Town of Carrboro

Meeting Agenda

Town Council

Town Hall
301 W. Main St.
Carrboro, NC 27510

Tuesday, October 13, 2020 **7:00 PM** **Remote Meeting - View Livestream or Cable TV 18**

7:00-7:05

A. ROLL CALL

7:05-7:15

B. POETRY READING, RESOLUTIONS, PROCLAMATIONS, AND ACKNOWLEDGEMENTS

7:15-7:20

C. ANNOUNCEMENT OF UPCOMING MEETINGS

7:20-7:30

D. REQUESTS FROM VISITORS AND SPEAKERS FROM THE FLOOR

Comments are limited to three minutes per speaker.

7:30-7:45

E. CONSENT AGENDA

1. 20-374 Approval of Minutes from the September 22, 2020 Meeting

2. 20-329 Update on Chapter 160D

PURPOSE: The purpose of this agenda item is to provide the Town Council with an update on the adoption of Chapter 160D of the N.C.G.S. and to discuss a tentative schedule for bringing Town regulations into compliance.

Attachments: Attachment A - Resolution

3. 20-373 Consideration of Expressing Town Council Support for the Chapel Hill/Carrboro Mothers' Club - Black Student Movement Project

PURPOSE: The purpose of this item is for the Town Council to consider the request for ideological support for the request.

Attachments: Attachment A - Resolution

Attachment B - Emails Requesting Support for the Chapel Hill/Carrboro Mothers Club

4. 20-367 Transportation Projects Report

PURPOSE: The purpose of this agenda item is to provide Council with a status updated for current transportation projects.

Attachments: Attachment A - Resolution

Attachment B - Transportation Projects Report 10-13-20

5. 20-364 Vehicle and Equipment Installment Financing Contract Award

PURPOSE: The Town Council is requested to award a lease purchase installment financing contract for vehicle and equipment acquisitions in 2020 and 2021

Attachments: Resolution for Vehicle Financing 10-2020

ATTACHMENT B 2020 AND 2021 VEHICLES FINANCING PROPOSALS

Financing RFP - Vehicles FY 2020

6. 20-380 Appointments to the Appearance Commission

PURPOSE: The purpose of this agenda item is for the Town Council to make appointments to the Appearance Commission.

Attachments: Attachment A - Appointment Resolution

Attachment B - Matrix

Attachment C - Chair Forms and Applications

7. 20-379 Request-to-Set a Public Hearing for Consideration of Land Use Ordinance Text Amendments Relating to the Historic Rogers Road Neighborhood

PURPOSE: The purpose of this agenda item is for the Town Council to consider setting a new public hearing on proposed text amendments to the Land Use Ordinance to establish new zoning districts and associated development requirements for the Historic Rogers Road neighborhood.

Attachments: Attachment A - Resolution

Attachment B - Draft LUO Ordinance to Establish HR-MU District_10-02-2020

Attachment C - Public Comments

Attachment D - Comments (received after the 24-hr period)

7:45-8:20

F. PUBLIC HEARING

1. 20-372 The 203 South Greensboro Project -Public Hearing on Schematic Design

PURPOSE: The purpose of this item is to provide the Town Council an opportunity to receive public comment on the 203 South Greensboro Project as it proceeds with the development of a schematic design.

Attachments: A - Location map

B- 2018-2020 comparison

G. OTHER MATTERS

8:20-8:45

1. 20-377 Petition to Designate the Area Currently Referred to as Plantation Acres as Barred Owl Creek

PURPOSE: The purpose of this item is to allow the Town Council to receive and consider a petition from residents to designate the area that encompasses several subdivisions referred to as Plantation Acres as Barred Owl Creek.

Attachments: A- Resolution

B - Petition

C- Map of responses

D- Petition email

8:45-9:15

2. 20-375 Energy and Climate Protection Plan and Community Climate Action Plan Implementation Update

PURPOSE: The purpose of this item is to update the Town Council on Energy and Climate Protection Plan and Community Climate Action Plan Implementation Efforts.

Attachments: Attachment A - Resolution To Receive Update

Attachment B - CCAP and ECPP Implementation Update - October 2020

Attachment C - Summary of EAB Recommendations for CCAP and ECPP

Attachment D - Energy and Climate Protection Plan - Oct 2020

Attachment E - Community Climate Action Plan - Oct 2020

Attachment F - Carrboro 2019 Community Climate Action Plan Survey Report

9:15-9:45

3. 20-368 Focused Transportation Projects Update

PURPOSE: The purpose of this agenda item is to provide Council focused updates and presentation on specific transportation topics.

Attachments: Attachment A - Resolution
Attachment B - Update on Laurel Ave Parking
Attachment C - Update on Traffic Calming Projects
Attachment D - Potential Bike Share Pilot Program Overview
Attachment E - Unpaved Streets Speed Limit Report and Staff Recommendation

9:45-10:15

4. 20-267 Check-in on the Comprehensive Plan Process

PURPOSE: The purpose of this agenda item is to provide the Town Council with an update on the current process and progress of this effort.

Attachments: A - Plan Overview
B- Plan approach and team
C- Interviews summary

H. MATTERS BY COUNCIL MEMBERS

Town of Carrboro

Town Hall
301 W. Main St.
Carrboro, NC 27510

Agenda Item Abstract

File Number:20-329

Agenda Date: 10/13/2020 **File Type:**Agendas

In Control: Board of Aldermen

Version: 1

TITLE:
Update on Chapter 160D

PURPOSE: The purpose of this agenda item is to provide the Town Council with an update on the adoption of Chapter 160D of the N.C.G.S. and to discuss a tentative schedule for bringing Town regulations into compliance.

DEPARTMENT: Planning

CONTACT INFORMATION: Christina Moon - 919-918-7325, cmoon@townofcarrboro.org <mailto:cmoon@townofcarrboro.org>; Marty Roupe - 919-918-7333, mroupe@townofcarrboro.org <mailto:mroupe@townofcarrboro.org>; Patricia McGuire - 919-918-7327, pmcguire@townofcarrboro.org <mailto:pmcguire@townofcarrboro.org>; Nick Herman - 919-929-3095, herman@broughlawfirm.com <mailto:herman@broughlawfirm.com>

INFORMATION: Legislation adopted as Part II of the S.L. 2019-111 (Senate Bill 355), and updated as S.L. 2020-25, reorganized the state's planning and development regulation statutes, combining the previously separate county (G.S. Chapter 153A) and municipal statutes (G.S. 160A) (for cities) into one article, and relocating some regulations previously located in separate sections such adult businesses and family care homes into the same article.

Some of the key elements of the legislation include:

- The removal of conditional use districts as a rezoning mechanism (rezoning & conditional use permits at the same time); existing conditional use districts will automatically become conditional districts as of January 1, 2021
- The use of conditional use permits will also be removed. All quasi-judicial permits will become special use permits; this change will also occur automatically.
- Comprehensive plans will become required.
- Provisions relating to development agreements have been moved to 160D as part of the legislation. The use of development agreements will become legislative decisions. The Town does not currently use this tool for development.
- Conflict of interest provisions will apply to staff.
- Notice for letters of enforcement can be sent via email.
- Citations for legislative authority in the Land Use Ordinance, other chapters of the Town Code and the Town Charter will need to be updated.

Agenda Date: 10/13/2020 **File Type:**Agendas

In Control: Board of Aldermen

Version: 1

Staff has been reviewing the legislation to identify the necessary amendments to the Land Use Ordinance, Town Code and Town Charter to comport local regulations to the state legislation. The process also provides an opportunity to make other updates: changing references to the Board of Aldermen to the Town Council, checking that language is gender neutral and correcting any clerical errors that may have inadvertently occurred over the years, such as minor typos, or formatting errors.

While much of this update will be methodical editing there will be a lot of material to review in order to go through all of the articles of the LUO and to talk through the substantive changes such as the removal of conditional use zoning. With that in mind, staff is recommending that the amendments be presented to the Town Council in clusters of 4-5 articles at a time each month during the spring of 2021. This approach will allow for Council members to ask questions or seek clarification along the way. A public hearing to adopt all of amendments would be scheduled for May-June, to allow for the adoption to be completed in time for the July 2021 deadline.

FISCAL & STAFF IMPACT: There are no costs associated with the discussion of this item, future costs will be associated with public hearing process for formal consideration of amendments to the Land Use Ordinance.

RECOMMENDATION: Staff recommends that the Town Council receive the update, ask questions and provide input as desired.

Attachment - A

A RESOLUTION RECEIVING THE UPDATE ON CHAPTER 160D

WHEREAS, legislation adopted as Part II of the S.L. 2019-111 (Senate Bill 355), and updated as S.L. 2020-25, reorganized the state's planning and development regulation statutes, combining the previously separate county (G.S. Chapter 153A) and municipal statutes (G.S. 160A) (for cities) into a new Chapter 160D; and

WHEREAS, local governments are required to amend local ordinances to conform with state statutes; and

WHEREAS, Town Planning staff have prepared a tentative schedule for bringing forth amendments to Town ordinances as necessary to bring Town regulations into compliance with Chapter 160D, for review and during the winter and spring of 2021, and for adoption before July 2021.

NOW, THEREFORE, BE IT RESOLVED by the Carrboro Town Council that the Council receives the update with the proposed schedule for the review and adoption of amendments

BE IT FURTHER RESOLVED that the Council provides the following comments:

1. _____
2. _____
3. _____
4. _____
5. _____

This is the 13th day of October in the year 2020.

Town of Carrboro

Town Hall
301 W. Main St.
Carrboro, NC 27510

Agenda Item Abstract

File Number:20-373

Agenda Date: 10/13/2020

File Type: Agendas

In Control: Board of Aldermen

Version: 1

TITLE:
Consideration of Expressing Town Council Support for the Chapel Hill/Carrboro Mothers' Club - Black Student Movement Project

PURPOSE: The purpose of this item is for the Town Council to consider the request for ideological support for the request.

DEPARTMENT: Town Clerk and Town Manager

CONTACT INFORMATION: Cathy Dorando and Rebecca Buzzard

INFORMATION: The Town Council has received a request from Tiz Giordano to support the Chapel Hill/Carrboro Mothers' Club fundraiser for the UNC Black Student Movement (BSM). The Chapel Hill/Carrboro Mothers' Club is in the process of starting a fundraiser for the BSM and has indicated that the BSM is ready to receive a financial contribution of up to $5,000. The Finance Director and Town Attorney have concurred that a financial contribution is not allowed but the Town Council can express ideological support. This would allow permission to use the Town's logo and to list the Town of Carrboro as a supporter/sponsor.

FISCAL & STAFF IMPACT: N/A

RECOMMENDATION: It is recommended that the Town Council adopt the attached resolution.

A RESOLUTION EXPRESSING IDEOLOGICAL SUPPORT FOR THE CHAPEL HILL/CARRBORO MOTHERS' CLUB FUNDRAISER FOR THE UNC BLACK STUDENT MOVEMENT

NOW, THEREFORE BE IT RESOLVED BY THE TOWN COUNCIL THAT:

Section 1. The Town of Carrboro Town Council hereby expresses its support for the cause and efforts; and

Section 2. The use of the Town's logo and name are authorized for use as supporters of the fundraiser.

From: Tiz Giordano [mailto:tizdogbiz@gmail.com]
Sent: Friday, October 2, 2020 12:19 PM
To: Rebecca Buzzard <rbuzzard@townofcarrboro.org>
Cc: Catherine Dorando <CDorando@townofcarrboro.org>
Subject: Re: Letter of Support for the Mothers' Club BSM Project

Hi there,
My name is Tiz Giordano, I am an independent community organizer who is currently working with The Chapel Hill Carrboro Mother's Club (in an unofficial capacity) to support UNC students impacted by the pandemic + UNC's sudden decision to go remote. Students without local, high-resourced, and affirming family are most impacted by this. Because of our country's history of systemic racism, many students most impacted are African American/Black/African-decended. I am proposing a fundraiser for the Black Student Movement's Mutual Aid Fund. We would like the Town of Carrboro's official endorsement for this project by adding ya'll as hosts for the Facebook event, and permission to use the Town's logo on graphics and flyers.
Best,
Tiz Giordano
804-298-6785

On Wed, Sep 2, 2020 at 2:24 PM Tiz Giordano <tizdogbiz@gmail.com> wrote:
Thank you so much Barbara, Jaquie, Randee + David for the kind messages and support of this initiative! I talked to a ToC staff member named Rebecca today, wanted to reiterate what an "ask for co-sponsorship" for this event looks like in my mind: would love to be able to use the ToC logo on graphics/posters as well as adding the Town as a co-sponsor on the FB Event in order to utilize the town's social media/reach within the community. Rebecca asked if I was requesting the town make a financial contribution...I do deeply believe in direct reparations + think the Town putting money directly into the hands of Black students who have been harmed by powerful institutions both local and national is an excellent + timely measure of solidarity with progressive, anti-racist principles.
Thank you so much for your time,
Tiz
8042986785

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301 W. Main St.
Carrboro, NC 27510

Town of Carrboro

Agenda Item Abstract

File Number:20-367

Agenda Date: 10/13/2020 **File Type:**Agendas

In Control: Board of Aldermen

Version: 1

TITLE:
Transportation Projects Report

PURPOSE: The purpose of this agenda item is to provide Council with a status updated for current transportation projects.

DEPARTMENT: Planning

CONTACT INFORMATION: Zachary Hallock, 919-918-7329, zhallock@townofcarrboro.org; Tina Moon, 919-918-7325, cmoon@townofcarrboro.org; Trish McGuire, 919-918-7327, pmcguire@townofcarrboro.org

INFORMATION: An updated Transportation Projects Report has been provided as attachment B. The following items are covered in a separate item with additional detail:

- Laurel Avenue Parking Conditions
- Starlite Drive Traffic Calming
- Plantation Acres Traffic Calming
- Potential Bike Share Pilot Program
- Staff Recommendation for Speed Limits on Unpaved Streets

FISCAL & STAFF IMPACT: There is no impact associated with receiving the report.

RECOMMENDATION: Staff recommend the Council consider the resolution (Attachment A) receiving the report and provide comments.

Attachment A

A RESOLUTION RECEIVING THE TRANSPORTATION PROJECTS REPORT

WHEREAS, the Town Council has received presentations on important long range, regional and statewide transportation plans; and

WHEREAS, the Town of Carrboro has a number of local transportation projects that are in process and working towards implementation; and

WHEREAS, Town staff have requested Council input and have provided the Council with updates related to specific projects at regular intervals.

NOW, THEREFORE, BE IT RESOLVED by the Carrboro Town Council that the Council receives this Transportation projects report.

BE IT FURTHER RESOLVED that the Carrboro Town Council provides the following comments:

_____

_____

_____

_____

_____

This the 13th day of October, 2020.

TOWN OF CARRBORO

NORTH CAROLINA

TRANSMITTAL **PLANNING DEPARTMENT**

DELIVERED VIA: ☐ *HAND* ☐ *MAIL* ☐ *FAX* ☒ *EMAIL*

To: **David Andrews, Town Manager**
Mayor and Town Council

From: **Zachary Hallock, Transportation Planner**

Date: **October 9, 2020**

Subject: **Update on Transportation Projects**

Summary

Beginning in 2017, staff began providing regular updates on transportation projects to the then Board of Aldermen (now Town Council). This document is intended to update the Town Council on the status of ongoing transportation projects. These include NCDOT managed projects, Town managed projects, bicycle projects & planning, development projects, pedestrian safety projects, and The last update was provided on February 25, 2020. The previous agenda item can be found at: https://carrboro.legistar.com/LegislationDetail.aspx?ID=4336492&GUID=75108466-7D65-491D-AEC7-F63CB4A4021C

NCDOT Projects

Estes Drive/North Greensboro Street Roundabout Project (U-5846)

The project is ongoing and updates will be provided as construction progresses. As of 9/4/20 we are still anticipating that some lane closures will be needed as the construction of the stormwater pipes beneath the road progresses towards completion. Drilling is needed to remove rock, and the contractor may encounter unexpected pockets of rock during excavation and additional drilling may be needed in the future. Urgent public information related to this project will be posted via news flashes. General project information and history can be found online at: https://carrboro.legistar.com/LegislationDetail.aspx?ID=4336492&GUID=75108466-7D65-491D-AEC7-F63CB4A4021C

Merritt Mill/Franklin/E Main/Brewer intersection project (U-5847)

This project is completed as of February 2020. For more information about upcoming changes to E Main Street and this intersection, see the East Main Street Restriping Plan.

NC 54 West – Corridor Study and TIP Projects

The final project report was completed as of December 20, 2019.
More information on the study may be found at http://www.nc54west.com/.

As it currently stands, the DCHC MPO has decided against placing points on the NC 54 widening in the SPOT process, until such a point in time that Carrboro and Orange County can reach a consensus on this corridor. Operational improvements to NC 54 at Orange Grove Road (R-4821B) have been completed. On 8/26/20, staff were informed via the DCHC MPO TC that the currently accepted STIP project, Operational Improvements along NC 54 from Old Fayetteville Road to W Main St (U-6070), has been delayed 6 years as a result of the changes HB 77 made to NCDOT finances. HB 77 delayed projects currently programmed in the STIP by spreading out the currently programmed projects over a longer period of time. Staff are currently working to find more details and will provide an update when possible.

NC 54 Bike/Ped Safety Study: Old Fayetteville Road to Manning Drive (Chapel Hill)

The final project report was completed as of December 31, 2019.
More information on the study may be found at http://nc54bikeped.com/

This study did not identify funding for projects rather it developed recommendations which NCDOT, the Town of Carrboro, and the Town of Chapel Hill could work towards implementation. Staff are looking for opportunities to apply for Highway Safety Improvement Program (HSIP) funds and the recommendations for the NC 54/Smith Level Road interchange are being incorporated into the S. Greensboro Street Sidewalk project.

Town Projects

Laurel Avenue Parking

An update on the status of Laurel Avenue on-street parking has been provided as part of a separate agenda item.

Starlite Drive Traffic Calming

An update on the status of the Starlite Drive Traffic Calming project has been provided as part of a separate agenda item.

Plantation Acres Traffic Calming

An update on the status of the Plantation Acres Traffic Calming project has been provided as part of a separate agenda item.

Unpaved Roads Speed Limits

An update on the status of setting speed limits for unpaved roads within the Town Limits has been provided as part of a separate agenda item.

Bike Loop Detectors (U-4726-DF)

The Town has advertised the bike loop detector project (the installation of bike loop detectors at North Greensboro at Weaver and Main and Main at Roberson and at the intersection of Poplar at NC 54) twice, first in October 2017 and again in July 2019, without receiving any bids. Staff is working with NCDOT to determine if there may be other ways to move forward with the project, such as an add-on to the resurfacing project for East Main Street, or if the installation could be performed by NCDOT's traffic engineering division.

Homestead Road-Chapel Hill High School Multi-Use Path (U-4726-DE)

This project is completed.

Morgan Creek Greenway (EL-4828A)

The project consists of an approximately half-mile paved multi-use path beginning at the cul-de-sac at Abby Lane, extending to the Smith Level Road Bridge, running under the bridge to connect with a future multi-use path in Chapel Hill, and beginning again, along the south side of Morgan Creek to a turnabout point before the soccer field at the Berryhill Subdivision.

Phase 1 of the Morgan Creek Greenway was advertised in June 2019 and re-advertised in August 2019. Two bids came in higher than expected and, per NCDOT procedures, bids are not acceptable if higher than 10-percent above the Engineer's estimate. Staff continues to work with the Town Engineer (Sungate) to review the project and consider possible modifications to the design and value engineering prior to re-advertising the project for bid. CEI services will also be needed. Staff will reach out to surrounding property owners, particularly residents of Berryhill Subdivision and the Canterbury Townhomes, again, once there is a better sense of the schedule for moving forward.

Jones Creek Greenway (C-5181)

Advertisement for engineering services, selection of Wetherhill Engineering, and approval of the firm & cost estimate by NCDOT was completed in the fall of 2018. The contract was executed before the end of 2018 and a project kickoff meeting was at the end of January 2019. During this kickoff the public input process was established to include open house input sessions at 15%, 30%, and 60% design. At the beginning of March 2019, planning staff facilitated an internal staff

discussion with the police department and school district to discuss issues related to greenway safety. The third public hearing for the project, at 65% design, was held on September 24, 2019. After further assessment for the greenway alignment and discussions with the County with regard to a potential staging areas and right of entry, updated plans, CE documents and environmental permit applications will be submitted to NCDOT in the near future. Staff continues to work with NCDOT to determine the status of CMAQ funds earmarked for construction.

Feedback from ITRE has indicated that if we wish to identify a location for a continuous bicycle-pedestrian counter along this greenway, we would be better suited waiting until construction is completed.

Estes Drive Corridor Study and Bike/Ped Improvements (EB-5886)

This project to consider improvements to Estes Drive from N Greensboro St to the Town Limits was submitted in SPOT 4.0 and accepted to the State Transportation Improvement Program (STIP). Due to the current NCDOT budget crisis, the DCHC MPO has been asked to reprogram the years identified for projects in the STIP, as the previous funding schedule has been spread out over a longer period of time. Staff are working with NCDOT to determine how or if the schedule for this project will be pushed back, and will coordinate with Chapel Hill to ensure consistency between the jurisdictions. More information will be provided at a later date.

South Greensboro Street Sidewalk (C-5650)

The Town entered into a municipal agreement from NCDOT in the summer of 2018 and a contract with Ramey Kemp Associates (RKA) in 2019 for design services. The scope of work for RKA also include a capacity analysis for the southern section of the corridor from the roundabout at South Green to the bridge over Morgan Creek. The 15% design plans have been completed, and planning staff have coordinated review between Town Departments, NCDOT, and external agencies to garner feedback on the design. Staff are working to develop a plan to hold a public meeting to gather public input on the 15% design.

West Main Street Sidewalk

As part of the development of the 2012 Durham and Orange county transit plans, the Town submitted a capital project request for funding to construct a sidewalk along West Main Street between Fidelity Street and Poplar Street. Staff requested delaying the funds for the Main Street project to a later fiscal year in order to receive funds for the South Greensboro Street sidewalk in an earlier fiscal year. A schedule for moving forward with the West Main Street project has not yet been determined.

Barnes Street Sidewalk (EB-5890) & Jones Ferry Road Sidewalk (EB-5880)

The Barnes Street and Jones Ferry Road sidewalk projects are programmed for funding in the 2019-2029 STIP. Staff has requested that the start date of these two projects begin in FY 2022, anticipating a schedule of design in FY 2022, ROW acquisition FY 2023 and construction FY

2024. The proximity of the two projects offers an opportunity to seek one contractor to construct both projects if such an arrangement provides an economy of scale benefit. Due to the NCDOT budget crisis, the DCHC MPO is working with NCDOT and local governments to update the schedule for locally administrated projects (LAP) in the STIP, which have been delayed by the suspension.

East Main Street Restriping Plan

Draft pavement marking plans were approved by NCDOT in April, 2020, and we were informed of the need to prepare additional plans construction the necessary signal modifications that would be required due to the pavement marking changes. Staff are working with Stantec and NCDOT to finalize the pavement marking plans so that work on the signal timing plans can begin on schedule. The resurfacing for this project is anticipated to occur in the summer of 2021.

Jones Ferry Road – Protected Bike Lanes

Town staff have been working with NCDOT Division 7 and Division Bike/Ped Transportation to identify potential treatments for protected bike lanes on Jones Ferry Road, an interest identified as part of the Spot Safety Improvement Project for the corridor. To date, discussions with Public Works and NCDOT have focused on concerns over cost, maintenance, snow clearance, and transit operations. Based on feedback received from NCDOT during the Bike Plan Update, staff have currently identified a set of potential treatments which could be used as different test areas along the corridor. Town Staff met again with NCDOT Division 7 and Bike Ped on January 27th to finalize test zones along the corridor as part of a pilot project. This pilot is expected to last at least one year and will include data collection of vehicle volumes, speeds, and bicycle volumes (before, during, and after the pilot); public input sessions; and survey to gauge public perceptions of safety and preferred treatment.

Recent communication with NCDOT Division 7 has indicated that, if desired, the Town could proceed with a protected bike lane installation using standard white delineator poles for vertical separation, installed through encroachment agreement. Staff are currently developing an encroachment agreement application, with the goal of starting the pilot before the end of this fiscal year.

Bicycle Projects and Planning

Bicycle Transportation Plan Update

On September 22nd, the Council set the public hearing to consider adoption for October 27th, this item was also referred to the Planning Board, Transportation Advisory Board, and Environmental Advisory Board for comment. A presentation was made to the Joint Advisory Boards on October 1st.

Bicycle Friendly Communities Application

Staff will use information from the BFC scorecard and priority projects identified in the Updated Bike Plan to better situate the Town for the next application for the BFC program in 2023.

Bike Share

Staff have been continuing to coordinate with both the Town of Chapel Hill and Gotcha (the current bike share provider for UNC) to develop a potential pilot program to operate in both towns. Additional information as to the specifications of the program have been provided as a separate agenda item.

Pathway Drive Bike Boulevard

There has been no change on this item from the previous report.

Cobblestone Colfax Connector

There has been no change on this item from the previous report.

Cobblestone Drive Traffic Calming

This traffic calming project is completed. Follow up traffic count to assess the effectiveness of the installed devices will be scheduled at a later date, pending return to normal travel and commuting patterns.

Development Projects

Lloyd Farm Development Traffic Mitigation

With the approval of the Lloyd Farm Phase 1 Conditional Use Permit, one condition imposed was a financial contribution of $15,000 to be used on traffic calming efforts in the Plantation Acres Neighborhood. This was included due to the considers that neighborhood residents anticipated increased traffic as a result of the development. Residents have expressed interest in modifying the access to/from Carol Street at Old Fayetteville Road. Staff are working to schedule a public meeting to gather input on resident preferences for changes to that location.

Additional information about the current traffic calming project (to address traffic issues identified by residents in the present day) was provided as a separate agenda item.

Pedestrian Safety Projects

Locations Based on Citizen & TAB Requests

Planning and Public Works continue to coordinate on the development of preliminary design plans, to be used for encroachment agreement to make modifications to NCDOT streets or on Town Streets, for the following locations:

- N Greensboro St @ Pine St: High-visibility crosswalk markings and signage
- Culbreth Rd @ Rossburn Way: High-visibility crosswalk markings and signage
- Old Pittsboro Road: Shared Lane Markings and Bicycle Wayfinding
- Roberson Street @ Libba Cotten: Intersection Safety Markings

A number of other locations are still under consideration, however, both the current COVID-19 pandemic's impact on travel patterns and NCDOT's suspension of projects has had an impact on the previously anticipated schedule for these projects. Additionally, NCDOT has informed us that neither Rapid Rectangular Flashing Beacons (RRFBs) or High-intesity Activated WalK (HAWK) signals are acceptable for installation within an intersection. Data collection is required to support a traffic signal warrant and will be scheduled when conditions are supportive.

- W Main St @ Hillsborough Rd: Traffic Signal and/or Pedestrian Median Island
- Hillsborough Rd @ James St: Traffic Signal
- N Greensboro St @ Shelton St: Traffic Signal
- W Main St @ W Weaver Street: Bike Boxes, Bike Loop Detectors, Bike Lane Intersection Markings, Curb Radii revisions, and Pedestrian Signal Heads where needed

The status of the pedestrian safety projects, which have been prioritized based on cost estimates, traffic volumes, bike-ped counts, safety data and input from the TAB is described in the table on the following page.

	NAME	Identified Improvement	Current Status
NCDOT to Perform	Weaver @ E Main St	Pavement markings (NCDOT)	Resurfacing to occur in Summer 2021
	N Greensboro @ Oak St	High-vis crosswalk (covered by STIP, includes PHB)	Estes-Greensboro Roundabout to be completed by September 2021
	N Greensboro @ Williams St	High-vis crosswalk (covered by STIP, includes PHB)	
	N Greensboro @ Hillsborough Rd	High-vis crosswalk (covered by ADA ramps) & RRFB	Timeline for ADA upgrades uncertain due to NCDOT budgetary constraints
	Jones Ferry @ Bim St	High-vis crosswalk (covered by ADA ramps)	
	W Main @ Poplar Ave	High-vis crosswalk	
	N Greensboro @ Robert Hunt Dr	High-vis crosswalk (covered by ADA ramps)	
Town to perform through Encroachment Agreement	S Greensboro @ Merritt Mill Rd	Bicycle improvements and ped signal heads	Improvements identified in the NC 54 Safety Study working to be incorporated into the Design of the S Greensboro Sidewalk Project
	Weaver @ E Main St	Ped heads or signal modifications	EMSOA will address pavement markings and signal timing modifications, will assess signal heads after completion of resurfacing
	W Main @ W Weaver	High-vis crosswalks, bike lane markings, bike boxes, curb extensions & ped signal heads	Collect data to assess need for bike boxes; coordination with NCDOT ADA upgrades
	W Main @ Jones Ferry Rd	Bicycle improvements, marked crosswalk ped signal heads	Beginning preliminary design to add missing crosswalk, other items on hold pending bike plan recommendation
	Merritt Mill Rd @ Cameron St	Bicycle improvements and ped signal heads	On hold pending future coordination with Chapel Hill
	N Greensboro @ Pine St	High-vis crosswalk, ADA ramps	Developing design to submit with encroachment agreement
	Hillsborough @ James St	Traffic signal with pedestrian signals	Insufficient width for refuge island, collect data to assess signal warrant, survey needed
	Jones Ferry @ Davie Rd	Bicycle intersection improvements	On hold pending protected bike lane pilot
	W Main @ Hillsborough Rd	Median island and/or traffic signal	Assessing width for refuge island, collect data to assess signal warrant, survey needed
	N Greensboro @ Shelton St	Traffic signal	Collect data to assess signal warrant or crossing demand for RRFB, survey data needed
	NC 54 @ Westbrook Dr	PHB or HAWK or traffic signal	Recommendation identified in NC 54 Safety Study, funded through OC Transit Plan
	Hillsborough @ High/Cheek St	Hi-vis x-walk	Need to consider additional sidewalk due to lack of connection infrastructure needed for NCDOT to approve crosswalk
	W Main @ Ashe St	Hi-vis x-walk and ada curb ramps	Beginning preliminary design
	Old NC 86 @ Hillsborough Rd	Pedestrian refuge island, ada curb ramps	Beginning preliminary design
	Jones Ferry Protected Bike Lane	Physical delineation to place in buffer	Sungate has completed exhibit, Staff identified budget, working to develop encroachment application
	W Main @ High/Westview	Hi-vis crosswalk and RRFB (Rectangular Rapid Flashing Beacon)	Need to consider additional sidewalk due to lack of connection infrastructure needed for NCDOT to approve crosswalk
	Homestead @ Claremont Rd	Lighting & RRFB plus median island	Beginning preliminary design
	Culbreth Drive and Rossburn way	Hi-vis crosswalk	Preliminary design complete
	Hillsborough @ McDougle Driveway	Pedestrian refuge island	Beginning preliminary design
Town to perform	Roberson @ Libba Cotten	Raised intersection or green paint	Preliminary design complete
	Old Pittsboro Rd	Sharrows and bike route (or Bike Blvd)	Preliminary design complete
	Cobblestone Connector	Widen sidewalk to 10' Multi Use Path (MUP)	Sungate has completed concept design, on hold due to low priority.

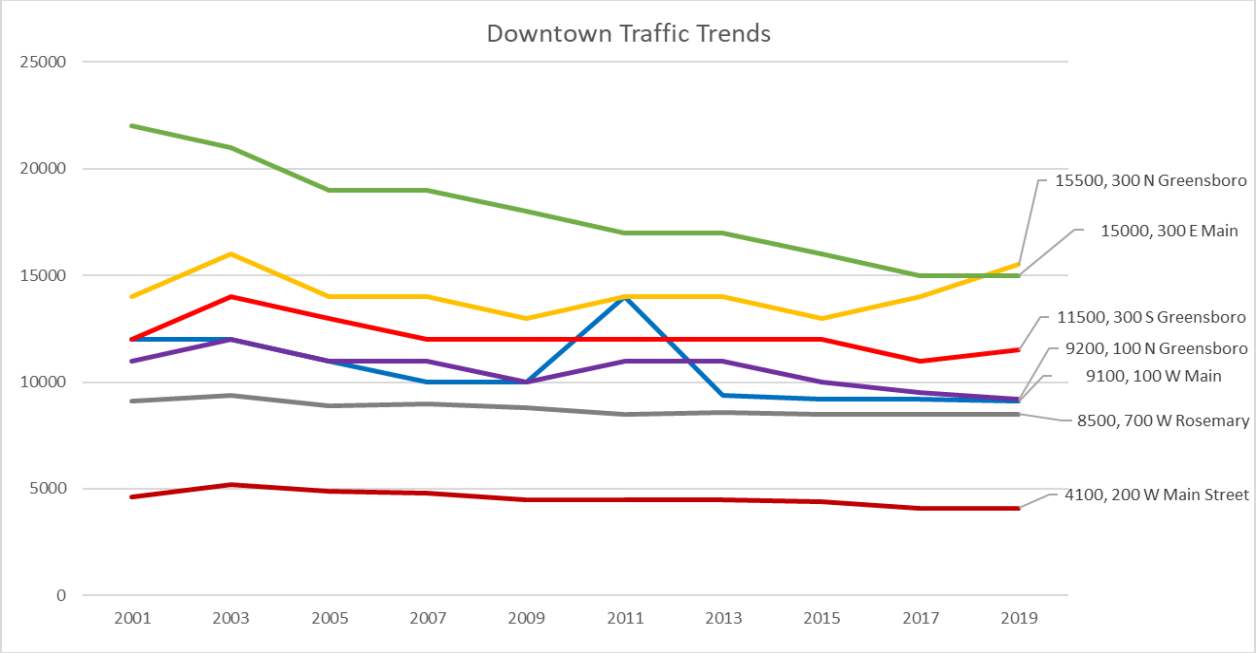
Preliminary Design Completed
Preliminary Design In Progress
Project on Hold
Additional data collection, survey work, or supporting infrastructure required

Downtown Safety Improvements

Conversations with NCDOT have indicated that the State Traffic Engineer will not approve speed limits lower than 25 MPH on state maintained facilities due to the difficulties with enforcement. In light of this, staff are working to pursue engineering improvements to help manage vehicle speeds within and around downtown including: Leading Pedestrian Interval (LPI), the East Main Street Restriping Proposal, and Pedestrian Safety Projects (mentioned above). Additionally, implementing No Right Turn on Red (RToR) can be investigated but is a more detailed process, which will require approval from the State Traffic Engineer.

Downtown Traffic Volume Trends

In the past, the Board of Aldermen received updates on traffic volume counts and traffic operations within the downtown area. As an alternative to a detailed traffic analysis, a review of the historic trends in available Annual Average Daily Traffic (AADT) as collected by NCDOT can be an efficient way to gain useful insights. The table below displays the AADT volumes collected between 2001 and 2019 for locations at: 100 W Main St, 300 E Main St, 300 N Greensboro St, 100 N Greensboro St, 300 S Greensboro St, 700 W Rosemary St, and an aggregate total volume. While the majority of locations have seen flat or mild fluctuations in AADT, the 300 E Main Street location has consistently trended downwards during this period (a decrease of about 32%). This item has been updated with NCDOT 2019 AADT volumes.



Safe Routes to School Implementation Committee

Due to the restrictions in place to limit the spread of COVID-19, the call for applicants to the SRTS Implementation Committee has been delayed. Staff are working to determine the best method to identify interested community members and reconvene this group as a subcommittee of the Transportation Advisory Board.

Transit Projects

Orange County Transit Plan Update

The OCTP is funded by the transit dedicated half-cent sales tax that was approved by Orange County voters in 2012. The current OCTP was adopted in 2017 and can be viewed online at: https://gotriangle.org/sites/default/files/publications/orange-county-transit-plan_170424_app.pdf

While it can be unclear what improvements Carrboro is getting out of a transit plan, as our service is operated by Chapel Hill Transit, there are a number of capital improvements which enhance transit service (such as upgraded bus stops and greenways/sidewalks) that received funding from the 2017 plan. Summarized below are the projects in Carrboro:

Type	Description	Year
Transit	Bus stop improvements for the 405 Route in Carrboro	FY18-20
Transit	Two new shelters for bus stops in Carrboro	FY18-20
Access	Morgan Creek Greenway	FY18-20
Access	S Greensboro St Sidewalk	FY18-20
Access	W Main St Sidewalk	FY18-20
Access	NC 54 Hawk Signal	FY18-20
Access	Estes Drive Corridor Study and Bike Ped Improvements	FY21-22

The framework for the Orange County Transit Plan (OCTP) Update was approved by the Orange County BOCC in November 2019, to update the plan due to the discontinuation of the Durham-Orange Light Rail project. On August 27, 2020 Orange County announced that it would begin public engagement and outreach for the plan including a public survey, which can be found online at https://www.surveymonkey.com/r/OCTransit. On Thursday, October 1st, the first Orange County Transit Summit was held via Zoom. Staff are working to coordinate with the Transit Plan team to ensure that capital projects from the previous plan are carried over to the new plan. For more information about the plan update and ways to get involved visit the project website at: https://octransit2020.com/

CHT Short Range Transit Plan (SRTP) Service Changes

Due to the restrictions in place to limit the spread of COVID-19, Chapel Hill Transit has only proceeded with partial implementation of the SRTP and is currently running a reduced schedule, which began on August 3rd.

- The following routes are running 7 days a week, plus some holidays: A, CM, CW, D, J, NS , NU, & U.
- The following routes are running Monday through Friday: FCX, HS, RU, & S
- The Senior Shuttle and EZ Rider are running on regular schedule.

- The Carrboro Plaza Park and Ride has ceased being a PnR lot as of August and will no longer be served. Riders should use the Jones Ferry Park and Ride lot, approximate three-quarters (3/4) mile away.

