

# ThinkBike Workshop Reno, Nevada, USA September 2022





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Margot Daris, Dutch Cycling Embassy Jasper Homrighausen, Royal HaskoningDHV Dick van Veen, Dickvanveen Street Design Public Space Utrecht, September 2022

Graphic design: Daniela Garcia-Rojas and Sophia Hanneman, Dutch Cycling Embassy

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Dutch Cycling Embassy Adress: Nicolaas Beetsstraat 2A 3511 HE – Utrecht Telephone: +31 (0)15 202 6116

www.dutchcycling.nl info@dutchcycling.nl Twitter: @cycling\_embassy Facebook: @dutchcyclingembassy Instagram: @cycling\_embassy Linkedin: Dutch Cycling Embassy

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The Dutch Cycling Embassy (DCE) is a vast network of public and private partners who work together to create cycle-friendly cities. The DCE shares its knowledge and expertise in all aspects of cycling so that more cities and countries around the world can experience the advantages of having cycling as a safe transport option. One of the solutions we offer cities are ThinkBike Workshops. During a ThinkBike Workshop, a team of three experts visits a city where they get together with the local decision makers, planners, and cycle advocates for a couple of days. The workshops are intensive, interactive, and hands-on.

The ThinkBike Workshop was hosted by the Truckee Meadow Bicycle Alliance and the City of Reno. From September 12 to September 14, 2022, Dick van Veen (Senior traffic engineer and urban designer at Dickvanveen Street Design Public Space), Jasper Homrighausen (Consultant and project manager at Royal HaskoningDHV) and Margot Daris (Project Manager at DCE) visited Reno. During the workshop, several aspects of cycling were discussed, including hardware, software and orgware. This report summarizes the most important take aways from the workshop.



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# Introduction

The ThinkBike workshop was a three-day workshop, consisting of several working sessions, during which different aspects of cycling were discussed, categorized by hardware, software and orgware. Hardware are the physical elements of the built environment, such as the infrastructure. Software are the mental and virtual elements: the ideas, plans, policies, programs, and laws. Behavioral change and cycling stimulations are part of the software as well. Orgware are the organizational and institutional elements, such as the communication, administration and governments.

When people think about the future of smart mobility, they often think about automated vehicles, electric vehicles, or shared mobility. However, all these solutions do not offer an answer to the true challenges of sustainable urban mobility. The biggest challenge for sustainable urban mobility is space, which is very limited in cities. Therefore, the DCE and its member organizations plead for cycling as a sustainable, healthy, livable, affordable, age-friendly, and safe solution for the mobility issues we are facing nowadays.

We should focus not only on stimulating bicycle usage but focus on cycling to achieve overarching goals, such as good air quality, livability, sustainability, inclusiveness, attractivity and accessibility. Cycling is not a goal; it is a means to achieve much more. We must think about what cycling can bring for people, planet, and profit. Start with being ambitious.

#### Start ambitious:

- 1. Formulate the **overarching goals** (such as improve the level of air quality, zero traffic deaths, a more attractive downtown)
- 2. Formulate the cycling goals (such as increase the number of cyclists, increase the value of cycling, increase the number of protected bike lanes)

# 1. Setting the Agenda

## Start with why

Cycling is not a goal by itself. It is a means to achieve much more, including better air quality, livability, sustainability, inclusiveness, and accessibility. The first part of our ThinkBike workshop was build around this approach. We set the stage by zooming in on the benefits that cycling may bring to Reno. As a result, cycling will also be seen as a solution for the city, instead of as a solution for cyclists only. Therefore, we must think about what cycling can bring for people, planet, and profit. The Golden Circle of Simon Sinek is a useful tool to start thinking from 'why', instead of 'how' and 'what'.

## Ambitous goal setting

In addition to seeing cycling as a means, it is also important to be ambitious. A cycling city is not built overnight, but requires a long-term vision, dedicated policymakers, and an evolutionary approach. The BHAG (Big Hairy Audacious Goals) is a tool that helps to formulate ambitious goals.

We distinct two types of goals, as stated previously 2022 new logo DCE-Vlag copy.pdf in the ambitions:

- 1. Overarching goals
- 2. Cycling goals

A good cycling vision requires both.

## The importance of an integraded approach

A successful cycling city requires more than cycling infrastructure. It is important to focus on three types of solutions: hardware, software and orgware.

**Hardware** is about the physical side of planning, e.g., infrastructure, bike parking, viewpoints or playgrounds along the route, bicycle pumps and safe stops at intersections. Now that e-bikes are becoming more popular, it is important that bars, hotels, and restaurants offer charging points.

