CASCADE ROAD: CAN WE GROW THE NEIGHBORHOOD & THE TREE CANOPY?
One of Atlanta’s most identifying characteristics is its natural condition. Included in this condition is a tree canopy coverage that ranks at the top nationally. As we face a potential wave of unprecedented growth that could triple the city’s population in the next few decades, how we protect our natural assets, such as our tree canopy, as we grow is a paramount concern. The Atlanta City Design: Aspiring to the Beloved Community specifically recognizes that our challenge with respect to nature will be to protect and expand the ecological value of our watersheds, forest, and habitat in the face of potential rapid urbanization.

Cascade Heights is home to the second highest tree canopy coverage in Atlanta. In this neighborhood, similar to the rest of the city, the majority of this tree canopy is located on private land. The question faced by Atlanta rings especially true in Cascade Heights: how do we protect this key piece of our identity during a time of growth? Tools like the Tree Protection Ordinance and the recently adopted Tree Trust Fund provide measures of protection against the loss of tree canopy on private land. However, we’re also going to need new models and ways of approaching development to show us how we can better utilize private, forested sites without sacrificing one of our city’s greatest assets.

The site selected for this studio—located at the intersection of Cascade Road and Lynhurst Drive at the edge of the Cascade Heights and Mangum Manor neighborhoods—is a perfect opportunity to test ideas for new development models on private, tree-covered land. At approximate 16 acres, it’s size requires solutions at both the master planning and architectural scales. Beyond the tree canopy and natural conditions, solutions will also have to respond to critical local issues such as residential options and affordability, access and transportation, and integration with the surrounding neighborhood.

For these reasons the City of Atlanta Department of City Planning invited Georgia Tech’s Master of Science in Urban Design students to develop and test prototype solutions. The seven thoughtfully designed proposals illustrate different combinations of housing types revealing the capacity of the site to accommodate a range of densities and price points while preserving the tree canopy. Over 200 neighborhood residents viewed the proposals while they were exhibited at the Atlanta City Studio during its time in Cascade Heights. Their feedback to the students and to the studio has been very positive and bodes well for our continued efforts to bring further resolution to the Atlanta City Design and illustrate how we can embrace the beauty and value of both nature and urban life.

Kevin Bacon

Director
Atlanta City Studio
Department of City Planning
CASCADE ROAD:
Can we grow the neighborhood AND the tree canopy?

HOUSING TYPE PROPOSALS
By-Right Development:  
Christy Dodson

Single-family house + Detached Accessory Dwelling Unit:  
Zachary Lancaster & Karen Vijayanand

Single-family house + Cottage Court:  
Mariam Alzaabi & Sam Stephen

Single-family house + Duplex:  
Bruce Ling & Winnie Zhang

Mansion Apartment + Detached Accessory Dwelling Unit:  
Coston Dickinson & Carley Rickles

Duplex and Mansion Apartment:  
Fenghuan Hong & Yilun Zha

Cottage Court and Townhouse:  
Tejas Khandekar & Zeyue Yao

Courtyard house and Townhouse:  
Jiho Choi & Bowen Xue

Thanks to Tim Keane, Heather Alhadeff, Kevin Bacon, David Zaparanick, Lew Oliver, Tom Walsh, Zorana Matic and Chen Feng for assistance.

Note - all images are for academic purposes and may not have copyright approval.
To answer this question, the City of Atlanta invited graduate urban design students in Georgia Tech’s School of Architecture to propose hypothetical designs for the heavily wooded 16-acre lot at 3105 Cascade Road and Lynhurst Drive.

There were three main goals for the exercise:

• Instruct students in how to subdivide land to create great public and private spaces for the next generation of households, while protecting our legacy trees.
• Produce multiple proposals with various mixes of housing types to enable comparisons of their impact on the existing neighborhood, tree canopy, and drainage patterns.
• Invite feedback and speculation about the implications of this study for other infill sites throughout the city and for changes to the city’s zoning regulations and Tree Ordinance.

The exhibition starts with collective research into the site, Christy Dodson’s analysis of the tree ordinance and her demonstration of the cul-de-sac pattern and loss of trees that, albeit costly, could be allowed by right today. To mitigate this not uncommon practice, the class proposes Innovative Development Tools to revise both the site design process and the tree ordinance. These strategies are demonstrated in the design proposals and compared. They provide more connected street patterns, preserve many more trees and are arrayed from left to right illustrating mixes of more rural/suburban to more suburban/urban building types.

What do you think? We found that the most important factors for preserving trees are to minimize disturbance to the soil and drainage patterns.

This is best achieved by:

• Smaller building footprints, in other words building up rather than out
• Narrower streets and shorter driveways (ideally with permeable paving)
• Smaller lots, smaller private yards and larger shared spaces for trees and communal activities, (with exceptions where it makes sense to extend the back of a lot into the wooded area)
• Creative use of duplexes or mansion houses to provide fronts on two sides of a lot so as to face multiple streets or communal pathways when protecting the trees results in narrow blocks

Is the market ready for this?
In fact, the majority of households in the U.S. are only 1-2 persons. Smaller homes with access to more communal space, (sometimes known as “missing middle housing types”), are doing very well amongst the two biggest demographic groups: the downsizing empty nester baby boom generation and the millennials who have been delaying marriage and child rearing. To meet this market, student teams were assigned two primary housing types to array on the site – although they were allowed to include additional types.
The first consideration as new development is proposed for Cascade is zoning. Understanding the by right zoning for the site serves to indicate the type of development currently incentivized for the area. Modifications to the zoning are needed to enable development patterns that both better preserve the tree canopy and diversify and update the neighborhood’s housing stock.

The City of Atlanta has an average tree cover of 48%. That figure nears 70% in the Cascade neighborhoods where the canopy is a defining feature. The trees are important to the neighborhoods and the City of Atlanta’s ecosystem as they mitigate stormwater, reverse heat island effects and reduce greenhouse gas emissions. However, the City’s current tree ordinance enables tree removal for a fee and might benefit instead from rewarding tree protection with zoning variances for cluster development and other tools.

As the City of Atlanta looks toward development patterns to accommodate future growth, it is imperative to consider the impacts of development on the beloved and iconic canopy. Buildings with smaller footprints and more vertical height can be an effective tool for strategically preserving trees, but must be considered in context of the surrounding existing single-family neighborhoods.
The 1930 City of Atlanta Topographic Map shows buildings on the top of the hill and a school closer to the Road.

Current Neighborhood Context
The neighborhoods along Cascade Road have a storied history in Atlanta, from its development in the mid-1950s with suburbanization, through racial tension in the late 1960s with white flight, to its current position as a flourishing, beloved community in Southwest Atlanta. Cascade—as the area’s many neighborhoods are often referred—is recognized as being home to many prominent residents over time including: Atlanta Mayors Shirley Franklin and Andrew Young, Congressman John Lewis, baseball legend Hank Aaron, and Dr. Hamilton Holmes, one of two African Americans first integrating the University of Georgia. Cascade has a proud history as home to many civil rights leaders, and continues its legacy as a community built around equity and inclusivity.
This yellow-brick and stone bungalow was built 1919 for Thomas Pitts, the owner and operator of a very popular and profitable soda fountain and cigar store at Five Points for more than 30 years. “Meet me at Tom Pitts” was a familiar invitation during that time. The house, outbuildings, and land were a complete dairy farm which supplied the milk for ice cream and sodas served Pitts’ fountain. The farm includes a waterwell, watertower, a large single-story cow barn, garage, two cottages and ten acres of pasture. The site was placed on the National Register in 1979. From City records, permitting in 2008 indicated that the property was in the preliminary process of subdividing the parcel. The City lists the current owner of this property as Cascade Glades LLC which filed for bankruptcy in October of 2011.

Listed in 2003
Address: 3105 Cascade Rd SW
Atlanta, GA 30311
Area of City: Southwest of Downtown
Time: 1919
Architect: Unknown
As the area’s name suggests, its terrain is marked by slopes and creeks that cascade through the West Atlanta Watershed. Our site is located in the Utoy Creek sub basin. Aside from some steep slopes to the north and an outflow pipe along LynHurst Drive opposite Lynway Lane, the site generally drains to the Southwest before entering South Utoy Creek south of Cascade Road. The 1930 topography shows what may have been a creek on the western boundary of our site, before the development of properties on Clearbrook Drive. Recognition of the interdependence of the trees’ need for appropriate water levels and their absorption of stormwater is key to good planning on this site.
The class walked the site with City Arborist David Zaparanick to identify environmentally sensitive areas and distinguish healthy, high priority trees. These were mapped (using approximations,) and students were advised to minimize soil disturbance within 1/2 again the distance of the radius of the dripline of a priority tree.

