

A Burlington Walk Bike Council Walking Mode Commentary Series

—Addressing Unwalkable Burlington

The following Walking Mode Commentary Series (Commentary) of six parts was placed over the last several weeks on the Burlington Walk Bike Council (VT) listserv. The commentary arose as a necessary exploration of what is safety for those who walk and what does a safe walkability comprise of in a basic urban neighborhood? The necessary exploration ties directly to the approximately two year Environmental Justice process undertaken in regard to Burlington's Champlain Parkway focused on the King Maple neighborhood which is identified as a minority neighborhood by the Parkway project administrators, the Federal Highway Administration, Vermont Agency of Transportation (VTrans) and City of Burlington.

The black and brown skin residents of King Maple neighborhood which is over 20% minority, according governmental assessment, is part of a City where 26% of all residents live in households who have below poverty level incomes (Census) and where about 30 percent of King Maple and adjacent Old North End overall households lack access to an automobile. Lack of a car mean mobility is highly dependent on walking and transit which in turn is accessed by foot.

So the question is what is walkability, how do you measure it and what makes for a safe walkability environment? As one can guess those who are walking dependent—generally those in poverty and/or Black and Hispanic—also experience high rates of pedestrian injury fatality, exactly the case based on national figures. Rates of Blacks population pedestrian deaths per 100,000 population are almost twice the rate of whites, Hispanics 50% higher than for white, and the Native American rate several times that of white.

The concluding section 6, "Burlington Neighborhood Renewal—Attaining True Walkability and the Centrality of Conversions of Signalized Intersections to All-way-Stops and/or Roundabouts in that Endeavor" takes the lessons learned from the walkability series and applies them to North Street in the Old North End, the historic shopping and institutional

center of the neighborhood—which just happens to have four intersections on the high crash VTrans current listing of 111 statewide.

The series attempts to stay away from complicated research and analysis and tries to translate new findings of pedestrian safety and treatments in a non-technical manner.

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1. Walkability

This commentary will address “walkability” and how each of us can measure the walkability of our street and neighborhood whether you live on the flats of the Addition or the sharp grades of the Hill Section.

Let’s first consider what a “walkable” street or built up area is and how to measure basic walkability. BTV has been rated fairly low on walkability scores compared to other American cities. Except for the Church Street Marketplace—clearly walkable and the ideal—our streets have not been rated highly, 59 overall in this difficult to interpret scheme <https://www.walkscore.com/VT/> . San Francisco is ranked highest in walkability, second only to New York, but also has a quite high pedestrian fatality rate. (this site provides a list of scores and how they are determined—<https://www.walkscore.com/cities-and-neighborhoods/> <https://www.walkscore.com/VT/>) My view is San Francisco hills are about as walkable as Mount Everest while the flatlands along the Embarcadero from Giants stadium to Fisherman’s Wharf onto the Golden Gate Bridge are marginally pedestrian friendly because of signalized intersections and pedestrian congestion.

My preferred rating of walkability employs the 1000 Friends of Oregon study in Portland, OR as a basic approach for determining/scoring walkability:

Score Each Factor 0 to 3

Presence of sidewalks

Presence of interconnected sidewalk network

Ease of crossing intersections

Degree of grades

A score of at least 9 gets a rating of “walkable.” Walkable means from a land use perspective existing and proposed development can assume an attractive and efficient pedestrian mode thereby moderating if not reducing vehicle travel demand. As important the only one of these four factors in obtaining an acceptable walkability score which we cannot correct with public investment and management is physical grades—we cannot flatten our city!

Regarding sidewalks we are most of the way to a score of 6 already. Presence of sidewalks and a network of sidewalks is almost universal in Burlington and so a score of 3 is likely for each in the majority of cases—already two-thirds of the way to a “walkability” score of 9. If there is a sidewalk on only one side of the street or if maintenance level is poor a lower score might be considered. Certainly practically all streets get a “3” for presence of a sidewalk network and a 2 or 3 depending mostly on the sidewalk condition.

