

The Many Problems with Bi-Directional Cycling Paths

Bi-directional (two-way) cycling paths can be an appropriate form of cycling infrastructure when placed along rail lines, canals and country roads. When they are designed to have few intersections or crossings, these types of cycling paths are quite safe and ideal for recreational purposes. In the city, however, bi-directional paths are crowded, cramped, slow to ride on, and can create extremely dangerous situations for all road users. The vast majority of cycling paths in the downtown core of Montreal are bi-directional. Furthermore they are poorly designed bi-directional paths.

Two crowded and dangerous bike paths: De Maisonneuve and Rachel

Downtown cycling paths accommodate many cyclists per day. According to Vélo Quebec, the Claire Morissette cycling path on De Maisonneuve handled more than 3000 cyclists per day during the cycling season of 2010. Each direction of the cycling path is only 4 feet wide, which is enough space for cyclists to comfortably ride single file but not wide enough for cyclists to pass one another without veering left into oncoming cycling traffic. Given the volume of cyclists travelling in both directions, the De Maisonneuve path is simply insufficient in width. The bi-directional cycling path on Rachel is even more crowded as it accommodates a similar number of daily users as the De Maisonneuve path yet it is significantly narrower in width. It narrows to just over 3 feet in each direction at many intersections.

Cycling networks are much like chains in that they are only as safe as their most dangerous links. The City has done a very poor job of keeping up with the increase in cycling rates among residents. Not enough cycling infrastructure has been built and what has been built has been poorly designed and poorly maintained. Paths are too narrow, littered with potholes and dangerous at

intersections. Numerous studies have shown that more than half the population of city dwellers in Canada and the United States don't commute by bike because they don't feel it is safe enough. The city of Montreal claims that it wants to take measures to increase the rate of cycling and pedestrian activity. But the City is simply not backing up its claims with proper action. For Montreal's cycling network to become safe and accessible to all potential cyclists, the City needs to completely rethink its design as well as the road space and financing that support it. We can start by identifying where accidents and near-misses happen most often — ironically enough, it's on our bike paths.

Frequent causes of accidents

Most cycling accidents occur either at intersections where drivers can cut off cyclists when taking a turn or between intersections where cyclist are forced to veer left into oncoming cycling traffic. There is an elevated risk of cyclist accidents on the De Maisonneuve and Rachel cycling paths because on bi-directional cycling paths both of these high-risk situations are extremely common.

In Montreal, intersections occur much more frequently in the east-west direction than in the north-south direction. A cyclist riding eastwards along Rachel from the eastern edge of Jeanne Mance Park to the eastern edge of Park Lafontaine will pass through 28 intersections over the 1.8 km stretch. That is the equivalent of an intersection every 60 meters. On the other hand, a cyclist riding northwards along Brébeuf from the office of Vélo Quebec at Park Lafontaine to Laurier Park will encounter only six intersections along the 1.1 km stretch. That works out to 180 meters between each intersection, 1/3rd the frequency compared to riding along Rachel. Nothing can be done to change the fact that east-west streets have a higher frequency of intersections, however, the

design of east-west cycling paths must take the danger and frequency of intersections into account. Because intersections occur at such high frequency, each one must be made as safe as possible for cyclists, pedestrians and drivers.

Cyclists, riding on bi-directional cycling paths, increase their likelihood of colliding with another cyclist when they enter the oncoming cycling lane. Unfortunately, traversing the solid line, which divides the two cycling directions, is typical behaviour for many cyclists as there are many circumstances that demand it. Cyclists have to negotiate around road obstructions (potholes, sewer grates, large puddles or garbage), slower cyclists, roller-bladers, skateboarders and the rogue pedestrian. Because each lane is so narrow, cyclists are often forced to go into oncoming cycling traffic in order to avoid obstructions or slower users.

