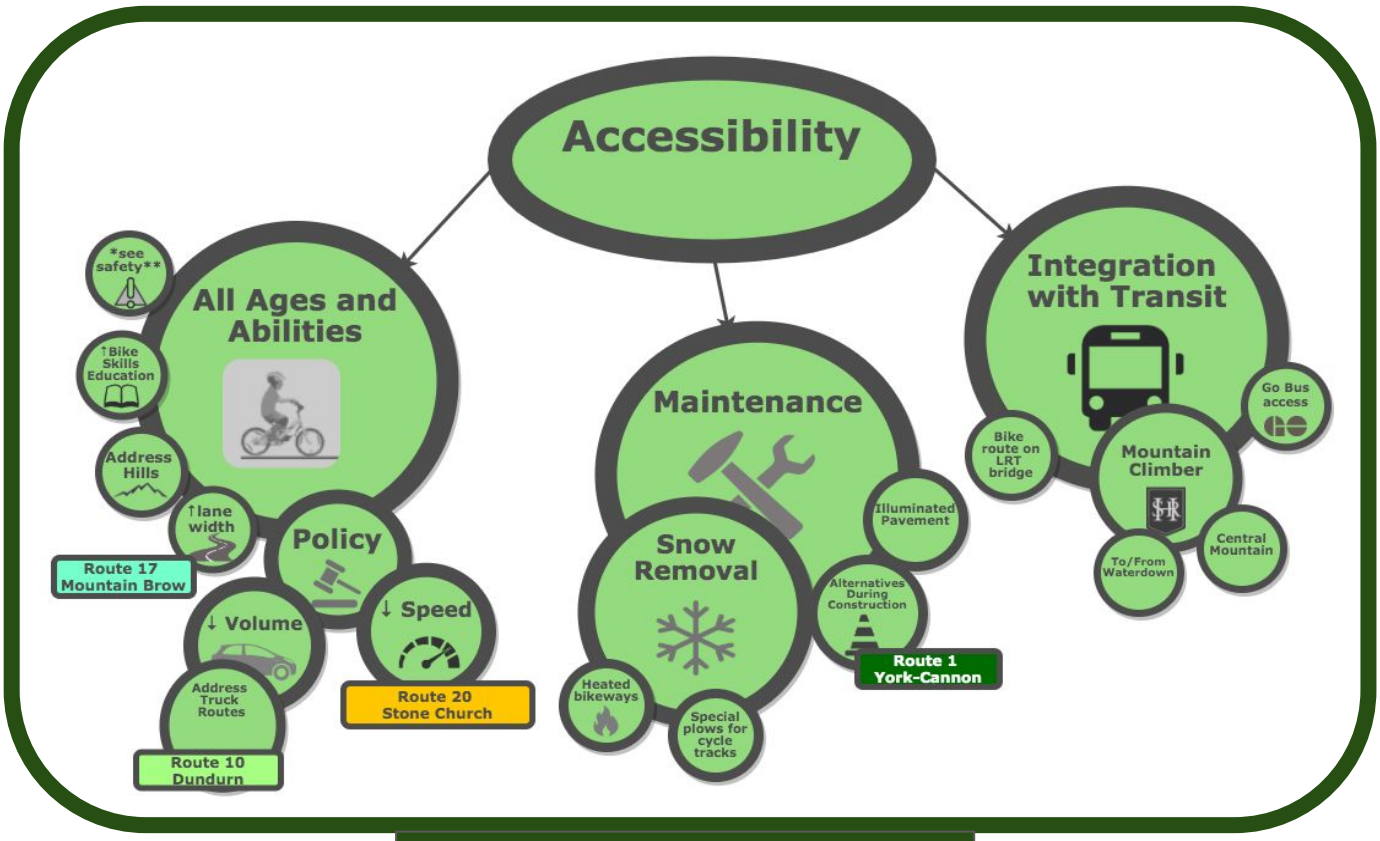
Wayfinding concerns related to accessing trails and navigating non-direct routes were major aspects that were addressed.



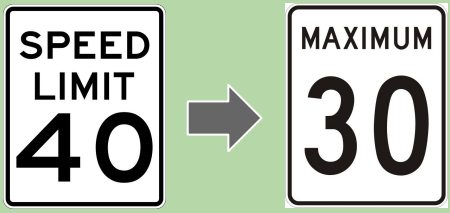
Suggestions included improving signage to access trails in areas surrounding the Brantford Rail Trail and Chedoke Radial Trail.

Suggestions included adding directions at turns on Charlton and Herkimer were also mentioned.

Accessibility Concerns



A major aspect of the Minimum Grid identified in the workshop is accessibility of cycling infrastructure for all people, in all weather and in all locations across Hamilton. Major concerns preventing accessibility were related to winter maintenance, high traffic speeds and high traffic volumes



Suggestions included implementing policies that lower speed limits in residential areas including Stonechurch and Limeridge. Recently residential speeds were reduced to 40km/hr, however a further decrease to 30km/hr on unprotected lanes is recommended

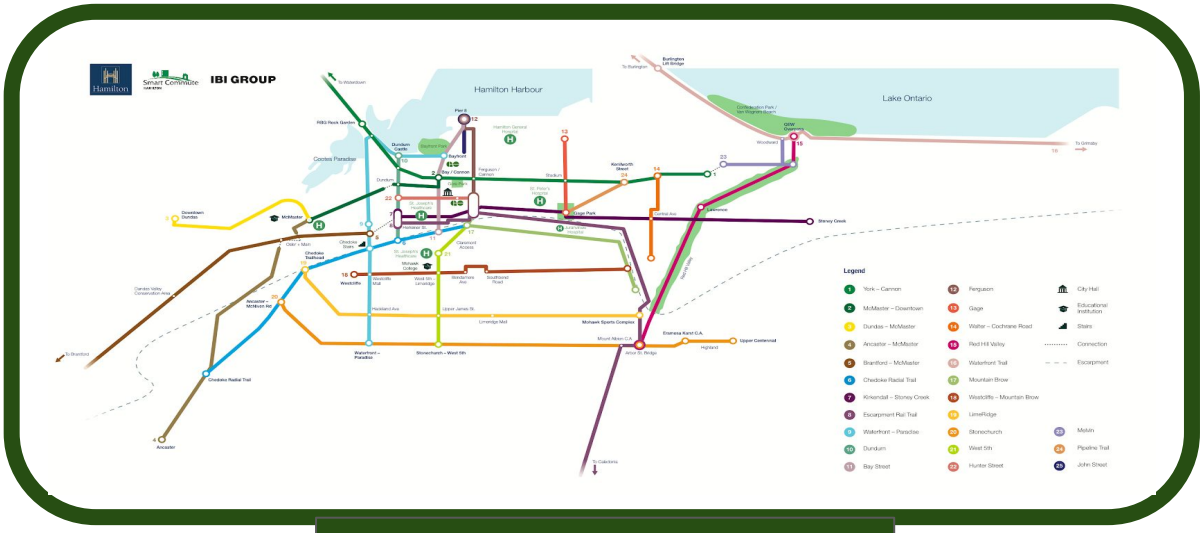
Snow on Dundurn St N bike lanes (photo by Randy Kay)

Improving snow plowing procedures of bike lanes to prevent build-up was addressed. Examples include Dundurn, Bay, Cannon etc.