We can apply this formula to any street in town including those in our neighborhoods. Church Street from Pearl to Main Street gets a perfect 12 in my book—sidewalks in the form of a dedicated pedestrian space, no significant grades, and intersections easiest/safest in town to cross. One notes overall downgrade from Pearl to Main is highest in the College to Main block and perhaps tests the 3 rating. For examples: Depot Street ranks 0 on grade in my book, College Street between South Champlain and Battery a 1 and College between South Champlain and Saint Paul a 2.

This scheme can be turned in degrees of grade and then applied citywide with streets, neighborhoods, etc., getting ratings for this factor.

So, except for hilly sections of the City much of Burlington achieves a score of 9 without consideration of the “ease of crossing” intersections. Intersections do present a challenge. Next, ease of crossing intersections and consideration of a Walking Level of Service (WLS) and Walking Mode Safety.



King Maple Neighborhood—students must walk to school bus at Pine/Maple intersection

2. The Centrality of the Sidewalk—Safety

Why the Sidewalk, the Major Key to the Walk Mode?

Clearly the common sidewalk along with degree of grade comprise three of the four factors which best describe walkability of a street, area or neighborhood—the fourth factor is ease of crossing intersections.

The standard sidewalk is set on a different plane than the roadway, generally about six inches above the roadway and most importantly separated by a six inch barrier, mostly the typical curb. Historically city sidewalks were built to prevent the invasion of the daily deposit of horse drawn exhaust which in turn was cleaned up overnight by public works crews—road slop in rain storms and snow were not something which enable pleasant walking along City canyons.

With the advent of the car the sidewalk and curb barrier took on a more important role: safety. The curbed sidewalk reduces pedestrian crashes about 88%. The Burlington policy of installing sidewalks on the few streets lacking them is, essentially, a safety program.

But differential between the quality of the street surfaces and sidewalks grew-and continues unabated—to mark why the pedestrian gets second class treatment in most everywhere including Burlington. I term this bias in treatment of pedestrians on their most important facility, transportation apartheid. It is rare if not impossible to find a pock marked, broken paved road in the City. Sidewalks? Just go outside anywhere and one can on average find some cracked, humped, potholed sidewalk. In a word transportation discrimination, particularly for those who travel by scooter, with a cane or walker, or the large proportion of the population who bicycle on the sidewalks because of the lack of cycle tracked (protected bike lanes) busy streets. Add to poor quality sidewalks the winter water and ice-pooling and inadequate snow dispersal and you have a picture total opposite to the smooth, groomed and snow cleared road travel ways and in most cases parking spaces too.

There are places where grade separation of pedestrian space is not necessary. One obvious example is the Church Street Marketplace. Along the Marketplace there is no need for curbing and is fully dedicated to the

pedestrian—the very definition of a pedestrian street. Also check out a similar, spectacularly beautiful, pedestrian way from Main Street to Maple Street that winds through the Champlain College campus.

City Market is unique in Burlington for having a form of “shared space” at the Cherry, Bank and College Streets intersections where cars and pedestrians mingle. Not perfect as cars are given stop signs instead of yields and do not get the message that once stopped at the sign does not mean then “go” to full 25 mph speed, though the presence of pedestrians and experience means minimal conflicts with pedestrians—watching the set of buses of Green Mountain Transit handle the intersections gives one a sense of how shared space can work quite nicely. One UK City center with 20,000+ daily traffic numbers (think Pearl-Winooski intersection) and lots of trucks works quite nicely every day with shared space.

In sum, the sidewalk is first and foremost a safety device and the sidewalk and sidewalk network which comprise half of a walkability score represent a dominant factor in a systematic scheme of pedestrian safety.

Now onto the fourth factor—in addition to sidewalks, a sidewalk network and degree of grades: ease of crossing intersections.

3. Speed—the Major Determinant of Pedestrian Injury

While a sidewalk, network of sidewalks and degree of grade represent three of the four determining factors of a walkable street or neighborhood, a short diversion to speed and pedestrians must be made before dealing with ease of crossing intersections.

