International Sustainable Transportation Engagement Program (I-STEP)

Summary Report

A Project of Texas State University's Center for Research, Public Policy and Training, The Pedestrian Bicycle Resource Initiative at Merritt C. Becker, Jr. University of New Orleans Transportation Institute, CivilStreets.com, and Visum

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Vision: Making Connections/Building Capacity

Communities around the globe are struggling with an interconnected set of transportation challenges. They are confronted by the economic imperatives of providing safe access to key destinations while at the same time meeting the environmental challenge of minimizing transportation pollution. The challenge is significant. Worldwide, 1.24 million people lose their lives in traffic crashes every year with vulnerable road users (pedestrians and bicyclists) accounting for 27% of the total (WHO 2013). At the same time, transportation emissions account for approximately 1/3 of greenhouse gas emissions.

While the global transportation challenges are daunting, technical solutions at the local level that encourage building safer, more connected communities are attainable today. Over the last 20 years, an emerging set of best practices in sustainable community design has developed that shows how streets can be remade to serve multiple functions simultaneously. One way to think about the potential of these new best practices is to envision them as a new technology that can make cities safer, economically stronger, and more environmentally friendly.

The International Sustainable Transportation Engagement Program (I-STEP) is designed to help deploy this new technology by linking local communities with resources to help create more livable, equitable, and vital places through improved transportation planning. The program focuses on connecting participating communities with international specialists in walking, bicycling, and transit to create a platform for improved transportation planning.

I-STEP in Action: Netherlands/Romania Summer 2015

The I-STEP concept emerged as a project of the U.S.-based team led by Texas State University's Center for Research, Public Policy, and Training and the Romanian non-profit Visum. The concept was to help build a network of Romanian governance organizations to spark a conversation about how to create safer, more sustainable street environments.

The team began meeting in the fall of 2014 to plan for a summer 2015 event. Over the course of 6 months, the U.S. team was solidified with the addition of the University of New Orleans Pedestrian Bicycle Resource Initiative and Tony Hull of Civil Streets.com. The U.S. team worked with Visum to help create a systematic approach to active transportation data collection and began to plan for an event in Brasov, Romania.

The I-STEP approach that emerged focuses on a 3 step process for evaluation and engagement:

1. Evaluation of best practices in active transportation planning supplemented through a study tour of the Netherlands
2. Active transportation data collection in Romania to establish a baseline for policy initiatives and metrics for evaluating progress
3. Active transportation policy evaluation and engagement through a week long symposium in Brasov

In implementing this three-step process, team members learned a number of important lessons that could help both local communities in building stronger active transportation organizations and international teams in building stronger programming to engage host communities. This short report provides an overview of what we learned working together. It is not meant as a definitive account of best practices in international sustainable transportation engagement. It is meant, rather, to provide an accessible compendium of actions that could be used to begin to build stronger working relationships across multiple cultures and administrative sectors.

What we learned is that there is an emerging consensus across multiple countries that street spaces are the foundation of strong communities. Creating streets that are safe for people of all ages creates more livable communities that are economically, socially, and more environmentally sustainable. Retrofitting our streets requires building partnerships across the government and non-profit sectors and across area specializations.

The report below provides an overview of how the team worked together and came to this shared understanding. The report is organized around the three step used during the I-STEP program.

Evaluation of Active Transportation Best Practices: Netherlands Scan Tour

The first phase of I-STEP was a short, scan tour of the Netherlands to survey best practices in sustainable street design. The Netherlands is renowned for its innovative design practices, but these designs can often seem unattainable.

What we learned in the Netherlands was that they also had to struggle to make changes. It took 30 years of refinement and pushing to make changes to the way they designed their street spaces. Projects still aren't easy, but a shared understanding of the goal of safe, sustainable streets seems to help guide the discussions.

To help understand how this shared understanding developed, our U.S. based team traveled to both Delft and Utrecht for site visits planned by the Dutch Cycling Embassy. In Delft, our team met with representatives from the MobyCon consulting team. The Mobycon group started by pointing out the political history of street reform in the Netherlands. Despite the image that bikes have always been safely included in the Dutch transportation system, the 1970s saw a huge rise in bicycle and pedestrian fatalities. In the 1970s, residents took to the streets to protest the increased number of children killed in car crashes. This launched a street reform movement with an emphasis on slower speeds and separated bicycle facilities.

Woonerf neighborhood, Delft, ND. Photo Courtesy of Dick van Veen, Mobycon

Bicycle and pedestrian-only lift bridge connecting neighborhoods in Delft

Shared bicycle/automobile roadway with pervious features to address drainage

One of the earliest efforts to implement these concepts on a larger scale was in the town of Delft. Delft pioneered the woonerf neighborhood street design where a slow, chicaned street was woven into a residential areas. Our visit included a visit to the world's first woonerf. One of the members of the Mobycon team lives on the street and told a story about letting his 3 year play outside without fear. He said that, "We believe that kids should be free in the Netherlands."

This view of freedom extends to bicycling as well. Delft was part of a national pilot program in the 1980s to test new practices in separated cycling infrastructure. The pilot helped to build the framework of a connected bicycle system. We visited one of the first projects completed during the pilot program, a bicycle only bridge linking multiple neighborhoods together.

One of the most important lessons to take away from the scan tour of Delft was the overall level of thought that went into projects. Often the changes in street design were small and inexpensive, but helped to make streets slower and safer for all users. One good example was a street that had been redesigned to include a smooth, colored strip for bikes and then a two-way, textured section for cars. This design include pervious material on the roadside to allow for better water management.

Study team learning about innovative street design in Delft with Mobycon

The team explores the first "woonerf" or shared street in Delft

In Utrecht, we met with representatives of the Goudappel Consulting team. We saw how newer developments have been planned and integrated into the bicycle network. We looped through Utrecht examining the university campus and older historic town. At the University, an existing roadway for cars was transformed into a large cycle path through the heart of the campus.

One of the most interesting aspects of the tour, again, was the thoughtful integration of different modes. At one particular intersection, there were trains, buses, cycle paths, cars, and traffic lights. While it could have been overwhelming, the street was comfortable enough for a father to take his child through town on their bikes. The result was a low emissions, low stress environment. This is what sustainable transportation looks like.

Cycle path connecting the University campus with the bicycle network

Overall, the I-STEP Scan Tour provided an important way for the U.S.-based team to experience innovative sustainable street design first hand. Instead of an unattainable future condition, the team was able to talk with designers and planners about what worked and what could be improved today. The Netherlands experience showed how multiple landscapes from old historic areas to newer suburban areas could be effectively designed to create places for people with slow speed traffic and the integration of multiple other modes. Solidifying these multiple landscape templates in the team's minds was an important outcome, and helped as the team moved towards Romania for the project phase of I-STEP.

Multi-Use Utrecht Intersection

Pedestrian & Bicycle Capacity-Building Symposium: Brasov, Romania

The second phase of I-STEP took place in Brasov, Romania. I-STEP volunteers worked with Visum and other local advocates to convene stakeholders and discuss the city and region's need to improve conditions for people walking and bicycling, to evaluate existing policy and identify opportunities for policy change, and to support the development of an active transportation data collection program.

The need to effectively evaluate capacity was re-emphasized during the Romanian symposium component of the program. We had hoped to conduct a detailed policy evaluation where we would

1. Build solid foundation of existing policy conditions and

2. Build citizen engagement in transportation policy development process through the policy evaluation

The idea was that we would work in teams with U.S.-based volunteers partnered with Romanians to evaluate local street corridors. We would then work in partnership to understand what agencies were making decisions about streets, what standards they used, and how much flexibility there was in administration of those standards. We hoped to create a question template to determine how transportation policy decisions were currently made and have policy teams during write up results with the end goal of helping to create levers for Romanians to engage in transportation policy process.

Unfortunately, we were not successful in building policy teams. The symposium that we hoped would create a buzz and a network of team members was not well attended. The team with the help of Visum was, however, able to improvise and creatively came up with a series of open house events. These open house events where the team would gather in a central location in the city became known over the week. Key transportation stakeholders dropped in on team working sessions and participated in informal exchanges that built a surprisingly strong dialogue about key needs for the community. Representatives from regional council, city, federal government, and local industry gathered with local residents and discussed key issues.