It is not surprising that De Maisonneuve and Rachel rank second and third on a list of streets with the most reported bike-on-moving-car accidents on the Island of Montreal. Data compiled by the SAAQ indicates that in the five years between 2006 and 2010, 3742 reported accidents occurred between cyclists and moving vehicles. De Maisonneuve and Rachel each had about 150 accidents apiece over five years. Only Sherbrooke, a street that is well used by cyclists despite being incredibly dangerous, had more reported accidents. Bear in mind that reported cycling accidents only account for a small proportion of the actual number of accidents and near-misses that occur. We simply don't know the true number of cycling accidents that occur on De Maisonneuve and Rachel. A more realistic estimate of the number of cycling accidents may be upwards of 50 times the number of reported accidents.

Downtown bi-directional cycling paths: a nuisance and a danger for all road users

Bi-directional cycling paths are a headache for drivers to cross. Drivers making a left turn off of De Maisonneuve Boulevard must look for cyclists coming from both directions as well as for pedestrians. There are essentially three layers of traffic flow that the driver must cross in order to make his/her turn – both directions of cyclist flow and the pedestrian flow. On Rachel Street it is even more difficult to turn than on De Maisonneuve because it is a two-way street. A driver going eastwards on Rachel who wants to turn left must turn through a lane of oncoming cars, two directions of cycling traffic and pedestrian flow (see figure 1). During rush hour, a left-hand turn on De Maisonneuve or on Rachel is close to impossible for drivers to accomplish and an attempt can seriously endanger the lives of cyclists and pedestrians. The driver's ability to see can be reduced in bright conditions or at low-light conditions, such as at dawn, at dusk or at night, making it very difficult to simultaneously look for other drivers, cyclists and pedestrians entering the intersection from both directions. Turning through cycling traffic while driving along De Maisonneuve or Rachel is the equivalent of making a left turn off of Saint-Denis from the right-most lane – a manoeuvre that would violate multiple road rules. Just about every Montrealer has witnessed several accidents and countless near-misses involving a left-turning driver and a cyclist travelling straight along the De Maisonneuve or Rachel cycling path.

Bi-directional cycling paths, as they are currently designed in Montreal, create dangerous situations for pedestrians. When pedestrians cross an intersection parallel to a bi-directional cycling path, they risk not being seen by drivers making a left turn (again, see figure 1). Since it can be difficult for left-turning drivers to find an opening

