CNU REPORT

Saving Lives, Time, Money: Building Better Streets

New Urbanists, Fire Marshals Find Common Ground

Residential streets like this 28-foot wide example in Prospect New Town in Longmont, Colo., are a staple of New Urbanism, but are often hindered by the International Fire Code's 20-foot clear rule. Properly designed, and in connected networks, these streets actually help emergency response times and calm traffic. (Photo courtesy of CNU)

The Congress for the New Urbanism (CNU), U.S. Environmental Protection Agency (EPA), and fire marshals from across the country have partnered together on an Emergency Response & Street Design Initiative. This initiative is aimed at reconciling the growing desire for appropriately-sized and connected streets with emergency responders' access needs. We believe common ground exists for solutions because streets in connected networks:

- Can improve emergency response times by providing several routes to any given address.
- Are safer for pedestrians, drivers, and emergency responders since they calm traffic below speeds that more likely result in fatal or serious injury collisions.

Narrower streets in well-connected networks also help reduce stormwater runoff, require less energy to construct, and facilitate non-greenhouse emitting transportation alternatives like walking and bicycling.

Abundant literature supporting these findings exists in academia, municipal reports and the work of Local Government Commission, a non-profit dedicated to helping local leaders and elected officials create healthy, walkable communities. An annotated bibliography provides a summary of current findings and is available at the Initiative's web page: cnu.org/emergencyresponse.

Traditional, connected streets are sustainable, viable alternatives to sprawling, wide road systems that encourage people to drive everywhere for everything. As the United States responds to the potential dangers of global climate change and the urgent need to reduce vehicle miles traveled to mitigate that threat, bringing back connected street patterns can help reduce energy consumption and carbon dioxide emissions.

Moreover, the demographic trends of the 1990s and this decade, which saw both young professionals and empty nesters migrating into cities, suggest growing demand for urban living. In response, the initiative partners are developing cutting-edge solutions for street designs that reduce emergency response times and improve community safety.

Over the past 40 years, the fire service has done a tremendous job reducing fire-related civilian deaths in the U.S. – from 7,395 in 1977 to 3,430 in 2007 according to the National Fire Protection Association. The majority of emergency calls are not related to fire, but rather to calls for medical or traffic injuries. In 2007, the National Highway Traffic Safety Administration reported that traffic collisions killed 41,059 and injured 2,491,000 people.

The Emergency Response & Street Design Initiative aims to achieve reductions in traffic injuries and deaths through better street design.

Origin of the Problem

As suburbs mushroomed and spread after World War II, the traditional, connected street grid network was

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Fire Officials, Urbanists Connect on Streets

Connectivity is Common Ground for Solutions

As we moved away from traditional development patterns, two major things happened to our streets: they became wider and the level of connectivity decreased.

Recent studies have shown that wider streets are associated with more traffic injuries and fatalities—leading to an increase for emergency response services. And at the same time, reduced connectivity has increased local fiscal burdens as each fire station is able to serve fewer and fewer households as homes sprawl across the landscape.

In their quest for better, more efficient public safety, new urbanists and fire marshals can learn from each other. New urbanists and smart growth advocates, guided by the Charter of the New Urbanism, call for compact, pedestrian-friendly, and mixed-use neighborhoods with interconnected networks of streets that promote alternatives to driving. Whether they're lined with bungalows with front porches, or shops and sidewalk cafes, traditional streets create an outdoor space that works well for drivers and pedestrians. They create lasting economic value and improve a community's quality of life.

But our desire for modestly-sized streets stems as much from public safety concerns as walkability. Properly designed and placed in connected networks, they reduce collision injuries and increase emergency access to a given address. And at the core of the emergency response profession is the goal of reducing injuries through effective response times and conditions. Ideally, fire trucks should get to locations in their station area within five minutes. They need to move down streets efficiently. Since highly interconnected street networks offer many routes to most places, emergency personnel have a better opportunity to find the most direct and unimpeded route possible.

As you will see in these pages, there are many pieces to this puzzle and much common ground between new urbanists and fire marshals. The Emergency Response and Street Design Initiative lets us search together for mutually acceptable and beneficial street design solutions.

John Norquist, President & CEO

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discarded in favor of cul-de-sacs and sprawling roads whose widths and parking restrictions easily accommodated fire apparatus of any size, even as their limited subdivision entries and cul-de-sacs increased the distance emergency responders needed to travel to reach their destinations.

As the consequences of sprawl became apparent, New Urbanism emerged during the 1980s to re-establish traditional, human-scaled neighborhood design including elements such as mixed-use buildings and streets that meet the needs of pedestrians and transit riders. Streets built for vehicles, pedestrians, cyclists, and transit with connections to the larger community are healthier alternatives to subdivisions, strip malls and office parks that stand isolated from each other and surrounding uses. Because they strengthen community bonds, improve quality of life, and are the building blocks of sustainable communities and regions, New Urbanist neighborhoods are holding their value much better than conventional subdivisions in the current economic downturn.

But as New Urbanism spread, the "20 foot clear" provision of the International Fire Code, which has been part of national fire codes since 1976, remained. The provision, which requires "an unobstructed width of not less than 20 feet" on designated fire access roads, vexes developers, planners, and engineers since it is commonly interpreted to force some streets to be wider than necessary

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What We're Doing and Why

The Emergency Response & Street Design Initiative brings together fire code officials, new urbanists and the U.S. EPA to find ways of accommodating traditional urban streets and emergency responders' needs for quick and ready access to a given address.

Our goal is providing streets that work for everyone – pedestrians, drivers, and emergency responders – and that reflect the principles of sustainable neighborhood design and public safety alike.

Working together, CNU, the EPA, and emergency responders will accomplish this in three main ways: new fire code language, research linking street design and public health, and aggressive education and outreach to build partnerships between new urbanists and emergency responders.

Code Changes

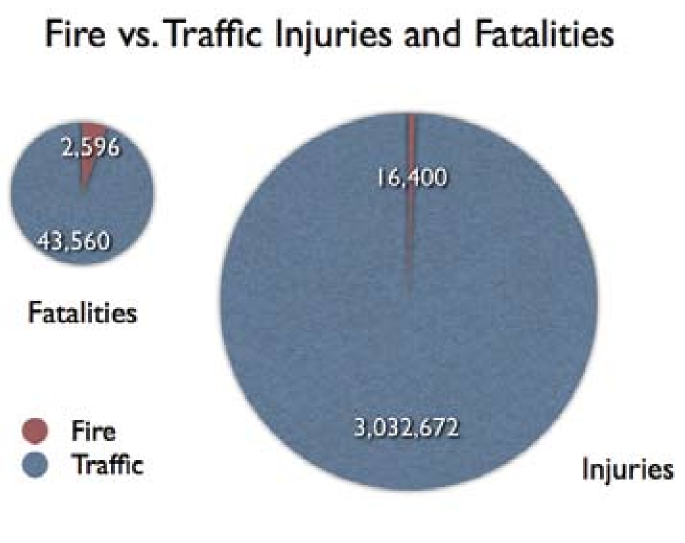
The Initiative team has developed proposed amendments to Chapter 503 of the International Fire Code that will empower local fire code officials to be more flexible, under specific circumstances, regarding the standard that currently requires street widths to include at least 20 feet of unobstructed space. The team also proposed a new appendix to the code, and a commentary explaining those circumstances. The International Code Council's code amendment process will continue through 2009 and 2010. We invite you to offer comment to the ICC on our proposed changes. For more information, please visit the Initiative's web page, www.cnu.org/emergencyresponse.

