

# Approaches to Residential Infill Development

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# Table of Contents

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- 1 Overview**
  - History and Purpose of the Study .....4
  - What We Have Done.....4
  - What We Have Learned.....5
  - Summary of Options for Next Steps .....5
  
- 2 Community Engagement**
  - Community Online Survey.....6
  - Community Meetings.....7
  - Field Visits ..... 8
  - What Was Learned .....9
  
- 3 Products and Conclusions**
  - Examples from Other Communities.....10
  - Observations and Conclusions ..... 12

## **4 Additional Issues Identified**

Process and Design Issues.....	13
Missing Middle / Affordable Housing.....	13
Relationship to Sprawl .....	13

## **5 Options for Moving Forward**

Procedural Adjustments .....	14
Possible UDO Text Amendments.....	14
Identification of Topics for Additional Discussion/Work.....	15

# 1 Overview

## History and Purpose of the Study

The Residential Infill Development Study originated in 2018 during a Raleigh City Council discussion of another study, Guidelines for Hillside and Sloped-Site Development in Mixed Use Districts. As the City Council was reviewing interim products that were part of the Hillside study, a related issue surfaced: concerns about construction of new residential houses within existing neighborhoods. Following discussion about the nature and impacts of infill residential development, the Raleigh City Planning department was directed to begin a study on this related topic. The purpose of the infill study was to examine existing trends and regulations, reach out to Raleigh residents and stakeholders to learn community perspectives on this issue, research examples of how other cities have approached this issue, and offer guidance regarding possible changes to Raleigh's Unified Development Ordinance (UDO), along with identifying topics for subsequent study. The Residential Infill Development Study has now been completed, and this report highlights the findings and conclusions.

The Hillside study also has been completed, and addresses transition zones, pedestrian access, measurement of height, transparency, retaining walls, and blank foundation walls. A third effort is underway now and will be addressing issues closely related to these two studies: work on revising Raleigh's Stormwater Management regulations. All three topics are related. As that Stormwater Management project moves forward, information from these two City Planning department studies will help provide context for stormwater discussions.

## What We Have Done

A project website was created to provide general information about this infill study, and to explain the purpose of the study. The study website includes descriptions and illustrations of topics subject to regulation, along with links to related topics.

A community survey was prepared and distributed in August-September 2019. The purpose of the survey was to learn community perspectives on residential infill occurring in Raleigh. The survey was advertised through several avenues, including email blasts, social media posts, flyer distribution, and a Residential Infill Open House meeting. Over 3,000 people responded to the survey, answering questions and offering over 10,000 individual comments. Description of the survey and its results are summarized below in the Community Online Survey portion of Section 2 of this report.

Stakeholder meetings were scheduled and well attended, including meetings with Raleigh Boards and Commissions, groups of builders and developers, and a citizen open house. Descriptions of these meetings and the feedback that was received is summarized below in the Community Meetings portion of Section 2 of this report.

Field visits were conducted to infill sites within existing Raleigh neighborhoods. Fifty sites were visited to observe the development that has occurred pursuant to Raleigh's existing ordinances and regulations. Descriptions of the field visits are summarized below in the Field Visits portion of Section 2 of this report.

Finally, we have compiled an inventory of examples from other communities, within North Carolina and elsewhere, to summarize how those communities have addressed

management of residential infill development. Examples are described below in the Examples from Other Communities portion of Section 3 of this report, and offer ideas for approaches that Raleigh might consider.

Taken together, this body of information and feedback has provided a base for offering observations about the status of residential infill development in Raleigh, along with suggestions for next steps regarding possible changes to regulations to consider, and topics for subsequent study.

