Connectivity Provisions
Why connect our streets?

- Recent complaints about poorly-designed subdivisions funneling all of their local traffic onto a single or very few collector streets, resulting in unsafe or undesirable conditions for residents on collectors.
- Desire to create closer-knit neighborhoods with greater walkability
- As a land use regulation, street connectivity has a direct nexus to improving the health, safety, and general welfare of the public
Applicability

• Only applies to new subdivisions which have not yet submitted a preliminary plat
• Not retroactive
Why connect our streets?
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- Reduction in travel distance (VMT) and travel times for drivers
- Less burden on collector and arterial streets
- Higher percentage mode share for bicycling and walking
- Better and more efficient emergency vehicle access
- More efficient public services access (mail, garbage, etc.)
Why connect our streets?
How do we enforce Connectivity?

Connectivity Ratio

• A ratio used to determine the connectivity in a neighborhood by dividing the number of links by the number of nodes in a network

• Node: Any intersection of any two segments, culs-de-sac, or permanent turnarounds, such as dead end streets

• Links: connections between nodes

• Connectivity = links/nodes
What is a node?

A node is the terminus of a street or the intersection of two or more streets.

- Any location where a street name changes shall be considered a node.
- Any location where a street T-intersects with another street of any classification shall be considered a node.
- Any curve or bend of a street that exceeds 75 degrees shall receive credit as a node.
- Any curve or bend of a street that does not exceed 75 degrees shall not be considered a node.
Connectivity Ratios

• Connectivity Index value range is between 1 and 2.5
• Value of 2.5 indicates perfect street grid
• Value of 1 is a tree network, or completely disconnected network
• A connectivity ratio of 1.4 or greater is widely considered to be well connected in both planning and transportation literature. Anything less than that is considered not well-connected.
• 1.4 is also considered the base value for encouraging growth of walkable pedestrian communities.
• Connectivity analysis can be done on any network, not just vehicles
• Separate requirements for different transportation modes could prove to be very useful in creating connected communities
Connectivity Ratio Examples

14 Street Links
9 Nodes
Connectivity Ratio = 1.56

6 Street Links
6 Nodes
Connectivity Ratio = 1.00

11 Links ÷ 10 Nodes = 1.10 Connectivity Index

Legend
- 11 Links
- 10 Nodes
Connectivity Ratio examples

Connectivity Index: $\frac{36}{21} = 1.71$
Round Rock Neighborhood Summary

• 35 neighborhoods evaluated
  • Selected for ease of measuring
  • Wide range of ages, sizes, and prices
• High of 1.80 (Remington Heights)
• Low of 1.10 (Oak Bluff Estates)
• Mean connectivity index of 1.36
Round Rock Examples

Bent Tree

Links: 32
Nodes: 23
Connectivity Index = 1.39
Round Rock Examples

Preserve at Dyer Creek

Links: 21
Nodes: 19
Connectivity Index = 1.11
Round Rock Examples

Settlers Crossing

Links: 43
Nodes: 27
Connectivity Index = 1.59
Other Tools to Achieve Connectivity

• Minimum numbers of connections to outside streets, based on number of lots
• Minimum numbers of stub streets to adjacent vacant properties, also based on number of lots
• Language requiring connections to existing adjacent stub streets
• Restrictions on block length
Other Cities with Connectivity Ratios

• Georgetown: 1.2 ratio required
• Hutto: 1.2 ratio required
• Mont Belvieu: 1.4 ratio required
• Buda: Proposing 1.6 ratio
• Rowlett: No ratio but minimum connections and block length maximums
• Pflugerville: Only connection to existing stub streets required
Proposed Connectivity Requirements for Round Rock

• Roadway connectivity ratio of at least 1.35 for all new single family or two family subdivisions
  • Pedestrian links must be added to achieve total connectivity ratio of 1.40
• Minimum number of connections to existing streets and stubs to adjacent vacant properties, based on number of lots proposed.
  • City currently has requirement for two points of access for more than 29 residential lots (based on fire code)
• Block length limit with requirement for mid-point pedestrian access path on the longest blocks built
Proposed External Connection Requirements

• Less than 75 lots: 1 connection to public road, 1 stub to vacant property where feasible
• Between 75 lots and 149 lots: 2 connections to public road, 1 stub to vacant property
• Between 150 lots and 299 lots: 3 connections to public road, 2 stubs to vacant property
• 1 additional connection to a public road and 1 stub to vacant property for every additional 200 lots over 300
• One stub may substitute for one road connection requirement.
Block Length/Pedestrian Connections

• Block lengths shall not exceed 1000’ without P&Z approval
• Where blocks exceed 1000’, there shall be a pedestrian access easement, greenbelt, or similar feature placed mid-block.
• 600’ cul-de-sac length limit (based on fire code)
Proposed Connectivity Process

• Applicant would include connectivity analysis for proposed subdivision in Preliminary Plat phase for new SF or TF subdivisions
• Applicant may deviate from some connectivity requirements depending on site conditions and if approved by P&Z:
  • Natural features (monarch trees, bodies of water, bluffs, karst features)
  • Cultural features (historic landmarks, burial grounds)
  • Incompatible adjacent uses (industrial, rail lines)
  • Infill lots without ability to connect to other subdivisions or roads
  • Driveway and intersection separation standards
• Staff would include in recommendation to P&Z whether or not the site’s constraints legitimately prevent strict compliance with connectivity requirements