Street Design & Public Health

CNU and the Centers for Disease Control – which has already identified transportation injuries as a public health problem – are exploring the relationships between street design, traffic injuries, and public health/public safety, and how the organizations can work together in finding solutions to this problem.

Educating everyone about these interconnected factors dovetails with the Initiative's effort to teach new urbanists and fire code officials more about each other's professions, outlooks, and approaches to street design.

Through these approaches, we hope to improve the quality of the built environment and emergency service. We hope you will agree, and join us in this endeavor. Please see the "Get Involved" section of this Report on Page 13 for more information.



While traffic and fire deaths are equally tragic, fire-related injuries and deaths are a small portion of the overall number of accidents in the United States. In 2007 (the latest year for which statistics were available), the number of traffic-related injuries and fatalities nationwide far outpaced those from fires. (Chart courtesy of Peter Swift)

Shared Values for Traditional Urban Streets and Emergency Response

This list was created by during the CNU Streets and Emergency Response Workshop, held in April 2008, in Austin, Texas.

1. Life safety is important, should be inclusive, and extend from fire to traffic.

2. We value the efficient use of resources, including property, services, and infrastructure.

3. We value vibrant places that enhance pedestrian activity.

4. We value communities that include a range of neighborhoods and compatible uses.

5. We value streets, structures, and fire protection features that match the context of the neighborhood.

6. We value creative collaboration among those who serve and shape the built environment.

7. We value an ongoing process of education and capacity-building among those who serve and shape the built environment.

8. We value adaptation in life saving responses due to regional differences.

(Photo courtesy of LouAngeli2008, via Flickr under a Creative Commons license)

Traditional Streets are Safer

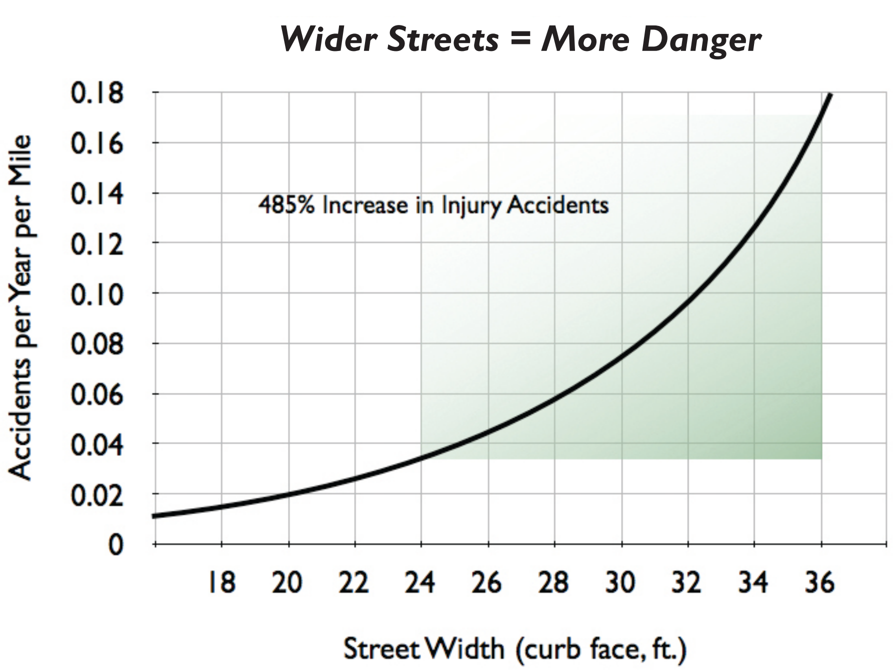
Slower Speeds, Fewer Collisions

Traditional streets improve public safety by guiding motorists to drive at appropriate speeds. Slower drivers are much less likely to strike cyclists and pedestrians at speeds capable of causing severe injury or death – facts compelling new urbanists' desires to construct them in mixed-use neighborhoods.

The 1997 Swift-Painter-Goldstein study of Longmont, Colo., analyzed 20,000 police accident reports based on five criteria to determine how street design impacted collisions. It found "the most significant relationship to injury accidents" was street width. "As street widths widen, accidents per mile per year increases exponentially, and the safest residential street width are the narrowest (curb face)."

The Longmont analysis, and the studies it cites (from 1976 and 1981), all correlated wider streets with higher speeds. The 1997 study concluded, "Clear relationships are evident between accident frequency and street width. The findings support the premise that narrower, so-called 'skinny' streets, are safer than standard width local streets." The study also noted "narrow streets should not be used without at least a second means of access. This can be accomplished with alleys and/or an interconnected network of streets."

Harbor Town in Memphis, Tenn., serves pedestrians, traffic, and emergency responders. The developer won strong support from the fire department by working early and often to identify and solve potential access problems like turning radii at intersections. Harbor Town won a prestigious Charter Award from CNU in 2007. (Photo courtesy of Looney Ricks Kiss Architects and RTKL)



The Swift-Painter-Goldstein study of traffic accidents in Longmont, Colo., revealed a 485 percent increase in accident rates per year per mile as street widths increased from 24 feet to 36 feet. (Chart courtesy of Peter Swift)

"Speed is the defining factor of a safe street — reduce the speed and you reduce the frequency and severity of collisions."

Eric Dumbaugh, a professor at Texas A&M University's Department of Landscape Architecture and Urban Planning, states that the design of the road communicates what is expected of a driver, especially when it comes to speed. Speed is the defining factor of a safe street – reduce the speed and you reduce the frequency and severity of collisions. There are many design factors that inform drivers of the appropriate speed—some of them are commonly misunderstood, like shorter sight distances reducing speeds, which cuts against the grain of conventional traffic engineering thinking in the U.S.