### What We Have Learned

We now have a good body of information to draw from in considering the situations of existing and proposed residential infill development. First, we know that there is a wide array of public opinion on this topic. Our report on the community survey, for example, shows:

- 75% of respondents have concerns about residential infill. Those concerns vary widely from how infill can transform neighborhoods in a negative way to expressing a need and desire for more infill development.
- Over 80% of respondents agreed with the statement that there are potential benefits associated with infill development, including offering an alternative to sprawl and meeting the needs of new families.
- The largest consensus resulting from the survey was an interest in preserving trees as residential infill development occurs, either through requirements or incentives.

In addition, we heard a strong message from the development community during stakeholder meetings focused on a need for procedural changes to minimize requirements and lengthy time frames for review/approval of plans.

We learned that multiple communities, both within and outside North Carolina, have employed approaches to management of residential infill development that could be considered for Raleigh.

### Summary of Options for Next Steps

At the end of this report is a list of options for further consideration, in addressing possible approaches for adjusting Raleigh's management of residential infill development. Those options include:

- Procedural options for processing proposals for residential infill development;
- Consideration of a combination of requirements / incentives to promote preservation of existing trees;
- Adjustments to stormwater management regulations;
- Adjustments to UDO approaches to measuring and regulating height of buildings;
- Adjustments to UDO approaches for regulating installation of retaining walls on infill lots; and
- Topics for additional study, including the relationship of residential infill development to other City objectives such as avoiding sprawl and promoting affordable housing options.

It is the intent of this report to serve as an information base to help guide subsequent policy and regulatory work that involves attention to residential infill development options.

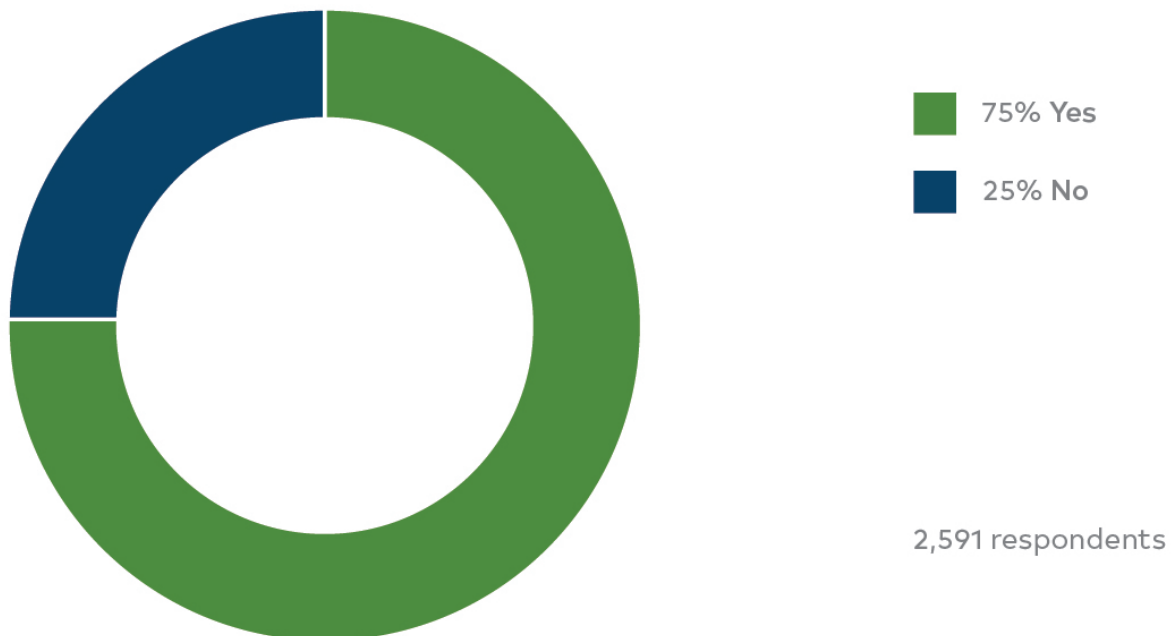
## 2 Community Engagement

A comprehensive outreach approach for the Residential Infill Development Study was developed in the summer of 2019. The goal was to collect feedback and comments through a variety of ways, including a detailed survey, scheduled meetings with the development community, Boards and Commissions, and an open house for citizens to attend. In addition, city staff and retained consultants conducted extensive field visits throughout Raleigh's established neighborhoods. Additionally, a separate webpage for the study was created which allowed interested persons or groups to participate in the survey, track the project, call with questions and attend public meetings.