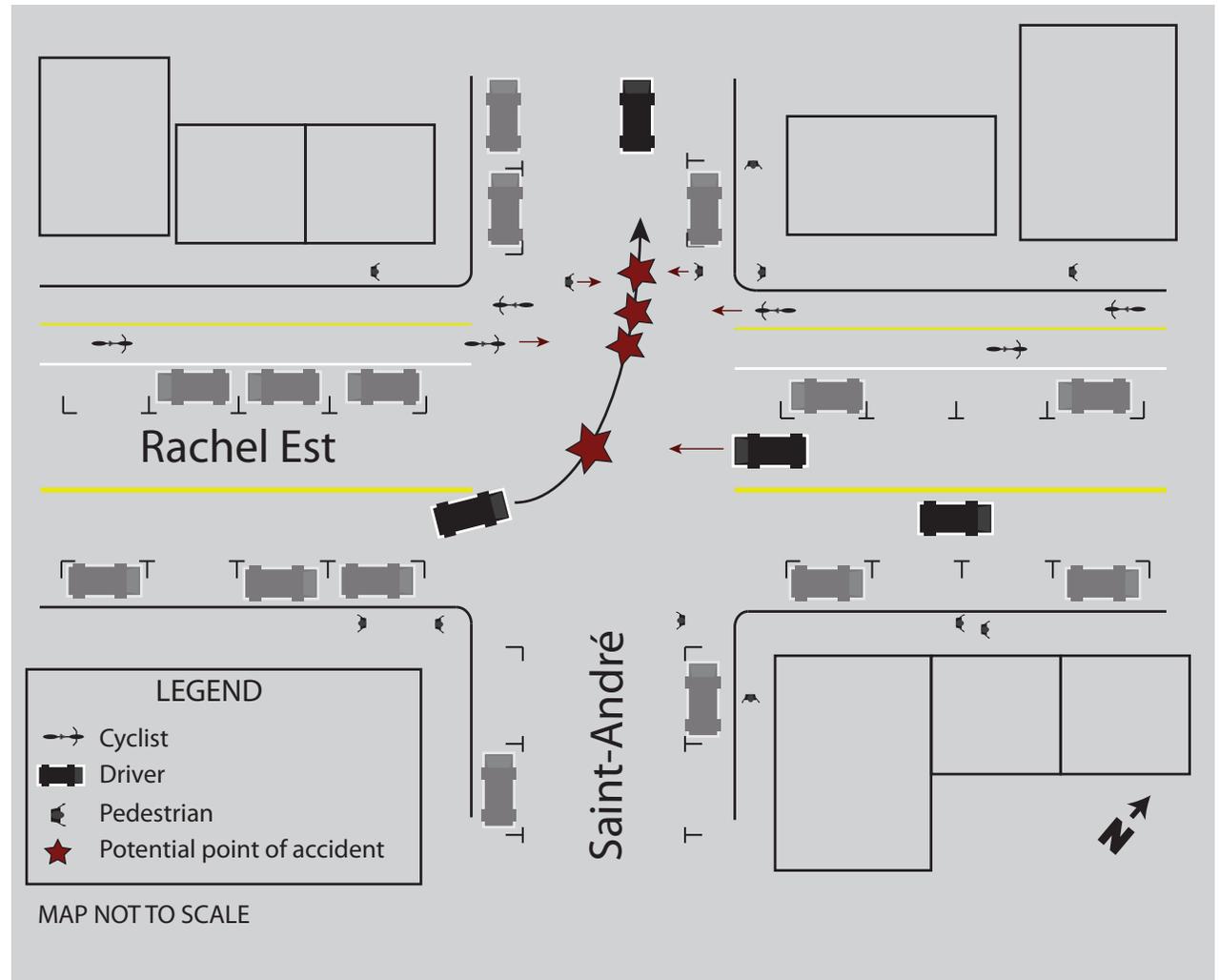


Figure 1: Potential accident caused by left-turning car driving along Rachel Est corner Saint-André

in cyclist flow, drivers often neglect to carefully look for any pedestrians crossing behind the cyclists. The fact that drivers have to split their attention between oncoming vehicle traffic, two directions of cyclists flow as well as pedestrians makes left-turning drivers less likely to see pedestrians at intersections.

For city cyclists, bi-directional cycling paths are not only frustrating to ride along but tremendously dangerous as well. Unlike drivers, cyclists do not have a ton of steel around them for protection. A cyclist travelling at 15-25 km per hour can be seriously injured by an impact against the side of a car or against another cyclist. The risk of bike-on-bike accidents is increased on bi-directional cycling paths since oncoming cycling flow is just a couple of feet to the left. A cyclist who needs to swerve to the left to avoid a pothole, a sunken sewer grate, a puddle or some garbage risks a head-on collision with another cyclist. Some bike-on-bike accidents are also caused by improper pedestrian behaviour. Cyclists can be forced to swerve into oncoming cycling traffic in order to avoid a pedestrian who, oblivious to the existence of the cycling path, crosses the path between intersections or during a pedestrian red light.

The most perilous part of bi-directional cycling paths occurs at intersections. This is where there is not only a great risk of bike-on-bike accidents but also car-on-bike accidents. In fact, the threat of one type of accident can cause the other. In other words, a near miss with a car at an intersection can cause a cyclist to collide with another cyclist (see figure 2). I have witnessed this type of collision on several occasions. It usually unfolds much like the following example. A driver patiently waits to make a left turn onto Crescent from De Maisonneuve. The driver keeps an eye on the side-view mirror to check for cyclists approaching from behind her and in the same moment she's looking forward to check for cyclists coming from the other direction. She finally sees a small opening and