What emerged was two signature projects for Visum (a community trails project and a street redesign synopsis) to pursue with help of other governance organizations. The program results section below outlines how the community trail project and the street redesign synopsis emerged.

Active Transportation Data Collection

In addition to evaluating policy and building regional capacity supporting walking and bicycling, I-STEP aimed to assist Visum with data collection and analysis. Active transportation count data has become a key indicator that can be used to help evaluate the impact of new facilities and policies and help show what works and what needs to be improved. The active transportation count program pioneered by Transit for Livable Communities during the U.S. Nonmotorized Transportation Pilot Program is good example of how this can work.

The purpose of the Nonmotorized Transportation Pilot Program (NTPP) was to demonstrate the extent that investments in bicycling and walking could result in significant changes to transportation behavior, or mode split and associated benefits of increasing bicycling and walking. Program evaluation relied heavily on using annual two-hour counts following an established count protocol using agency staff and volunteers to sample volumes at close to 50 locations community-wide.

By establishing a consistent and repeated count program, Transit for Livable Communities was able to establish baseline walking and bicycling numbers and observe the increases over several years of program implementation. In the end, it was able to be demonstrated that bicycling increased 62% and walking 19% resulting in 85 million avoided vehicle miles of travel over the life of the program.

Of greater importance has been the legacy of institutionalized data collection that has continued to be undertaken by the participating cities like Minneapolis, which has expanded its program to include automated counters that allow improved extrapolation of the two-hour counts to daily and annual averages that account for temporal and seasonal variation. The long term implications of this data collection is an ongoing commitment to improving conditions for bicycling and walking in Minneapolis, including recently adopting a plan for 78 miles of new protected on-street bikeways. While this type of large-scale program was not possible in advance of I-STEP's visit to Romania, the U.S.-based team worked with the Romanian counterparts to help build a functional count program. The U.S. team provided count forms and a basic overview of how counts can be conducted to help ensure accuracy. The U.S. team emphasized that the initial counts were a way to build momentum for policy change and to help to track progress over time. A small-scale project with manual counts taken by volunteers at just a couple of locations could be a valuable first step.

The Romanian team had a very ambitious effort planned to coordinate with the University of Transylvania in conducting video counts at multiple locations and then use software to extract the "data," the number of pedestrians, cyclists, and drivers. The large-scale plan, unfortunately, ran into a fairly complex internal bureaucracy at the university which prevented the scale of volunteer contributions necessary for the full count project. The Romanian team was able to video several locations, but did not have the resources to extract the data. The result was that many hours were spent preparing for data collection, but no solid data was acquired in advance of the symposium.

The team learned important lessons about capacity and the need for data. While data would have been good, it was not absolutely necessary for the program. Successful data collection programs are time-intensive and require a base of capacity that not all communities have. A clear discussion of capacity should be conducted before encouraging a large-scale community data collection effort. It doesn't help build momentum when local communities are flustered and overwhelmed by initial data collection efforts. Building on these lessons is an important next step, utilizing what data has been collected to determine how best to move forward. The study team will recommend a number of strategies to address data collection as a follow up to our study tour.

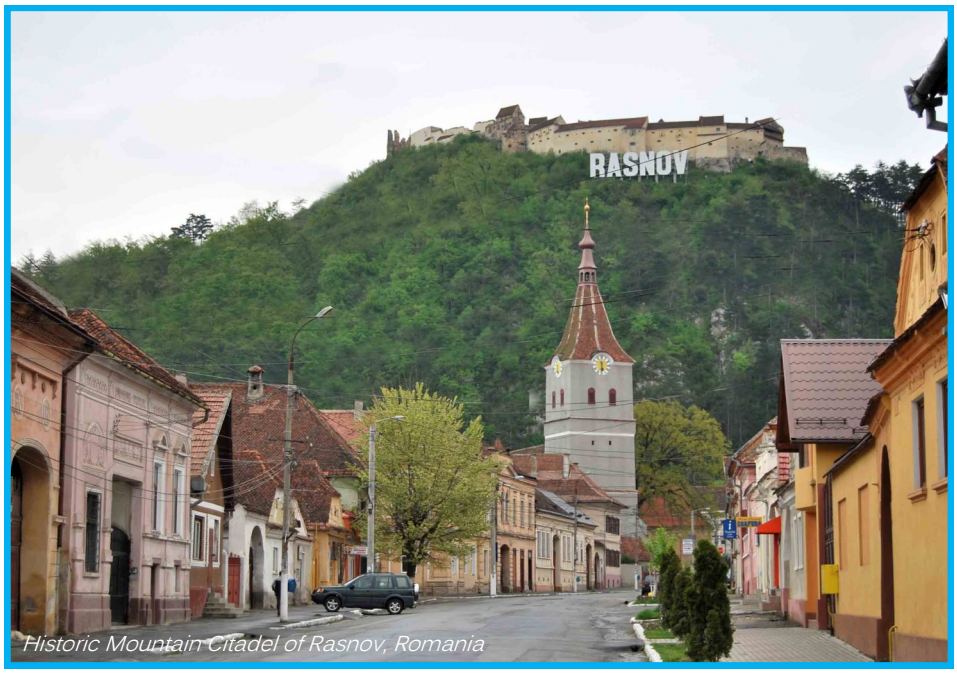
Program Results: Brasov Community Trail

Study Team with Dumitru Ducar of Schaeffler Group on Proposed Trail Route Outside of the Village of Cristian

One of the projects identified by the team for further study is a potential trail connecting Brasov with neighboring towns. The trail route would travel from Brasov to Bran Castle, one of the largest tourist attractions in the area. The trail could strengthen tourism while providing significant benefits to local communities in the form of active commuting and recreational opportunities.

The study team was approached by representatives of the Schaeffler Group, a German-based automotive and industrial parts manufacturer with a local plant, and Braşov Municipality Councilor Cristian Macedonschi. Both the company representatives and councilor were excited about the potential of the trail and provided significant background about the project and potential partners. The study team was provided with a copy of an initial cost estimate for the proposed trail put together by the Schaeffler Group. Schaeffler was very interested in providing active transportation commuting options for its workers and also helping to create a more sustainable image for the region. The company's desire to engage in the project is an important partnership opportunity for local communities and Visum.

Given this background, the study team conducted site visits along the proposed trail route to determine initial feasibility. The trail team had the benefit of including members with significant trail planning and active transportation engineering experience. The trail team identified three key advantages that could help push the project forward.



Historic Mountain Citadel of Rasnov, Romania

This project has a string of historic towns and villages (Brasov, Cristian, Rasnov, and Bran) that are both beautiful and within easy cycling distances of 10 to 20 kilometers. This is the "sweet spot" for cycling tourism. A trail connecting these towns has incredible potential to help rebrand the region in terms of eco -tourism.

In addition to the economic development potential of the trail, the short distances between the towns open up the potential of active transportation commuting between towns and to local industries that congregate just outside of built up areas. At present, a fairly congested narrow roadway connects the region. This roadway is not inviting as an active transportation commuting connection. The trail offers the potential to help link local communities in a much safer and sustainable way providing benefits to both locals and tourists alike.

First, trail ownership is fairly clear. While many trail projects are hindered by a lack of land ownership, the Schaeffler representative communicated that nearly all of the land along the trail route is owned by either local governments is the property of the Evangelical Church of the Augsburg Confession, which owns Brasov's historic Black Church and with which Schaeffler has a positive relationship. Both sets of entities were to open to creating a trail linkage. This is significant as many trail projects flounder on issues of land ownership and the potential costs of acquiring rights of way. As land ownership appears to be fairly straightforward, use agreements can likely be drawn up in a way that benefit all parties.

The second key strength of the project is the potential for the trail to act as a significant tourism platform for the region and, simultaneously, provide local benefits in terms of improved quality of life and active transportation linkages. In the United States, it is often difficult to find clusters of truly historic towns that can be linked together over fairly short distances.