**SITE SECTIONS**

**SITE SECTION A-A**
- 370' MOST SENSITIVE
- 145' SUGGESTED PRESERVE

**SITE SECTION B-B**
- 85' SUGGESTED PRESERVE

**SITE SECTION C-C**

**SITE SECTION D-D**
- 50' LYNHURST DRIVE R.O.W.
- 50' CASCADE ROAD R.O.W.
- 95' SUGGESTED PRESERVE
- 150' MOST SENSITIVE

**SITE SECTION E-E**
- 50' LYNHURST DRIVE R.O.W.
- 50' CASCADE ROAD R.O.W.
- 150' MOST SENSITIVE
- 185' MODERATE SENSITIVITY

**SITE SECTION F-F**
- 50' LYNHURST DRIVE R.O.W.
- 185' MODERATE SENSITIVITY
Trees can be accommodated in a range of spaces, such as those shown here.

- **Unprogrammed Parks**
- **Gardens**
- **Playgrounds**
- **Orchards**
- **Front + Backyards**
- **Street Trees**
- **Courtyards**
- **Roundabouts**
- **Medians + Couplets**
- **Rain Gardens**
- **Community Gardens**

**Greenspace Precedents**
BY RIGHT DEVELOPMENT PATTERNS
Understanding the Impacts of Zoning + Tree Ordinances on the Built Environment

R3 ZONING
The existing R-3 zoning prevalent in most of the Cascade neighborhoods has resulted in distinctly suburban development patterns. Large width lot requirements, deep setbacks, and low FAR ratios define the by right regulations. While originally intended to provide developments full of light and air away from the crowded city, what results are large lots that are unaffordable and today development patterns that disincentivize tree canopy preservation.

TREE ORDINANCE
The existing tree ordinance economically incentivizes the preservation of the tree canopy, but does not require the preservation of many trees on a site. Further, the document’s technical format is difficult to navigate, resulting in an underutilization of tools and incentives provided in the code. By simplifying and visually representing these provisions in the code, developers can become partners with the city in enacting best practices of tree canopy preservation.

DEVELOPMENT PATTERNS
When considering R-3 zoning and the tree ordinance, it is important to consider what implications the regulations have on future development. These regulations could be restricting the desired development patterns that achieve both goals of fitting into existing neighborhood context and preservation of the iconic tree canopy. Strategic zoning re-writes in areas targeted for infill development can provide a road map for developers.
INTENT

(1) To provide the development of single family residential communities and protection of existing communities on lots of medium size and at a density of not more than one dwelling unit per 18,000 square feet.
(2) To provide for the development of recreational, religious, and educational facilities as basic elements in a balanced community.

PERMITTED USES

PRINCIPLE USES + STRUCTURES

- Public Schools
- Single-family detached dwellings
- Structures required for operation of MARTA

ACCESSORY USES + STRUCTURES

- Greenhouses, garden sheds, and private gardens
- Guest houses, servant quarters, or lodging facilities
- Swimming pools, tennis courts and similar facilities
- Home occupation
- Structures necessary for construction projects
- Devices for the generation of energy
- Amateur radio service antenna structures
- Electric vehicle charging stations
- Urban gardens
- Market gardens

METRIC

<table>
<thead>
<tr>
<th>METRIC</th>
<th>RANGE</th>
<th>NOTES</th>
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<tbody>
<tr>
<td>LOT DIMENSIONS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lot Area (Minimum)</td>
<td>18,000 SF</td>
<td></td>
</tr>
<tr>
<td>Lot Width (Minimum)</td>
<td>100'</td>
<td></td>
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<tr>
<td>LOT COVERAGE</td>
<td></td>
<td></td>
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<tr>
<td>Floor Area Ratio (Maximum)</td>
<td>0.4</td>
<td></td>
</tr>
<tr>
<td>Lot Coverage (Maximum)</td>
<td>40%</td>
<td></td>
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<tr>
<td>BUILDING SETBACKS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Front Yard</td>
<td>50'</td>
<td></td>
</tr>
<tr>
<td>Side Yard</td>
<td>10'</td>
<td></td>
</tr>
<tr>
<td>Rear Yard</td>
<td>20'</td>
<td></td>
</tr>
<tr>
<td>Accessory Structure</td>
<td>--</td>
<td>Accessory structures, other than fences, are placed to the side or rear of the main structure within the buildable area of the lot.</td>
</tr>
<tr>
<td>BUILDING HEIGHT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Building Height (Maximum)</td>
<td>35'</td>
<td>As measured from average grade to average roof height (from the bottom of the cornice to the top of the ridge).</td>
</tr>
<tr>
<td>MINIMUM PARKING REQUIREMENTS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single-family detached dwellings</td>
<td>2 spaces per dwelling</td>
<td></td>
</tr>
<tr>
<td>Other uses</td>
<td>1 space per 300 SF of floor area</td>
<td></td>
</tr>
</tbody>
</table>
STEP 1: DETERMINE PERMIT TYPE
PERMIT REQUIREMENTS:
Any tree having a diameter breast height (DBH) of six inches or more.

FOUR CATEGORIES OF REMOVAL:
» Dead, dying, diseased, or hazardous trees:
  Not subject to notice of preliminary approval, posting requirements, standards for tree replacement or afforestation, recompense formulas, or public appeal.
» Standard applications to remove, destroy, or injure trees:
  Subject to notice of preliminary approval, posting requirements, standards for tree replacement or afforestation, and recompense formulas.
» Applications to remove, destroy, or injure trees for silvicultural prescription for forest stand improvement:
  Subject to notice of preliminary approval, posting requirements, standards for tree replacement or afforestation, and if applicable, recompense formulas.
» Permits for tree removal based on compliance with federal consent decrees:
  Department of Watershed Management may remove, destroy, or injure private property trees, without limitation to trees located on city easements over private property, if performed in compliance with the CSO Consent Decree or the First Amended Consent Decree.

EXEMPT TREE SPECIES:
Following species of trees, with 12 or less DBH and located on private property, exempt from posting, replacement, or recompense. Larger than 12 inches requires replacement or recompense if tree cover is less than minimum tree cover per zoning district. Removal with DBH larger than 6 requires permit.

- Mimosa
- Tree of heaven
- White mulberry
- Paper mulberry
- Chinaberry
- Princess tree
- Carolina cherry laurel
- Bradford Pear
- Leyland cypress
- Chinaberry

STEP 2: PLAN TREE REMOVAL + REPLACEMENT
GUIDELINES FOR MINIMAL IMPACT OF TREES + REPLACEMENT OF TREES:
» Plant replacement trees on the site that equal the total number of trees being removed.
» On public property, cumulative DBH of replacement trees shall be equal to or greater than cumulative DBH of trees removed.
» When site precludes replanting of required trees on site, the remaining total may be planted in local park, on public lands, or along rights-of-way in same NPU or within one mile of NPU boundary.
» Replacement trees shall be overstory or mid-canopy species. Overstory trees @ 35 o.c. minimum; Mid-canopy trees @ 25 o.c. minimum; Understory trees @ minimum 15’ o.c.

STEP 3: CALCULATE RECOMPENSE FEE
RECOMPENSE CALCULATION
The difference between the number of trees removed, destroyed, or injured (Nrem) and the number of trees replaced (Nrep) times the established recompense value. In addition to, the difference between the total diameter breast height of trees removed (TDBHrem) and the total caliper inches of trees replaced on site (TCIrep) times the established recompense value.

Recompense value = $100 (Nrem – Nrep) + $30 (TDBHrem – TCIrep)

RECOMPENSE LIMITS + ADJUSTMENTS
» All trees included with DBH >= 6, except pines which are included with DBH >= 12.
» New subdivision, lots of record, and vacant lots: maximum recompense set at pro-rated per acre based on zoning classification, provided no less than specified minimum of existing trees are retained on site. Credit based on recompense formula, subtracted from maximum recompense per acre.
» Adjusted maximum recompense per acre:
  Reduction from MRPA = $100 (Nrem) + $30 (TCIrem)
  AMRPA = MRPA – Reduction from MRPA
» For trees removed for streets and infrastructure, maximum recompense shall be $5,000 / acre
» Adjustments for affordable housing, see potential tools.
» Conservation easements and fee simple donations shall receive credit of $20,000 per acre against recompense fees. This includes water detention areas established in lieu of construction of detention ponds, deeded as conservation easement.