The sidewalk reasonably protects pedestrians from injury—an 88% reduction of streets with sidewalks versus those without—injuries and fatalities do occur on sidewalks, some from cars which for whatever reason jump curbs and hit, mostly pedestrians who are unable to avoid injury in such circumstances.

Speed and pedestrian injury are a basic element at pedestrian crossings from one sidewalk to another either at or between intersections. All pedestrian safety research finds one common element in pedestrian crash rates and injury severity: the speed at which crashes occur. Second, older crash victims are far more likely to die than young individuals in a given

pedestrian crash. In Burlington in the most recent five year tabulation there is a pedestrian injury every two weeks, about 25 yearly. Pedestrian deaths occur once a decade with the last three, two on signalize pedestrian crossing and one at an unmarked crossing (Poirier Court on North Avenue) site of a similar fatality in the past. Nationally, the pandemic of 21,000 excess highway fatalities as the U.S. fell from first in highway safety in 1990 to its present slot, 15th, includes since 2010 a 50% increase in ped deaths (2 in Burlington), now about 6,000 yearly similar to the number in 1990. Most pedestrian deaths of adults 25-45 involve WUI (walking under the influence of drugs).

Certainly there is also a relationship between “exposure” —total pedestrians and total vehicles—in a given stretch of roadway or intersection and pedestrian crash rates. However, differentials in speeds have a major effect on actual pedestrian injury rates at a given exposure. When it comes to pedestrian injuries it is all about speed.

Managing speeds along streets and at intersections mostly involves traffic calming techniques. The safest intersections for pedestrians are—no surprise—intersections where vehicles are required or forced to reduce speeds: all-way stops, roundabouts with median crossings, and shared space.

Why are signal unsafe for pedestrians? In a word signalized intersections are a higher speed environment than all-way stops, roundabouts, and traffic calmed intersections (including shared space). Drivers at signalized intersection must give attention to signals, operate in many cases with jack rabbit starts or stops, and fact other distractions—all contributing to a higher pedestrian crash rate and more server injuries when crashes occur at 20-25 mph (above 25 mph the majority of pedestrian crashes are fatal). Walking guru Jeff Speck references the on-the-ground proof of signs versus signals pedestrian safety which occurred when Philadelphia converted a series of traffic signals in the build up areas with all-way-stops with a sharp drop in pedestrian injuries resulting.

In fact, traffic signals are so dangerous for traffic management they are, in effect, a method of trading off injuries for operationally efficient, a process called “warrants.” Until the advent of the modern roundabout and use of traffic calming techniques dating from 1956 in the case of the roundabout (U.K.) and traffic calming practice emerging in the 1980s in Europe, the

only traffic management techniques were signs and signals. Most nations which passed the United States in highway safety in 1990 employ traffic calming and roundabouts (they cut serious injuries by about 90% overall) to a far greater extent than do US cities.

Now onto the fourth factor in walkability—ease of crossing intersections.

4. The Fourth Factor of Street/Neighborhood Walkability: Ease of Crossing Intersections

Ease of crossing intersections seems innocuous to most people as a key walkability factor as it does not seem to pose the same threat to health and safety as the opioid crisis, climate change or the new Burlington “Racism as a Public Health Emergency.” Believe it or not, for the pedestrian, there is a direct connection between ease of crossing intersections and all three of these commonly held public concerns.

A sidewalk on a street, a sidewalk network and grade plus ease of crossing intersections comprise the four factors used to measure the presence of a walkable street, area, or community. As outlined earlier, a built up community like Burlington already sports sidewalks on practically every street and therefore also meets the second factor without further consideration, a system or network of interconnected sidewalks. The third factor, presence of a significant grade while beyond our control is compensated for in an urban area like Burlington by public transit—think of the free College Street Shuttle (right now and perhaps ongoing, all Burlington transit is fare free). Thousands of tourists use the shuttle—now a regular larger route and until the pandemic free only between the waterfront and UVMCC—to go back and forth to the Marketplace and the waterfront.

Transportation research tells us mid-block crossings, particularly on busy streets, are more problematic than intersections in terms of both safety and service (no pedestrian priority of any kind). Intersections remain a major safety problem and the location of almost 20% of all road fatalities, almost half in the case of senior driver fatalities.