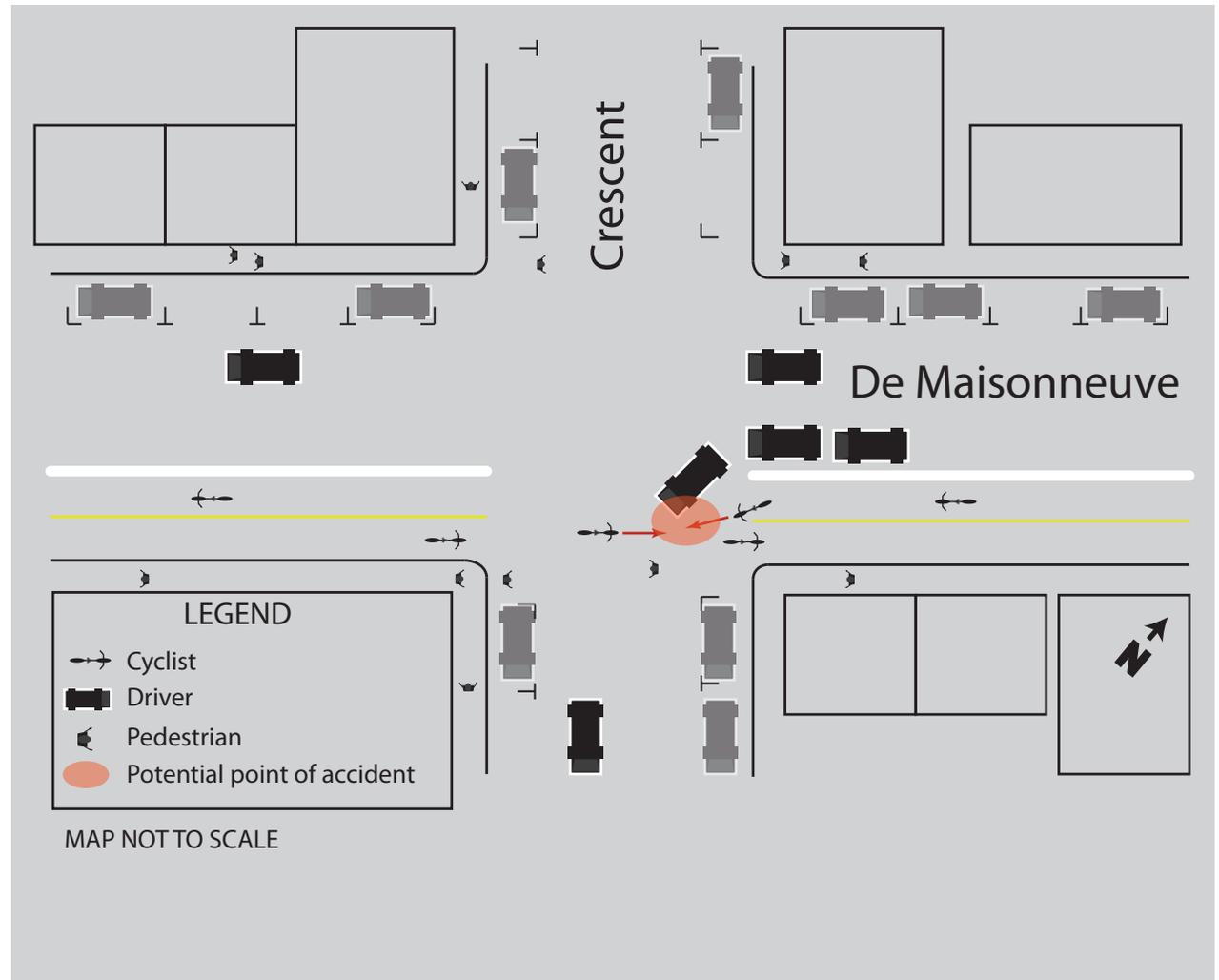


Figure 2: Potential accident caused by left-turning car driving along De Maisonneuve corner Crescent

begins her left turn. Just as she's entered the bike lane, a pedestrian enters the intersection to cross Crescent. The driver brakes but has already partially entered the cycling path. Meanwhile more cyclists have arrived at the intersection and a cyclist travelling westwards veers into oncoming cycling traffic to avoid the car that is now blocking the path and collides with another cyclist travelling eastwards. These accidents can be fatal for cyclists. If both cyclists are travelling at a modest 20 km per hour, then the head-on collision occurs at 40km/hr. This type of hazard could be avoided by investing in dedicated pedestrian and cyclist traffic lights along bike paths.