RECOMPENSE LIMITS + ADJUSTMENTS

<table>
<thead>
<tr>
<th>Zoning</th>
<th>Minimum Trees Retained (Total DBH Inches)</th>
<th>Maximum Recompense Per Acre</th>
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<tbody>
<tr>
<td>R-1</td>
<td>45%</td>
<td>$10,000.00</td>
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<tr>
<td>R-2</td>
<td>40%</td>
<td>$7,500.00</td>
</tr>
<tr>
<td>R-2A</td>
<td>40%</td>
<td>$7,500.00</td>
</tr>
<tr>
<td>R-3, R-3A</td>
<td>35%</td>
<td>$7,500.00</td>
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<tr>
<td>R-4, R-4A, R-G, R-LC</td>
<td>30%</td>
<td>$5,000.00</td>
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<tr>
<td>RG-4, RG-5</td>
<td>10% - 20%*</td>
<td>$10,000.00</td>
</tr>
<tr>
<td>R-4B</td>
<td>10% - 20%*</td>
<td>$5,000.00</td>
</tr>
<tr>
<td>R-5</td>
<td>10% - 30%*</td>
<td>$5,000.00</td>
</tr>
<tr>
<td>O &amp; I, C (1-5), I (1&amp;2)</td>
<td>10%</td>
<td>$10,000.00</td>
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<tr>
<td>PD, PD-H, PD-MU, PD-OC, PD-BP, SPI Districts, Landmark Districts, and other special zoning categories**</td>
<td>Treat according to underlying zoning categories</td>
<td>Treat according to underlying zoning categories</td>
</tr>
</tbody>
</table>

PLANTING PRIORITY
» First: Heat island areas
» Second: Soil stabilization areas
» Finally: Location at the discretion of the applicant

PROTECTION OF TREES
» Lots and subdivisions of one acre or more, require applicant to identify environmentally sensitive areas including wetlands, floodplains, permanent and intermittent streams, stands of trees and other significant aspects of the natural environment.
» Lots and subdivisions less than an acre, root save areas established in setback and required yard areas for tree preservation.
» Maximum of 10% of trees in designated wetland or 100-year floodplain may be approved for removal or destruction.

MINIMUM TREE COVER:
» When total tree cover is less than minimum tree cover per zoning district, requires afforestation standard such that minimum tree cover is satisfied.
» Minimum required tree cover (TDBH+TCI) for R3: 40 inches per acre
Regulatory Plan

R-3 ZONING DEVELOPMENT PATTERN + METRICS

SCENARIO 1

MAXIMUM CUT

<table>
<thead>
<tr>
<th>Coverage Lost (%)</th>
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<tbody>
<tr>
<td>Coverage Lost (SF)</td>
<td>419,443.60</td>
</tr>
<tr>
<td>Coverage Replaced (%)</td>
<td>0%</td>
</tr>
<tr>
<td>Coverage Replaced (SF)</td>
<td>0</td>
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<tr>
<td>Net Coverage Lost</td>
<td>419,443.60</td>
</tr>
<tr>
<td>Max. Recompense</td>
<td>$123,450</td>
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<tr>
<td>Less Replacement Adjustment</td>
<td>$0</td>
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<tr>
<td>RECOMPENSE TOTAL</td>
<td>$123,450</td>
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R-3 ZONING DEVELOPMENT CHARACTERISTICS

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<th>Coverage Lost (%)</th>
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<tbody>
<tr>
<td>Coverage Lost (SF)</td>
<td>419,443.60</td>
</tr>
<tr>
<td>Number of Units</td>
<td>30</td>
</tr>
<tr>
<td>Typical Lot Size</td>
<td>19,800</td>
</tr>
<tr>
<td>Building Value / Acre</td>
<td>$137,025.77</td>
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<tr>
<td>Average Lot Value / Acre</td>
<td>$7,500.30</td>
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<tr>
<td>Building to Land Value / Acre</td>
<td>6.42</td>
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SCENARIO 2

MAXIMUM CUT + MODERATE REPLACE

<table>
<thead>
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<th>Coverage Lost (%)</th>
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<tbody>
<tr>
<td>Coverage Lost (SF)</td>
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<tr>
<td>Coverage Replaced (%)</td>
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<td>Coverage Replaced (SF)</td>
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<td>Net Coverage Lost</td>
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<tr>
<td>Less Replacement Adjustment</td>
<td>$68,309</td>
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<td>RECOMPENSE TOTAL</td>
<td>$55,141</td>
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SCENARIO 3

MAXIMUM CUT + REPLACE WITH CONSERVATION EASEMENT

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<th>Coverage Lost (%)</th>
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</thead>
<tbody>
<tr>
<td>Coverage Lost (SF)</td>
<td>419,443.60</td>
</tr>
<tr>
<td>Coverage Replaced (%)</td>
<td>0%</td>
</tr>
<tr>
<td>Coverage Replaced (SF)</td>
<td>0</td>
</tr>
<tr>
<td>Net Coverage Lost</td>
<td>419,443.60</td>
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<tr>
<td>Max. Recompense</td>
<td>$123,450</td>
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<tr>
<td>Less Replacement Adjustment</td>
<td>$68,309</td>
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<tr>
<td>Less Easement Adjustment</td>
<td>$25,925</td>
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<tr>
<td>RECOMPENSE TOTAL</td>
<td>$29,216</td>
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INNOVATIVE DEVELOPMENT TOOLS
Building the Future We Want + Preserving the Trees We Have

SITE DESIGN PROCESS

As Atlanta begins to understand how development can be accommodated on one hand, while protecting the trees can happen on the other, diligent site planning techniques will be integral to a project’s success. If land can be developed to speak both to environmental principles, and in response to the character of the surrounding context—rather than be hampered by traditional zoning regulations—rich, thoughtful site planning begins to emerge. A necessary part of integrating these types of practices into development is the measuring the success of the project on several key values. In Edward T. McMahon’s Conservation Communities, successful projects property address: avoidance of the edge effect, proper buffers between conservation and development areas, connectivity of development and green space, protection of riparian buffers, minimization of impervious surfaces, protection of site-specific conservation values, and adequate land management tools ensuring long-term open space conservation.

STEP 1: CONSERVATION AREAS

First, it is important to identify the low, medium, and high priority conservation areas. On top of this, environmentally sensitive areas should be specified, as they impact watersheds and biohabitats. At a minimum, high priority and environmentally sensitive areas should be targeted for conservation, and considered for an easement.

STEP 2: DEVELOPMENT SITES

Once conservation areas are identified, the remaining land is designated as dedicated development areas. By concentrating development in higher densities on the development areas, the project maintains economic viability while also preserving the most sensitive areas of the site, also serving as a green space amenity.

STEP 3: STREETS + LOTS

Finally, roads and trails can be laid out on site with lot platting to follow. Roads and trails should aim to preserve public access to green spaces and conservation areas as community amenities. Lots should be platted to be developed as various housing types including single family and multifamily.
**Innovative Development Tools**

**CONSERVATION EASEMENTS + FEE SIMPLE DONATIONS**

- Permanently protects land in its natural scenic landscape
- Encourages relocation strategies that are in accordance with Stormwater Management BMPs
- Further reinforces efforts to comply with Federal Consent Decrees.

**AFFORDABLE HOUSING CREDITS**

- Lowers development cost by reducing recompense maximums
- Strategy to use in conjunction with land trust to reduce development costs, and potential to maintain public control of trees

**RELOCATION OF TREES INTO EASEMENTS + PUBLIC R.O.W.**

- Begins to move the future canopy into public control
- Increased maintenance costs can be offset by increased property taxes as a result of denser development
- Creates connectivity to nature through a network of green spaces, reduces heat island effect, and manages stormwater
# Development Metrics

## R-3 Zoning
### Development Characteristics
- **Single Family Units**: 30
- **Total Number of Units**: 30
- **Number of DU / Acre**: 1.82
- **Typical Lot Size (SF)**: 19,800
- **Typical Lot Size (Acre)**: 0.45

### Property Value Characteristics
- **Average Unit Size**: 2,093.8
- **Average Building Value**: $75,181.47
- **Building Value / Acre**: $137,025.77
- **Average Lot Size**: 0.45
- **Average Lot Value**: $9,700.30
- **Land Value / Acre**: $21,340.66
- **Building to Land Value / Acre**: 6.42

### Tree Canopy Characteristics
- **Coverage Lost (%)**: 65%
- **Coverage Lost (SF)**: 419,443.60
- **Coverage Replaced (%)**: 0%
- **Coverage Replaced (SF)**: 0
- **Max. Recompense**: $123,450
- **Less Replacement Adjustment**: $0
- **Recompense Total**: $123,450.00
- **Tree Canopy / Acre**: 13,721.40

## Single-Family + DADU
### Development Characteristics
- **Single Family Units**: 33
- **DADU Units**: 30
- **Mansion Apartment Units**: 6
- **Live-Work Units**: 4
- **Commercial Units**: 3
- **Total Number of Units**: 76
- **Number of DU / Acre**: 4.62

### Property Value Characteristics
- **Total Single-Family SF**: 188,941
- **Total DADU SF**: 65,464
- **Total Mansion Apartment SF**: 36,800
- **Total Live-Work SF**: 15,244
- **Total Commercial SF**: 15,244
- **Total SF Added**: 319,693
- **Building Value / Acre**: $697,395.15
- **Land Value / Acre**: $21,340.66
- **Building to Land Value / Acre**: 32.68

### Tree Canopy Characteristics
- **Coverage Lost (%)**: 61.1%
- **Coverage Lost (SF)**: 394,202.60
- **Coverage Replaced (%)**: 4.3%
- **Coverage Replaced (SF)**: 17,088.00
- **Trees Replaced**: 98
- **Total Caliper of Trees**: 293
- **Net Coverage Lost**: 377,114.60
- **Max. Recompense**: $123,450.00
- **Less Replacement Adjustment**: $18,552.69
- **Recompense Total**: $104,897.31
- **Tree Canopy / Acre**: 16,293.03