As discussed, all-way stops, shared use (think Marketplace) and roundabouts represent practically zero delay for pedestrians and the top

level of pedestrian safety. A large number of research and studies confirms this. Burlington has commendably employed all-way stops in large numbers throughout the City and this makes some small areas safe and walkable. Still, our major intersections are mostly signalized.

Traffic Signals and Un-Safety

The traffic signal arrived in the 1930s and beginning in this century the traffic signal increasingly has been discarded as a useful technology. This is primarily because on average the traffic signal fails compared to the new standard, the modern roundabout, in every performance area, particularly in safety. On average the traffic signal increases serious/fatal crashes up to about 900% (a roundabout replacing a signal reduces serious/fatal injuries about 90% compared to alternatives). In the past all way-way stops and shared space also perform better in safety, but the most popular, the all-way-stop does cannot move traffic as efficiently. The now 30-year old North American experience with the modern roundabout is smaller and much safer than the outdated older predecessor, the rotary, i.e., the older roundabout dating from the start of the last century (think National Lampoon European Vacation).

There is one not very well designed (but excellent safety record) modern roundabout in Chittenden County—the one on Maple Tree Place between Bed Bath and Beyond and Best Buy. Many are familiar with only a rotary or old style roundabout, not much different than the the traffic circulator in Winooski which is a high crash facility. Three of the first scheduled Burlington roundabout at the Shelburne Street “rotary” fits inside the Winooski traffic circulator with plenty of space left over. The Winooski oval is a quarter mile, equal to the Thunder Road raceway in Barre Town. Note race driver Governor Scott clearly has been aware of the safety and performance of the roundabout. Governor Scott was allied with the late Senator James Jeffords who placed the word “roundabout” in the U.S. statutes for the first time, inserted on a list of eligible safety treatments receiving 100% federal funding—exactly the provision where 100% funding comes from for Burlington’s Shelburne Street “rotary” roundabout!

The first adoption of roundabouts in place of signals were the NY State Department of Transportation in 2005 followed by two Canadian provincial transport ministries, British Columbia followed by Alberta.

Ease of Crossing

So, what intersection traffic management system—signals, signs, roundabouts, traffic calming measures, or a combination—best meets the test of “ease” of crossing an intersection for pedestrian, and in doing so also responds to pedestrian comfort and safety? Which crossing meets a minimum acceptable level? What scores 0, 1, 2, or the maximum for the factor, 3?

There are three types of intersections which feature 0 seconds of delay as well as a reasonable level of pedestrian comfort and safety—all-way stops, shared space (think of Marketplace) and roundabouts. All traffic signals delay pedestrians—about 20 seconds or more. All traffic signals cause pedestrian injuries—about 20% more than the equally safe roundabout and all-way stops, according to Federal Highway Administration.

It is important to view the traffic signal from the standpoint of the pedestrian. From a pedestrian viewpoint the traffic signal kills, injuries and delays pedestrians. Here in Burlington which sports 18% or 20% of the high crash intersections in Vermont, all but one are signalized. In fact, because installing a signal knowingly involves a tradeoff of some user injuries for vehicle movement efficiency, there are engineering tests mostly related to traffic volume called “warrants” which must be met in order to install a signal. A signal is an injury generating technology! AAA calls for converting signals to roundabouts as 30% of its proposed set of six treatments reduction of tens of thousands of deaths and fatalities. Sweden signal to roundabouts efforts means more roundabouts there than signals and Sweden is now converting another 30% of remaining signals to roundabouts. The Burlington 75 signals would be about 40 roundabouts and 35 signals in Sweden today with another 12 signals scheduled for roundabout conversion. Even the rather meek and mild AARP promotes converting signals to roundabouts.

For those who walk our Burlington streets and/or bicycle them for any significant time, a near serious injury or possibly fatal crash with a vehicle—or an actual one—is very likely. So, too, is the likelihood over time of observing a pedestrian or bicycle crash which occur on average once a week in normal times. Walking across traffic signal intersections is perhaps the most risky behavior one experiences in Burlington day to day.

