



Draft
**IRELAND'S
CYCLE
NETWORK**
International
Research



International Research

As the NTA Cycle Design Office was developing a comprehensive cycle network of such a large scale, it was important to research and review similar cycle networks in other parts of the world. This was undertaken to identify key elements that contribute to a safe interurban cycle network. However, other elements that may contribute to developing a high-quality routes that will encourage an increased uptake in cycling were also noted.

EuroVelo (Europe)

EuroVelo is a cycling network in Europe comprised of 17 interconnecting long distance cycle routes that encompass the whole European continent. Figure 1.1 shows the extent of the EuroVelo route which includes two routes in Ireland: EuroVelo 1: Atlantic Coast Route and EuroVelo 2: Capitals Route connecting Galway and Dublin.



Figure 1.1: EuroVelo Network (eurovelo.com)

In the Netherlands and Denmark much of the EuroVelo route is at several stages of development. The majority of routes in both countries are denoted as being developed with signage. A portion of the Dutch segment of EuroVelo 15 is a Certified EuroVelo route [1]. In both countries cyclist safety is important when designing a route. Because of that both countries opt for less direct but safer routes, travelling close to the route of main roads.

National Cycle Network (UK)

The National Cycle Network (NCN) was created by the cycle charity Sustrans and acts as a reference for long distance cycle routes in the UK. It is comprised of a number of signed paths and routes, with an aspiration to deliver a high ratio of traffic free cycle routes. These include

segregated cycle routes and greenways. These routes are mainly based outside urban areas, but some will pass through cities and towns. Figure 1.2 below shows a typical example with the extent of the National cycle network shown in the southwest of England and Wales. This includes route classifications such as traffic free routes, on-road routes and national cycle network route numbers.



Figure 1.2: National Cycle Network for the south of England and Legend (Sustrans Network)

Sustrans Traffic Free Route and Greenway Design Guide notes that the introduction of these routes should be done as a network wide plan and aim to create a coherent and consistent network that meets all travel needs of an area. The routes should be related to trip generators and should take into account any proposed change of land use for an area [2]. When the traffic free routes and greenways were designed, inclusive design was important. The following core principles were referenced to help ensure this:

- Be traffic-free.
- Be accessible to all legitimate users.
- Be wide enough to accommodate all users, considering future and predicted usage levels
- Minimise maintenance.
- Clearly and consistently signed.
- Enable all users to safely crossroads.
- Be attractive and interesting places to be.
- Have a smooth surface that is well-drained.
- Feel like a safe place to be. [2]

Traffic free routes were not considered safe due to their isolation from the road, this perception is increased due to low levels of use at certain times of the day. This can be improved by introducing measures such as high-quality lighting, creation of frequent access and exit points, and maintaining clear views. The level of service is measured using tools that form part of Design Guides such as Design Guidance: Active Travel (Wales) Act 2013, the London Cycling Design Standards, and the Transport for London Pedestrian Comfort Level assessment. The outcome of these tools is based on the following criteria:

- Coherence
- Directness

- Safety
- Comfortability
- Attractiveness [2]

These allow for the assessment of proposed route and network links.

The Netherlands Cycle Network

The Netherlands has a reputation as a cycle friendly nation and being a great destination for cycling. Much of the road infrastructure in the country is aimed towards cyclists. This includes separate dedicated cycle lanes, and cycle crossings with dedicated traffic lights. There are 37,000 km of segregated cycle lanes in the Netherlands. There are approximately 3,300 km of long-distance cycle routes, some of which include the EuroVelo routes [3].

The Dutch cycle network is comprised of a three-tier structure:

- Basic Structure (Essential Routes)
- Main Cycle Network (Urban routes)
- Bicycle Highways (Rural Routes)

The Dutch Cycle Embassy notes that separating cyclists from traffic is safer and leads to fewer accidents. Planning the promotion of cycling creates a safer environment for all road users. Developing a clear road safety program reduced 1,600 traffic casualties between 1998-2007 in the Netherlands [4]. It notes that people are often influenced by perceived safety rather than actual safety. For example, in locations where the chance of an accident is statistically low, people will not consider cycling an option if the physical environment looks dangerous [5].

The Dutch cycle network is comprised of 8,900 nodes, numbered junctions, numbered 1 to 99 [6]. This is done for navigational purposes. These nodes are the points where the recreational cycling routes all intersect. These routes are not all on segregated cycle ways, but where possible the routes go along roads with lower levels of traffic.