Cyclist Riding Along Tight Roadway Section Between Brasov and Cristian

Finally, the trail has the potential to build important partnerships between local industry, politicians across multiple cities, and citizens across the region. For the trail to become a reality, groups across multiple sectors need to come together to build a series of linked segments. Building the partnerships necessary to link these segments together, while a difficult endeavor, can help to strengthen a regional identity that ties economic development and livability together in a powerful and visual way. While one project rarely alters regional perceptions, the trail project provides a base for larger conversations about sustainability, livability, and future economic development. The study team came away seeing the potential of a network of villages linked by a trail through a beautiful mountain valley. The work of accomplishing this vision is always hard, but the potential exists to build on current partnerships to help push this project forward.

In the near term, the team suggested that Visum and Schaeffler work together to stimulate use of the proposed trail alignment in order to generate excitement about the project. This could include organizing and sponsoring an event to clear and maintain the unimproved trail, as well as providing employer incentives for bicycling to work, providing facilities for employees who bicycle (e.g. repair station, storage areas, secure bike parking). These interim activities can help to define community objectives and priorities for the trail and generate stakeholder enthusiasm and buy-in to advance the project.

In the longer term, trail advocates will need to work together to identify potential partners and stakeholders (see page 13), to clearly define the proposed trail alignment and establish consent among all owners of that right-of-way, and to identify funding sources for trail design and construction.

Further Guidance

The **European Cyclists Federation** (www.ecf.com)maintains a resource library including information pertinent to

- trail development
- bicycle tourism
- employer encouragement of bicycling (e.g. ("bike2work")
- national and regional bicycle planning and policy
- and funding opportunities (e.g., "Cycling for Growth: Using European Funds for Cycling")

Numerous resources exist to help advance trail planning efforts. The **Rails to Trails Conservancy** (www.railstotrails.org) includes information on the benefits of trails, tools for acquiring right-of-way, conducting community outreach, and designing and managing trails.

The **National Trails Training Partnership** (www.americantrails.org) similarly offers a wealth of resources documenting US experiences with trail planning.

The **U.S. Federal Highway Administration** (www.fhwa.dot.gov) provides design provides various guidebooks and detailed design guidelines for trails.

Existing: Gravel road between Brasov and Schaeffler Facilities

Proposed: Portion of roadway dedicated to trail

Existing: grass cart path between Schaeffler and Cristian

Proposed: paved trail along existing cart path

POTENTIAL TRAIL PARTNERS

Sector	Organization	Contact Person (if known)	Notes
City of Brasov	City Council	Christian Macedonschi, Consilier Local	Responsible for "Smart City Brasov" resolution
	Transportation Infrastructure Committee		
	Urbanism Deparment		Responsible for road design
	Metropolitan Department		
	Bus Department		
	Brasov Police Department		
	Environment Department		Responsible for sound and air quality, conducts testing at intersections
Other Municipalities in Region	Rasnov		
	Cristiana		
Brasov Metropolitan Agency	Urban Mobility Department	Pastor Catalin Frangulea, Planning and Implementation Councillor	Oversees development of Sustainable Moblity Plan
		Sigfried Ruprecht	Lead consultant on Sustainable Mobility Plan
National Ministries			
Private Sector	Schaeffler Romania	Dumitru Ducar, Engineer and trail advocate	
	Best of Brasov Metropolitan Magazine	Catalin Badulescu, Editor in Chief	
	Tourism Bureaus		
	Bicycle-related businesses		
	Local media		
	Bicycle Tour Companies		e.g.: http://www.city-tours.ro/biking_tours_transylvania_romania_0000478.html
	Other local businesses		
NGO/Other	Visum/Bicycleste Omnieste		
	European Cycling Federation		Provides technical assistance, aids in finding grant opportunities: http://www.ecf.com/wp-content/uploads/European-Funding-for-Cycling-Report.pdf
	German Forum (political party)		
	Public Transport Company		Operates buses within municipality of Brasov
	Transilvania University of Brasov Department of Sociology and Communication		
	German Church		Owns right-of-way for portion of trail
	European Commission		Sponsors grant programs supporting transportation, tourism, economic development, and environment

Program Results: Improving Street Design

In addition to the potential for a regional trail system, the study team examined street design in the City of Brasov. Brasov has all the fundamental elements of a world class city, a rich history and a dense network of streets and hearty mix of land uses. Much of the city is walkable and bikeable for all types of transportation and recreation. The greatest threat to this quality of life is the growing presence and behavior of motorists. Since the end of the Communist era, the automobile has become a sign of progress and wealth for individuals, but the rapid expansion of automobile ownership and driving is having some undesirable impacts on the city.

Old Brasov - streets are tame, encouraging use of outdoor space

Despite the fact that the automobile still accounts for a minority of trips (26% of all trips) while walking and transit are the dominant modes (33% and 34% of all trips respectively) in Brasov, the presence of the automobile has begun to dominate the landscape. This has negative impacts to the comfort, safety and viability of other modes of travel. On many streets the speed of traffic creates an unfriendly environment for people afoot or on bicycles.

To some extent this steals the life from streets making it less attractive for people to eat, shop or socialize with neighbors.

The key strategy to mitigate the impacts of motorization of Brasov is to manage travel speeds to increase the comfort and safety of city streets. Reducing speeds and increasing safety cannot be achieved by design alone. There will also need to be strong efforts around education, enforcement, and encouragement to bring about more civilized driving behaviors.

Intersection at Teatrul Plaza - merging motorists ignore stop control and speed through the intersection

The following are several elements of design, as noted by the study team that relate to the comfort and safety of the streets in and around Brasov. These observations emphasize the pedestrian experience in Brasov, but also reflect needed changes to the roadway characteristics that will improve the comfort and safety of on-street bicycle facilities and off-street transitions.

Intersections

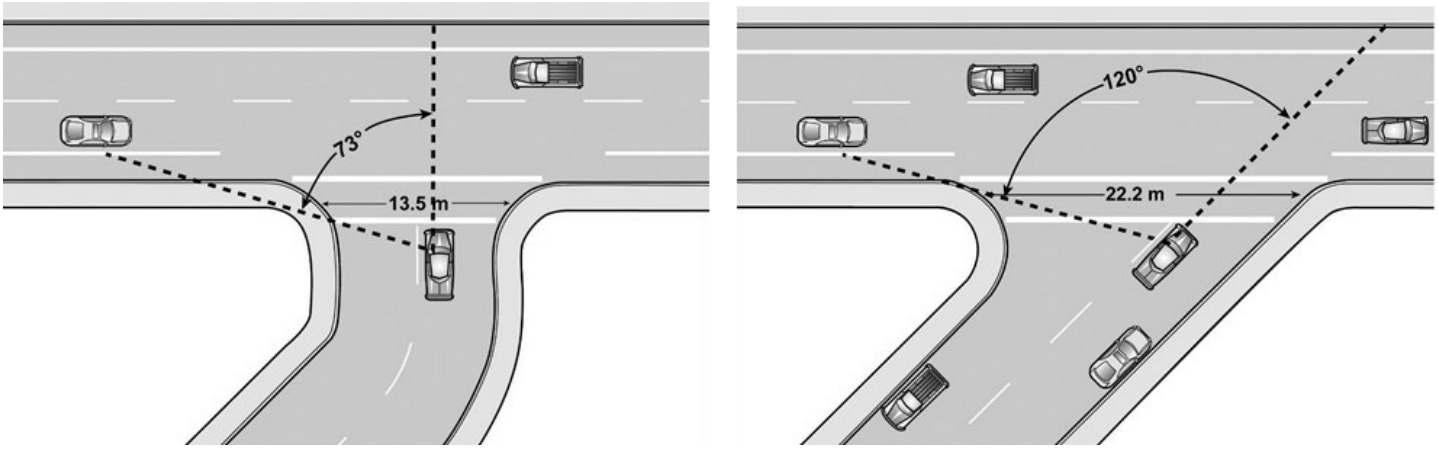
Intersections create the nodes of our cities and foster the connectivity of our transportation networks. These nodes become focal points for locating shops and businesses and can provide the key destinations for social and economic activity. The design and traffic operations of intersections will greatly impact the comfort and safety and even the economic viability of an intersection and the adjacent land uses. Managing the speed and volume of traffic at these intersections is a balance in moving traffic and preserving the urban character of the community.