Normally, a planning process would evaluate existing busy intersections and prioritize conversions to roundabouts based on expected injury reductions and other benefits ranging from environmental, racial, and income equity as well as climate change. This will be discussed further.

Data from Vermont urban roundabouts confirms the high level of performance of pedestrian safety. The five town center roundabouts—Montpelier, Middlebury and Manchester Center (3)—in a half century service recorded one bumped and bruised pedestrian and 0 bike injuries. (Four non-serious car occupants were also recorded.)

In terms of scoring, a roundabout, shared space and all-way stop intersection would normally receive a score of 3. A two-way-stop-control and signals with a good safety record might score 0 or 1 in a few cases.

Next a discussion of intersections relationship to the new City policies of the Climate Change Emergency and Racism as a Public Health Emergency. Spoiler alert—the traffic signal does not fare well and all-way stop, shared space and the roundabout come out on top.

5. Walkability: Reach Principle, Transportation Racism and Low Income Discrimination

The context of walkability factors—sidewalks, sidewalk network, grade and ease of intersection crossing have been outlined. There are walkability principles along with newly discovered application of transportation justice and equity in the form of racism and low income discrimination placed on neighborhoods where walkability is sacrificed for the sake of vehicle priority treatment.

Principle of Reach

One tool to determine walkability of a location or neighborhood involves applying reach—that is, the distance a pedestrian can travel in a fixed amount of time measured in minutes. For example, how far can a pedestrian travel from the top the Marketplace in ten minutes at Pearl Street/Marketplace (Church Street) intersection starting at the Unitarian Church side of the street? Assume it takes an average of 20 seconds for a pedestrian to get a walk light at an intersection and the pedestrian

travels at a speed of 3 miles per hour. One can draw a diagram showing the area the pedestrian can “reach” in all directions—north along Clarke or Elmwood Ave, south on Church, west toward to the Transit Center and Battery Park and east toward North/South Union, the Willards, etc. With a string of 20 second delays from signals along Pearl it is clear the “reach” of the pedestrian is further on Church toward Main Street and north along Elmwood Avenue, etc. Each signal cut reach about 60 feet. Suddenly the walkability of a street—like Church Street with shared use, no delay intersection to Main Street—enables a far longer trip in a given time span that east or west on Pearl Street. Also, easterly to reach Willard and Williams a slight but increasing grade will affect the reach number. So, reach for a pedestrian depends on streets and intersections with all-way stops/roundabouts/shared space will always provide greater reach than a street with signalized intersections. Plus signals cause more injuries at a 20% greater rate over all-way-stops and roundabouts.

Obviously reach is reduced by hills and grades—think the aptly named Hill Section of the City. Or, consider the reach at the waterfront intersection of Lake and College Streets. The sharp grade to the Marketplace easterly reduces the distance a typical pedestrian can cover in ten minutes time versus a trip along the Bikepath or south on Buttery Street. Add to this equation an older pedestrian, a person with a cane or walker and delays at intersections loom an eagerness greater factor in their reach diagram.

Racism as a Public Health Emergency and Walkability in Burlington

The 2020 Burlington City adoption of Racism as a Public Health Emergency aimed at identifying and eliminating racial as well as its corollary low income discrimination connects quite directly with walkability. This is new territory for folks in transportation—racism language and application to projects is new. While I have always described the pedestrian mode the apartheid mode, that term was used to describe the relationship of policies and investments in our urban areas which clearly discriminate, i.e., segregate the pedestrian versus vehicle based travel and to a lesser extent, though still a factor, bicycling. When the US adopted Right Turn on Red (RTOR) late in the last century that policy (New York City and Montreal the exceptions in North America) kills about 35 pedestrians a year and seriously injures a far larger number. RTOR clearly discriminates against pedestrians. But also—we now come to understand largely through the new City policy on racism and the now two year

Environmental Justice process instigated by the Pine Street Coalition. Pine Street documented in 2018 racism is part and parcel of the current Champlain Parkway design. As leaders of the Vermont racial justice community turned their attention to the Parkway and the King Maple minority black and brown skin residents, the specter of racism became evident to all.