### Community Online Survey

The online survey went live on August 14, 2019, and remained open through September 20, 2019. The survey was advertised through several avenues, including GovDelivery email blasts, social media posts, and flyer distribution. Attendees at the Residential Infill Open House meeting held on September 17, 2019, were also encouraged to complete the survey, as were viewers who saw coverage of the study on WRAL. There were 3,147 people who answered at least one question on the survey, resulting in 62,891 total responses from 26 total questions and 10,170 individual comments. You can find all of the survey findings in the full report.

Do you have any concerns about residential infill development in Raleigh?



## Community Meetings

Simultaneously with the survey, three public bodies were involved in outreach. They were the Raleigh Citizens Advisory Council (RCAC), the Appearance Commission, and the Stormwater Management Advisory Commission (SMAC). The primary stakeholder groups were the Development Services Advisory Committee (DSAC) and the Wake County Home Builders Association (HBA). A well-attended open house for citizens was held at a local community center, which focused on education and listening to citizen concerns. Below is a collection of the comments offered at these meetings.

### Appearance Commission, RCAC, SMAC:

- The process of obtaining permits and approvals is difficult, inefficient, and it takes too long to get a permit, much longer than in previous years.
- A mechanism is needed to help neighborhoods stay informed about development activity.
- The Neighborhood Conservation Overlay District (NCOD) should be used more.
- The missing middle is missing, specifically duplexes, triplexes, townhouses.
- There is a need for densification and removing barriers for more housing options.
- Mitigating bulk and massing for large homes is needed.
- Housing affordability is a big concern.
- Changing grades on home sites creates stormwater issues for other properties.

### DSAC and HBA:

- Lifestyles have changed since many neighborhoods have been built and it is a natural process for areas to redevelop.

- Buyers want larger homes and garages, often three car garages.
- Wall height doesn't work well with current demands for higher floor to ceilings, 10 to 12 feet in many cases.
- The City of Raleigh text change that changed the method for measuring building height is a barrier to provide daylighted basements.
- The city needs more housing options to accommodate more density.
- More housing options could improve affordability.
- The City of Raleigh text change that changed how front setbacks are measured doesn't work in an area without an established setback pattern.
- For front setback measurement, 10 percent of the median is too strict and doesn't make allowances for physical features on the site.
- Procedurally, it is difficult to keep up with text changes and there are too many processed at one time.
- Submission requirements for permit applications is difficult and complicated compounded by poor communication with staff and it takes too long to get issues resolved, a change that has occurred in the past few years.
- The City of Raleigh seems to be pushing a prescriptive approach to regulations and it doesn't allow enough flexibility or a way for staff to make common sense decisions.
- Notification requirement to neighbors creates an adversarial environment from the start of the project.:

### Open House:

- Tree canopy retention is very important and valuable, especially mature trees.

- How a site is graded determines compatibility with other homes in the area.
- Stormwater runoff is a concern with larger homes and grade changes.
- Retention of homes is important to preserve neighborhood character.
- House scale and size are key components for compatibility.
- Expanded use of the NCOD is desired. Can the process and regulations be revisited?
- Quality of construction on infill sites tends to be very good, with attention to architectural detail. Architecture is diverse and homes often are custom built. Homes built on existing grades typically are more compatible than those on sloping sites that are raised with fill or the use of retaining walls.
- Many homes on sites that sloped to the rear had tall rear walls with walk out basements and garages tucked underneath. This design is encouraged, but some measures might be examined to mitigate the wall height. The use of step backs and breaking up a roofline on some sites helps to mitigate the impact of the tall side or rear wall. Some good examples where this height was mitigated include the use of step backs, offsets, changes in building material and breaking up of roof lines.