Several routes have no changes identified in the SRTP, these are the J, JFX, NS, RU, and U routes. Several routes will no longer run, but service will be provided by other routes. The routes and their substitutes are defined below:

Route going out of service	**Routes to switch to**
CPX route	CM route, JFX route
HU route	B route
V route	NS route, N route
FG route (Saturday)	A route
JN route (Saturday)	J route, N route

More information can be found at:
https://www.townofchapelhill.org/government/departments-services/transit/service-changes

North-South Bus Rapid Transit (NSBRT)

On September 22nd, the Chapel Hill Transit Partners received an update on the current status NSBRT Project. The following information was provided:

- Chapel Hill Transit staff applied for the NEPA Class of Action request on 8/13/20.
- CHT staff declined to request a project re-evaluation (declining does not have an impact on the project, unless the resubmittal is required by the FTA) as there are changes underway that could influence the rating in the future:
    - Chapel Hill Future Land Use Map & Land Use Management Ordinance updates
    - North Chapel Hill Master Plan
    - East Rosemary Redevelopment
    - Orange County Transit Plan
- The NSBRT has applied for $35M in state funds under SPOT 6.0, there are $14.1M in allocated funds from the Orange County Transit Plan, and the project will be seeking the maximum $99M in Federal Funding through the Small Starts process.
-

Carrboro Trolley

Based on conversations with previous Economic Development Director Annette Stone, and Chapel Hill Downtown Partnership director Matt Gladdek, this project has been defined as more of a cultural attraction amenity rather a transportation project. It is recommended that a service provider other than Chapel Hill Transit be considered to provide the type of service desired.

Town of Carrboro

Town Hall
301 W. Main St.
Carrboro, NC 27510

Agenda Item Abstract

File Number:20-364

Agenda Date: 10/13/2020 **File Type:**Agendas

In Control: Board of Aldermen

Version: 1

TITLE:
Vehicle and Equipment Installment Financing Contract Award

PURPOSE: The Town Council is requested to award a lease purchase installment financing contract for vehicle and equipment acquisitions in 2020 and 2021

DEPARTMENT: Finance and Town Manager

CONTACT INFORMATION: Arche McAdoo (919) 370-6065, Cary McNallan, and David Andrews

INFORMATION: The Town finances the acquisition of vehicles and equipment through the use of lease purchase installment financing. Normally, this is done on an annual basis; however, the Town did not issue a contract in 2020 for vehicles and equipment. By issuing a financing Request for Proposal for two years we increased the principal amount which attracted more competitive responses (See Attachment B).

On September 4, 2020 the Town issued a request for proposal for installment financing for the acquisition of vehicles and equipment in 2020 and 2021. The Town is not required by law to undertake a competitive process for lease purchase installment financing for vehicles and/or equipment. In order to ensure that the Town gets a competitive financing rate, we issue RFP to financial institutions. We sent RFP to eighteen financial institutions inviting them to submit a proposal to finance $1,871,923 for seven years (See Attachment C). The Town received 7 proposals from six financial institutions.

The proposal with the lowest interest rate (1.040%)was submitted by Key Government Finance, Inc. Total interest over seven years would be $78,622 with annual payment of $278,649 beginning November 2021 (assuming we close in November 2020).

FISCAL & STAFF IMPACT: This annual interest payment is included in the FY 2020-21 adopted budget. By having the first payment due a year after closing (i.e., next fiscal year) and changing term from five to seven years, allows the Town to minimize cash outlays at this time.

RECOMMENDATION: The Town Council is requested to adopt the resolution in Attachment A that will: 1) designate the lease purchase installment financing as tax-exempt obligations of the Town; 2) award the lease purchase financing contract to Key Government Finance, Inc. for the equipment and vehicle purchases

listed in the RFP; 3) authorize the Town Manager and Finance Officer to execute the necessary financing documents and agreements, and 4) ratifies, approves and confirms all prior actions of Town officers in furtherance of the purposes stated in the resolution. .

ATTACHMENT A

RESOLUTION APPROVING FINANCING TERMS

WHEREAS: The Town of Carrboro ("Town") has previously determined to undertake a project for financing the purchase of various vehicles and equipment (the "Project"), and the Finance Officer has now presented a proposal for the financing of such Project.

BE IT THEREFORE RESOLVED, as follows:

1. The Town hereby determines to finance the Project through Key Government Finance, Inc. in accordance with their proposal dated September 24, 2020. The amount financed shall not exceed $1,871,923.00, the annual interest rate (in the absence of default or change in tax status) shall not exceed 1.040%, and the financing term shall not exceed seven (7) years from date of closing.

2. All financing contracts and all related documents for the closing of the financing (the "Financing Documents") shall be consistent with the foregoing terms. All officers and employees of the Town are hereby authorized and directed to execute and deliver any Financing Documents, and to take all such further action as they may consider necessary or desirable, to carry out the financing of the Project as contemplated by the proposal and this resolution.

3. The Finance Officer is hereby authorized and directed to hold executed copies of the Financing Documents until the conditions for the delivery of the Financing Documents have been completed to such officer's satisfaction. The Finance Officer is authorized to approve changes to any Financing Documents previously signed by Town officers or employees, provided that such changes shall not substantially alter the intent of such documents or certificates from the intent expressed in the terms executed by such officers. The Financing Documents shall be in such final forms as the Finance Officer shall approve, with the Finance Officer's release of any Financing Document for delivery constituting conclusive evidence of such officer's final approval of the Document's final form.

4. The Town shall not take or omit to take any action the taking or omission of which shall cause its interest payments on this financing to be includable in the gross income for federal income tax purposes of the registered owners of the interest payment obligations. The Town hereby designates its obligations to make principal and interest payments under the Financing Documents as "qualified tax-exempt obligations" for the purpose of Internal Revenue Code Section 265(b) (3).

5. The Town intends that the adoption of this resolution will be a declaration of the Town's official intent to reimburse expenditures for the project that is to be financed from the proceeds of the Key Government Finance, Inc. financing described above. The Town intends that funds that have been advanced, or that may be advanced, from the Town's general fund, or any other Town fund related to the project, for the project costs may be reimbursed from the financing proceeds.

6. All prior actions of Town officers in furtherance of the purposes of this resolution are hereby ratified, approved and confirmed. All other resolutions (or parts thereof) in conflict with this resolution are hereby repealed, to the extent of the conflict. This resolution shall take effect immediately.

Approved this ___ th day of October, 2020.

By: _____ By: _____

(Clerk) (Mayor)

[SEAL]

ATTACHMENT B

FY 2020/2021 VEHICLE AND EQUIPMENT FINANCING PROPOSALS

Loan Amount	**$ 1,871,923**		***Closing date of 11/2/20***	
Loan Term	**7 Years**		*First payment date of 11/1/21*	
	RATE	**INTEREST**	**TOTAL P & I**	**ANNUAL PMT**
KEY GOVERNMENT FINANCE (30)	1.04000%	$ 78,622	$ 1,950,545	$ 278,649
KEY GOVERNMENT FINANCE (60)	1.09300%	$ 82,671	$ 1,954,594	$ 279,228
BANK OF AMERICA	1.15950%	$ 87,883	$ 1,959,806	$ 279,972
TRUIST/BBandT	1.19000%	$ 90,414	$ 1,962,337	$ 280,334
US BANCORP	1.39200%	$ 103,482	$ 1,975,405	$ 282,201
STERLING BANK	1.87500%	$ 140,055	$ 2,011,978	$ 287,425
REGIONS BANK	2.15260%	$ 164,612	$ 2,036,535	$ 290,934
AVG	**1.41459%**	**$ 106,820**	**$ 1,978,743**	**N/A**

ATTACHMENT C

TOWN OF CARRBORO, NORTH CAROLINA
REQUEST FOR PROPOSAL
INSTALLMENT FINANCING FOR VEHICLES AND /OR EQUIPMENT
Date Issued: September 4, 2020
Proposals Due: September 24, 2020

The Town of Carrboro, North Carolina, is seeking proposals for $1,871,923 in installment financing for the acquisition of vehicles. Proposals must be submitted by September 24, 2020, 3:00 PM Eastern Time.

The Finance Director expects to present a recommendation for award of the financing contract to the Town Council in October 2020. The successful proposer must be able to close on the financing within 30 days.

A. Vehicles to be Acquired

Below is a list of the vehicles to be acquired under this installment financing.

DEPARTMENT	VEHICLES/EQUIPMENT	COST EST.
Police	10 Patrol Vehicles	$ 503,541
Police	2 Non-Patrol Vehicles	$ 76,242
Fire & Rescue	Tanker Truck	$ 350,000
Fire & Rescue	Ford Hybrid Explorer	$ 49,000
Public Works	Sanitary Collection Trucks	$ 646,436
Public Works	2 Pick-Up Trucks	$ 64,000
Public Works	Boom Truck	$ 155,000
Planning	Vehicle	$ 27,703
	TOTAL COST	**$ 1,871,923**

B. Contract Requirements and Specifications

1. The financing will take the form of an Installment Financing Agreement pursuant to Section 160A-20 of the North Carolina General Statues.

2. The financing will be exempt from the requirement to obtain prior approval from the North Carolina Local Government Commission.

3. The Town expects the financing to qualify as tax-exempt under Section 205 of the Internal Revenue Code of 1986.

4. The Town desires to make seven equal principal and interest payments annually on November 1 of each year commencing November 1, 2021 to and including November 1, 2027.

5. The interest rate shall be fixed for the seven year term of the financing.

6. The interest rate(s) proposed must be guaranteed through November 30, 2020.

7. Pre-payment terms must be described fully and provide the Town with pre-payment flexibility.

8. The Town's obligations under the Installment Financing Agreement will be secured by a security interest in the vehicles and/or equipment being financed as negotiated between the Town and the successful proposer. The lender will have no recourse beyond the financed property or equipment in the case of a default.

9. No deficiency judgment may be rendered against the Town for breach of a contractual obligation under the Installment Financing Agreement, and the taxing power of the Town will not be pledged to secure repayment.

10. The Installment Financing Agreement must not contain a non-substitution clause and there must be a non-appropriation clause in the Installment Financing Agreement.

11. The terms of this Request for Proposal and your written response will be incorporated into the terms of the final financing agreement if your firm is the successful proposer.

12. Proposer must be a Pooling Method Financial Institution in accordance with Local Government Commission standards.

C. Submission of Proposal

Proposals must be submitted no later than 3 PM Eastern Time on September 24, 2020 Proposals received after this date and time may not be considered. Written proposals are to be marked "Vehicle and Equipment Financing Proposal" and submitted to:

Town of Carrboro
ATTN: Finance Director
301 West Main Street
Carrboro, NC 27510

Proposals may also be submitted by email to: AMcAdoo@townofcarrboro.org or may be faxed to (919) 968-7745.

D. Content of Proposals

Proposals must clearly state and include the following:

1. Term of the financing
2. Interest rate
3. Terms of repayment
4. Debt service schedule
5. List of all costs and the total costs associated with this transaction, including any origination or placement fees, escrow fees, counsel fees and expenses. State whether or not any of such fees or expenses will be capped.
6. Proposed method for creating the lien or security interest in the collateral for the financing.
7. Additional statements: The proposer shall include the following statements:
   a. The bank or financial institution agrees to the contract specifications set forth in Part B above and the Contract Requirements and Specifications of this Request for Proposal.
   b. The Town can draw funds as needed for the Project, as opposed to drawing the full amount at closing.
   c. Circumstances under which you may withdraw your proposal.
   d. Any conditions to the closing of the transaction other than preparation of acceptable documentation. The Town will rely on there being no such conditions unless stated in the proposal
   e. Any legal opinion(s) you will require at closing.

8. References: Proposals should include the names and contact information for three (3) references of municipalities in North Carolina that you have recently done a similar installment financing.

E. Additional Information and Right to Reject Proposals

1. The Town may request additional clarifying information from responders to this request for proposal.
2. The Town reserves the right to reject any and all proposals.
3. The issuance of this request for proposal in no way binds the Town to act on any proposal.
4. No commitment on the Town's part is final until the Town Council has approved the financing.

F. Preparation of Financing Agreement Documents

The Town's counsel (Robert Hornik Jr., Chapel Hill, North Carolina) is available, at the option of the successful proposer, to prepare all financing documents. Alternatively, the proposer may choose to use its own legal counsel and/or standard documents for

transactions of this nature. Your proposal must state your preference on this matter.

G. Town Financial Ratings and Statements

The Town of Carrboro is currently rated AAA by Standard & Poor's Ratings Services, and Aa1 by Moody's Investors Service.

The Town's audited financial statements for the fiscal year ended June 30, 2019 are available and may be downloaded from the Town's website at http://www.townofcarrboro.org/.

H. Selection Criteria – Evaluation of Proposals

The selection of the successful responder will be based on the lowest total financing cost (including interest costs, upfront fees and all expenses) that best meet the needs of the Town.

If further information is needed or you have questions regarding this Request for Proposal, please contact Arche McAdoo, Finance Director at 919-918-7300.

Town of Carrboro

Town Hall
301 W. Main St.
Carrboro, NC 27510

Agenda Item Abstract

File Number:20-380

Agenda Date: 10/13/2020 **File Type:**Agendas

In Control: Board of Aldermen

Version: 1

TITLE:
Appointments to the Appearance Commission
PURPOSE: The purpose of this agenda item is for the Town Council to make appointments to the Appearance Commission.
DEPARTMENT: Town Clerk

CONTACT INFORMATION: Cathy Dorando, 919-918-7309

INFORMATION: The Appearance Commission currently has sevent vacant seats available for appointment.

Applications were received from: David Markiewicz and James Scott. The Town Clerk has contacted both applicants and confirmed their continued interest in serving.

Vickie Brown is the chair of the Appearance Commission and has provided the chair forms for the Council's review. Chair forms are located directly in front of the application and in alphabetical order.

Information from the Advisory Board Recruitment and Appointment Policy:

Terms
a. Members are appointed to staggering three-year terms on all advisory boards that expire annually in February. The Carrboro Tourism Development Authority members are appointed to one-year terms that expire annually in January.
b. Members are limited to two full terms. After completing two full terms, a member must take off one year before applying for re-appointment to the advisory board. However, a board member may apply to serve on another advisory board if he/she desires. The Town Council may make exceptions to this rule under the following circumstances:
1. To retain diversity on an advisory board;
2. A lack of applicants.

All applicant and chair information is attached.

A matrix is also included.

FISCAL & STAFF IMPACT: N/A

Agenda Date: 10/13/2020 **File Type:**Agendas

In Control: Board of Aldermen

Version: 1

RECOMMENDATION: It is recommended that the Mayor and Council review the applications and consider making appointments.

ATTACHMENT A

A RESOLUTION MAKING APPOINTMENTS TO THE
APPEARANCE COMMISSION

Section 1. THE TOWN COUNCIL HEREBY APPOINTS THE FOLLOWING APPLICANT(S) TO THE APPEARANCE COMMISSION:

Appointee	**Term Expiration**
James Scott	2/2023
David Markiewicz	2/2023

Section 2. This resolution shall become effective upon adoption.

Current makeup of the Appearance Commission:

NAME	ADDRESS	TERM EXPIRATION	DOB	RACE	SEX	OCCUPATION
Vickie Brown	503 Bolin Creek Dr.	2/2021	10/15/1950	White	Female	Retired
Sharon Reilly	206 Maple Ave.	2/2021	6/8/1956	Caucasian	F	Physician
Vacant						
Vacant						
Vacant						
Vacant						
Vacant						
Vacant						
Vacant						

Applicant summary information (full detail in application):

NAME	ADDRESS	Advisory Board Preference	DOB	RACE	SEX	OCCUPATION
David Markiewicz	403 S. Greensboro St.	Appearance	3/28/1957	Caucasian	Male	Retired
James Scott	222 Old. Fayetteville Rd.	Appearance	7/20/1986	White	Male	Sponsorship Coordinator

Print

Advisory Board Chair Report (Complete One Per Applicant) - Submission #4515

Date Submitted: 1/21/2020

Advisory Board Name:*

Appearance Commission

Chair Name*

Vickie Brown

Applicant First Name:*

David

Applicant Last Name:

Markiewicz

1. Has the applicant previously served on this or another advisory board?*

- [x] Yes
- [ ] No

2. If yes, how many total years have they served?

2

This should be available on the application or by asking the applicant.

3. Is the applicant already serving on this advisory board and seeking reappointment to their second, full term?

- [ ] Yes (Skip to Last Question)
- [x] No

4. Is the applicant already serving on this advisory board and completed their two full terms?

- [ ] Yes
- [x] No

5. Is the applicant applying for a special or expert seat on the advisory board?*

- [ ] Yes
- [x] No

6. If yes, which seat?

7. Did the applicant attend an advisory board meeting?*

- [x] Yes
- [ ] No

8. If applicant did not attend an advisory board meeting, did you contact them via phone or email?

- [ ] Yes
- [ ] No

9. Applicant has demonstrated a clear understanding of the time commitment, roles, and responsibilities of serving on the advisory board:

- [x] Yes
- [ ] No

10. If no, briefly explain:

11. In addition to your comments above, please check other qualities that the applicant offers that would help the Advisory Board meet its goals for community representation. Please note that candidates who do not meet any of these qualities are still eligible for appointment. Please communicate any urgent needs and priorities for Advisory Board composition to your Board of Aldermen Liaison.

- [ ] Diversity
- [x] Occupation, Experience, or Special Skills
- [ ] Other

If other, please explain:

Print

Advisory Board Chair Report (Complete One Per Applicant) - Submission #4514

Date Submitted: 1/21/2020

Advisory Board Name:*

Appearance Commission

Chair Name*

Vickie Brown

Applicant First Name:*

James

Applicant Last Name:

Scott

1. Has the applicant previously served on this or another advisory board?*

- [ ] Yes
- [x] No

2. If yes, how many total years have they served?

This should be available on the application or by asking the applicant.

3. Is the applicant already serving on this advisory board and seeking reappointment to their second, full term?

- [ ] Yes (Skip to Last Question)
- [x] No

4. Is the applicant already serving on this advisory board and completed their two full terms?

- [ ] Yes
- [x] No

5. Is the applicant applying for a special or expert seat on the advisory board?*

- [ ] Yes
- [x] No

6. If yes, which seat?

7. Did the applicant attend an advisory board meeting?*

- [x] Yes
- [ ] No

8. If applicant did not attend an advisory board meeting, did you contact them via phone or email?

- [ ] Yes
- [ ] No

9. Applicant has demonstrated a clear understanding of the time commitment, roles, and responsibilities of serving on the advisory board:

- [x] Yes
- [ ] No

10. If no, briefly explain:

11. In addition to your comments above, please check other qualities that the applicant offers that would help the Advisory Board meet its goals for community representation. Please note that candidates who do not meet any of these qualities are still eligible for appointment. Please communicate any urgent needs and priorities for Advisory Board composition to your Board of Aldermen Liaison.

- [ ] Diversity
- [x] Occupation, Experience, or Special Skills
- [ ] Other

If other, please explain:

Print

Advisory Board Application - Submission #4393

Date Submitted: 11/5/2019

First Name*
David

Last Name*
Markiewicz

Date*
3/4/1957
Select today's date

Address1*
403 South Greensboro Street

Address2
#A

City*
Carrboro

State
NC

Zip*
27510

Is this address located within the corporate limits of the Town of Carrboro?*
Yes
Please select Yes or No.

Is this address located within the Town's ETJ, Planning Jurisdiction, or Northern Transition Area?*
ETJ

Telephone*
9198126875
Please enter your primary contact phone number.

Email Address*
dmarkiewicz57@gmail.com
Enter your primary email address.

Date of Birth*
3/28/1957
Please enter your Month/Day/Year of Birth

Race*
Caucasion
Please enter your race.

Sex*
Male
Please enter your sex.

Occupation*
Retired
Please enter your occupation.

Are you a registered Orange County Voter?*
Yes
Please answer Yes or No

Length of Residence in Orange County*
1993
How long have you been a resident of Orange County?

Length of Residence in the Town of Carrboro*
2007
How long have you been a resident of the Town of Carrboro?

I wish to be considered for appointment to the following committee/board(s) (Select no more than two (2)):*

- [ ] Affordable Housing Advisory Commission
- [ ] Animal Control Board of Appeals
- [x] Appearance Commission/NPDC
- [ ] Arts Committee
- [ ] Board of Adjustment
- [ ] Economic Sustainability Commission
- [ ] Environmental Advisory Board
- [ ] Human Services Commission
- [ ] Greenways Commission
- [ ] Northern Transition Area Advisory Committee
- [ ] OWASA Board of Directors
- [ ] Planning Board
- [ ] Recreation and Parks Commission
- [ ] Safe Routes to School Implementation Committee
- [ ] Stormwater Advisory Commission
- [ ] Tourism Development Authority*
- [ ] Transportation Advisory Board

Please note that membership is limited to one advisory board at a time. You shall not be considered for appointment to another board unless you resign before filing an application or you are in the last six months of your current term.

Other (advisory board not listed):

Please indicate by typing the advisory board that you are applying for.

Advisory Board Preference*

Appearance

If you are applying for membership on more than one advisory board, please indicate your preference by typing your first choice. Please limit your selection to two boards).

***Employer/Self Employed**

American Heart Association (Retired 10/1/19)

Please enter your employment information. This is a requirement for application for the Tourism Development Authority.

Number of Years Employed*

40

Enter the number of years you have been employed at the organization listed to the left.

*** Provide examples of how you are involved in the promotion of travel and tourism in the Town of Carrboro.**

Required only for the Tourism Development Authority Application.

Community Activities/Organizational Memberships*

Just completed the Citizens Academy, enjoyed it immensely. Previously served on the Appearance Committee until my work travel obligations nesessitated I resign.

Please enter the requested information.

Experience to Aid You in Working on Advisory Boards*

I worked for the American Heart Association for 40 years. In my last position I was responsible for 350 staff, a 90 million dollar annual budget, volunteer boards spread throughout the states of Georgia, Florida, Tennessee, Alabama, Louisiana, and Mississippi and the territory of Puerto Rico. I was one of 9 senior level staff at the national level working with volunteers to maximize our national annual budget of nearly one billion dollars to address the issues of Heart disease and Stroke. I am very comfortable, skilled and experienced with consensus-driven outcomes and community involvement to accomplish goals and objectives. to get things done. ,

Reasons You Wish to be Appointed*

Our community has an exceptional visual character and I believe that for it to be maintained and enhanced it needs vigilance and careful decision-making. I am interested in helping with this and have the time to devote to it. I own two homes in Carrboro and believe that if we all do our part to improve our town's appearance, all boats rise. I also am pragmatic and recognize that compromise often carries the day but in doing so more voices are heard and utilized and better decisions are made.

Have you ever served on any Town of Carrboro Committee or Board?*

Yes

If yes, which one(s)?

Appearance

Are you currently serving on a Town Board or Committee?*

- [ ] Yes
- [x] No

If yes, are you applying for a third consecutive term?*

- [ ] Yes
- [x] No

If yes, please describe how you meet one, or more, of the following exceptions noted below. *

This does not apply to me.

After completing two full terms, a member must take off one year before applying for re-appointment to the same advisory board. However, a board member may apply to serve on another advisory board if he/she desires. The Board of Aldermen may make exceptions to this rule under the following circumstances: 1. To retain diversity on an advisory board; 2. A lack of applicants.

Print

Advisory Board Application - Submission #4457

Date Submitted: 12/30/2019

First Name*
James

Last Name*
Scott

Date*
12/30/2019
Select today's date

Address1*
222 Old Fayetteville Rd. A107

Address2

City*
Carrboro

State
NC

Zip*
27510

Is this address located within the corporate limits of the Town of Carrboro?*
Yes
Please select Yes or No.

Is this address located within the Town's ETJ, Planning Jurisdiction, or Northern Transition Area?*
Planning Jurisdiction

Telephone*
336422518
Please enter your primary contact phone number.

Email Address*
scotjr4@gmail.com
Enter your primary email address.

The demographic information provided below is of interest because your elected officials want the Town's advisory boards to reflect the diversity of the Town. Diversity of the applicant pool is a priority of the Board.

Date of Birth*
7/20/1986
Please enter your Month/Day/Year of Birth

Race*
White
Please enter your race.

Sex*
Male
Please enter your sex.

Occupation*
Sponsorship Coordinator
Please enter your occupation.

Are you a registered Orange County Voter?*
Yes
Please answer Yes or No

Length of Residence in Orange County*
7 years
How long have you been a resident of Orange County?

Length of Residence in the Town of Carrboro*
5 years, 7 months
How long have you been a resident of the Town of Carrboro?

I wish to be considered for appointment to the following committee/board(s) (Select no more than two (2)):*

- [x] Affordable Housing Advisory Commission
- [ ] Animal Control Board of Appeals
- [x] Appearance Commission/NPDC
- [ ] Arts Committee
- [ ] Board of Adjustment
- [ ] Economic Sustainability Commission
- [ ] Environmental Advisory Board
- [ ] Human Services Commission
- [ ] Greenways Commission
- [ ] Northern Transition Area Advisory Committee
- [ ] OWASA Board of Directors
- [ ] Planning Board
- [ ] Recreation and Parks Commission
- [ ] Safe Routes to School Implementation Committee
- [ ] Stormwater Advisory Commission
- [ ] Tourism Development Authority*
- [ ] Transportation Advisory Board

Please note that membership is limited to one advisory board at a time. You shall not be considered for appointment to another board unless you resign before filing an application or you are in the last six months of your current term.

Other (advisory board not listed):

Please indicate by typing the advisory board that you are applying for.

Advisory Board Preference*

Appearance Commission/NPDC

If you are applying for membership on more than one advisory board, please indicate your preference by typing your first choice. Please limit your selection to two boards).

***Employer/Self Employed**

The Piedmont Sundial

Please enter your employment information. This is a requirement for application for the Tourism Development Authority.

Number of Years Employed*

2.5

Enter the number of years you have been employed at the organization listed to the left.

*** Provide examples of how you are involved in the promotion of travel and tourism in the Town of Carrboro.**

Required only for the Tourism Development Authority Application.

Community Activities/Organizational Memberships*

I volunteer regularly at a local assisted living facility. I have worked professionally and personally towards being involved with Carrboro's citizenry as well as the administrative processes that keep it running, and have consistently strived to be informed by and involved with the entire spectrum of people who inhabit the Town. I am also EFD, EPD and EMD certified which includes active CPR certification. Prior to that I spent time volunteering with the Chapel Hill Fire Department in order to gain experience and knowledge that aided me in working for Durham Communications. My ultimate goal, however, was to work in Orange County and for Carrboro specifically.

Please enter the requested information.

Relevent Experience:*

I studied Business at Wake Forest University. After University I studied corporate organizational structure and applied that experience towards a local but rather large home builder and land developer. I developed a personal interest in working for the public and working on projects that as much as possible benefitted the community. I have worked as a writer for a small upstart news publication where I gained experience covering municipal gatherings as well as interacting with local residents and staying informed of community events. I worked as a 911 Calltaker in Durham for the sole purpose of applying that knowledge and experience to Carrboro and Orange County. Currently I am primarily employed by UNC-TV where I raise sponsorship funds and handle administrative duties to support public television. I am still employed by The Piedmont Sundial, however my responsibility lies solely with being informed of community events and maintaining a comprehensive online events calendar.

Reasons You Wish to be Appointed*

I liked Chapel Hill when I moved there. Several years ago, I walked down Franklin Street and into Carrboro and immediately felt that this was home. It was a place where I certain I could thrive, and my impression at that time has turned out to be accurate. I wanted to work for a community, and since I arrived here I became certain that THIS was the community I wanted to serve. The goals and values of the Town as well as its residents are congruent with those that I hold personally. One of my mentors and a close personal friend - unbeknownst to me prior to my moving here - lived here for several years, and so I've experienced the positive characteristics of this Town even outside of it. I identify deeply with Carrboro and since my arrival have sought every opportunity to become more involved.

Have you ever served on any Town of Carrboro Committee or Board?*

No

If yes, which one(s)?

Are you currently serving on a Town Board or Committee?*

- [ ] Yes
- [x] No

If yes, are you applying for a third consecutive term?*

- [ ] Yes
- [x] No

If yes, please describe how you meet one, or more, of the following exceptions noted below. *

N/A

After completing two full terms, a member must take off one year before applying for re-appointment to the same advisory board. However, a board member may apply to serve on another advisory board if he/she desires. The Board of Aldermen may make exceptions to this rule under the following circumstances: 1. To retain diversity on an advisory board; 2. A lack of applicants.

Town of Carrboro

Town Hall
301 W. Main St.
Carrboro, NC 27510

Agenda Item Abstract

File Number:20-379

Agenda Date: 10/13/2020 **File Type:**Agendas

In Control: Board of Aldermen

Version: 1

TITLE:
Request-to-Set a Public Hearing for Consideration of Land Use Ordinance Text Amendments Relating to the Historic Rogers Road Neighborhood

PURPOSE: The purpose of this agenda item is for the Town Council to consider setting a new public hearing on proposed text amendments to the Land Use Ordinance to establish new zoning districts and associated development requirements for the Historic Rogers Road neighborhood.

DEPARTMENT: Planning

CONTACT INFORMATION: Christina Moon - 919-918-7325, cmoon@townofcarrboro.org <mailto:cmoon@townofcarrboro.org>; Marty Roupe - 919-918-7333, mroupe@townofcarrboro.org <mailto:mroupe@townofcarrboro.org>; Patricia McGuire - 919-918-7327, pmcguire@townofcarrboro.org <mailto:pmcguire@townofcarrboro.org>; Nick Herman - 919-929-3905, herman@broughlawfirm.com <mailto:herman@broughlawfirm.com>

INFORMATION: On September 22, 2020 the Town Council held a public hearing on proposed text amendments that, if adopted, would establish new mixed-use districts (general and conditional district) for the Historic Rogers Road neighborhood (HR-MU).

(Background information from the public hearing may be found here: <https://carrboro.legistar.com/LegislationDetail.aspx?ID=4646381&GUID=B03626B2-6CA2-48E3-BAF7-843BEE5E27D3&Options=&Search=>.) Public comment at the meeting focused on implementing the community vision outlined in the *Mapping Our Community's Future* report for affordable housing, expanded economic opportunities at a community scale, and addressing increasing concerns relating to stormwater management. (A copy of the *Mapping Our Community's Future* report may be found here: <http://www.townofcarrboro.org/DocumentCenter/View/5936/Mapping-Our-Communitys-Future-Report>)

A subsequent agenda item was scheduled for consideration of the draft ordinance on October 6, 2020. (Agenda materials for the October meeting may be found here: <https://carrboro.legistar.com/MeetingDetail.aspx?ID=802042&GUID=58D1AABF-A9CC-4C0B-B15F-2F00AA4E8395&Options=&Search=>) Questions and comments from the Town Council discussed during the public hearing are noted in the October 6th abstract.

Comments from a potential purchaser/developer of the some of the lots under consideration for the HR-MU district were received during the 24-hour period after the close of the public hearing as permitted by S.L. 2020-3 *(Attachment C)*. These comments offer insight into some of the considerations of a developer seeking to construct a successful project. Potential limitations relating to the 8-lot district/development requirement were noted along with thoughts about the affordable housing provisions, potential number of dwelling units and viability of nonresidential uses.

Additional comments were also received after the close of the public hearing period *(Attachment D)*. These comments, submitted from adjacent property owners, focus on concerns of stormwater management relating to the potential for more intensive development. Setting a new public hearing provides an opportunity to consider these new comments and, potentially others, as part of the public record.

Staff is preparing a revised draft ordinance to be considered on November 10th that will provide options for alternative language or new language for the some of the provisions. Modifications to the property boundary setbacks under Section 11 have been addressed. The setbacks along the perimeter of the HR-MU district remain 50 feet to match the undisturbed buffer but the setbacks along the internal boundary lines have been changed to 20 feet; the boundary setbacks for the HR-R district is also 20 feet *(Attachment B)*. Other areas of potential modification include:

- Reducing the minimum size for the HR-MU district. It should be noted that the mixed-use concept includes a percentage of residential and nonresidential uses; it may be difficult for projects on smaller acreage to comply with this requirement.
- Limitations on locations for ingress/egress will also affect development opportunities and may require recombinations or the use of easements to provide access to Rogers Road.
- Reexamining the certain dimensional requirements, such as density/minimum lot size
- Revisiting the permit requirements, particularly for residential uses so that requirements are based on density.
- Changing the name of the district to better reflect the focus of community commercial, such as the HR-CC instead of HR-MU.
- Expanding the description of the district to identify more specific examples of the permitted uses so that community members have a better sense of economic opportunities.

FISCAL & STAFF IMPACT: Public hearings involve staff time and public notice costs associated with advisory board and Town Council review.

RECOMMENDATION: Staff recommends that the Town Council consider adopting the resolution *(Attachment A)* setting a new public hearing for November 10, 2020.

Attachment A

A RESOLUTION SETTING A PUBLIC HEARING ON AN ORDINANCE AMENDING THE CARRBORO LAND USE ORDINANCE TO ESTABLISH HISTORIC ROGERS ROAD MIXED USE DISTRICT AND ASSOCIATED DEVELOPMENT STANDARDS

WHEREAS, the Town of Carrboro Town Council seeks to provide ample opportunities for the public to comment on proposed amendments to the Land Use Ordinance;

NOW, THEREFORE BE IT RESOLVED that the Town Council sets a public hearing on November 10, 2020, to consider adopting "An Ordinance Amending the Carrboro Land Use Ordinance to Establish the Historic Rogers Road Mixed Use District and Associated Development Standards."

This is the 13th day of October in the year 2020.

AN ORDINANCE AMENDING THE CARRBORO LAND USE ORDINANCE TO ESTABLISH HISTORIC ROGERS ROAD MIXED USE DISTRICT AND ASSOCIATED DEVELOPMENT STANDARDS

DRAFT 10-02-2020

THE CARRBORO TOWN COUNCIL ORDAINS:

Section 1. The Carrboro Land Use Ordinance is amended by modifying Section, 15-136.1 Historic Rogers Road District Established, to read as follows:

Section 15-136.1 Historic Rogers Road Districts Established

(a) The Historic Rogers Road districts, HR-R (residential) and HR-MU (mixed use), are established to implement the goals and recommendations of the *Mapping Our Community's Future* community planning effort, completed in May 2016. The intent of *Mapping Our Community's Future* and the HR Districts is to:

1) Create opportunities for long-term residents to continue living in the community and to age in place;
2) Preserve the socioeconomic and cultural diversity of the neighborhood;
3) Increase physical connections within the neighborhood, including for pedestrians and bicyclists;
4) Respect and protect the natural character of the neighborhood;
5) Ensure that new development is consistent with neighborhood character and the vision that residents have developed for its future;
6) Provide greater residential housing choice, affordability, and diversity;
7) Increase economic opportunities within the neighborhood;
8) Increase recreational resources within the neighborhood; and
9) Ensure that new development is adequately served by infrastructure, including streets, sidewalks, and utilities.

(b) The HR-R zoning district is designed to protect and preserve the character of existing lower-density areas (minimum lot size 14,520 square feet, or no more than three lots per acre) within the neighborhood while providing for compatible new development, including new housing choice options, and increased home occupation opportunities for residents.

(c) The HR-MU district is designed to provide for a broader range of housing and employment options by concentrating new development into nodes which will balance providing areas for desired new uses while protecting the overall neighborhood character. Uses appropriate in the HR-MU district include live-work units, flex space, and low-intensity neighborhood-serving establishments such as healthcare, assisted living, elder care, child care, and recreation facilities. Property proposed for rezoning to an HR-MU district shall include no

less than sixteen contiguous acres. The development of an HR-MU district may include the recombination of existing lots and/or the subdivision of new lots that meet the density and dimensional standards outlined in Article XII.

Section 2. Section 15-141.4(a) of the Carrboro Land Use Ordinance is amended to read as follows:

(a) Conditional zoning districts are zoning districts in which the development and use of the property so zoned are governed by the regulations applicable to one of the general use zoning districts listed in the Table of Permissible Uses, as modified by the conditions and restrictions imposed as part of the legislative decision creating the district and applying it to the particular property. Accordingly, the following conditional zoning districts may be established:

R-20-CZ, R-15-CZ, R-10-CZ, R-7.5-CZ, R-3-CZ, R-2-CZ, R-R-CZ, R-S.I.R.-CZ, and R-S.I.R.-2-CZ

B-1(C)-CZ, B-1(G)-CZ, B-2-CZ, B-3-CZ, B-3-T-CZ, B-4-CZ, CT-CZ, O-CZ, OACZ, M-1-CZ, M-2-CZ **(AMENDED 4/27/10; 06/23/15; 10/23/18)**

There may also be established a HR-MU-CZ zoning district, pursuant to the purpose statement and criteria described in Section 15-136.1.

Section 3. Article II Section 15-15 Definitions of Basic Terms is amended by modifying the existing definition of Home Occupation, Major to add a reference the HR-MU district as follows:

Home Occupation, Major. A Major Home Occupation is an accessory business use of a residentially-zoned property, that meets one or more of the following criteria: (i) employs up to four non-resident employees, who may work on site; (ii) utilizes outdoor storage of materials, supplies, products, or machinery; or (iii) generates noise, vibration, dust, odor, light, or glare that is visible from neighboring properties or the public right-of-way at any hour of the day. Examples of Major Home Occupations include: lawncare or landscaping services, woodworking shops, small engine repair, appliance repair, metalworking, and any home business with more than one non-resident employee. Major home occupation uses are only permissible with a zoning permit in the HR-R and HR-MU districts, and are subject to the performance standards specified in Section 15-176.9.

Section 4. Section 15-146 (Table of Permissible Uses) is amended by adding one new column labelled HR-MU with permissible use classifications as shown in the attached Exhibit 'A.' The letters "Z," "S," "C," "SC," and "ZS," and the symbol "*" have the meanings described for all uses as provided in applicable subsections of Section 15-147.

Section 5. Section 15-147 (Uses of the Designations Z,S,C in Table of Permissible Uses) is amended by adding a new subsection (v) to read as follows:

(v) Per Section 15-176.9, Special Standards for Historic Rogers Road Districts, triplexes are only permissible in the HR-R and HR-MU districts if they meet the definition of an affordable housing unit as described in Subsection 15-182.4.

Section 6. Section 15-176.9 Special Standards for Historic Rogers Road District, is amended to include the HR-MU District as follows:

Section 15-176.9 Special Standards for Historic Rogers Road Districts.

(a) All applicable provisions of the Carrboro Land Use Ordinance not specifically exempted or modified by this section shall apply to the HR-R and HR-MU districts.

(b) In both the HR-R and HR-MU districts, the maximum size of any single-family dwelling constructed after the effective date of this section shall be 2,000 square feet of heated floor area; the maximum size of any duplex or triplex dwelling unit constructed after the effective date of this section shall be 1,200 square feet of heated floor area. Any dwelling unit in existence on the effective date of this subsection containing 2,000 square feet or greater of heated floor area may be increased by a maximum of 25% of the existing heated floor area or 500 square feet whichever is greater, but with a maximum size of 2,500 square feet at any time. Any dwelling unit in existence on the effective date of this subsection containing less than 2,000 square feet of heated floor area may be expanded up to a maximum size of 2,000 square feet of heated floor area or 25% whichever is greater.

