Memo

To: Town Council

Cc: Planning & Zoning Board

From: Jeff Ulma, AICP, Planning Director

Date: July 24, 2003

Re: Connectivity Summary

Recently, during the Upchurch Rezoning (03-REZ-05) public hearing, one of the Town Council members requested a summary of the Town's connectivity requirements. This memorandum describes the requirements, the rationale for them, and some information from other communities addressing connectivity. Staff has used this pending rezoning case to illustrate the impacts and benefits of the requirements.

What are the Town's Connectivity Requirements?

The Land Development Ordinance requires any new subdivision to be designed to have a connectivity index of 1.2. The index is calculated by dividing the number of street links (street sections between intersections, including cul-de-sacs) by the number of street nodes (intersections and cul-de-sacs). A grid street network would yield an index of 2.0. The ordinance also requires connections to compatible adjacent land uses spaced no more than 1,250 to 1,500 feet apart in each direction, a requirement that ensures a minimum level of external connectivity. It should be noted that these standards can be waived if meeting them "is impractical due to topography or other natural features."

The ordinance has been in place since 1999 and was adopted following an extensive public involvement process. It was also included in the recently adopted Land Development Ordinance update. From 1999 to the present, the Town has applied this ordinance to all new developments.

What is the Purpose of the Connectivity Requirements?

The purposes of the ordinances are to:

- Support the creation of a highly connected transportation system within the Town, in order to provide choices for drivers, bicyclists, and pedestrians;
- Promote walking and cycling;
- Connect neighborhoods to each other and to local destinations such as schools, parks, and shopping centers;
- Reduce vehicles miles of travel and travel times;
- Improve air quality;
- Reduce emergency response times;
- Increase effectiveness of municipal service delivery; and
- Free up arterial road capacity to better serve regional long distance travel needs.

How are other Communities Addressing Connectivity?

Last month, the American Planning Association published a report on "*Planning for Street Connectivity.*" The Town of Cary is one of the communities highlighted in the report along with eleven other communities. As the table below indicates, communities are using one of two approaches to improve connectivity in their cities, block length limits or connectivity indices. Based on the sampling shown in the table, Cary's connectivity standards are not as restrictive as in other communities and allow for more cul-de-sacs than are permitted in the other sampled jurisdictions. The following table summarizes the different requirements.

Table 1: Connectivity Requirements

Community	*Max. local street intersection spacing*	*Are street stubs required?*	*Are cul-de-sacs allowed?*	*Max. cul-de-sac length*
Metro, Oregon	530	No	No (with exceptions)	200
Portland, Oregon	530	Yes	No (with exceptions)	200
Beaverton, Oregon	530	Yes	No (with exceptions)	200
Eugene, Oregon	600	Yes	No (with exceptions)	400
Fort Collins, CO	Uses max. block size acreage	Yes	Yes, limited	660
Boulder, CO	Not regulated, practice is 300-350 feet	Yes	Yes, limited	600
Huntersville, NC	250-500	Yes	No (with exceptions)	350
Cornelius, NC	200-1,200	Yes	No (with exceptions)	250
Conover, NC	400-1,200	Yes	yes	500
Raleigh, NC	1,500	Yes	yes	400 ft. for residential, 800 ft. for commercial
Orlando, FL	Uses 1.4 connectivity index	Yes	yes	700 ft. or max. 30 units
Middletown, DE	Uses 1.4 connectivity index	Yes	yes	1,000
Cary, NC	Uses 1.2 connectivity index	Yes	yes	900

An Example of the Application of Cary's Connectivity Requirements:

To illustrate the connectivity ordinance in practice, staff conducted an analysis of the pending rezoning for Mr. Upchurch's property between the existing Berkeley and Somerset subdivisions. Staff's review

of the connectivity for this case includes a quantitative analysis that illustrates the value of connectivity from a traffic, accident information, service delivery and public safety perspective.