Transport truck on Cannon Cycle Track (photo by Lynda Lukasik via Raise the Hammer))

Suggestions to implement policies that reduce transport trucking on cycling routes were raised. Specifically Dundurn St N was identified.

Subway Style Cycling Map: Results for Design Improvements



Hamilton has begun creating a Subway Style Map to portray a simple and connected cycling network across Hamilton. The goal is to encourage more people to cycle and find new routes. This Map was presented at the Workshop and received the following concerns and feedback.

This graphic outlines the specific feedback on how to improve the design of the subway style map

DATA INTEGRATION WITH EXISTING TOOLS

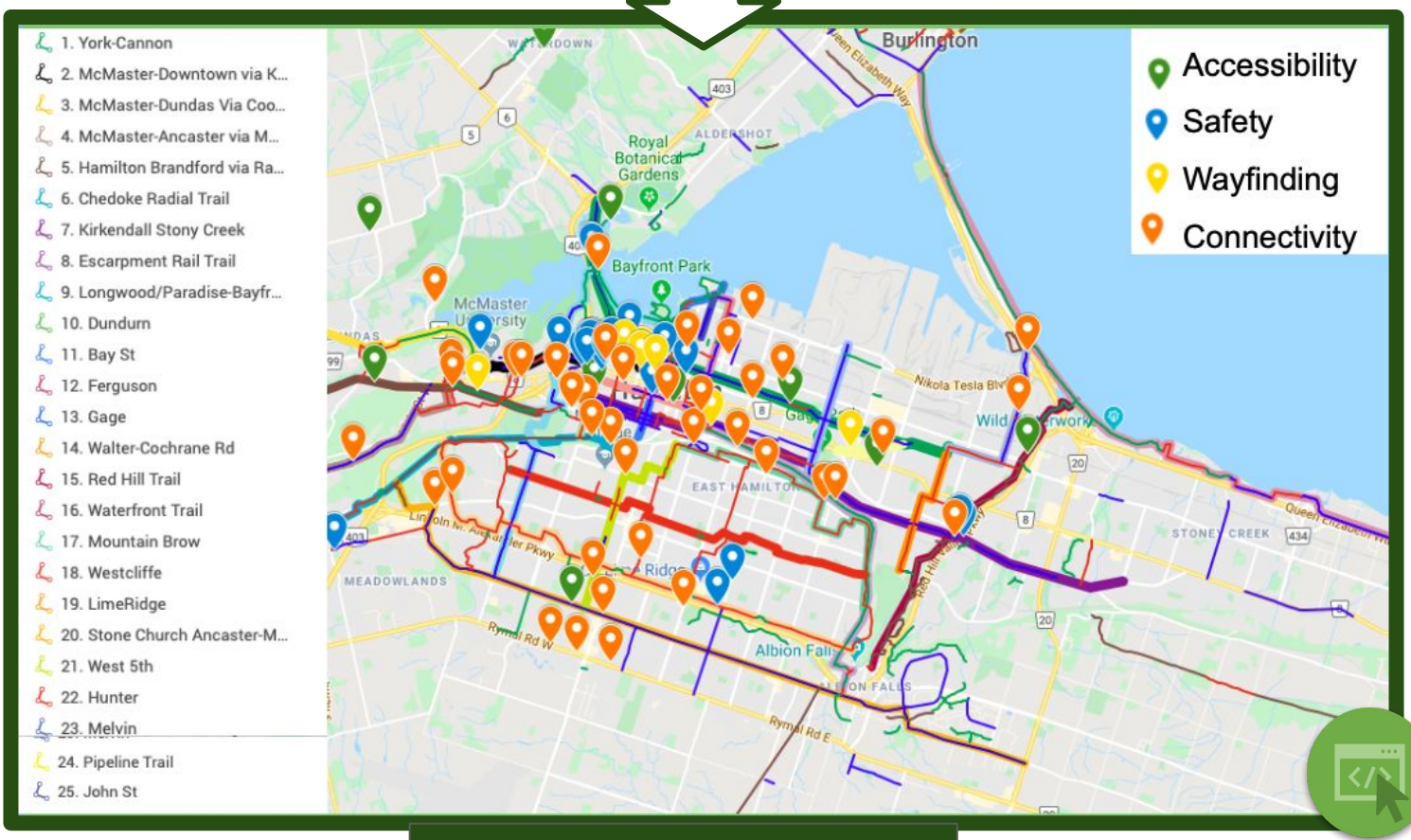
A Google MyMaps was developed to integrate existing cycling tools with new tools and data

Existing Tools

- **Interactive Cycling Map**
  - Existing shared routes, designated bike lanes, paved multi use recreational trails, and unpaved multi use recreational trails displayed in red, blue, green, and brown respectively.
- the Sobi Hub finder
- Secure **Bike Parking Map**.

New Tools

- ***Subway-Style* routes**
  - Where applicable, explanations and videos of the infrastructure constituting the routes were provided in a pop-up description box, available upon right-clicking a given route
- current **positive and conflict** features
- Pre-identified destinations and "gaps" outlined in the *Subway-Style Cycling Map* were also added in another layer.



All comments and feedback that pertained to geographic locations were added as pins according to the categories "Accessibility", "Safety", "Wayfinding" and "Connectivity". The pins facilitate a holistic view of feedback where dangerous or inaccessible "hotspots" could be easily viewed by the concentration of pins, with full descriptions of the provided comments being available upon clicking the pin.

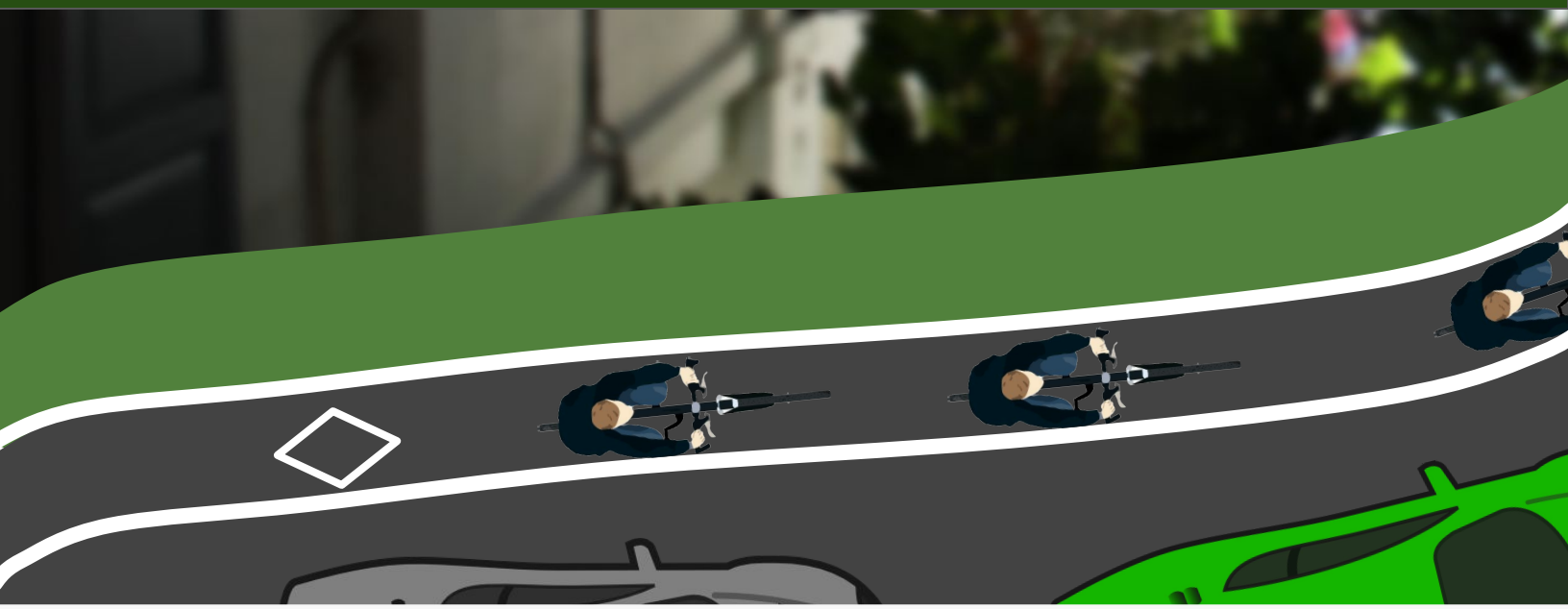
Visit the Google MyMaps at https://drive.google.com/open?id=1f5_8TYlWgJ_vnYW7oYS96CJsfuXHIXRg&usp=sharing