(c) Any triplex dwelling unit constructed after the effective date of this section in both the HR-R and HR-MU districts shall be an affordable housing unit pursuant to Subsection 15-182.4(b) of this chapter.

(d) In the HR-MU district the maximum size of the building footprint for any building containing any nonresidential uses shall not exceed 3,000 square feet.

(e) An undisturbed buffer, of no less than 50 feet, shall be maintained along the perimeter of the entire HR-MU district.

1. The buffer shall consist of existing vegetation and/or new plantings to meet the requirements in Section 15-307(1) for an Opaque Type A screen.
2. This area shall remain undisturbed except for the removal of noxious weeds and trees determined to be diseased by a Certified Arborist, and the installation of new plantings as required by the standards for a Type A screen described in subsection (c)(1) above.

(f) Development within the HR-MU district shall be subject to the screening requirements of Section 15-306, to provide sufficient screening between uses, so long as a Type A screen is retained at the boundary line of any parcel in the HR-MU district where that parcel adjoins an adjacent property outside of the district.

(g) As set forth in the Table of Permissible Uses, Major Home Occupations are permissible only in the HR-R and HR-MU districts, subject to the following standards:

1. Must be conducted by a person who resides on the same lot.
2. Major Home Occupations shall only be located on lots a minimum of one acre in size.
3. No more than 50% of the heated square footage of the home shall be used for business purposes. This calculation does not include accessory structures in the total square footage calculation for the home; such structures shall be limited to a

maximum size of 150% of the home, but in no case shall exceed 2,000 gross square feet.

4. The maximum number of trips per day to or from the business shall not exceed 50.
5. The on-premises sale and delivery of goods which are not produced on the premises is prohibited, except in the case of the delivery and sale of goods incidental to the provision of a service.
6. No more than three business-associated vehicles shall be parked on-site.
7. Business-associated vehicles shall be limited to vehicles allowed under a Class C license.
8. Parking for vehicles associated with the business, including employee and visitor vehicles shall be provided on-site, pursuant to the requirements in Section 15-291.
9. If more than three parking spaces are provided for business-associated vehicles and / or employees and visitors, then the additional spaces above three must be screened by a Type A buffer.
10. All business activities shall be a minimum of 60 feet from all lot lines or within a fully enclosed building.
11. All noise, dust, vibration, odor, light, and glare-producing activities shall be located a minimum of 60 feet from all lot lines, and any activity that results in noise, vibration, dust, odor, light, or glare shall only occur between the hours of 8 AM and 6 PM.
12. Any outdoor storage of materials, supplies, products, or machinery (excluding functional vehicles associated with the business) shall be screened with a Type A screen as described in LUO Section 15-307.

(h) Any Land Use Category 8.100 use located in the HR-MU district is limited to 2,000 square feet heated floor area and may only conduct business between the hours of 6 am and 9 pm.

(i) For proposed developments within the HR-MU District, a phasing plan must be incorporated into the project which mandates that at least fifteen percent (15%) of the uses must be nonresidential and at least fifteen percent (15%) of the uses must be residential. The phasing plan must ensure that the nonresidential portions are completed prior to or in conjunction with the residential portions of each phase.

Section 7. Section 15-181 Minimum Lot Size Requirements, subsection (a) is revised with the addition of minimum lot size requirements for the HR-MU zoning district as follows:

ZONE	**MINIMUM SQUARE FEET**
HR-MU	7,500

Section 8. Section 15-182 Residential Density, subsection (a) is revised with the addition of residential density requirements for the HR-MU zoning district, as follows:

ZONE	**Minimum Square Feet Per Dwelling Unit, Multi-Family, Triplex and Duplex**
HR-MU	7,500

Section 9. Section 15-182.3 Residential Density of Major Developments in Certain Districts, subsection (a) is amended to read as follows:

(a) Notwithstanding the provisions of Section 15-182, when any tract of land within the R-10, R-15, R-20, RR, HR-R and HR-MU districts is developed under circumstances requiring the issuance of a special or any tract within the R-10, R-15, R-20, RR, HR-R or HR-MU requiring the issuance of conditional use permit, the maximum number of dwelling units that may be placed on that tract shall be determined in accordance with the provisions of this section.

Section 10. Section 15-183 Minimum Lot Widths, subsection (b) is revised with the addition of minimum lot width requirements for the HR-MU zoning district, as follows:

ZONE	**Lot Width**
HR-MU	50

Section 11. Subsection 15-184 Building Setback Requirements, subsection (a) is revised with the addition of setback requirements for the HR-MU zoning district, as follows:

ZONE	**Minimum Distance from Street Right of Way Line**		**Minimum Distance from Street Centerline**		**Minimum Distance from Lot Boundary Line**
	Building	Freestanding Sign	Building	Freestanding Sign	Building and Freestanding Sign
HR-MU	50	20	70	50	50/20 (50 from edge of HR-MU district as established on date of adoption; otherwise 20)

Section 12. The table included in Subsection 15-185 (a) (2) is amended by the addition of information on the maximum building height for the HR-MU zoning district, as follows:

ZONE	**Maximum Height**
HR-MU	40’

Section 13. Article XVII Signs, Section 15-271(e) is amended to read as follows:

(e) Signs for home occupations and major home occupations shall be permitted subject to the following provisions:

1. A lot that houses a legally-established home-based occupation as an accessory use may have up to one wall-mounted sign with a maximum area of 4 square feet. In

the HR-R and HR-MU districts, legally-established major home occupations may have up to one wall-mounted sign with a maximum area of 8 square feet.

2. Signs must be non-illuminated.
3. Signs shall comply with the standards of Sections 15-271, Permit Required for Signs, 15-275, Computation of Sign Area, and 15-282, Miscellaneous Requirements.

Section 14. All provisions of any town ordinance in conflict with this ordinance are repealed.

Section 15. This ordinance shall become effective upon adoption

Exhibit 'A' - TABLE OF PERMISSIBLE USES

Historic Rogers Road Zoning District Additions - 10/02/2020

DESCRIPTION	HR MU
1.000 Residential	
1.100 Single Family Residences	
1.110 Single Family Detached One Dwelling Unit Per Lot	
1.111 Site Built/Modular	Z
1.112 Class A Mobile Home	Z
1.113 Class B Mobile Home	
1.120 Single Family Detached More Than One Dwelling Unit Per Lot	
1.121 Site Built/Modular	*
1.122 Class A Mobile Home	*
1.123 Class B Mobile Home	
1.200 Two-Family Residences	
1.210 Two-Family Conversion	*
1.220 Primary Residence with Accessory Apartment	* *
1.230 Duplex	
1.231 Maximum 20% units > 3 bedrms/du	*
1.232 No bedroom limit	
1.240 Two Family Apartment	
1.241 Maximum 20% units > 3 bedrms/du	*
1.242 No bedroom limit	
1.300 Multi-Family Residences	
1.310 Multi-Family Conversion	
1.320 Multi-Family Townhomes	
1.321 Maximum 20% units > 3 bedrms/du	C
1.322 No bedroom limit	
1.330 Multi-Family Apartments	
1.331 Maximum 20% units > 3 bedrms/du	
1.332 No bedroom limit	
1.340 Single-Room Occupancy	
1.350 Triplex	C
1.400 Group Homes	
1.410 Fraternities, Sororities, Dormitories and Similar Housing	
1.420 Boarding Houses, Rooming Houses	
1.430 Adult Care Home, Class A	C
1.440 Adult Care Home, Class B	C
1.450 Child Care Home, Class A	C

* denotes "ZSC" Permits

Exhibit 'A' - TABLE OF PERMISSIBLE USES

Historic Rogers Road Zoning District Additions - 10/02/2020

DESCRIPTION	HR MU
1.460 Child Care Home, Class B	C
1.470 Maternity Home	C
1.480 Nursing Care Home	C
1.500 Temporary Residences	
1.510 Tourist Homes and other Temporary Residences Renting Rooms for Relatively Short Periods of Time	
1.600 Homes Emphasizing Services, Treatment or Supervision	
1.610 Temporary Homes for the Homeless	
1.620 Overnight Shelters for Homeless	
1.630 Senior Citizen Residential Complex	
1.700	
1.800	
1.900 Home Occupation	Z
1.910 Major Home Occupation	Z
2.000 Sales and Rental of Goods, Merchandise and Equipment	
2.100 No Storage or Display of Goods Outside Fully Enclosed Building	
2.110 High-Volume Traffic Generation	
2.111 ABC Stores	
2.112 Specialty High Volume Retail	
2.120 Low-Volume Traffic Generation	
2.130 Wholesale Sales	
2.140 Drive-In Windows	
2.150 Retail Sales with Subordinate Manufacturing and Processing	
2.200 Display of Goods Outside Fully Enclosed Building	
2.210 High-Volume Traffic Generation	
2.220 Low-Volume Traffic Generation	
2.230 Wholesale Sales	
2.240 Drive-In Windows	
2.300 Storage of goods outside fully enclosed building	
2.310 High-volume traffic	

* denotes "ZSC" Permits

Exhibit 'A' - TABLE OF PERMISSIBLE USES

Historic Rogers Road Zoning District Additions - 10/02/2020

DESCRIPTION	HR MU
generation	
2.320 Low-volume traffic	
2.330 Wholesale Sales	
2.340 Drive-in Windows	
3.000 Office, Clerical, Research and Services Not Primarily Related to Goods or Merchandise	
3.100 All operations conducted entirely Within Fully Enclosed Building	
3.110 Operations designed to attract and serve customers or clients on the premises, such as the office of attorneys, physicians, other professions, insurance and stock brokers, travel agents, government office buildings, etc.	C
3.120 Operations designed to attract little or no customer or client traffic other than employees of the entity operating the principal use	C
3.130 Office or clinics of physicians or dentists with not more than 10,000 square feet of gross floor area	C
3.140 Watershed research	
3.150 Copy Centers/Printing Operatio	C
3.200 Operations conducted within or outside fully enclosed buildings	
3.210 Operations designed to affect and serve customers or clients on the premises	
3.220 Operations designed to attract little or no customer or client traffic other than employees of the entity operating the principal use	
3.230 Banks with drive-in window	
3.240 Watershed research	
3.250 Automatic Teller Machine, Freestanding	

* denotes "ZSC" Permits

Exhibit 'A' - TABLE OF PERMISSIBLE USES

Historic Rogers Road Zoning District Additions - 10/02/2020

DESCRIPTION	HR MU
3.260 Social Service Provider with Dining	
4.000 Manufacturing, Processing, Creating, Repairing, Renovating, Painting, Cleaning, Assembling of Goods, Merchandise and Equipment	
4.100 All operations conducted entirely within fully enclosed buildings	C
4.200 Operations conducted within or outside fully enclosed buildings	
5.000 Educational, Cultural, Religious, Philanthropic, Social, Fraternal Uses	
5.100 Schools	
5.110 Elementary and secondary (including associated grounds and athletic and other facilities)	C
5.120 Trade or vocational school	
5.130 College	
5.200 Churches, synagogues and temples (including associated residential structures for religious personnel and associated buildings but not including elementary school buildings) school or secondary	C
5.300 Libraries, museums, art galleries, art centers and similar uses (including associated educational and instructional activities)	
5.310 Located within a building designed and previously occupied as a residence or within a building having a gross floor area not in excess of 3,500 square feet	
5.320 Located within any permissible structures	
5.400 Social, fraternal clubs and lodges, union halls, and similar uses	
6.000 Recreation, Amusement, Entertainment	
6.100 Activity conducted entirely within building or substantial structure	
6.110 Bowling alley, skating rinks,	

* denotes "ZSC" Permits

Exhibit 'A' - TABLE OF PERMISSIBLE USES

Historic Rogers Road Zoning District Additions - 10/02/2020

DESCRIPTION	HR MU
indoor tennis and squash courts, billiards and pool halls, indoor athletic and exercise facilities and similar uses.	
6.120 Movie Theaters	
6.121 Seating capacity of not more than 300	
6.122 Unlimited Seating Capacity	
6.130 Coliseums, stadiums, and all other facilities listed in the 6.100 classification designed to seat or accommodate simultaneously more than 1000 people	
6.140 Community Center--a Town sponsored, non-profit indoor facility providing for one or several of various type of recreational uses. Facilities in a Community Center may in-clude, but are not limited to gymnasia, swimming pools, indoor court areas, meeting/ activity rooms, and other similar uses	
6.150 Electronic Gaming Operations	
6.200 Activity conducted primarily outside enclosed buildings or structures.	
6.210 Outdoor recreational facilities developed on private lands, without Town sponsorship or investment, such as golf and country clubs, swimming or tennis clubs, etc. and not constructed pursuant to a permit authorizing the construction of a residential development.	
6.220 Outdoor recreational facilities developed on public lands, or on private lands with swimming pools, parks, etc., not con-structed pursuant to a permit authorizing the construction of another use such as a school	
6.221 Town of Carrboro owned and operated facilities.	

* denotes "ZSC" Permits

Exhibit 'A' - TABLE OF PERMISSIBLE USES

Historic Rogers Road Zoning District Additions - 10/02/2020

DESCRIPTION			HR MU
	6.222	Facilities owned and operated by public entities other than the Town of Carrboro	
6.230		Golf driving ranges not accessory to golf course, par 3 golf courses, miniature golf course, skateboard parks, water slides, and similar uses.	
6.240		Horseback riding stables (not constructed pursuant to permit authorizing residential development)	
6.250		Automobile and motorcycle racing tracks	
6.260		Drive-in Movie Theaters	
7.000		**Institutional Residence or Care of Confinement Facilities**	
7.100		Hospitals, clinics, other medical (including mental health) treatment facilities in excess of 10,000 square feet of floor area	
7.200		Nursing care institutions, intermediate care institutions, handicapped, aged or infirm institutions, child care institutions	
7.300		Institutions (other than halfway houses) where mentally ill persons are confined	
7.400		Penal and Correctional Facilities	
8.000		**Restaurants (including food delivery services), Bars, Night Clubs**	
8.100		Restaurant with none of the features listed in use classification below as its primary activity	C
8.200		Outside Service or Consumption	
8.300		Drive-in (service to and consumption in vehicle on premises)	
8.400		Drive Through Windows (service directly to vehicles primarily for off-premises consumption)	
8.500		Carry Out Service (food picked up inside of off-premises consumption)	
8.600		Food Delivery	
8.700		Mobile prepared food vendors	
9.000		**Motor Vehicle-Related Sales and Service**	

* denotes "ZSC" Permits

Exhibit 'A' - TABLE OF PERMISSIBLE USES

Historic Rogers Road Zoning District Additions - 10/02/2020

DESCRIPTION	HR	MU
Operations		
9.100 Motor vehicle sales or rental of sales and service		
9.200 Automobile service stations		
9.300 Gas sales operations		
9.400 Automobile repair shop or body shop		
9.500 Car wash		
10.000 Storage and Parking		
10.100 Independent automobile parking lots or garages		
10.200 Storage of goods not related to sale or uses of those goods on the same lot where they are stored		
10.210 All storage within completely enclosed structures		
10.220 Storage inside or outside completely enclosed structures		
10.300 Parking of vehicles or storage of equipment outside enclosed structures where: (i) vehicles or equipment are owned and used by the person making use of the lot, and (ii) parking or storage is more than a minor and incidental part of the overall use made of the lot		
11.000 Scrap Materials Salvage Yards, Junkyards, Automobile Graveyards		
12.000 Services and Enterprises Related to Animals		
12.100 Veterinarian		
12.200 Kennel		
13.000 Emergency Services		
13.100 Police Stations		
13.200 Fire Stations		
13.300 Rescue Squad, Ambulance Service		
13.400 Civil Defense Operation		
14.000 Agricultural, Silvicultural, Mining, Quarrying Operations		
14.100 Agricultural operations, farming		
14.110 Excluding livestock		
14.120 Including livestock		
14.200 Silvicultural operations		
14.300 Mining or quarrying operations, including on-site sales of products		
14.400 Reclamation landfill		
15.000 Miscellaneous Public and Semi-Public Facilities		

* denotes "ZSC" Permits

Exhibit 'A' - TABLE OF PERMISSIBLE USES

Historic Rogers Road Zoning District Additions - 10/02/2020

DESCRIPTION	HR MU
15.100 Post Office	
15.200 Airport	
15.300 Sanitary landfill	
15.400 Military reserve, National Guard centers	
15.500 Recycling materials collection operations	
15.510 Using collection facilities other than motor vehicles	
15.520 Aluminum recycling using motor vehicles	
15.600 Public utility service complex	
15.700 Cable Television Signal Distribution Center	
15.750 Data Service Provider Facility	
15.800 Town-owned and/or Operated Facilities and Services	
15.810 Town-owned and/or Operated Public Parking Lot	
15.820 All other town-owned and/or operated facilities and services	
16.000 Dry Cleaner, Laundromat	
16.100 With drive-in windows	
16.200 Without drive-in windows	
17.000 Utility Facilities	
17.100 Neighborhood	
17.200 Community or regional	
17.300 Cable Television Satellite Station	
17.400 Underground Utility Lines	
17.410 Electric Power Lines & Gas Lines	
17.420 Other Underground Lines	
17.500 Solar Array	
17.501 Solar Array Facility, Level 1	
17.502 Solar Array Facility, Level 2	
17.503 Solar Array Facility, Level 3	
18.000 Towers and Related Structures	
18.100 Towers and antennas fifty feet tall or less	C
18.200 Towers and antennas attached thereto that exceed 50 feet in height, and that are not regarded as accessory to residential users under 15-150(c)(5)	
18.300 Antennas exceeding 50 feet in height attached to structures other than towers, [other than accessory uses under 15-150(c)(5)]	

* denotes "ZSC" Permits

Exhibit 'A' - TABLE OF PERMISSIBLE USES

Historic Rogers Road Zoning District Additions - 10/02/2020

	DESCRIPTION	HR	MU
18.400	Publicly-owned towers and antennas of all sizes that are used in the provision of public safety services		
19.000	**Open Air Markets and Horticultural Sales**		
19.100	Open air markets (farm and craft markets, flea markets, produce markets)		
19.200	Horticultural sales with outdoor display		
19.300	Seasonal Christmas or pumpkin sales		
20.000	**Funeral Homes**		
21.000	**Cemetery and Crematorium**		
21.100	Town-owned cemetery		
21.200	All other cemeteries		
21.300	Crematorium		
22.000	**Day Care**		
22.100	Child Day Care Home	C	
22.200	Child Day Care Facility	C	
22.300	Senior Citizens Day Care, Class A	C	
22.400	Senior Citizens Day Care, Class B	C	
23.000	**Temporary structure or parking lots used in connection with the construction of a permanent building or for some non-recurring purpose**		
23.100	Temporary structures located on same lot as activity generating need for structure	C	
23.200	Temporary parking facilities located on or off-site of activity generating need for parking		
24.000	**Bus Station**		
25.000	**Commercial Greenhouse Operations**		
25.100	No on-premises sales		
25.200	On-premises sales permitted		
26.000	**Subdivisions**		
26.100	Major	C	
26.200	Minor	C	
27.000	**Combination Uses**	C	
28.000	**Planned Unit Developments**		
29.000	**Special Events**	C	
30.000	**Planned Industrial Development**		
31.000	**Off-Premises Signs**		

* denotes "ZSC" Permits

Exhibit 'A' - TABLE OF PERMISSIBLE USES

Historic Rogers Road Zoning District Additions - 10/02/2020

DESCRIPTION	HR MU
32.000 Village Mixed Use Development	
33.000 Office/Assembly Planned Development	
34.000 Temporary Lodging	
34.100 Hotels and Motels	
34.200 Bed and Breakfast	C

* denotes "ZSC" Permits

Town of Carrboro

Town Council

September 23, 2020

RE: Historic Rogers Road Zoning discussion

Dear Carrboro Town Council,

I represent a partnership that is under contract to purchase most, but not all, of the 8 parcels of land on Rogers Rd., that were the subject of discussion during yesterday's council meeting. It is our intention to purchase the property and develop it. My reason for writing is to offer a different perspective with "real world" considerations when viewing how this property should be developed.

As a potential buyer for the property, we have been conducting our proper "Due Diligence". Some of the issues that were discussed during the hearing have a direct impact on the viability of any sort of development on this property. Please allow me to address them:

1.) The number of houses that were mentioned as being developed on this property was 35. Based on work that we have done with our engineer, which included reviewing the proposed guidelines for the HRR area and speaking with several people that work for the town of Carrboro, we interpret the that approximately 58-60 residential lots could be built. Some homes would be duplexes and others would be single-family homes. This needs to be confirmed. Please remember that this is for 6 of the 8 parcels.
2.) There is a stream that cuts across the southeast corner of the tract. I have had a professional Wetland Scientist survey the property and review the course and path of the stream. That being said, the town of Carrboro needs to make a formal stream determination. This is a very important factor for any developer when considering a project. The stream and its buffer zone will render a sizeable part of the tract unusable for development of new homes. Some of the area can be used as a place to construct a storm water management area. There will also be room for some recreational area. However, this is land that the developer must purchase as part of the deal and will be a non-revenue part of the project and has to be factored into the project.
3.) The town of Carrboro requires that 15% of the homes that are built be "affordable homes". These homes are built by the developer under specific requirements and guidelines and will be sold to the Community Home Trust (CHT). These 8-9 homes will be sold to the CHT based on a particular formula that takes into account the average household income for low income

families. Typically, the developer loses money on each affordable home that is sold to the CHT. We think that this is a fine program and a tremendous asset for the community. However, it needs to be said that a developer cannot continue in business if he loses money on each home that is built. The cost of providing homes to the CHT must be made up by being able to develop a sufficient number of homes that sell for a profit.

4.) As mentioned earlier, we are under contract to purchase 6 of the 8 parcels that are under discussion and review. We understand that the town of Carrboro is making a uniform plan that covers all 8 parcels. While we know that it's not the council's problem if there are challenges that face either the buyer or seller in a private real estate transaction, what ever uniform plan is approved will affect the development project. All 8 parcels are currently owned by one entity. If we buy 6 of the parcels, then there will be at least two different owners. Guidance from the town of Carrboro on how to navigate this matter will be appreciated and welcome.

5.) In his remarks to the council, Minister Campbell speaks about "identifying opportunities" for the HRR area. Specifically, he was referring to retail opportunities. Let me preface my comments by saying that I've been a retail restaurant developer for over 40 years. I have worked exclusively with one particular international sandwich chain and have helped develop over 800 locations in North Carolina. While I love the idea of having services and businesses close to my home, my experience tells me that a business in a location such as the HRR area would be a major struggle. As a developer, I would welcome the opportunity to build commercial property that I can rent out to tenants who would pay rent every month. However, in my professional opinion there is not enough traffic, either from autos and/or pedestrians to support most kinds of business. My worry is what happens when some people are cajoled or encouraged into opening businesses and the businesses fail within the year. I understand the desire for the council to listen closely to its constituents and to support their requests. But you also have a responsibility to make wise and prudent choices. You would do a disservice to potential business owners and to the developer by legislating that retail be developed: the business owners, because they will believe that since you pushed for the space to be built, that it is a sure thing and for the developer, because he will incur a loss and have no one to fill his vacant property.

6.) Minister Campbell expressed his concern about stormwater runoff. I agree that this is an important issue and needs to be completely addressed by the town of Carrboro. Certainly, as a developer, we wish to know the stream determination status as soon as possible and by way of this letter, request that the town of Carrboro make that determination. This will assist all those concerned in making the proper engineering plans for dealing with water, particularly during rainy periods. And as mentioned earlier, this will help with home site planning, as well.

7.) The town is setting specific limits on the size of homes to be built. I believe that the requirement is that 15% of the homes (affordable houses) are approximately 1100 square feet (SF) and 15% of the homes can be as large as 2,000 SF. The remaining homes to be 1200-1800 SF. (I am not 100% certain about the exact specifics required and offer these numbers for review purposes only.) As a developer, the smaller the homes, the smaller the income to the builder. I know that this is not of concern to the council; I only mention this because it is another of the "real world" factors that must be considered.

8.) Finally, I have a few comments regarding "flex" space. I like this idea. I can imagine a tradesperson, perhaps someone like a plumber who owns a house in the development. He runs a plumbing business and goes to his jobs using his truck. At the end of the day, he drives to his

flex space (a 1200 SF bay that is part of a 6000 SF building). He pulls his truck into the garage, loads, unloads and restocks his truck. In the front corner of the bay, is a small office in which he can conduct his business administrative work. Then, he walks 5 minutes to his home. It's hard to know what the market is for this sort of space is, but unlike retail business, it's not dependent upon outside traffic. This can work.

Thank you for taking the time to read my comments.

Respectfully yours,

Peter Slomianyj

Comprop, LLC

Christina Moon

From: David Andrews
Sent: Monday, October 5, 2020 6:15 PM
To: Patricia J. McGuire; Christina Moon
Subject: Fwd: Proposed text amendments to the Land Use Ordinance to establish new zoning districts and associated development requirements for the Historic Rogers Road neighborhood.

FYI

Begin forwarded message:

From: Kathryn Thomas <braskakjt@yahoo.com>
Date: October 5, 2020 at 5:09:23 PM EDT
To: PublicComment <publiccomment@townofcarrboro.org>
Subject: Proposed text amendments to the Land Use Ordinance to establish new zoning districts and associated development requirements for the Historic Rogers Road neighborhood.

I am unable to attend the Council meeting tomorrow (10/6/2020) evening but I would like to reiterate my concerns relative to the proposed text amendments to establish new zoning district HRR. My primary concerns relate to the protection of water quality available to Fox Meadow residents who are reliant on wells, and with the management of storm water resulting from development.

I purchased my home in 2002. Subsequently, this area went through several years of drought and the quality of my water degraded significantly. It became orange and very cloudy. I took my laundry to a laundromat for several years because I needed to conserve the water for personal hygiene. I drank only bottled water. After the drought abated, I continued to have concerns about the safety of my water and had it tested. The county decided to condemn my well and a new well was built using the well fund available to certain residents of the area. I have my well tested periodically because of this neighborhood's close proximity to the old landfill. A couple of years ago I was told that the water quality in my "new" well no longer met safety standards and I needed to have a water treatment system installed. The county paid for the installation of a water treatment system because of my proximity to the landfill. I now pay for water treatment services, but the water is still not safe to drink because of the sodium level resulting from the water treatment. I still have to purchase bottled water for drinking. I am concerned that water quality is a moving target in this area and that the HRR zone being proposed will result in further degradation of the water quality available which may require further mitigation measures.

Furthermore, I am concerned that denser development, including the addition of much more impervious surface, would have a significant impact on both the quality and the ability of the current wells to recharge. Storm water seems to be concentrated from the creek that runs under Rogers Road through the Rogers Road neighborhood and then runs down through the Fox Meadow neighborhood under Tallyho Trail. The surface runoff has increased significantly in recent years resulting in the creek overtopping its banks on occasion creating a significant potential for flooding for some of my near neighbors. In addition, in the aftermath of the construction of the sewer line, the shoulder along Tallyho in front of my house has eroded significantly because of the manner in which it was reconstructed. Soil is being washed away, leaving gravel and crushed asphalt. The soil is partly filling up the ditch, but mostly it has been washed away into the creek. We were promised that it would be made better than it had been, but the results are quite the opposite. Mitigation measures are costly for Fox Meadow residents.

Fox Meadow has been buffeted by many development changes since its inception in the early 1980s. The planning for this neighborhood was grounded on a completely different set of regulatory

requirements than are in existence today, yet this neighborhood is being treated as if the consequences of prior government and development decisions don't matter.

Fox Meadow residents are dependent on the health of their wells. I would hope that any development take into account water quality and storm water issues of concern to Fox Meadow residents like me.

Thank you for your consideration.

Kathryn Thomas
1415 Tallyho Trail
Chapel Hill, NC 27516

Christina Moon

From: David Andrews
Sent: Monday, October 5, 2020 6:14 PM
To: Patricia J. McGuire; Christina Moon
Subject: Fwd: Rogers Road Text Amendments

FYI

Begin forwarded message:

From: Cammie Brantley <cabbytwo@netscape.net>
Date: October 5, 2020 at 5:24:19 PM EDT
To: council <council@townofcarrboro.org>, PublicComment <publiccomment@townofcarrboro.org>
Subject: Rogers Road Text Amendments
Reply-To: Cammie Brantley <cabbytwo@netscape.net>

Dear Carrboro BOA members,
Thank you for the opportunity to comment on the Rogers Road text amendments up for consideration at your Oct 6 meeting. It has been a long time since many of us have had the time and opportunity to turn our attention toward these matters and understand that these comments are outside of the 24 hour window for public comment following the Sept 22 meeting, but so much is new with Covid changes that a lot of us did not realize the new procedures until today.

I ask that when considering the text amendments for the Bellin property that you remember the concerns of those of us downstream. Please remember that excessive storm water runoff can not only damage homes, but also wells and septic systems. This was not something I heard specifically mentioned at the Sept 22 meeting which I reviewed on video today.

The Tallyho Trail neighborhood is entirely dependent on well water and almost entirely dependent upon septic. About a dozen neighbors who border the new sewer easement that runs thru Tallyho in order to service Rogers Road were given the option to hook up. The rest of us are without recourse if our wells or septic systems are damaged or destroyed due to flooding and/or excessive run off. We need clean water to drink and we were specifically told by OWASA that there are no plans to provide service to our neighborhood now or in the future.

At the Sept 22 public hearing, I was happy to hear Tina Moon say that the draft language meets stormwater guidelines, etc. but am also wondering if those are the new guidelines or the old ones? When we were meeting on this previously, new guidelines were being developed out of necessity and I am unclear which are being adhered to for this property now. I would recommend that be looked at closely by the Board.

In the public comments submitted by the perspective developer of the property, he seeks a "formal stream determination" and I agree that is key to making good decisions about this property. There are streams that have developed in our neighborhood that don't show on stream maps because they were previously dry the majority of the time. I urge you to look closely and carefully at this issue.

Neither Tallyho Trail neighbors or Rogers Road neighbors intended or desired seeing a 58-60 unit residential development at this location. At one meeting Rogers Road representatives were adamant they didn't want to see something like the neighborhood at the intersection of Homestead and Seawell School Rd. (sorry, I don't know its name). Such a development would not be in keeping with the existing neighborhoods, which was definitely a stated goal for both Rogers Road and Tallyho neighbors.

Please make sure the language in the approved text doesn't allow any unintended consequences such as this. I believe there was discussion of general use vs. conditional use at the Sept 22 meeting and if conditional use allows greater ability to match the development of this property with the goals of the community and protects both the character and health of existing properties, I encourage you to choose it.

Sincerely,
Cammie Brantley
1315 Tallyho Trail

Christina Moon

From: jeaniefstroud <jeaniefstroud@gmail.com>
Sent: Tuesday, October 6, 2020 4:48 PM
To: Christina Moon
Subject: Multi-development 65 units

I am a resident of Rogers Road for over 30 yrs. I would NOT like to see this development come on Rogers Road. It will be very dangerous for our elderly, our children and our animals. NO MORE DEVELOPMENT ON
ROGERS ROAD. Please, THANK U

Sent from my Verizon, Samsung Galaxy smartphone

Christina Moon

From: Jackie Poole <jackiepoole414@gmail.com>
Sent: Tuesday, October 6, 2020 6:33 PM
To: Christina Moon

We do not need another development coming to Rogers Road. A development of this magnitude will be a disaster to this neighborhood. The neighbor will be over-crowded and the increased traffic could become a hazard to the kids in the neighborhood.
Thank you!
Jackie Poole
jackiepoole414@gmail.com
919 260 4675
8006 Rogers Road
Chapel Hill, NC 27516

Town of Carrboro

Town Hall
301 W. Main St.
Carrboro, NC 27510

Agenda Item Abstract

File Number:20-372

Agenda Date: 10/13/2020 **File Type:**Agendas

In Control: Board of Aldermen

Version: 1

TITLE:
The 203 South Greensboro Project -Public Hearing on Schematic Design
PURPOSE: The purpose of this item is to provide the Town Council an opportunity to receive public comment on the 203 South Greensboro Project as it proceeds with the development of a schematic design.
DEPARTMENT: Planning

CONTACT INFORMATION: Patricia McGuire 919-918-7327, pmcguire@townofcarrboro.org <mailto:pmcguire@townofcarrboro.org>;

INFORMATION: The concept development process for the 203 Project kicked off in late June. Building on the 2018 engagement and design, the updated building program includes approximately 49,000 square feet to house the following:

Carrboro Recreation, Parks and Cultural Resources
WCOM Radio
Seed Library
Virtual Justice Center
Teen Space
Multi-purpose Performance Space
Orange County Southern Branch Library
Orange County Skills Development Center Certified Nursing Assistant Program/Durham Tech
Orange County Guardian ad Litem program

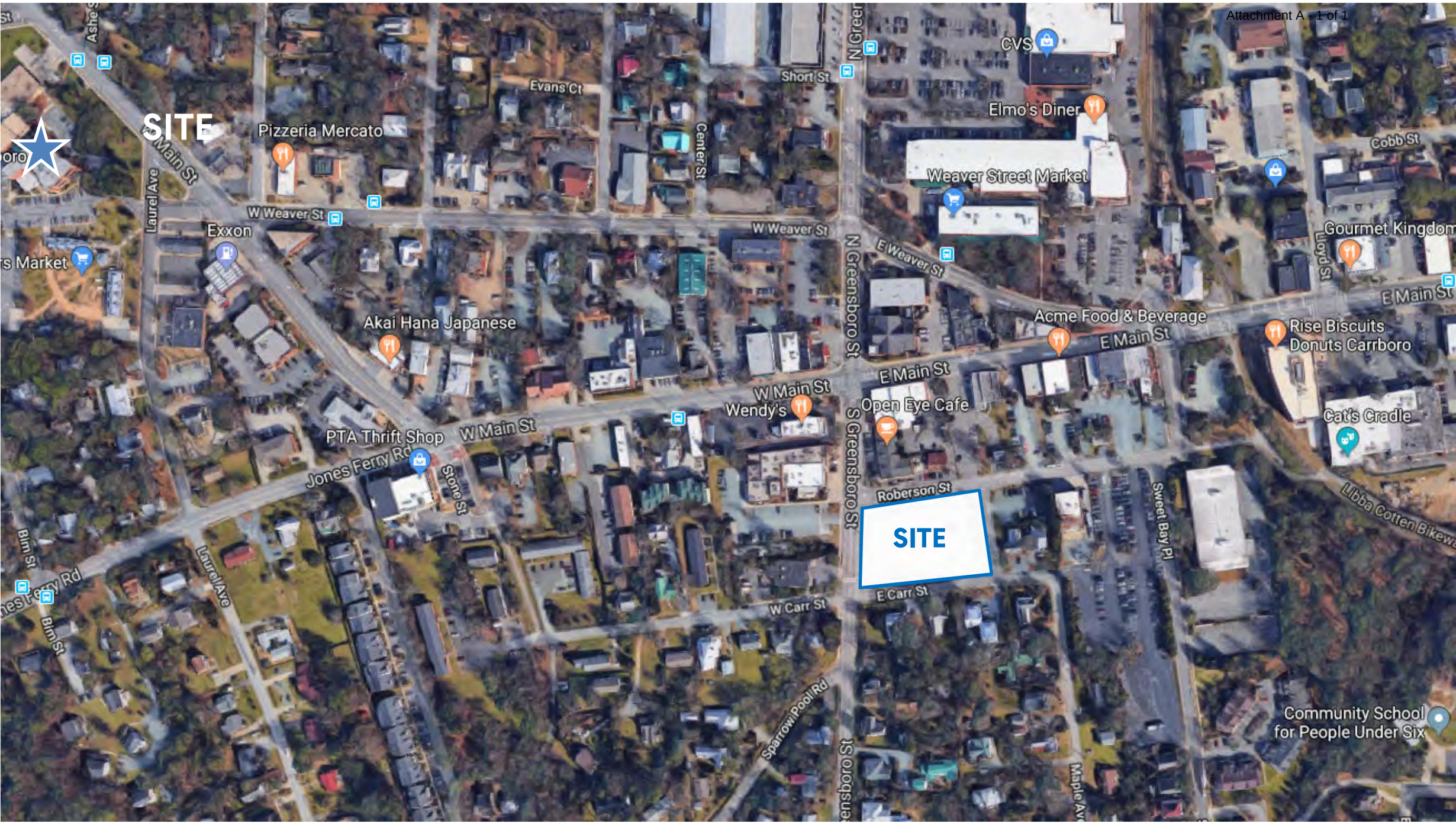
The schematic design incorporates features that were derived from public input in 2018, with the principle change being the substitution of the Skills Development Center activities for the Artscenter space. The design also responds to the revised synergies that result from the new partnerships and opportunities between the building users.

Three public meetings have been held since the last public update on this project on September 15th. Agenda materials and a copy of the presentation are available for review at <https://carrboro.legistar.com/LegislationDetail.aspx?ID=4639477&GUID=EB052C47-E64C-4420-B7A8-A383891AC131&Options=ID|Text|&Search=203> or with other materials at The203Project.org

<http://www.townofcarrboro.org/1151/The-203-Project> .

FISCAL & STAFF IMPACT: To be determined in relation to direction resulting from the receipt of public comment.

RECOMMENDATION: Staff recommends that the Town Council receive public comment on the schematic design.


SITE
Pizzeria Mercato
Exxon
Akai Hana Japanese
PTA Thrift Shop
Wendy's
CVS
Elmo's Diner
Weaver Street Market
Acme Food & Beverage
Open Eye Cafe
Rise Biscuits Donuts Carrboro
Gourmet Kingdom
Cat's Cradle
Community School for People Under Six
SITE
Main St
W Weaver St
E Weaver St
W Main St
E Main St
Jones Ferry Rd
Laurel Ave
Center St
Evans Ct
Short St
N Greensboro St
S Greensboro St
Roberson St
E Carr St
W Carr St
Sparrow Pool Rd
Sweet Bay Pl
Lloyd St
Cobb St
Stone St
Bim St

THEN & NOW

2018

2020

	2018	2020
Building Area:	50,400 sf	52,780 sf
Open Site Area:	8,465 sf	5,183 sf
Occupiable Terrace Area:	2,564 sf	1,000 sf
Parking Count:	73	173

Agenda Item Abstract

File Number:20-377

Agenda Date: 10/13/2020

File Type: Agendas

In Control: Board of Aldermen

Version: 1

TITLE:
Petition to Designate the Area Currently Referred to as Plantation Acres as Barred Owl Creek

PURPOSE: The purpose of this item is to allow the Town Council to receive and consider a petition from residents to designate the area that encompasses several subdivisions referred to as Plantation Acres as Barred Owl Creek.