Successful intersections safely and effectively manage traffic without detracting from the vitality of the street where it is comfortable and desirable for people to eat, work and shop in close proximity of the intersection, and this includes the ability to navigate the intersections safely whether on foot, bicycle, transit or in a private automobile. When these needs are neglected and intersections focus on minimizing delay and improving travel time for private automobiles, the intersection loses this vitality and becomes a place where people choose not to be.

There are some simple guiding principles for intersection design that help avoid some of the design issues that can diminish the safety of an intersection for all users.

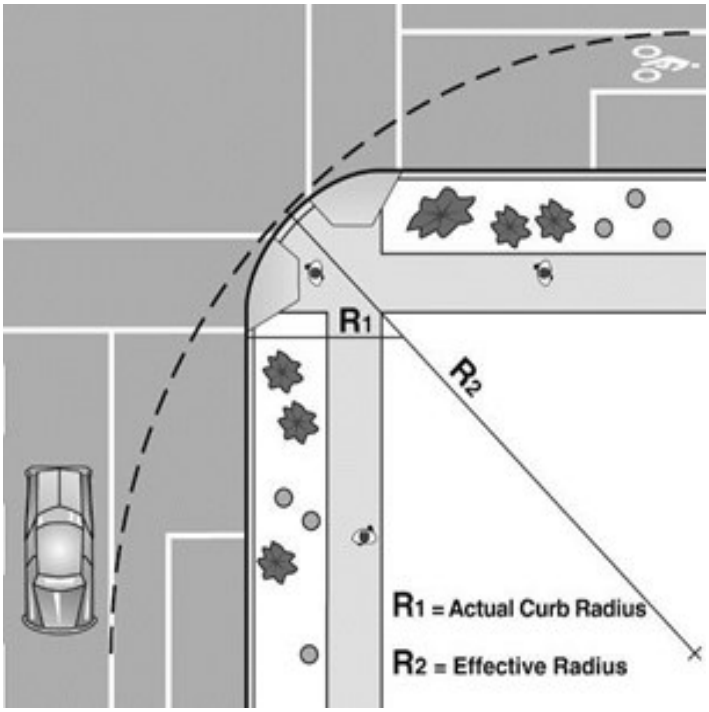
Intersection Geometry

Intersection geometry has a significant impact on safety. When streets are aligned perpendicular to each other the curb radius is minimized to reduce turning speeds, and the sight-lines are optimized for motorists to be able to see conflicts. When the intersection is angled, the likelihood of higher speed turns is increased and the sight lines become much more difficult with motorists forced to turn their head further from forward, making it harder to see conflicts in all directions as illustrated below.

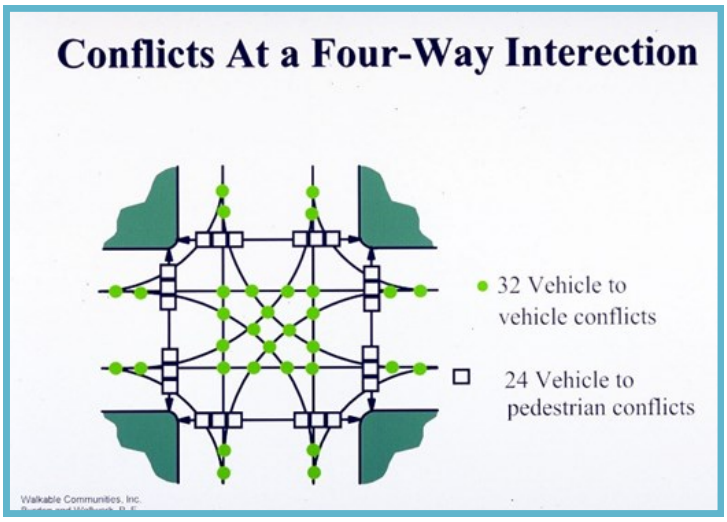


Example of geometry impact on sight lines (image courtesy of FHWA)

The illustration at right demonstrates how an actual curb radius can be kept to a minimum when the approach and receiving lanes are offset to allow for a larger "effective" radius of the intersection. This can be accomplished on urban streets where on-street parking or bicycle lanes create additional effective space the can accommodate turning needs, especially for buses and large trucks without increasing the actual radius [and crossing distance] of the curb, improving connections for sidewalks and crosswalks at the intersection.



Example of managing curb radius to lower speed for turning traffic (Image courtesy of FHWA)

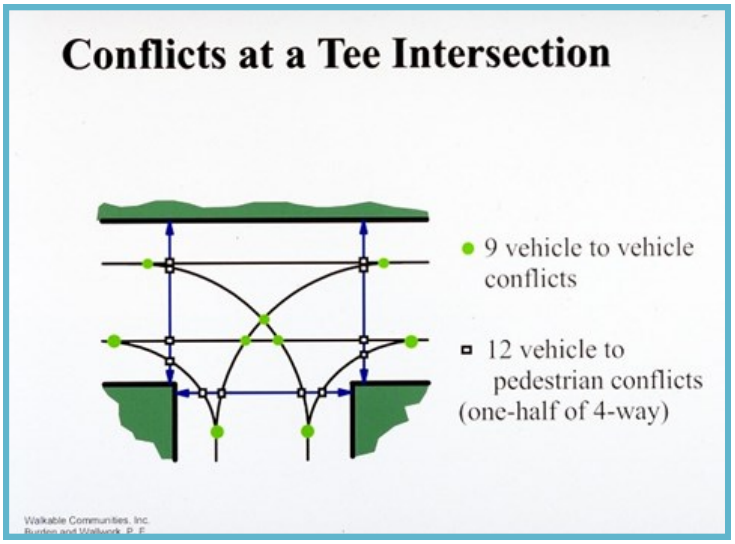


Example of the conflicts at a typical four-way intersection. (Image courtesy of Dan Burden)

Four-way Intersections

Four-way intersections are most common in an urban environment, a product of grid street design that promotes good network connectivity. However, four-way intersections can represent the greatest numbers of conflicts for various users as vehicle turning movements, and pedestrian crossings are maximized, increasing the number of potential conflicts for all users.

These conflicts can be mitigated through design practices, or by considering alternative intersection designs, such as "Tee" intersections, or roundabouts which eliminate left turns with the use of a center circulating lane to reduce the number of conflicts and eliminate the need for traffic signals.



Tee Intersections

The "T" intersection greatly reduces the number of potential conflicts, but also has broader implications for network connectivity and accessibility.

Example of the conflicts at a typical "tee" intersection (Image courtesy of Dan Burden)

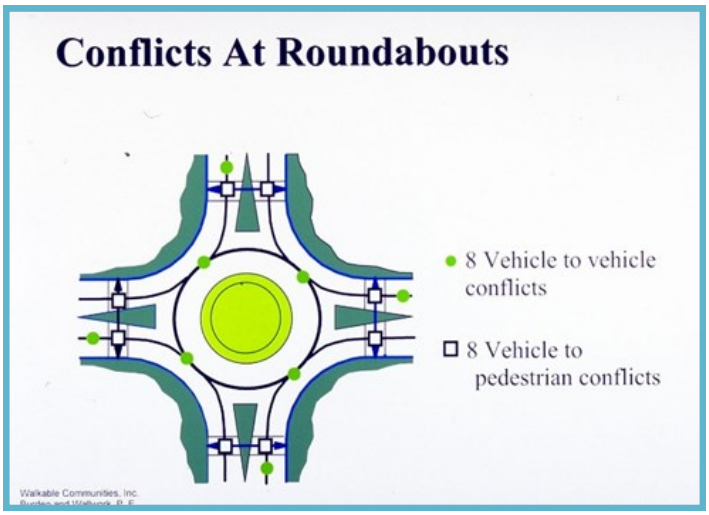
Roundabouts

Roundabouts, when designed effectively, have been proven to be an effective tool for managing conflicts for all users.