## Single-Family + Cottage Courts
### Development Characteristics
- **Single Family Units**: 20
- **Cottage Court Units**: 26
- **Commercial Units**: 1
- **Treehouse Units**: 5
- **Total Number of Units**: 52
- **Number of DU / Acre**: 3.16

### Property Value Characteristics
- **Total Single-Family SF**: 120,128
- **Total Cottage Court SF**: 77,582
- **Total Commercial SF**: 6,920
- **Total Treehouse SF**: 9,375
- **Total Added SF**: 214,005
- **Building Value / Acre**: $466,841.78
- **Land Value / Acre**: $21,340.66
- **Building to Land Value / Acre**: 21.88

### Tree Canopy Characteristics
- **Coverage Lost (%)**: 57.0%
- **Coverage Lost (SF)**: 368,000.60
- **Coverage Replaced (%)**: 17.6%
- **Coverage Replaced (SF)**: 64,908.00
- **Trees Replaced**: 371
- **Total Caliper of Trees**: 1,113
- **Net Coverage Lost**: 303,092.60
- **Max. Recompense**: $123,450.00
- **Less Replacement Adjustment**: $70,471.54
- **Recompense Total**: $52,978.46
- **Tree Canopy / Acre**: 20,790.11

## Single-Family + Duplexes
### Development Characteristics
- **Single Family Units**: 14
- **Duplex Units**: 40
- **Commercial Units**: 1
- **Total Number of Units**: 55
- **Number of DU / Acre**: 3.34

### Property Value Characteristics
- **Total Single-Family SF**: 31,720
- **Total Duplex SF**: 56,890
- **Total Commercial SF**: 2,800
- **Total Added SF**: 91,410
- **Building Value / Acre**: $159,406.59
- **Land Value / Acre**: $21,340.66
- **Building to Land Value / Acre**: 9.34

### Tree Canopy Characteristics
- **Coverage Lost (%)**: 60.5%
- **Coverage Lost (SF)**: 390,176.84
- **Coverage Replaced (%)**: 21.7%
- **Coverage Replaced (SF)**: 84,720.00
- **Trees Replaced**: 484
- **Total Caliper of Trees**: 1,452
- **Net Coverage Lost**: 305,456.84
- **Max. Recompense**: $123,450.00
- **Less Replacement Adjustment**: $91,981.71
- **Recompense Total**: $31,468.29
- **Tree Canopy / Acre**: 20,646.48

---

**Innovative Development Tools**
### Innovation Development Tools

#### Development Characteristics

<table>
<thead>
<tr>
<th>Type</th>
<th>Quantity</th>
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</thead>
<tbody>
<tr>
<td>Single Family Units</td>
<td>19</td>
</tr>
<tr>
<td>DADUs</td>
<td>39</td>
</tr>
<tr>
<td>Mansion Apartments</td>
<td>36</td>
</tr>
<tr>
<td>Townhouses</td>
<td>43</td>
</tr>
<tr>
<td>Commercial Units</td>
<td>12</td>
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<td><strong>Total Number of Units</strong></td>
<td><strong>149</strong></td>
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<table>
<thead>
<tr>
<th>Type</th>
<th>Quantity</th>
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<tbody>
<tr>
<td>Mansion Apartments + DADU</td>
<td>19</td>
</tr>
<tr>
<td><strong>Number of DU / Acre</strong></td>
<td><strong>9.05</strong></td>
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#### Property Value Characteristics

<table>
<thead>
<tr>
<th>Type</th>
<th>Total Single Family SF</th>
<th>Total DADU SF</th>
<th>Total Mansion Apartment SF</th>
<th>Total Townhouse SF</th>
<th>Total SF Added</th>
<th>Building Value / Acre</th>
<th>Land Value / Acre</th>
<th>Building to Land Value / Acre</th>
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</thead>
<tbody>
<tr>
<td>Total Single Family SF</td>
<td>66,552</td>
<td>23,400</td>
<td>65,610</td>
<td>66,650</td>
<td>224,212</td>
<td>$489,107.87</td>
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</table>

#### Tree Canopy Characteristics

| Coverage Lost [%]          | 84.56 |
| Coverage Lost (SF)         | 545,297,84 |
| Coverage Replaced (%)      | 18.35 |
| Coverage Replaced (SF)     | 100,000.00 |

| Trees Replaced             | 571 |
| Total Caliper of Trees     | 1,714 |
| Net Coverage Lost          | 445,297,84 |
| Max. Recompense            | $123,450.00 |
| Less Replacement Adjustment| $108,571.43 |
| Recompense Total           | $14,878.57 |

| Tree Canopy / Acre         | 12,150.67 |

#### Duplexes + Mansion Apartments

<table>
<thead>
<tr>
<th>Type</th>
<th>Quantity</th>
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</thead>
<tbody>
<tr>
<td>Duplex Units</td>
<td>121</td>
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<tr>
<td>Mansion Apartment Units</td>
<td>39</td>
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<td><strong>Number of DU / Acre</strong></td>
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#### Property Value Characteristics

<table>
<thead>
<tr>
<th>Type</th>
<th>Total Duplex SF</th>
<th>Total Mansion Apartment SF</th>
<th>Total Added SF</th>
<th>Building Value / Acre</th>
<th>Land Value / Acre</th>
<th>Building to Land Value / Acre</th>
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<tbody>
<tr>
<td>Total Duplex SF</td>
<td>323,102</td>
<td>371,885.15</td>
<td>272,801.00</td>
<td>$704,831.72</td>
<td>$21,340.66</td>
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</table>

#### Tree Canopy Characteristics

| Coverage Lost [%]          | 65%   |
| Coverage Lost (SF)         | 419,443.60 |
| Coverage Replaced (%)      | 13.2% |
| Coverage Replaced (SF)     | 29,843.00 |

| Trees Replaced             | 171   |
| Total Caliper of Trees     | 512   |
| Net Coverage Lost          | 371,885.15 |
| Max. Recompense            | $123,450.00 |
| Less Replacement Adjustment| $51,634.89 |
| Recompense Total           | $71,815.11 |

| Tree Canopy / Acre         | 16,610.73 |

#### Cottage Courts + Townhouses

<table>
<thead>
<tr>
<th>Type</th>
<th>Quantity</th>
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</thead>
<tbody>
<tr>
<td>Cottage Court Units</td>
<td>27</td>
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<tr>
<td>Townhouse Units</td>
<td>77</td>
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<tr>
<td>Live-Work Units</td>
<td>6</td>
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<tr>
<td>Commercial Units</td>
<td>5</td>
</tr>
<tr>
<td><strong>Total Number of Units</strong></td>
<td><strong>115</strong></td>
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<table>
<thead>
<tr>
<th>Type</th>
<th>Total Cottage Court SF</th>
<th>Total Townhouse SF</th>
<th>Total Live-Work SF</th>
<th>Total Commercial SF</th>
<th>Total Added SF</th>
<th>Building Value / Acre</th>
<th>Land Value / Acre</th>
<th>Building to Land Value / Acre</th>
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<tbody>
<tr>
<td>Total Cottage Court SF</td>
<td>22,410</td>
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<td>6923</td>
<td>119,403</td>
<td>$260,471.99</td>
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#### Tree Canopy Characteristics

| Coverage Lost [%]          | 35.06 |
| Coverage Lost (SF)         | 225,854.24 |
| Coverage Replaced (%)      | 13.2% |
| Coverage Replaced (SF)     | 29,843.00 |

| Trees Replaced             | 171   |
| Total Caliper of Trees     | 512   |
| Net Coverage Lost          | 194,011.24 |
| Max. Recompense            | $123,450.00 |
| Less Replacement Adjustment| $32,400.97 |
| Recompense Total           | $91,049.03 |

| Tree Canopy / Acre         | 27,295.66 |

#### Courtyard Houses + Townhouses

<table>
<thead>
<tr>
<th>Type</th>
<th>Quantity</th>
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</thead>
<tbody>
<tr>
<td>Cottage Court Units</td>
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<tr>
<td>Townhouses</td>
<td>51</td>
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<tr>
<td>Courtyard Houses</td>
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<tr>
<td>Live-Work Units</td>
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<tr>
<td>Commercial Units</td>
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<td><strong>Total Number of Units</strong></td>
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<table>
<thead>
<tr>
<th>Type</th>
<th>Total Cottage Court SF</th>
<th>Total Townhouse SF</th>
<th>Total Live-Work SF</th>
<th>Total Commercial SF</th>
<th>Total Added SF</th>
<th>Building Value / Acre</th>
<th>Land Value / Acre</th>
<th>Building to Land Value / Acre</th>
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<tbody>
<tr>
<td>Total Cottage Court SF</td>
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<td>13,300</td>
<td>8,655</td>
<td>190,885</td>
<td>$416,406.59</td>
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<td>19.51</td>
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#### Tree Canopy Characteristics

| Coverage Lost [%]          | 80.6% |
| Coverage Lost (SF)         | 520,297.84 |
| Coverage Replaced (%)      | 8.3%  |
| Coverage Replaced (SF)     | 43,342.00 |

| Trees Replaced             | 248   |
| Total Caliper of Trees     | 743   |
| Net Coverage Lost          | 476,955.84 |
| Max. Recompense            | $123,450.00 |
| Less Replacement Adjustment| $47,057.03 |
| Recompense Total           | $76,392.97 |

| Tree Canopy / Acre         | 10,227.34 |

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**DWELLING UNITS / ACRE**

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<tr>
<th>Building to Land Value Ratio / ACRE</th>
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**TREE CANOPY / ACRE**

<table>
<thead>
<tr>
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<td>12,150.67</td>
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<tbody>
<tr>
<td>10,227.34</td>
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</tbody>
</table>

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CASCADE ACRES
Single Family Homes & Detached Accessory Dwelling Units (DADU)

INTENTION
Cascade Acres sits atop a dramatic 16 acre landform that has been cut by natural processes that have created a fertile and evocative landscape. Calling back to the site’s history as a dairy farm Cascade Acres creates a new agrarian community in which the hands of all are welcome to tend the fields and benefit from the bounty.