Minimum Grid Implementation

A preliminary, broad meta-analysis of what the landscape of cycling in Hamilton *could* be

This section includes:

- The History of Minimum Grid
- Hamilton Cycling Resources
- Defining Minimum Grid



MINIMUM GRID HISTORY

Minimum Grid Toronto

The Minimum Grid term was coined by a public advocacy campaign called CycleToronto[1].

The non-profit community advocacy group fosters the prioritization of families, urban safety education, and advocacy of hazard-prevention measures for cyclists and pedestrians in public policy

Minimum Grid Goals

To develop 100km of protected biking lanes on main streets

To develop 100km of bicycle boulevards in residential residential sectors, speed reductions to 30km/h

Target was to be implemented by 2018 with an estimated cost of $18,000,000

Minimum Grid Outcomes

Minimum Grid Toronto received a substantial amount of public support and press coverage upon its inception including a featured article on The Toronto Star[2]

Minimum Grid's municipal council support peaked from the 2014-2018 term with 25 out of 44 city councillors supporting the initiative, according to self published stats

Currently, Toronto has a pending reform to install 100km of new biking infrastructure from 2019 to 2022.

1 CycleTO (2018)
2 #MinimumGrid Toronto (2014)

HAMILTON CYCLING RESOURCES

The following are various cycling resources that are available in the City of Hamilton.

Dedicated to working with stakeholders to transform Hamilton into a **vibrant** bikeable & walkable city.

A volunteer run organization that empowers cyclists by offering under utilized bikes, bike maintenance and **safety courses**.

Removes barriers that prevent people from cycling.

Advocates for cycling in Ontario through increasing **education and safety**.

A bicycle shop that sells refurbished bikes, offers bike repair courses and cycling education.

Provides **publically accessible** bikes to facilitate one-way trips around Hamilton.

Advocates for all ages and abilities to cycle through Hamilton.

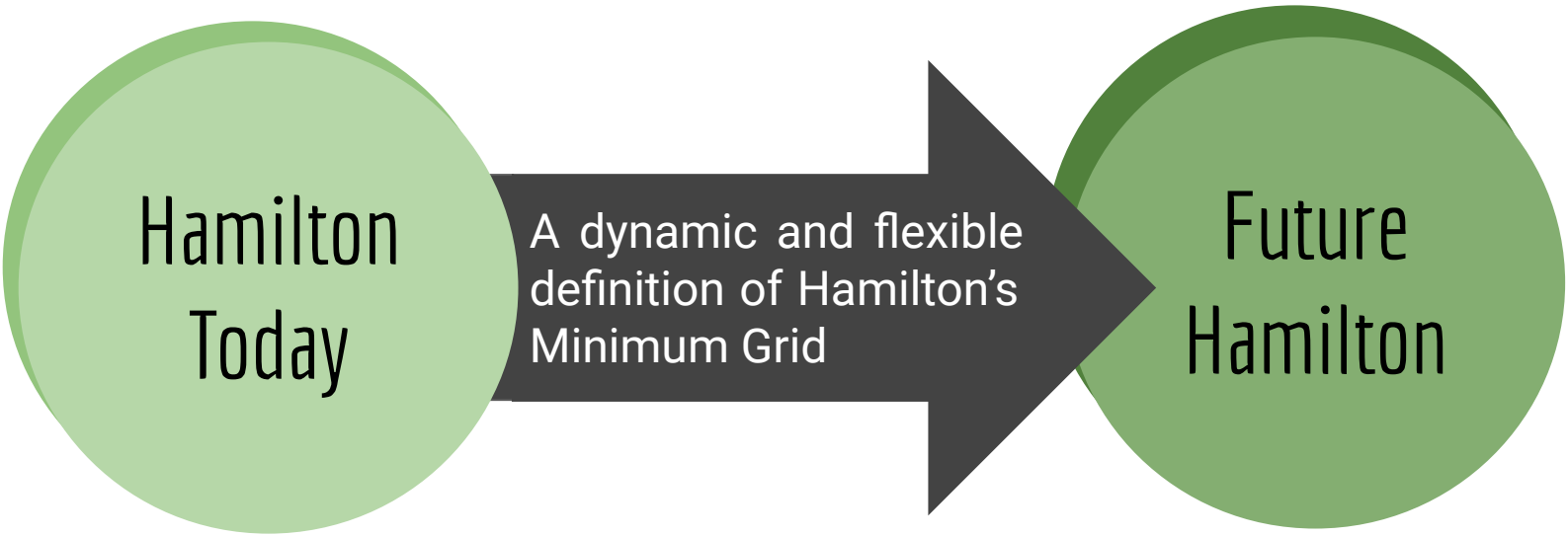
A bike repair shop that empowers riders to learn cycle maintenance that will **encourage lifelong biking**.

The Hamilton Cycling Committee **advises** the City of Hamilton on all cycling matters and ensures the progress of the Hamilton Cycling Plan.

While these are resources that the Minimum Grid has engaged with, other cycling resources exist in Hamilton that have not been mentioned.

Flexibility: Addressing Ever-Changing Circumstances

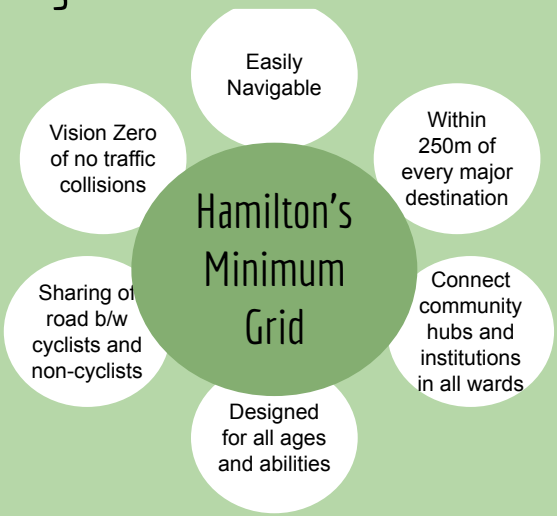
Despite the desired outcome of this project being to define a Minimum Grid for Hamilton, it should be noted that any chosen definition needs to encapsulate a fair degree of flexibility. This is because ultimately, cities are not static entities - **their demographics, infrastructure and needs are constantly evolving.** As such, the definition of Hamilton's Minimum Grid would need to be dynamic enough to accommodate **societal shifts** which influence the the contextual meaning of key features including All Ages and Abilities, Continuity, Connectedness and Safety. Furthermore, structural shifts in Hamilton, including **pending infrastructural changes**, will inevitably alter the priorities of different communities. As a result, a Minimum Grid definition and its associated recommendations should be inherently **flexible and adaptable**, in order to be able to provide relevant outcomes not only today, but also into **Hamilton's future**.