DEPARTMENT: Planning

CONTACT INFORMATION: Patricia McGuire 919-918-7327, pmcguire@townofcarrboro.org <mailto:pmcguire@townofcarrboro.org>;

INFORMATION: Neighbors from subdivisions near and within the area referred to as Plantation Acres have been in contact with the Town since the early summer of 2020. Initially, the communication focused on renaming the two subdivisions that include the name Plantation Acres.

Interest grew and the current request is that the Town designate the area currently referred to as Plantation Acres, (which includes the subdivisions: Plantation Acres, Plantation Acres Extension, R.S. Lloyd Section One, R.S. Lloyd Section Two, and Lloyd Square) as Barred Owl Creek.

The key group working on the renaming efforts is made up of residents, Elyza Halev, Marcia Roth, Carrie Keymel, Eva Canoutas, Gordon Chadwick, Victor Jimenez, and Sergio Jimenez, note that they are making this request because of the association of the word "Plantation" with slavery.

The renaming process involved soliciting ideas for names from neighbors, conducting a survey to identify the top choices, and developing and distributing a petition. A copy of the petition is attached as is a map showing the locations of those who have signed the petition. (*Attachments B and C*).

An online form for obtaining signatures was used; there was no door-to-door soliciting because of COVID-19. In total, 107 signatures were obtained. The email conveying the petition is also attached (*Attachment D*).

Both staff and the attorney have reviewed the process and there are not any formal review/decision requirements associated with the Town Council acting on this request.

Should the Town Council grant the request, the new name would be included in maps and GIS map data layers used by the Town and made available to other mapping outlets (e.g. Google, Bing).

FISCAL & STAFF IMPACT: Minimal impacts are anticipated with action on the request.

RECOMMENDATION: Staff recommends that the Town Council receive and discuss the request. A resolution that could be used to approve the designation of Barred Owl Creek is provided (*Attachment A*).

Resolution Designating the Area referred to as Plantation Acres as Barred Owl Creek

WHEREAS, residents worked together and created a Plantation Acres renaming task force (PA Task Force) because of the association of the name "Plantation" to slavery; and,

WHEREAS, the PA Task Force requested suggestions for names from neighbors, surveyed neighbors for top name choices, and developed and distributed an online petition; and,

WHEREAS, 107 signatures were obtained on the petition submitted, requesting the designation of an area encompassing five subdivisions, Plantation Acres, Plantation Acres Extension, RS Lloyd, Section One, RS Lloyd, Section Two, and Lloyd Square as "Barred Owl Creek."

NOW, THEREFORE, BE IT HEREBY RESOLVED that the Carrboro Town Council designates the area outlined on the map labelled Attachment C as Barred Owl Creek and directs staff to update GIS and other maps accordingly.

This the 13th day of October in the year 2020.

We, the undersigned landowners of the neighborhood now known as Plantation Acres, which includes the subdivisions: Plantation Acres, Plantation Acres Extension, R.S. Lloyd Section One, R.S. Lloyd Section Two and Lloyd Square. Request the Town of Carrboro to designate this area as Barred Owl Creek

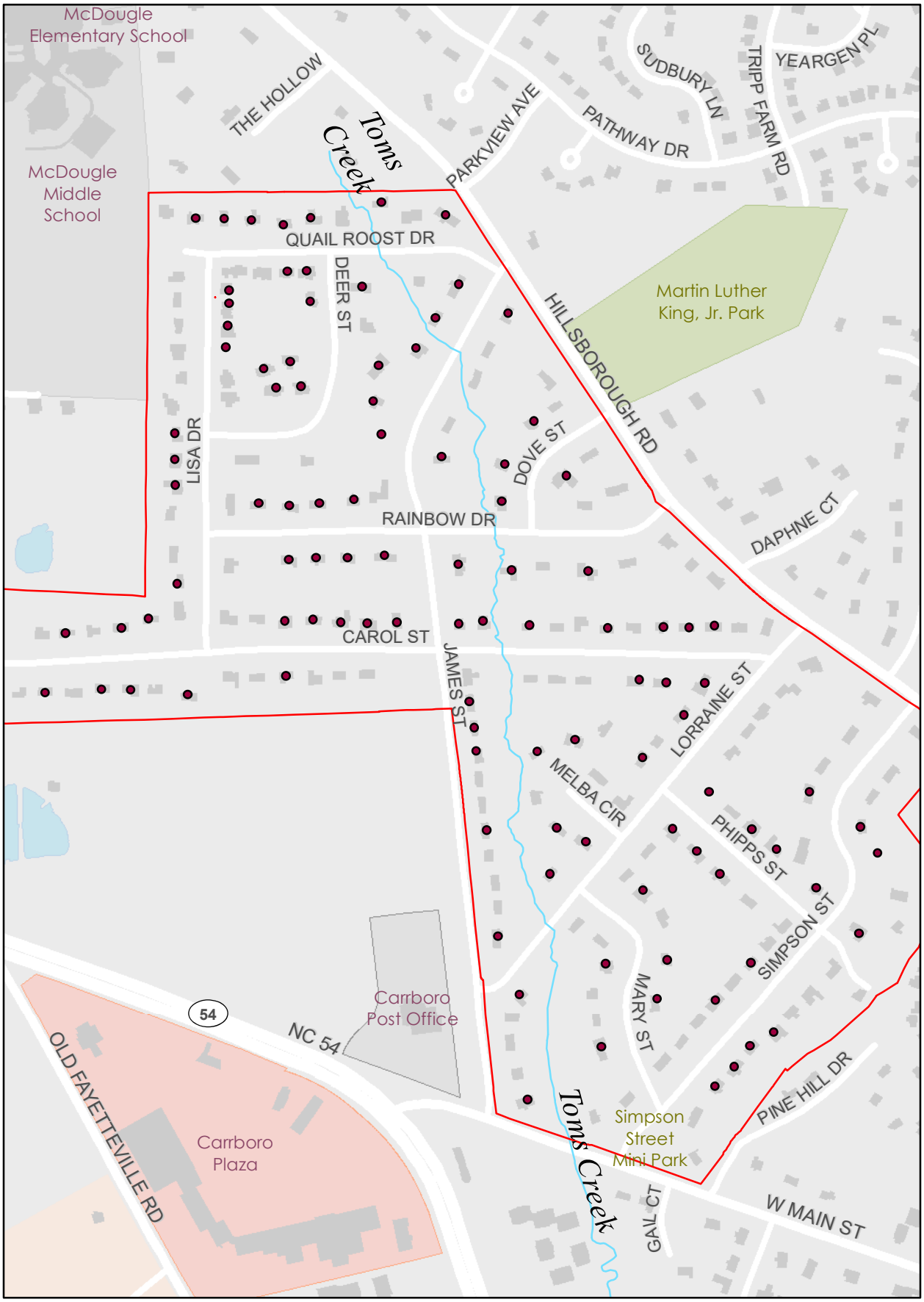
Timestamp	Printed Full Name of Property Owner	Type your Name as a Signature	Property Street Address	Mailing Address if Different	Email Address	Phone Number
9/5/2020 11:32:14	Lucy Stetson Gorham	Lucy S Gorham	100 Dove Street		Lucysgorham@gmail.com	9193572228
9/4/2020 19:59:23	Melissa and Gordon Chadwick	Melissa and Gordon Chadwick	100 James Street		gchadwick10@gmail.com	5044320651
9/14/2020 15:39:35	Erica Eisdorfer	Erica Eisdorfer	100 Mary st		Eisdorfer@unc.edu	9196368065
9/8/2020 21:26:29	Brian Wells Pence	Brian Wells Pence	100 Phipps St		bwpence@gmail.com	9199684131
9/4/2020 19:43:24	Andrew G Keeler	Andrew G Keeler	100 Quail Roost Drive		akeelerbiz@gmail.com	2525882228
9/4/2020 20:16:10	Stephanie S Phillippi	Stephanie S Phillippi	101 Dove Street		stephanie.phillippi@gmail.com	9199323369
9/11/2020 13:05:57	Megan Franks Plenge	Megan F. Plenge	101 Mary St		buticamega@gmail.com	7036063128
9/4/2020 21:09:24	Michele M. Hayslett	Michele M. Hayslett	101 Melba Circle		michele_hayslett@yahoo.com	9194526548
9/8/2020 13:19:40	Randy Skidmore	Randy Skidmore	101 Phipps St.		fluxes@gmail.com	2524744578
9/8/2020 9:11:00	Chad Jones	Chad Jones	102 Carol Street		chad.michael.jones@gmail.co	7204800708
9/5/2020 13:16:40	Lorraine Victoria Aragon	Lorraine V. Aragon	102 Mary Street		aragonalia@gmail.com	9199329638
9/19/2020 12:25:44	Margaret Doherty	Margaret Doherty	102 Phipps St		Mmdohertypa@mindspring.co	9199680272
9/12/2020 15:12:18	Diana Joy Newton	Diana Joy Newton	103 Dove Street		diana@fallingapples.com	9199519386
9/15/2020 20:10:12	Hannah Day	Hannah Day	103 Melba Circle		Hannahpday5@gmail.com	9197936630
9/15/2020 0:43:48	Brandon Michael Ayers	Brandon Ayers	103 Quail Roost Dr		bayers744@gmail.com	3364081150
9/7/2020 21:20:16	Kelly Pattison Peak	Kelly P Peak	104 Carol Street		kpeak1@curvedpath.com	9199422490
9/17/2020 19:34:58	Robert Wesley Rountree	Robert Wesley Rountree	104 Deer Street		wesrountree@gmail.com	9195225037
9/4/2020 19:50:25	Shawna Catlett	Shawna Catlett	104 Phipps Street		shawnacat@gmail.com	9193685384
9/14/2020 17:31:23	Christopher Hamon	Christopher Hamon	104 Quail Roost Drive		christopher.hamon@gmail.co	9172089037
9/4/2020 21:53:34	Karen M. Eldridge	Karen M. Eldridge	104 Simpson Street		eldridgekaren@gmail.com	9194750454
9/13/2020 23:40:28	Ingrid Fricks	Ingrid Fricks	105 Carol St	2020 Jo Mac Rd., Chapel Hi	fricksip@gmail.com	9194288360
9/13/2020 20:51:13	Rachel Holderied	Rachel Holderied	105 Phipps St		rdickey@gmail.com	9192802712
9/4/2020 20:34:04	Denise Williamson	Denise Williamson	105 Rainbow Drive		svendsgaardwilliamson@gma	9196022272
9/8/2020 9:25:14	Frances Tong	Frances Tong	105A Simpson St		FRANCES.P.TONG@GMAIL.	5105295267
9/4/2020 21:10:07	Michelle Walker	Michelle Walker	106 Carol Street		michelle.merck.walker@gmail	9194488029
9/14/2020 7:26:31	James Emery	James Emery	106 Mary Street		jemery9999@aol.com	9199667172
9/8/2020 9:24:41	Kara LaFleur	Kara LaFleur	106 Melba Circle		lafleur_kara@yahoo.com	9196052962
9/4/2020 21:18:05	Walter C. West	Walter C. West	107 Carol St.		tmwst01@gmail.com	9196198418
9/7/2020 14:12:06	Natalie Phanstiel	Natalie Phanstiel	107 Lisa Dr		Nnhoover@gmail.com	6086098378
9/5/2020 12:05:06	Kimberly Chamberlin Cudahy	Kim chamberlin	107 Mary St		Kimpaige0415@gmail.com	9196181950
9/8/2020 9:32:27	Austin Brown	Austin Brown	107 Melba Circle		abrown75@gmail.com	9199608187
9/5/2020 20:13:05	Herbert Mitchell Simpson	Herbert Mitchell Simpson	107 Phipps Street		mitchbettysimpson@gmail.co	9194286327
9/4/2020 21:01:51	David Lane Linda Lane	David Lane	107 Simpson St # 109	PO BOX 1149 CARRBORO,	drlane2020@gmail.com	9199231842
9/2/2020 11:20:30	Victor Jimenez	Victor Jimenez	109 Phipps St		victorjimeneznc@gmail.com	9196727066
9/8/2020 22:23:57	Amy Weller	Amy Weller	110 Carol St		amyweller@gmail.com	7203339948

We, the undersigned landowners of the neighborhood now known as Plantation Acres, which includes the subdivisions: Plantation Acres, Plantation Acres Extension, R.S. Lloyd Section One, R.S. Lloyd Section Two and Lloyd Square. Request the Town of Carrboro to designate this area as Barred Owl Creek

Timestamp	Printed Full Name of Property Owner	Type your Name as a Signature	Property Street Address	Mailing Address if Different	Email Address	Phone Number
9/22/2020 13:56:51	Garrett J Christian	Garrett J Christian	110 Deer Street		Garrett.Christian@gmail.com	9193023459
9/14/2020 16:28:08	Ilona Jaspers	Ilona Jaspers	111 Lisa Drive		jaspersilona2@gmail.com	9193026337
9/4/2020 22:38:41	Shannon E Jordan	Shannon Jordan	113 Simpson St		cupsofjupiter@gmail.com	9194918973
9/2/2020 11:57:34	Elyza Richmon HaLev	Elyza Richmon HaLev	114 Deer Street		elyzahalev1@gmail.com	9193580650
9/21/2020 11:45:58	Randall Juras	Randall Juras	115 Lisa Dr.		randall.juras@gmail.com	5175251441
9/15/2020 13:30:02	Timothy Carless	Timothy Carless	116 Carol Street		timcarless@gmail.com	9194488432
9/5/2020 12:16:44	Laura Linnan	Laura Linnan	118 Carol street		llinnan421@gmail.com	9199692665
9/8/2020 10:51:34	Laura Swartz	Laura T Swartz	118 Deer Street	PO Box 756, Carrboro NC 2	LauraTSwartz@gmail.com	9196127364
9/14/2020 16:07:36	Karmen Bisher	Karmen Bisher	119 Lisa Drive		karmenlea@gmail.com	2024680841
9/5/2020 19:19:16	Barbara Stenross	Barbara Stenross	120 Carol Street		stenross@gmail.com	9193685837
9/7/2020 20:51:43	Pia Bunton	Pia Bunton	122 Deer St		piab212@gmail.com	9178476915
9/5/2020 16:03:20	Patricia Mahaffee Gingrich	Patricia Mahaffee Gingrich	200 Carol St		bpging@bellsouth.net	9192709060
9/20/2020 21:07:25	zhenchun fu	Zhenchun Fu	200 James St		fzc8931124@gmail.com	9195257805
9/4/2020 20:09:50	Sarah Brendel Huppert	Sarah Brendel Huppert	200 Lisa Drive		Sarahbhuppert@gmail.com	9193603493
9/13/2020 21:25:01	Lucas Coan Paulsen	Luke Paulsen	200 Lorraine Street		lucas.paulsen@gmail.com	3363807812
9/8/2020 9:06:50	Matthew Hayes	Matthew Armstrong Hayes	200 Quail Roost Drive		matthew.hayes9@gmail.com	5173036800
9/8/2020 9:51:19	John D. Moriarty	John D. Moriarty	200 Rainbow Drive		moriarty.john77@yahoo.com	9199296918
9/2/2020 22:53:54	Marcia Cordova-Roth	Marcia Cordova-Roth	201 Rainbow Drive		marcia_roth@unc.edu	9196222729
9/4/2020 23:05:33	Samuel Joseph Tarlton	Samuel Joseph Tarlton	202 Carol Street		Jtarlton@nc.rr.com	9192700032
9/19/2020 7:51:56	james george stock	James George Stock	202 Lisa Dr		hawriverwineman@gmail.com	9199692789
9/13/2020 19:18:16	Merle Thorpe	Merle Thorpe	202 Lorraine Street		merle@vanguardpublications.	9193606704
9/15/2020 8:11:28	Jennifer Lund	Jennifer Lund	202 Quail Roost Drive		jennifer.l.lund@gmail.com	9195930893
9/7/2020 14:52:22	Lawrence Steven Solomon	Lawrence Steven Solomon	203 Quail Roost Drive		LawrenceSolomon@hotmail.c	9198697492
9/11/2020 12:29:28	James Duffy	James Duffy	204 Carol Street		phdadd@gmail.com	3109639621
9/5/2020 10:15:51	James Econopouly	James Econopouly	204 Lisa Dr		easteco1@gmail.com	19199687238
9/5/2020 15:12:09	Jonathan Oberlander	Jonathan Oberlander	204 Quail Roost Dr.		jboberlander@gmail.com	9192594364
9/5/2020 11:57:06	Erika Kristine Wise	Erika Kristine Wise	204 Simpson St		ab.and.ekw@gmail.com	9194287082
9/15/2020 12:41:11	Ida Halsted	Ida Halsted	206 Carol St		irhalsted@gmail.com	4404657472
9/5/2020 12:50:31	Ande West	Ande West	206 Lorraine St		westande@gmail.com	9199679300
9/14/2020 8:30:17	Chris Ballou Lillie	Chris Ballou Lillie	206 Quail Roost Drive		cblillie@mindspring.com	19199233706
9/14/2020 0:04:23	Angela M. Giddings	Angela M. Giddings	207 Carol St		kiurbarra@gmail.com	9193601434
9/7/2020 18:54:37	William Thelin	William Thelin	207 Quail Roost Dr		Bthelin@parion.com	9192691251
9/5/2020 9:23:02	Zona Carawan Norwood	Zona Carawan Norwood	207 Simpon Street		zonanorwood@bellsouth.net	9199423810
9/11/2020 16:44:28	Chihiro Christmas	Chihiro Christmas	208 James Street		chihiro.christmas@gmail.com	9199284628
9/15/2020 12:37:21	Brandy Aghajanian	Brandy Aghajanian	208 Quail Roost Drive		Brandy0982@gmail.com	9199436478

We, the undersigned landowners of the neighborhood now known as Plantation Acres, which includes the subdivisions: Plantation Acres, Plantation Acres Extension, R.S. Lloyd Section One, R.S. Lloyd Section Two and Lloyd Square. Request the Town of Carrboro to designate this area as Barred Owl Creek

Timestamp	Printed Full Name of Property Owner	Type your Name as a Signature	Property Street Address	Mailing Address if Different	Email Address	Phone Number
9/23/2020 19:20:55	Susan Brooks	Susan Brooks	208 Simpson St		varmintnurse@gmail.com	9199320260
9/5/2020 21:36:34	Logan A. Carter	Logan A. Carter	209 Simpson Street		Logancarter@fmrealty.com	9194184694
9/15/2020 21:42:38	Gisele Long	Gisele Long	211 Simpson St		Gisele.a.long@gmail.com	9194148261
9/5/2020 11:20:43	Julian D. Sereno	Julian D. Sereno	213 Simpson St		sereno@mindspring.com	9197405231
9/14/2020 15:03:13	Lucia Binotti	Lucia Binotti	214 James Street		lbinotti@email.unc.edu	9193601203
9/5/2020 11:48:53	Virginia Andrews	Virginia Andrews	216 James Street		34fordxz@gmail.com	9199293452
9/8/2020 10:39:00	Paula Lynn Flowers	Paula Lynn Flowers	218 James Street		plynnf@email.unc.edu	9192606071
9/5/2020 16:18:08	ALLEN E. SPALT	Allen E. Spalt	300 James St.		aspalt@att.net	9198180688
9/5/2020 12:26:42	Rebecca S Coble	Rebecca S Coble	301 Carol St		beckycoble@gmail.com	9199425515
9/6/2020 10:22:34	Cynthia Kahler	Cynthia P. Kahler	301 James St		cindykahler@nc.rr.com	9199681978
9/5/2020 15:42:34	Ruth A, Zweidinger	Ruth A, Zweidinger	301 Rainbow Dr,		ruthzw@outlook.com	9198697422
9/8/2020 9:51:24	Lisa D. Bennett	Lisa D. Bennett	302 Rainbow Dr.		LDBENN@gmail.com	9195939565
9/13/2020 23:33:14	Suzanne Valdivia	Suzanne Valdivia	303 Lisa Drive		suz.valdivia@yahoo.com	9194234292
9/15/2020 6:42:27	Aja & Eoghan Kelleher	Aja & Eoghan Kelleher	303 Rainbow Dr		aja0525@gmail.com	9193388032
9/25/2020 16:19:52	James Sanders	James Sanders	304 Carol Street		sandersjbob@gmail.com	8284060286
9/5/2020 18:04:38	Samantha Corte	Samantha Corte	304 Rainbow Drive		cortesam@gmail.com	9194281105
9/5/2020 19:33:05	Shirley Weaver Harmon	Shirley W Harmon	305 Carol St		harmonweaver41@aol.com	9199332361
9/6/2020 19:23:49	Andrea Iliadis and Christian Iliadis	Andrea Iliadis	305 Rainbow Dr.		andreailiadis@gmail.com	9196191379
9/8/2020 10:03:27	Walter Parks Gottschalk	Walter Parks Gottschalk	306 Carol Street		jvtuyl@duke.edu	9199672347
9/15/2020 18:22:04	Teri Brigham	Teri Brigham	306 Rainbow Dr		Tlsells@gmail.com	8169355300
9/5/2020 15:21:59	Norman B. Adcock	Norman B. Adcock	307 Carol St		uncchfan@msn.com	9199292041
9/8/2020 20:05:34	Jennie Toth	Jennie Toth	307 Rainbow Dr		jenniek7@yahoo.com	2522412777
9/5/2020 17:00:12	Laurie A. McDonald	Laurie A. McDonald	308 Rainbow Drive		laurie.mcdonald@fastmail.cor	9199510084
9/5/2020 14:54:09	Susan Marie Gisler	Susan Gisler	310 Carol St		sgisler@gmail.com	9193577963
9/15/2020 9:26:28	Charles J. Romeo	Charles Romeo	311 Carol Street		mr.romeo@mindspring.com	9193600172
9/8/2020 10:11:41	Philip Kosdan	Philip Kosdan	400 James St.		pwkosdan@gmail.com	9199674259
9/4/2020 20:08:20	David Alan Cottingham	David Alan Cottingham	400 Lorraine St		gratefuldave@pm.me	9192592850
9/5/2020 7:40:10	Kenneth Mills	Kenneth C. Mills	403 James St.		ken@profileinc.net	9199333500
9/5/2020 11:40:57	John Van Fleet	John Van Fleet	403 lorraine Street		vonpixelstein@Gmail.com	9199425802
9/19/2020 13:23:11	Melba F Ribeiro-Doll	Melba Ribeiro	405 James St		melbafribeiro@gmail.com	9286072082
9/8/2020 9:39:05	Jeffrey T Cobb & Celisa A Steele	Celisa Steele	407 James Street		celisa@steelcob.com	9199670686
9/8/2020 9:19:57	Christopher Raymond Egle	Christopher Egle	408 James Street		me@chrisegle.com	7155705184
9/4/2020 20:50:14	Serge Scott Drouin	Serge Scott Drouin	409 James St		ssdrouin@gmail.com	9199676661
9/4/2020 20:42:53	David Stuckey	David j Stuckey	411 James St		anoddduck@aol.com	19199677335
9/8/2020 10:30:06	Evanthia Canoutas	Evanthia Canoutas	415 James Street		ecanoutas@yahoo.com	19196995311



Area referred to as Plantation Acres

• Petition Response

Patricia J. McGuire

From: Victor Jimenez <victorjimeneznc@gmail.com>
Sent: Monday, September 28, 2020 9:51 AM
To: Patricia J. McGuire
Cc: Nicholas Herman; Jacquelyn Gist; Gordon Chadwick; Eva Canoutas; Carrie Keymel; Elyza Halev; Marcia S. Roth; David Andrews
Subject: Re: PA Neighbors - Name Change - Please Reply
Attachments: Final Petition To The Town of Carrboro to Change the Plantation Acres Name Designation To Barred Owl Creek (Responses) - Form Responses 1.pdf; Final Petition To The Town of Carrboro to Change the Plantation Acres Name Designation To Barred Owl Creek (Responses) (1).xlsx

Trish, et al

Thanks to everyone on this email for all the support and help. It means a lot to our community.

Attached you will find two versions of the Petition, 1 in Excel and 1 in PDF format.

As you can see we received 107 Signatures using an online form as we described in a previous discussion in this email chain. These are 100% digital as we did not solicit door to door because of Covid.

We believe that this is a majority of households, and shows broad support of the new name designation. We did not count US Postal, Duke Power, Harris Teeter, and Lloyd Square Homeowners Association as households.

We are requesting that the Town of Carrboro designate the neighborhood now known as Plantation Acres, (which includes the subdivisions: Plantation Acres, Plantation Acres Extension, R.S. Lloyd Section One, R.S. Lloyd Section Two, and Lloyd Square). to designate this area as **Barred Owl Creek.** We are making this request because of the possible interpreted reference of the name "Plantation" to slavery.

Please provide us with details about the board meeting as soon as you have a chance.

Very Best

Victor Jimenez

The PA Task Force
Elyza Halev
Marcia Roth
Carrie Keymel
Eva Canoutas
Gordon Chadwick
Victor Jimenez
Sergio Jimenez

On Tue, Sep 22, 2020 at 8:25 AM Patricia J. McGuire <PMcGuire@townofcarrboro.org> wrote:

Dear Victor,

That sounds fine. We'll be on the lookout for it. It looks like October 13 is the evening when the item would be included on the Town Council's agenda.

Thank you,

Trish

From: Victor Jimenez [mailto:victorjimeneznc@gmail.com]
Sent: Monday, September 21, 2020 1:41 PM
To: Patricia J. McGuire <PMcGuire@townofcarrboro.org>
Cc: Nicholas Herman <herman@broughlawfirm.com>; Jacquelyn Gist <JGist@townofcarrboro.org>; Gordon Chadwick <gchadwick10@gmail.com>; Eva Canoutas <ecanoutas@yahoo.com>; Carrie Keymel <warhorsedesign@gmail.com>; Elyza Halev <elyzahalev1@gmail.com>; Marcia S. Roth <marcia_roth@med.unc.edu>; David Andrews <dandrews@townofcarrboro.org>
Subject: Re: PA Neighbors - Name Change - Please Reply

Trish

Apologies for the delayed reply.

We will have the petition to you by next Monday the 28th at the latest. There is a good chance we will have it to you this week.

What else do you need from us to move this forward?

As for the dates? Would really like to see this happen at one of the meetings in October if that's at all possible,

Very Best

Victor Jimenez

On Thu, Sep 17, 2020 at 12:30 AM Patricia J. McGuire <PMcGuire@townofcarrboro.org> wrote:

Dear Victor, et al.,

Howdy. Hope you are all well. Just checking in on the status of the petition and whether you have an idea when you will submit it for council review. Based on items included on the calendar at present, dates that seem to have availability for the Town Council to review the petition include the following:

October 6

October 13

October 27

November 10

November 17

December 1

Thank you and please let me know if you need other information.

Trish McGuire

From: Victor Jimenez [mailto:victorjimeneznc@gmail.com]
Sent: Monday, August 31, 2020 3:31 PM
To: Nicholas Herman <herman@broughlawfirm.com>
Cc: Jacquelyn Gist <JGist@townofcarrboro.org>; Patricia J. McGuire <PMcGuire@townofcarrboro.org>; Gordon Chadwick <gchadwick10@gmail.com>; Eva Canoutas <ecanoutas@yahoo.com>; Carrie Keymel <warhorsedesign@gmail.com>; Elyza Halev <elyzahalev1@gmail.com>; Marcia S. Roth <marcia_roth@med.unc.edu>; David Andrews <dandrews@townofcarrboro.org>
Subject: Re: PA Neighbors - Name Change - Please Reply

Nick thanks so much for your quick reply.

We will proceed accordingly.

Thank you

On Mon, Aug 31, 2020 at 1:44 PM Nicholas Herman <herman@broughlawfirm.com> wrote:

> Victor:
>
> From a legal standpoint, I am okay with the name you propose and the method you are using for obtaining signatures. I believe you should proceed in accordance with your email below. Thanks.
>
> Nick Herman
>
> 1526 E. Franklin St., Suite 200
> PO Box 2388
> Chapel Hill, NC 27514
> M (919) 630-1204
> T (919) 929-3905
> F (919) 942-5742
> Email: herman@broughlawfirm.com
> gnherman@gmail.com
> Web site: broughlawfirm.com
>
> -----Original Message-----
> From: Jacquelyn Gist <JGist@townofcarrboro.org>
> Sent: Monday, August 31, 2020 7:03 AM
> To: Victor Jimenez <victorjimeneznc@gmail.com>; Patricia J. McGuire <PMcGuire@townofcarrboro.org>; Nicholas Herman <herman@broughlawfirm.com>; Gordon Chadwick <gchadwick10@gmail.com>; Eva Canoutas <ecanoutas@yahoo.com>; Carrie Keymel <warhorsedesign@gmail.com>; Elyza Halev <elyzahalev1@gmail.com>; Marcia S. Roth <marcia_roth@med.unc.edu>
> Subject: RE: PA Neighbors - Name Change - Please Reply
>
> Thank you for all the work you have done -I love the name I look forward to staff's response Best Jacquie
>
> Jacquelyn M. Gist
> Alderman
> Town of Carrboro N.C.

From: Victor Jimenez [victorjimeneznc@gmail.com]
Sent: Sunday, August 30, 2020 5:45 PM
To: Patricia J. McGuire; Nicholas Herman; Jacquelyn Gist; Gordon Chadwick; Eva Canoutas; Carrie Keymel; Elyza Halev; Marcia S. Roth
Subject: PA Neighbors - Name Change - Please Reply

Trish, Nick, Jacquie et al

Thanks, everyone for all the help.

Today (Sunday) our little hard working task force had a meeting and we decided that we would like to move forward with the petition. Before we do so, we need confirmation on a few items outlined below. Please respond before 5 pm on Monday as we are making an announcement to the neighborhood at 6pm Monday.

We have decided on a name that we would like to use for our neighborhood name that has the least amount of conflict.

The name we are planning on using is Barred Owl Woods

Our task force did research and the only close partial conflict that we found is a street name in Northern Orange county called "Barred Owl Way".

The Orange Co. Sheriff's office was called to see if they thought there would be any confusion for emergency services in responding should our neighborhood adopt this name. After speaking with two initial OC Sheriff office employees, a Sargent responded, "I don't think there'd be any issue. It's a different town, zip code, ... and therefore would be a different 911 dispatch for Carrboro than for Northern Orange County." All three OC representatives said it would be unlikely that anyone would use a neighborhood name to identify their location in an emergency. The only thing they thought of as a "place identifier" might be the name of an apartment complex. All said, we should not be causing ANY issue with using Barred Owl Creek as our neighborhood name.

The town staff did indicate that there may be potential conflict concerns.

We are going to inform the neighborhood about the new name Monday, August 31 at 6 pm and we would like one final ok from the town that there are no legal conflicts and we are able to proceed with the petition process.

On the petition process

Due to the COVID outbreak, it is going to be very difficult and potentially dangerous to physically gather signatures. We looked into using one of the e-sign platforms but that is not practical for us to use because of the nature of our contact list.

So we came up with a workaround that we feel should suffice given the circumstances. With our workaround it does not gather actual signatures, rather people just type in their details into a simple google form. It will include a timestamp as you can see in the links below.

This is the petition format that we would like to use, please use that link.

Here is a link to our online petition https://nam12.safelinks.protection.outlook.com/?url=https%3A%2F%2Fforms.gle%2FgVdWX9rw5DFgkeaS7&data=01%7C01%7Cherman%40broughlawfirm.com%7Ca96e2f94182a46bf5a6c08d84d9d6c44%7Cde61d7001b3e42fdb488857a63a69dee%7C0&sdata=Tvs70s5b008viXHkuAO2KMnJJE4Wc0us2wGJiX2p0h4%3D&reserved=0

This is a spreadsheet of how we will present the results to the staff and the council. https://nam12.safelinks.protection.outlook.com/?url=https%3A%2F%2Fwww.screencast.com%2Ft%2Fd2sgaXyr&data=01%7C01%7Cherman%40broughlawfirm.com%7Ca96e2f94182a46bf5a6c08d84d9d6c44%7Cde61d7001b3e42fdb488857a63a69dee%7C0&sdata=sc24ihQoOmbgEP%2BpYfLCIyX67fvnm8RPsNw6C%2FVegmA%3D&reserved=0

Please take a close look and let us know that this is a green light.

Very Best

Victor Jimenez

The PA Task Force
Elyza Halev
Marcia Roth
Carrie Keymel
Eva Canoutas
Gordon Chadwick
Victor Jimenez

Town of Carrboro, NC Website - http://www.townofcarrboro.org E-mail correspondence to and from this address may be subject to the North Carolina Public Records Law and may be disclosed to third parties.

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Town of Carrboro

Town Hall
301 W. Main St.
Carrboro, NC 27510

Agenda Item Abstract

File Number:20-375

Agenda Date: 10/13/2020

File Type: Agendas

In Control: Board of Aldermen

Version: 1

TITLE:
Energy and Climate Protection Plan and Community Climate Action Plan Implementation Update

PURPOSE: The purpose of this item is to update the Town Council on Energy and Climate Protection Plan and Community Climate Action Plan Implementation Efforts.

DEPARTMENT: Planning Department

CONTACT INFORMATION: Laura Janway, Environmental Sustainability Coordinator, ljanway@townofcarrboro.org, (919) 918-7342; Patricia McGuire, Planning Director, pmcguire@townofcarrboro.org, (919) 918-7327

INFORMATION: The purpose of this item is to provide the Board with an update on the implementation of two climate action plans, the municipal Energy and Climate Protection Plan (ECPP) and Community Climate Action Plan (CCAP). Work on the ECPP has been underway since the Board's adoption on May 28, 2014. (A complete copy of the ECPP can be found at: http://www.townofcarrboro.org/DocumentCenter/View/553/Energy--Climate-Protection-Plan-2014). Progress on the CCAP has been ongoing since the Board's adoption of the plan on January 24, 2017. (A complete copy of the CCAP may be found at: http://www.townofcarrboro.org/DocumentCenter/View/4116/Community-Climate-Action-Plan).

This update includes a detailed report describing ECPP and CCAP implementation since the January update (Attachment B), recommendations from the Environmental Advisory Board for the ECPP and CCAP (Attachment C), updated versions of the ECPP (Attachment D) and CCAP (Attachment E), and a report detailing the results of the Town's 2019 Community Climate Action Plan Survey (Attachment F).

FISCAL & STAFF IMPACT: There is no fiscal or staff impact related to this update.

RECOMMENDATION: Staff recommends the Town Council consider the attached resolution to receive the report and accept the updated Energy and Climate Protection Plan and Community Climate Action Plan.

A RESOLUTION RECEIVING AN UPDATE ON THE CLIMATE AND ENERGY PROTECTION PLAN AND COMMUNITY CLIMATE ACTION PLAN

WHEREAS, the Town Council has received a presentation regarding the Energy and Climate Protection Plan and the Community Climate Action Plan; and

WHEREAS, the Town of Carrboro has a number of emissions-reduction projects in process; and

WHEREAS, Town staff have requested Council input at key milestones; and

WHEREAS, staff have provided the Council with updates on particular projects at regular Intervals; and

WHEREAS, staff have updated the Energy and Climate Protection Plan and Community Climate Action Plan per Town Council's direction on January 21, 2020.

NOW, THEREFORE, BE IT RESOLVED by the Carrboro Town Council that the Council receives this update on the implementation of the Energy and Climate Protection Plan and the Community Climate Action Plan.

BE IT FURTHER RESOLVED that the Council accepts the updated Energy and Climate Protection Plan and Community Climate Action Plan.

This the 13th day of October in 2020.

TOWN OF
CARRBORO

TRANSMITTAL **Manager's Office**

DELIVERED VIA: ☐ *HAND* ☐ *MAIL* ☐ *FAX* ☒ *EMAIL*

To: **David Andrews, Town Manager**

From: **Laura Janway, Environmental Planner**
Patricia McGuire, Planning Director

Date: **October 13, 2020**

Subject: **Implementation Update: Energy and Climate Protection Plan (2014) & Community Climate Action Plan (2017)**

Summary

The purpose of this memo is to provide the Board with a progress report on implementation of the Energy and Climate Protection Plan (ECPP), adopted May 28, 2014, and the Community Climate Action Plan (CCAP), adopted January 24, 2017. The ECPP concentrates on lowering municipal greenhouse gas (GHG) emissions and the CCAP has recently been updated with an 80% reduction goal in per capita greenhouse emissions by 2030. Town staff are examining and pursuing several initiatives to reach the emissions reductions goals.

Staff have continued to implement the ECPP by addressing renovation and rehabilitation of municipal buildings and examining building performance. Staff also worked with a contractor to retrofit all fluorescent lighting in the Century Center to LED lighting through Duke Energy's incentive program. Staff are also providing guidance to a graduate student who will update the Town's municipal and community GHG inventories.

Recent CCAP implementation measures include the final reporting from the CCAP implementation survey and the completion of the FY20-21 Environmental Sustainability Work Plan to inform the climate action budget. Staff are working to design a grant program for the Green Neighborhoods Initiative and continue to hold invasive species removal volunteer events. The Town has also received a grant to restore the riparian buffer of an intermittent stream in Anderson Park. Additionally, staff are working with a volunteer from the Environmental Advisory Board (EAB) to complete a baseline food emissions profile for the Town to inform future implementation of CCAP Food Choices recommendations.

Energy and Climate Protection Plan

LED Lighting in Town Buildings

- *Policy Connections*: ECPP Section 2.B.ii: Facility Energy Efficiency

Public Works staff utilized Lime Energy Services to provide an Energy Efficiency Proposal for lighting at the Century Center through the Duke Energy Small Business Energy Saver Program.

The proposal provided a Scope of Work to retrofit all fluorescent lighting in the building to LED lighting and provided an analysis of the resulting energy and GHG emissions savings. Duke Energy offers incentives through this program, which covered 52% of the total cost of the retrofits. This summer, Public Works staff moved forward with this project using the Town Facilities Rehabilitation Funding. The project was completed in July and replaced over 300 light fixtures in the Century Center, reducing energy consumption by 32,744 kwh per year and reducing GHG emissions by 23.2 metric tons. The estimated payback for this investment will be 34-months due to increased energy efficiency and lower utility bills.