A modern roundabout is identified by some key characteristics and design features [1] :

- ◊ Channelized approaches that provide physical constraints for moving traffic and allow for pedestrian refuge islands;
- ◊ Yield control on all entries, where vehicles entering the circulating route must stop for pedestrians or vehicles already in the circulatory lane(s);
- ◊ Counterclockwise circulation of all vehicles around the central island; and
- ◊ Appropriate geometric design that will effectively encourage slow travel speeds through the intersection.

One caveat, roundabouts work best as single lane facilities, with each added lane in an approach or within the circulatory route, travel speeds and the number of potential conflicts greatly increase to the point that some complex roundabouts can exceed the number of conflict points of a traditional four-way intersection. The added complexity of navigating these roundabouts can lead to undesirable behaviors, including speeding.



Example of the conflicts at a typical roundabout (Image courtesy of Dan Burden)

[1] *Federal Highway Administration (FHWA) Office of Safety Technical Summary – Roundabouts FHWA-SA-10-006*

Pedestrian Crossings

The pedestrian is the life of the urban community, and successful pedestrian environments require safe and convenient crossing opportunities in abundance. Crossings need to be provided where any level of activity is anticipated. Crossings can be classified as either intersection or mid-block types. All intersections need to provide crossings if there is to be a complete pedestrian network. In many situations mid-block crossings are appropriate to allow for convenient proximity to destinations and offer alternatives to complex intersection conflicts and delays.

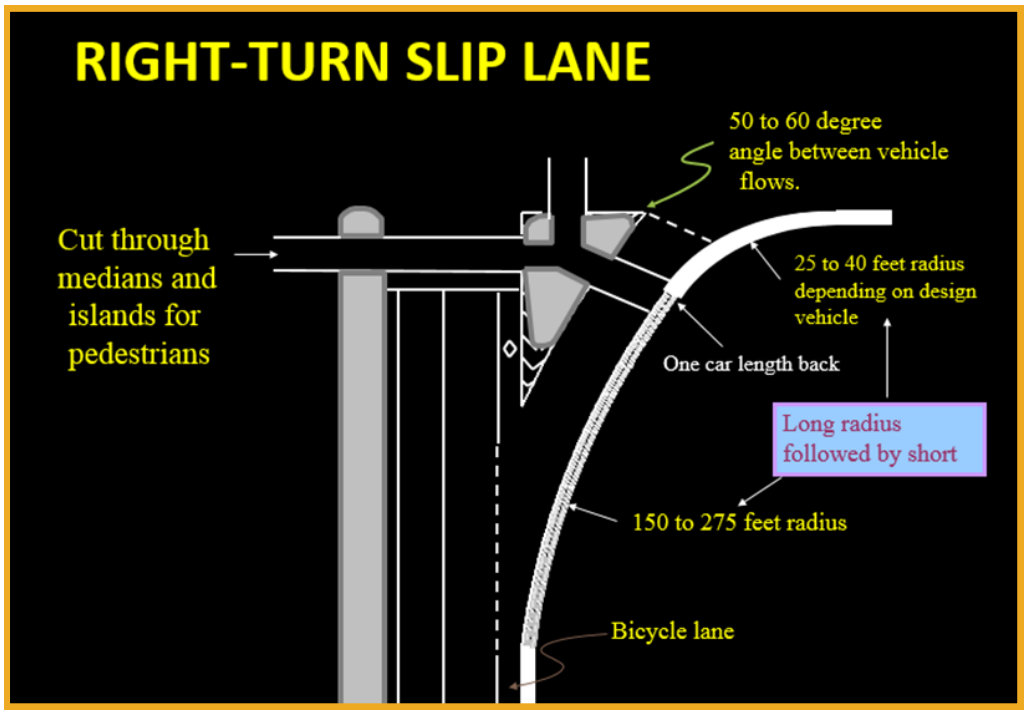
Example of a pedestrian friendly intersection (image courtesy of Dan Burden)

Intersection Crossings

Intersection crossings are best when streets are perpendicular with smaller curb radii to both shorten crossing distance and improve recognition among motorists and pedestrians. Crosswalks should have smooth transitions and be a natural extension of the existing walkway.

Slip-Turn Lanes

Where significant turns are anticipated and there is a need to provide expanded radius to accommodate large vehicles, such as trucks and transit buses, a slip-turn lane is typically used to facilitate better traffic flow. Slip turn lanes can have unanticipated consequences for pedestrian safety by increasing turning speed and decreasing yielding rates for vehicles making right turns. On the other hand, good slip turn design can mitigate these issues and even provide additional advantages when designed with "porkchop" islands that provide pedestrian refuge and reduce the direct crossing distance for pedestrians which reduces exposure and delay .

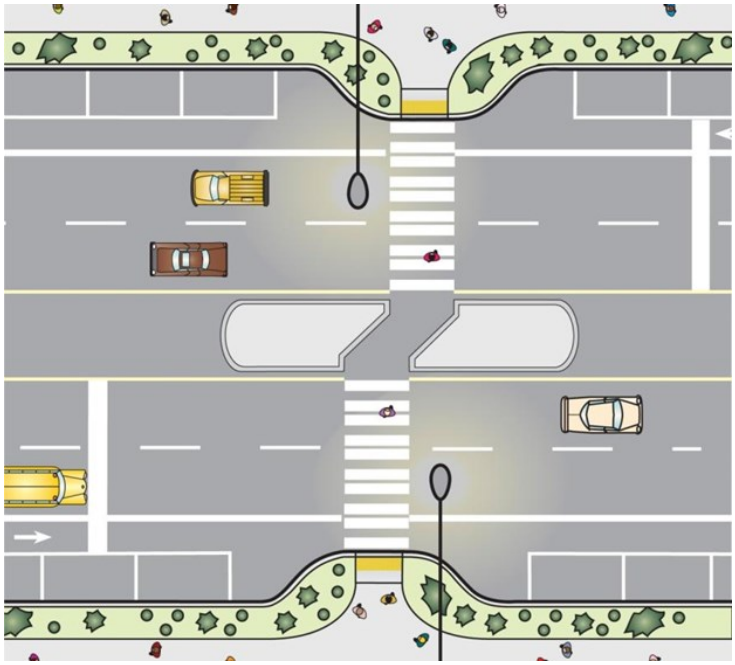


Example of improved "slip turn" design (Image courtesy of Michael Moule, TY Lin Inc.)

Mid-Block Crossings

Mid-block crossings are established by signing and striping the roadway to indicate locations outside traditional intersections where pedestrians are permitted to cross. The location and design of mid-block crosswalks must take into account numerous variables including the speed, volume, and number of travel lanes of vehicle traffic. Where needed additional features may be added to improve safety and convenience, such as median crossing islands, additional signage or even signalization such as HAWKs, and sometimes traffic calming features, such as curb "bump-outs", speed bumps, or raised crossings that force motorists to slow down while passing over the crossing.

Median crossing islands are particularly helpful where four or more travel lanes need to be crossed. The installation of a median crossing island allows pedestrians to cross shorter distances and separate conflicts into two-stages instead of processing the speed and proximity of vehicles from two different directions at the same time.