MINIMUM GRID DEFINED

Combining findings from both research and community engagement, the following definition was developed.

A **Minimum Grid** is a **cycling network** that is easily navigable, providing routes within **250 metres of every major destination.** This involves connecting both institutions and community hubs within every ward to each other and their respective city center hubs. This network of routes must be **safe** and **accessible** for people aged **8-80, facilitating usage for all ages and abilities**. This entails cycling infrastructure that feels safe and comfortable to all people and is conducive to proper **sharing of the road** between cyclists, pedestrians, and automobile users to achieve a **Vision Zero** of no traffic collisions.



NACTO illustrates various existing cycling facility designs on the left which exclude all ages and abilities and on the right which are suitable for All Ages and Abilities. The type of cycling facility also impacts the level of comfort a cyclist experiences. NACTO promotes that are cycling facilities be safe, equitable and comfortable.[1]

[1]Vancouver Design for All Ages and Abilities (2017)

Applications & Recommendations

This section includes:

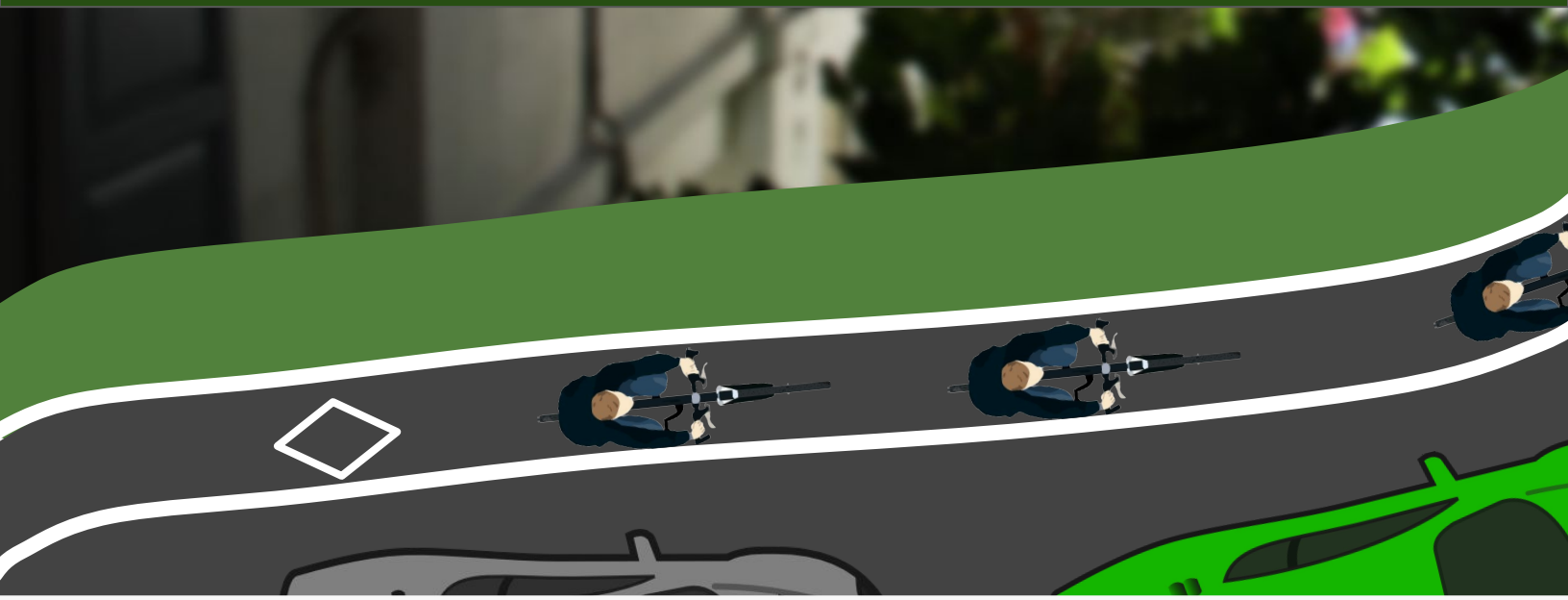
Recommendations

Infrastructure Tools

Applications

- Pearl St. Proposal
- Sterling St. Proposal
- Future Awareness Campaign Strategies

Next Steps



RECOMMENDATIONS

Several documents reference different forms of facilities that can be introduced to benefit cycling. These types of cycling facilities can be divided into **linear** or **non-linear**. The following pages provide infrastructure tools that can inform future cycling developments.

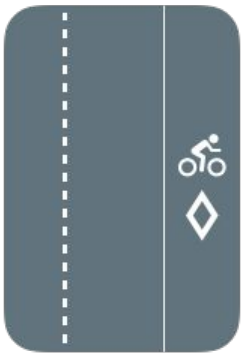
Linear facilities account for major cycling infrastructure implementations.

Non-linear facilities consists of individual components along a road.

