



**Downtown Block Length** = 340 - 360 Feet (approximately)

**Downtown Block Perimeter** = 1,360 - 1,400 Feet (approximately)

**Downtown Intersection Density** = 0.5 Intersections / 1 Acre



**Commercial Block Length** = 1,000 - 2,180 Feet (approximately)

**Commercial Block Perimeter** = 6,000 - 7,000 Feet (approximately)

**Commercial Intersection Density** = 0.07 Intersections / 1 Acre

**Residential Block Length** = 800 - 1,000 Feet (approximately)

**Residential Block Perimeter** = 2,000 - 2,600 Feet (approximately)

**Residential Intersection Density** = 0.3 Intersections / 1 Acre



The connectivity of a network impacts the available range of streetscape designs. More connected networks (above, left) account for greater variety; less connected networks (above, right) must prioritize the automobile before addressing other important streetscape elements.

### INTRODUCTION...

This Structure Paper focuses on the connectivity of the transportation network. Connectivity is primarily reflected by the pattern created by blocks and streets. The issue of street connectivity standards impacts many planning and development decisions at many scales. It impacts macro-scale policies such as preserving the integrity of region-wide transportation networks. However, less obvious but just as important to transportation goals, connectivity impacts micro-scale policies such as the way a building, lot, and development site can be arranged and accessed within a district or neighborhood. When a plan calls for multi-modal transportation solutions or improved walkability, better connectivity at the micro-scale or local street network level is a fundamental strategy. Better connectivity must be planned and coordinated at the first increment of development in order to fit into the larger community or regional development and transportation patterns. The cumulative effects of these decisions across many developments will determine how people move about the community for decades. Better connectivity improves transportation options – both in terms of potential routes and in terms of the viability of different transportation options.

### WHAT IS CONNECTIVITY?

**Connectivity** is a way to measure the overall function of the transportation network.

It determines how well the transportation network can support different development scenarios - both immediate and long-term. When applied to the scale and context of a specific development, connectivity will impact site design, building orientation and design, and streetscape design. In general, there are three common ways to measure the degree of connectivity in a transportation network -

- maximum block lengths;
- maximum block perimeters; or
- density of intersections.

While the latter is more accurate in correlating the function of the network to a specific connectivity measure, the former two are the most common forms of regulatory standards because of their objectivity and ease of calculation, particularly when applied to a development project.

### WHAT PLAN CHEYENNE SAYS...

*PlanCheyenne* addresses connectivity both implicitly and explicitly. Implicitly *PlanCheyenne* is very strong on long-range policies for:

- Improved Walkability;
- Multi-modal Transportation;
- Complete Streets;
- Mixed-use Activity Centers;
- Community Character; and
- Neighborhoods with Choices of Housing Options.

All of these policies are directly furthered by better connectivity of the regional and local street networks.

*PlanCheyenne* also mentions street connectivity explicitly in several places – most often it is mentioned in association with the Activity Centers and Urban Neighborhoods, calling for maximum block lengths of 400 to 600 feet.

This range of block lengths represent good default parameters or guidelines. The range is based on many established precedents of built communities that fulfill principles similar to those of *PlanCheyenne*. However, there are plenty of justifications to deviate from this guideline. *PlanCheyenne* identifies many of these as well, which include:

- Preserving more intact open and natural spaces;
- Accommodating large scale parks and trails systems;
- Lower density and rural development patterns; and
- Regional destinations that deviate from activity center development patterns.

Overall *PlanCheyenne* promotes a strong policy towards improved connectivity in the general long-range development patterns of the City.

### Commercial Streets



This type of street typically results from the lack of connectivity at the local network level. Arterial streets are forced to carry greater amounts of traffic, carrying both local and regional trips. Land uses become further spread out and require automobile-oriented design. Pedestrian facilities require large buffering from traffic, when accommodated at all, yet are underutilized due to the pattern and format of land uses and site designs.



This type of street is possible in a well connected network. Traffic is typically “calmed” as it enters the activity center. Most trips are either to the center, or when they are through the center drivers have a choice of dealing with the slower speeds for this segment or finding alternative routes around the center, particularly in peak times. This design allows a better relationship of the streetscape to the supported land uses and buildings, and offers more options to balance the needs of multiple users of the rights-of-way.

### KEY ELEMENTS OF CONNECTIVITY...

Connectivity at a regional scale can support better long-range transportation options. Most communities recognize this as an essential part of planning for growth, and include connectivity at the arterial street level in long-range plans or development standards. However, this typically only ensures connectivity for vehicular transportation. The scale and frequency of arterial streets does not account for the land use, density / intensity, and site design issues that are necessary for considering trips by walking, transit, or bicycle.

Improved connectivity at the much more specific and local level is what delivers better function of a multi-modal transportation system. Local street network connectivity is essential to the ability to develop much more densely, efficiently, and in walkable, mixed-use patterns.

A local transportation network that results in block sizes in the 2 to 5 acre range is considered the threshold for developing walkable urban neighborhoods and activity centers. These blocks accommodate anywhere from 8 to 30 lots typically and can yield a greater mix of housing and compatible land uses across blocks.