Yes, it was known that in the Old North End and certainly in King Maple about one third of the population has no car access, but it takes a second step to recognize that pedestrian and transit dependent population very much is both minority and low income with both traffic as well as added pedestrian injury rates and delay jumping in King Maple. Given the pedestrian downgrade with the current Parkway design one get sa grasp on the clear racial injustice harm.

The harm comes directly from shifting from no-delay all-way-stops today on Pine in the King Maple neighborhood to high pedestrian injuring and delay imposed on pedestrians by the Parkway new traffic signals at King and Maple intersections. Even a member of the survey of top urbanists in recorded history told Mayor Weinberger to his face replacing the all way stop at Pine and Maple Streets would be a “huge mistake” (Dan Burden on a street audit at the 2014 AARP Pine Street Workshop). Burlington normally experiences a pedestrian or bicyclist injury weekly and a fatality every five years. To be clear, the VTrans forced the City against the opposition of two Progressive Mayors—Clavelle and Kiss—and City Council as well as the neighborhood to cut King Maple in two with the Parkway. Our incoming US Department of Transportation Secretary Pete Buttigieg explained last month his first priority is safety, then climate change then equity—racial justice—as he condemned the use in the past of road money to cut minority neighborhoods in two, exactly the way the current Parkway design does! Hopefully the tide is turning on this but it is important to stress that it is the hurt to low income and minority pedestrians the current Parkway design entails only came to light through new federal laws, laws a grassroots group and racial justice leaders brought forcefully to the attention of City, State and Federal officials, including through a federal court lawsuit filed in 2019 by the Pine Street Coalition.

The lesson here is walkability is especially critical to neighborhoods in our City, a City where 26% of it residents live below the poverty line, and a

large number of low-income and minority (like the 24% minority in King Maple) lack a car and must travel by foot and transit.

The next and last section of this commentary series will look at how we can apply walkability principles outlined in other sections of Burlington.

An Aside from the Walkability Series: Burlington and America Walk and Bike Share of Transportation Trips Abnormally Low

It fair to say, what difference does it make for a quality safe walkability environment in Burlington and urban America? Why should walkability be a concern if we are a typical nation where walking and bicycling are common. But that is not the case. Quite simply the share of walking and biking trips of all transportation in Burlington and rest of the nation is abnormally low—11% are walk and bike trips, 10% walk and 1% bike. The 10% of trips by foot in America is less than half the average of ten European nations. (Bike trips in America, 1% of all trips compares to the average of 9% in ten European nations surveyed where percentages ranged from 2% to 26%.)

John Pucher of Rutgers University has authored individually or jointly with others the comparative walk and bike studies from the early 1990s to date. The paper “Walking and Cycling in Western Europe and the United States Trends, Policies, and Lessons” (2012) features a number of graphic pictures of how other modern nations have far higher walk and bike mode shares.

<http://onlinepubs.trb.org/onlinepubs/trnews/>

So walkability—a context of safe, quality walking environment of our City—is a critical factor if we wish those who walk today, and hopefully more tomorrow, are provided that opportunity. With a Climate Emergency much less the potential health and air quality aspects, encouraging walking and bicycling cannot be overemphasized. And given that walking is disproportionately the choice by necessity of BIPOC and low income, the failure to provide a quality, safe context for walking now know is one of racial and income equality.

So, the total United State walk share of all trips—11%—is about than half—21.3%—of average of 10 European nations ranging from 16% to 25%. (Bicycling is even worse—1% America, 2-26% 10 European nations with 9.3% average.)

Yes, walking is the apartheid mode. Walkability of our City, i.e., a safe, quality walking environment remains a major transportation policy problem that has been left in the ditch for far too long.