Bicycle Boulevard

Cost: $50 / metre

Painted Bicycle Lane



Cost: $110 / metre

Buffered Bicycle Lane

Cost: $ 120 / metre

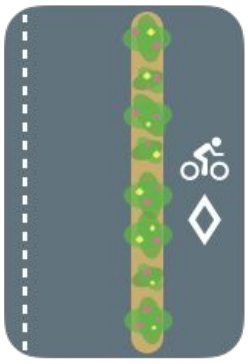
Bidirectional Bicycle Lane

Cost: $109 / metre

Bike Path

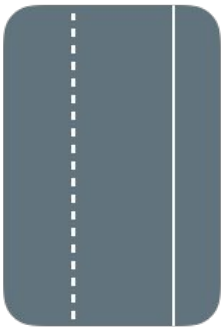
Cost: $1,222 / metre

Protected Bicycle Lane



Cost: $153 / metre

Paved Shoulder



Cost: $101 / metre

Sharrows

Cost: $101 / sharrow

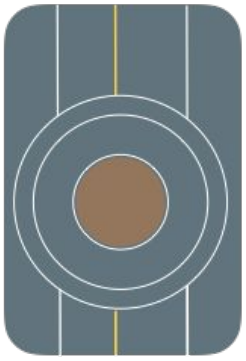
Speed Bumps

Cost: $3,322 / bump

Signage

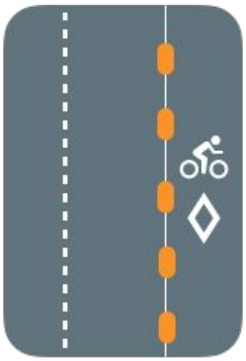
Cost: $100/ sign

Roundabouts



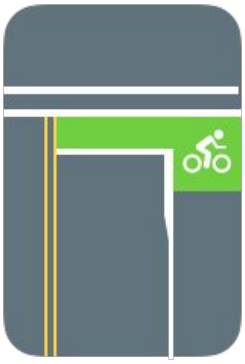
Cost: $100,000 / circle

Bike Bollards



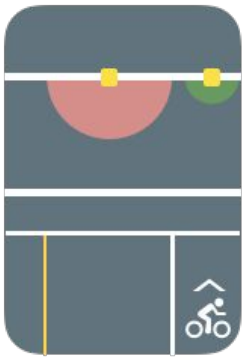
Cost: $140 / bollard

Bike Box



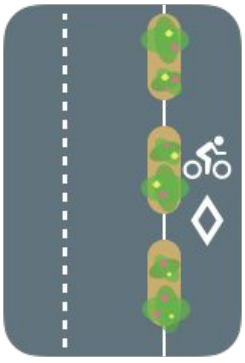
Cost: $25,000

Bike Signals



Cost: $1,900 / intersection

Planters

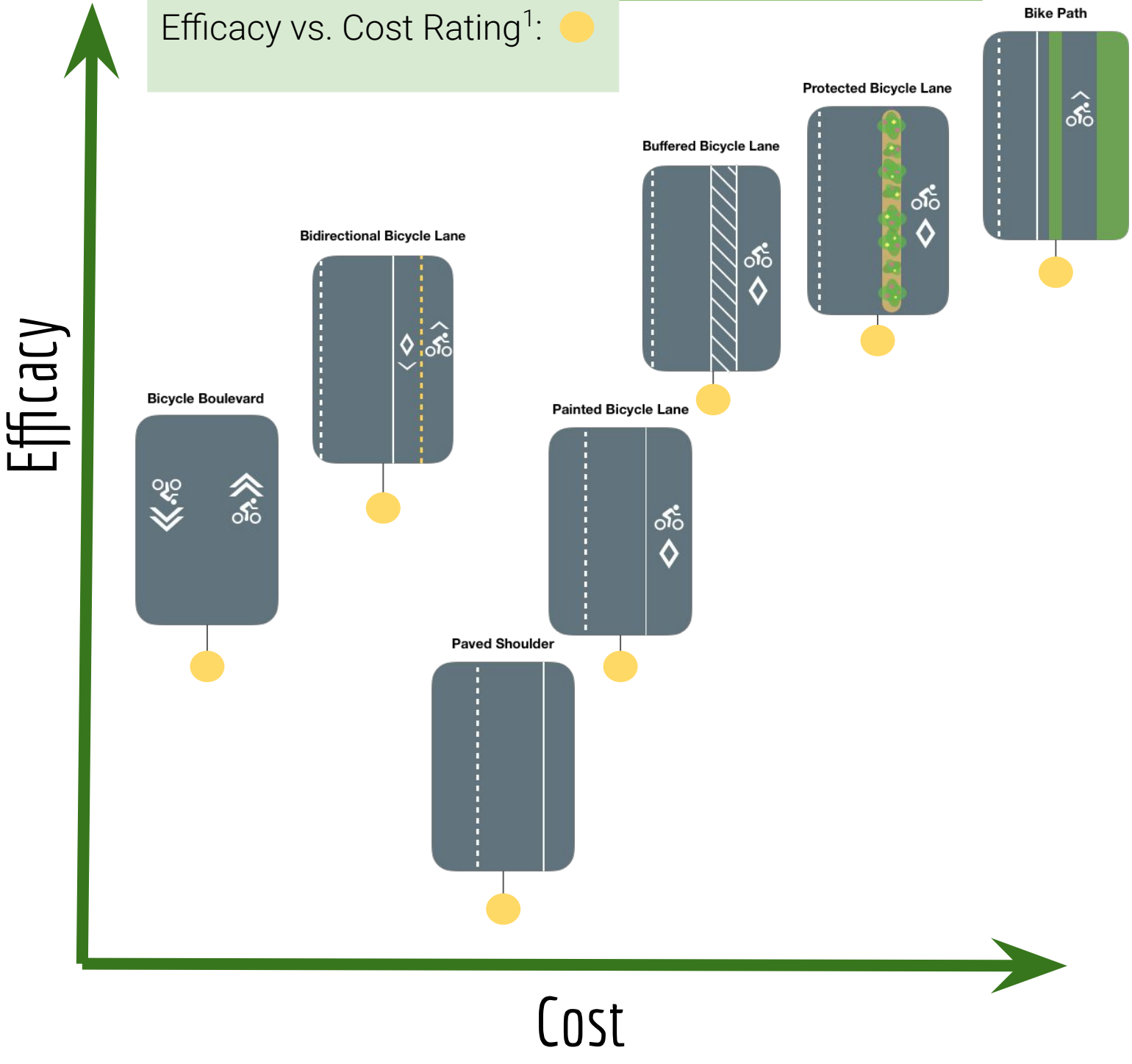


Cost: $140 / bollard

Linear Facilities

This graph depicts the **efficacy versus costs** of various linear cycling implementations. The efficacy of each is based around how well each infrastructure provides AAA mobility.

Efficacy vs. Cost Rating[1]:

