Changing the DNA of City Streets:

NACTO's Urban Street Design Guide and the New City Street Design Paradigm

By David Vega-Barachowitz, Peter Koonce, P.E., and Michael Flynn, AICP

Bicyclist and pedestrian fatalities in cities remain one of the United States' most unyielding challenges. In a 2013 survey by the International Transport Forum, the nation ranked 29th of the 37 countries surveyed for road fatalities per 100,000 people. The U.S. Department of Transportation recently launched a campaign, "Everyone is a Pedestrian," inviting cities with disproportionately high pedestrian fatalities to apply to become one of six focus cities in a coordinated effort to drastically decrease pedestrian fatalities around the country. While motorist deaths have steadily decreased as automakers continually incorporate new safety features, road designers and traffic engineers have been constrained by standards and guidelines that are outdated and often inappropriate when applied in current urban contexts.

In the face of these disconcerting statistics, cities have been leading the way towards a more bicycle and pedestrian friendly street design framework. The following article investigates the myriad factors that govern the DNA of city streets, looking at conventional design practices and parameters through the lens of the National Association of City Transportation Officials' (NACTO) recently released *Urban Street Design Guide*, a blueprint for world-class street design. The product of an unprecedented collaboration between city engineers, planners, and designers in the nation's largest cities, the *Urban Street Design Guide* sets forth an ambitious and concrete vision for city streets, compiling a resource that some are already calling a new "Green Book for cities."

CityScape: A Fictional Yet Familiar Scenario

In order to better understand how conventional engineering practices can limit treatments for pedestrians and bicyclists on existing urban streets, consider the following hypothetical scenario. A new development, CityScape, is proposed just beyond the downtown core on an older urban arterial that radiates along the route of an old streetcar line. Advertisements depict a mixed-use development whose streets brim with activity—people biking, walking, shopping, and drinking coffee at sidewalk cafes. CityScape's sidewalks are packed with pedestrians. They have ample public seating, trees, and landscaping that together give the development an idealized "sense of place." These images echo the city's recently passed Complete Streets Ordinance and complement an ambitious bike master plan, as well as new plans for light rail and transit-oriented development that aim to make the city more attractive to new businesses whose employees want to live in a walkable city.

City staff has been tasked with reevaluating the streetscape conditions adjacent to the site with respect not only to proposed parking, access, and mitigation plans proposed by the development,

but also in light of the city's overall goals for the area. The primary street abutting the development site is a wide arterial with three lanes in each direction plus a center two-way left turn lane. It has wide outer lanes but no on-street parking and a 45 miles per hour (mph) speed limit. Other than for a short period during the morning and afternoon peak hours, the street generally operates well below capacity. There is not a strong demand for on-street parking because the current commercial uses, which tend to be "strip mall" in character, provide large parking lots. Nonetheless, CityScape and other new developments are being encouraged to have a more traditional orientation to the street and less prominent off-street parking.

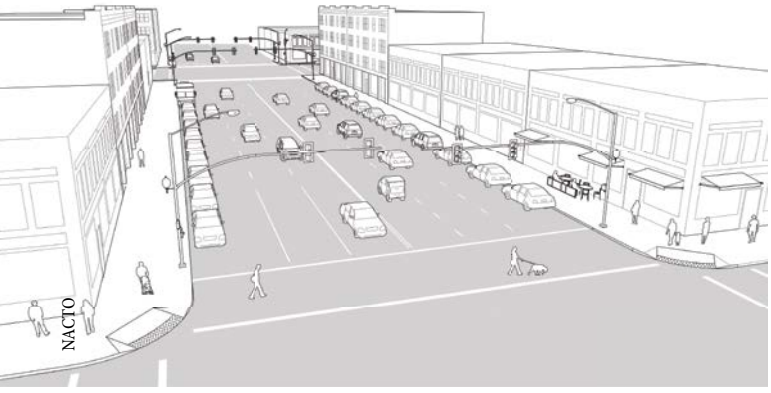
At the outset of the project, the City looks at the possibility of a road diet—removing a lane of traffic in one or both directions so as to add a landscaped median, on-street parking, and/or bike lanes. However, a look at the traffic study prepared by the developer based on existing city, state, and national guidance shows that this is not feasible. The study does not consider available capacity elsewhere in the traffic system and assumes background growth rates and vehicular trip generation rates based on continued auto-oriented patterns of development rather than reflecting the City's goal for walkable development in this area. It also assumes that high vehicular levels of service (LOS) must be maintained at intersections during the small percentage of the day when congestion is highest. Removing travel lanes would bring vehicle delays to an unacceptable level during the peak periods, even though the lanes sit mostly empty the rest of the day.