A related point steps beyond street width: the sense of spatial enclosure provided by structures lining traditional streets also influences traffic speeds. A national study, *Improving the Residential Street Environment* (Smith-Appleyard, for the Federal Highway Administration, 1981), found that while wider street widths are the primary cause for higher traffic speeds, wider building-to-building distances also increase speeds.

Reid Ewing, a research professor at the University of Maryland's Center for Smart Growth, Dr. Richard A. Schieber, of the National Center for Injury Prevention and Control, and Charles V. Zegeer, director of the Pedestrian and Bicycle Information Center at the University of North Carolina's Highway Safety Research Center, studied sprawl and collision fatality risk in 448 counties comprising the nation's 101 largest metropolitan areas. They developed a sprawl index identifying conventional development patterns and used regression analysis to correlate that index to all-mode traffic fatalities. Their results, published in the *American Journal of Public Health* (September 2003), found that:

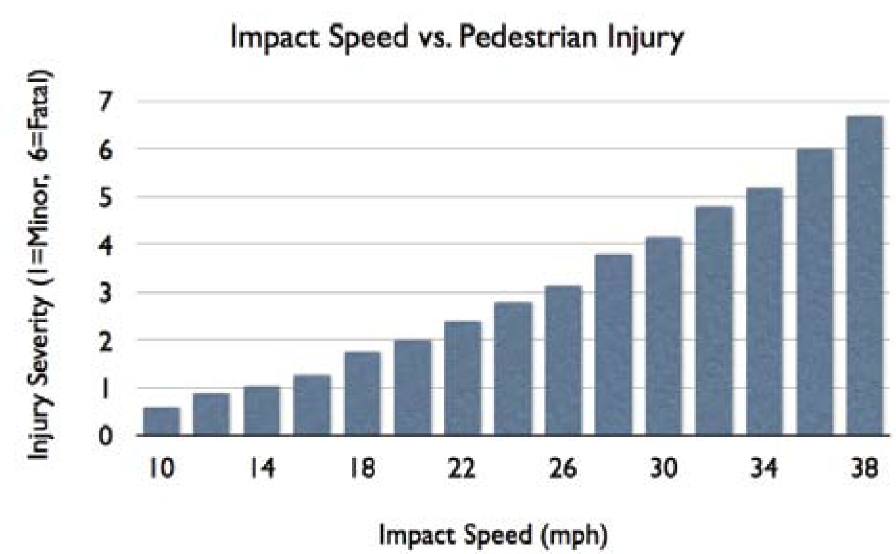
•Urban sprawl is "directly related" to traffic and pedestrian fatalities; the more sprawl, the higher likelihood of traffic and pedestrian fatalities.

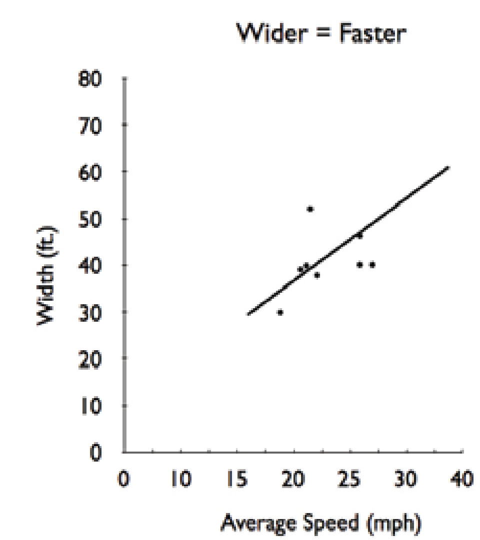
•"Sprawling areas tend to have wide, long streets that encourage excessive speed."

•"… developing land in a more compact manner may reduce pedestrian deaths, provided that the street network is designed for lower-speed travel."

These findings are confirmed by other work done by Swift, Noland, Dumbaugh and others. Burden summarized that their work shows that "better connected street systems and narrower streets and lanes (generally 26-28 foot wide local streets or 9-10 foot lanes [for avenues]) are the most safe." The Local Government Commission's publication, *Emergency Response, Traffic Calming and Traditional Neighborhood Streets* (Burden & Zykofsky, 2001), amplifies another key point that, "…to insure that emergency response times are given full consideration, fire department personnel – along with other key players – must be at the table."

"Urban sprawl is 'directly related' to traffic and pedestrian fatalities; the more sprawl, the higher likelihood of traffic and pedestrian fatalities."





The relationship between traffic speed and street width, right, and the speed vs. safety implications, left, are clear: The wider the street, the faster the traffic, which means a greater likelihood of severe or fatal pedestrian injuries from collisions. In other words, traditional streets calm traffic and reduce the severity of pedestrian injuries. (Charts courtesy of Peter Swift)

Traditional Streets are Safer for People and Traffic

Street Grid's Efficiency Helps Everyone

New urbanists like connected street networks because they handle large volumes of traffic at safer speeds in people-centered environments while offering multiple ways to get from A to B. At the same time, the importance of a 4- to 6-minute response time cannot be underestimated. Firefighters swear by it for three reasons:

•Someone who has collapsed and isn't breathing typically starts suffering brain damage within 4 to 6 minutes of oxygen deprivation; except for rare cases, brain death almost always occurs after 10 minutes.

•Fires can reach an uncontrollable condition called "flashover" within 3 to 8 minutes. Fire death is certain if someone is present at that moment.

•It mitigates unavoidable lag time as firefighters don't know about emergencies until notification. And once at the scene, they must evaluate and set up before attacking a blaze.

"Traditional, connected street networks, even when narrower than 20 feet, can reduce response times by offering multiple and shorter paths to a given location."

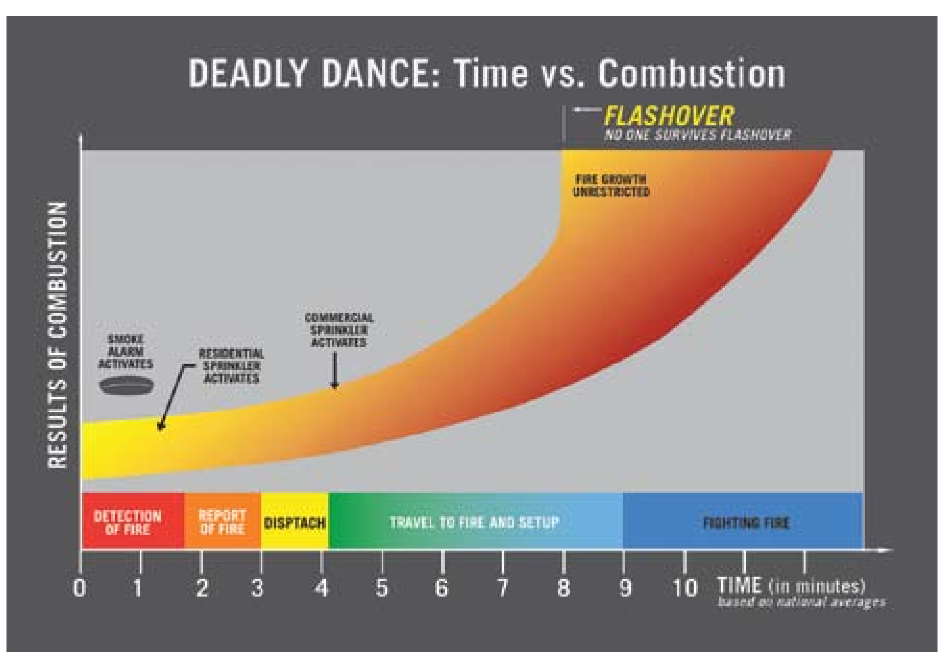
Traditional, connected street networks, even when narrower than 20 feet, can reduce response times by offering multiple and shorter paths to a given location.