Project Summary	
Total Cost to convert to LED:	$15,371.51
Duke's Incentive:	$8,491.06
Town's Cost:	$6,880.45
Estimated Annual Cost Savings due to increased efficiency:	$2,443.03 per year
Estimated Investment Payback	34 months
Estimated Annual Greenhouse Gas Emissions Reduction	23.2 Metric Tons of CO_2 per year

Facilities Rehabilitation and Renovation

- *Policy Connections*: ECPP Section 2.B.i: Building Assessments and Ratings

Town staff are currently working to address rehabilitation of municipal buildings and will be examining building performance. Public Works staff have selected an Architectural and Engineering Firm to develop renovation plans for Carrboro's Town Hall and Century Center. The consultant is working to produce the following products:

- Task 1: Energy Analysis of Town Hall, Century Center, and Public Works buildings
- Task 2A: Documentation and Conceptual drawings for planned renovations and additions
- Task 2B: Discussion on Net Zero Buildings and potential solutions for existing buildings
- Presentation to Town staff and Town Council
- Task 3: Provide final recommended solutions to retrofit buildings to meet program requirements and energy goals
- Task 4: Provide construction drawings for specific renovations identified by Town staff

Public Works staff have organized internal meetings to discuss the progress of this initiative and have also recently worked to modify HVAC schedules in Town buildings due to new patterns of employee usage during 2020 as a result of COVID-19.

Municipal and Community Greenhouse Gas Inventories

- *Policy Connections*: ECPP Section 4 (Measurement, Inventory, Assessment, and Reporting). Pursuing these activities will inform actions and stakeholders and create transparency.

Mr. Jacob Becker, a student at UNC- Chapel Hill pursuing a Master of City and Regional Planning and a Master of Environmental Science and Engineering, will be working to update Carrboro's municipal and community greenhouse gas inventories for his Master's Project. Mr. Becker began working with the Town Environmental Sustainability Coordinator in June 2020 and will complete the project by Spring 2021. The project will have three goals:

- Explore the effectiveness of Carrboro's policies in decreasing greenhouse gas emissions from the Town's most recent municipal and community greenhouse gas inventories.
- Quantify the impact of fugitive methane on GHG inventories.
- Recommend additional policies to meet Carrboro's goal of 80% carbon reduction by 2030 compared to 2010 levels.

International Council for Local Environmental Initiatives (ICLEI) Membership

In March 2020, staff renewed the Town's membership to ICLEI. Staff are working to use tools provided by ICLEI to track ECPP and CCAP emissions reduction progress.

Climate Action Budget

In early 2020, Town staff worked to develop a climate action budget and Environmental Sustainability Work Plan for the FY20-21 fiscal year. The work plan was reviewed by the EAB in May 2020. In future years, the climate advisory board will be given the opportunity to provide input on the annual work plan.

Town Council 6/25/19 Resolution Regarding Climate Action Goals and Budget Plan

The 6/25/19 Resolution directed staff and the Environmental Advisory Board (EAB) to review the carbon reduction goals in the ECPP and CCAP and recommend changes as may be needed to achieve goals defined the Town of Carrboro's 2009 climate resolution, recognizing the latest science and historical responsibilities for climate change.

The Town Council also directed the Town Manager to charge staff to work with the EAB to identify substitutions to or additional activities or projects and their estimated CO_2 reductions.

The updated carbon reduction goals and project recommendations were presented to the Town Council in January 2020 (Attachment C) and were incorporated into the ECPP and CCAP (Attachments D and E). Pending the Town Council's discussion and directions, the EAB's recommendation regarding the Bolin Creek Greenway was not included in the updated plans.

Community Integration

Climate Advisory Board

- *Policy Connections:* CCAP Community Integration Recommendation #5: Expand Capacity

Town staff are working to draft the Town Code Amendment to create a climate advisory board using the proposal presented to the Town Council on September 8, 2020. The Environmental Advisory Board held a Special Meeting on October 8, 2020 to finalize recommendations for integrating the climate advisory board's work into the FY20-21 Environmental Sustainability Work Plan. This Town Code Amendment will be presented to the Town Council in Fall 2020.

Green Neighborhoods Initiative

- *Policy Connections:* CCAP Community Integration Recommendation #3: Create Participatory Green Neighborhood Budgeting Program to Reduce Carbon Emissions, Build Community, Save Money, and Reallocate Savings to New Green Project Initiatives

In late 2019, staff began to hold the first Green Neighborhoods Outreach Meetings. These meetings were paused due to COVID-19 precautions. Staff are pursuing the possibilities of holding virtual meetings and are also working to design a Green Neighborhoods grant program as outlined in the FY20-21 Environmental Sustainability Work Plan, which will provide financial assistance to neighborhoods to complete projects which reduce greenhouse gas emissions or contribute to ecosystem resiliency. CCAP Community Integration Recommendation #5 recommends pursuing a community grant program in order to expand the Town's capacity to pursue sustainability initiatives. Town staff plan to incorporate opportunities to apply for two specific pilot programs, the every-other-week garbage collection pilot program and a multifamily composting pilot program. Staff are working to present the program to the Town Council in late 2020.

Modules Project

- *Policy Connections:* CCAP Community Integration Recommendation #5: Expand Capacity

The Community Climate Action Plan Modules Project is a community-driven outreach initiative aimed to educate and engage Carrboro residents in climate action. The initiative involves designing materials for Carrboro residents to educate others about specific climate action topics. The materials will be organized into modules, which will act as templates for residents to customize for presentations or demonstrations. Staff are currently working to implement the project as directed by the Town Council at the June 9, 2020 meeting.

Orange County Climate Council

- *Policy Connections:* CCAP Community Integration Recommendation #2: Community Integration Recommendation #2: Expand Public Partnerships to More Explicitly Consider Climate Action.

The Town Environmental Sustainability Coordinator, Town Council Member Sammy Slade, and

Carrboro at-large representative Kathy Kaufman have attended monthly virtual meetings of the Orange County Climate Council throughout 2020. The Council is currently working to finalize plans for a virtual public event on October 22 at 7:00 pm. At the event, Council members will introduce themselves to the public and present subcommittee work on a climate action reporting database, communication, and climate policy. There will also be a question and answer session for the public.

Building Energy Efficiency Measures

Energy Efficiency Revolving Loan Fund (EERLF)

- *Policy Connections:* Buildings Recommendation #1, #2: Reduce Emissions Attributed to Carrboro Buildings by 50% by 2025; Energy Audit/Performance Rating; Community Integration Recommendation #4, #6: Integrate Climate Action with Local Living Economy; Facilitate Low Cost Financing for Energy Efficiency and Renewable Energy Projects

Town staff are currently working to discuss how this program can be utilized moving forward as outlined in the FY20-21 Environmental Sustainability Work Plan.

Transportation

Volkswagen (VW) Settlement Phase 1 – Diesel and Bus Program

- *Policy Connections*: ECPP Goals; CCAP Transportation Recommendation #1: Reduce Greenhouse Gas Emissions from Motor Vehicle Use by 50% by 2025.

In September 2019, Town staff submitted a proposal for two newer, more-efficient diesel refuse trucks and two compressed natural gas vehicles as part of a pilot project with Orange Water and Sewer Authority (OWASA) for a potential biogas-to-fuel project. In July 2020, staff were notified that the Town was not chosen as a recipient for funding in Phase 1. Staff will discuss the possibility of applying for funds during Phase 2 of this program and will also examine other funding opportunities to reduce emissions from the municipal fleet.

Transportation Demand Management (TDM) Grant

- *Policy Connections:* CCAP Transportation Recommendation #4: Further Promote Walking, Biking, Transit

The Center for Advanced Hindsight partnered with the Town to submit a proposal to the Triangle J Council of Governments (TJCOG) Transportation Demand Management (TDM) Program to design welcome packets for Carrboro residents outlining alternative transportation options to reduce single-occupant vehicle (SOV) trips.

In May 2020, Town staff were notified of the proposal's status by the Center for Advanced Hindsight. The proposal's funding request was approved, however, the TDM funding is currently

not available due to the NC Department of Transportation's need to reconsider funding allocations due to the impacts of COVID-19. The Center for Advanced Hindsight will notify staff when more information is available and whether the funding will be available this year.

Land Use Ordinance Amendments –Electric Vehicle (EV) Charging Stations

- *Policy Connections:* Reduce GHG Emissions from Motor Vehicle Use by 50% by 2025.

Staff are currently working to draft amendments to the Land Use Ordinance to incorporate the EV charging station requirements for parking lots proposed by the EAB. These amendments were included in the January 2020 ECPP and CCAP Implementation Update presented to the Town Council. Staff will work to bring the draft amendments to the Town Council for approval.

Ecosystem Protection and Enhancement

NC Urban Forest Council Grant

- *Policy Connections:* Ecosystem Recommendation #4: Tree Preservation, Protection and Conservation; Ecosystem Recommendation #6: Pursue Watershed Restoration Actions to Protect Local Streams from Changes in Rainfall Due to Climate Change

In May 2020, Town staff applied for a grant from the North Carolina Urban Forest Council Legacy Tree Fund to plant trees and restore the riparian buffer of an intermittent stream in Anderson Park. In August, staff were notified that the NC Urban Forest Council had chosen to fund the project. Through this project, the Town will host volunteer events to plant trees as part of a larger-scale project to create pollinator habitat, improve water quality, install stormwater control measures, and provide education and outreach to Carrboro residents.

Restoring the riparian buffer on the stream will create habitat for pollinators and other wildlife. The Town plans to increase the tree canopy and fulfill Bee City USA commitments using trees planted with this funding.

This project will also address stormwater concerns in Carrboro. Trees along the intermittent stream will slow overland flow and improve infiltration, which will help reduce flooding downstream. The Town also plans to expand this project by incorporating additional stormwater control measures, including a dissipation pad and to slow the flow of storm runoff. The stream within the project area falls within the University Lake watershed. University Lake is one of the primary water supplies for Carrboro residents. Restoring the riparian buffer will filter pollutants and nutrients entering the lake and reduce water treatment needs.

By sequestering carbon and restoring the stream's riparian buffer, the trees planted with this funding will help Carrboro reach the climate action and ecosystem protection goals outlined in the CCAP to conserve trees, increase the Town's tree canopy, and pursue restoration projects along local streams from changes in rainfall due to climate change.

Public education and outreach about the benefits of trees and their role in providing ecosystem services will be a significant focus of the project. The site will contain interactive outreach stations and opportunities for Carrboro residents to collect data as citizen scientists. Staff will create informative signs to describe the benefits of trees and the ecosystem services they provide. Signs will discuss topics including water quality buffers and pollinators. Staff also plan for the outreach to include an interactive element involving citizen science and photographs.

Bee City USA

In March 2020, Town staff worked to finalize the Town's annual accomplishment report for 2019 and renew the Town's participation in the initiative for 2020. In June 2020, Town staff organized a free virtual screening of the film, *The Flight of the Butterflies* to celebrate National Pollinator Week.

Invasive Species Volunteer Events

- *Policy Connections:* Ecosystem Recommendation #5: Improve Regulations and Community Capacity to Discourage Invasive Plants and Encourage Native Plants

To continue this projects momentum, the Town Environmental Sustainability Coordinator worked to coordinate a large invasive species removal volunteer event in Wilson Park in February 2020. These events were temporarily halted in March due to COVID-19 precautions. In June, Town staff began to work with small, socially-distanced groups in the Adams Tract in Wilson Park to continue removing invasive species while following COVID-19 precautions. Staff have continued to supervise these small meet-ups once month since June and hope to continue through the fall.

Composting Bin Sales

- *Policy Connections:* Ecosystem Recommendation #3: Accelerate/Expand Organic Waste
- Collection/Composting

Town staff are working to launch sales of composting bins. Carrboro residents will be able to purchase compost bins by mailing an order form and check to Town Hall and staff will provide contactless bin delivery. Staff will work to provide additional purchasing options, including in-person purchasing, when COVID-19 precautions no longer need to be in place.

Managed Natural Landscape Ordinance

- *Policy Connections:* Ecosystem Recommendation #5: Improve Regulations and Community Capacity to Discourage Invasive Plants and Encourage Native Plants

Town staff are currently working on continued revisions on a draft of amendments to the Town Code to allow for managed natural landscapes. Managed natural landscapes offer critical wildlife habitat, result in decreased use of petroleum-based fertilizers and pesticides, more effectively capture stormwater runoff, and reduce the heat island effect. The draft will be presented to the

Town Council in Fall 2020.

Food Choice Measures

CCAP Survey

- *Policy Connections:* CCAP Food Choice Recommendation #2: Develop Local Dietary Consumption and Associated GHG Profile

During Fall 2019, a research team worked to interview 400 Carrboro residents over age 18 for the Town's first CCAP Survey. The research team analyzed the data and provided results to the Town in March 2020. The final report, including cross-tabulated data, is provided as Attachment F.

Build Dietary Greenhouse Gas (GHG) Emissions Profile

- *Policy Connections:* CCAP Food Choice Recommendation #2: Develop Local Dietary Consumption and Associated GHG Profile

The Town Environmental Sustainability Coordinator is working with Ms. Chrissie Schalkoff, a Doctoral Student at UNC Gillings School of Global Public Health and member of the EAB, to build the Town's dietary GHG emissions profile using data from the CCAP survey.

This profile will allow the Town to begin benchmarking and tracking progress towards emissions-reduction goals. The Environmental Sustainability Coordinator and Ms. Schalkoff are also working to develop outreach material to educate Carrboro residents about dietary choices and related GHG emissions. The educational material will compare the emissions from consumption of different types of food and will provide residents with specific, measureable ways to reduce personal dietary emissions by consuming different food types or selecting organic or local foods.

After completing the profile, staff will move forward with guidance from the FY20-21 Environmental Sustainability Work Plan to hold events to promote plant-based food choices in Carrboro and hire an intern to support the Environmental Sustainability Coordinator with management of the Green Neighborhoods Program and assist with the organization, coordination, and promotion of the food choices events and outreach program

EAB Recommendations for Community Climate Action Plan

Community Integration			
Task ID	**CCAP Recommendation**	**EAB Recommendations for Additional Activities or Projects**	**Staff Comments**
CI1	Create Grassroots Partnerships to Engage Community	Web-based modules to raise awareness of climate action	
CI2	Expand Public Partnerships to More Explicitly Consider Climate Action	Designate a climate action chamption on each advisory board.	
		Request that the League of Municipalities facilitate notifications related to climate and ecological protection and to request local (to places that will be affected by the policy) public hearings.	
		Possibly in cooperation with other municipalities, seek outside legal advice as needed to resolve questions of state and municipal authority. Pursue exploration of the meaning/opportunity of Carrboro not having a franchise agreement with Duke Energy.	
CI3	Create Green Neighborhood Program	Hold community organizer trainings	
CI5	Expand Capacity for Sustainability Initiatives	Create Climate Advisory Board	
		Add additional sustainability staff	
CI6	Facilitate Low Cost Financing for Energy Efficiency and Renewable Energy Projects	Use the recently-approved tax increase in OC to increase energy efficiency in low-income housing.	
CI7	Integrate Climate Action and Social/Equity Initiatives	Reach out to refugees, work with El Centro	Town staff has been in contact with representatives working with the refugee community and El Centro regarding the Green Neighborhood Initiative and will continue outreach as this initiative and others are implemented

Building Energy Efficiency Measures			
Task ID	**CCAP Recommendation**	**EAB Recommendations for Additional Activities or Projects**	**Staff Comments**
BE1	80% Challenge	Incentivize lower energy use in buildings by framing actions using economic reasoning.	
		Perform an inventory of municipally-owned buildings for energy efficiency improvements	Staff have drafted a Request for Qualifications to select an Architectural and Engineering Firm for consulting services for developing renovation plans for Town Hall and the Century Center. The consultant will provide energy analyses of the buildings and will provide recommended solutions and drawings to retrofit existing buildings to achieve energy sustainability goals.
		Dedicate a yearly budget amount to implement energy-efficiency projects.	
		Pursue solar projects on Town buildings, including solar leasing; dedicate enough funding for these projects	Staff have held discussions with a solar leasing company and are working to evaluate this proposal against other options.
		Create energy efficiency templates/toolkits for residents	
		Renewable portfolio standards - purchasing RECs	Analysis underway as to how purchasing RECs or increasing the Town's contribution to NC Green Power may benefit the Town.
		Create a set of guidelines for residents to lead a lifestyling involving owning less and sharing more	
		Promote the use of radiant heating and solar-heated water tanks in building design.	
		Citizen groups and regional governments should use whatever resources they could to agitate for modification of the "third party sale rules" that hinder many options for quick adoption of solar and removing existing impediments, such as thrid party sales prohibition, to implementing solar.	
		Pursue the reinstatement of state solar tax credits. Local inducements such as local tax credits, low-interest financing through town-issued bonds could also be pursued.	
		Promote the use of USDA rural loans	

Building Energy Efficiency Measures			
Task ID	**CCAP Recommendation**	**EAB Recommendations for Additional Activities or Projects**	**Staff Comments**
BE2	Energy Audit/Performance Rating	Perform energy audits on Town buildings	This is an existing recommendation in the CCAP.
		For existing buildings, perform energy audits at the point of sale or lease.	This is an existing recommendation in the CCAP.
BE3	Demonstrate/Pursue Energy Performance Beyond Minimum Requirements for New Development	Create a rewards program to recognize green builders.	
		Negotiate with developers, e.g. density bonus	
BE4	Create Rental Property Task Force and Process	EAB Comment: The Town could immediately move forward with this recommendation.	The Town has partnered on previous funding requests to address this Recommendation. While this grant was not funded, the Town will continue to pursue grant opportunities.
		Engage with the Town attorney to see what the Town could legally require of landlords.	
BE5	Create Rental Property Registry/Certification	EAB Comment: The Town could immediately move forward with this recommendation.	
Transportation Measures			
Task ID	**CCAP Recommendation**	**EAB Recommendations for Additional Activities or Projects**	**Staff Comments**
TM1	80% Challenge	Strategic placement of EV charging stations combined with increased advertisement of locations	
		Require EV charging stations and infrastructure in new developments in the LUO	
		Incorporate solar panels to power EV charging stations	
		Use B100 biodiesel for half the year in Town vehicles (when the temperatures are above freezing)	
		Rental scooters and bikes	Staff is currently working to explore possibilities for a pilot bike share program.
		Incentivize EV cars wtih priority spaces at popular destinations.	
		Promote catching the school bus	
		Solarize fleet	
		Continute discussing Bolin Creek Greenway.	
TM2	Enhance Transit Service	Extending transit service - routes that run into RTP and Durham aren't being fully utilized.	

Transportation Measures			
Task ID	**CCAP Recommendation**	**EAB Recommendations for Additional Activities or Projects**	**Staff Comments**
TM4	Further Promote Walking, Biking, Transit	Apply for funding from the Triangle Transportation Demand Management (TDM) Program	Staff have partnered with the Center for Advanced Hindsight on a proposal for the TDM program.
		Work with Chapel Hill to pursue a redistribution of TDM funding	
		Have a staff member work more on TDM	
		Find a way to integrate more schools in the Safe Routes to Schools Grant through the Chapel Hill-Carrboro City Schools (CHCCS) - include non-infrastructure projects and middle- and high-schools.	
TM6	Improve Bicycle and Pedestrian Infrastructure	Apply for Platinum status through the League of American Cyclists' Bicycle Friendly Communities program	
		Pursue infrastructure-based projects to reduce greenhouse gas emissions and traffic (e.g. roundabouts)	
Renewable Energy Measures			
Task ID	**CCAP Recommendation**	**EAB Recommendations for Additional Activities or Projects**	**Staff Comments**
RE1	Pursue Community Solar Projects	Work with a non-profit to become a community champion	
		Form a utility	
		Solar project on Eubanks Rd landfill	
		Create a microgrid under Duke Power	
		Pursue creative financing arrangements (solar leasing, third-party solar, PACE, on-bill financing)	
		Pursue solar projects in areas beyond solely Town buildings.	
RE2	Pursue Downtown Geothermal Heating and Cooling	Use Orange County as an example	
		Pursue geothermal for 203 Project	Staff will ask architects to evaluate in conjunction with updated project designs.

Ecosystem Protection & Enhancement			
Task ID	**CCAP Recommendation**	**EAB Recommendations for Additional Activities or Projects**	**Staff Comments**
ES1	Pursue Stormwater Utility	Implement changes in ordinances related to stormwater management to require developers to absorb the cost of increased stormwater requirements	
ES2	Evaluate Extent to Which the Deer Population and Climate Change affect Native Plant Ecosystems	Partner with a local university for research on impacts of deer population to forest health/invasive species. To start, reach out unversities/botanical gardens to see if anyone is currently researching question.	
		Create an ordinance against feeding deer	Feeding deer is prohibited by the Town Code.
ES3	Accelerate/Expand Organic Waste Collection/Composting	Set up an educational demonstration on Town property to hold monthly events	Staff are currently discussing this possibility.
		Explore composting at multifamily residences (e.g. contracting with Brooks)	Staff are currently discussing this possibility.
		Set up model composting sites/yard waste management sites	
ES4	Tree Preservation, Protection, and Conservation	The Town should set specific standards for arborists in analyzing impacts to trees and determining tree health.	
		Create a public-private partnership for planting canopy trees on the edges of properties.	
		Analyze carbon capture on development sites.	
		Add additional environmental review requirements for developers to the Town's LUO, including tools such as the NHP Data Explorer and the Green Growth Toolbox	
		Ensure environmental reviews are considered early on in the development process	
		Perform outreach to environmental policy experts to see what Carrboro can do with broad land-use planning and Zoning, such as creating a Conservation overlay	
		Require EAB to use tools such as the NHP data explorer, national wetland inventory, DEQ environmental justice tool, and green growth toolbox before making recommendations.	
		Identify the amount of carbon capture that Carrboro is responsible for (per capita) and how to conserve such forests (OWASA, rural buffer, Bolin forest)	

Ecosystem Protection & Enhancement			
Task ID	**CCAP Recommendation**	**EAB Recommendations for Additional Activities or Projects**	**Staff Comments**
ES4	Tree Preservation, Protection, and Conservation	Expand right-of-ways to include tree protection	
		Work with Orange County to exchange land in the Rural Buffer to protect properties with high ecological value, such as properties along Eubanks Road.	
	Create New Biodiversity Recommendations	Develop a biodiversity protection plan to go along with CCAP, using local resources such as the Natural Heritage program and retired professors	
		Create thresholds for biodiversity and carbon capture in developments	
ES5	Improve Regulations and Community Capacity to Discourage Invasive Plants and Encourage Native Plants	Provide education and resources about invasives and native plants by adding features on native plants to the Town website or creating informational brochures.	
		Educate Town staff about treating invasive species on Town properties	
		Initiatate a Climate Friendly Habitat Program and promote New Hope Audubon Society's Bird Friendly Habitats Certification Program	
		Create awareness campaign to encourage residents to leave leaves on the ground in their yard.	
		Observe Earth Day with large event.	
Food Choice Recommendations			
Task ID	**CCAP Recommendation**	**EAB Recommendations for Additional Activities or Projects**	**Staff Comments**
DM1	50% Challenge	Use behavioral information about motivations for food choices to encourage residents to choose plant-based options, e.g. menu placement	
		Work with local restaurants to promote plant-based meals and promote ideas such as Meatless Mondays.	
DM2	Develop Local Dietary Consumption and Associated GHG Profile	Purchase local sales data and grocery store loyalty data	Staff are exploring costs and available data.

EAB Recommendations for Items not Listed in Community Climate Action Plan

	CCAP Recommendation	EAB Recommendations for Additional Activities or Projects	Staff Comments
	New Section	**EAB Recommendations**	
	Environmental Justice	Add section regarding environmental justice and climate equity to CCAP	
		Community-based participatory research and participatory democracy concepts should be considered when deciding how best to work with community members to achieve goals	
		Utilize mapping tools and other resources.	
		In conjunction with the policies and procedures analyzed using racial equity toolkits through the GARE initiative, utilize racial equity impact assessments	
		Implement proactive procedures for outreach to ensure climate justice	
		Hold meetings in neighborhoods outside of Town Hall	Staff are currently working to plan Green Neighborhood Initiative Outreach Events in locations throughout the Town.
	Carbon Offsets	The Town should have a metric to determine how analyze what to prioritize in terms of buying carbon offsets - it is important to know more specifics about the projects and their efficiency.	
	Research	Protect climate action research	

EAB Recommendations for Energy and Climate Protection Plan

	ECPP Section	EAB Recommendations for Additional Activities or Projects	Staff Comments
Municipal Operations	LED Outdoor Lighting	The Town should inform residents of the possibility of removing streetlights from their neighborhood. This should include an educational component about actual relation of streetlights and safety.	
	Building Assesments and Ratings	Complete energy assessments in Century Center and Town Hall as well as all Town buildings.	
		Investigate the possibility of using non-profits such as Waste Reduction Partners to perform energy audits for free	
		Create implementation plans for energy-efficiency upgrades to Town buildings	
		Execute implementation plans for energy-efficiency upgrades to Town buildings	
		Look at the buildings as a system to ensure all upgrades are performed comprehensively.	

EAB Recommendations for Energy and Climate Protection Plan

	ECPP Section	EAB Recommendations for Additional Activities or Projects	Staff Comments
Municipal Operations	Facility Energy Efficiency	Solarize all municipal buildings.	
	Fleet Replacement & Efficiency		
		Convert all municipal cars to electric vehicles and power vehicles using solar panels on buildings.	
		Convert trucks and larger vehicles when appropriate models are available.	
		Investigate bulk purchasing of electric vehicles.	
		All EV charging stations should be solar-powered.	
		Consider using biogas to fuel vehicles that are not electric (Public Works).	
		Self-imposed internal cap and dividend for Town Departments to incentivize purchasing electric vehicles.	
Municipal Support of Community Sector	Transportation	Ask the Town Council to generate a letter to the State regarding placement of DC Fast Charge EV Charging Stations along travel corridors.	
		Work with Chapel Hill Transit to increase bus service overall, especially on Sundays.	
		Revive trolley service.	
		Leverage Transportation Demand Management Funding.	
	Buildings	Create a program that helps landlords and homeowners perform energy-efficiency upgrades. Host workshops to provide information.	
		Create a Green Home Program using the structure and funding example provided by Babylon, NY.	
	Renewable Portfolio	Solarize the bus fleet.	
	Other	Make it easier for employees to live in Town.	
		Look at trends over time for locations of employee residences.	
		Hold focus groups and perform qualitative interviews with Town employees to understand barriers to living in Town.	
		Provide stipend or livable salary for employees to live in Carrboro to reduce commutes among other things.	
		Town negotiate lower pricing for municipal purchases or leases for transportation options (such as electric vehicles or electric assist bicycles) for employees.	
		Expand sustainable living opportunities for employees	
		Develop a stormwater chapter in the Climate Change: Vulnerability and Adaptation section of the ECPP.	

TOWN OF CARRBORO
NORTH CAROLINA

ENERGY AND CLIMATE PROTECTION PLAN

May 28, 2014

Updated October 13, 2020

BOARD OF ALDERMEN
LYDIA LAVELLE, MAYOR
BETHANY CHANEY, ALDERMAN
JACQUELYN GIST, ALDERMAN
RANDEE HAVEN-O'DONNELL, ALDERMAN
MICHELLE JOHNSON, ALDERMAN
DAMON SEILS, ALDERMAN
SAMMY SLADE, ALDERMAN

TOWN MANAGER
DAVID ANDREWS

DEPARTMENT HEADS
ANITA JONES-MCNAIR, RECREATION & PARKS
ANNETTE STONE, ECONOMIC AND COMMUNITY DEVELOPMENT
CAROL DORSEY, HUMAN RESOURCES
CATHY WILSON, TOWN CLERK
GEORGE SEIZ, PUBLIC WORKS
PATRICIA MCGUIRE, PLANNING
TRAVIS CRABTREE, FIRE AND RESCUE
WALTER HORTON, POLICE

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Executive Summary

This Energy and Climate Protection Plan has been developed as a step in supporting the Town in reducing greenhouse gas emissions, becoming more energy efficient and generating more renewable energy. The plan focuses on identifying opportunities, best practices, and planning through budgeting and the Capital Improvement Program. ~~It has been~~ It was originally created with a near term focus, with a goal of approximately 5-10% reduction in municipal energy use in FY 14/15-FY 15/16. The long-term goal of this plan is an 80% reduction in 2010 municipal greenhouse gas emissions by 2030. (UPDATED 10-13-20)

The Town is committed to energy sustainability, using the following approaches:

a. The Town will use this plan as an initial means of articulating:
    i. Specific near term goals and actions to demonstrate the Town's commitment to responsible energy management and greenhouse gas reductions.
    ii. Accountability and resources for implementation
b. The Town will plan to refine this plan in the future to guide:
    i. Longer term measurable and achievable goals and timelines
    ii. Additional efforts to measure, inventory, assess, and report on progress
    iii. Additional identification of energy conservation opportunities, concept development of projects and process changes, and prioritization of improvement efforts
    iv. Funding and staff resources to define, develop, and execute projects and process improvements
    v. Reviews of conservation efforts and regular updates to the Plan.
    vi. Efforts to reach out to the community to identify and pursue community scale efforts for greenhouse gas emissions reduction, increased energy efficiency and renewable energy generation.

The Town has created this plan to address energy use primarily for municipal operations but also to recognize municipal support for the community sector. Key elements of the plan for Town operations include:

- For outdoor lighting, pursuing retrofits with LED lights
- For buildings:
    - Complete energy assessments at Century Center and Town Hall
    - Retrofitting lights and installing controls and sensors to reduce electricity demand.
    - Replacing older, inefficient heat pumps and appliances with Energy Star rated units prior to their failure.
- For the municipal fleet:
    - Pursue grant funding for a solid waste vehicle
    - Increased foot patrols/reduced vehicle idling
    - Supplementary battery systems.
    - Continued downsizing/rightsizing of vehicles
    - Potentially converting some vehicles to liquid propane (LP) gas (or another alternative fuel)

- Supporting practices that reduce the net consumption of fossil fuels, and increase the use of more sustainable energy sources.
- For public facilities and right-of-ways:
    - Inventory trees and develop and implement tree plans

For the Town's support of the community sector, the following recommendations are presented:

- Community Buildings
    - Explore and pursue opportunities for community outreach
    - Continue the Energy Efficiency Revolving Loan Fund for businesses
- Community Transportation
    - Commit local matching funds for greenways
    - Support Safe Routes to School Implementation Committee
    - Plan for increased transit service connections; car and bike sharing; walkability; carpooling and other TDM strategies
    - Consider GHG emissions in efforts such as parking and long-range transportation plans
- Expand upon efforts to promote renewable energy
    - Identify municipal host sites
    - Pursue outreach to identify investors
    - Continue to support Solarize Carrboro
- Urban forestry
    - Complete tree canopy analysis, and resource assessments and develop a community forestry master plan
- Continue collaboration with Orange Water and Sewer Authority, Orange County, Chapel Hill Transit and others.

In addition to presenting these recommendations for actions for the Town to pursue in the next 1-2 years, this plan includes a section on climate change adaptation and appendices with additional contextual information.

1. Background and Context

This Energy and Climate Protection Plan is premised on reducing greenhouse gas emissions, becoming more energy efficient and generating more renewable energy. It recognizes the profound and unprecedented global reality of a changing climate and imperative for a healthier relationship with planetary cycles. This is the biocentric or ecocentric, life-affirming perspective. While pursuing this plan will reduce greenhouse gas emissions and environmental impacts, it is also motivated by significant anthropocentric (human) needs for strong local economies, resilience, human health, and societal benefits. Examples of relevant human needs include:

- Lower transportation and building operating costs
- Better environmental quality and a more livable, healthier community
- Insulation against future price hikes
- Retention of local dollars
- Energy independence

Vision & Guiding Principles

A premise of this plan is that the Town of Carrboro strives toward responsible energy management and climate protection in its policies and operations, and aims to demonstrate leadership to the community by the following guiding principles:

- Engaging and educating employees and the community about the challenges climate change presents and driving a collaborative process to implement innovative solutions.
- Promoting inter-departmental collaboration for short and long-term solutions to enhance the Town's organizational excellence and financial efficiency.
- Modeling responsible energy management through efforts in energy efficiency and renewable energy generation.
- Addressing climate change through strategic management of our Town facilities, transportation resources, infrastructure, and land use planning.
- Supporting continued development of a diverse, vibrant, local green economy.
- Measuring, monitoring and communicating the Town's progress toward a defined goal set.
- Partnering and collaborating with other public, private, and nonprofit organizations in harmony with these principles.

Can we meet the needs of the present without compromising the ability of future generations to meet their own needs?

The "Triple Bottom Line" balances environmental stewardship, economic growth and social responsibility.

from Asheville Sustainability Management Plan

While this plan is a report to and for the community, its focus is on the municipal operations that the Town administers. This is the sector where the Town has the most responsibility and control. Given that climate protection, energy efficiency and generation, local living economies and many other community interests cannot be fully pursued within a limited jurisdictional and administrative context, this plan should also be considered within a larger context. Local government operations occur within the larger community scale and regional/state/national/global context. Values such as job creation, greater energy security and influence over energy choices, enhanced potential for public-private partnerships, and increased livability, while not being the focus of discussion in this plan, are important drivers and components for the long term success of the plan. Collaboration with a variety of public and private partners will continue to be extremely important in pursuing the goals of climate protection and energy planning, and requires foresight and initiative at many levels. It is beyond the scope of this plan to attempt to fully articulate the details of this larger collaboration; this plan is intentionally focused on Town operations.

Planning Focus: Local Government

The U.S. Department of Energy has developed a "Guide to Community Strategic Energy Planning" that identifies two types of planning efforts: one focusing on the government operations and one focusing on the community at large. The former: includes a focus on government buildings, facilities, infrastructure, operations, and transportation; concentrates on activities for which the government has direct influence – personnel, operations, planning, and budgeting – which means tighter control over implementation. The latter (community-wide plan) is a broader plan to also include activities for the entire community that: expands the focus to include energy saving activities across the jurisdiction (residential, commercial, industrial, transportation, and other sectors) of the broader community; recognizes that, while local government actions can greatly influence, energize, and leverage effective activities in the broader community, the government has less direct control over these activities in comparison to a government-only plan. This plan focuses on the former (Local Government Operations), and also attempts to make some progress on the latter (Community Energy Activities).

Building on Past Efforts

This plan is the next step in over a decade of consideration of climate protection and energy planning in Carrboro. The Town has been involved in activities associated with inventorying greenhouse gas emissions and planning for and pursuing emissions reductions since 2001, when the Board of Aldermen adopted a resolution pledging the Town's commitment to reduce greenhouse gas emissions, improve air

quality and save energy through joining the Cities for Climate Protection (CCP) program. The Town participated with other local governments and ICLEI – Local Governments for Sustainability (an international association of local and regional governments dedicated to sustainable development) to develop a Greenhouse Gas Emissions Inventory for Orange County. Additionally, the Town is a signatory to the U.S. Conference of Mayors' "Mayors' Climate Protection Agreement" (see Appendix V for more information). Participating cities in the Agreement serve as conduits to spur local and state action in order to reduce global warming. In the Vision 2020 document, the Town adopted "sustainable" and "green" goals, objectives, and action items, ranging from sustainable land use patterns to reduced energy consumption.

In 2009, the Board of Aldermen passed a resolution resolving that the Board "will seek, and will facilitate the community at large, to cut CO2 emissions by its proportion of the amount which is required to stabilize the climate back to <350 ppm of CO_2 …", and asks staff to evaluate how to achieve this target for municipal operations and the community. This plan is a step towards pursuing this charge, while recognizing it is more responsive for municipal operations than for the community at large.

Also in 2009 Carrboro joined 33 other communities in achieving the NC League of Municipalities Green Challenge "Advanced" level. In 2011 A UNC Capstone Team partnered with the Town to complete a Greenhouse Gas Emissions Inventory focusing on Carrboro. In April 2012, a detailed municipal emissions inventory using local data was completed, with a recommendation that the Town "investigate the financial costs of implementing a GHG reduction policy across all Town operations with a goal of reducing emissions 2% of 2007 levels annually through at least 2025. If the costs are found to be acceptable, then it is recommended that the Town implement the policy in order to further the Town's stated goals of environmental stewardship and "leading by example"". This inventory was updated in the spring of 2013, with the Board requesting at its June 18th, 2013 meeting that staff also look into the implications of a 7% annual reduction in emissions. At its October 8th, 2013 meeting, the Board reviewed staff efforts to initiate this plan, and provided the direction to prepare this plan. Additional details regarding past efforts, the science and global context of climate change and protection are provided in sections and appendices of this plan.

Climate change is not an abstract problem for the future or one that will only affect far-distant places.

Rather, climate change is happening now, we are causing it,and the longer we wait to act, the more we lose and the more difficult the problem will be to solve.

Center for Biological Diversity

Organization of Plan

The organization of this plan reflects the goals and historical foundation discussed above and the opportunities Town staff have been able to identify in this initial plan. The recommendations provided focus on tractable and specific areas of near term emphasis especially for municipal operations (and to a lesser extent for the broader community), and plans to pursue projects through the operational budget and Capital Improvement Program. The need for a longer term, more comprehensive plan is acknowledged. The focus for this plan is more immediate and tractable, i.e., what are the priorities for in the next 1-2 years.

The local government operations section of the plan addresses outdoor lighting, facilities, and the municipal fleet. The municipal support for the community section of the plan addresses community transportation, buildings, renewable energy, and the urban forest. A discussion is also provided on climate vulnerability and adaptation. Sections are presented in a common format as presented in the graphic below.

LEGEND

DESCRIPTION

What is proposed?

BASIS

Why is this being recommended?

BREAKDOWN

How will this be accomplished?

LEAD DEPARTMENT

Which department is taking the lead?

INTERNAL COORDINATION

Who will be involved on staff?

EXTERNAL COORDINATION

Who else will be involved?

RESOURCES REQUIRED

What is needed? Is it in the CIP? What year? Is it budgeted for next year?

CIP: ☐ CIP YEAR:_____

2014/15 BUDGET: ☐

PAYBACK PERIOD	0-5 YEARS	5-10 YEARS	10-15 YEARS	15-20 YEARS	>20 YEARS

2. Municipal Operations

Introduction

The motivation for the Town to invest in municipal energy efficiency are many:

• Efficiency can *reduce greenhouse gas emissions and other air pollutants*, an important objective for addressing climate change and environmental health concerns.

