

***Network Preamble: CNU Statement of Principles on
Transportation Networks***

Cities and their surrounding regions are the social, cultural, and economic drivers of human civilization. Of especial importance is the design and composition of transportation networks, which not only enable the movement of people and goods within and between cities and regions, but which provide the physical foundation on which human settlements are based.

While a great deal of attention is currently directed towards the design and operation of the individual components of a region's transportation system, comparatively little attention is given to the design and development of the transportation networks which these facilities comprise. This has resulted in the creation of transportation systems that are fragmented, disconnected, and inefficient from a transportation perspective, and that do not effectively address the social, environmental, or economic aspirations of the communities they serve. The United States now has the world's highest level of VMT per capita, while simultaneously experiencing the highest traffic fatality rates of any developed nation. Per capita traffic delay has more than doubled in the United States since 1982.³ This deterioration in transportation system performance has occurred in spite of an ongoing public investment of more than \$200 billion per year in transportation infrastructure.

Given these trends, there is a clear need to rethink the design and operation of regional transportation infrastructure, moving beyond a focus on the individual components of the system, and towards a more comprehensive, network-level approach. A network-level approach to transportation planning and design recognizes that a transportation system's primary purpose is to connect people, places, and activities with each other and with the social and

economic activities of the larger community and region, and that there are multiple strategies available to do so.

Attention to the design and configuration of transportation networks improves the transportation system in four key ways:

1. Enhancing Accessibility for Persons of All Ages and Abilities.

Much of conventional transportation practice focuses on enhancing mobility, as measured in terms of either speed or travel delay, and which are embedded in contemporary level-of-service measures. While such measures are invaluable for addressing freight movement and interregional transport, they fail to address transportation needs within a metropolitan region, where destination accessibility – or the ability to quickly and conveniently access desired travel objectives – is what matters.

A network-level approach to transportation systems planning and design focuses on a transportation network's ability to enable travelers to access their destinations in a timely and efficient manner. Such a perspective recognizes that travel objectives may be accommodated using a variety of modes – including motor vehicles, transit, walking, and bicycling – and that such demands may be addressed through land use planning and community design.

A key concept in addressing intraregional accessibility is street network connectivity, or the connectedness of the street network. Street networks with higher levels of connectivity shorten trip distances by permitting more direct trip routing, making destinations more accessible by walking⁵ and increasing the capture area surrounding transit stations. Street networks with higher levels of connectivity have further been shown to reduce vehicle miles traveled, as well as reduced traffic congestion and vehicle delay by permitting traffic to diffuse across the larger street network, and by providing alternate routes to absorb excess demand on any individual route.

Beyond enhancing the performance and viability of each of the primary modes of travel, well-connected networks ensure that all persons – regardless of their age or driving ability – are able to independently accomplish their travel objectives in a safe and

efficient manner, thereby providing a key means for addressing the challenges of addressing personal transportation in an aging society.

2. Addressing the challenges of global climate change.

The transportation sector is responsible for almost one-third of the carbon dioxide (CO₂) emissions in the United States.⁸ While improvements in fuel economy and clean emissions technologies may help offset the transportation-related production of CO₂, the design and configuration of community and regional transportation networks can aid in these goals by reducing vehicle miles traveled and encouraging shifts to cleaner modes of transportation, such as walking, bicycling, and transit.

3. Increasing Health and Safety.

The design of transportation networks can have a profound effect on health and safety. The design of transportation networks has a profound effect on physical inactivity and traffic fatalities, two of the leading causes of preventable death in the United States.¹⁰ In the case of physical activity, street networks designed and configured to support travel by active modes – such as walking and bicycling – have been shown to increase physical activity and to reduce the incidence of overweight and obesity.¹¹ In the case of traffic safety, street networks can be designed and configured to moderate the behaviors that result in traffic crashes, thereby reducing the incidence of traffic-related death and injury.

4. Ensuring the Responsible Stewardship of Limited Fiscal Resources.

There is currently a crisis in transportation finance. While the gas tax has remained legislatively fixed since the early 1990s,¹³ increased global demand for transportation-related materials, such as concrete, steel, and asphalt, have caused construction and maintenance costs to skyrocket in recent years.¹⁴ The result is that many transportation agencies are hard pressed to fund basic

system preservation and maintenance, let alone the construction of new capital facilities.

A focus on the design and configuration of transportation networks, rather than single-use facilities, can provide low-cost opportunities for enhancing transportation system performance. Well-connected street networks permit traffic to diffuse over larger geographic areas, dispersing traffic and providing alternate transportation routes that relieve congestion at bottleneck locations. Because street connectivity requirements can be incorporated as part of local development codes, the transportation benefits associated with increasing network connectivity can be realized at little or no cost to the public sector during the development review process.