The community is centered around a small village like area seated atop the hill. Private homes line the fields and sit nestled back in the wooded hills. While the community contains 33 luxury single family homes and 40 affordable apartment and detached units, creating a diverse community.
CASCADE ACRES
Single Family Homes & Detached Accessory Dwelling Units (DADU)

APPROACH TO NATURAL SPACE
This project began by considering the landform upon which it sat. Starting with a consideration of identified ecologically sensitive areas. This resulted in a process similar to the approach outlined by McHarg (1969). By layering different information about (1) trees, (2) drainage, and (3) topography a scheme for achieving a development strategy that had minimal impact on critical zones was created.

APPROACH TO PUBLIC SPACE
Cascade acres has two strategies towards public space. The Field, a community agriculture space, and The Forest a set of activity trails. The Field follows the model of Community Supported Agriculture communities. Its goal is to create an active public space that is open to Cascade Acres residents and surrounding communities to come together and produce food locally.

The Forest seeks to create an active pastoral environment that connects neighborhoods together without the need for cars. This space is intended to be as much a place for meditative introspection, a place to disconnect from the mediascape, an experience more and more desired in an age of digital connectedness. While also providing a space for individuals and groups to explore the natural landscape.
Cascade Acres: SINGLE FAMILY HOUSES + DADU

The Cascade Heights and Mangum Manor communities as they exist are primarily older, approaching retirement. The community is in need of new hands to come and take part in the caring for both the land and for those that dwell upon it. By diversifying the housing types available and the activities along Cascade Rd the development seeks to attract a new younger market.

37.34% over 55 years old in Cascade Heights area

Existing Market

Retiring Boomers

New Hands to Harvest

Young Families

Housing Types:
- Large Lot Single Family
- Small Lot Single Family

Desired Amenities:
- Abundant Open Space
- Village Like Community

Childless Couples

Housing Types:
- Small Lot Single Family
- Large Rental Units

Desired Amenities:
- Community Agriculture
- Urban Style Living

College Students

Housing Types:
- Small Rental Units

Desired Amenities:
- Access to Transit
- Active Recreation Spaces
A GROWING COMMUNITY
Strategies for sharing the Land’s Bounty

BUILD GOOD FENCES
Strategies for addressing development edges.

SOW THE RIGHT SEED
Distributing program within development

OPEN THE GATES TO ALL
Creating new connections to surrounding amenities and communities
RETROFITTING THE AMERICAN DREAM

The American suburb grew out of a desire for a return to the Pastoral life style. The popular vision of the suburb has always been one closer to that of the small American town or farming village in the model of Williamsburg VA.

THE FARMING COMMUNITY

Globally and throughout history the farming community has been one that has come together to participate in the act of cultivating land. This concept of a community with shared motive was core to the original concepts of the American Suburb, such as Clarence Perry’s Neighborhood Unit.

AMERICAN MAIN STREET

Main Street has been an indelible icon of the mythology of small town America. These places are icons, places that people gather and interact. Recapturing this centralization of community activity plays a major role in re-imagining the suburb as not a place of isolation, but instead as a place of community and fellowship.

AGRARIAN URBANISM

A growing number of communities have created a new model on the edges of America’s cities. Very urban in activity, but rural in aspect. Developments such as Serenbe have proved to be a successful model of building an urban lifestyle around the act of cultivation and agriculture.

A BEATING RURAL HEART

Cascade Acres brings the successful model of the agrarian urban community from the exurban fringes into the suburban context of Atlanta. This vision of community provided by developments such as Serenbe restores the sense of community present in pastoral life by inviting neighbors in to harvest and share the bounty of the land.
Detached Accessory Dwelling Unit (DADU)

18’ x 24’ DADU

Farmhouse

40’ x 50’ Farmhouse

Skinny House

60’ x 30’ Skinny House
Key
- Preserved Tree
- New/Replacement Tree
- Removed Tree
The Atlanta tree ordinance discourages the cutting down of even a single healthy tree. The tree ordinance is religiously followed to create a masterplan that allows for high priority trees to continue to grow and also make way for new trees to be planted to provide the required shade for the community. Public spaces are created around trees instead of the other way around. The existing trees are given priority over the grade of the land.

The intention was to create a new way of organizing single family homes - to densify and to share amenities. The densifying and repacking of single family homes create different levels of privacy and affordability that enable the creation of an inclusive environment for demographics that range from young couples to retired senior citizens. Importance was given to preserve trees according to the ordinance.

Cascade Re+assembled is a way of rethinking single family homes but with more communal amenity spaces. The surrounding neighborhood prioritizes private backyards and front yards over public spaces, while this project values the existence of a range of shared courtyards, publicly accessible woodlands, and a small commercial building. These bind the surrounding homes and creates public front yards that houses look onto. It creates a neighborhood level social cohesion.
We propose making smaller home cottage courts out of variations of the long narrow Charleston Houses facing each other across a common courtyard. We propose variations of the 1930’s Cottage for our single family houses along the main access road and 1920s Bungalow for the larger home cottage courts towards the south of the site.
CHARLESTON HOUSES/

The house is well-suited to long, narrow lots. A single house has its narrow side (often two- or three-bays wide) with a gable end along the street and a longer side (often five-bays) running perpendicular to the street.

PROJECT// Charleston - South Carolina
• Positive usable outdoor space for residents on narrow lots
• Light and air on all sides
• Narrow and deep house lots that are in series
• Minimal or no fencing at all
• In rural areas houses tend to face amenities such as parks
• Works well to complement a street frontage on its own or in groupings

1930S COTTAGE

PROJECT// Bent River Cottage - IA
• Usually 1 – 2 stories
• Long side of the house faces the street
• Entry typically opens directly into living room
• Rustic cottage floor plan that will work great on a small lake lot
• Easy access to outdoor spaces like verandas, porches, and patios
• Open floor plan maximized for efficiency and flow between rooms
1920S BUNGALOW
A one-story house, cottage or cabin. Bungalows are generally small in terms of square footage, but it is not uncommon to see very large bungalows. Bungalows were originally designed to provide affordable, modern housing for the working class.

PROJECT// Bungalow Company- Bend, Oregon
- Usually 1 – 1 1/2 stories, low-pitched roof, with broad eaves
- Entry typically opens directly into living room
- Often has a large front porch that creates an outdoor room
- Easy access to outdoor spaces like verandas, porches, patios
- short side of the house faces the street

COTTAGE COURTS
Cottage housing is generally defined as a grouping of small, single family dwelling units clustered around a common area and developed with a coherent plan for the entire site.

PROJECT// Greenwood Avenue Cottages - Shoreline, WA
- Eight small houses of this ‘pocket neighborhood’
- enclose a shared community green
- private yard for each dwelling
- Garages and parking are clustered off to the side
- fostering a strong sense of community with common shared central courtyard
The surrounding context shows a residential neighbourhood primarily filled with large single family residential suburban houses that are set deep into the lots with a huge area of frontyards and backyards. Route 285 divides the area and only on the other side commercial establishments exist. On the eastern side of the freeway, our site exists along with several other similar suburban house lots that have an ageing population in them. Existence of schools and churches show pull factors that could have attracted the existing residents when they came here and these can be used to attract new residents as well.