Many of the larger settlements in the Netherlands are serviced using EuroVelo routes, such as Rotterdam, Utrecht and Amsterdam. The Netherlands has EuroVelo routes 2, 4, 12, 15 and 19. Routes such as the North Sea Cycle Route (12) and Rhine Cycle Route (15) follow the direction of the coast and river allowing for scenic views while also visiting cultural and natural heritage sites, as well as various cities.

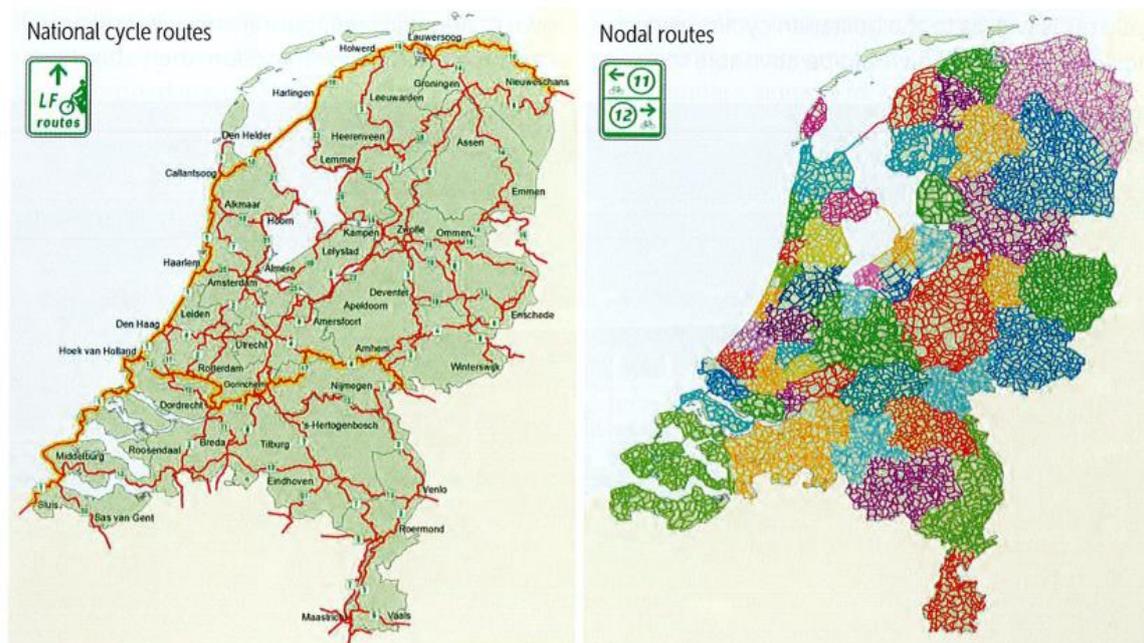


Figure 4-8. Representation of the network of national cycle routes in the Netherlands (left) and of the many node networks (2015)

Figure 1.3. Dutch Cycle Network (Ref: CROW Manual)

Danish Cycle Network

Denmark also has a large cycle network, with 11,000 km of routes, these include 4 being EuroVelo routes. The EuroVelo routes are numbers 3, 7, 10 and 12. These routes serve as links between larger settlements and cities while also acting as recreational routes for tourists [7]. Figure 1.4 below shows the extent of the Danish Cycle Network. The EuroVelo routes are included in this figure.

The Cycle Embassy of Denmark was created in 2009 to encourage cycling at a national and international level. It is comprised of members from private companies as well as local authorities and non- governmental organisations.

The Danish Cycle Network is comprised of Five Route Types;

- Primary Routes
- Secondary Routes
- Recreative Routes
- Catchment Routes
- Traffic & Recreational Routes