• Improvements in the energy efficiency of local government operations (e.g., buildings, vehicle fleets) can reduce *maintenance and operating costs* and may *reduce or avoid capital costs*. These avoided costs can, in turn, *decrease or prevent increases in local taxes*, and allow for those funds to be spent elsewhere, which can result in *more investment in the local economy*.

• Efficiency can *improve local energy security* by decreasing demand for resources from outside the community.

• Improvements demonstrate the principal of *"leading by example",* resulting in increased interest from the community.

At the same time, Carrboro faces challenges that are particularly noteworthy for a small town with aging building stock and modest access to capital relative to many larger jurisdictions.

Some of the challenges to comprehensively addressing energy efficiency are as follows:

• **Upfront capital cost:** With limited access to capital, the size and number of potential projects is more limited.

• **Looking for quick payback period:** A common approach is to choose measures that will pay for themselves quickly — the low-hanging fruit. There is a common tension between the limited number of projects with quick paybacks and the larger number of projects with both large capital and extended payback periods. This is where lifecycle cost analysis comes into play, as long-lived infrastructure can generate significant cost savings when measured over years of operating life.

• **Lack of reliable information on energy expenditures and potential savings:** The Town has only recently been able to more rigorously track energy usage, and does not have more comprehensive and detailed information on potential energy savings. Without this knowledge, it is difficult to determine where the most energy is being wasted, what the potential for savings are, and where opportunities lie. This is why projects identified to date are of the "low hanging fruit" variety, but not as comprehensive as needed.

The U.S. EPA recommends the following key approaches for assessing baseline building energy performance in existing buildings:

• Use available, standardized tools and audit protocols for baseline energy consumption assessments. For example, ENERGY STAR'S Portfolio Manager is an online tool that can be used to assess baseline energy performance in existing buildings and compile data across a portfolio of buildings.

• Benchmarking involves comparing a building's energy performance to the performance of similar buildings. The most meaningful benchmark comparisons compare buildings that operate in nearby areas or, at minimum, under similar climate conditions. It is best to perform records-based benchmarking over a two-year period, at minimum, to eliminate the effects of unusual weather conditions.

• Conduct technical assessments and audits. In addition to establishing baseline energy performance and determining a building's relative performance compared to its peers, a thorough energy performance assessment includes comparing the actual performance of a building's systems and equipment with its designed performance level or the performance level of top-performing technologies. These technical assessments can be conducted as part of a whole-building energy audit conducted by an energy professional and used to identify priority energy efficiency investments. If not bundled into the equipment cost, walk-through audits (ASHRAE Level I) are frequently priced at $.02-$.05 per square foot. Level II audits are frequently priced at $.10-$.15 per square foot. Investment grade audits (ASHRAE Level III) are frequently priced at $.20-$.30 per square foot, a sum that may vary depending on the complexity of the modeling to be performed.

An investment-grade audit will determine which energy efficiency measures are cost-effective over a reasonable time horizon (often between 10 and 20 years). Targeted areas typically include building heat losses and excess energy consumption from older equipment. Recommendations can include simple items like insulation, window replacements, lighting replacements, boiler and chiller upgrades or replacements, high efficiency motors and variable frequency drives on pumps, and energy management control systems. Energy audits can also focus on local government services and operations such as for street lights and fleets.

Best practices for energy audits and retrofit installation include the following:

• Use qualified professionals. Energy audits are best performed under the direction of a professional or firm specializing in energy audit activities. Individuals qualified to perform energy audits may include licensed professional engineers, certified energy managers, or commissioning authorities. Firms qualified to conduct building energy audits include energy service companies (ESCOs), building engineering companies, and building energy consulting companies.

In the case of retrofits involving significant capital improvements, it is often wise to engage a third-party construction manager to ensure that the retrofit is taking place according to plan. It is wise to scrutinize the credentials of proposed service providers and to require multiple bids before selecting vendors. Local governments that lack a sufficiently trained staff to vet vendors might wish to contract with a third-party expert to help select vendors.

Past Efforts

For Town operations, the Town has taken the following steps in the past. In 2008 and 2009, the Town partnered with Waste Reduction Partners, a program sponsored by the State and Triangle J COG, to perform an energy audit of Town buildings (Century Center, Town Hall, Fire Station #1, Public Works). The Town also worked with Big Woods Engineering in 2009-2010 to identify lighting and HVAC retrofits that could be pursued through the Energy Efficiency Conservation Block Grant program administered by the State Energy Office for these four buildings.[1] Both of these efforts can be considered as "walk through (ASHRAE Level 1) audits".

The Town also designed the new fire substation on Homestead Road to LEED silver standards. In the past several years, Public Works staff has been replacing older (T-12 fluorescent) lighting ballasts and bulbs with higher efficiency (T-8) ballasts and bulbs. Public Works staff estimate that 40% of these fixtures have been upgraded to date. Other incremental steps have also been pursued, such as installation of programmable thermostats, a community solar project at the Town Commons, and contributions ($80/month) for renewable energy to NC Green Power. The Town has also taken steps for the municipal fleet to reduce emissions, use alternative fuels, and save on operational expenses. Examples include: purchasing hybrid vehicles; implementation of 2007 emissions standards phased in over several years; downsizing/rightsizing of vehicle purchases; adoption of idling policy; and a fuel conservation initiative. Beginning in 2014, the Town is formalizing commitment to sustainability and energy measures in Capital Improvement and Operating Budget annual updates.

Collaboration and Partnerships

While not being formally part of Carrboro municipal operations, entities that the Town cooperates with are important partners for energy and climate action efforts. Perhaps the two most important of these are OWASA and Orange County. OWASA's water conservation efforts are important for energy conservation, as every gallon conserved is a gallon that is not pumped and treated. OWASA staff estimate that, for every 1000 gallons of treated water and sewage conserved, 7.5 kilowatt hours (kWh) of energy/electricity are also saved, which is equivalent to the energy generated by the solar array at Town Commons for 1.5 hours. In addition, OWASA is pursuing opportunities to reduce energy use and costs e.g., by replacing older mechanical equipment with more efficient units, installing more efficient lighting and temperature controls, and using renewable energy sources instead of conventional fuels. Work is underway to install more energy efficient treatment wastewater treatment equipment, which will reduce electricity usage by about 20 percent when the project is completed later this year. OWASA has recently presented a strategic plan which includes the development and implementation of an energy management plan to further reduce energy use. For solid waste, Orange County is recognized as being number one in the state for waste reduction, reaching 59% of its 61% reduction goal. The County is disposing 0.56 tons/person compared to the base year of 1991-92, when the disposal rate measured 1.36 tons. Waste reduction benefits emissions reductions both through reductions in methane (a potent greenhouse gas which is being captured at the landfill) and reduced emissions

[1] The grant application was not funded because criteria favored economically disadvantaged communities; more information on measures recommended is available in Appendix II.

associated with hauling. The Town is faced with an emission reductions challenge with the closure of the landfill on Eubanks Road given the longer transport to the transfer station and out-of-county landfill. Another partner worth mentioning is Piedmont Biofuels (PBF) Cooperative; the Public Works facility has been hosting a community biodiesel pump run by PBF since 2004, with this pump being one of the earliest on the "B100" trail, and the supply chain for the fuel produced being provided from carbon neutral local sources. In 2012, the Town collaborated with Carrboro Community Solar to install a photovoltaic system at the Town Commons. In 2013/14, the Town has been providing logistical support to a nonprofit, Next Climate, Inc. to pursue "Solarize Carrboro" to encourage homeowner installation of solar electricity.

Steps Presented in This Plan

The sections that follow provide recommendations for the Town to pursue in the next 1-2 years with municipal operations to improve energy efficiency. A high priority action is to work with utility providers (Duke Energy, Piedmont Electric Membership Corporation, and NCDOT) to replace existing streetlights and area lights (currently leased from utility companies) on Town maintained property with LED fixtures. Other recommended actions include: completing studies and assessments of the Century Center HVAC system and Town Hall; improving energy use and management in buildings and equipment through energy savings capital and operational improvements; and pursuing fleet initiatives such as grant funding for more efficient vehicles, increased foot patrols/reduced vehicle idling, installing supplementary battery systems and continued downsizing/rightsizing of vehicles; and potentially converting some vehicles to LP gas (or another alternative fuel). It is also recommended that the Town continue to annually report on its municipal greenhouse gas emissions inventory to track changes in energy use, and consider other approaches for measuring, assessing, and reporting on energy use and emissions.

References

Some of this introduction is excerpted from:

USEPA Environmental Financial Advisory Board. January, 2014. Municipal Energy Efficiency and Greenhouse Gas Emissions Reduction: Financing and Implementing Energy Efficiency Retrofits in City-Owned Facilities. http://www2.epa.gov/sites/production/files/2014-02/documents/municipal_engergy_efficiency_and_ghg_emissions_reduction.pdf

See also:

ACEEE. "Fact Sheet: Energy Efficiency Policies for Local Governments." Available at: https://www.aceee.org/fact-sheet/local-government-ee-policy

2.A LED Outdoor Lighting

DESCRIPTION (UPDATED 10-13-20)

The proposed emphasis with outdoor lighting is to replace existing streetlights and area lights (currently leased from utility companies) on Town maintained property with LED fixtures. Because the Town does not own the lights, the timing of how quickly the Town may be able to pursue replacement with LED lights is currently unknown. The initial plan is to replace the roughly 700 fixtures on Town streets starting in FY 14-15 and complete the project in FY 2015-16. The remaining 200 fixtures on State (NCDOT) roads will require state approval with less certainty about a probable time frame. A rate structure for LED replacement of high pressure sodium (the predominant type of fixture in the current inventory) and metal halide under a utility owned option is currently under development. If a rate option and structure is made available that allows the Town to own street light fixtures, the Town will have an option of taking over ownership. The replacement timing and payback should become clearer in the summer of 2014. Additional recommendations: The Town should inform residents of the possibility of removing streetlights from their neighborhood. This should include an educational component about the relation between streetlights and safety.

BASIS

LED lights typically last over 100,000 hours, or 20+ years, and feature a "plug and play" electrical system which lowers maintenance costs. The LED lamps would be owned by the Town, rather than leased from the utility company, which would result in operational savings. LED lighting is much more efficient than current standard lighting fixtures, yielding a relatively short payback period for capital investment (3 years or less). The cost of LED lighting is also dropping rapidly, suggesting more favorable financial benefits. Street lighting is a large contributor to all municipal emissions (22%). It is anticipated that the LED streetlights would have a relatively rapid payback that could result in roughly a 10% municipal footprint reduction for the year(s) in which fixture replacement occurs.

BREAKDOWN

- Develop and implement comprehensive streetlight replacement plan
- Replace streetlights first on Town property and then on State roads
- Coordinate with Duke Energy, PEMC, and NCDOT, and perform community outreach

LEAD DEPARTMENT

Public Works

INTERNAL COORDINATION

Outdoor lighting workgroup

EXTERNAL COORDINATION

Utility providers; contractors

RESOURCES REQUIRED

$262k (preliminary estimate if customer owned option available); contract support

CIP: ☒ **CIP YEAR:** 2014/15, 15/16

2014/15 BUDGET: ☒

The City of Asheville has determined that LED streetlight replacement to be the best investment for meeting greenhouse gas and sustainability goals.

PAYBACK PERIOD	0-5 YEARS	5-10 YEARS	10-15 YEARS	15-20 YEARS	>20 YEARS

2.B.i Building Assessments and Ratings

DESCRIPTION: (UPDATED 10-13-20) Building energy assessments and ratings are valuable tools to determine the scope, costs, and energy and operational savings for future improvements and compare building energy use to other comparable buildings. In 2008 and 2009, the Town partnered with Waste Reduction Partners to perform an energy audit of Town buildings. The Town also worked with Big Woods Engineering in 2009-2010 to identify lighting and HVAC retrofits.[1] Carrboro could also work with a contractor to determine improvements needed for Town buildings to become an USEPA Energy Star™ partner organization, and in doing so, participate in Portfolio Manager, EPA's online tool to award the Energy Star™ designation. An Energy Star™ facility meets strict energy performance standards, is less expensive to operate, and causes fewer GHG emissions than its peers. To qualify for the Energy Star™ designation, a building must score in the top 25 percent based on EPA's National Energy Performance Rating System. Carrboro has not used the Portfolio Manager system, and doing so will require outside assistance because of limited staff time and expertise.

Additional recommendations:

- Complete energy assessments in Century Center and Town Hall as well as all Town buildings.
- Investigate the possibility of using non-profits such as Waste Reduction Partners to perform free energy audits.
- Create and execute implementation plans for energy-efficiency upgrades to Town buildings.
- Look at all Town buildings as a system to ensure all upgrades are performed comprehensively.

BASIS

Performing an energy assessment or audit is a crucial step to assessing and improving energy efficiency. There are many types of assessments that can be performed, ranging from 'walk-through audits' to more comprehensive 'process audits. The American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) refers to benchmarking as a process that involves collecting facility energy data, reviewing energy bills, and comparing the facility's energy consumption with similarly-sized facilities using similar processes. EPA recommends all facilities use Portfolio Manager or another benchmarking tool. Through analysis of the buildings in Portfolio Manager and in concert with building assessments, targeted energy conservation projects can be identified and demonstrate the energy benefits of the projects.

TASK BREAKDOWN

Complete study/assessment of Century Center HVAC system in FY 14/15

Complete study/assessment of Town Hall in FY 14/15

Consider other future building assessments beginning in FY 15/16

LEAD DEPARTMENT:

Public Works

INTERNAL COORDINATION

Buildings Energy Workgroup

EXTERNAL COORDINATION

Contract support

RESOURCES REQUIRED

$65k in FY 14/15 operating budget for Century Center, Town Hall studies (Town Hall includes non- energy items)

CIP: ☒ CIP YEAR: FY 14/15, 15/16

2014/15 BUDGET: ☒

[1] See Appendix II for additional information

Payback depends on results of assessments and follow through pursued

PAYBACK PERIOD	0-5 YEARS	5-10 YEARS	10-15 YEARS	15-20 YEARS	>20 YEARS

"Assessing baseline energy use allows one to identify operations that are wasting energy and target limited financial resources." –ICLEI

2.B.ii Facility Energy Efficiency

DESCRIPTION: (UPDATED 10-13-20) Energy efficiency in facilities applies to efforts to reduce energy consumption capital and operational improvements. Retro-commissioning projects ensure that existing building systems operate well considering their current use. Occupant behavior change is goal of communications strategies which encourage conservation. Improved controls involve measures such as upgraded thermostats, occupancy sensors, and enforcement of a setpoint policy, including carefully monitoring setpoints for unoccupied buildings for evenings, weekends and holidays. Life-cycle cost analysis incorporate energy conservation/ efficiency into the decision-making process for capital decisions to gain a full understanding of total cost over the useful life of project or equipment. Public utility incentives are available to subsidize costs for selected improvements. The Town can develop a policy requiring that Energy Star™ qualified products are chosen for purchases such as Information technology can continually be evaluated and operated for energy efficiency improvements Operation and maintenance best practices can continually be considered to identify procedures that consider and encourage equipment efficiency. Additional recommendations: Solarize all municipal buildings.

BASIS: Installation of more energy efficient measures, controls along with policies and strategies can reduce energy use and utility costs. Cost savings can potentially be reinvested. Significant reductions in energy use also means reductions in greenhouse gas emissions. Improvements may also allow for indoor air quality improvements that may not otherwise have been possible due to funding constraints. Retro-commissioning can produce significant cost savings, reduce energy waste, improve system operation beyond preventive maintenance and potentially yield a payback of less than 3 years. A more rigorous setpoint control procedure could significantly reduce energy waste and operating cost. Additional benefits could include avoided accelerated equipment degradation, and extended equipment life. Energy Star™ results in reductions in energy use without compromising and potentially improving quality and performance. Lowest life cycle cost is the most straightforward and easy-to-interpret measure of economic evaluation.

BREAKDOWN

Retro-commissioning: Century Center, Town Hall

Internal staff communications

Controls and setpoint strategy

Life-cycle cost analysis

Review purchasing policies/modify language

Gather energy savings data when replacing existing equipment

LEAD DEPARTMENT

Public Works/Management Services

INTERNAL COORDINATION

Department Heads, Administrative Staff, Buildings Energy Workgroup

EXTERNAL COORDINATION

Contract support/vendors

RESOURCES REQUIRED

Studies of Century Center HVAC and Town Hall in FY 14/15 will help determine.

CIP: ☒ **CIP YEAR:** 2014/15-16/17

2014/15 BUDGET: ☒

PAYBACK PERIOD	0-5 YEARS	5-10 YEARS	10-15 YEARS	15-20 YEARS	>20 YEARS

2.C FLEET REPLACEMENT AND EFFICIENCY

DESCRIPTION: (UPDATED 10-13-20) Historically, the Town has taken steps for the municipal fleet to reduce emissions and save on operational expenses. Examples of practices include: purchasing hybrid vehicles; implementation of 2007 emissions standards; downsizing/rightsizing of vehicle purchases; adoption of idling policy; and a fuel conservation initiative. Data has demonstrated that carbon emissions from the fleet have decreased. As older vehicles are replaced with newer, more efficient models, this trend should continue. Based on early information for FY 13/14, the increase in emissions due to transporting solid waste to Durham may not be as large as expected. For FY 14-15, if vehicles are replaced, added and deleted as planned, the vehicle fleet should produce 658.19 MTCDE, a decrease of 2.09% from FY12-13. That metric assumes the removal of two vehicles from the fleet, the addition of one fuel-using vehicle (a Vacuum Leaf Loader that performs the work currently requiring four pieces of equipment), the replacement of police vehicles with newer, more-efficient vehicles and a more efficient Fire Engine. Additional opportunities to decrease GHG emissions in the Town's fleet in FY14-15 include potential grant funding for a hybrid MSW collection vehicle (decreasing emissions to 653.41 MTCDE or a reduction of 2.81% from FY 12-13 levels); increased foot patrols and reduced vehicle idling in the Police Department; and use of supplementary battery systems in Police vehicles that allow the vehicle's systems to run without the engine. The Town participates in the Triangle Clean Cities Coalition which provides grant funding, technical assistance, and networking opportunities. Additional strategies under consideration for future years include downsizing/rightsizing vehicles up for replacement and converting portions of the fleet to LP gas (or another alternative fuel). Additional recommendations (Updated 10-13-20):

- Convert all municipal cars to electric vehicles and power vehicles using solar panels on buildings.
- Convert trucks and larger vehicles to electric vehicles when appropriate models are available.
- Investigate bulk purchasing of electric vehicles.
- All EV charging stations should be solar-powered.
- Consider using biogas to fuel vehicles that are not electric (Public Works).
- Pursue a self-imposed internal cap and dividend for Town Departments to incentivize purchasing electric vehicles.

BASIS: The fleet is responsible for about 1/3 of the Town's total municipal sector emissions; a more efficient fleet is therefore an important component of climate and energy planning. Increased efficiency has the potential to also provide positive fiscal impacts such as reduced operating costs and life cycle costs. Replacement vehicles should be acquired with the goal of minimizing operational costs by replacing the vehicles in a timely manner.

BREAKDOWN

Implement CFAT grant award for municipal solid waste vehicle

Increased foot patrols/reduced vehicle

idling Supplementary battery systems.

Continued downsizing/rightsizing of vehicles

Potentially converting some vehicles to LP gas (or another alternative fuel; future years)

LEAD DEPARTMENT

Manager's Office and Department Directors

INTERNAL COORDINATION

Fleet Workgroup

EXTERNAL COORDINATION

Vendors; Clean Cities Coalition; NC Solar Center

RESOURCES REQUIRED

Equipment financing annually updated

CIP: ☒ **CIP YEAR:** All

2014/15 BUDGET: ☒

5 police vehicles to be purchased in FY 14/15 will be equipped with a Havis Idle Manager to allow officers to pursue critical work without the engine.

PAYBACK PERIOD	0-5 YEARS	5-10 YEARS	10-15 YEARS	15-20 YEARS	>20 YEARS

~~13~~15

3. Community Sector

Introduction

While it is difficult to quantify, the community transportation sector is perhaps the sector in which the Carrboro has made the most progress in addressing and reducing energy usage historically. To provide alternatives to vehicle use in general, the Town has been a partner in the State's most ambitious and successful (and fare free since 2001) transit program (Chapel Hill Transit) for several decades. The system provides over 7 million rides per year. The Town contributes about $1M annually to the operation of the system, or about 5% of the Town's annual budget. In addition to the high ridership, higher efficiency busses are being employed in the fleet, with 15 new hybrid busses acquired in 2013 (one third of the fleet is now employing hybrid technology), and solarizing lighting at bus stops has also been pursued. The Town has also been assertively supporting bicyclists and pedestrian for many years, with the Town being recognized as a "Silver" level bicycle friendly community by the League of American Bicyclists. (Carrboro is one of a handful of communities, and the smallest, east of the Mississippi River to receive this designation.) The Town has promoted walkability and bikability through the Safe Routes to School Action Plan, bicycle facilities[1], and sidewalks and greenways with support from a bond passed in 2003. The Town continues to pursue other measures (e.g., transportation demand management, transit-oriented/mixed use land use planning, participation in regional transit efforts, road connectivity, alternative fuels) to reduce community vehicle miles traveled and emissions and encourage alternative transportation modes. A relatively recent area of focus relevant to community transportation has been working to expand affordable housing options for workers employed in and near Carrboro that currently commute long distances, in part because of high local housing costs.

With support from federal stimulus funds, Carrboro pursued efforts in the past several years to reduce energy use in buildings in the community through establishment of the "Worthwhile Investments Save Energy" (WISE) program. During the recently ended grant period, the Carrboro WISE program: provided commercial loans to local businesses through the Energy Efficiency Revolving Loan Fund (EERLF); provided incentives for 18 single-family home and two multifamily complexes energy efficiency retrofits; reached over 200 additional citizens in Chapel Hill and Carrboro through a grass roots energy efficiency outreach and education campaign; and trained home performance contractors to be Home Performance with Energy Star certified contractors.

Steps Presented in This Plan (UPDATED 10-13-20)

The sections that follow provide recommendations for the Town to pursue in the community to improve energy efficiency, support renewable energy, and pursue urban forestry efforts that have energy efficiency, climate protection, and other benefits. For community transportation, it is recommended that the Town continue initiatives underway and more explicitly consider energy and climate protection in transportation-related planning. For community buildings, it is recommended that the Town continue

[1] e.g., bike lanes, sharrows, multi-use paths, paved shoulders

to offer and promote energy efficiency loans to businesses through the Energy Efficiency Revolving Loan Fund (EERLF), to support community volunteers ("Elite Petes") trained by Clean Energy Durham, and to support Solarize Carrboro. To support renewable energy, Town staff will continue to work with Solarize Carrboro. Further involvement with community solar projects will require additional dedication of resources and/or initiative from the community in pursuing a project in collaboration with the Town. Further urban forestry efforts are recommended to provide climate protection and energy benefits, and also recognize the many other benefits of urban trees. Ongoing measurement, inventory, assessment, and reporting is also recommended, which will require support through collaboration (as has been done in the past) with UNC potentially others.

Additional recommendations:

- Make it easier for employees to live in Town.
  - Look at trends over time for locations of employee residences.
  - Hold focus groups and perform qualitative interviews with Town employees to understand barriers to living in Town.
  - Provide stipend or livable salary for employees to live in Carrboro to reduce commutes among other things.
- Town negotiate lower pricing for municipal purchases or leases for transportation options (such as electric vehicles or electric assist bicycles) for employees.
- Expand sustainable living opportunities for employees
- Develop a stormwater chapter in the Climate Change: Vulnerability and Adaptation section of the ECPP.

3.A Community Transportation

DESCRIPTION (UPDATED 10-13-20)

The Town has historically been active in the community transportation sector. No significant new direction is recommended in this plan; it is recommended that initiatives underway are continued and energy and climate protection is more explicitly considered in transportation- related planning. The Town has been a partner in Chapel Hill Transit, which is an alternative to automobile use. The Town has also been assertively supporting bicyclists and pedestrians for many years through the construction of bicycle facilities, sidewalks, and greenways. The Town adopted a bicycle plan in 2009 and a Safe Routes to School action plan in 2012. The Town also continues to pursue transportation demand management, transit-oriented/mixed-use land use planning, participation in regional transit efforts, road connectivity, and alternative fuels. A step that is included in Town planning documents and worth emphasizing for its climate protection/energy benefits is to identify local matching funds to allow greenway design work for Bolin Phase 2 and Morgan future phases to proceed. With the expiration of grant funds, it is also recommended that the Town offer support for Safe Routes to School implementation.

Additional recommendations:

- Ask the Town Council to generate a letter to the State regarding placement of DC Fast Charge EV Charging Stations along travel corridors.
- Work with Chapel Hill Transit to increase bus service overall, especially on Sundays.
- Revive trolley service.
- Leverage Transportation Demand Management Funding.

BASIS

Conceptually, changes in energy use and greenhouse gas emissions for the community transportation sector are directly associated with: changes in population; changes in vehicular use per capita; and changes in technology affecting energy use and emissions. These in turn are affected by factors such as alternatives available, infrastructure, land use, and economics. Quantifying the GHG footprint associated with vehicular use in Carrboro is difficult. A UNC Capstone team (2011) pursued this using a regional transportation model (RTM). The Durham- Chapel Hill-Carrboro Metropolitan Planning Organization (DCHC-MPO) uses the Triangle Regional Model, a unified four-step travel demand model that estimates vehicle miles traveled (VMT) based on trip generation, trip distribution, mode choice and route assignment. Some MPOs also employ models that estimate GHG emissions.

BREAKDOWN

* Commit local matching funds for greenways

* Support Safe Routes to School Implementation Committee

* Plan for: increased transit service connections; car and bike sharing; walkability; carpooling and other TDM strategies

* Consider GHG emissions in efforts such as parking and long-range transportation plans

LEAD DEPARTMENT

Planning

INTERNAL COORDINATION

Community Transportation Workgroup

EXTERNAL COORDINATION

MPO, transit agencies, NCDOT, Chapel Hill

RESOURCES REQUIRED

Support for the above actions

CIP: ☒ CIP YEAR:2014-2020 2014/15 BUDGET: ☒

"Dear future generations. Please accept our apologies. We were running drunk on petroleum" –Kurt Vonnegut

payback difficult to determine

PAYBACK PERIOD	0-5 YEARS	5-10 YEARS	10-15 YEARS	15-20 YEARS	>20 YEARS

3.B Community Buildings

DESCRIPTION (UPDATED 10-13-20)

For three years and with support from federal stimulus funds, the Town pursued energy efficiency in buildings through the WISE (Worthwhile Investments Save Energy) program. WISE: provided loans for businesses and incentives for single-family homeowners and multifamily complexes; reached over 200 additional citizens through a grass roots energy efficiency outreach and education campaign designed by Clean Energy Durham; and trained home performance contractors to be Home Performance with Energy Star certified contractors. Now that the grant and program has ended, the Town has a new challenge: how to maintain the momentum created by the WISE program without the federal support. Two modest next steps envisioned for sustaining the initiatives established with the WISE program are to continue to offer and promote energy efficiency loans to businesses through the Energy Efficiency Revolving Loan Fund (EERLF) and to support community volunteers ("Elite Petes") trained by Clean Energy Durham, and the Solarize Carrboro initiative. Additional recommendations: Create a program that helps landlords and homeowners perform energy- efficiency upgrades. Host workshops to provide information. Create a Green Home Program using the structure and funding example provided by Babylon, NY.

BASIS

The U.S. Green Building Council (USGBC) provides statistics which indicate that, nationally, buildings account for 40% of primary energy use, 72% of electricity consumption and 39% of CO_2 emissions. Studies have determined that improving buildings can reduce energy use and CO_2 emissions by up to 50%. Community buildings are the largest single contributor to the community greenhouse gas footprint, with electricity consumption estimated to contribute about six times as much as natural gas consumption. The utilities providing electricity continue to rely on coal, along with nuclear energy, for a significant portion of the energy supply. An emphasis on community buildings, and particularly on electrical consumption, is therefore an essential component of energy and climate protection planning in Carrboro. At a municipal level, however, the Town has limited legal authority and responsibility for the energy supply and efficiency of private buildings, and also limited capacity. The current best options available include support for outreach and education and promoting the EERLF.

BREAKDOWN

- Explore opportunities to maintain grass roots outreach; support Solarize Carrboro
- Update website
- Continue to offer loans through the EERLF and explore ways to promote the loan program

LEAD DEPARTMENTS

Planning and Economic and Community Development

INTERNAL COORDINATION

Community Buildings Workgroup

EXTERNAL COORDINATION

Businesses, Elite Pete volunteers, Next Climate, Inc.

RESOURCES REQUIRED

Small operating and outreach budget

CIP: ☐ CIP YEAR:_____

2014/15 BUDGET: ☒

PAYBACK PERIOD	0-5 YEARS	5-10 YEARS	10-15 YEARS	15-20 YEARS	>20 YEARS

Community buildings account for 46% of total community emissions in Carrboro.

3.C Renewable Portfolio

DESCRIPTION: (UPDATED 10-13-20) Renewable energy sources include photovoltaics, solar thermal, wind, and geothermal heat. To be financially competitive, "renewables" take advantage of federal and state tax credits, renewable energy credits and accelerated depreciation. As a municipality, Carrboro cannot take advantage of these incentives alone. As a pilot project to investigate alternatives, the Town partnered with Carrboro Community Solar in 2012 for a small-scale (5kW) solar electric system at the Town Commons. The community investing model results in an "average" breakeven return for private investors in 5-6 years, and a free or bargain system for the Town after 5-6 years with revenue generating ability from the sale of electricity. In the community sector, the "Solarize" model is currently being tested to encourage homeowners to install solar electric systems. http://www.solarizenc.org/. Additional recommendations: Work with Chapel Hill Transit to solarize the bus fleet.

BASIS: Currently, cost-effective integration of renewable energy is dependent upon partnerships with private sector investors who can take advantage of the available tax credits and depreciation for installing renewable systems, and funnel their tax liability towards renewable energy. North Carolina is currently a progressive state regarding these credits, and when coupled with the federal tax credits, renewable energy becomes much more cost-effective. It is worth noting that these credits are not indefinite and will need to be renewed in the next two years to continue to incentivize renewable energy. A non-monetary "value" should also be placed on renewable energy development in Carrboro. Using installed systems for demonstration can provide Carrboro a "value-added" characteristic to pursue outreach about the importance of renewable energy. Into the future, a mix of solar energy with conventional energy will also reduce the overall utility cost for the Town.

BREAKDOWN

Community Solar Project:

- Identify municipal host site(s)
- Pursue outreach to identify investors
- Enter into lease agreement for system

Continue to support Solarize Carrboro

LEAD DEPARTMENT

TBD

INTERNAL COORDINATION

TBD

EXTERNAL COORDINATION

Private investors

RESOURCES REQUIRED

Consider contract support for community investing

CIP: ☐ **CIP YEAR:**_____

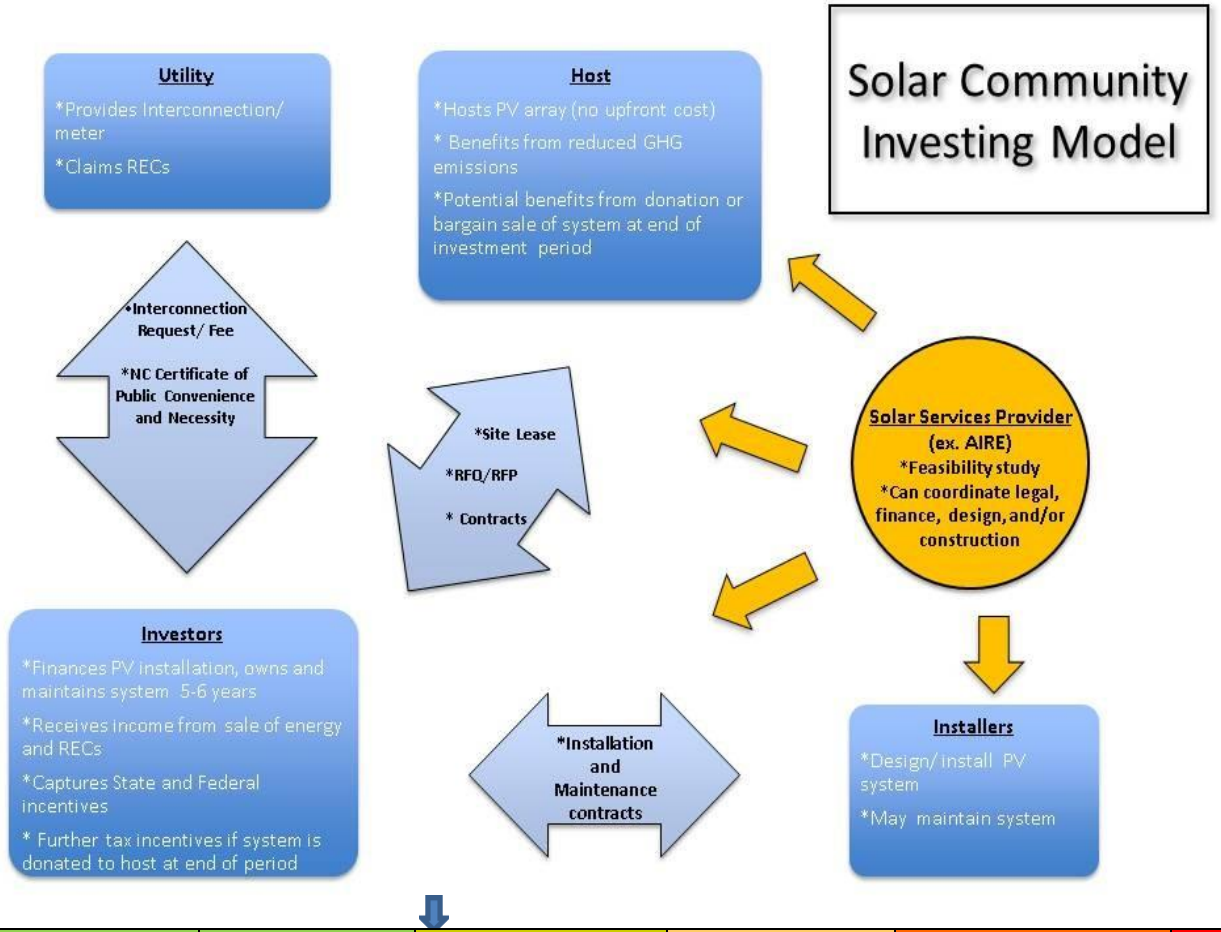
2014/15 BUDGET: ☐

PAYBACK PERIOD	0-5 YEARS	5-10 YEARS	10-15 YEARS	15-20 YEARS	>20 YEARS

"Community is the secret ingredient of sustainability" –Nick Meima and Abraham Paiss.
Second graphic Courtesy of Appalachian Institute for Renewable Energy: www.aire-nc.org

3.C Renewable Portfolio

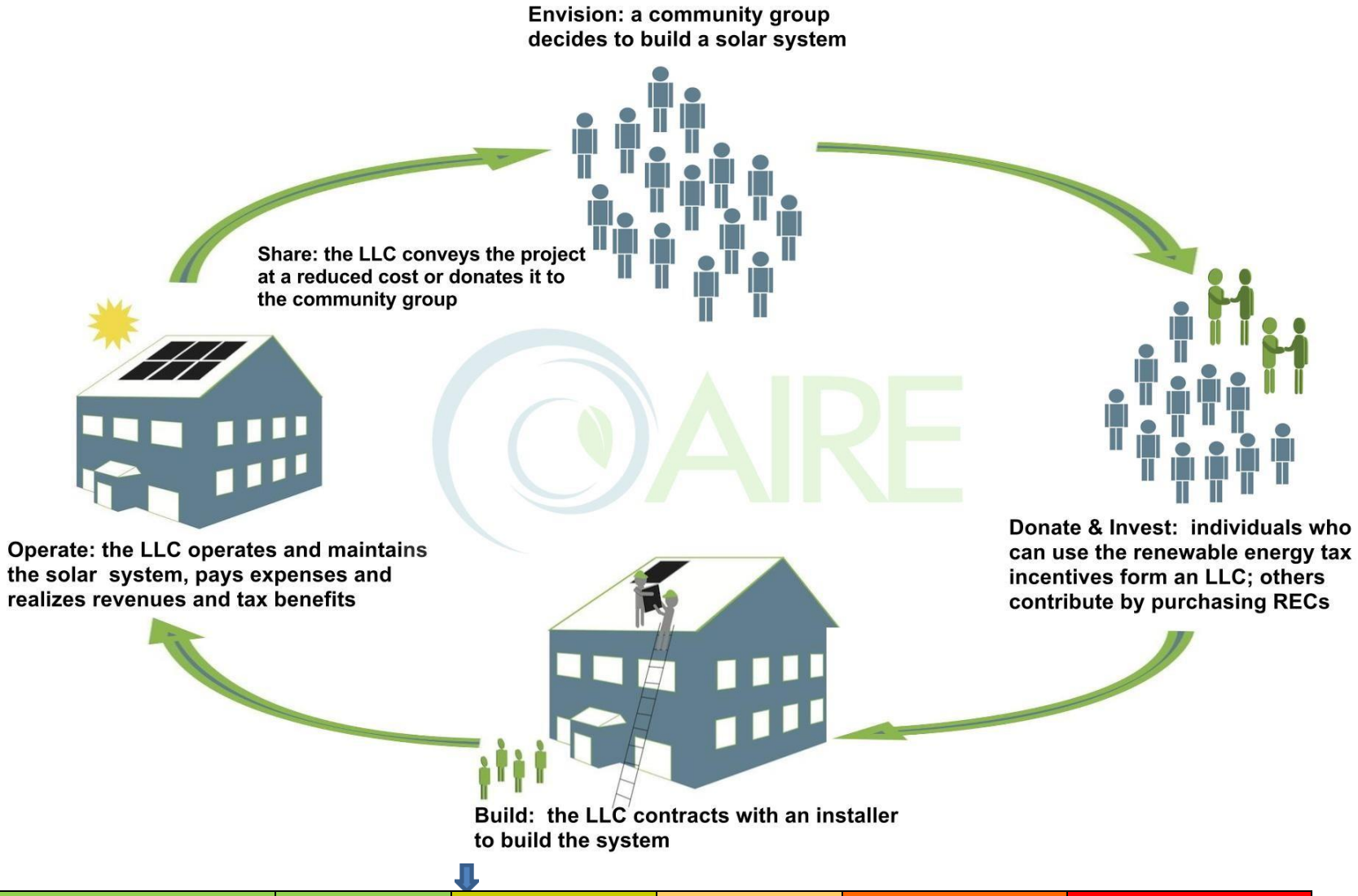
The Town collaborated with Carrboro Community Solar in 2012 to install a photovoltaic system at the Town Commons (see www.carrborosolar.org.) General graphics of the community investing model are shown below. More information on this model is available at http://aire-nc.org/.