The context shows lack of choice in building and lot types. The neighborhood limits the kind of households it can attract and retain to only those that can afford and desire to maintain a large lot single family house. If it offered more diverse options at a range of price points the neighborhood could retain more of its aging population as well as welcome investment from the next generation.
The design process started with responding to surrounding context by carving out lots with similar widths such that a drive down Cascade Road and Lynhurst Drive is pleasant and neighborly. The second step is to respect the most sensitive areas of vegetation while laying down the roads and projecting the remaining masses. In the third step, the projected masses are fragmented into livable and walkable sized blocks that span the site. The fourth step considers the typologies that can be created in these blocks. The surrounding shell is kept single family lots that are smaller sized than the neighbourhood. The inner shell has single family lots that face each other over a public courtyard. The innermost shell has the cottage courts which are skinnier lots and more affordable. In the final step, the new greenery is plugged in to cool down the micro climate and to create replacement trees. Tree houses (small houses on stilts with minimal disturbance to the soil) are plugged into the dense vegetated areas.
Cascade Re+assembled: SINGLE FAMILY HOUSE + COTTAGE COURT

TYPOLOGIES + FRONTS

SITE TOPOGRAPHY

- SINGLE FAMILY
- LARGER HOME
- SMALLER HOME
- COTTAGE COURTS
- TREE HOUSES
Cascade Re+assembled: SINGLE FAMILY HOUSE + COTTAGE COURT

CANOPY

DRAINAGE

WATER FLOW

PROPOSED TREES

EXISTING TREES
ILLUSTRATIVE PLAN

Cascade Re+assembled: SINGLE FAMILY HOUSE + COTTAGE COURT
SHARING THE FOREST: SINGLE FAMILY HOUSES + DUPLEXES

HOUSING
With the growth of the city, it is becoming increasingly important to infill suburban areas with new development. However, the city also needs for many of these areas to retain rural characteristics - such as a high level of tree canopy. The existing parcels around the site do this with lots that are two to three times the typical sizes in today’s market. To keep prices affordable, the first step in our design is to reduce the lot sizes. Second, our design preserves and plants large communal areas of trees which are both healthier for the trees, and provide green areas where people can have shared interactions with each other and can experience a natural forest, rather than a cultivated yard. Along with our dual-fronted duplex houses, the result is that every home gets access to a CITY FRONT DOOR AND A NATURE BACK DOOR.

TREES
According to the primary study of the sensitive area, we retained most of them and preserved many important trees according to their growth period and growth status. Our design philosophy is SHARING THE FOREST, with the intention of leaving enough space for the tree to grow by properly reducing the backyard area of each lot. Residents can also go to the forest at any time through their own backyard. Trees and vegetation can not only penetrate the stormwater to avoid excessive ground runoff, but also protect the original ecological balance and provide living quarters for a variety of plants and animals.

COMMUNAL SPACE
Housing in suburban areas tends to emphasize private space to the point of excluding public or communal space. Our proposal balances the continued desire for private space and front lawns, with the growing popularity of shared amenities. In our case, these take the form of the SHARED BACKYARD FOREST, as well as the entry plaza for farmer’s markets, festivals, and other activities.
We did research about single family houses in the neighborhoods around our site and duplexes of similar size and type. The average lot size is 24000 sqft and the average house square footage is 2500 sqft. It is worth mentioning that, because duplex shares the front yard and backyard by two household, it often cannot have a good activity space and landscape perspective. Therefore, this design creates multiple fronts for duplex, and make full use of its flexibility to adapt to different environments and terrain. Both units garages still face the primary residential street. However, one of the units can be turned to have a front door and path facing another street or communal area. This puts “eyes on all streets” and adds both safety and dignity to passersby.
According to the current topography, the site has four main water catchment areas. We will focus on preserving and protecting the vegetation and trees in these areas and building green infrastructure like raingarden and bio-swale to deal with the stormwater. Taking into account the slope of the site and sensitive area, we design the road network and development area.
We first tried to analyze the existing context to understand the relationship of the lot, the house, and the trees. We found there are two typical lots, one is house in a forest and one is house with front lawn and backyard trees, and both lot sizes are actually too large to be affordable for a new single family house and duplex even designated as a rural suburban conservation area. We tried to design a community with large areas of forest to be shared and enough private yards, then we combined those two typical lots on our site to form clumps of forests and houses of reduced lawns and backyard trees.
The average lot size of both a single family house and duplex is 80' × 110', which contains at least a 35' front yard, a 15' back yard and 7.5'-10' side yards. We shrunk the lot size to make it not as large as the surroundings in order to put more lots and public spaces into the site and protect more sensitive areas, but still has enough space as private space. House foundations are kept at least 1.5 times the radius of the dripline from existing tree trunks. Those distances are shown here at 20' and 30'.
The first thing we tried to do is to tell the difference between frontyards and backyards. Basically we let frontyards to face the city street and drive lane, which is easy for people to go in and out and protect their privacy. We let the backyard face the high value places like preserved sensitive areas and other public green areas, which people could have more chances to have contact with green spaces.

The duplex plays an important role in the project, since the two units can be combined in different ways. It is a better way to adapt to little of the topography, so we used duplex to fit into the topography, one unit lower and one higher. Besides, we used duplex (B-1) at the corner to get higher value since it has two sides of views. Duplex(B-3) is likewise. We also use duplex(B-2) when both sides have city streets or drive lanes, which could do the best to protect privacy between united while also establishing a front, instead of a back, onto both streets.
REGULATING PLAN

LEGEND:
- Streets/Center Line
- Right-of-Way
- Parcel Line (neighborhood)
- Parcel Line (Site)
- Replacement Tree Trunks
- Preserved Tree Trunks
- Removed Tree Trunks
- Tree Canopy
The main idea of the project is sharing the forest. Large private backyards are replaced with much larger, shared wooded areas. At the edges of the site, these are made up primarily of preserved trees. A new backyard forest at the center of the site provides places for people, especially children to interact and play together. It leads to a large rain garden. Paths throughout the woods link the whole community and can be used for jogging and dogwalking.

The shared experience of nature out the back door is complemented by the design of welcoming streets out the front door. In addition to the usual sidewalks and front doors facing the streets, the project makes use of dual-facing duplexes on lots with dual fronts (Unit types B2 and B3.) Guest parking for these units is provided along Lynhurst Drive and adjacent to the Farm Market plaza.

Though it is considered as a rural area, we still want to add a few urban elements in it, so we kept The southeast corner is developed as a public plaza with a welcoming barn/coffee shop. Since it is at the corner and there is a bus stop next to it, it can attract lots of people from this neighborhood to come here to buy morning coffees, to have farm markets, to celebrate festivals.
We first analyzed the city street, and put two entrances at the quiet street to avoid blocking the traffic. The loop drive lane inside is designed to fit the topography and easily connect houses. Sidewalks inside green areas provide opportunity for people to get close to nature.

We tried to preserve the sensitive areas as much as possible and keep lots of public green spaces including the backyard forest in the center to provide more places for residents to interact.

Frontyards mainly face to the city streets outside and drive lanes inside, backyards mainly face to landscape. At the edges of the site, these landscapes of preserved trees create a buffer to the neighboring homes.

This section is the sharing forest area, and it is also the main communal space. There are two designed rain gardens in this site, the function of which is gathering stormwater and avoid excessive runoff. They can reduce the evaporation of water, improve the micro-climate, and to a certain extent, alleviate the adverse effects made by impervious surface. There are bio-swales beside the drive way and houses, to collect water in permeable surface.
Our main idea is sharing the forest, as we can tell from the renderings that kept large areas as green spaces and still have modest private yards. The backyard forest in the center could do well as a daily social and play space. The houses have a great connection with the original topography since we use duplexes to deal with the height difference. Duplexes with front yards facing the city street could protect the privacy, be convenient for visitors to come and fit into the context.
CASCADE CREEK
Mansion Houses and Detached Accessory Dwelling Units (DADU)

INTENTION
Cascade Creek is an investigation of green development in the southwest part of Atlanta. The design is informed by current and past hydrology; seeking to restore a historic creekbed and water flow across the site. Ecological sensitivity informs the neighborhood parks creating diverse public spaces for the proposed subdivision and the greater cascade community.

TREES
Designed around the most ecologically functional part of the site, a large common greenspace will serve as an asset to the community of Cascade Creek and will increase adjacent land values. The ecologically considerate open space constrained the site design and allowed for density and proximity. After an analysis of the site’s trees and environmentally sensitive areas as many trees as possible were preserved and replaces to a surplus in more ecologically robust areas. A variety of native and edible plant species line the streetscapes and inform the ecopark and interior central park, fitting in with the city within the trees.

HOUSING
The housing typologies of Cascade Creek include single family houses with or without DADU’s (detached accessory dwelling units), quadplex mansion apartments, and townhouses. The neighborhood also features commercial buildings that house local retail. The Cascade Creek HOA seeks to fortify the local ecology and tree canopy by planting guilds, which are dense clusters of native trees with high biodiversity.

A question for the city: Rather than be fined for removing trees, can a developer be rewarded for regenerating ecology?
Located on the corner of Cascade Road and Lynhurst Drive, lies a historic creek bed likely piped below single-family homes. The existing Cascade Creek site is half mowed lawn, half wild with nature’s course and sloping to the southwest.

Development will change the landscape and the way water flows off the site. An intention to preserve, re-forest, and cleanse and control water flow will be an important part of the development of this site.

PROPOSED WATER FLOWS: waterflow on the site is slightly redirected based on the historic creek bed and to allow for water to be filtered and stored on site.