Example mid-block crossing with angled median (image courtesy of FHWA)

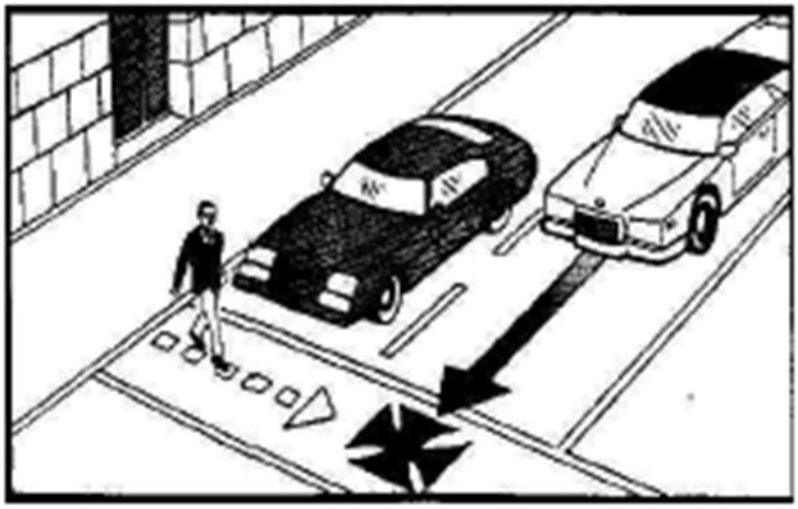
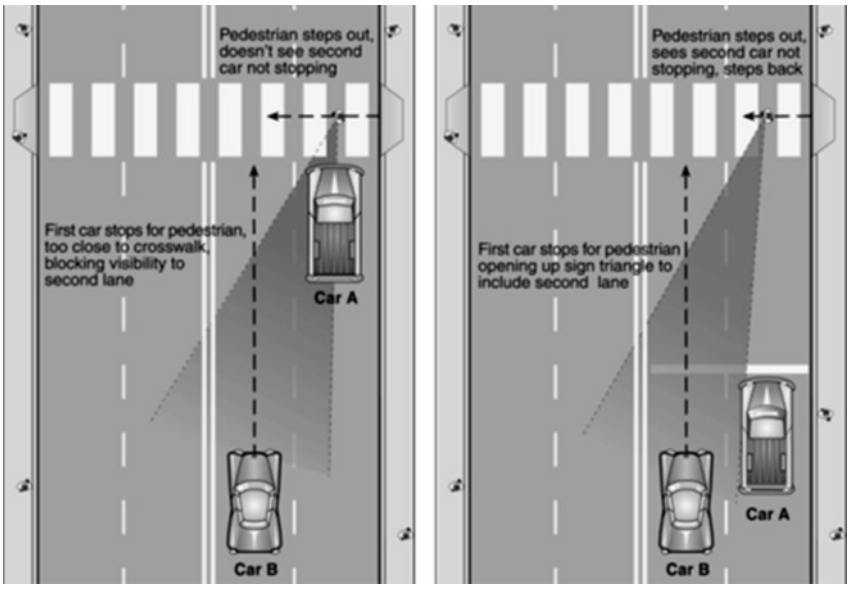


Diagram of "multiple-threat" conflict (image courtesy of FHWA)

Advance Stop Lines

In the United States, one of the most common and harmful pedestrian crashes is what has been labelled the "multiple-threat" crash. These crashes occur at crosswalk locations with two- or more travel lanes in the same direction, where a vehicle nearest the pedestrian may stop to allow for crossing, but a second vehicle in the adjacent travel lane does not stop. The pedestrian and overtaking motorists are not able to see this conflict and the result can be a traumatic crash, often resulting in serious injury or even death.

The most effective countermeasure for reducing the multiple threat is installing an advance stop or yield line in the roadway at 20 to 50 feet in advance of the crosswalk. The advance stop line improves safety by positioning the yielding motorists away from the actual crossing which improves the visibility for the pedestrian crossing and any additional motorist that may be overtaking, unaware of the pedestrian crossing.



Example illustrating "multiple-threat" conflict (left) and advance stop line (right, image courtesy of FHWA)

Speed Reduction – Traffic Calming

The design options described in the previous section are specifically intended to address key issues that may be most relevant in and around Brasov. The effectiveness of these design treatments are predicated on numerous other factors including the travel behavior of motorists using Brasov streets.

Perhaps the most critical traffic safety issue for Brasov is the travel behavior of a growing number of motorists. The study team observed a number of behaviors that detract from the walking and bicycling environment. Aggressive driving and speeding not only foster intimidation and fear of the streets, they are most likely to result in crashes and traumatic injuries, and even death on the roadway.

Traffic calming is greatly needed to restore the safety and civility of the city streets. Traffic calming is a newer approach to traffic management evolving in Australia, Europe and the United States since the 1980s. According to the Institute of Transportation Engineers (ITE), traffic calming involves changes in street alignment, installation of barriers, and other physical measures to reduce traffic speeds and/or cut-through volumes, in the interest of street safety, livability, and other public purposes.[2]

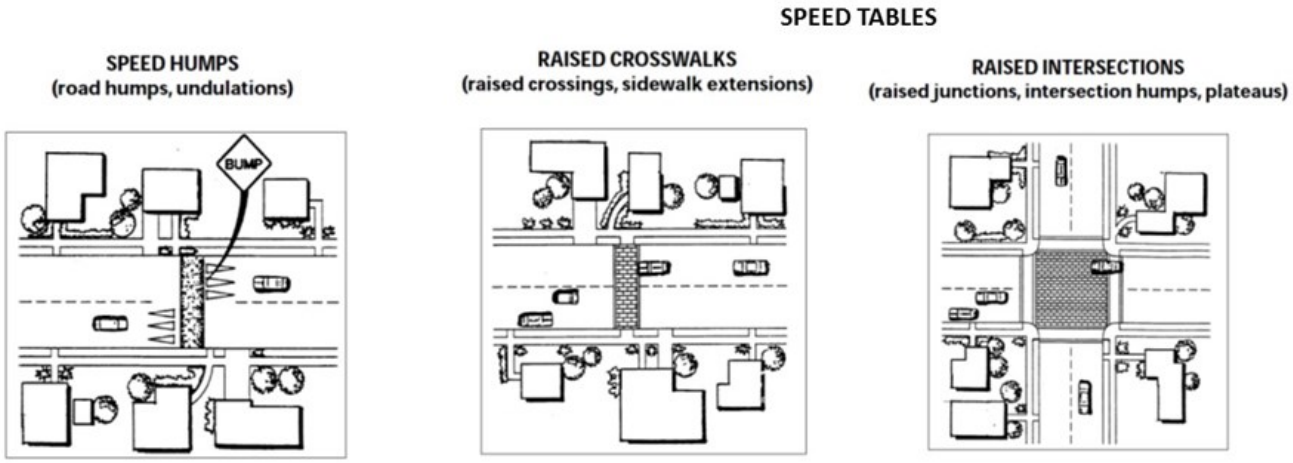
For the most part this includes physical countermeasures deployed or retrofitted on streets with known or perceived speeding issues. However, traffic calming measures are most effective when implemented with non-infrastructure efforts including education, enforcement and encouragement of appropriate driving behavior. The following is a brief introduction to the physical countermeasures commonly employed in traffic calming efforts.

There are generally two categories of infrastructure countermeasures for traffic calming; vertical elements, such as speed humps and speed tables; and lateral elements such as diverters, chicanes, bump-outs and neck-downs.

[2] *Institute of Transportation Engineers (ITE) Traffic Calming State of Practice, Washington, DC, 1999*

Vertical Traffic Calming Elements

Vertical traffic calming elements can be greatly effective as they require drivers to greatly reduce speed or face disruptive jolts or even significant vehicle damage when crossed carelessly. Because of this, they should be only deployed where appropriate and with adequate warning to approaching drivers.



Examples of vertical traffic calming measures (images courtesy of ITE Traffic Calming State of Practice)

Horizontal Traffic Calming Elements

Horizontal traffic calming elements reduce travel speed through deflection by forcing motorists to deviate from a straight path. The following illustrations demonstrate a few examples of altering geometry to slow travel speeds. These illustrations are by no means comprehensive, as there are numerous alterations that can accomplish deflection based on roadway characteristics and land use context.