In Charlotte, N.C., the city's Department of Transportation examined connectivity and response time in a 2008 study and found the citywide average response time rose from 4.5 minutes in the mid-1970s to 5.5 minutes in 2002. This increase corresponds with the prevalence of street design patterns in conventional subdivision development.

However, the study discovered that since October 2001, when the city's subdivision ordinance began requiring street connectivity, average response time has dropped 30 seconds, to 5 minutes. This is a dramatic drop given the lag time in transforming conventional subdivisions into connected spaces.

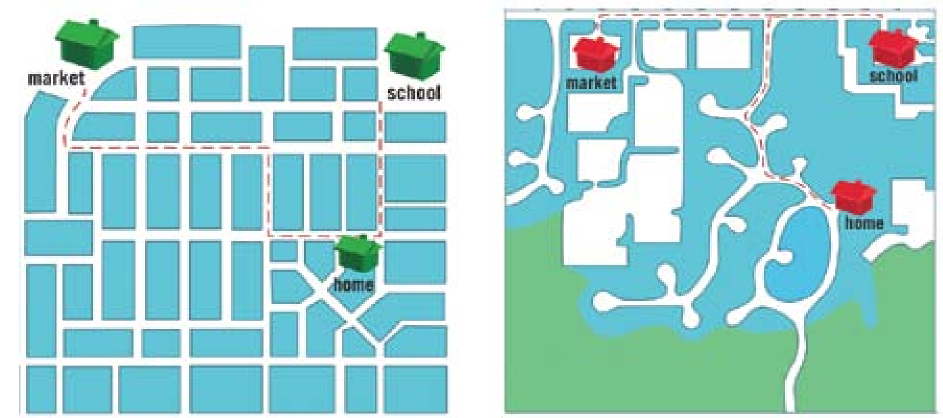
In addition, connected street networks can also improve fiscal efficiency when it comes to fire stations' fixed costs. Both Charlotte and Raleigh, N.C. studied the effects of connected versus disconnected street patterns on fire station coverage and cost efficiency. Each city concluded – in 2008 and 2000, respectively – that connected networks improve both factors.

Response Time: When a Short Wait Saves Lives



The 4- to 6-minute response time is critical for emergency responders, given the inevitable lag between a blaze starting, or someone falling unconscious, and the fire department being alerted. When present, sprinklers help control the fire early, lengthening the time before deadly, uncontrollable "flashover" occurs. That response window also gives emergency medical technicians the best chance to treat unconscious victims before brain damage or brain death occurs. (Courtesy of Austin, Texas, Fire Department, Northern Illinois Fire Sprinkler Advisory Board, Chicago Sprinkler Fitters Local 281, Orland Fire Protection District, Orland Professional Firefighters, Sprinklerfitters Local 669, and National Fallen Firefighters Foundation)

Grid vs. Sprawl: The Power of Connectivity

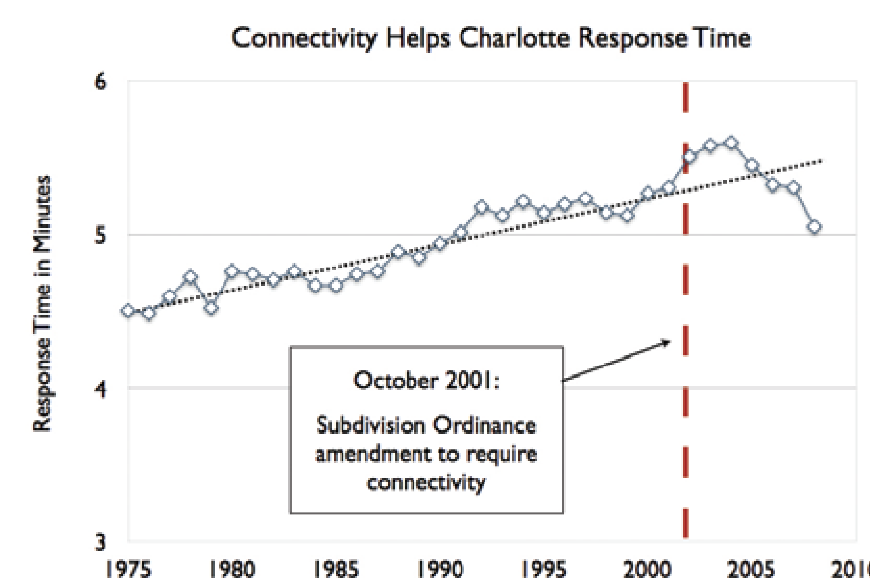


In traditional New Urbanist neighborhoods like the one at left, pedestrians, automobile drivers, and emergency responders can take myriad routes to any destination on streets designed to accommodate both vehicles and people. Suburban sprawl, center, excludes pedestrians in favor of cars, and funnels traffic onto a limited number of routes. Here, if this one route is blocked, emergency responders trying to reach the house must travel miles around to the subdivision's other access point.(Image by Paula Salhany, courtesy of Duany Plater-Zyberk & Co.)