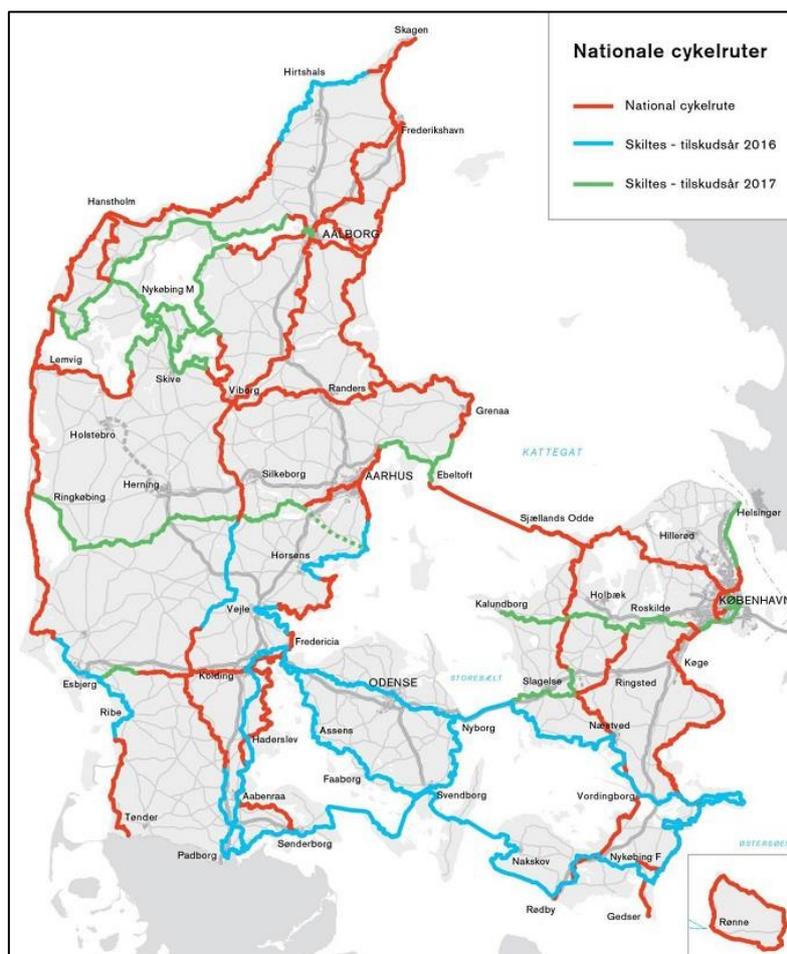


Figure 1.4: Danish Cycle Network (Cycling Embassy of Denmark)

The cycling strategy in Denmark focuses on 3 elements:

- **Everyday cycling** (focusing on secure parking at hubs, cycle superhighways, green waves, cyclist shortcuts, and filling in missing links to create a cohesive network),
- **Active holiday and leisure** (focus on recreational routes, signage and an effort to develop Denmark as a cycling destination) and
- **security for new cyclists** (focusing on safe roads and paths, cycling campaigns and railway crossing protection) [8]

The National Cycle Network route is segregated from vehicular traffic but shared with pedestrians and horses. The EuroVelo route is shared with motor vehicles but has been routed away from major roads to avoid high traffic volumes.

EuroVelo 7: the Sun route passes through Copenhagen connecting Sweden to Italy. EuroVelo 3 is the Pilgrims route and spans from Norway to Spain, travelling through Denmark, and France. It is one of the longest routes in the EuroVelo Network. The Pilgrims Route allows cyclists to visit a number of impressive religious buildings and pilgrimage routes. It also passes through larger cities such as Hamburg and Paris amongst others. Outside of Denmark, sections of the EuroVelo 3 route are along the RAVeL network of trail along abandoned rail line and towpaths. This allows for the complete segregation of cyclists from traffic.