ENVIRONMENTAL SENSITIVITY: Zone one serves as a wildlife corridor to be reformed with berms and swales to slow and clean stormwater runoff as it flows down 1,000 linear feet and is received by a retention pond adjacent to Cascade Avenue. The second zone is a wetland infiltration zone with riparian buffers. This area can include constructed wetlands and rain gardens. As the diagram to the right depicts, the third layer serves as open green space for active public use and contains walking trails and sports areas for the neighborhood of Cascade Creek. It is managed by the Homeowners’ Association of Cascade Creek. The fourth zone is the urban edge, which consists of ecological landscaping for residential units with gardens. In the fifth zone is the best land for development. It is the high land and has the lowest quality top soil, allowing for the least intrusive to natural ecology development possible.
Cascade Creek: MANSION APARTMENT + DADU

inventory and analysis

existing water flows

proposed water flows

environmental sensitivity

development suitability

land okay to develop; highland; lower quality topsoil

urban edge, lawn; gardens

wildlife corridor; creek bed; topsoil high quality; berms and swales

open green space; park; passive recreation; riparian buffer
Cascade Creek: MANSION APARTMENT + DADU

typology + lot types + parking

covered bridge
dadu + single family
mansion apartment
townhouses

frontages
parking
- covered bridge

- single family home (old fourth ward, atlanta)

- detached accessory dwelling units (dadu) pair with single family lots and townhome lots

- townhomes

- solar panels on south and west facing roofs

- mansion apartment (4 unit) (old fourth ward, atlanta)

- mansion apartment (4 unit)
illustrative master plan

- Raised wooden bridges
- Solar panels on south and west facing roofs
- Stormwater retention pond
- Passive recreation
- Park
- Retail
- Cascade Creek
- Lyhurst Drive
- Pedestrian access

North
community orchard + open play park

pollinator gardens in “extra” corners

community gardens in “extra” corners

green streets

previous parking

green alleys

strong pedestrian connectivity

raised wooden bridges over park space

riparian buffers to clean stormwater

native trees and low-impact walking paths

solar panels on south and west facing roofs

living machines
The analytical diagram to the left shows various housing typologies used in the subdivision. Included are mansion apartments, townhomes or single-family homes with detached accessory dwelling units and a commercial corridor at the corner of Cascade Avenue and Lynhurst Drive. The building masses are oriented facing east/west in order to minimize solar heat gain. Additionally, this allows for a majority of the roofs to face south and southwest for the greatest PV solar potential. Most of the buildings on site are equipped with a solar array and all excess power generated is shared by the neighborhood or resold to the utility companies to provide savings for neighborhood residents.

SITE GOALS:
1. environmental responsiveness
2. resource efficiency
3. community and cultural sensitivity

This section shows a 12 ft. alley that allows for a pedestrian-friendly environment without driveways in the fronts of the single-family residential units and shows a street-front like condition for the detached accessory dwelling units that face the backside of the houses. These alleys would be constructed with pervious pavers, slowing down traffic and reinfiltrating stormwater.
central park perspective

This section shows the central park. It highlights the open space for public events and neighborhood initiatives. It also illustrates a 25 ft. wide street condition that allows two-direction traffic with space for street parallel parking on the building side.

central park section

This section shows the urban edge interaction with the stormwater ecoparkce and natural asset at their leisure.

stormwater park section
Larger lots toward the east face Lynhurst Drive and acknowledge the existing urban morphology with larger lot types. These spaces accommodate for the single-family houses and mansion apartments. They also allow for the owners of these property types to have DADUs, or Detached Accessory Dwelling Units, as a source of additional income. The park areas are lined with townhomes for greater value and higher density.

### Metrics

<table>
<thead>
<tr>
<th>Type</th>
<th># of units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single family</td>
<td>19</td>
</tr>
<tr>
<td>Townhomes</td>
<td>49</td>
</tr>
<tr>
<td>Mansion apartment</td>
<td>36 (9 bldgs)</td>
</tr>
<tr>
<td>Total:</td>
<td>143</td>
</tr>
</tbody>
</table>
This regulating plan depicts the separation between the dense developed area of land in contrast with the large ecopark of Cascade Creek. It highlights which existing trees of the canopy have been protected, replaced, and removed. Although many of the existing trees were removed, they were all replaced in the ecopark to surplus for a robust, ecologically functional stormwater park.
Due to the fact that most of high priority trees exist near the edges of the site, we emphasize a compact development that preserves these trees to the highest limit. Including these high priority trees and other preserved ones, total tree canopy area is 6.65 acres, accounting for 42.37% of the total site area. In addition, a rethinking of fronts and backs of the houses which is learned from the project of Radburn is carried out where the fronts of the houses face the natural environment including the trees. In this way, the trees can be celebrated and respected by residents, which reveals our concept “LIVE WITH NATURE”.

The two main building types studied are duplexes and mansion apartments. A duplex is a two-family building in which two dwelling units are vertically stacked one above the other or semi-detached horizontally, with individual entrance. Mansion apartment, which is designed to resemble a single-family house, usually has two stories and contains six to nine units with a central entrance hall that connects foyer of each unit. In addition, we also introduce townhouses and courtyard apartments in the project. The mix of all these “missing middle housing” types shows our concept “LIVE WITH PEOPLE”.

The communal spaces, namely the land belonging to the homeowners’ association (HoA), includes the surrounding green areas with most of the preserved trees, wedge-shape green corridors growing from the edges of the site and the core public space in the center of the plan. Almost all the communal space is faced by the fronts of the houses and there is a trail winding through the green area. Furthermore, in the regulating plan, the lot is expanded into the communal space so that the area of HoA hold land can be reduced.
This is our first concept, including three strategies: creating wedge-shape green corridors that occupy land of home owners’ association, compact development that allows preservation of high priority trees existing around the edges of the site, and the garage and backyard is on an alley and the house fronts the shared green area.

The second part of the design concept emphasizes the density of residents, the possible mixture of different kinds of residents and the communal activities they will get involved in. This is stated from two aspects: diversified residents and the mixture of housing typologies.
A duplex house is a dwelling having apartments with separate entrances for two households. This includes two-storey houses having a complete apartment on each floor and also side-by-side apartments on a single lot that share a common wall. By contrast, a building comprising two attached units on two distinct properties is typically considered semi-detached or twin homes but sometimes also duplex.
Mansion Apartment is a medium structure that appears more or less like a very large house but consists of 6 to 9 side-by-side and/or stacked dwelling units, typically with one shared entry or individual entries along the front.
Typical Mansion Apartment Layout
### Live Well Together: Duplexes + Mansion Apartments

#### Matrix

<table>
<thead>
<tr>
<th>Storey</th>
<th>Duplex</th>
<th>Mansion Apartment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 to 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 to 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 to 8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9+</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Doorway / Entry</th>
<th>Duplex</th>
<th>Mansion Apartment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual Access for Each Unit</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shared Access to Portion of Units</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shared Access to All of Units</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Parking</th>
<th>Duplex</th>
<th>Mansion Apartment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Located on Street</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Located on Site</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Located in Building</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Private Open Space</th>
<th>Duplex</th>
<th>Mansion Apartment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual Yard for All Units</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Individual Yard for Some Units</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shared Common Area</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Limited Common or Privated Yard</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Potential Neighborhoods</th>
<th>Duplex</th>
<th>Mansion Apartment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rural Residential</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Suburban Residential</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Traditional Residential</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Major Corridor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Walkable Commercial</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Demographic Transition

- 23% Percentage of nuclear family
- 16.1% Percentage of aging population
- 16.6% Percentage of 2-8 units housing
- 2.58 Average size of household

Targeted Residents

- Newly Retired
  - Outdoor Walking
  - Cooking
  - Dancing

- The Handicapped
  - Daily Care Services
  - Outdoor Wandering

- The Elderly
  - Taichi
  - Chess
  - Outdoor Activities

- Dinks
  - Parties
  - Disco
  - Dog Walking

- Young Families
  - Kids Raising
  - Outdoor Sports

- Nuclear Families
  - Family Get-togethers
  - Children-care Activities
  - Outdoor Picnic

- Individuals
  - Neighborhood Parties
  - Dynamic Activities

- Courtyard Apt.
  - Outdoor Activities

- Mansion Apt.
  - Outdoor Activities

- Duplex
  - Outdoor Activities
  - Outdoor Walking

- Townhouse

- Dynamic Activities
LIVE WELL TOGETHER: DUPLEXES + MANSION APARTMENTS

Spatial Structure Pattern

 OUTER RING

 GREEN CORE

 WEDGE-SHAPE

 MOSAIC
LIVE WELL TOGETHER: DUPLEXES + MANSION APARTMENTS

PRESERVATION

DEVELOPMENT

Development Boundary
Illustrative Site Plan
CASCADE GREENS: TOWNHOUSES + COTTAGE COURTS

INTENTION
Atlanta’s City Design projects a tripling of population and aspires to be an even more loved place than it is today. Some of this growth will have to occur through densification within suburban neighborhoods. Our proposal provides greater density and the kind of communal spaces associated with urban life, within the kind of green setting of garden courts and woodlands associated with suburban living. Add the site’s proximity to I-285 and Americans love for cars and Cascade Greens provides a model for how Atlanta can triple in population and be triply beloved.