The following are just a few of the planning and urban design benefits that result from improved connectivity:

- It is more efficient for vehicles – it can handle greater amounts of traffic by dispersing volumes through a greater number of route options.
- It allows for a greater variety of streetscape designs – more lower-volume, lower-speed streets can allow for streetscape designs to more closely correspond to the associated land use and development it supports.
- It improves alternative modes of transportation – primarily transit and walking – by adding a greater number of route options and adding more direct routes to a variety of trip destinations.
- It accommodates “complete street policies” as fewer streets need to be designed as large-volume / large speed streets which compromise the safety and interests of non-vehicular users of the rights-of-way.
- It reduces vehicle miles traveled even when you still have to drive to destinations – more direct routes and land use / urban design patterns that allow more destinations within a tighter distance.

### WHAT DO CURRENT REGULATIONS SAY?

The current regulations do not consistently advance a policy of improved street connectivity. Some standards do impact the planning and design of roadway networks, but most often it is through access management standards that promote vehicular flow. Those standards could compromise some of *PlanCheyenne’s* other goals. For example:

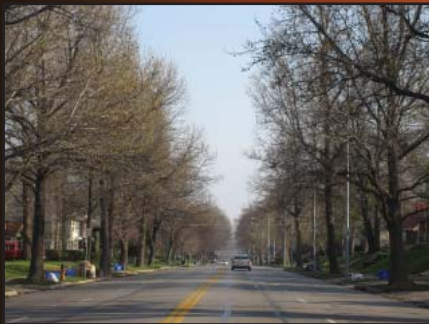
- Table 4-1 and Table 5-A-2 in the Road Street and Site Planning Design standards has minimum separations between full access driveways and intersections at 200’, 330’ or 660’ for collector, minor arterial, and principal arterial streets, respectively. While this may be important for access management on large, traffic moving streets, as a default standard that applies to all development in all contexts it would yield blocks that are a minimum of between 6 (two collector streets - minimum 660’ x 660’ blocks) to 40 acres (two arterial streets - minimum 1,320’ x 1,320’ blocks) if block faces are accessed by a full-access driveway. This may be acceptable for a purely automobile oriented context, but it will not deliver any successful pedestrian-oriented or mixed-use development.

Otherwise, there are no standards in the current zoning, subdivision, or street regulations that directly address local street network connectivity or link to the City’s policies for improved connections in the transportation networks.

### Pedestrian Streets



This type of residential street typically results from a lack of connectivity at the local network level. Most local trips are routed onto this street and it must be designed to accommodate all trips at peak times – even if that is only necessary for a small portion of the day. As a result most lots and buildings turn their backs on the street, deadening a significant portion of the public realm. In addition, a large investment in this street goes purely to accessing other streets with no developable blocks and lots on the street.



This type of residential street is possible in a well connected network. Even though the street may serve a large amount of traffic, the slower speeds and improved urban design features in the streetscape make it an attractive residential street and lots and buildings still front on the street as the primary public realm.

### CHEYENNE OPTIONS TO CONSIDER...

The City should consider more explicit links to the transportation policies of *PlanCheyenne* in the Unified Development Code (“complete streets”; walkability, multi-modal transportation, etc.). In particular, the key role local street connectivity plays in delivering results that meet these policies should be emphasized in addition to the regional connectivity goals. The regulations should also emphasize different connectivity solutions for different contexts:

- Greater connectivity should be required in “Activity Centers” (blocks in the 2 to 5 acre range, maximum) than in automobile oriented places or other regional, single-purpose destinations (such as a campus or industrial park).
- Greater connectivity should be required in urban and mixed-density residential neighborhoods than is required in low or rural density neighborhoods.
- Greater connectivity should be required where development is proposing the use of alternative or narrower street designs that reflect complete street policies.
- Where connectivity is not required, layouts that could allow these areas to redevelop or accommodate future infill development with greater street connectivity may be important to long-range planning. Additionally, alternative interim connections should be explored and provided where appropriate to overall transportation patterns in the area.

### WHAT IS A STRUCTURE PAPER?

Structure Papers are a series of discussion papers developed in association with the *PlanCheyenne* implementation project. Each paper identifies a central issue from *PlanCheyenne* and discusses how this issue is impacted by current regulations as well as future amendments to the regulations. In addition to the basic information, citations to other resources for further in-depth information on the topics are also included. These Structure Papers are intended as an aid to project participants as they continue to discuss the merits and details of potential implementation strategies.

- Exceptions should be authorized for overriding regional urban design or transportation issues. For example trails, natural open spaces, extreme topography, or major regional transportation routes are all good planning justifications for not providing connectivity.

The Initial and Final Review Draft UDC incorporates all of these elements in Section 4.3.3.

### OTHER RESOURCES...

*For Effective Stimulus, Promote Street Networks*, New Urban News, January/February 2009.

*Planning Complete Streets for an Aging America*, AARP Policy Institute, May 2009 (Chapter 4, Best Practices – Making Streets Work For Older Travelers).

*Planning for Street Connectivity: Getting from Here to There*, Susan Handy, Robert G. Patterson, and Kent Butler, American Planning Association PAS Report 51, 2003.

### Connectivity Applied

Improved connectivity, does not necessarily require implementing a strict grid pattern of streets as you find in Downtown Cheyenne. While grid-like networks are important to the success and adaptability of the few blocks of an Activity Center Core, "modifying" the networks to account for site characteristics and to minimize undesired through traffic results in more interesting layouts for supporting neighborhoods, while still meeting connectivity goals. Furthermore, context-based connectivity standards and justifiable exceptions to the standards add tremendous flexibility to planning a well-connected local street network.

This site plan was produced for an area of Cheyenne at the Design Charrette in April 2008. It shows one of a great variety of street networks that can result from improved connectivity standards.