When it comes to bicycle parking, there are many options. Therefore, you need to think about the reason why people would want to park their bikes there. Is it for a short trip to the store or supermarket? Then the bike parking does not have to be monitored or be very fancy. A staple will do the job. When you go to a restaurant or to work, the bike needs to be parked more securely. In these cases, it makes sense to build an indoor bike parking garage where the bikes are monitored.

**Software** is about human behavior. Cycling must be for everyone; it must improve social equity and equality. Software is also about improving traffic safety, social safety, cycling promotion and campaigns.

If you want to create a mobility hub, software is also important. For example: make clear what you can expect from the hub. Brand the busses, shared bikes, shared scooters, lockers all the same so people know what is part of the hub. It gets easier if everything is branded the same way. Make sure people can share their ideas about the hubs about what they would want to have there.

**Orgware** is what you must do besides the social and physical part of planning. This includes a cycling vision, involved policy makers and decision makers, project management, process management and acquiring enough funds. It is important to have a vision and a strategy. It also helps to have a leader on the bike. In the Netherlands, the King, Queen, and Prime Minister are often on their bike. We use this as an example to get more people on bikes.

Orgware is strongly linked to the local culture. For example, in the US education and economic development appear to be very important drivers for promoting cycling.

### Exercise reults: start with why

Why do we want more cycling in Reno?

- Reduce congestion
- Improve quality of life: physical, environmental, economic, air quality, greenery, space
- Convenience
- Quality of community
- Senior freedom and independence
- Accessibility
- Equity
- Remove stigma that biking is bad or not cool
- Safety: less cars and more bikes is perceived as a safer situation
- Beauty
- Save money
- Make downtown a destination where people love to be
- Prioritize year-round community
- Reduce carbon footprint

# Exercise results: BHAG for 2050

- 50% modal shift to public transportation and active transportation
- Downtown is completely car free
- Make a safe network so everyone can bike to downtown
- Mobility hub in downtown
- Greater funding for sustainable modes than cars
- Policy of reverse triangle
- Reno is a cycling destination, from landing at the airport to getting around the city



#### Source: Dutch Cycling Embassy

# In 2025, the city of Reno...

- has car-free school zones
- has 25+ complete bike trails through out McCarran
- has a bike stress map (what are the busiest areas?)
- has a bike-friendly intersection standard
- · has affordable and ubiquitous car free mobility everywhere
- closes Virginia Street and make it completely in favor of pedestrian and bike
- has 40 miles of bike lanes
- policy change is in effect
- has pop up bike parking and repair stations throughout the city
- has safe and covered bike parking at several locations (cameras, security)
- has apps for people to provide input for where infrastructure is/should be
- has a successful PR campaign in place

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## Exercise results: an integrated approach

What **positive hardware, software, and orgware** measures does Reno already have?



#### Positive hardwares in Reno:

- East-west corridor
- Not too many cars
- Existing bus system
- Wide roads
- Presence of birds
- Many bike shops
- Some existing bike infrastructure
- Nature (rivers and mountains)
- Flat city

#### Positive softwares in Reno:

- Large student population
- Culture of outdoor recreation
- Small local businesses open to active mobility
- Festival culture
- Farmers market
- Focus on health

#### Postive orgwares in Reno:

- Working together with several stakeholders
- Openess among leaders

- State-wide hero: leader NDOT is cyclist
- Presence of huge research university
- \$16 million in 3 years
- Positive receptive from politics

#### What are the negative hardwares, softwares and orgwares in Reno?

OFT COST + MAINTENANCE OF LACK OF DATA SFTERATED BIKE LANES AND COMMUNICATION FOR EXISTING INFRAST PUCTURE NEIGHBORHOOD ACCESS SERVICES FOR HOMELECS 15 LACKING TO ANOID NEGATIVE WE OF BIKE & PARK INFRATTRUCTUR LOSING PART OF GRID FOR MIGROMOBILITY BECAUSE NOT A PRIORITY BIKE INFRASTRACTURE NOT CONTINOUS NOT ENOUGH TRAIL ANGELS TO ENFORCE NO BIKESHARE NOT ENOUGH INTEGRATION OF DIFFERENT ORGANIZATIONS THAT REPRESENT DIFFERENT WERE MISS ELDERLY & HOMELESS ORGS IN PUBLIC-PRIVA PARTNERSH

Negative hardwares in Reno:

- Cost and maintenance of seperated bike lanes
- Neighborhood access is lacking
- Losing part of grid for micromobility because not a priority
- Bike Infrastrucuture is not continuous

Negative softwares in Reno:

- Lack of data and communication for existing infrasturcture
- Services for homeless to avoid negative use of bike & park infrastucture

Negative orgwares in Reno:

- Not enough trail angles to enforce
- No bikesharing
- Not enough integration of different organizations that represent different mobility users
- Miss elderly and homeless organisations in public-private partnerships

# 2. Network Design

The infrastructure should be safe enough to allow mistakes by people. In case of accidents, it should not lead to serious injuries or death. For this, we focus on 'forgiving infrastructure'.