"...since October 2001, when the city's subdivision ordinance began requiring street connectivity, average response time has dropped 30 seconds, to 5 minutes. This is a dramatic drop given the lag time in transforming conventional subdivisions into connected spaces"

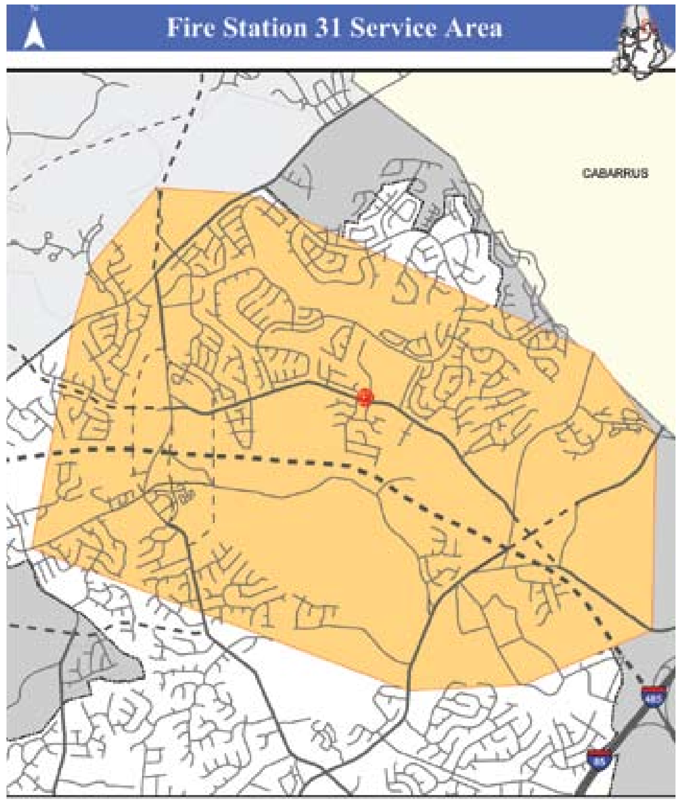
Charlotte compared eight fire stations from near downtown to a newer neighborhood at the city's periphery (See "Saving Lives and Money: A Charlotte Case Study", page 8).The study confirmed that higher street connectivity means that a single station can serve more households at a lower per capita cost. For example, Station 2 in Dilworth, a neighborhood begun in the 1890s as a streetcar suburb, scored best, serving 26,930 households in 14.1 square miles at an annualized per capita life cycle cost of $159. Station 31 near Highland Creek, which developed in the 1980s and 1990s, scored worst, serving just 5,779 households in 8 square miles at an annualized per capita life cycle cost of $740.

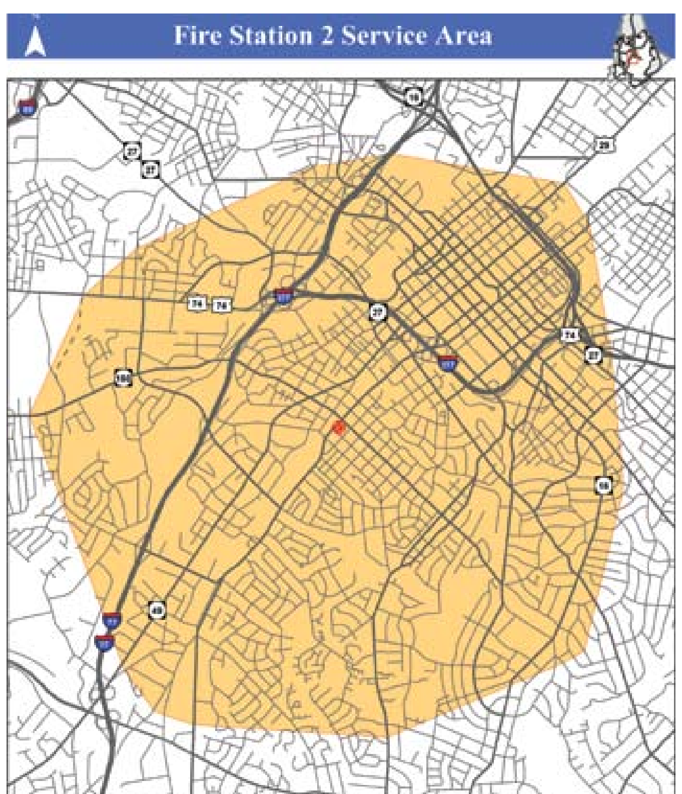
Raleigh's study, cited in *Planning for Street Connectivity: Getting from Here to There* (Handy, Paterson & Butler, 2003), looked at response area coverage within a 1.5-mile radius of fire stations. The authors concluded that older neighborhoods had greater service efficiencies due to their greater street connectivity – "...a fire station in the most interconnected neighborhood could provide service to more than three times as many commercial and residential units as the least connected neighborhood."



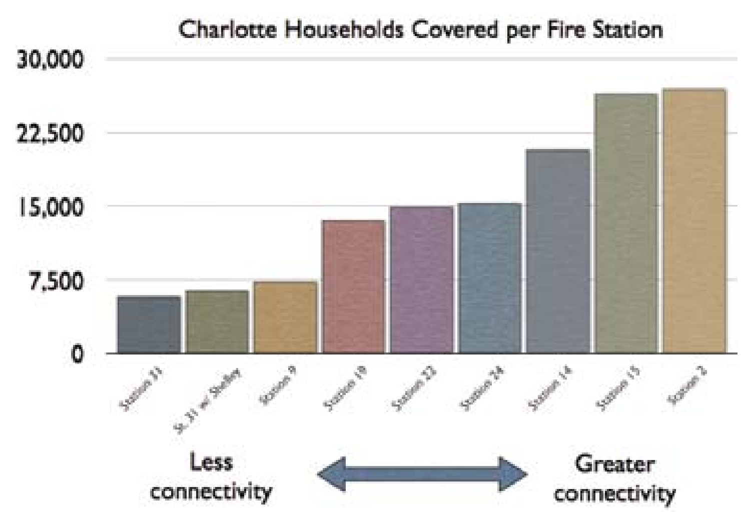
In a 2008 study, the city of Charlotte, NC, found that average response times decreased as street connectivity increased after a connectivity ordinance became law in October 2001. (Chart courtesy, City of Charlotte, NC)

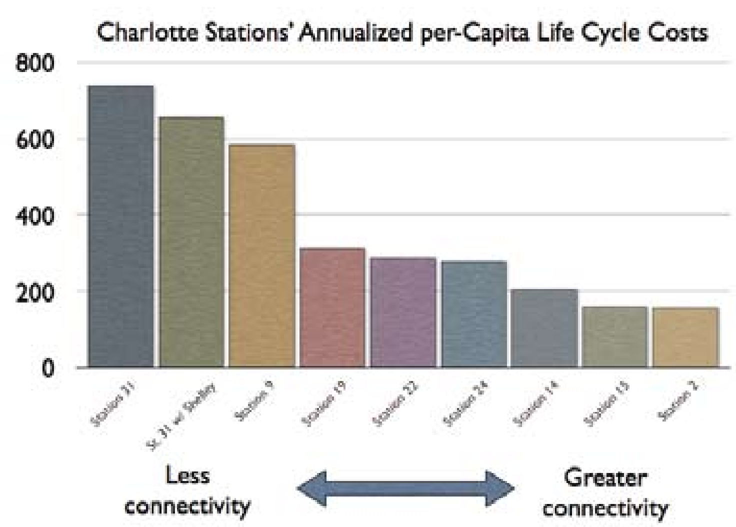
Saving Lives and Money: A Charlotte Case Study