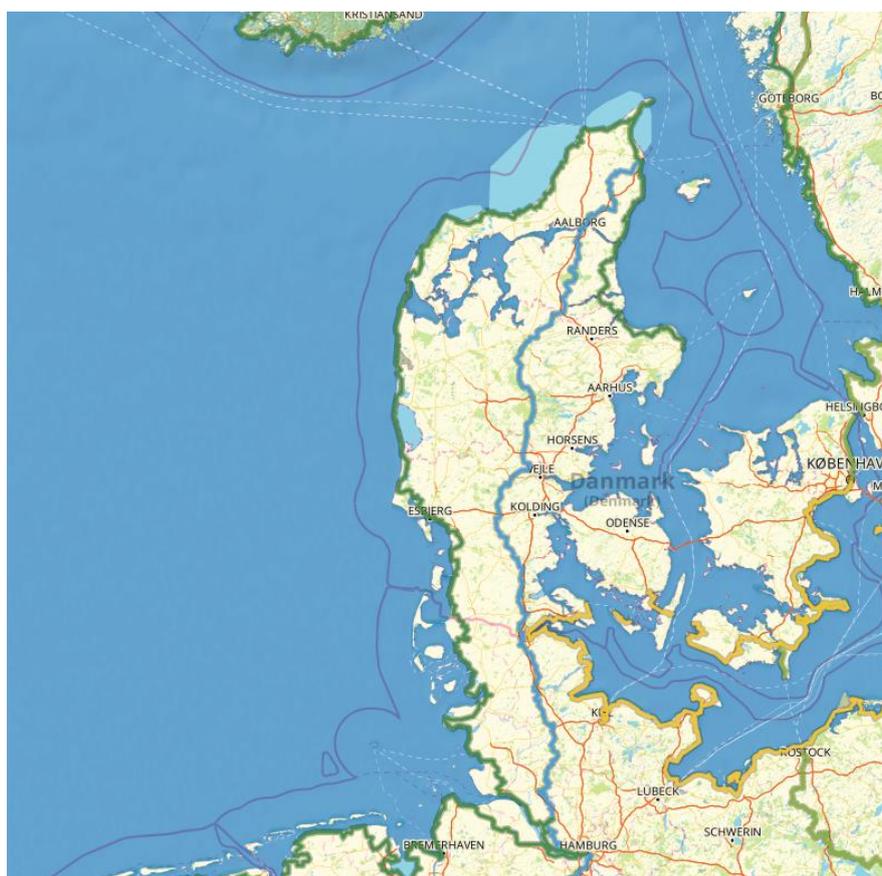


Figure 1.5: EuroVelo Network through Denmark

Cycle Network Guidance (New Zealand)

The Cycle Network Guidance produced by NZ Transport Agency aims to promote a consistent, best practice approach to planning cycling routes and networks.

Cycle network planning is noted as being a key part in improving mobility and accessibility in a community. It provides interconnected routes as well as facilities for the different needs of cyclists. Networks should provide users with safe, comfortable, direct cycling routes that connect origins with key destinations. Routes should connect to form a network that provides for tourism, recreation as well as commuting. [9]

Cycling routes should aim to make cycling safer and a more attractive mode of transport. They should provide a high level of service including safety, convenience and comfort. There should be minimal conflicts with other users, both pedestrian and vehicles [9]. This can be achieved through segregation and adequate operating space for cyclists and other users. The facilities should meet the minimal design standards.

Segregated networks can offer a higher level of safety and comfort to cyclists. The degree of separation can vary on a route. Provision of a segregated route offers pleasant, off-road cycle paths free of conflict from motorised traffic that serve all areas.

When designing a cycle network, the combinations of destinations and origins can be complex. It is important to understand the different users that the cycle network will cater for eg. Tourists and commuters. These impact the desired trip destinations.

The guidelines mention a number of factors that should be considered when planning a route. Amongst them are the following:

- Traffic speeds
- Traffic volumes

- Traffic composition, especially percentage of heavy vehicles
- Other road/path users' demands and requirements
- Crash history
- Planning regulations
- Local initiatives and developments
- Existing provision for cycling
- Traffic management controls and operational details, for example traffic signal phasing
- Intersection layout details
- Key infrastructure details
- Local traffic calming measure [10]

GIS can be used to aid in route design by allowing for a number of these factors to be analysed together. [10]

In addition to this Guidance, the NZ Transport Agency convened the Cycling Safety Panel in early 2014. The Panel publishes a cycling safety action plan in 2015. To improve cycling on rural roads, a number of proposals were made in the action plan. These include speed regulation and reduction, design, maintenance, technology for heavy vehicles, HGV driver training and mandatory passing distances [11]. A Safer Speeds program was endorsed, with the aim of delivering a safer cycling environment by targeting the most dangerous parts of the network, both rural and urban. Speed management guidelines were introduced, considering the needs of all road users, as well as the design, function and level of use of roads [11].