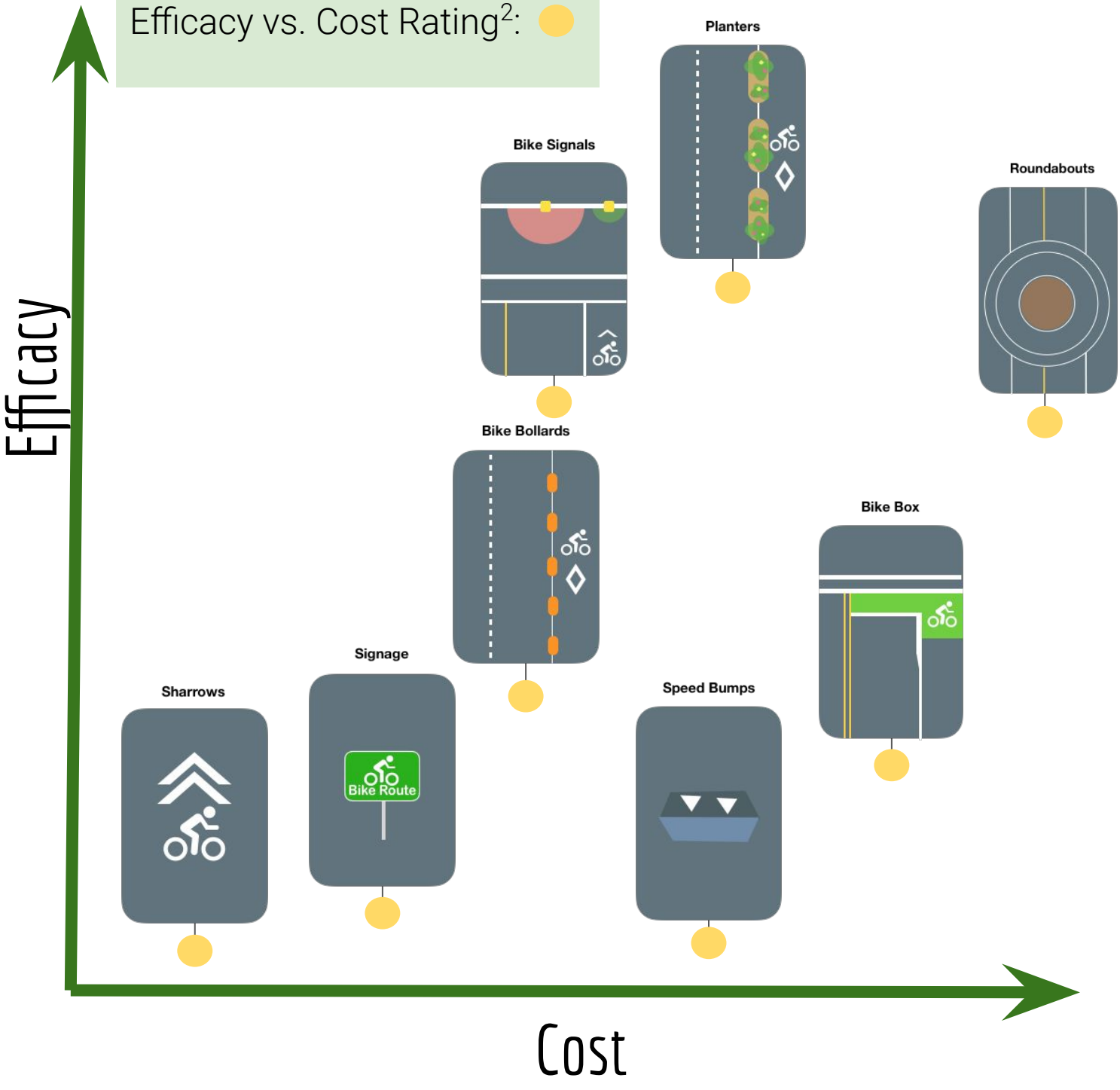


[1]Ville De Montreal (2019)

Non-Linear Facilities

This graph depicts the **efficacy versus costs** of various non-linear cycling implementations. The efficacy of each is based around how well each infrastructure provides AAA mobility.[1]

Efficacy vs. Cost Rating[2]:



[1]Ohio Paving (2017)
[2]Costing of Bicycle Infrastructure and Programs in Canada (2019)

Exploring the future: Pending municipal plans

Hamilton has a number of projects to improve cycling infrastructure currently in the planning stage. These two streets have been chosen based on **public recommendation** and in order to demonstrate how the City can move towards a **Minimum Grid**. The Pearl Street proposal is an example of how to create an **effective bike boulevard** on neighbourhood street while the Sterling Street proposal demonstrates how to **revamp the existing infrastructure** for additional safety and accessibility.

Street 1: Pearl Street

Street 2: Sterling Street

Pearl St. Proposal

Local Neighbourhood Streets

Currently are understood as suitable for cyclists without adding any other features.

Bicycle Boulevard

Low-speed, low-volume streets where walking or bicycling are given priority.

STEPS

Track and Manage peak-hour Speed and Volume

SPEED

- Speed humps
- Pinchpoints
- Neighborhood traffic circles
- Changing speed limit to 30-40km/h for motorists

VOLUME

- Constructing diverters
- Prohibiting through traffic
- Removing parking
- Allowing only bikes at peak periods

Completed When[1]:

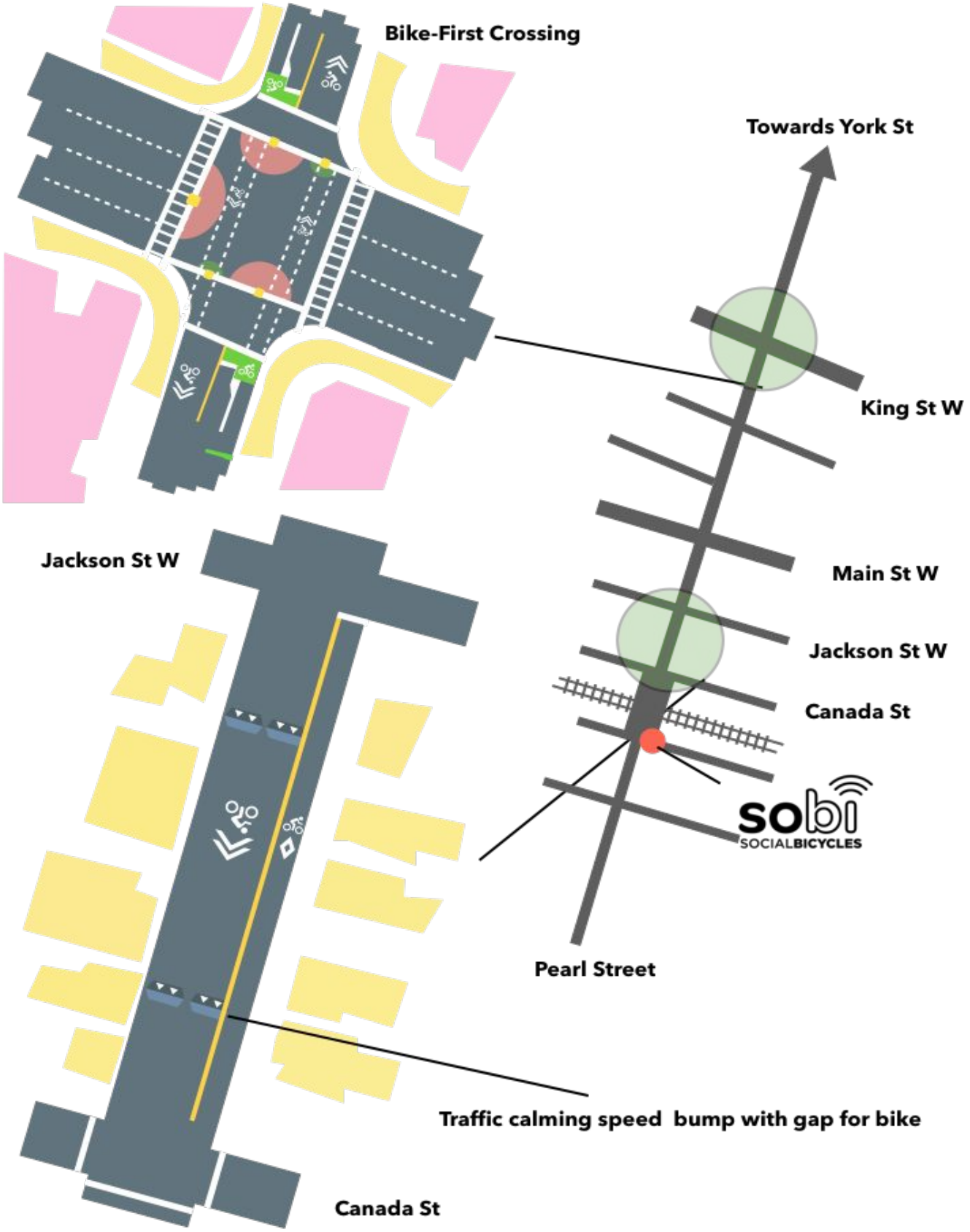
- Sharrows: "shared lane pavement marking" are added and lines painted
- Speeds below 30 km/h
- Cyclists encounter few motor vehicles.
- The volume is limited to 1,000 – 1,500 vehicles per day
- Green infrastructure
- Safe and convenient crossings

Design informed by the All Ages and Abilities NACTO document

Public opinion recommended this street as a bike boulevard!

[1]Urban Bikeway Design Guide (2019)

Pearl St. Proposal



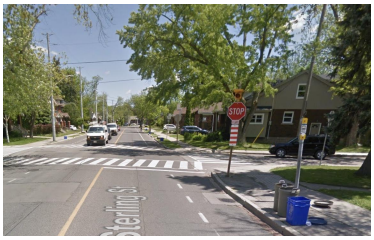
Sterling St. Proposal

Current Proposals and Urban Reforms

Street parking on Sterling St. that is adjacent to the bike lane.