The benefits of connectivity and traditional neighborhood development become clear in these maps showing the coverage areas of Charlotte Fire Stations 2, bottom left, and 31, top left: Station 2 covers 4.5 times more addresses in highly connected Dilworth than Station 31 does in sprawling Highland Creek, and at a much lower annualized per capita cost ($159 vs. $740).
Moreover, the charts, below, show how this pattern holds true with other fire stations, too. They also show that Station 31 and nearby subdivisions would benefit from a proposed, but not yet built 300-foot connection on Shelley Avenue that could shave a mile off the 1 1/2-mile route firefighters must currently drive.
Station 31 could then cover approximately 12.5 percent more households and 17 percent more area for a lower annualized per capita cost ($659), yet still vastly under-perform Station 2. (Charts, maps courtesy of City of Charlotte, NC)





States and Towns Embracing Reform

Connectivity, Choice are Key for New Approaches

Street width is mainly a matter of local and state jurisdiction. Most local ordinances discuss street width variances or focus on connectivity requirements.

Only Oregon and Washington allow local jurisdictions to override the 20-foot clear rule. Oregon gave local communities increased flexibility in a 1997 law developed with the state's fire service (Oregon Revised Statutes, 368.039). The statute empowers local governments to design their own street standards in consultation with the local fire department. Washington's updated code is very similar to Oregon's, with the local government allowed to adopt street standards that differ from the state uniform fire code (see Revised Code of Washington, 19.27.060 [5]).

The Commonwealth of Virginia is moving to reduce street width on a statewide basis. Virginia is a unique case because its Department of Transportation is responsible for local road maintenance. In 2008, they adopted new connectivity requirements based on the link-node ratio – the number of links (stretches of streets or alleys) divided by the number of nodes (intersections) in a given area; the higher the ratio, the more connected the street network (a perfect grid's ratio is 2.5). Starting this year, VDOT requires new developments to meet minimum ratios of 1:4 for suburban areas and 1:6 for urban, or compact areas.

Assistant Secretary of Transportation Nicholas Donohue said those ratios will be a vast improvement, as most developments in Virginia since the 1970s offer minimal connectivity. The new connectivity standards will allow the curb-to-curb width of future neighborhood through streets will be much less than the current 36 feet, Donohue added. The pending new standards are 29 feet with parking on both sides or 24 feet with parking on one side. "Increased connectivity allows reduced street widths because it provides firefighters with at least two paths to respond to any emergency", he said.

Fire departments welcome increased connectivity. Carl Wren, senior engineer of the Austin (Texas) Fire Department says the biggest concern with connectivity ordinances is the willingness of future county commissions, city councils or village boards to follow them in the face of developer and/or residents' resistance. The question becomes how communities ensure that connectivity goals are not short circuited while discrete projects are developed over the years by different people and in various neighborhoods. This is an especially important topic in an era where developers are designing the streets – not like in the past where the local governments had general street plans.

Most fire departments can identify long dead-end roads or road stub-outs in adjacent subdivisions resulting from abandoned plans for connectivity during phased construction of developments. Fire departments and street designers alike can cite examples of connectivity being defeated by the refusal of adjacent communities to cooperate on the alignment and connection of neighborhood streets.

A trio of North Carolina communities, Davidson, Cornelius and Huntersville have pioneered connectivity requirements. Davidson attempts to address neighborhood resistance to increased connectivity through signage. Its 2001 ordinance requires that signs be posted on cul-de-sacs and dead-end streets that "have the potential to connect" to adjacent properties where future development may go, declaring: "This cul-de-sac is temporary. The street will be extended when the adjacent property develops." Huntersville, recently mandated similar signs for dead-end streets that will one day be connected to the next subdivision. See *Planning for Street Connectivity: Getting from Here to There* for more information.

Potential emergency response problems from the failure, or inability to connect streets are clearly seen in this aerial photo of the Barton Hills neighborhood in Austin, Texas. While geography and the city's concerns about impervious cover helped prevent this connection in the red circle, residents' opposition influences decisions to stop other connections, even though neighborhood traffic flow and emergency response may be hampered. (Photo courtesy of Carl Wren)

Fire Officials, Transportation Engineers Want Connectivity

Examples Prove Cooperation Can, Does Work

Effective emergency response and traditional streets can coexist. In fact, they already do in every neighborhood predating World War II. Given existing codes, however, new developments often fail to achieve the connectivity necessary for fast response times or the human-scaled streets that lead to fewer traffic injuries and fatalities.

But this trend is starting to change—fire officials and transportation engineers are coming together to build safe places. Dan Burden, founder of Walkable Communities, a non-profit organization promoting pedestrian and bicycle-oriented development, reviewed this progress in *Emergency Response and Traditional Neighborhood Street Design*. This study presents the Waterfront District in Hercules, Calif., Harbor Town in Memphis, Tenn., and High Point in Seattle, Wash., as case studies of New Urbanist neighborhood designs successfully integrated with existing fire service.

Well-designed streets like those in Harbor Town, above, and Winter Park, Fla., below, work for pedestrians, neighborhoods, and emergency responders. Poor designs that create access problems sour emergency responders to future developments using traditional street design. (Top photo courtesy of Looney Ricks Kiss Architects and RTKL; bottom photo courtesy of Norman W. Garrick)

In Hercules, the developer and redevelopment agency collaborated on providing residential sprinklers for the 64 single family homes and the waterfront district was built using 26-foot-wide streets that offered 17 feet of clear space. The trade-off was agreeing with the fire marshal's insistence on removing parking from one side of the streets – an arrangement not typically favored by New Urbanists, but agreed to, Burden said, because it was better to design and build a good street at the time, and revisit the parking question at a later date.

Seattle's fire marshal approved the designs for the High Point neighborhood because its proposed street system was designed to fit in with the surrounding area's existing grid, even though more current codes called for wider streets. Burden said the fire marshal agreed to narrower streets in this case not only for that reason, but also because the innovative stormwater strategies called for narrower streets.

At the 2008 New Partners for Smart Growth conference, Antonio Bologna, architectural consultant and vice president of development for Harbor Town, spoke about the importance of flexibility and working early and often with a local fire department. Using this approach for Harbor Town meant problems involving intersection designs, primary access routes, and turning radii were cooperatively identified and solved – a strategy he said paid off when it came time for city council approval and the Memphis Fire Department indicated its enthusiastic support.