Figure 1.6: New Zealand Cycle Network (nzcycletrail.com)

Cyclists and pedestrians will be given greater consideration in setting and managing speed limits. Cyclists' safety around heavy vehicles was another key issue identified [11]. The Panel recommended further investigation of how side under-run protection and other technologies could be used to reduce risk to people on bikes from HGVs. The action plan noted that investigation into existing and emerging technology could improve cyclist safety and the safety of other road users. Education of cyclists and drivers of large vehicles such as buses to prevent incidents was also noted as being important. As part of the proposals, the concept of Safe Use was promoted. This put forward recommendations such as introducing a minimum passing distance.

South Korea

The 2008-2013 South Korean Government has green growth and low carbon as a main goal. As part of the Four Major Rivers Project to improve the ecosystem of the four main rivers in the country, bike paths were constructed next to these rivers. The first section opened in 2012, with other parts still in development. It is an estimated 1,700 km [11]. There are specifically marked bike signs and paved bike paths for easier navigation.

In addition to riding along the main rivers, there are also routes to cycle from Seoul to Busan, cycle around Jeju Island and to cycle the East Coast of the country. The majority of these routes are on paved pathways near major rivers. There are also sections on small agricultural roads. Some of these may be located near busy roads and others on dedicated cycle facilities.



Figure 1.7: South Korean Cycle Network (kojectscm)

There are 4 cycling challenges associated with these routes. As part of completing these cycle routes, cyclists are encouraged to collect stamps along the way in a cycling passport issued by KWATER.

- **Completion of River Course**

Taking on river by river is the simplest and easiest challenge. You receive a sticker for the completion of each river.

- **Four Rivers**

Any cyclist that rides from the beginning until the delta of the Nakdong River, Han River, Geum River and Yeongsang River receives a certificate and a medal for the accomplishment of the four rivers challenge.

- **Cross-Country**

This cycling route goes across Korea. The cross-country challenge goes from Ara West Sea Lock in Incheon to the Nakdong Estuary Bank in Busan. Anyone who collects all stamps along the way in the bicycle passport receives a very nice-looking certificate and a medal.

- **Grand Slam**

For any cyclist who completes all routes, they will be honored with the Grand Slam Certificate. This certificate isn't yet available because the national bicycle network is still in construction. [11]

Nova Scotia Blue Route (Canada)

Nova Scotia is approximately half the size the Ireland but has a similar climate and topography. In the past 10 years, it has sought to develop almost 3000km of cycle routes on the island called the blue route. The aim of the Blue Route is to establish and promote a consistent set of design and signage guidelines for bicycle routes in Nova Scotia. This has also been complemented by a wayfinding strategy to provide signage for the different types of cyclists in Nova Scotia [13]. A map of this route is seen in Figure 1.8.