6. Burlington Neighborhood Renewal—Attaining True Walkability and the Centrality of Conversions of Signalized Intersections to All-way-Stops and/or Roundabouts in that Endeavor

With some of basics of walkability examined, the question must be asked, how can we bring walkability to the Burlington's older downtown neighborhoods, namely the Old North End and King Maple where until the last decade or so workable engineering choices other than signal or sign control remained nonexistent. Besides much of pedestrian service and safety never came to the fore in the period of multi-modalism ushered in with federal highway funds pouring in starting in 1991 (Intermodal Safety Transportation Efficiency Act or ISTEA)—the other ignored mode, bicycling, received deserving attention but with its historic built in strong advocates kept walkability, the pedestrian mode, more or less in the background. One can argue bicycle advocacy delayed adoption of new and better technology for all modes, primarily the roundabout, from reaching critical mass as it has in other nations, in great part because other nations pursued safety for all transportation users. In a word while the car still retained its crown, however dulled and both transit and particularly the cycling modes received investment and attention the pedestrian mode remained as in the past, the “apartheid” mode here in the United States, segregated with the possible exception of support for a sidewalk network of often poor quality and surface condition to this day (number one complaint in the ONE study survey under way). Even many roundabout proponents and practitioners failed to give attention to the roundabout as central to walkability in North America.

Enter the now two year outreach and analysis of Champlain Parkway, a re-examination under new federal rules for Environmental Justice. The re-examination was caused by the Pine Street Coalition filing a lawsuit in June 2019. City, VTrans and Federal Highway Administration (FHWA) findings preliminarily identified the King Maple neighborhood of about 25% black and brown skinned residents (the highest such population in Vermont) in a City with the highest percentage of population living in poverty—26% according to Census. Add the characteristic that in both the Old North End and King Maple neighborhoods having about 30% of households have no access to a car. Both these neighborhoods therefore are strongly pedestrian and transit dependent, both have high numbers and proportions of residents living with poverty incomes—with the King Maple area residents not only poor and lacking car access, but also about a quarter with black and brown skin. In these neighborhoods safe routes to the bus stop, shopping and all services—to all destinations—are equally important to safe pedestrian routes for their children to school!

What community advocates found in King Maple Environmental Justice was simply not only increased traffic—the obvious negative of the Parkway—also combined with the conversion of all-way-stop intersections to signals to constitute a major deterioration of the residential and transportation environment. In addition, this obvious blight and increased injury rate new context clearly disproportionately impacts on the predominately poor and pedestrian dependent BIPOC populations! One goes from of pedestrian no-delay/safe all-way-stops to higher pedestrian injury rates, substantial pedestrian delay where there is none today, and even higher levels of air pollution impacting on the health of pedestrians of all ages on the streets as well as all living in the adjacent and nearby housing. Based on the principle first “do no harm” then any shift from the current all-way-stops on the two central intersections (Pine/Maple and Pine King) to traffic signals would be, as Dan Burden said in a 2014 AARP street audit on Pine, a “huge mistake.” We must praise the efforts of former Mayors Clavelle and Kiss and their Department of Public Works and engineers for opposing the Parkway cutting the King Maple neighborhood in two and retaining any and all all-way-stops within King Maple neighborhood. FHWA and VTrans imposed the King Maple Parkway route in opposition to DPW, Mayors and Council by open threats to discard the project altogether unless the Pine Street connection to Main Street alternative was chosen. At the time there was no Environmental Justice regulation to intervene in the FHWA and VTrans demands.

Dan Burden, 58th on a list of greatest urbanists of recorded history (Jane Jacobs tops the list), lead transcontinental bike tours as a young man from Alaska to Chile, but later placed first providing a safe walking environment, hence the name of his company for decades “Walkable Communities.” He was also the first State bicycle and pedestrian coordinator hired by the State of Florida to cut the more than thousand yearly pedestrian deaths there when he began. For Burden the priority has not vehicle communities, not bicycling communities—it has been **walkable** communities. His approach has been to address the needs of the pedestrian, if that is done he seems to imply all else can be resolved for other modes. For Burden it is pedestrians first!