TREES
Cascade Greens not only tries to preserve as many of the site’s high priority trees as possible, it CELEBRATES them as focal points in the design. Several of the site’s communal spaces center on existing trees and circulation on foot and by car frames views of significant trees, adding to the wayfinding through the site while honoring these ancestors.

COMMUNAL SPACES
Recognizing the converging interests of retiring baby boomers and maturing millennials in more opportunities for face-to-face socializing and shared amenities, Cascade Greens orients homes around SHARED FRONTYARDS. These take the form of interconnected green courtyards, a paved, shared street, a central plaza, and peripheral woodlands.

**URBAN VS SUBURBAN**

<table>
<thead>
<tr>
<th></th>
<th>1950</th>
<th>2005</th>
<th>Urban</th>
<th>Suburban</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Living in Suburbs</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percentage of population living in suburbs</td>
<td>23%</td>
<td>50%</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Couple with Kids</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percentage of families with kids showing a more diverse population</td>
<td>44%</td>
<td>23%</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Cars per Household</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vehicles owned by household, demonstrating the increase in car ownership</td>
<td>1.0</td>
<td>1.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Carbon Urban</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The per capita land required for carbon sequestration</td>
<td>3.00 Acres per capita</td>
<td>15.83 Acres per capita</td>
<td>6 Metric Tons</td>
<td>21 Metric Tons</td>
</tr>
<tr>
<td><strong>Carbon Emissions</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Annual average for household’s transportation and heating</td>
<td>21 Metric Tons</td>
<td>2 Metric Tons</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Land Consumption</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The net area for 100 units of housing</td>
<td>2 Acres</td>
<td>30 Acres</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Household VMT</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average vehicle miles of travel per house</td>
<td>7,300 Miles</td>
<td>30,000 Miles</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Walk Score</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measures walkability proximity of local commercial destinations</td>
<td>98</td>
<td>46</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**DESIGN PRINCIPLE**

- **Increase Density**: Propose housing typology that can densify the residential area
- **Celebrate Trees**: Preserve existing trees as an important element in shaping space
- **Create Public Space**: Provide public space for shared activities to promote communal living style
Analysis of the terrain helped determine storm-water drainage on site. A conceivable plan was achieved through minimal regrading.

Every lot was fronted towards another or at a public space so as to increase social interaction in the shared areas.

Environmentally sensitive areas were left untouched except for the addition of trails. The green spaces intensify and development gets less dense as one moves away from Cascade Road.

To Celebrate trees, every community space had one significant tree and then connections were formed between them.
Cascade Green: TOWNHOUSE + COTTAGE COURT

HIGHLAND PARK TOWNHOMES, ATLANTA
Townhouses located right next to the Beltline take advantage of the view and front themselves towards it while the backs along with access for tuck-under garages go towards the street.

Typical house area: 2680SF - 3150SF
4 bed, 3 bath
2 garages.

Roswell, Georgia’s Unified Development Code was used to obtain guidelines for typical lot sizes, setbacks, etc. Atlanta Metro precedents helped define our lots and design.
BUILDING TYPES: PRECEDEENTS

COTTAGE COURTS

1) Commerce drive cottage courts, Decatur, Georgia
Developed to fulfill unmet demand for cottage homes sized roughly 700 to 1,200 square feet.

Design considerations:
- Maximized green space
- Maximized setbacks and buffers
- Tree preservation
- More community participation
- Previous parking

2) 3rd street cottages, Langley, WA
Focused towards families of one and two, the cottage courts limited their area to 700 square feet on the ground level and the houses to be not more than 1.5 stories tall. Set the stage for compact housing, focusing more on the community rather than commute.

Design considerations:
- Connection and Contribution
- Cottage Scale
- Individuality
- Corralling the Car
- Eyes on the commons
- Nested houses

Year Constructed: 1998
Size of Lot: 28,800 square feet
Building Footprint: ~650 sq. ft. (for each building)
Number of Units: 8
Density: 12.1 units per acre
Parking: 8 spaces accessed by shared drive, 2 spaces on street
Size of Units: 650 to 850 square feet
PUBLIC SPACES: DEFINING SPACES WITH TREES

We preserved existing trees on the site and utilize them as important spatial element in shaping public space. Based on spatial feature and programs we propose in different places, trees can be the permeable boundary, the visual focus or the shading canopy.

PUBLIC SPACES: WHAT AND WHERE

1. CENTRAL SQUARE
2. SHARED STREET
3. BOULEVARD
4. COURT AND RAINWATER GARDEN
CONNECTING THE SPACES

- Nature trails through preserved woods.
- Central Pedestrian spine.

- Ensures fronts facing communal areas.

- Free flowing towards the deep end.

- More Urban towards Cascade

- Focused towards Public realm
  - Encourages communal interaction
A community in most cases is defined by its streets. The streetscape in Cascade Greens varies from a typical urban to suburban character. Ranging from a typical section (2) of townhouses on both sides to a shared street promenade (3), we tried to open them up to a public space on one side almost everywhere (1).
If asked what kind of a place you’d want to grow up in, the answer you often get is a community with lots of open space, safe streets, and diverse trees. Cascade Greens is just that, with children playing in the common areas that have eyes on them from all sides. The townhouses enclose the central square, shown here, adding to the feeling of comfort and safety where the whole “village” helps to raise the children.
DICHOTOMY OF TOWN & FOREST
TOWNHOMES + COURTYARD HOUSES

TREES + TOPOGRAPHY
Environmental concerns are a huge priority in the area, as it impacts every single aspect of the design and layout of the neighborhood. The slope informs the street Network and the resulting density and community. It creates the public spaces and the private spaces. The topography and terrain is been used as a means to filtrate water into the Abundant forests that were saved by choosing to build densely. The water drains naturally into the forest that were preserved so that water runoff is less of a factor and to be ecologically friendly.

HOUSING
In the area of the westside of Atlanta that is primarily single-family housing and private space, this 16-acre plot of land offers a chance to create more diverse housing options to attract a wider range of new households. Dense townhouses around the communal village center allow a more urban lifestyle while cabins nestled into the upper forest provide more of a private retreat. This diversity of social interaction is further augmented by cottage courts and courtyard houses.

COMMUNAL SPACE
We have two central public green spaces in this project. One is the main communal village center in the southern part of the site. It is designed for large and small group activities. The other is the nature preserve to the north, designed for quiet strolling. In addition, we propose that the southeast corner of the site be developed with both commercial and a community building.

First, slope analysis to determine the difficult parts of the terrain and identify flat zones for ease of use. Second, site analysis shows the ecologically sensitive areas to be mostly left alone and untouched.

Third, through the analysis, develop a natural means of movement through the zones for a most beneficial flow of the neighborhood. Fourth, determine a street network making use of slope and terrain while leaving sensitive areas and maximum water drainage.
COURT YARD PRECEDEMENTS

The Attached Courtyard House

A more luxurious version of the attached house type. The house is defined by two or three sides, and a creatively designed and articulated wall.

The Detached Compound / Courtyard House

Gross Site Density: 6-12 units per acre
Lot Width: 60' - 120'
2.5 stories, 40 Feet
Parking Solution: Alley accessed garage

Particular in a Spanish historical influence area. These types are extremely efficient in their use of land; extremely high densities for vibrant communities can be created with these types.

The Attached Patio / Courtyard House

Gross Site Density: 6-12 units per acre
Lot Width: 28' - 60'
2.5 stories, 40 Feet
Parking Solution: Alley accessed garage
Dichotomy of Town + Forest: TOWNHOUSES + COURTYARD HOUSES

Typical Townhome

Cottage Court
Dichotomy of Town + Forest: TOWNHOUSES + COURTYARD HOUSES

Cabin Home

Courtyard Home

ATTACHED COURT YARD

DETACHED COURT YARD
Cottage Court:
This building type faces towards their communal public space. Their private space is shared by others in their facility.

Courtyard House:
This type faces inward with a private courtyard. Walled off and secluded their private space is insular and point of contact is small. This type offers maximum privacy but can be designed with attractive street walls and plantings that do not harm walkability.

Townhouse:
Aside from porches and minimal backyard space, the townhouse has little private outdoor space. It has the maximum engagement with public space, whether streets or communal greens.

Cabin Cottage:
Situated in the woods, this type has no private yard, but is afforded considerable privacy by the forest itself.
The village center contains a pool, a sports field, a stream, a garden and groves. It's lively activities for gathering and building community contrast and complement the quiet character of the nature preserve.
ILLUSTRATIVE PLAN

Vignette from the community public building looking towards the urban center of the neighborhood.

Vignette looking towards the forested cabin zones of the neighborhood featuring the woods and the walking trails.

Dichotomy of Town + Forest: TOWNHOUSES + COURTYARD HOUSES
Dichotomy of Town + Forest: TOWNHOUSES + COURTYARD HOUSES

PERSPECTIVE OF TWO LIVING STYLES

A - A SECTION

Preserved Natural Areas  |  Cottage Court Community & Courtyard Homes  |  Town Center Greens & Homes

B - B SECTION

Townhome Density  |  Town Center & Greens  |  Townhome & Courtyard Homes  |  Nature Park  |  Walking Trails & Cottages