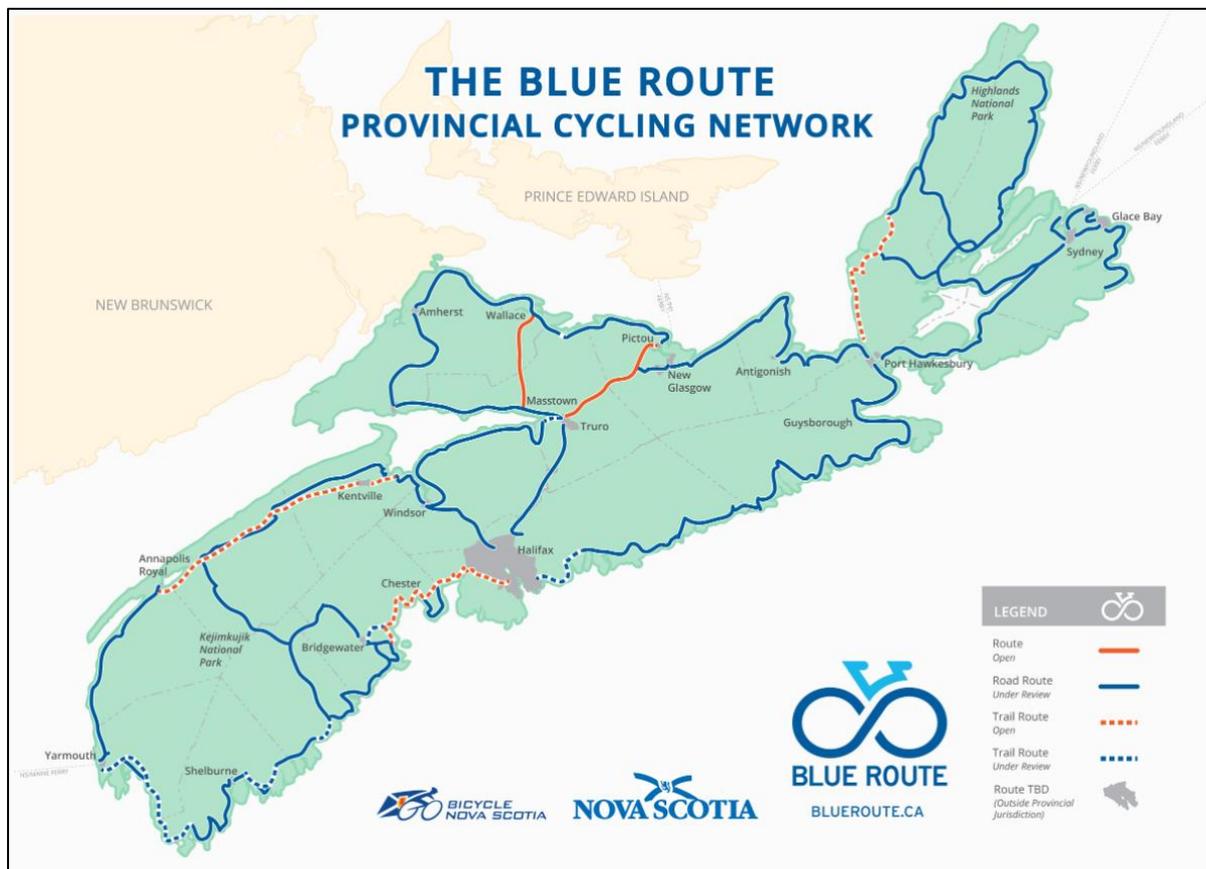


Figure 1.8: Map of The Blue Route in Nova Scotia (blueroute.ca)

The route selection was based on the planning priorities listed below and incorporates input from meetings and consultations with stakeholders around the province. Route planning priorities include:

- Connecting communities and important destinations along a province-wide spine for bicycle transportation
- Availability and accessibility of services along the corridor
- Accessibility and utility of the corridor to local communities
- Scenic views and topographic qualities that lend themselves to special cycling experiences
- Incorporating established bicycle routes that are well used today
- Coordination with local and regional plans where goals align, including active transportation plans or priorities, development of Nova Scotia Destination Trails, and the Trans Canada Trail
- Potential to provide a safe, comfortable bicycling experience based on existing conditions or the feasibility of upgrading infrastructure to an appropriate level of service in the future
- Providing a diversity of route types to accommodate a broad range of users. [13]

While it may not have a large population, the above principles are notable given its aim to develop a cycle network over a land area with smaller communities. This approach could potentially be considered for less populous counties in Ireland.

Research Summary

From conducting the review of international examples, it was noted that many interurban routes would not follow the most direct route but take a longer, safer route, parallel to a major traffic route. This is part of the intention to provide a safe and comfortable cycle route in line with principles of sustainable safety. Where possible, segregated cycle routes are encouraged to provide an increased level of safety to users. A key design difference is the lack of hedgerows on rural Danish and Dutch roads which has allowed provision of segregated two-way cycle lanes adjacent to traffic lanes.

Connections to key locations in communities is important for a network to function well. These include scenic and tourist locations for leisure cyclists, as well as including education facilities and workplaces for commuter cyclists.

It is clear that both driver and cyclist education are important during the roll out of cycle network plans. Driver behaviour may need to be altered to accommodate higher levels of cycle traffic on routes that previously were not part of any cycle network. Both cyclists and drivers will need to understand the correct way to interact with each other on interurban links that are not segregated.

Furthermore, it was noted that many interurban routes, particularly tourist and leisure routes, had a route numbering system across the route. However, it was also difficult to obtain maps showing the full network with only individual routes shown. Frequent themes that emerge from the various documents are:

- Safety: Providing a safe route for all users.
- Connectivity: To services and local communities.
- Consistency: Providing a consistent layout along routes.
- Attractiveness: Cycle routes are to be of higher quality and attractive to users.

As noted in the New Zealand cycle network guidance, that a number of existing influencing factors need to be considered when designing cycle routes and cycle networks. These include traffic speeds, accident statistics, planning regulations and traffic volume and composition. All of these will be considered during the planning process of the CycleConnects cycle network.

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