Chicanes

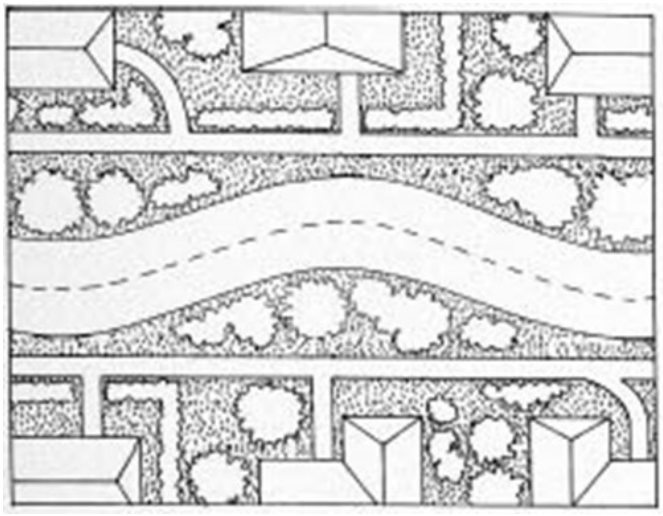


Illustration of a chicane (image courtesy of FHWA)

Bulb-outs

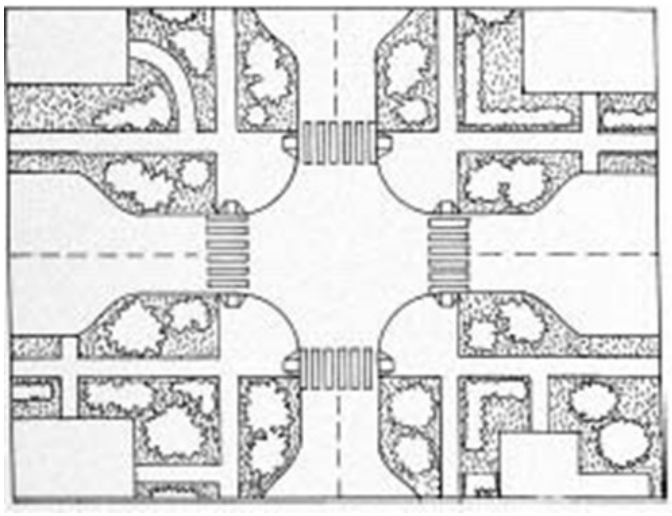


Illustration of a bulb-out (image courtesy of FHWA)

Median Barriers

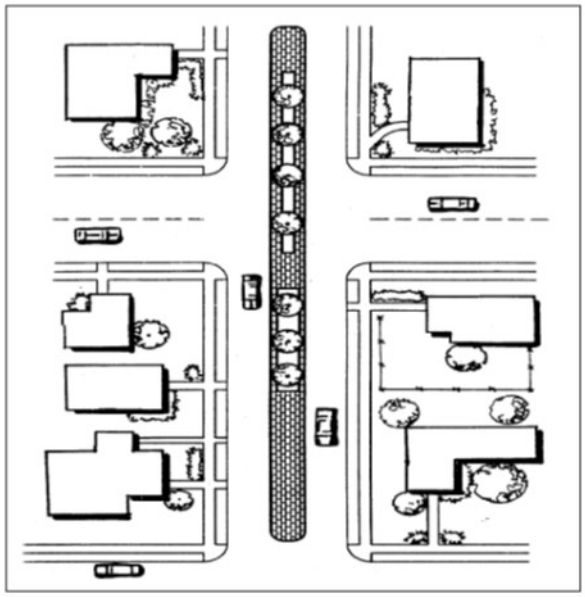


Illustration of a median barrier image courtesy of FHWA)

Chokers

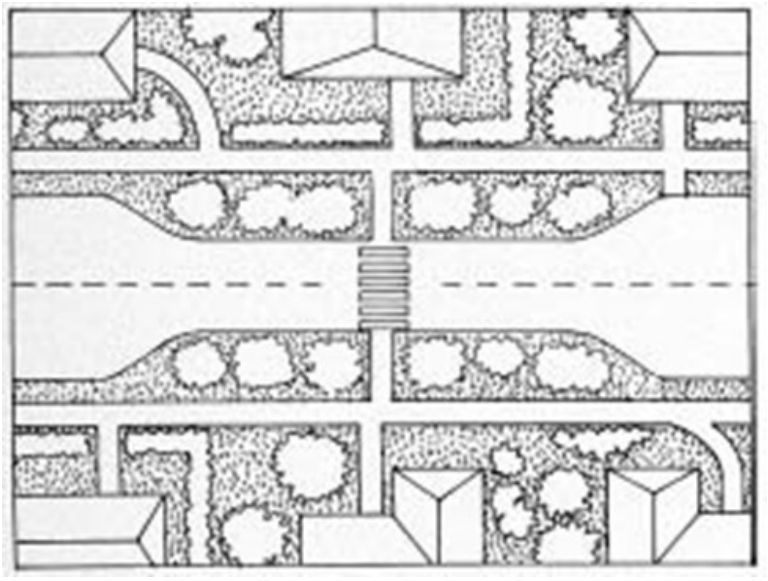
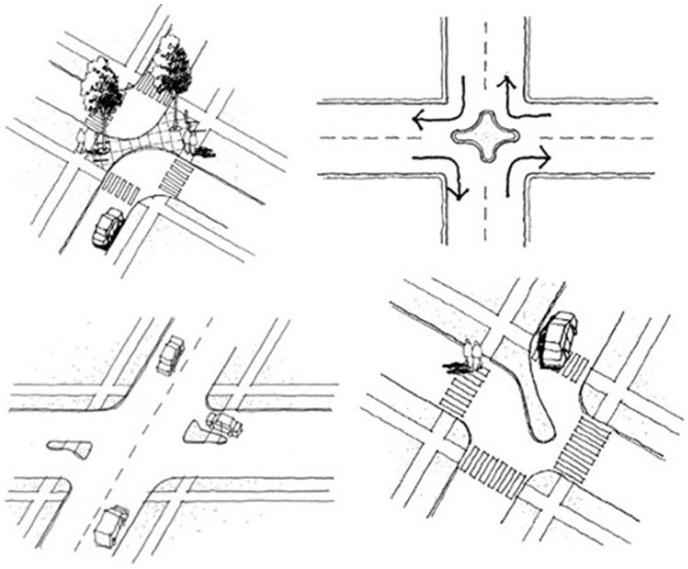


Illustration of a choker with a mid-block crosswalk (image courtesy of FHWA)

Diverters



Examples of intersection diverters (image courtesy of FHWA)

Roundabouts

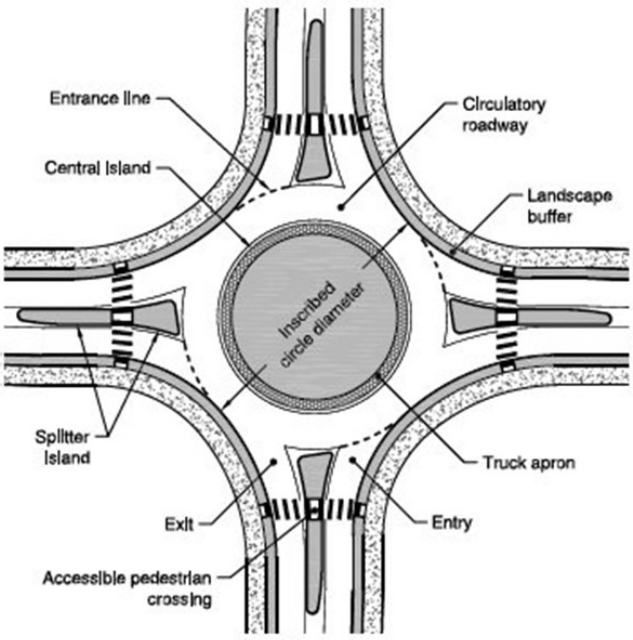
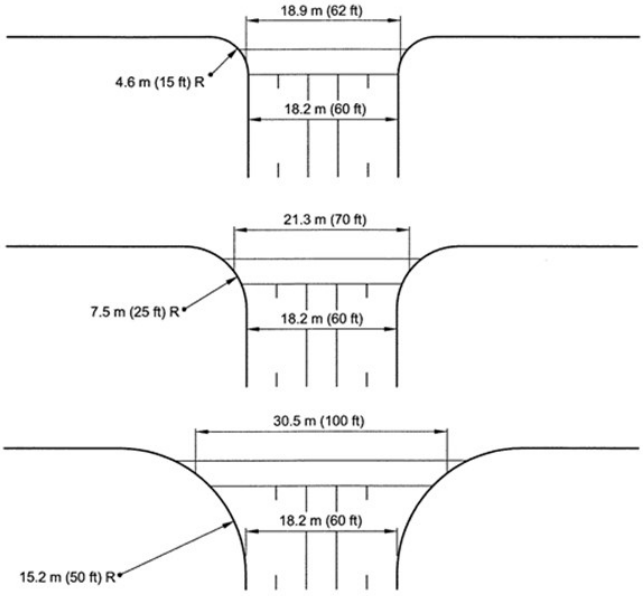