In lieu of removing lanes, the City explores the possibility of narrowing the existing lanes, which are currently 12 feet wide or more. However, the state department of transportation's design guidance recommends lane widths of at least 12 feet on streets that are functionally classified as arterials. Although the guidance implicitly allows flexibility on this figure, it does not explicitly recommend narrower widths in neighborhoods with more walkable or mixed-use development, so the City does not feel comfortable recommending 10 foot or 11 foot lanes. Similarly, current corner radii at the intersections leading into the new development site are much wider than is necessary to accommodate typical vehicles making the turn at safe speeds, and the current rule of thumb used by City staff is to use tractor trailers as the design vehicle on arterials, ensuring that they can make turns without crossing over lane lines or center lines. Again, in the absence of positive guidance encouraging tighter corners, the City opts to stick with the current configuration.

Because of the size of the CityScape development site, there are not currently signals at several intersections along its periphery, creating stretches of several blocks (totaling almost a quarter mile) that lack crosswalks. Nearby residents and the developer have raised concerns that pedestrian access to the site will be difficult, as many pedestrians will need to walk several minutes out of their way to access it, or may even be tempted to save time by crossing in the absence of a crosswalk, raising safety concerns. The intersections are reviewed but the City finds that signal warrants are not met based on current pedestrian volumes and gaps in the traffic. No alternative options are readily apparent to improve access to the site for the many more pedestrians that are expected to walk there once it is built.

Finally, based on requests from the community to slow traffic speeds on these streets to make it safer and more comfortable to walk to the new stores and for children to walk to school, the City considers the possibility of bringing the speed limit down. Without other traffic calming tools at their disposal and unchanged 85th percentile speeds, lowering the speed limit is not seen as a practical option.

What is the moral of this story—a story that may be reflected in actual cities around North America on a regular basis? Numerous design decisions add up to an outcome that falls short of the transformative vision that the City, elected officials, and merchant groups had sought. The existing tools and guidance sources at the City's disposal do not provide enough specific, easily adapted design guidance for streets of an urban nature—in this case, a street transi-



The NACTO Urban Street Design Guide *uses a three-dimensional graphic style to demonstrate how streets can be transformed proactively. A six-lane urban arterial is retrofitted with protected bike lanes, turn bays, and a planted median.*

NACTO

NYC DOT

The Guide *translates pioneer projects, like the 1st Avenue Complete Street in New York City into a world-class standard for better street design around the U.S.*

tioning from a more suburban to urban character based on the city and community's economic development and livability goals.

The NACTO Urban Street Design Guide

The example of CityScape, a proxy for developments happening all around the country today, reflects some of the major challenges faced by cities as they try to make streets more supportive of dense, mixed-use development. Many of these challenges are heavily embedded in the basic assumptions about a street made at the outset of a project. Traditional standards tend to suggest rigid rules that maintain order, while in reality this order (in traffic operations) often results in barriers to safe, multimodal travel inconsistent with larger policy goals and objectives. This is exactly the type of situation that the newly released NACTO *Urban Street Design Guide* was intended to address.

Released in fall 2013, the NACTO *Urban Street Design Guide* was published with the explicit goal of creating a roadmap for engineers and designers to proactively make streets safer, more multimodal, and supportive of dense, mixed-use urban development. The *Guide* challenges the entrenched assumptions of prevailing street design standards, forging a complete vision that aligns transportation engineering with larger urban design and sustainability objectives.

The concept of a street design manual tailored to urban streets is neither new nor unprecedented. A number of prominent local street design manuals, including those of Charlotte, VA, New York, NY, Boston, MA, and San Francisco, CA have already set the stage for a national document of this type. Moreover, the joint Institute of Transportation Engineers (ITE)/ Congress for the New Urbanism (CNU) *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach*, funded by the Federal Highway Administration (FHWA) and the Environmental Protection Agency, laid the groundwork for NACTO by advancing new ways of thinking about context, design speed, design vehicle, and other concepts.