1. Traffic

The Town's traffic engineer performed an analysis of the implications of making a street connection between the Berkeley and Somerset subdivisions via the property subject to the rezoning. The conclusions reached by the technical analysis include the following:

- In the peak hours, it will be almost 30 seconds faster for motorists to use High House Road and NC 55 than it will be to drive through the neighborhoods using Sir Walker Lane and Connemara Drive. Travel times in the off-peak hours will be about 60 seconds faster.
- Connectivity will create a reduction of over five percent in existing traffic volumes from Berkeley and Somerset subdivisions due to internal trip reductions. The addition of the twenty-five (25) new homes will only increase overall trips to the area less than six (6) percent with the connection.
- Since the Somerset subdivision is the larger of the two subdivisions, Connemara Drive will benefit with a reduction of more than ten (10) percent in existing traffic volume. This reduction is created by the second means of egress. The Berkeley subdivision will have an increase in traffic volume of twenty-eight (28) percent.
- The future traffic volumes on Connemara Drive at NC 55 and Sir Walker Lane at High House Road will be equal.
- The Sir Walker/Connemara connection will save the 81 units in Berkeley 130-150 miles of driving per day or 47,000-55,000 miles per year. The 120 units in Somerset will save 200-220 miles of driving per day and almost 70,000-80,000 miles per year. This translates to 117,000-135,000 miles of travel saved each year for the existing residents. In addition, this linkage yields positive air quality benefits. Based on these mileage savings, an annual reduction in vehicle emissions could range between 405,000-880,000 pounds per year.

2. Accident Information

One of the concerns expressed by some residents was that the connection could increase the number of accidents with pedestrians. Based on existing town-wide data from 1998-2002, residential streets have experienced considerably less pedestrian and bicycle accidents than thoroughfares or parking lots. The following table summarizes this information:

Accident Type	**Thoroughfares**	**Parking Lots**	**Residential Streets**	**Totals**
# of pedestrian accidents	33	47	21	101
# of bicycle accidents	37	8	8	53
Totals	70 (45% of total)	55 (36% of total)	29 (19% of total)	154

3. Service Delivery

An important reason for the Town's connectivity ordinance is efficiency benefits for solid waste, recycling and yard waste delivery to Cary residents. Based on an analysis conducted by the Public Works Department, savings in time and money are achieved by a well-connected street system.

In the sample case, staff has estimated that it will take approximately 10 less minutes per service pick-up for the Berkeley and Somerset subdivisions if the street system were connected. The time savings equates to 26 hours over the course of the year. The reduced travel distance savings for the three

service deliveries is over 550 miles per year. The reduced distance also provides the Town with cost savings from fuel purchases and from lifecycle costs for the service delivery equipment.

Based on an analysis conducted by the Public Works Department, connectivity also has positive impacts to public water quality in two specific areas (hydrant flushing program and customer service calls). From a customer service perspective, over 30% of the residential water quality complaints come from households on dead end lines (cul-de-sacs). On average, it takes about 12 minutes to handle the complaint and substantially more time if a crew needs to be dispatched to determine the problem and correct it. One way that the Town has responded to some of the water quality issues on dead ends has been to institute a hydrant flushing program. Based on the review of the case example, the dead ending of the subdivisions will add almost 50 hours of additional hydrant flushing time per year.

4. Public Safety Response

In discussing the case project with the Cary Police Department, connection of the two subdivisions (Berkeley and Somerset) could reduce response times for the police in responding to emergencies in these areas. While the reduction is difficult to quantify since the response time is dependent on where the police vehicle is coming from, a reduction in response time by up to 1 minute could be realized if the police vehicle had to respond to a call at one end of the subdivision.

From a Cary Fire Department perspective, response times are also reduced with well-connected street systems. According to the Fire Department analysis of the case project, connectivity for Sir Walker Lane and Connemara Drive and the other streets in Somerset and Berkeley subdivisions will improve response time from the fire station on High House Road by 2-3 minutes for the Somerset subdivision.

5. Case Study Conclusions

Based on the analysis performed by the Fire, Public Works and Utilities, Police, Engineering and Planning Departments, providing a connection between the Somerset, Berkeley and the future adjacent subdivision will be beneficial from an overall traffic, public safety, service delivery, and environmental perspective.

While the analysis yields the conclusion that connectivity is beneficial, the design of the connection will be important in ensuring that connectivity is made in a manner that reduces convenience for non-neighborhood related traffic. There are numerous ways to address the design of the linkage including some of the options that consultant Walter Kulash discussed at this year's retreat. Staff is working with the applicant to address the design during the rezoning and subdivision processes.

Please feel free to contact me if you need further information.

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