Necessary interventions

1) Reduce the number of intersections along bike paths allowing drivers to turn through cycling traffic

Along De Maisonneuve, in the downtown core, drivers can make a left turn on every street that supports traffic in the southward direction. In other words, drivers can turn left, across the cycling path, on McGill College, Metcalf, Peel, Stanley, De La Montagne, Crescent, Mackay, Guy, Saint-Mathieu, Fort, Lamber-Closse and Atwater. The city could remove four of the 12 intersections allowing left turns, without seriously impacting traffic flows. The same action should be taken on Rachel. This action alone would greatly improve the safety of a third of the most dangerous intersections along the De Maisonneuve and Rachel cycling paths.

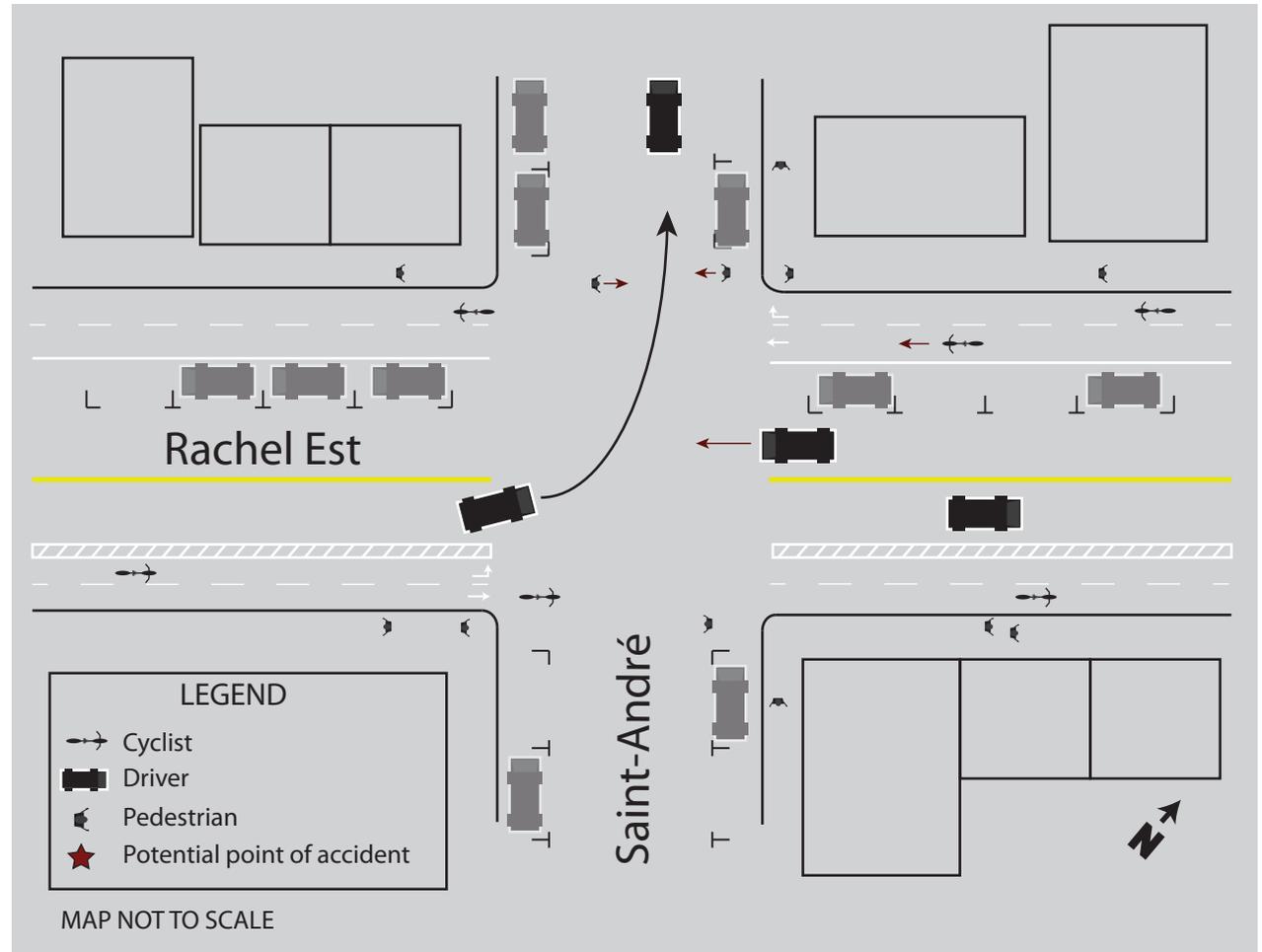


Figure 3: Redesigned Rachel Est with two uni-directional cycling paths

2) Add dedicated cycling and pedestrian traffic lights to appropriate intersections

The intersections along bike paths, that continue to allow drivers to turn through cycling traffic, require traffic light upgrading. These intersections need dedicated traffic lights for pedestrians and cyclists. Drivers cannot be allowed to turn into the cycling and pedestrian flow while cyclists and pedestrians are allowed to cross the intersection. This improvement at intersections would be beneficial to all road users! Cyclists and pedestrians would be able to, without stress, cross intersections much more safely. Meanwhile, left-turning drivers would be assured a dedicated window in each light cycle for making their turn. The cost of a complete upgrade would be much less than the cost of creating the bike path in the first place and it would allow pedestrian, cyclist and vehicular traffic to move more freely and with greater safety through intersections.

By reducing the number of intersections along bike paths that allow drivers to turn through cycling traffic and by installing appropriate traffic lights at the remaining intersections, cycling along bi-directional paths with frequent intersections like on De Maisonneuve and Rachel would be made more enjoyable and much safer. However, further improvements could be made to both cycling paths by making them uni-directional.