NACTO's first foray into design guidance, the *Urban Bikeway Design Guide*, was released in 2011, a year and a half after the launch of its Cities for Cycling project. The *Bike Guide* was developed in response to the need for an update to AASHTO's 1999 *Guide to the Development of Bicycle Facilities* and the need for guidance on implementing protected bike lanes (also known as cycle tracks), which have widespread international use to improve bicycle safety. In the two years following the release of the *Urban Bikeway Design Guide*, the number of protected bike lanes in the United States has increased rapidly, with many agencies using NACTO as their resource for design guidance.

With the kick-off of the Designing Cities initiative in 2012, NACTO launched the development of its *Urban Street Design Guide*, striving to build on the local street design manuals and the *Bike Guide*, while also aiming to codify much of the recent progress around the country in design for complete streets. The design guide was based foremost on the proposition that cities are ill equipped by current traffic engineering standards and assumptions to design and foster communities that are walkable, bikeable, or traditionally urban in character. In contrast to most existing manuals,

the *Guide* focuses on the physical transformation of the street as a driving principle for design, rather than the (design) controls, which often misapply assumptions of policies from a bygone era. Similar to the *Bike Guide*, the document employed a dynamic three-dimensional perspective and graphic style to convey how streets can be transformed, visualizing wider sidewalks, protected bike lanes, green infrastructure, and other key strategies.

While the majority of the content in the document does not directly refute or contradict AASHTO's *Green Book*, the *Guide* takes pains to celebrate, rather than only accommodate, the city street. Building on past efforts, the book codifies several new innovations that have occurred within the last several years. The "pilot" or "tactical" approach to street design, epitomized by New York City's Times Square redesign, stands out among these new strategies. Cities are encouraged to deploy bicycle and pedestrian safety improvements using low-cost materials, enabling them to realize the benefits of more expensive capital retrofit projects in the near term. The *Guide* also tackles some of the more vexing pedestrian access issues. Decisions about crosswalk and signal placement are analyzed through existing pedestrian "desire lines," anticipated land uses, and the unique character of the urban built environment (such as building entrances or transit stops) rather than limiting them to every quarter mile. The *Guide* clearly posits urban street design as a projective as much as a reactive exercise, empowering the engineer with a tool that can better shape a vision for walkable and bikeable development.

Revisiting CityScape

By applying the *Urban Street Design Guide* to developments like CityScape, City staff can yield an outcome that is aligned with the desired vision of a city and community. The *Guide* explicitly recommends the repurposing, removal, and/or narrowing of existing travel lanes as a way to make streets safer and more multimodal. A series of before-after renderings show typical streetscape transformations, underscoring the need to think about streets holistically, and to phase out analytical tools that prevent practitioners from doing so. Lane widths in urban environments, for instance, are recommended to be 10 feet, with the occasional exception for certain transit and truck routes. This recommendation derives not only from the recognition that narrower lane widths help to control travel speeds, but also from the reality that extra width can be used to help the street realize its potential for all modes of traffic.[1]

The *Urban Street Design Guide* further catalyzes a new approach to street design by reframing conventional design controls and assumptions. The *Highway Capacity Manual*, for instance, recommends an analysis procedure that focuses on an evaluation of the worst 15-minute period of traffic for the entire day (often adjusted for seasonal fluctuations in traffic). The AASHTO *Green Book* cites the need to design for the 30th highest hour of traffic for the entire year. These kinds of assumptions make it difficult to realize a new kind of street—one that is based on a balanced vision and mode share. The *Urban Street Design Guide* recommends an analysis of a street's traffic behavior over 2–3 peak hour conditions, as well as an understanding of how that street functions and whom it serves at other parts of the day. This entails critically evaluating the land uses, peak bicycle, transit, and pedestrian behaviors, and other factors that help create a more nuanced portrait of the street as a public space. A street's design year, based on projected traffic growth forecasts, is reframed to reflect actual trends and the desired conditions that the project is intended to accomplish.