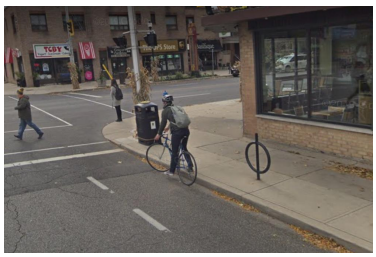
Add protected bike lanes to prevent dooring.

There are bus stops on Sterling St.



Add a buffered bike lane to prevent buses from entering bike lane.

Sobi Bike parking and singular bike parking.



Add bicycle racks to encourage cycling and availability of bike parking.

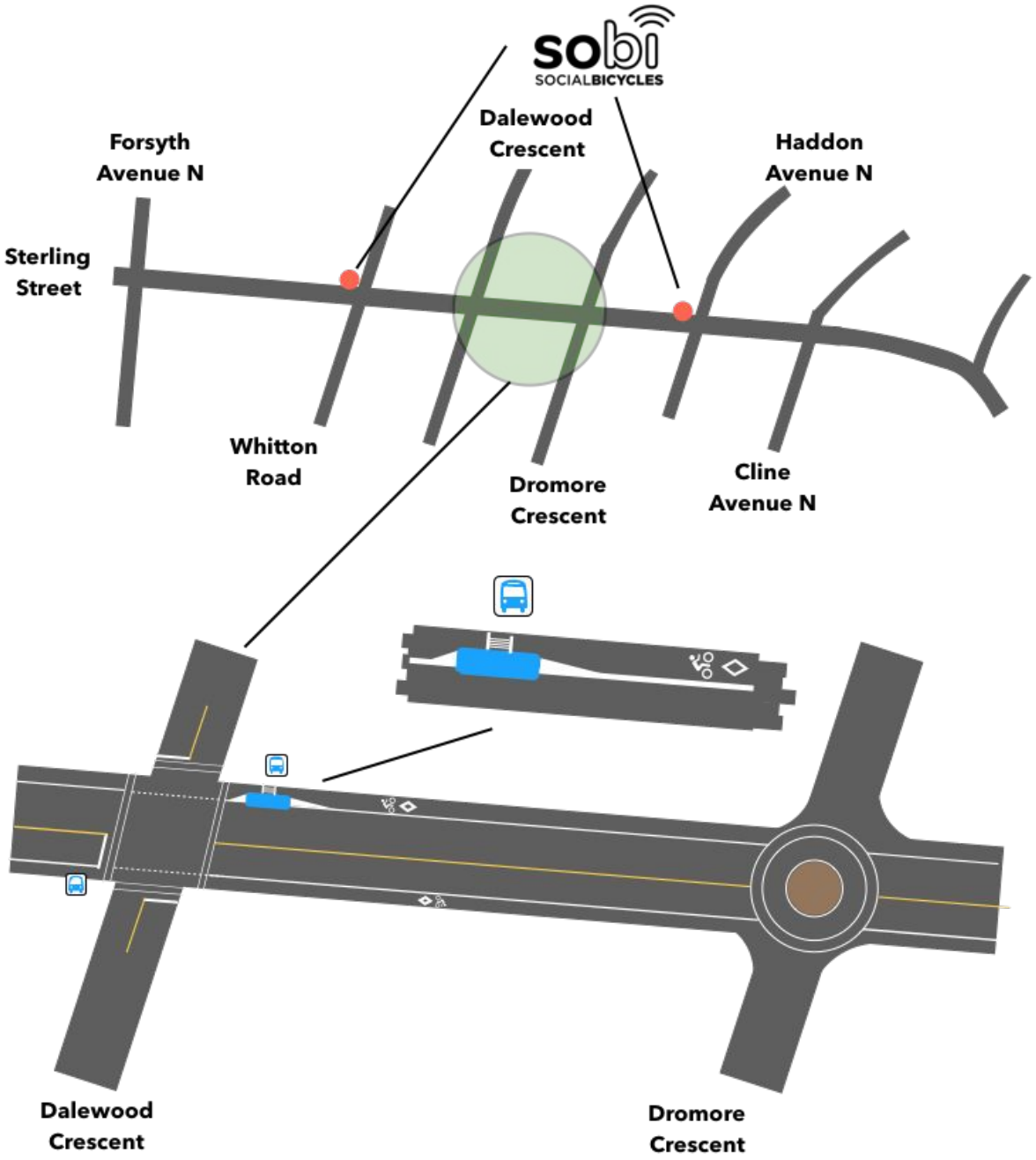
Bike lane on Sterling St. begins outside of the university entrance.

Limit vehicle access on Sterling St. to McMaster to facilitate a bike lane on campus and to enhance safer cycling and walking.

Faded, bumpy, and unprotected bike lane.

Repavement of bike lane to clearly identify bike lane, as well as allow for a smoother ride.

Sterling St. Proposal

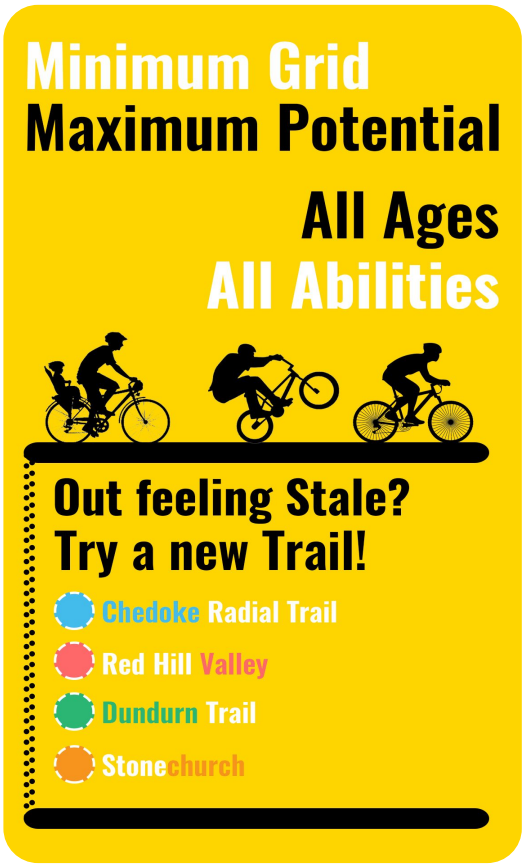


A diagram displaying the previous pages' "Current Proposals and Urban Reforms". Added features includes a bus bulb on Dalewood and Sterling, as well as a roundabout at Dromore and Sterling.

Future Awareness Campaign Strategies

An aspect of moving forward the Minimum Grid project is **communicating to the community** the available routes and trails around the city of Hamilton.

Cycling should be accessible for **all ages and abilities**, with each and every route accessible for everyone. Everyone should be **aware** of the available transportation modes in their city.



Demographic-centric micro variations of the same message adhered to increasing public awareness of existing infrastructure

Prioritization of city values such as **safety and connectivity**.