In the US, cyclists are in the 'fast zone', whereas pedestrians are in the 'slow zone'. In the slow zone, people are walking, smiling, chatting. We believe cyclist have more in line with pedestrians in how the behave and what they require and desire. That is also visible in the basis of how we design; cycling belongs in the slow zone as well.

# Choosing the right Road Classification matters

It is important to have a road classification so you can determine what the purpose of the road is and what the speed limit is.



Why do we opt for the 20-mph threshold for mixing traffic? If a cyclist gets hit by a car that is driving 30 m/h, the chances of death are 85%. Whereas if that car was driving 20 m/h, the chances of death are 15%. Therefore, it is important to have physically separated bike lanes where cars drive fast. Mix when you can, separate if you must. In 20 m/h zones, traffic can be mixed. Per road category there is a fixed set of design characteristics, so that users instantly know in what street they ride, what behavior to show and what to expect from others. This eases up the traffic system and makes is safer.

## Five bicycle design criteria

There are five main principles when it comes to planning a bicycle network: coherence, directness, attractiveness, safety, and comfort. However, the overarching and most important goal is cycling happiness. Cycling happiness is what we should be aiming for, it goes beyond all other principles. Thereby, every bike lane has a tradeoff and thus, the perfect bike lane does not exist. You must design for the different kinds of users and needs.

- 1. Safety: minimize conflicts with other road users. Safety is key, however, if you only focus on safety, you will not get cycling happiness. Make sure that you minimize the number of conflicts by separating bike lanes when cars drive faster. Conflict points are unavoidable but make sure that even the conflicts are as safe as possible. You do this by traffic calming and making sure people can have eye contact with each other. To create safe situation, create safe infrastructure (for example, make sure there are no dead corners in the design of the space).
- 2. Directness: cycling is a physical activity, so cyclists do not want to make a huge detour but a direct route to their destination. If cyclists have to add 50% extra time travel because of detours, they will stop cycling. You want to minimize the delays at traffic lights and to make it easy for cyclists to cross intersections. You can do this by implementing bike detective systems or push buttons.
- **3. Coherence**: coherent and recognizable infrastructure encourages predictable behavior of road users. You must plan a coherent network that gets its users from A to B. There should not be any missing linkages or gaps in the network. Cycling is only happening if the least safe part, is still very safe. Thus, it is important to make a network, not just a series of routes. Bike lanes need to be recognizable; you need to be able to see immediately where you are going and when you are crossing the street. Continuity is very important and is often forgotten. For example, some cities plan bus stops in the middle of the bike lane. This is not good for the coherence and continuity of the bike lane. In order to create a coherent network, you need every actor in the city to understand what you are doing to improve cycling. Signposting is important but it comes after the design of the infrastructure. Signage is not going to contribute to your cycling happiness, it just makes sure everyone knows it is a bike lane.
- 4. **Comfort**: It is important to make cycling as comfortable as you can by minimizing energy consumption. Minimize the number of stops, arrange a smooth surface, and minimize gradients. When cycling is easy, it becomes comfortable. A smooth surface, such as asphalt, allows for a smoother bike ride as it does not cost much energy. This is important for commuter bike lanes. When designing a recreational bike route, you can use sand and gravel as well (asphalt is quite costly and not good for the drainage).

**5.** Attractiveness: cyclists want to cycle in pleasant surroundings, it is much nicer to bike in an attractive area and helps with your physical and mental health.

All those aspects are constantly combined and considering, both in the design on the network level and on the street level.

### Not ad hoc planning but working from a coherent network.

When designing a bicycle network, we do not look at the 'easy' segments; places where there is room to add a bike lane. Instead, we want to focus on getting the right infrastructure in on the segments where it's needed. If that's hard, so be it. We rather spend more money on one good route than a few bucks here and there on roads which do not really need infrastructure. And there is a lot of that; most streets can just benefit from traffic calming, reducing the speed and the danger, so that no bicycle infrastructure is needed. This saves money so we can build that primary bike network.

When designing the primary bicycle network, we focus on an integral approach:

- 1. Identify the main destinations and origins
- 2. Connect these areas with each other, highlighting which relationship is stronger (more users) and which is weaker
- 3. Create a 'metro style' corridor map for cycling, conceptual
- 4. Allocate these corridors to the existing street network, taking into account the road classification and the existing bike infrastructure.

These steps have been worked out in the workshop by two subgroups. The early draft results of this exercise can be seen in the images.