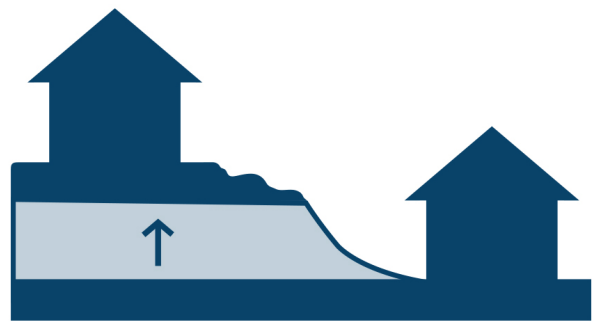
## Field Visits

Approximately 50 site locations were chosen among Raleigh's north, east, south, and west neighborhoods. The locations were related to a variety of scenarios such as teardowns with a one-to-one house replacement; subdivisions of properties where houses were removed and added lots were recorded with a net increase in the number of homes; and areas of block renewal through a government agency or developer. Below is a list of the observations noted from the field visits.

### Field Visit Observations:

- Individual houses as well as blocks of homes are being built, resulting in extensive redevelopment throughout the city.
- Extensive cut and fill, including use of retaining walls is common among many of the homesites. In some cases, the resulting grade changes had an adverse impact on adjacent properties.
- Mature tree canopy is being removed to make room for larger homes and garages.
- There are some cases where sidewall heights appear to have a towering affect over adjacent homes.
- There are cases where there is water runoff in side yards, impacting the street, sidewalk and adjacent properties.
- Retaining walls are used where extensive cut and fill occur. There are several instances where walls are very tall and close to the side and rear property line, creating a cavern effect.
- Grade changes by the use of cut and fill can change the neighborhood context, creating sites padded up or where bigger houses tower over neighbors' homes.
- Retention of trees on a site helps to mitigate the impact of a larger home.
- The 30 foot wide gable exemption appears to be too wide in proportion to the size of a home. This standard can be revisited.
- With recently adopted limitations on impervious surface, it is too early to determine if this new regulation is having any impact on house size. However, it may have an impact on the front setback and explain the occurrence of two-track driveways.





## What Was Learned

The survey findings reveal that the topic of infill development is both nuanced and polarizing. Seventy-five percent (75%) of respondents reported having concerns about infill development. These concerns fall into three general categories: the transformation of communities as a result of infill development; the emphasis on larger homes rather than multifamily units on infill lots; and the potential that tighter regulations will deter future infill

development. A high percentage of respondents (83%) acknowledged that there are benefits associated with this type of development, including the potential to minimize sprawl and bring vibrancy to existing neighborhoods. While there was little consensus among respondents about how infill development should or should not unfold in Raleigh, there was a moderate degree of agreement that stormwater regulations should be reassessed and that tree canopy should be preserved.



The field visits and stakeholder sessions helped develop some goals and objectives moving forward on issues related to:

- Site Grading: Impacts are visible due to site grading, or cut and fill, especially where grades are changed and negatively impact an adjacent property.
- Stormwater: Some controls are needed during construction and post construction. Regulations are also needed to limit the height of a retaining wall, especially in the cases where fill is used.
- Height, Side Wall: The existing regulations for side wall and overall building height should be revisited for effectiveness. Investigate what can be done to limit tree removal and perhaps look at conservation incentives, or green development options.
- Loss of Trees: In many cases, large mature trees were removed to accommodate a larger home on a site.

## 3 Additional Information

### Examples from Other Communities

A regulatory comparison was done with over 15 peer cities in North Carolina along with a dozen national cities. The challenge/opportunity of best managing infill residential development is an issue that is widely prevalent. Review of approaches being used by other communities can be useful as Raleigh considers what strategies are appropriate here. Following are examples of approaches to topics that have been identified as needing attention.