We know as a given Burlington records about one pedestrian injury every every two weeks, a pedestrian fatality every seven years, and 19 of 20 of its State high crash intersections are signalized. We also know applying roundabouts would reduce injuries for all modes per year per high crash intersection now 1.5 a year downward 72% to about 0.5 on average per high crash intersection. Historically, all-way-stops gave way to traffic signals in ONE and King Maple during the decades after World War 2 because all-way-stops could not and cannot handle the high traffic numbers without endless traffic jams (think of the 5 minute wait now experienced at Pine/Maple intersection in a afternoon normal times peak hour). The roundabout dating only from 1990 in North America provides not only the same two critical benefits of and all-way-stop—highest pedestrian safety and no pedestrian delay—but also about doubles the traffic capacity of signals, attains about a 30% reduction in traffic signal health harming pollutants as well as climate change emissions, about a 90% overall reduction in serious and fatal injuries across all modes, lower ongoing maintenance maintenance costs (the list of roundabout benefits goes on and on). Burlington’s first roundabout, Shelburne Rotary Roundabout also addresses a State high crash intersection termed the “intersection of death” by the neighborhood—it is 100% funded with FHWA safety monies at the intersection with an elementary school and church adjacent.

In addition to the findings in King Maple in the Environmental Justice process, so too are there clear similarities in a current Chittenden County Regional Planning Commission funded study of grassroots community transportation needs of transit and pedestrian dependent being led by

Laura Jacoby of Old Spokes Home. Preliminary findings identify similar Environmental Justice issues for those pedestrian dependent in ONE including high speed streets (North, Park, North Champlain Streets, etc.) as a problem of pedestrian safety and mobility, as barriers to shopping, accessing medical services, etc.

Again, until the early 2000s Department of Public Works (DPW) engineering like all through North America had no choice but to shift to signals from all-way stops when traffic congestion reached unbearable levels, even though that choice inevitably increased pedestrian injuries and reduced pedestrian mobility. Yes, it was a necessary tradeoff between the car mobility increasing and decreased pedestrian safety and mobility. So today of the six busy intersections along ONE's North Street between North Ave and North Union—the “shopping” street of ONE—four are on the State's high crash list—North Ave, North Champlain St, North Winooski Ave, and North Union. The other two—signalized Elmwood/ Intervale and Park Street—with high traffic numbers are not currently on the high crash list. Much of that traffic is north-south between the New North End and downtown areas. All major cross intersections mentioned except North Union, a 3-way all-way-stop, are signalized.

Roundabout technology has been the standard in NY State Department of Transportation (NYSDOT) since 2005 and in a nation like Sweden (actually slipped to fifth place in international highway safety, US once 1st, now 15th) where there are more roundabouts than signals 30% of the remaining signals there are slated for conversion to roundabouts. As newly minted US Department of Transportation Secretary Pete Buttigieg says of US transportation “...one of these areas where Americans have been expected to settle for less and we shouldn't...” So, too, we can now study the North Street corridor—something suggested some years ago to the ONE Arts and Business Network (ABN) with the knowledge now there are truly effective and fairly low cost investments for transportation renewal along North Street. Already two DPW pilot roundabouts are planned for North and North Winooski intersection this year and a second intersection one block further north on North Winooski. Money is always an issue, but the likely roundabout design applicable to North Street intersections (Pine Street also) is the inexpensive mini-roundabout format which costs about a third of a signal and have no maintenance costs compared to a signal. Mini roundabouts cost at most about \$50,000 while a standard signal system approaches the \$200,000 level.

(The Pine Street Coalition and the Vermont Racial Justice Alliance are battling to stop the Champlain Parkway cutting King Maple in two, the current design. The two groups received one of five inaugural awards by the Vermont Sierra Club chapter on the first Transit Equity Day held February 4, 2021. In their thanks for the award Pine Street explained their grassroots work as a battle against “blatant environmental injustice” of the Parkway on the King Maple neighborhood.)

So the Environmental Justice process on the Champlain Parkway has brought forth an approach to how we can today provide true walkability to North Street in ONE as well as applying the various elements outlined in this series throughout the neighborhoods of Burlington. The key starts as Dan Burden has often said with addressing pedestrians first!

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