PAYBACK PERIOD	0-5 YEARS	5-10 YEARS	10-15 YEARS	15-20 YEARS	>20 YEARS

"Community is the secret ingredient of sustainability" –Nick Meima and Abraham Paiss.
Second graphic Courtesy of Appalachian Institute for Renewable Energy: www.aire-nc.org

3.C Renewable Portfolio



PAYBACK PERIOD	0-5 YEARS	5-10 YEARS	10-15 YEARS	15-20 YEARS	>20 YEARS

"Community is the secret ingredient of sustainability" –Nick Meima and Abraham Paiss.
Second graphic Courtesy of Appalachian Institute for Renewable Energy: www.aire-nc.org

3.D Urban Forestry Program

DESCRIPTION :

The Town has been pursuing urban forestry efforts for many years. Examples include participation in Tree City USA and Arbor Day, purchase of the Adams Tract and development of a management plan for the property, and development of provisions for tree protection and open space in the Land Use Ordinance, including a potential update to the ordinance currently under review by staff. Further program development is recommended as a part of this plan to provide climate protection and energy benefits, and also recognize the many other benefits of urban trees (see Appendix 3). Examples of initiatives that can be considered include: tree inventories, canopy analysis and resource assessments; development of master tree plans for streets and facilities and the community, and pursuit of actions that would help the Town qualify for a Tree City USA Growth Award and be eligible for the NC Forest Service urban forestry grant program.

BASIS:

There is significant merit and synergy in managing the Carrboro's forest to reduce energy consumption and store carbon, while simultaneously forwarding many community goals. Trees influence thermal comfort and energy use by providing shade and reducing wind speeds. For example, three or more large trees strategically placed on sunny sides of a house reduce the air-conditioning demand as much as 30 percent. One acre of forest absorbs six tons of carbon dioxide and puts out four tons of oxygen. The urban forest also provides significant ecological and societal services such as air, water and soil quality improvement, wildlife habitat, enhanced biodiversity, mental, emotional and physical health and well-being, aesthetic value, and economic value. Another urban forestry interest is in planning for forest resilience in consideration of the impacts of climate change.

BREAKDOWN

Complete tree inventories, canopy analysis, and resource assessments

Develop public and community master plans

Investigate grant opportunity with NCFS

LEAD DEPARTMENT

Public Works, Planning

INTERNAL COORDINATION

Public Works, Planning

EXTERNAL COORDINATION

North Carolina Forest Service

RESOURCES REQUIRED

TBD

CIP: ☐ CIP YEAR:_____

2014/15 BUDGET: ☐

← *payback difficult to determine* →

PAYBACK PERIOD	0-5 YEARS	5-10 YEARS	10-15 YEARS	15-20 YEARS	>20 YEARS

"Imagine if trees gave off WiFi signals. We'd be planting so many trees and would probably save the planet. Too bad they only give off the air we breathe". Viral internet posting of unknown origin

4. Measurement, Inventory, Assessment, and Reporting

DESCRIPTION: Measurement involves monitoring and metering energy use, and is vital in creating "management by fact." An inventory involves using the measurement data along with calculations and analysis to comprehensively compile estimates of energy use and associated greenhouse gas emissions for different types of uses. Assessment involves the process of studying and placing in context the measurements and inventory information. Reporting involves sharing the results with the community in a way that is meaningful. Software tools such as emissions software, energy dashboards, and scorecards are increasingly being used for these activities. The Town has been involved in annual monitoring of municipal emissions for several years, and has worked with other local jurisdictions and a UNC Capstone team on community emissions estimates. The American Council for an Energy Efficient Economy (ACEEE) has developed a scorecard that allows communities to score their energy efficiency efforts by evaluating locally-enacted programs and policies across local government operations, community-wide initiatives, and building, energy and water, and transportation policies.

BASIS: Milestone 5 of Cities for Climate Protection specifically calls for monitoring. Pursuing these activities is important to create a feedback loop, inform stakeholders, and to create transparency. Based on experience, the payback for an energy dashboard system is typically less than three years due to increased energy awareness and identified energy conservation opportunities. Organizations and business that monitor and report alone have seen energy consumption drop by 5 to 10 percent. The ACEEE Local Energy Efficiency Self-Scoring Tool provides the benefit of presenting options for the Town to consider for future actions, and for comparing efforts with other jurisdictions.

BREAKDOWN

- Identify and obtain best software tools
- Seek and obtain support
- Complete and submit ACEEE scorecard

LEAD DEPARTMENT

Planning

INTERNAL COORDINATION

All workgroups

EXTERNAL COORDINATION

Support from contractors and possibly UNC

RESOURCES REQUIRED

Staff time and budget for contract support

CIP: ☐ **CIP YEAR:**

2014/15 BUDGET: ☐

←*payback specific to action pursued*→

PAYBACK PERIOD	0-5 YEARS	5-10 YEARS	10-15 YEARS	15-20 YEARS	>20 YEARS

5. Climate Change: Vulnerability and Adaptation

The following discussion is excerpted from the recently completed study "Climate of the Southeast United States: Variability, Change, Impacts, and Vulnerability (Ingram et al (ed.), Island Press, 2013). It does not specify actions or goals, but is included to provide a context for future consideration of adaptation strategies in Carrboro.

Climate adaptation can be defined as the "adjustment in natural or human systems to a new or changing environment that exploits beneficial opportunities or moderates negative effects". It is a different concept than the primary focus of this plan, climate change mitigation. Climate change mitigation refers to activities that avoid or decrease the release of greenhouse gas (GHG) emissions, or decrease atmospheric GHG concentrations, e.g., carbon storage in forests or soils. Closely related to the concept of adaptation is climate resilience. ICLEI[1] has developed a 5 step resiliency process that is similar to their 5 step process for climate mitigation:

Milestone One: Conduct a Climate Resiliency Study

Milestone Two: Set Preparedness Goals

Milestone Three: Develop a Climate Preparedness Plan

Milestone Four: Publish & Implement Preparedness Plan

Milestone Five: Monitor & Reevaluate Resilience

The process of adaptation can be conceptualized as a series of steps moving from developing an understanding of current and future climate changes related to the system of interest, assessing vulnerabilities and risks, evaluating management options, implementing strategies, monitoring outcomes, and re-evaluating those analyses and decisions (Figure 1). The process generally prescribes multiple iterations to incorporate new information and changing conditions. The emphasis on risk management and identification of opportunities and co-benefits differs among frameworks, but there is good consistency at the conceptual level that this is a critical piece to adaptation.

[1] ICLEI stands for International Council for Local Environmental Initiatives," but in 2003 the organization dropped the full phrase and became "ICLEI-Local Governments for Sustainability"

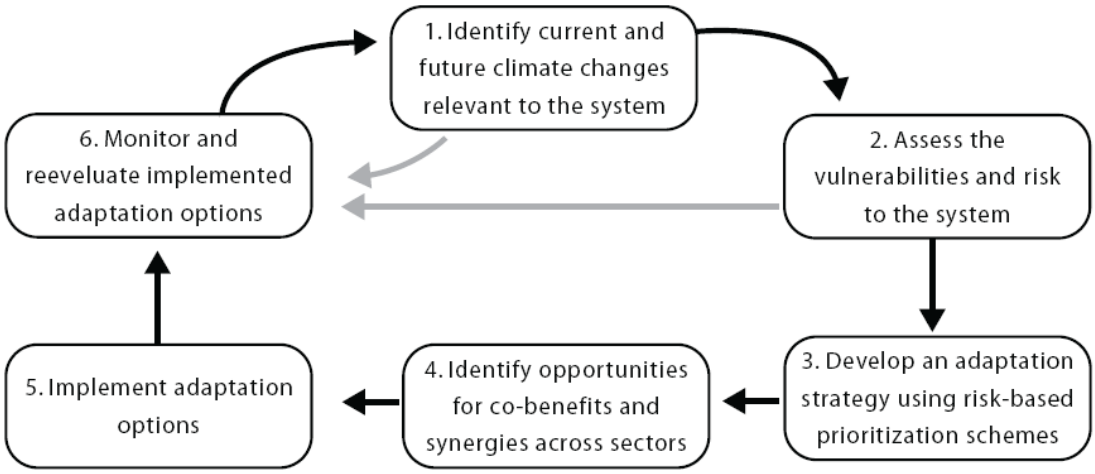


Figure 13.1 Adaptation planning is envisioned as a cyclical, iterative process incorporating these six steps (NRC 2010a).

The adaptation/resilience process is complex and must include partnerships for cross-disciplinary coordinated response from many sectors including financial, technical, governance, and social. In the future, as groups move from risk and vulnerability assessments to strategic adaptation planning and implementation, it is anticipated that there will be a shift in activities and information needs that place more emphasis on costs, benefits, and co-benefits of adaptations. As efforts advance, evaluation of adaptation efforts will become important in decision making.

The remainder of this section includes a high level summary of some of the findings and implications from the southeastern US study, organized by major theme (temperature change; precipitation change; human health; built environment; energy; forests) as a starting point for identifying climate change implications (step 1 in figure above) that will need to be considered in adaptation planning. The discussion includes agricultural interests because of the Carrboro's commitment to supporting farmers.

Temperature Change

Increasing temperatures and the associated increase in frequency, intensity, and duration of extreme heat events will affect public health, natural and built environments, energy, agriculture, and forestry. 2014 National Climate Assessment: Southeast Region

Since the 1970s, temperatures have steadily increased in the southeastern US, with the most recent decade (2001 to 2010) noted as the warmest on record. A portion of this warming may be due to increased nighttime temperatures resulting from human development of the earth's surface. There is better scientific agreement and overall confidence in temperature projections, which indicate an overall increase through the end of the 21st century. Increases in the length of the growing season, the number of cooling degree days, the number of consecutive hot days, and interannual temperature variability are all projected to occur.

Non-native, invasive species will increase due to less frequent and shorter durations of cold temperatures caused by climate change. Increasing summer heat stress will reduce crop productivity,

especially if it occurs during flowering and seed set and if it is combined with drought. Warm temperatures during the winter months reduces fruit set on crops that have a chilling requirement. These adverse impacts can be partly offset through the application of growth regulators, but such methods increase costs of production. Heat stress already limits production of dairy and livestock, especially during summer months. An increased frequency of heat stress events will have the potential to force some dairy and livestock production northward.

Warming air temperatures likely will increase regional drying through increased forest water use via evapotranspiration (ET) regardless of changes in precipitation, and this drying will likely increase wildfire risk across southeast USA forests. Longer growing seasons will likely increase the risk of insect outbreak and very likely will expand the northern range of some species, such as the southern pine beetle.

Precipitation and Runoff

Mean annual precipitation may slightly increase in North Carolina through the first half of the 21st century. The greatest changes are expected during the summer months. However, water availability in central North Carolina is not expected to increase, as evapotranspiration will also increase. Interannual precipitation variability has increased across the southeast region, with more exceptionally wet and dry summers compared to the middle of the 20th century.

Flood frequency likely will increase as a result of predicted increased numbers and intensity of storms. Floods cause direct damage to crops, especially if they occur during fruit set or near crop maturity, as well as indirect damage through soil erosion, leaching of nutrients, and loss of future productivity. More frequent droughts coupled with increasing water demands from greater evapotranspiration (ET) and growing human consumption may result in more frequent stream drying, even in systems historically considered perennial.

Under most scenarios and locations in the southeast, the net effect of temperature and precipitation changes will result in a greater uptake of soil water by forests and lead to reductions in streamflow. Future climate warming likely will increase water loss through evapotranspiration (ET) due to increased evaporative potential and plant species shift. Greater ET can decrease total streamflow, groundwater recharge, flow rate, and regional water supplies.

Regionally, water supply stress is projected to increase significantly by 2050 due to hydrologic alteration caused by climate change and increased water use by key economic sectors, such as domestic water supply, irrigation agriculture, and power plants. Water supply stress will become most severe in the summer season when normal rainfall is typically not sufficient to meet evaporative demand of the atmosphere. Declining runoff and increasing demands for water resources are likely to increase the pressure on the existing reservoirs, leading to deeper and longer lasting drawdowns. Runoff and soil erosion potential are projected to increase in some areas due to changes in rainfall that either increase rainfall erosivity or decrease vegetative cover protection.

Human Health

Climate change is expected to have a broad impact on human health. Major categories for human health consideration in central North Carolina include: extreme weather events (e.g., more extreme heat events); air quality and respiratory/airway diseases; vector-borne and zoonotic disease; water

quality and quantity; and healthcare disruption. Health impacts in other areas, such as mental health and food security may also occur, but more research is needed to determine the potential effects.

Rising air temperatures will worsen heat waves and increase levels of harmful pollutants such as ozone. Shifts in precipitation are expected to lead to more extreme precipitation events that can cause direct injury and other related health effects. Vector-borne disease like dengue and malaria could be affected by rising temperatures and shifting precipitation patterns.

Built Environment

Development of adaptation plans to maintain built environment infrastructure are imperative to cope with the effects of climate change and to ensure built environment sustainability. Because of the complexity of the built environment and its supporting ecosystems, we must operate at a component-by-component level to assess various types of adaptability measures needed to make the individual systems sustainable and resilient. Good stewardship of the resources that comprise the subcomponents of systems related to the built environment, as well as climate change adaptation planning, are primary requirements of success in dealing with these challenges. Both "grey" and "green" infrastructure should be considered. Areas of the built environment likely to be affected by climate change (and not described under other headings) include: the urban heat island effect; the urban wildland interface; tourism; poverty and socio-economic vulnerability; migration, and security.

Energy Sector

As the climate changes, concerns exist for energy services due to the potential for changing patterns of demand, such as increased demand for air conditioning, as well as the potential impacts on electricity generating capacity and energy distribution infrastructure. Improvements in both energy efficiency and renewable energy generation provide a large potential for a more resilient energy sector.

Forests

Despite climate and land use changes, forests in the southeastern USA will likely continue to provide a sink of atmospheric carbon dioxide (CO_2). There is potential for mitigating $C0_2$ emissions through carbon sequestration in soils and plant biomass. Protection of these natural carbon sinks in the face of development pressures is an important issue for climate change mitigation. The potential savannafication of the southeast, in which forests are converted into more open woodlands due to a combination of hotter and drier conditions, is one of the most significant potential climate change impacts in the USA.

References

Ingram, K., K. Dow, L.Carter, J. Anderson (eds). Climate of the Southeast United States: Variability, Change, Impacts, and Vulnerability. Washington, D.C. Island Press, 2013.

NRC (National Research Council), 2010. Adapting to the Impacts of Climate Change. Washington, D.C. National Academies Press,

Glossary and Acronyms

ASHRAE: The American Society of Heating, Refrigerating and Air-Conditioning Engineers, founded in 1894, is a global society advancing human well-being through energy efficiency, indoor air quality, refrigeration and sustainability within the industry. https://www.ashrae.org/about-ashrae/

Capstone: "Capstone" refers to the Capstone Research Projects of the UNC Institute for the Environment. These projects bring together the education, research and outreach/service missions of the Institute. They are conducted by teams of undergraduate students. Topics for the projects are selected from recommendations by Community Advisory Boards and other clients and focus on a significant environmental issue requiring broad, interdisciplinary research. The projects are a learning experience for our students, a chance for them to conduct team-based research typical of professional practice and the Institute's way of using the expertise of Carolina to help find solutions to the issues facing communities. http://www.ie.unc.edu/for_students/courses/capstone.cfm

Energy Efficiency Revolving Loan Fund: In the fall of 2010, Carrboro combined federal and local funding to seed a new small business loan fund aimed at improving building energy efficiency. These funds are being administered in a similar model as Carrboro's existing Small Business Revolving Loan Fund. The goals of these loans include reduced energy consumption (15-20%) and reduced energy bills for local businesses. Funds are available to all for- and non-profit businesses in Carrboro town limits with 50 employees or fewer. Applications are first-come first-served and loans are subject to availability. http://www.townofcarrboro.org/ECD/PDFs/EERLF/EERLFCarrboroDescriptionandCriteria.pdf

Energy Star: ENERGY STAR is a U.S. Environmental Protection Agency (EPA) voluntary program that helps businesses and individuals save money and protect our climate through superior energy efficiency. The ENERGY STAR program was established by EPA in 1992, and is " a basic engineering research and technology program to develop, evaluate, and demonstrate non–regulatory strategies and technologies for reducing air pollution." In 2005, Congress updated the program "establish at the Department of Energy and the Environmental Protection Agency a voluntary program to identify and promote energy–efficient products and buildings in order to reduce energy consumption, improve energy security, and reduce pollution through voluntary labeling of or other forms of communication about products and buildings that meet the highest energy efficiency standards." https://www.energystar.gov/

ESCO: An energy service company or energy savings company (acronym: ESCO or ESCo) is a commercial or non-profit business providing a broad range of energy solutions including designs and implementation of energy savings projects, retrofitting, energy conservation, energy infrastructure outsourcing, power generation and energy supply, and risk management *(from Wikipedia).*

GHG emissions: A greenhouse gas (sometimes abbreviated GHG) is a gas in an atmosphere that absorbs and emits radiation within the thermal infrared range. This process is the fundamental cause of the greenhouse effect. The primary greenhouse gases in the Earth's atmosphere are water vapor, carbon dioxide, methane, nitrous oxide, and ozone. Greenhouse gases greatly affect the temperature of the Earth; without them, Earth's surface would average about 33 °C colder. Emissions refer to the process and quantity of gas being released into the atmosphere from various sources.

HPwES: The Home Performance with Energy Star is a national program that has supported over 330,000 homeowners with whole house improvements that improve comfort and indoor air quality while reducing energy bills. http://www.energystar.gov/index.cfm?fuseaction=hpwes_profiles.showsplash

ICLEI: An organization "International Council for Local Environmental Initiatives," but in 2003 the organization dropped the full phrase and became "ICLEI-Local Governments for Sustainability". http://www.iclei.org

LED lights: LED lighting products use light emitting diodes to produce light very efficiently. An electrical current passed through semiconductor material illuminates the tiny light sources called LEDs. The heat produced is absorbed into a heat sink. LEDs are now being incorporated into bulbs and fixtures for general lighting applications. LEDs are small and provide unique design opportunities.

Portfolio Manager: EPA created ENERGY STAR Portfolio Manager®, an online tool to measure and track energy and water consumption and greenhouse gas emissions based on the premise that you can't manage what you don't measure. It is used to benchmark the performance of one building or a whole portfolio of buildings, all in a secure online environment. http://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/use-portfolio-manager

Retro-commissioning: When most existing buildings were built, energy efficiency was not a major concern. The result is a building using more energy to accomplish less. Even if it was fully commissioned when built, the building may not be operating at peak efficiency today. A comprehensive testing of building systems with the goal of improving quality — retrocommissioning — allows building deficiencies to be identified and corrected for optimum energy use. Retrocommissioning is a systematic process to improve an existing building's performance that will increase occupant comfort and save energy. The process can be performed alone or with a retrofit project. Typical energy savings are between 5 percent and 20 percent, often with paybacks of less than one year. Retrocommissioning consists of four phases. In the planning phase, the building systems to be analyzed are identified. The next phase determines how those systems are supposed to operate, and a prioritized list of operating deficiencies is prepared. During the implementation phase, the highest priority deficiencies are corrected and proper operation is verified. In the hand-off phase, improvements are reported and facilities managers are shown how to sustain proper operation.

Transportation Demand Management (TDM): Transportation demand management is the application of strategies and policies to reduce travel demand (specifically that of single-occupancy private vehicles), or to redistribute this demand in space or in time. In transport as in any network, managing demand can be a cost-effective alternative to increasing capacity. A demand management approach to transport also has the potential to deliver better environmental outcomes, improved public health, stronger communities, and more prosperous and livable cities. http://mobilitylab.org/2013/09/18/tdm-is-not-scary-a-101-on-transportation-demand-management/

Solarize Carrboro: Solarize Carrboro is a collaboration between NextClimate (a Carrboro-based non-profit), the Town of Carrboro, and the NC Solar Center that makes solar simple and affordable. The solar installer partners are Southern Energy Management and Yes! Solar Solutions. http://solarizenc.org .

WISE Program: The Town of Carrboro conducted a Town-wide energy efficiency program for small commercial business owners and homeowners from 2010-2013 with federal stimulus funding. The program was a collaboration between the Carrboro, Chapel Hill, the Southeastern Energy Efficiency Alliance, Clean Energy Solutions (CESI), Clean Energy Durham, and a network of prequalified contractors.

Appendix I

Summary of Carrboro's Greenhouse Gas Emissions Inventories and Status for Cities for Climate Protection Five Milestones

A common theme discussed in this Plan and principle impetus for pursuing the Plan is the reduction of greenhouse gas (GHG) emissions. The baseline of GHG conditions below establishes a foundation for planning. As discussed in Appendix 4, climate change has multiple and far-reaching environmental, economic, and social effects. In order to begin to mitigate the effects of global warming, Carrboro is emphasizing the importance of understanding its GHG emissions profile. Table 1 summarizes the date and focus of previous inventories.

Table 1. Summary of Previous Greenhouse Gas Inventories

Inventory Date	Inventory Focus	Completed By	Link
2005	All emissions in county	ICLEI and local governments	http://www.co.orange.nc.us/ercd/greenhousegas.asp
2009	Carrboro municipal and community	UNC Capstone Team	April 19, 2011 Board of Aldermen agenda item at http://www.townofcarrboro.org/BoA/Agendas/2011/04_19_2011.htm
2011	Carrboro municipal	Chris Lazinski	April 3, 2012 Board of Aldermen agenda item at http://www.townofcarrboro.org/BoA/Agendas/2012/04_03_2012.htm
2012	Carrboro municipal	Chris Lazinski	June 18, 2013 Board of Aldermen agenda item at http://carrboro.legistar.com/Calendar.aspx

A baseline greenhouse gas emissions inventory provides a starting point for planning for emissions reductions, and is considered to be one of the 5 milestones of the CCP 5 Milestone process (Table 2).

Table 2. Cities for Climate Protection Five Milestone Process

Milestone	Description	Notes
1	Conduct a baseline emissions inventory and forecast.	See above
2	Adopt an emissions reduction target.	The Orange County inventory presented several scenarios for reduction targets. The Board of Aldermen adopted a climate protection resolution in 2009. Further articulation of the resolution using a 2%-7% annual reduction goal is currently being reviewed.
3	Develop a Local Action Plan	The Orange County inventory and above agenda items presented preliminary concepts for inclusion in a Local Action Plan.
4	Implement policies and measures	As described in plan.
5	Monitor and verify results	The Town has been involved in annual monitoring of municipal emissions for the past two years, and worked with a UNC Capstone team on emissions estimates in 2011.

Standard greenhouse gas (GHG) reporting classifies emission types into three types or “scopes”. Scope 1 emissions are direct emissions resulting from the combustion of fuel on-site. Examples of Scope 1 emissions include vehicular tailpipe emissions from vehicles and emissions from burning natural gas to heat buildings. Scope 2 emissions are indirect emissions associated with the consumption of purchased or acquired energy. Scope 2 emissions primarily result from electricity consumption. Scope 3 emissions are other indirect emissions not covered in Scope 2, such as the extraction and production of purchased materials and fuels, electricity-related activities such as transmission and distribution losses, outsourced activities, and waste disposal.

UNC Capstone Team Inventory (2011)

The UNC Capstone team inventory summary is shown in Table 4.

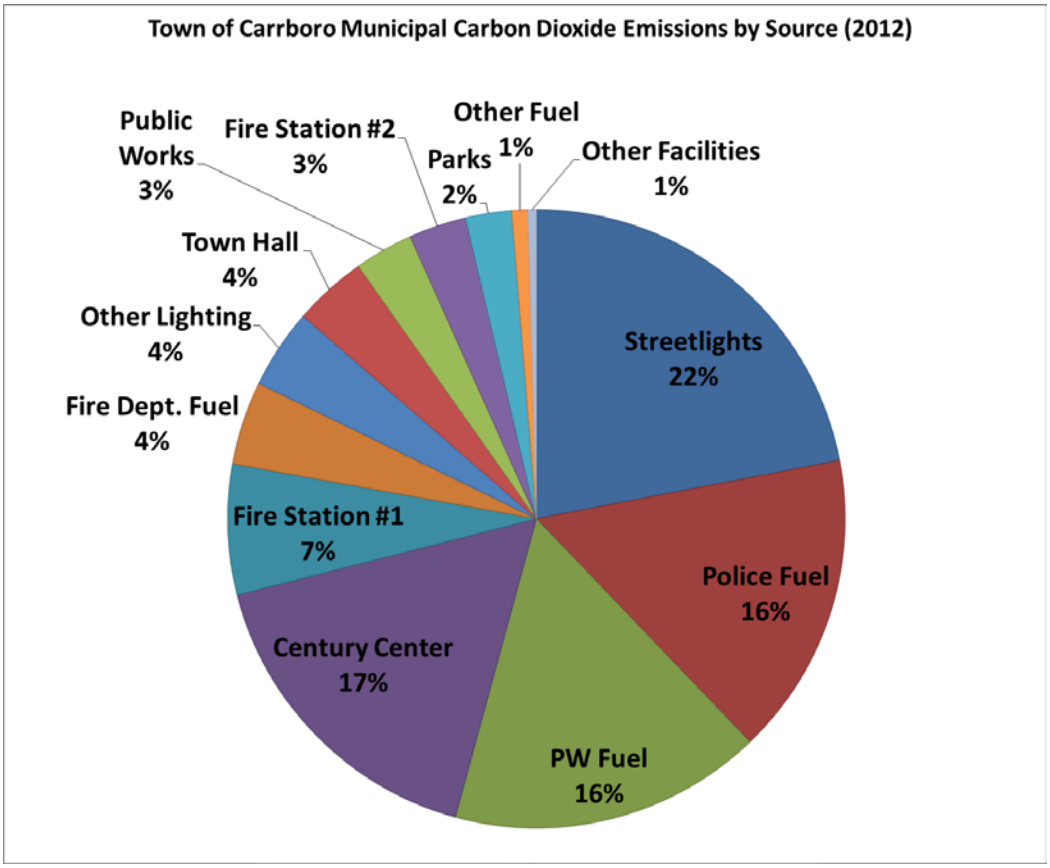
Municipal Inventory (2012, 2013 Update)

One conclusion from the Town’s municipal inventory is that the Town total emissions of roughly 2k metric tons of carbon dioxide equivalents (MTCDE), is a little less than 2% of the 115k total community inventory, including all community and public sources (Figure 1).

TABLE 4: UNC Capstone Inventory	Scope 1 GHGs (MTCDE)	Scope 2 GHGs (MTCDE)	Scope 3 GHGs (MTCDE)	Row Total (MTCDE)
Town of Carrboro Municipal Sources (excludes school and OWASA sources)				
Buildings and Facilities	100	484	-	584
Streetlights, Floodlights and Traffic Signals	-	467	-	467
Vehicle Fleet	676	-	-	676
OCSW	-	-	55	55
Public Transit* (Chapel Hill Transit)	-	-	960	960
Municipal Subtotals *(excluding Scope 3)*	***776***	***951***	**-**	***1,727***
Municipal Subtotals *(including Scope 3)*	***776***	***951***	***1015***	***2,742***
Town of Carrboro Public Sources (includes municipal, school, OCSW and OWASA sources)				
Schools (within municipal limits)	1,292	4,651	-	5,943
OWASA	-	-	2,030	2,030
Public Subtotals *(excluding Scope 3)*	***2,068***	***5,602***	**-**	***7,670***
Public Subtotals *(including Scope 3)*	***2,068***	***5,602***	***3,045***	***10,715***
Town of Carrboro Community Sources (excludes public sources)				
Residential	8,430	44,691	-	53,121
Commercial	1,782	16,687	-	18,469
Industrial	15	39	-	55 (due to rounding)
Transportation (within municipal limits)	31,576	-	-	31,576
OCSW	-	-	1,678	1,678
Community Subtotals *(excluding Scope 3)*	***41,803***	***61,417***	**-**	***103,220***
Community Subtotals *(including Scope 3)*	***41,803***	***61,417***	***1,678***	***104,899*** (due to rounding)
Town of Carrboro Sources (includes community and public sources)				
Town total *(excluding schools, excluding Scope 3)*	42,579	62,368	-	***104,946***
Town total *(including schools, excluding Scope 3)*	43,871	67,019	-	***110,889***
Town total *(including schools, including Scope 3)*	43,871	67,019	4,723	***115,614*** (due to rounding)

* For this table, Chapel Hill Transit buses GHG emissions are considered as Scope 3 relative to Carrboro because the Town of Chapel Hill administers the service.

Figure 1[1]



POLICY AND IMPLEMENTATION RECOMMENDATIONS FROM INVENTORIES

The community and organizations the Town partners with are encouraged to refer to these inventories for additional recommendations, with examples provided below.

From the Orange County Inventory:

∞ Explore further retrofits on all municipal buildings;

∞ Evaluate fleet for improvements to fuel efficiency and the use of alternative fuels;

∞ Further advance green purchasing policies;

∞ Study the viability of alternative vehicles (e.g., hybrids) for their fleets; and

∞ Solar panels (alternative energy source) installed on all LED traffic signals or flashers to power them.

[1] Inventory update completed by Chris Lazinski, first as a UNC DELTA Fellow and then under contract. Emissions are shown for 2012. For future calculations, staff intend to use a 3-year average as a baseline.

Recommendations for ways in which the various communities can reduce emissions in the community sector include:

∞ Further partnership development between the jurisdictions and the local utilities;

∞ Work with state and federal programs that could be implemented within the jurisdictions;

∞ Reduce single occupancy vehicle (SOV) trips throughout the jurisdictions through transportation demand management (TDM) initiatives, and promotion of non-motorized transportation planning principals; and

∞ Further partnership development with community groups and local businesses.

From the UNC Capstone Inventory:

All traditional incandescent light bulbs should be replaced with compact fluorescent light bulbs (CFLs) or Light-Emitting Diodes (LED)s.

Purchase Energy Star appliances when replacing outdated equipment, and they should be promoted to the residential and commercial sectors of Carrboro

Setpoints: Room temperature should be adjusted seasonally; UNC Energy Management policy, for example, recommends setting summer indoor temperatures to 76-78°F and winter indoor temperatures to 69-71°F

Set up an energy resource center of its own, perhaps in the form of an Energy Efficiency Exhibit at the Century Center

Encourage energy conservation in its municipal buildings by holding a competition between occupants of different town buildings for the greatest percent reduction in energy intensity.

From the municipal inventory (Lazinski):

It is recommended that Carrboro explore the feasibility and fiscal impact of implementing a GHG reduction policy that sets an annual reduction goal of 2% of 2007 levels per year annually through at least 2025. An annual percent reduction strategy is recommended because it provides the most easily measurable goal for the Town to pursue. Implicit in future efforts would be exploration of the best financing mechanisms for pursuing efforts, whether it is through performance contracting, an internal revolving fund or “energy bank”, community investing in renewable energy, or other ways to finance projects through energy savings, as well as possibly through debt servicing such as Qualified Energy Conservation Bonds.

Appendix II: Summary of Recommended Energy Improvements for Municipal Buildings, 2010 Study (Big Woods Engineering)[1]

Building/Improvement	**Upfront Cost**	**Annual Energy Savings**	**Annual Cost Savings**
Town Hall: 1) Lighting retrofit: T12 to T8 fixtures/lamps (50% delamping); Incandescent to CFL; Exit signs to LED 2) Heat pump replacement : 4 units (2,3,4,5 ton), 6 SEER to 16 SEER	$30k	44,865 kWh	$4030
Fire Station #1: 1)Lighting retrofit: T12 to T8 fixtures/lamps (50% delamping); 2) Heat pump replacement : 4 units (3 ton), 8 SEER to 16 SEER	$23k	19,700 kWh	$1170
Public Works:1) Lighting retrofit: T12 to T8 fixtures/lamps (50% delamping)	$8k	10,270 kWh	$822
Century Center: Lighting Controls: new switches and sensors for corridors, meeting rooms, and offices- substantial wiring work required and engineer stamp. 60 fixtures are currently uncontrolled and on 24/7. Remaining fixtures to be controlled would benefit from sensors in meeting rooms, offices, and other rooms. (*Note that heating/cooling system beyond scope of Big Woods study*)	$15k	38,000 kWh	$2300

[1] Public Works staff estimate that T12 to T8 replacements are 40% complete.
The costs and energy savings have not been adjusted for inflation or other factors from 2010. More efficient (19 to 20 SEER rated), and more expensive, heat pumps are now available. The cost of a four ton 20 SEER unit currently averages about $6,500 to $7500.

Appendix III: Urban Forestry, Climate Protection, and Ecological and Community Benefits

The following discussion demonstrates why Carrboro's urban forest has a wide variety of benefits that include but are not just limited to climate protection and energy management.[1] Therefore, there is significant merit and synergy in managing the forest to reduce energy consumption and store carbon, while simultaneously forwarding many community goals.

Nationally, urban forests in the United States are estimated to contain about 3.8 billion trees, with an estimated structural asset value of $2.4 trillion. This dollar value reflects only a portion of the total worth of an urban forest. Urban trees also provide innumerable ecosystem services that affect both the local physical environment (such as air and water quality) and the social environment (such as individual and community well-being) that contribute to urban quality of life.

Urban forest services and benefits include:

Local climate and energy use—Trees influence thermal comfort and energy use by providing shade and reducing wind speeds. The establishment of 100 million mature trees around residences in the United States has been estimated to save about $2 billion annually in reduced energy costs. For example, three or more large trees strategically placed on sunny sides of a house shade it from the hot summer sun, thus reducing the air-conditioning cost as much as 30 percent.

Carbon storage—urban trees mitigate climate change by directly storing carbon within their tissues and by reducing carbon emissions from power plants through lowered building energy use. Urban trees in the conterminous United States have been estimated to store 770 million tons of carbon, valued at $14.3 billion. One acre of forest absorbs six tons of carbon dioxide and puts out four tons of oxygen. This is enough to meet the annual needs of 18 people.

Air quality—Trees improve air quality by lowering air temperatures and removing air pollutants and in doing so, reducing the impacts of emissions from both stationary and mobile sources. Urban trees in the conterminous United States have been estimated to remove some 784,000 tons of air pollution annually, with a value of $3.8 billion.

Water flow and quality—Trees improve water quality, reduce runoff and erosion, and mitigate the need for costly stormwater treatment by intercepting and retaining or slowing the flow of precipitation reaching the ground. This allows more recharging of the ground water supply. During an intense storm in Dayton, OH, for example, the tree canopy was estimated to reduce potential runoff by 7 percent. In Carrboro, increased tree canopy could have a specific regulatory benefit of helping the Town comply with rules to protect Jordan Lake by reducing nitrogen and phosphorus in runoff.

Wildlife and biodiversity—Urban forests help create and enhance animal and plant habitats.

[1] Most of information in this section extracted from Nowak, D. et al., "Sustaining America's Urban Trees and Forests". USDA Forest Service, Northern Research Station. State and Private Forestry General Technical Report NRS-62. June 2010.

Soil quality—Trees and other plants help improve soil quality by breaking up heavy soils, mining nutrients, and remediating soils at contaminated sites by absorbing, transforming, and containing a number of contaminants.

Community well-being—Urban forests make important contributions to the economic vitality and character of a city, neighborhood, or subdivision. Community involvement in urban forestry efforts has been demonstrated to contribute to a stronger sense of community and neighborhood empowerment.

Individual well-being and public health—The presence of urban trees and forests creates a more aesthetic, pleasant, and emotionally satisfying place in which to live, work, and spend leisure time. Urban trees also provide numerous health benefits. For example, tree shade reduces ultraviolet radiation and its associated health problems. Hospital patients with window views of trees have been shown to recover faster and with fewer complications than patients without such views. The reduction in airborne pollutants results in significant human health benefit such as reduced rates of respiratory disease and illness. In laboratory research, visual exposure to settings with trees has produced significant recovery from stress within five minutes, as indicated by changes in blood pressure and muscle tension.[2]

Aesthetics- trees are not only beautiful in themselves but add beauty to their surroundings. Trees add color to the urban scene, soften the harsh lines of buildings, screen unsightly views, and provide privacy and a sense of solitude and security, while contributing to the general character and sense of place in communities. The specimen trees in downtown Carrboro are a great example of this benefit.

Noise abatement—properly designed plantings of trees and shrubs can significantly reduce noise. Wide plantings (around 100 ft.) of tall dense trees combined with soft ground surfaces can reduce apparent loudness by 50 percent or more (6 to 10 decibels).

Real estate and business—landscaping with trees can increase property values and commercial benefits. One study found that on average, prices for goods purchased in Seattle were 11% higher in landscaped areas than in areas with no trees. A mature tree can often have an appraised value of between $1,000 and $10,000[3]. Landscaping, especially with trees, can increase property values as much as 20 percent.[4]

A well-recognized national nonprofit, American Forests, recommends that communities set and maintain tree canopy goals. A community can design tree cover targets that fit the policy and environmental quality needs of the community. Chapel Hill updated its tree protection ordinance, and in doing so, established minimum tree canopy standards:[5] As another local example, Raleigh recognizes the community benefits of the urban forest by treating it as a local government capital responsibility. The City not only maintains an active urban forestry program[6], but also includes significant funds for tree replacement in their capital budget. Town staff are considering using i-Tree, a state-of-the-art, peer-reviewed software suite from the USDA Forest Service, as a tool to support urban forestry efforts. The i-Tree tools help communities strengthen their urban forest management and advocacy efforts by quantifying the environmental services that trees provide and the structure of the urban forest. More information is available at http://www.itreetools.org/index.php.