Dan Burden notes that for narrower, connected streets to work properly, they "must be part of a well-connected street system," and that "attention to design details is essential." Burden says developers and engineers must consider connectivity along with street width, turning radii, parking, and streetscape treatments. In *Healthy Neighborhoods and Healthy Streets* (2008), a guide written as part of this initiative, he calls for flexibility in designs based on performance instead of prescribed numbers; "Being too prescriptive creates problems for developers, designers and responders." Burden outlines the functions of traditional local, collector and arterial streets:

(1) assure large equipment access and movement,
(2) provide appropriate speed and volume,
(3) allow motorists to pull over to let responders by, and
(4) allow sufficient width for incident 'deployment' (generally 16-20 feet)

The August 2007 edition of *Urban Land* featured the work of Reid Ewing, Ted Stevens and Steven J. Brown tracking efforts in seven cities, plus the state of Oregon, to achieve streets with less than

"Using this approach for Harbor Town meant problems involving intersection designs, primary access routes, and turning radii were cooperatively identified and solved — a strategy he said paid off when it came time for city council approval and the Memphis Fire Department indicated its enthusiastic support."

20 feet clear. They found many examples of where streets with less than 20 foot clear were achieved and some cases much less. In Orlando, Fla., the Baldwin Park community was allowed a network of

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Sprinklers Help Street Design Discussions

Sprinklers are the key to greater flexibility from the fire service, says Capt. Frank Kinnier, an assistant fire marshal with Chesterfield County, Va., Fire & EMS"You don't have these massive fires when there are sprinklers," he says, "and you don't have the need for as much apparatus." Or for as much water.

For example, the International Fire Code requires ladder trucks for buildings over 62,000 square feet and more than 30 feet tall. The code also requires a 26-foot clear lane on two sides that must be placed at least 15 feet and no more than 30 feet from building facades to accommodate trucks' outriggers and hose placement. But if that 62,000-square-foot building has sprinklers, the code requires only one 26-foot clear lane and does not require ladder trucks until the building is over 124,000 square feet.

Sprinklers also reduce the amount of water required from hydrants, Kinnier says. For a typical one-story, 62,000-square-foot wood frame building, the required flow is 6,750 gallons per minute (gpm). If that building does not have a sprinkler system and catches fire in the middle of the night, firefighters learn of the blaze once it triggers alarms and blows out of the ceiling or windows. It's so big that once firefighters arrive, they'll flow water at the 6,750 gpm rate for about 30 minutes, for 202,500 gallons. However, if that building has sprinklers, the required flow is reduced by 75% to 1,687 gpm, will activate alarms, and will likely require significantly less water overall. "Water conservation," Kinnier says, "is even more powerful when you apply it to residential (buildings)."

Limited Options with Equipment Size, U.S. Fire Marshals Say

Former Milwaukee, Wis., Deputy Chief Neil Lipksi essentially created a specialized fire engine for Milwaukee by threatening to take the city's business elsewhere if the manufacturer wouldn't build a truck scaled to the city's existing fire stations and street grid. While he was able to be more adamant with fire equipment manufacturers about their city's particular needs, his experience is an exception to the general rule: fire engines, ladder trucks, and ambulances in the United States are not getting smaller.

Most residential structures in the U.S. are built of wood and so their inherent fire loads (available fuel for a fire) are much heavier than those in Europe or Japan. This leads to the need for first responding units to carry more equipment and water than the typical smaller fire engine can handle. Second, most, if not all, fire departments have limited capital budgets and prioritize the purchase of engines and ladder trucks capable of handling almost any emergency from medical to hazmat or roaring fires while being mindful of the number of firefighters required to adequately operate the vehicle. Moreover, fire code officials enforce road design limitations based on the emergency vehicles already in service in their jurisdictions and generally do not have a voice in the emergency vehicle purchasing process.

(Photo courtesy of Combined Media, via Flickr under a Creative Commons license)

CNU Charter, Canons, and Streets

The Congress for the New Urbanism's interest in better street design dates from its founding in 1993. Members subscribe to the Charter for the New Urbanism, a list of principles for building better communities at all scales, from the region down to the street. Signed in 1996 at CNU IV, in Charleston, S.C., the Charter devotes a section to "The block, the street, and the building" that states:

•A primary task of all urban architecture and landscape design is the physical definition of streets and public spaces as places of shared use.

•The revitalization of urban places depends on safety and security. The design of streets and buildings should reinforce safe environments, but not at the expense of accessibility and openness.

•Streets and squares should be safe, comfortable, and interesting to the pedestrian. Properly configured, they encourage walking and enable neighbors to know each other and protect their communities.

In addition to the Charter, many CNU members also subscribe to a new document, the Canons of Sustainable Architecture and Urbanism. Introduced in 2008 at CNU XVI in Austin, Texas, the Canons expand upon the Charter's inherent emphasis on sustainable development, and provide operating principles for those attempting to implement the Charter.

Of streets, blocks, and networks, the Canons say:

•The design of streets and the entire right-of-way shall be directed at the positive shaping of the public realm in order to encourage shared pedestrian, bicycle and vehicle use.

•The pattern of blocks and streets shall be compact and designed in a well-connected network for easy, safe, and secure walkability. This will reduce overall vehicular usage by decreasing travel time and trip length. Design shall strive to minimize material and utility infrastructure.

For more information about the Charter of the New Urbanism, please visit www.cnu.org/charter.

For more information about the Canons of Sustainable Architecture and Urbanism, please visit www.cnu.org/canons.

BUILDING continued

and poses barriers to creating compact, pedestrian-scaled neighborhoods.

The Initiative Begins

In 2007, the U.S. EPA's Smart Growth program awarded CNU a grant to study this problem and find solutions. An inaugural workshop held in Austin, Texas, united two dozen engineers, planners, and fire marshals to discuss street design, safety, and emergency vehicle operations. The diverse participants absorbed presentations from fire marshals, transportation engineers and urban planners and designers.

Participants discovered more common ground than was originally assumed – for example, a shared interest in improving public safety and promoting connected street grids – and developed a list of shared values that provided a solid foundation for moving forward. The findings of the inaugural workshop can be found at cnu.org/emergencyresponse.

Neil Lipski, a former deputy fire chief from Milwaukee, Wis., and Peter Swift, principal of Swift & Associates, immediately set to work updating the emergency vehicle response section for *Context Sensitive Solutions in Designing Major Urban Thoroughfares for Walkable Communities* – the CNU/Institute of Transportation Engineers proposed recommended practice. This manual advances street designs that create walkable environments and the inclusion of the emergency response section advances this initiative among a broad section of transportation engineers across the country. Their work is being incorporated into the next edition, scheduled for release in 2009.