**Tree Preservation:** Many cities use a combined approach of planting and preservation to achieve tree canopy objectives in neighborhoods. Preservation is often the preferred objective for heritage or mature trees located on the perimeter of sites, along with planting requirements. The following table illustrates preservation approaches of several North Carolina communities, with some specifics from Belmont N.C.:

#### TREE PRESERVATION PEER CITIES

CITY	PRESERVATION REQUIREMENT	APPLICABILITY	NOTES
Raleigh	10-15% min.	<ul style="list-style-type: none"> <li>Based on zoning district</li> <li>Lots &lt;2 acres exempt</li> </ul>	
Charlotte	10% min.	<ul style="list-style-type: none"> <li>Subdivisions Only</li> <li>If only canopy was 10% or more of total lot area</li> </ul>	<ul style="list-style-type: none"> <li>Incentives offered (setbacks, lot size, and density)</li> <li>Heritage and specimen trees worth more "credit"</li> </ul>
Matthews	15-20%	<ul style="list-style-type: none"> <li>Based on zoning district</li> <li>When existing canopy &gt;20% of total lot area</li> </ul>	
Durham	Urban Tier 7% min. Suburban Tier: 20% min.	<ul style="list-style-type: none"> <li>Lots &lt;2 acres exempt</li> </ul>	<ul style="list-style-type: none"> <li>Specimen trees worth more "credit"</li> </ul>
Belmont	25% min.	<ul style="list-style-type: none"> <li>3 units/acres or less</li> </ul>	
Wilmington	Certain types and sizes of trees must be preserved	<ul style="list-style-type: none"> <li>Lots &lt;2 acres exempt</li> </ul>	<ul style="list-style-type: none"> <li>Replacement trees must be provided if protected trees are removed or damaged</li> </ul>

**BELMONT, NC**

## TREE PRESERVATION

## APPLICABILITY:

- Residential developments with 3 units per acre or less.

## REQUIREMENT:

- Must preserve at least 25% of the healthy, mature, deciduoud tree canopy and 25% of the heritage trees on the property.
- Heritage tree canopy counts 1.5x towards the canopy tree requirement.
- Heritage tree is defined as 12 inch or greater DBH (diameter at breast height.)

**Stormwater and Grading and Retaining Walls:** Approaches vary throughout the country regarding how water quality and quantity are addressed for single-family homes. In North Carolina, communities offer options that work to protect adjacent properties using easements, engineered soils, grading limitations as well as slope maximums. If slopes exceed the maximum, retaining walls are introduced with maximum heights and terracing options, especially when used along property lines. Some communities also use the preservation of trees to work toward increasing water absorption on site, reducing erosion and adverse impacts downstream. Green infrastructure is also commonly used. Following is a summary of an approach used in Nags Head, N.C.:

**NAGS HEAD, NC**

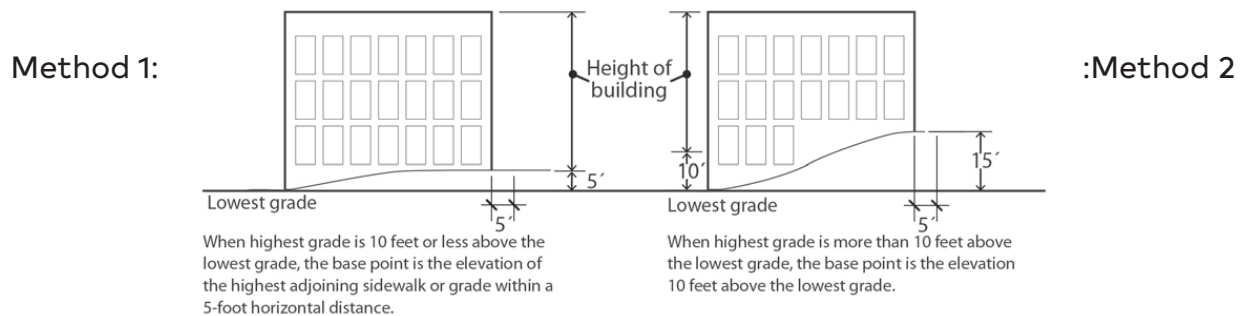
## "BUILT-UPON AREA" REDUCTIONS

- All runoff from a project's built-upon area must be directed into a stormwater system with a storage volume of 15 cubic feet for every 100 square feet of built-upon area.
- Certain stormwater BMP's are encouraged in exchange for a reduction in the site's built-upon area, such as:
  - Permeable surfaces;
  - Tree preservation and planting
    - Existing trees = 100 sq. ft. reduction (min. 6" caliper)
    - New trees = 50 sq. ft. reduction (min. 2" caliper, 6' tall);
- Open space preservation;
- Incorporation of three or more of the stormwater control measures listed (including rainwater harvesting, permeable pavement, bioretention or rain gardens, landscape swales) is worth a 15% built-upon area reduction.

**Height and Massing** - Height regulations vary. One approach that is frequently used is to create a method for breaking up a building into modules or components, often used to allow designers some flexibility. This method often encourages the breaking up of a roof structure to meet the regulations and can work to mitigate the size of a structure. Following below is a simpler approach used by the City of Portland, OR:

### PORTLAND, OR HEIGHT MEASUREMENT

Portland measures building height from a base point, which can be determined by one of two methods (whichever yields the greater height):



## Observations and Conclusions

A holistic approach works best to meet the identified goals and objectives. An inventory of N.C. cities, as well as other national communities, suggests that some UDO regulations should be revisited and modified to reflect best practices.

To address the loss of vegetation, there are challenges when dealing with small lots and maintaining the ability to allow for a primary structure, often with a detached structure to consider. Balance is important to maintain. A combination of plantings with an emphasis for mature tree preservation through a credit system can decrease the loss of tree canopy while still allowing a site to be developed. Additionally, placing limitations on the amount of cut and fill, which is the practice of adding or removing fill, on a site such as establishing maximum slopes of 3:1 can work together to minimize grading and tree removal. The added option for the use of green infrastructure can also be considered to address both tree preservation and storm water runoff objectives.

Changes to height calculations such as breaking up a structure in components or modules can work to mitigate impacts on other properties and maintain neighborhood character. With many home sites being sloped from the street to the rear, allowing height to be calculated by breaking up the structure into components or parts is consistent with the recommended approach in the Hillside Development Study. It can also provide designers more flexibility and address issues associated with tall uninterrupted walls and the desire to build daylight basements and understructure garages. Depending on the specific site circumstances, there could be a list of several options that a developer could select from to produce the best contextual product.

Altering grades on a homesite is one of the primary factors determining outcomes related to tree retention, building height, massing, bulk, water runoff and the use of retaining walls.

## 4 Additional Issues Identified

### Process and Design Issues

A primary concern expressed during stakeholder meetings involving Raleigh's development community was the need for an efficient, more predictable process for review and action on proposals for single-lot redevelopment.

Another major concern was implementation of the current method of calculating/regulating height requirements on downward sloping sites. It has been suggested that current regulations encourage side-gabled houses to allow additional height, whereas large gables and dormers can produce less impact with lower sidewalls. Building offsets and setbacks can also reduce visual impacts.

There currently are no standards for grading, cut and fill, or stormwater management for many infill projects, and no incentives for tree preservation.

It has been noted that building additions are treated in the same way as teardowns/new builds, which does not allow for provisions that would discourage demolition.