Normalized rating system to provide quick, crucial information such as difficulty of routes to new cyclists

Wayfinding A Hamilton-Centric Approach

Wayfinder-Hamilton: An ambitious prototype localizing global technology

Hamilton Specific Wayfinding tool using the routes listed on the subway-style map

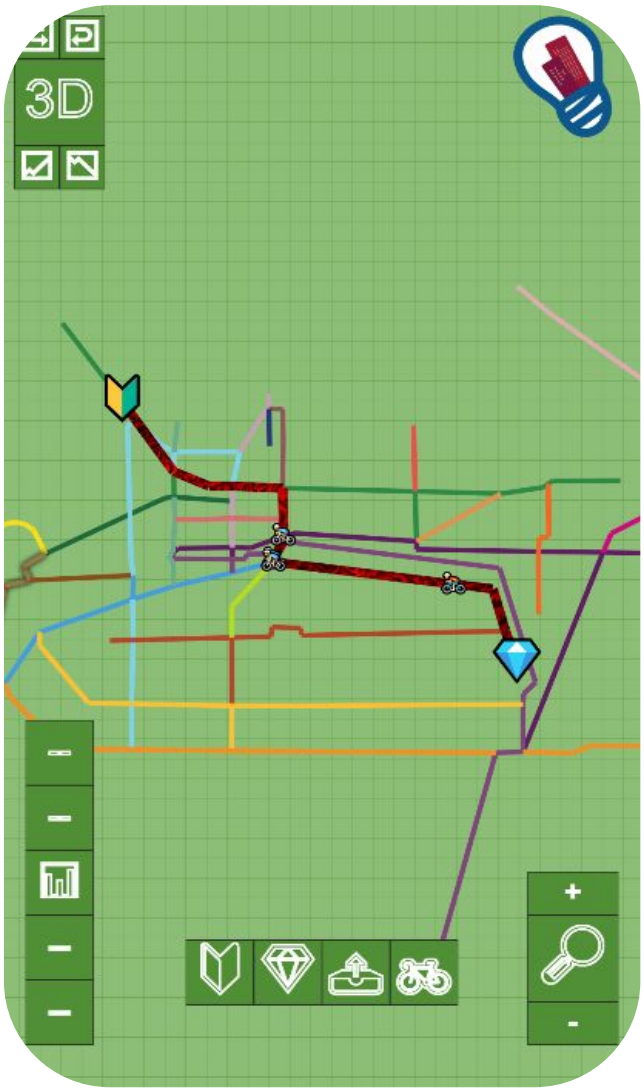
Designed to encourage users to try new trails

Bidirectional approach to navigation

Developed using a custom browser engine written from complete scratch using Javascript

As a prototype, arbitrarily assigns a difficulty score to each trail to advise decision making

Different Togglable views based on preference, with ultimate goal of **encouraging utilization of existing infrastructure**



Click here to view the prototype wayfinder! Both mobile and desktop friendly.

http://ayani.io/hamilton-wayfinder/ - Chrome recommended on desktops

NEXT STEPS

Workshop Recommendations

1. Show people a video and a map of a **specific route** for critique

2. Facilitate a workshop with a blank map and no preset plans in order to truly hear from the community

3. Hear from people with interactive surveys or workshops in other languages

4. Workshop focused on cycling within a specific **Ward** engaging residents of that Ward

5. Workshop on specific areas of concern and mapping out **specific solutions**

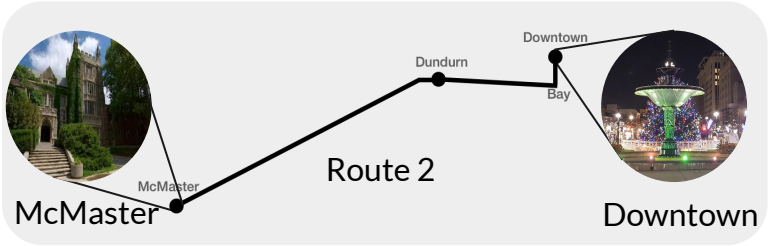
Campaign Recommendations

1. Invest in and develop a **"cycling culture"** at McMaster Campus. This is achievable through the presence of a mobility lab on campus.

2. Provide more **opportunities and incentives** for biking, such as free Sobi memberships for those who participate.

3. Promote cycling as a **healthy and fun** method of transportation, and physical activity.

An example of a route done with google street view and a video



An example of a route to explore with McMaster University Students

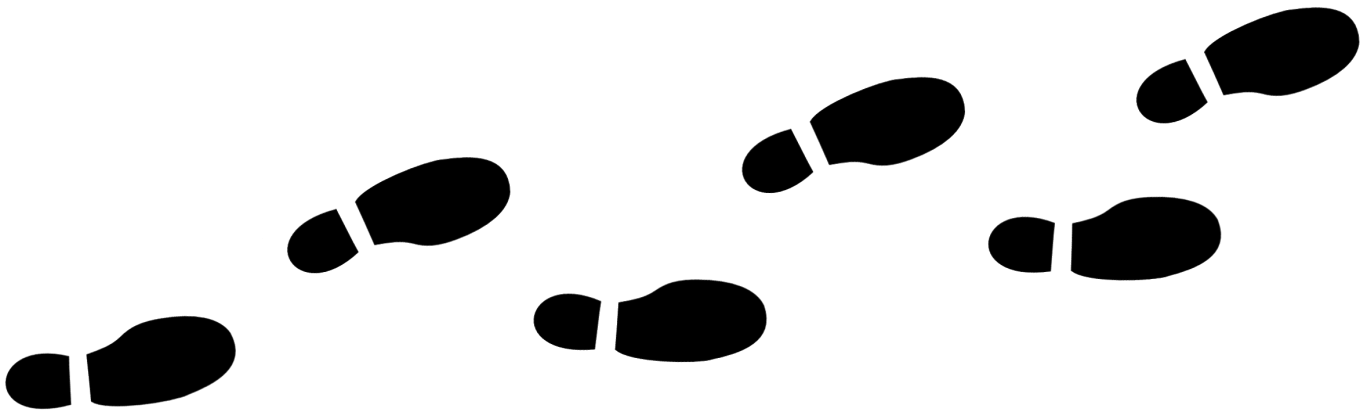
The next steps for the Minimum Grid are:

1. Transitioning the work to the future student group from Mohawk College, McMaster University or Redeemer University, for continuity of the project.

2. **Revamping** the Cycling Map in Hamilton through either
   a. Enhancing the Subway-Style Cycling Map to a more realistic representation of cycling infrastructure including gaps and potentially a ranking of the routes
   b. Creating another simplistic map outlining Hamilton's current and developing infrastructure

3. Mapping out and connecting specific **wayfinding destinations** between each ward inline with the definition of Minimum Grid.

4. Continuing to engage with the community in order to tailor both the meaning of minimum grid and its required infrastructure around community identified needs and priorities.



With an increased emphasis on active transportation being pertinent to future mobility solutions across the globe, cycling has come to the forefront of future development. While cycling can serve as a major component of reducing greenhouse gas emissions in Hamilton and aiding climate initiatives, there are numerous benefits of cycling beyond the environmental impacts. Furthermore, cycling provides a more accessible mode of transportation. For Hamilton, though there is a growing cycling population with an expanding bike-sharing service and cycling network, there is still much room for improvement in regards to becoming a more bikeable city. With the development of a prototype *Subway-Style Cycling Map* to be used for wayfinding and advertising Hamilton's cycling infrastructure, the city is working on increasing cyclists. Through interaction with city staff, meetings with various stakeholders, community engagement in a workshop, as well as research pertaining to cycling guidelines and Hamilton's own policies, this definition was determined. Though Hamilton has a long way to go to achieve a Minimum Grid, with careful implementation of future bicycling infrastructure, Hamilton has the potential to be a vibrant, healthy, and green city with a cycling backbone.

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