The project team then determined that the best way to affect practice across the country is by amending national fire codes in ways that empower local fire officials to approve streets with less than 20 feet clear in specific circumstances. They identified specific code language within the International Fire Code as the biggest stumbling block because this is the most prevalent code adopted at the State and local levels. The team committed to submitting code proposals to the International Code Council (ICC) within its 2009-2012 code amendment cycle.

A dozen team members continued to strategize on how best to write alternative code language. They chose a two-prong approach -- language creating an exception to the current code and an additional appendix explaining the circumstances in which the exception would be acceptable. The group began drafting new code and appendix language in the fall and plans to submit them to the ICC in June 2009.

CONNECTIVITY continued

neighborhood streets with curb-to-curb widths between 20 feet and 22 feet, which naturally slows traffic. The community also built a street grid that includes alleys, ensuring that emergency responders have myriad paths to an emergency, and required sprinklers in all buildings.

Atlanta fire and public works officials compromised on street widths in the Glenwood Park neighborhood following a fire engine ride-along demonstration of narrow street maneuverability that included Charles Brewer, CEO of Green Street Properties, and then-Mayor Shirley Franklin. The developer was subsequently able to build street widths of 20 feet without parking, 27 feet with parking on one side, and 23 feet with parking on both sides. The developer expanded turning radii at corners from 15 feet to 20 feet and placed tree islands in parking lanes to help visually narrow street vistas.

Healthy Collaboration Leads to Healthier Environments

EPA's goal is to protect human health and the environment. Where and how communities grow can dramatically impact our nation's land, air, and water resources. Communities are looking for development approaches that will help them achieve benefits for their economies, environments, and quality of life.

Walkable, compact communities built in areas already served by existing infrastructure not only reap better environmental outcomes in the form of less stormwater runoff, reduced per capita emissions, and better preserved natural and open spaces. Smart growth development also leads to better community outcomes, such as expanded choice in housing and transportation, and improved health.

EPA is proud of our collaboration with the Congress for New Urbanism and our partners in the emergency response community to identify and remove barriers to achieving smart growth. In our first year of work together, we have made great strides in identifying areas of common interest, such as improved connectivity that provides redundancy in emergency access routes as well as better mobility for community members. In addition, narrower streets reduce runoff, as well as slow traffic to reduce fatalities and improve community health and safety. Compact development can make the delivery of emergency response services more cost-efficient, and reduce the rate of land consumption required for new growth at the same time.

The first year has been a productive one, and we look forward to the fruits of our ongoing partnership between smart growth proponents, new urbanists, and our partners in the emergency response community in the coming years.

John Freece, Director, U.S. EPA Smart Growth Office

Get Involved

The ultimate goal of the Emergency Response & Street Design Initiative is to see traditional streets in connected networks acceptable by right – easy for new urbanists to get approved and easy for fire marshals to approve them. As an individual involved and concerned about emergency response and street design, we welcome your ideas and experience on this matter. The initiative team is submitting to the International Code Council in 2009 the following three items:

Code Reform

The initiative team is submitting to the International Code Council by June 1, 2009, the following three items:

1) Proposed new language for the International Fire Code, empowering local fire officials to approve streets with less than 20 feet of clear space under specific circumstances;

2) Proposed new language describing the specific circumstances for Appendix D of the Fire Code, to be available for local jurisdictions to adopt as they see fit; and

3) Commentary to support the proposed new changes.

We welcome your input and support and ask you to submit comments to the ICC during the window for public input, which opens after June 1 and runs through Feb. 12, 2010. While hoping these changes will be accepted during this code amendment cycle, we realize this process can take multiple cycles over several years.

Case Studies and Examples

We're especially looking for examples of successful municipal codes or ordinances allowing narrower streets with the fire department's support. Examples of successful municipal codes or ordinances allowing narrower streets and has the fire department's support are also very helpful.

Got other ideas? Please send us an e-mail and check the Emergency Response & Street Design Initiative website for updates and information:
cnu.org/emergencyresponse

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Additional Resources

CNU Emergency Response & Street Design Initiative website: Includes the latest updates on the initiative, summaries of workshops, downloadable presentations, an annotated bibliography, and information on many of the studies mentioned in this report: www.cnu.org/emergencyresponse

International Code Council's Code Development website: Includes information about the code development process and links to the public comment form (comments are due by Feb. 12, 2010): www.iccsafe.org/cs/codes

Local Government Commission Street Design website: Includes an overview of the LGC's work on street design, information on the 2008 New Partners for Smart Growth conference, and links to publications, including Emergency Response and Traditional Neighborhood Street Design (Burden & Zykofsky, 2000-01): www.lgc.org/transportation/street.html

U.S. EPA's Smart Growth Office
www.epa.gov/smartgrowth

Virginia's new connectivity rules
www.vdot.virginia.gov/projects/ssar/

ROLL UP YOUR SLEEVES

Like what you've seen? Help build a better future at these CNU events.

Whether it's beginning new initiatives or advancing existing ones, many of the most compelling ideas in New Urbanism result from CNU's gatherings. Join us at future events as we work toward creating new standards for streets that support New Urbanist and Emergency Response goals. CNU's annual Congress and Transportation Summit feature panel discussions and work sessions with leading practitioners. Events are open to all; more information can be found at www.cnu.org.

The annual Congress is the leading venue for new urbanist networking, collaboration, and education, drawing over 1,500 innovators from far and wide to discuss development practices and public policies, learn new research, and advance new ideas to transform our communities. Don't miss these opportunities to share your experiences, discover new tools, and learn how you can create better streets and connected neighborhoods. Upcoming events will have a special focus on street design and public health to create safer urban environments.

Future Congresses

CNU 17: Denver, Colorado, June 10-14, 2009
CNU 18: Atlanta, Georgia, May 19-22, 2010
CNU 19: Madison, Wisconsin, June 1-4, 2011
Visit www.cnu.org/congresses for more information.

CNU Transportation Summits are innovative New Urbanist gatherings of 150 people where experts gather to present ideas and work towards reforming transportation standards that prevent high quality urbanism. This year, we will explore how Oregon's state laws impact local community street designs and emergency response times.

Future Transportation Summits

2009: Portland, Oregon, November 4-6, 2009
2010: Indianapolis, Indiana, Dates TBD
2011: Burlington, Vermont, Dates TBD
Visit www.cnu.org/transportationsummits for more information.

These are your opportunities to learn the latest solutions, whether it is reframing street design into a public health issue or forging new standards in community codes. Turn obstacles into opportunities: Join new urbanists and emergency responders, transit planners and elected officials as we work to reduce response times, improve safety and create great urban environments. These events are open to all.

For more information on the Emergency Response & Street Design Initiative, or to get on the e-mail list for reminders about these events, contact Heather Smith at hsmith@cnu.org.

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