3) Bi-directional bike paths in the city centre should be made uni-directional.

As previously discussed, there are two main safety problems with bi-directional cycling paths like De Maisonneuve and Rachel. Firstly, the intersections are terribly unsafe because of turning cars. As proposed, this safety issue could be resolved by placing dedicated cycling and pedestrian traffic lights at each intersection that allows drivers to turn through cyclist flow. However, the second safety issue occurs between intersections.

Cyclists are regularly forced to ride in the oncoming cycling lane to avoid obstructions (of which there are many) and to pass other users of the cycling path. The risk of a head-on, bike-on-bike collision is simply too high on bi-directional paths.

Bi-directional cycling paths may be fine in small towns and along country roads where there are few intersections and few users but they are simply not appropriate in cities. In European cities, where cycling is a fully-formalized mode of urban transit, bi-directional cycling paths do not exist. European cities use the correct design: uni-directional cycling paths with dedicated cycling traffic lights and bike boxes at intersections.

Streets like De Maisonneuve and Rachel receive a sufficient cycling traffic volume to have their bi-directional paths converted into uni-directional cycling paths. This would effectively double the width of each cycling direction, allowing for an additional passing lane. In the case of Rachel, both cycling directions could be accommodated by replacing the on-street parking on the south side of the street with a buffered bike lane going eastwards (see figure 3). As for De Maisonneuve, a second path in the eastwards direction would likely have to be placed on a neighbouring street, ideally Sherbrooke.

Conclusion

The city of Montreal has a lot of work to do to improve the cycling network on the Island on Montreal. A good start would be to improve the safety of the cycling infrastructure that currently exists. That means converting most of the city's bi-directional paths into uni-directional paths and adding cyclist and pedestrian specific traffic lights to all major intersections along cycling paths.