Mapping origins and destinations.



Drafting a network, connecting the origins and destination, result group 1.



Drafting a network, connecting the origins and destination, result group 2.

# 3. Street Design

How you design intersections is important for the safety of cyclists. Even if you have the most perfect bike lane, if the intersection in the middle is dangerous, that is what you remember of the bike ride. Therefore, intersections must be designed to reduce speed to make sure road users can see each other. In other words: create an environment where it is safe to negotiate with the other road users.

From the design of the intersection, it should be obvious which road is the arterial road and which one is the side road. Because of the design it is immediately clear who has the right of way. However, sometimes two arterial roads cross. In the Netherlands we always check if we can design a roundabout. Roundabouts need more space than intersections, but they are also a lot safer. Traffic lights are four times less safe than roundabouts. This is because there is no physical blockade to just speed up, even when there is a red light. Whereas at a roundabout, you must stop and reduce speed. Even when you make a mistake on a roundabout as a car driver, this will most likely not result in death because you are only driving 20 km/h.

# When designing local streets, there are some key elements:

- Traffic calming: guarantee low speeds on local streets. Make the roads narrow, use non-asphalt, or use different coloring. Everything to create subjective insecurity.
- Prevent through traffic: create a network which accommodates local traffic but is unattractive for through traffic.
- Intuitive gateways: create a logical transfer point between two roads of different categories.
- Interaction at intersections: emphasize equality between roads of the same order.
- Differentiation and non-uniform: Different textures of surface materials, subtle suggestions, like trees, benches, angled parking, and the like.

# When designing intersections, there are three key elements:

- 1. The first is that people make mistakes. Design the intersection for forgiveness so that those mistakes will not be fatal.
- 2. Second, minimize the risk by separating dangerous modes of traffic from the vulnerable ones, both in space and in time. This makes it easier for all road users.
- 3. Third, redundancy, the intersection should also operate without the lights. Make sure that the design always works.

## Some other lessons from the Netherlands:

- Cyclists always have a free right turn, cars do not have this right.
- Create space for eye contact between cars and cyclists. For example, by making the turn for cars a little bit wider so it takes more time.
- Create islands for protection between cyclists and cars, this is vertical protection as the islands are a curb. This physically protects cyclists as cars cannot drive over it.
- On large intersections, make sure there are middle islands. This helps pedestrians and cyclists to cross the street in two phases. This makes it feel safer when you are crossing the intersection because you have a safe place in the middle of the road.
- Pedestrians walk on the outside and cyclists cycle on the inside of the intersection. Intersections should be in the same order as how you designed the roads. Otherwise, you create uncertainty while traffic should be as predictable as possible.
- A very cheap solution is the advanced stop bar. The bikes stop a few meters ahead of the cars which gives them a head start. Thereby, the cars immediately notice the presence of cyclists.



# 4. Group Results

To put theory into practices, we redesigned the streets of Reno to make it bikefriendly. The two results are called 'Downtown Superblocks' and 'The Ladder Structure'.



The Downtown Superblock idea is inspired by Barcelona. In Reno, for every few blocks, there will be one arterial road. Within the areas that are surrounded by arterial roads, the roads are traffic calmed to create a safe and comfortable area for active travel. The map below/above shows a first concept of the roads that will be used as an arterial road or as a traffic calmed street. This concept creates a continuous flow of traffic for car users, cyclists, and pedestrians. The result of this transformation is a mode shift towards more active travel and less cars. Therefore, with the traffic calmed areas in the city, Downtown will become a destination where citizens and tourists want to be. Downtown will have personalized streets with inputs from Reno's citizens. Utimately, this leads to kid friendly Downtown and neighborhoods.

The goal of the Ladder Structure was to create a comfortable route from Downtown to the University of Reno. Students should be able to move safely from their housing, to Downtown and Midtown, the Brewery District, and the University. In addition to the active travel route, the bus sysmetim should operate properly as well to transfer people from the city center to campus. The next two maps show the results of the traffic calmed streets and the bus-priority streets.





In order to create protected bike lanes, road space has to be reallocated. Currently, the streets of Reno allow a lot of space for car traffic. If center street would dismiss one car lane, we create space for a bidirectional bike lane with a line of trees as physical separation between the cars and the cyclists. The greenery provides safety as a physical barrier, it creates a nice environment as well as shade during the warm summer months.

### Evans St to Lake St via Bus Station Parking



Evans Street: Exisiting street vs. Proposed street



LAKE CPR. EXISTING Lake Street: Exisit-ing street vs. Pro-posed street PROPOSED CENTER ST. EXIST ING Center Street: Exis-iting street vs. Pro-posed street PROPOSED