Illustration of roundabout (image courtesy of FHWA)

Curb Radii Reduction



Examples of Curb radii impacts (image courtesy of FHWA)

Pedestrian Refuge Islands

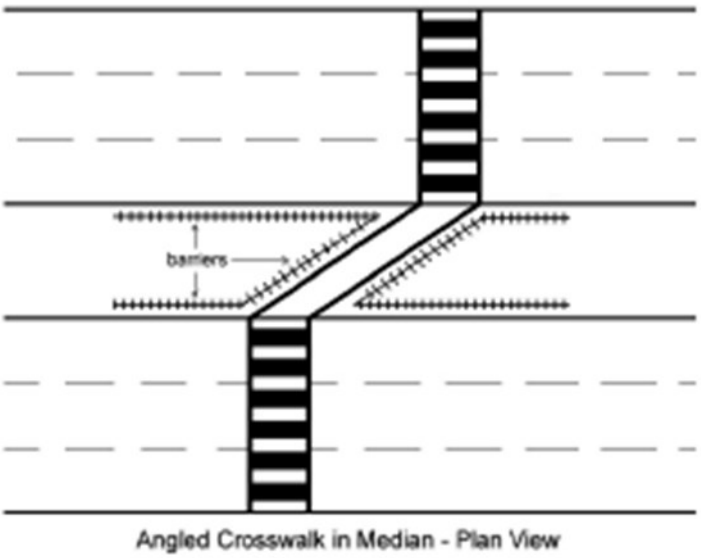


Illustration of a mid-block pedestrian refuge island (image courtesy of FHWA)

Further Guidance

There are a number of good resources for traffic calming and extensive guidance on the planning, design and appropriate implementation of traffic calming features including:

- **US Federal Highway Administration (FHWA) office of Safety Programs** (http://safety.fhwa.dot.gov/speedmgt/traffic_calm.cfm)
- **Institute of Transportation Engineers (ITE) Traffic Calming State of Practice** (http://www.ite.org/traffic/tcstate.asp)

A Foundation for Short-Term Change, a Pathway Towards Transformative Action: Next Steps for Visum

The I-Step experience was eye opening and grounding for us. It was eye opening because we realized that we should brace ourselves for a long run, not a sprint. Also, we realized that there is no universal solution, and that each city should tailor the solutions according to its own particularities.

It was grounding in two major ways. First, the presence of foreign experts helped raise the trust capital that our organization had in relation to the other stakeholder, opening some doors with some local authorities and the media. Second, the sharing of experience and tools for solution buildings helped us restructure our approach and gave us a much better chance to influence things for the good.

After the workshops we can say not only that we are an organization with a dream, but also an organization with plan.

Priorities:

Brașov is a city in which efforts to transform cycling and walking into core transportation modes is just beginning. We can see some sporadic efforts from the local authorities. We have a few NGOs that promote this goal. In this context, one of the hardest things to achieve is getting the local authorities to really listen to you.

The major factors that we have to consider:

- The E.U. will condition the funding for infrastructure development on the condition that it will provide equal access and security for all means of transportation;
- One of the political parties, Forumul Național German, has adopted a resolution that one of their main goals is to make the streets safe for all means of transportation;
- And the city council and the mayor have already approved some infrastructure modification to make cycling safer, but they are still riddled with problems and are yet to be adopted by the end users.

Objectives:

1. Local government efforts:

a. To help show the local authorities that there is demand in the local population for infrastructure that would make traveling by bicycle and foot safer and more respected. To accomplish this, we will continue our research on traffic flows, the daily monitoring of the problems that cyclists and pedestrians are facing in traffic, and the focus groups within the community to determine in more detail their stance on the issue.

b. Promote the small steps that have already been taken by the community. Although they are by no means sufficient, they are building blocks on which we can build hope and raise expectations. We will launch a P.R. campaign that will document the steps already taken, the problems that we still face and this will express hope for the future.

c. Use our allies within the local authorities to increase communication and "open up ears." We will continue our advocacy efforts .

2. Brașov to Cristian Trail project:

The second thing we are focusing on is building the trail between Brașov and Cristian, via the Schaffler factory. We currently working with the Schaeffler representatives to formulate a plan, and we are also collaborating with a team of experts in the domain of European and national founding to help us get funding for the project.

3. **Building a stronger and more diverse set of stakeholders:**

Our third priority is bringing together more of the civil society stakeholders to contribute to our efforts.

a. We are preparing to launch a set of informational brochures

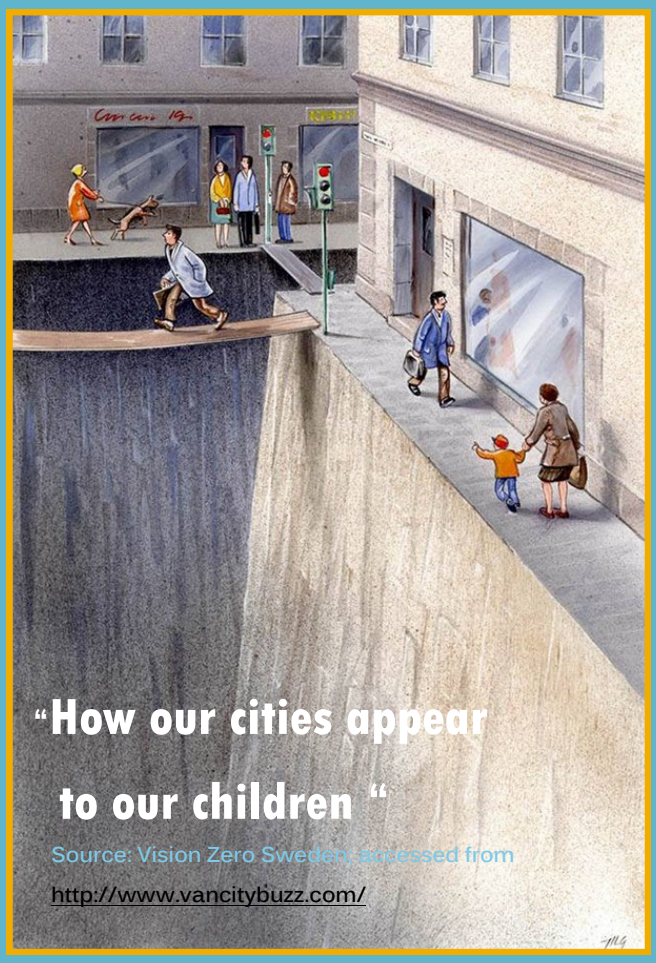
b. Enabling more workshops and skype talks with experts and advocates.

Concluding Thoughts from the U.S.-based Study Team

The U.S. based-study team was honored to help begin a transatlantic dialogue on sustainable transportation with our Romanian colleagues. We were struck by the similarities that community groups face as they seek to engage in changing policy priorities. The transportation bureaucracy often seems overly technical and difficult to understand. Efforts to improve safety, equity, and access can be turned into discussions about seemingly impenetrable technical issues such as vehicle throughput and turning radii. Our goal was to help bridge the technical divide by helping to explain the origins of the transportation standards and assist in providing technically workable alternatives.

Efforts to promote sustainable transportation require more than technically functional plans. These efforts to improve the safety and sustainability of transportation system require building coalitions to push for change. This process is difficult, time consuming, and occasionally deeply fulfilling. What makes this all worthwhile is the relationships with the amazing people who are working to improve their communities. We were fortunate to meet such a set of deeply committed and engaged people in our journey to Romania. We appreciate the passion and commitment of the Visum team and look forward to continued dialogue through a set of skype workshops planned for the fall and winter.

Mihai Tatu of Visum discussed the I-STEP program with multiple news outlets



Acknowledgements

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In addition, we thank Visum's Mihai Tatu, Emil Vulcu, Adriana Hurjui and Dragos Secarea for making this project possible and coordinating the Brasov symposium.

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