### Missing Middle / Affordable Housing

It is frequently the case that the result residential infill is to replace an older dwelling unit with a new, usually larger dwelling unit that significantly raises the cost of housing for that property. Given that maintenance and expansion of affordable housing opportunities continues to be a key objective for Raleigh, the impact of residential infill development on the inventory of existing affordable housing opportunities becomes a consideration.

If the market supports high-value single family development in a particular neighborhood, it is hard for regulation to stop property owners or builders from meeting this demand through additions and renovation, or demolition and new construction. If more modestly-priced housing options are desired through infill, then these lower-value units will have to "team up" to compete with the luxury single-family option, meaning they must be allowed at greater densities. The linkage between residential infill development, affordable housing objectives, and neighborhood character is an issue that warrants additional study.

### Relationship to Sprawl

In addition to housing cost considerations related to new housing developments on the outside edges of the city, there are infrastructure and sustainability factors that are related to Raleigh's approach to infill development. Development of new residential housing options within the city, as opposed to development on the edges of the city, can help achieve goals related to transportation efficiencies, efficient use of city infrastructure and services, and the vitality of existing commercial areas within the city. These are factors that warrant consideration as Raleigh examines potential changes to its approaches to residential infill development.

# 5 Options for Moving Forward

## Procedural Adjustments

Multiple suggestions coming out of this study call for adjustments to be made in city's process for review of and action on residential infill development proposals, ranging from time frames, to types of information that need to be prepared, to enhancing certainty in the review and approval process. These suggestions warrant consideration.

## Possible UDO Text Amendments

There are multiple components of Raleigh's Unified Development Ordinance that would benefit from review and possible amendment in working to achieve city goals related to Residential Infill Development. Following are examples that have been identified as part of this Residential Infill Development Study:

- **Remove Barriers, Increase Efficiency in Processes:** There are multiple examples that have been highlighted in this work that suggest text amendments to avoid unnecessary time and expense involved in pursuing residential infill development that aligns with City goals and objectives. Key to success in considering such procedural adjustments is to link them to accompanying functional and substantive adjustments, to help in promoting infill development of type and form that contributes to city goals and objectives while minimizing negative impacts on existing neighborhoods.
- **Height Measurement Methodologies:** A dominant topic coming out of the stakeholder meetings was a need to re-calibrate how Raleigh's UDO requires

height to be measured for buildings on sloping sites. Much of the complication in permitting residential infill is tied to the need to carefully document pre- and post-development grades and measure building height at every corner. Simplifying and clarifying height measurement would help achieve a greater efficiency of process. Consideration of options for measuring height is ongoing.

- **Tree Preservation:** Examination is ongoing regarding what Raleigh can do, in the context of N.C. statutory limitations, to require protection and preservation of trees on a redevelopment site: e.g., under what conditions the city can require information about existing vegetation on a site, under what conditions the city can require tree preservation, and what tree planting requirements might help achieve the city's goals that are not currently in place. One resource in this examination is reference to standards and requirements currently in use in other communities. Some combination of incentives and regulatory requirements is likely warranted.
- **Setbacks:** A new topic coming out of the survey and stakeholder meetings was a suggestion to revisit how required setbacks can be adjusted, either as an incentive or an option, to account for differing circumstances. Defining required setbacks to be calculated with reference to existing setbacks in an older neighborhood is a particular item that needs study.

These and other UDO text amendments are appropriately added to the existing lists of possible UDO amendments under consideration by the City Council, for direction to be provided to city staff.

## Identification of Topics for Additional Discussion/Work

There are many ideas regarding management of residential infill development in Raleigh that have emerged from this project. Several have been discussed above. Key topics for additional discussion/work include the following:

- New incentives and requirements designed to help promote preservation of existing trees.
- Development of strategies to link together land use objectives, affordable housing objectives, and approaches to residential infill.
- Adjustments to land development requirements for infill settings related to grading, fill, retaining walls, setbacks, buffers, and stormwater management.

Additional consideration of these topics can help address Raleigh's objectives in managing activity related to residential infill development.