Traditional street design has been grounded in highway design principles that tend to forgive driver error and accommodate higher speeds. The *Urban Street Design Guide* advocates for an approach to defining speeds that is counter to the traditional approach of using the 85th percentile speed. Using design criteria based on a target speed, the speed that you intend for drivers to go, rather than 85th percentile speed, is a simple way to make the street safer. The National Highway Traffic Safety Administration cites that 55 percent of all speed-related crashes were due to exceeding posted speed limits. Speeds of 30 mph and below are conducive to pedestrian activity and decrease the risk of fatality dramatically. While changing a street's speed limit arbitrarily is not an effective safety countermeasure, using a street's target speed as its design speed can contribute to a safe and multimodal urban environment.[2] Employed in concert with appropriate buildings setbacks, vehicle operating speeds can be decreased using distinct features such as on-street parking, trees, and narrower lane widths, all of which are encouraged as a means to reduce speeds to levels that support urban conditions .[3]

City of Austin

The peer-to-peer exchange facilitated through NACTO and the development of the Urban Street Design Guide *have already inspired projects around the United States, like the Guadalupe Cycle Track in Austin, TX.*

In the fictional example of CityScape, the development runs along an urban arterial that is classified as a state route on the National Highway System. State DOTs are charged with preserving mobility on the existing traffic system and thus typically try to preserve the through movement capacity on urban arterials. This mission often stands counter to the charge of city leaders and transportation directors, who are aiming to maximize economic development, improve quality of life, and spur neighborhood reinvestment. Nonetheless, the *Highway Capacity Manual* states that the performance of an urban arterial can be improved by reducing the density of intersections and the number of the driveways on the street, a design decision that makes a street's operation inhospitable to these kinds of developments. Signal timing can be "optimized" by restricting pedestrian crossings on various legs of the traffic signal, allowing allocation of green time to only movements that have the most cars. This mitigation treatment for potential delays to vehicles results in pedestrians having to wait for the pedestrian WALK indication three times to cross the street. Simply getting a cup of coffee can take three times as long as it ought to under these conditions. The *Urban Street Design Guide* counters many of these assumptions by making explicit recommendations for pedestrian networks. The guide negates certain provisions that restrict signals within 400 feet of one another, and qualifies warrants and other standards that inhibit cities from projecting desired conditions, in spite of the widespread use of traffic growth projections to justify projects and make investments for the future for automobiles. Taken together, these recommendations can contribute to a design framework that can not only support, but strongly encourage the kinds of mixed-use, walkable developments cities are striving to establish.

Conclusion

On the morning of October 29, 2013, NACTO President and NYC DOT Commissioner Janette Sadik-Khan invited city and state departments of transportation to join her in endorsing the NACTO *Urban Street Design Guide.* In launching this "endorsement campaign," NACTO set in motion a call for collective action and adoption of these guidelines, with the stated goal of eventually gaining FHWA endorsement and support for the *Urban Street Design Guide*. The campaign, which wraps up in May 2014, will induce widespread review and understanding of some of the practical ways that designers and engineers can rethink how they design urban streets. While campaigns of this sort can greatly increase the general understanding of street design in urban contexts, much work remains to be done to embed these practices at the state level, incentivize their implementation, and reduce other barriers to sustainable street design and walkable mixed-use development. **itej**

The NACTO *Urban Street Design Guide* is published by Island Press and is available for purchase from the ITE Bookstore at www.ite.org.

David Vega-Barachowitz *is the director of the Designing Cities initiative at the National Association of City Transportation Officials (NACTO). At NACTO, he coordinates the Designing Cities initiative and Cities for Cycling Project. In this role, he serves as project manager for the* Urban Bikeway Design Guide *and* Urban Street Design Guide*, which have together laid a better blueprint for city streets in the United States. Since joining NACTO in 2011, David's work has focused on design interventions that re-imagine the fabric of the American streetscape and challenge traditional metrics of urban design and transportation engineering.*

Peter Koonce, P.E. *is division manager for the City of Portland Bureau of Transportation's Signals, Street Lighting, & ITS Division. He has served as an adjunct professor at Portland State University teaching graduate level courses in transportation engineering. Peter has a bachelor's degree from Oregon State University and a master's from Texas A&M University. He is a registered professional engineer in Oregon and is the current chair of the Transportation Research Board's Committee on Traffic Signal Systems. Prior to joining the City, Peter worked in the private sector for 15 years with Kittelson & Associates. He is a member of ITE.*

Michael Flynn, AICP *serves as director of Capital Project Planning & Initiation at the New York City Department of Transportation (NYCDOT) where he oversees development of the City's capital street construction program, encouraging safer, greener and more vibrant streets as well as a state of good repair. Prior work at NYCDOT has included development of the* New York City Street Design Manual *and the design of innovative public space, bicycle, and safety improvement projects. Mike serves as a visiting professor at Pratt Institute's Graduate Center for Planning and the Environment. He is a member of ITE.*

Endnotes

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