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[2] Dr. Roger S. Ulrich Texas A&M University, as reported by City of Raleigh

[3] Council of Tree and Landscape Appraisers, as reported by City of Raleigh [4] ICMA, as reported by City of Raleigh

[5] http://www.townofchapelhill.org/index.aspx?page=879 (December, 2010)

[6] http://www.raleighnc.gov/neighbors/content/PRecParks/Articles/UFDivision.html

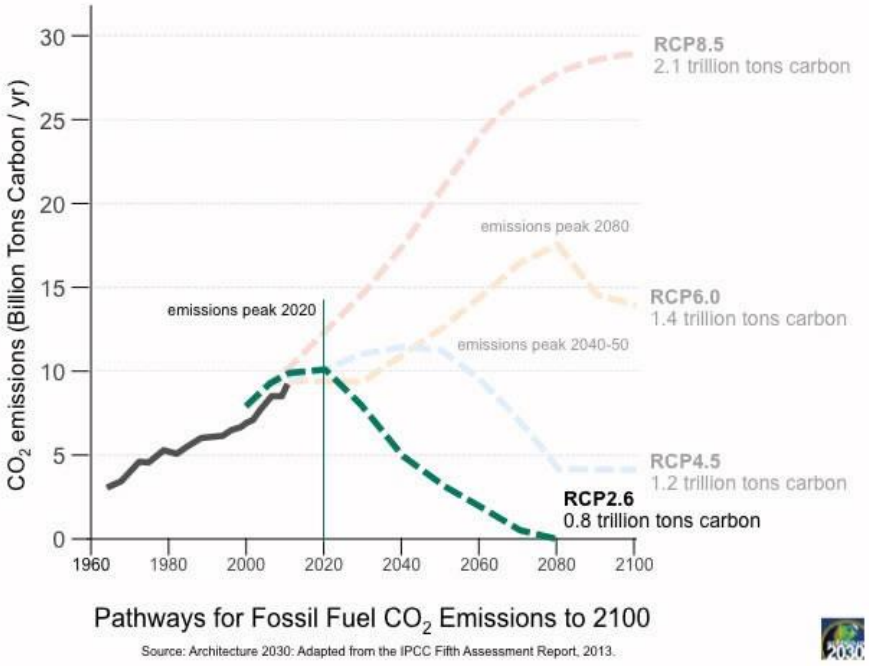
Appendix IV: Summary of Science On Climate Change

Table 1 summarizes some of the important indicators of the global impacts of climate change.

Air Temperature	**Extreme Weather Events**
The decade from 2000 to 2010 was the warmest on record[1]; 2005 and 2010 tied for the hottest years on record[2]; January through September 2012 were the warmest first nine months of any year on record for the contiguous U.S.[3]	Extreme weather events, most notably heat waves and precipitation extremes, are striking with increased frequency[8], with deadly consequences for people and wildlife
Public Health	Recent years have seen central North Carolina experiencing drops of 5 to 15 percent of annual rainfall. Availability of fresh water for drinking and other uses in much of North Carolina will also trend downward in the next 50 years, perhaps by 2.5 percent [13].
The Environmental Protection Agency determined that current and future greenhouse gas concentrations endanger public health[6]	In the US in 2011, a record 14 weather disasters (droughts, heat waves, and floods) occurred that cost at least $1 billion each in damages/loss of human lives[9]
According to the Global Humanitarian Forum, climate change is already responsible every year for some 300,000 deaths, with 325 million people seriously affected[7]	Climate change creates conditions that lead to more destructive storms like 2012's Superstorm Sandy[10], by loading storms with more energy and more rainfall[11], raising sea levels and causing storm surge to ride on a higher sea surface so that more coastline floods[12], and warming the Arctic and melting sea ice, which causes changes in the jet stream that are bringing more extreme weather to the U.S.[13]
Economic Impacts	**Sea Level Rise**
According to the Global Humanitarian Forum climate change is already responsible every year economic losses worldwide of U.S. $125 billion[7]	The world's land-based ice is rapidly melting, threatening water supplies in many regions and raising sea levels[19], and Arctic summer sea ice extent has decreased to about half what it was several decades ago[20], and reached a record low in 2012[21], with an accompanying drastic reduction in sea-ice thickness and volume[22], which is severely jeopardizing ice-dependent animals[23]
Climate change is affecting food security by reducing the growth and yields of important crops[14]; droughts, floods and changes in snowpack are altering water supplies[15]; as of October 2, 2012, 64.6 percent of the contiguous U.S. was experiencing moderate-to-exceptional drought[16]; and in 2012, the USDA designated more than half (50.3 percent) of all U.S. counties disaster areas, mainly due to drought[17]	Global sea level is rising 60% faster than projected by the Intergovernmental Panel on Climate Change[24]; the U.S. East Coast is a hotspot for sea level rise with rates three to four times faster than the global average[25]; sea level rise is accelerating in pace[26]; and sea level could rise by one to two meters in this century, threatening millions of Americans with severe flooding[27]
Biodiversity	
Scientists have concluded that by 2100 as many as one in 10 species may be on the verge of extinction due to climate change[18]	The current level of CO_2 in the atmosphere is approximately 392 parts per million[4] (ppm). One of the world's leading climate scientists, Dr. James Hansen, stated in 2008: "If humanity wishes to preserve a planet similar to that on which civilization developed and to which life on Earth is adapted….CO_2 will need to be reduced to at most 350 ppm"[5]

The International Panel on Climate Change (IPCC) Fifth Assessment Report confirms the necessity for immediate and sustained action. The IPCC report reveals how close we are to a turning point in the earth's climate system, and reveals two critical numbers that speak to the urgency of the situation:
• One trillion tons – a maximum global carbon budget of one trillion tons burned is necessary to keep global warming under two degrees Celsius above preindustrial levels; and
• 2020 – the year global CO_2 emissions must peak in order to burn less than one trillion tons of carbon (the world has already burned more than half of that to date).

The underlying conclusion of the report is that the time has arrived for taking the necessary steps to preserve livable conditions on earth: i.e., we must stop burning fossil fuels as quickly as possible. Only by peaking GHG emissions in the year 2020 or sooner, and phasing out conventional fossil fuel burning around 2080, can we stay beneath the total of one trillion tons of carbon burned, which represents the threshold of catastrophic climate change, as shown in the following graphs:



A GHG emissions peak by about 2020 (RCP 2.6) will be necessary to keep global warming under the two degrees Celsius (above preindustrial levels) threshold. If we exceed the world carbon budget of one trillion tons burned (RCP 4.5, 6.0 and 8.5), the models project the planet will keep warming and it will be virtually impossible to bring global average temperature back under the two degrees Celsius threshold.

The good news is U.S. GHG emissions peaked in 2007 and are currently 12% below 2007 levels. We must continue this trend in America. The bad news is, global GHG emissions are continuing to rise. The major driver of global energy consumption and GHG emissions over the next two decades is projected to be increasing urbanization. During this period, an area equal to a staggering 3.5 times the entire built environment of the U.S. will be redesigned, reshaped, and rebuilt in urban areas worldwide.

There is consensus among climate scientists that the increase of GHG emissions are caused by human activities such as the burning of fossil fuels, change in land use, and increased agriculture production. According to the International Panel on Climate Change (IPCC), concentrations of GHGs in the atmosphere have been on the rise since the industrial age. Currently, the concentration of carbon dioxide (CO_2) is over 390 ppm, which far exceeds pre-industrial levels and those seen in the past 650,000 years (as determined through the analysis of ice core data). According to the IPCC, the concentration of CO2 in the atmosphere will need to plateau at 450 ppm in order to stabilize emissions and the effects of climate change. Because CO_2 stays in the atmosphere for approximately 50 years, we are committed to a level of climate change from emissions already released, regardless of reductions made today.

There are six GHGs as identified by the IPCC: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFC), perfluorocarbons (PFC), and sulfur hexafluoride (SF_6). Each of these gases contributes to the greenhouse effect by trapping heat in the atmosphere and causing the global temperature to increase. The effects of climate change are already being seen throughout the world: global circulation models around the world indicate with high confidence that increased global temperature have led to a decrease in mountain glaciers and snow cover affecting water sources, increased global ocean temperatures, and melting of ice sheets. Both of the latter lead to a rise in sea levels, and in addition, an increase in ocean temperature may lead to greater storm intensity. The U.S. Environmental Protection Agency (EPA) projects that the effects of climate change on the state of North Carolina could include increased temperatures in all seasons, leading to more heat-related death and disease and affecting water quality and supply, increased precipitation resulting in flash flood events in the mountains and subsequent soil erosion, and the loss of species that have adapted to the state's historical climate.

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Appendix V:

Background on Global and National Efforts to Address Climate Change

In 1993, one year after the Rio Earth Summit, the International Council for Local Environmental Initiatives (ICLEI) launched the Cities for Climate Protection Campaign to support local governments in greenhouse gas emissions monitoring and reduction. This program is the most widely-used method to date that local governments have adopted to address global warming. Cities for Climate Protection leads participants through a five-milestone framework (see *Box 1*) to reduce emissions through policies and practices that conserve energy and develop renewable energy sources. Local governments worldwide are participating in this campaign, including hundreds of municipalities in the U.S.

On February 16, 2005 the Kyoto Protocol went into effect for the 141 countries that ratified it, which notably did not include the United States and Australia. Since then, four significant efforts have been launched to promote and support local government action on climate change:

Mayors Climate Protection Agreement. On the same day that the Kyoto Protocol went into effect, Seattle Mayor Greg Nickels issued a challenge for U.S. mayors to agree to "meet or beat" the greenhouse gas reduction goals of the Protocol in their own cities. This challenge was formalized as the U.S. Mayors Climate Protection Agreement (see *Box 2)* and passed unanimously by the U.S. Conference of Mayors in June 2005.

World Mayors and Municipal Leaders Declaration on Climate Change. At the December 2005 United Nations Climate Change Conference (which included the eleventh meeting of nations party to the UNFCCC and the first meeting of those party to the Kyoto Protocol) the parallel Fourth Municipal Leaders' Summit on Climate Change adopted the World Mayors and Municipal Leaders Declaration on Climate Change. The Declaration endorsed emissions reduction targets of 30 % by 2020 and 80% by 2050 for developed countries, and asserted the need for local governments to have a greater role in UNFCCC efforts.

Clinton Climate Initiative. In August 2006, the William J. Clinton Foundation launched a partnership with the Large Cities Climate Leadership Group by establishing the Clinton Climate Initiative. The Initiative is organizing an international purchasing consortium of the world's largest cities to bring down the cost of energy-efficient products and to accelerate development of emissions-reducing technologies. Although formal membership in the program is restricted to the world's 40 largest cities, smaller cities can receive some benefit by joining as affiliates.

Cool Counties Climate Stabilization Declaration On 16 July 2007, twelve large U.S. counties and the Sierra Club launched the Cool Counties Climate Stabilization Declaration, in which signatories pledge to reduce global warming emissions 80 percent by 2050. The Declaration also calls for vehicle fuel economy standards to be raised to 35 miles per gallon within a decade.

The U.S. Conference of Mayors, ICLEI, the City of Seattle and the Sundance Institute have partnered to make global warming information and mitigation resources-including handbooks and best practices

reports-available at a single online portal, www.coolmayors.com. The U.S. and Canadian affiliates of the international Climate Action Network include organizations that are working on global warming at the local, state/provincial, regional and national levels. Other efforts are underway at state and regional levels, such as the development of carbon "cap-and-trade" systems, renewable portfolio standards, emissions targets and climate action plans

Box 1: Cities for Climate Protection

Local governments join the Cities for Climate Protection (CCP) campaign by passing a resolution pledging to reduce greenhouse gas emissions from their local government operations and throughout their communities. To help cities achieve their goals, ICLEI then assists the cities undertake the CCP's five milestones. The five milestones of the CCP and the methodology that underlies the milestones provide a simple, standardized means of calculating greenhouse gas emissions, of establishing targets to lower emissions, of reducing greenhouse gas emissions and of monitoring, measuring and reporting performance.

The five milestones are:

Milestone 1. Conduct a baseline emissions inventory and forecast. Based on energy consumption and waste generation, the city calculates greenhouse gas emissions for a base year (e.g., 2000) and for a forecast year (e.g., 2015). The inventory and forecast provide a benchmark against which the city can measure progress.

Milestone 2. Adopt an emissions reduction target for the forecast year. The city establishes an emission reduction target for the city. The target both fosters political will and creates a framework to guide the planning and implementation of measures.

Milestone 3. Develop a Local Action Plan. Through a multi-stakeholder process, the city develops a Local Action Plan that describes the policies and measures that the local government will take to reduce greenhouse gas emissions and achieve its emissions reduction target. Most plans include a timeline, a description of financing mechanisms, and an assignment of responsibility to departments and staff. In addition to direct greenhouse gas reduction measures, most plans also incorporate public awareness and education efforts.

Milestone 4. Implement policies and measures. The city implements the policies and measures contained in their Local Action Plan. Typical policies and measures implemented by CCP participants include energy efficiency improvements to municipal buildings and water treatment facilities, streetlight retrofits, public transit improvements, installation of renewable power applications, and methane recovery from waste management.

Milestone 5. Monitor and verify results. Monitoring and verifying progress on the implementation of measures to reduce or avoid greenhouse gas emissions is an ongoing process. Monitoring begins once measures are implemented and continues for the life of the measures, providing important feedback that can be used to improve the measures over time. The five milestones provide a flexible framework that can accommodate varying levels of analysis, effort, and availability of data. This element makes the CCP both unique and innovative, by increasing its transferability amongst local governments. It is the breadth of this program that enables it to cross north/south, developed/ developing, metropolis/town boundaries and that has made it successful worldwide.

Box 2: US Mayors Climate Protection Agreement

The mayors of ten cities introduced the U.S. Mayors Climate Protection Agreement to *the U.S. Conference of Mayors on June 13, 2005, where it was passed unanimously. By mid-2007, over 600 mayors had signed the agreement. From City of Seattle, www.seattle.gov/mayor/climate*

The U.S. Mayors Climate Protection Agreement

A. We urge the federal government and state governments to enact policies and programs to meet or beat the Kyoto Protocol target of reducing global warming pollution levels to 7% below 1990 levels by 2012, including efforts to reduce the United States' dependence on fossil fuels and accelerate the development of clean, economical energy resources and fuel-efficient technologies such as conservation, methane recovery for energy generation, wind and solar energy, fuel cells, efficient motor vehicles, and biofuels;

B. We urge the U.S. Congress to pass the bipartisan Climate Stewardship Act sponsored by Senators McCain and Lieberman and Representatives Gilchrist and Olver, which would create a flexible, market-based system of tradable allowances among emitting industries; and

C. We will strive to meet or exceed Kyoto Protocol targets for reducing global warming pollution by taking actions in our own operations and communities such as:

1. Inventory global warming emissions in City operations and in the community, set reduction targets and create an action plan.
2. Adopt and enforce land-use policies that reduce sprawl, preserve open space, and create compact, walkable urban communities;
3. Promote transportation options such as bicycle trails, commute trip reduction programs, incentives for car pooling and public transit;
4. Increase the use of clean, alternative energy by, for example, investing *in* "green tags", advocating for the development of renewable energy resources, and recovering landfill methane for energy production;
5. Make energy efficiency a priority through building code improvements, retrofitting city facilities with energy efficient lighting and urging employees to conserve energy and save money;
6. Purchase only Energy Star equipment and appliances for City use;
7. Practice and promote sustainable building practices using the U.S. Green Building Council's LEED program or a similar system;
8. Increase the average fuel efficiency of municipal fleet vehicles; reduce the number of vehicles; launch an employee education program including anti-idling messages; convert diesel vehicles to bio-diesel;
9. Evaluate opportunities to increase pump efficiency in water and wastewater systems; recover waste water treatment methane for energy production;
10. Increase recycling rates in City operations and in the community;
11. Maintain healthy urban forests; promote tree planting to increase shading and to absorb C02; and
12. Help educate the public, schools, other jurisdictions, professional associations, business and industry about reducing global warming pollution.

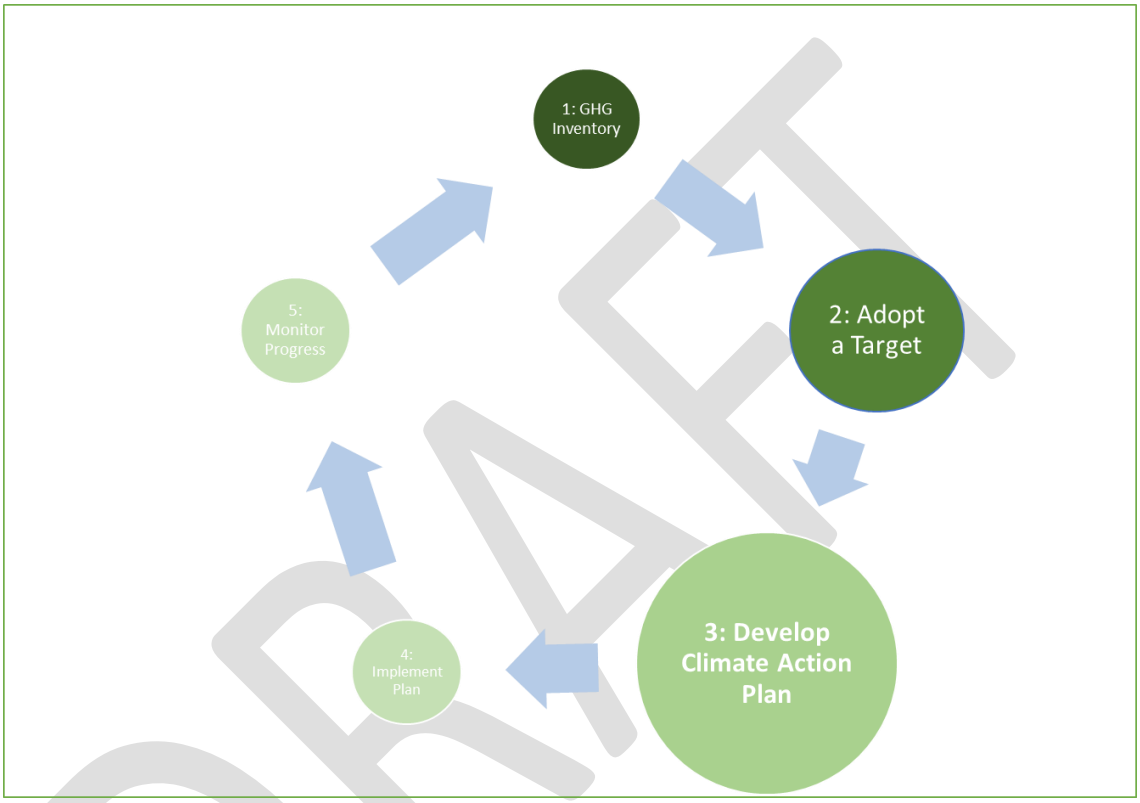
Appendix VI:

Amendments

October 13, 2020

Community Climate Action Plan

Reducing Greenhouse Gas Emissions, Saving Energy, Generating Renewable Energy, and Enhancing Ecosystems



Town of Carrboro, North Carolina

January 18, 2017

Updated October 13, 2020

BOARD OF ALDERMEN

LYDIA LAVELLE, MAYOR
BETHANY CHANEY
JACQUELYN GIST
RANDEE HAVEN-O'DONNELL
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With support from the Carrboro Energy and Climate Action Task Force:

Carolyn Buckner, Jeff Herrick, Kathy Kaufman, Jeanette O'Connor, Rob Pinder

Acknowledgments

The Carrboro Planning Board, Environmental Advisory Board, and Transportation Advisory Board for sponsoring the Fall Forum series on Energy and Climate Action held at the Carrboro ArtsCenter in 2014 and their review of a draft of this plan.

The Carrboro Board of Aldermen for adopting a proactive climate protection resolution, and feedback on a draft of this plan.

Those who have worked to develop and support previous greenhouse house gas inventories for Carrboro and Orange County.

The many people and organizations in the community involved in climate action work.

Lindsay Paydon and Katherine Kershaw for input into drafting of food/dietary related recommendations.

Table of Contents

Executive Summary

In 2009, the Carrboro Board of Aldermen passed a resolution committing the Town to take steps to reduce emissions of greenhouse gases that are causing global climate change. In doing so, and through work leading up to the resolution with other Orange County governments, the Town joined a group of more than 1000 cities, towns and metropolises around the world who are taking part in the Cities for Climate Protection Campaign. The campaign follows a 'Five Milestone' process that includes a greenhouse gas (GHG) emissions inventory, establishment of an emissions reduction target, development and implementation of an action plan to reduce emissions, and monitoring of emissions reductions measures.

This document expands on previous efforts, with an emphasis on completion of the second milestone – further articulation of a reduction target, and the third milestone – the drafting of a Local Climate Action Plan. In 2014, Carrboro developed a plan focusing on the Town's municipal operations. This plan is a companion and follow up to that effort with an emphasis on measures that the broader community is asked to take in order to achieve GHG reduction targets. The recommendations offered are intended to reduce greenhouse gas emissions, while raising the community's awareness of and involvement in solutions to global climate change and a post-carbon energy future, adaptation to changes and enhancement of ecosystem resilience.

A significant recommendation of this report is for the Town and community to adopt a goal of a ~~50~~80% reduction in greenhouse gas emissions by ~~2025~~2030, (UPDATED 10-13-20) as supported by a broad community campaign. Additional recommendations are provided around the themes of community integration, energy efficiency of buildings, transportation, renewable energy, and ecosystem protection and restoration. Measures outlined in the Plan to reduce greenhouse gas emissions not only contribute to overall climate change mitigation, but can also provide the community with many local benefits such as financial savings through energy efficiency, the creation of new jobs, improved air quality and public health, and a healthier forest and streams.

The degree to which the broad campaign advocated for in this plan takes off will depend on many factors. The following direction is suggested to build momentum: 1) focused attention is needed to more rapidly reduce energy use in buildings; 2) the Town needs to devote more resources towards implementing the plan, starting with creating a Sustainability Coordinator position; 3) similarly, the efforts underway to increase transit, bicycling and pedestrian modes of travel as well as vanpooling, carpooling, and carsharing need to gain even more traction; 4) innovative efforts are needed to support residents with limited opportunities for renewable energy; 5) grass roots efforts and new partnerships need to be fostered; 6) the paradigm for local environmental/ecosystem protection and restoration needs to expand to consider the stress of climate change; and 7) last not but not least, individuals, businesses, and in effect the entire community need to take the recommendations in this report to heart.

Introduction

"Recognizing that all human economic activity is a subset of nature's economy and must not degrade its vitality is the starting point for systemic transformation of the energy system."[1]

There is widespread scientific agreement that the increasing quantity of greenhouse gases (GHGs) in the atmosphere is causing temperatures to rise and increasing the frequency and severity of extreme weather events, and that human activities are the primary cause.[2] The accumulation of greenhouse gases is a major threat to the climate stability of the earth. Arguably, no other issue threatens our planet with such dramatic, far-reaching impacts, and no other issue is so clearly a worldwide problem. The world's leading scientists predict that, in the absence of radical societal change, global average temperature will rise from 2.7 to 11 degrees F. within our children's lifetimes. Already, effects of climate change are being seen, from melting of the Arctic permafrost, to the disappearance of glaciers worldwide, to rising sea levels around islands and other low-lying areas, and the acidification of oceans. Erratic weather and extreme events such as droughts, floods, heat waves, avalanches and hurricanes are becoming more common.

The primary cause of global climate change is the burning of fossil fuels such as petroleum, coal, and natural gas. These activities release gases such as carbon dioxide and methane that accumulate in the atmosphere and trap the sun's heat, thereby warming the earth – the so-called "greenhouse effect". The greenhouse effect is essential for life on earth, but rapidly increasing levels of greenhouse gases during the past 200 years are now destabilizing the climate. Average global temperature have already risen an unprecedented 1-2 degrees F during this period, and the impacts of emissions that have already occurred will take decades to cycle through ecosystems. Carbon dioxide concentrations in the atmosphere have reached their highest level in 160,000 years, and are rising at a rate 500 times higher than ever before in history.

Richard Heinberg, Senior Fellow of the Post Carbon Institute regarded as one of the world's foremost energy and climate action experts, says this: "The most important thing to understand about the energy transition is that it's not optional. Delay would be fatal. It's time to make a plan—however sketchy, however challenging—and run with it, revising it as we go." [3]

In Carrboro, the effects of climate change over the next century are likely to be significant. They may include the migration of hardwood forests northward to cooler areas. We will have to cope with hotter summers and more frequent floods, droughts, and intense storms, with more money diverted to repair damage from these events. Our local ecosystems could experience a broad range of negative trends and losses, and ecological diversity will likely decline. All of the careful planning, stewardship of beautiful natural places, promotion of biodiversity, and other crucial work at the local level will be rendered

[1] The Energy Reader: Overdevelopment and the Delusion of Endless Growth, Tom Butler, Daniel Lerch, and George Wuerthner, eds. (Healdsburg, CA: Watershed Media, 2012)

[2] http://www.townofcarrboro.org/DocumentCenter/Home/View/1213

[3] http://www.yesmagazine.org/issues/life-after-oil/100-renewable-energy-what-we-can-do-in-10-years-20160222

meaningless if we cannot stave off the worst consequences of climate change. As members of the world community, we will have to deal with challenges involving food security, human health, and scarce resources. Humanity is beginning to respond to the unprecedented transition from the industrial era to the era that is to follow. Local governments and communities can address the challenge and opportunity of the transition and specifically reducing greenhouse gases in a number of creative ways.

The 2014 Orange County State of the Environment[4] report provides a similar message:

"A report focused on Orange County alone also risks underemphasizing global climate change, the most pressing environmental threat we face. Our use of fossil fuels here, whenever we start a car engine or run our air conditioners, adds to the accumulation of carbon in the atmosphere that is rapidly destabilizing our climate. In 2012, leading climate activist and writer Bill McKibben summarized how close we are to reaching the limits of our carbon budget: *Scientists estimate that humans can pour roughly 565 more gigatons of carbon dioxide into the atmosphere by midcentury and still have some reasonable hope of staying below two degrees [Celsius] increase in global temperature. ("Reasonable," in this case, means four chances in five, or somewhat worse odds than playing Russian roulette with a six-shooter)….Reaching or surpassing that two degree rise in average global temperatures risks catastrophic consequences for our ability to grow food, maintain access to drinking water, and generally perpetuate human civilization as we now know it."*

Beyond Doom and Gloom

What we're for is leaving behind the current energy economy, which is wasteful, polluting, and centralized; assumes perpetual growth; and is anchored by nonrenewable fuels. We envision a bold leap toward a future energy economy that fosters beauty and health; that is resilient because it emphasizes renewable, community-scale energy generation; that supports durable economies, not growth; and that is informed by nature's wisdom.[5]

The previous section presents a stark, sobering, and ominous picture and one that we all need to acknowledge and recognize. However, only laying out the danger associated with climate change neglects humanity's capacity, ingenuity, and adaptability. It also can be counterproductive by effectively triggering a "fight and flight" response, or being received as a judgment for denial and lack of action. The reality of climate change also presents tremendous opportunity for transition to living in a more satisfying, resilient, and connected community that is less reliant on fossil fuels. [6] In addition, some measures are often necessary and/or more effective at the municipal/community level than at other levels. This plan is intended to inspire this community and others to accelerate and ramp up efforts, and begin to make significant reductions in the level of climate-changing gases now being produced.

[4] http://www.orangecountync.gov/document_center/DEAPR/2014_SOE_complete_report.pdf

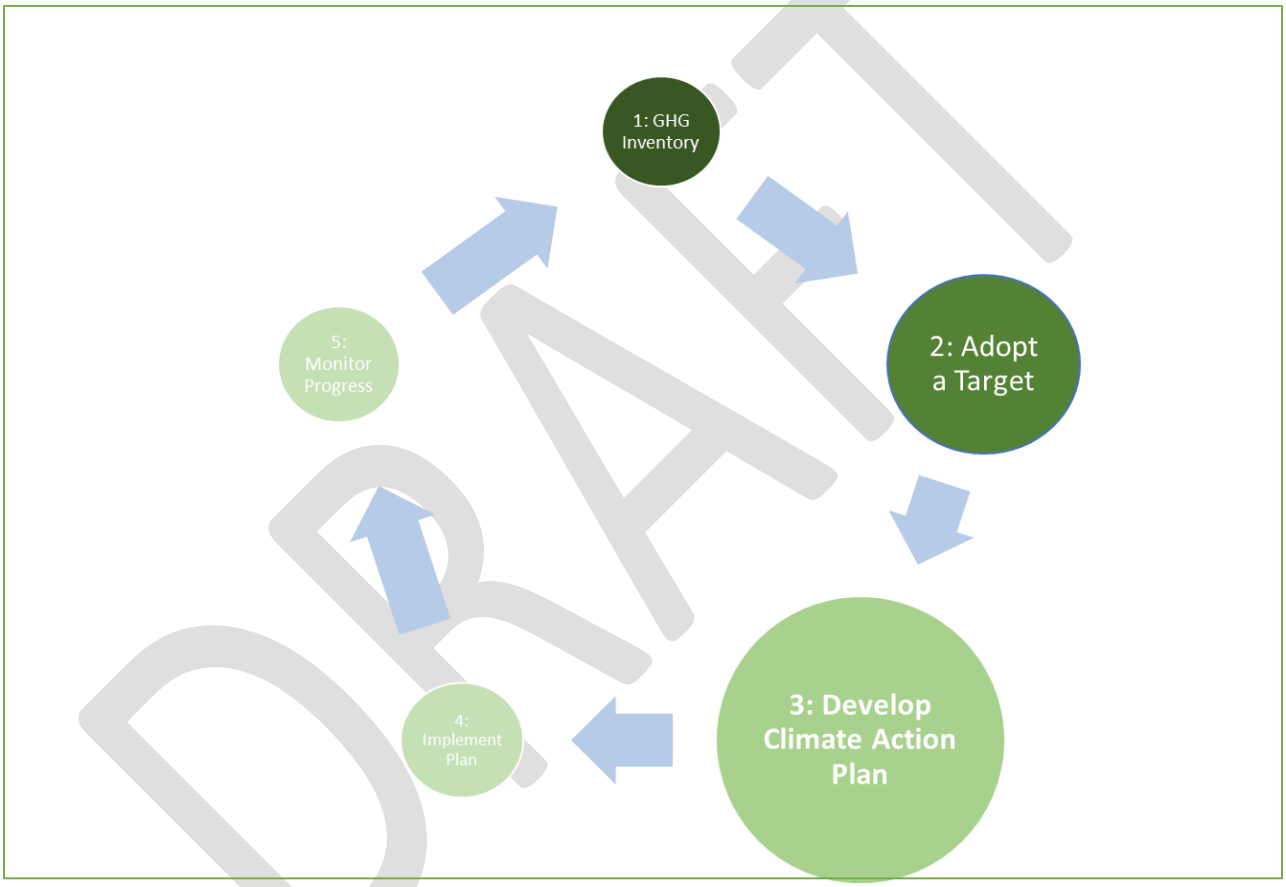
[5] The Energy Reader: Overdevelopment and the Delusion of Endless Growth, Tom Butler, Daniel Lerch, and George Wuerthner, eds. (Healdsburg, CA: Watershed Media, 2012)

[6] http://www.wri.org/news/2014/10/release-new-analysis-highlights-opportunities-economic-gains-climate-action-united

The Cities for Climate Protection Campaign and the Five Milestone Process

The Cities for Climate Protection (CCP) campaign is a global project led by the International Council for Local Environmental Initiatives (ICLEI), a membership association of local governments dedicated to addressing global environmental problems through local action. The CCP was established by ICLEI in 1993 at an international summit of municipal leaders. The CCP has engaged many municipal governments in North Carolina, the U.S and abroad in a worldwide effort to slow the earth's warming. The CCP campaign follows a 'Five Milestone' process (Figure 1).

Figure 1:
Cities for Climate Protection Five Milestone Climate Action Planning Process.



The size of each circle indicates the relative emphasis in this plan. The darkness indicates the amount of attention already given to each milestone based on work in Carrboro over the past decade, as discussed in the text.

The Greenhouse Gas Emissions Inventory[7]

Carrboro collaborated with other jurisdictions in Orange County and ICLEI to complete the first county-wide Greenhouse Gas Emissions Inventory for the baseline year of 2005. In 2011, a UNC Capstone Team completed a community scale inventory specifically for Carrboro based on data for 2009. Every year beginning in 2012, the Town has updated the municipal operations inventory, and in 2015, a second UNC Capstone Team updated the community inventory based on data for 2012 and assisted the Town in entering the inventory data into the ClearPath software which will help the Town with future climate action planning steps. These inventories help establish a baseline and guide the community to develop and implement strategies to mitigate emissions by understanding the sources and quantity of emissions. They also provide a means to monitor changes over time.

Establishing Emissions Reductions Goals

The county-wide inventory included an initial attempt to identify potential goals in terms of "tiers" of "least aggressive" to "most aggressive" climate action strategies. In 2009, the Board of Aldermen passed a resolution resolving that the Town "will seek, and will facilitate the community at large, to cut CO_2 emissions by its proportion of the amount which is required to stabilize the climate back to <350 ppm of CO_2 …, and asks staff to evaluate how to achieve this target for municipal operations and the community".[8] As part of municipal inventories, annual reduction goals of 2-7% have been discussed and the 2014 plan set a goal of a reduction in emissions from municipal operations on the order of 5-10% within a 2 year time frame. Other notable climate goals are listed in the table below.[9] In its Clean Power Plan to reduce carbon dioxide emissions in the power sector, EPA has set a unique target emissions rate for each state to achieve by 2030. 8 states are asked to reduce emissions by 41%-50%, 24 states are asked to reduce emissions by 31%-40%, and the remainder of the states are asked to reduce emissions by 30% or less. 8 large US cities have signed on to the Carbon Neutrality Alliance.

[7] More information on previous inventories is available on the Town's website: http://www.townofcarrboro.org/271/Greenhouse-Gas-Inventories

[8] 1990 is when global CO_2 concentrations first surpassed 350 ppm. To date, Carrboro emissions have not been estimated for 1990. Town staff have asked those providing support with completing emissions inventories to attempt to estimate emissions for 1990. The uncertainties due to the lack of data and difficulty deriving credible assumptions have proven too great to complete this task. It is certainly hypothetically possible to "backcast" emissions. For example, some factors could lead to lower per capita emissions such as industry/technology standards (e.g. more efficient vehicles, buildings, and appliances), more availability of transit and bicycle and pedestrian infrastructure, economic factors leading to changing behavior (e.g., fuel costs), and growing awareness and concern. Other factors could lead to higher per capita emissions, such as suburbanization, less affordable housing locally, and social/cultural norms and consumer choices with higher footprints (e.g., larger vehicles and homes and less active lifestyles and more emphasis on comfort and convenience) leading to more single occupancy vehicle trips, vehicle miles traveled (this has been documented) and use of fossil fuels. Assumptions could also be derived from national/international reports, however the bias that could be introduced is uncertain.

[9] Appendix 2 outlines a hypothetical example of a "typical" American household becoming carbon neutral in 10 years.

Table 1: Examples of Climate Action Goals

Scale	Entity	Reduction Goal	Date
National/Countries	United States	26 - 28% of 2005	2025
	Department of Defense	30% reduction in energy use; 20% of energy from renewable sources	2020
	China	20% of energy from non-fossil sources	2030
States	California	40%	2030
Cities	Seattle	Net zero/climate neutral (community)	2050
	Asheville	80% from 2011 (4%/year; municipal)	2030
	Chapel Hill	60% of 2006[10]	2050
	Durham	30% (community) 50% (municipal) of 2005	2030
	Boulder, CO[11]	80% (community)	2050
Businesses	Weaver Street Market	Net zero via efficiency, rooftop solar, purchased green power	2020
Utilities	OWASA (2015 draft)	35%/5% reduction in purchased electricity/natural gas (2020 vs. 2010) Pursue biogas to energy and renewable energy projects	2020
Universities	UNC	Net zero/climate neutral	2050
	Warren Wilson College	80% of 2007/8	2020

One purpose of this Plan is to provide a new recommendation on a community scale emissions reduction goal. Climate action goals can be framed in a variety of ways to best meet a particular entity's needs and values. The Energy and Climate Action Task Force has recommended that Carrboro's Climate Action Goal: meaningfully reduce greenhouse gas emissions at a time scale that is urgent; encourage growth and shared prosperity; and be able to be measured and certified. With these criteria in mind, the Task Force has recommended this Carrboro Climate Action Goal:

It is recommended that Carrboro adopt the goal of a ~~50~~80% reduction in per capita greenhouse gas emissions by 20~~30~~25. (UPDATED 10-13-20) *We recommend a goal to cut the carbon footprint in half over the next 10 years for the entire community, Town operations, the buildings and transportation "sectors", and ultimately each resident and business.*

This goal is a meaningful reduction in carbon/greenhouse gas pollution that is consistent with the scientific recommendations calling for the large emission reductions needed to reduce the risk of

[10] Reduction is on a per capita basis. Interim goals are 5 percent by 2010, 10 percent by 2015, 20 percent by 2030, 30 percent by 2040; 45 percent by 2045, and 60 percent by 2050.

[11] Appendix 1 provides more information on the leadership Boulder is providing with local climate action.

dangerous climate change. It is both ambitious and achievable with the support of the Town and community. It is framed in per-capita terms to recognize that Carrboro continues to attract new residents and businesses and to encourage any individual, business, or organization to measure and demonstrate their progress toward the goal. Investments in energy efficiency and renewable energy offer very favorable returns and substantial reductions in energy costs. This can power a virtuous cycle, where more energy costs are reduced and more income is available for local consumers and businesses.

It is possible that many people will sense that the goal is too ambitious: too much change too quickly. Richard Heinberg recently concluded that, globally, we can achieve at least a 40 percent reduction in carbon emissions in 10 to 20 years." While there are challenges (e.g., dropping petroleum prices, technology advances allowing for new extraction practices), there are also external factors that will help, most notably a rising global awareness and conviction. Solar power is accelerating; fuel economy standards will likely continue to reduce gasoline use. The proliferation of more energy efficient lighting, appliances and heating/cooling equipment is already reducing household energy use, and transportation options with smaller emissions footprints are expanding.[12]

The Local Climate Action Plan

The U.S. Department of Energy has developed a "Guide to Community Strategic Energy Planning" that identifies two types of planning efforts: one focusing on the government operations and one focusing on the community at large.

The former (municipal plan) includes a focus on government buildings, facilities, infrastructure, and transportation; concentrates on activities for which the government has direct influence – e.g., personnel, planning, and budgeting – which means tighter control over implementation. The latter (community-wide plan) is a broader plan to address activities that: expands the focus to include energy saving activities across the jurisdiction (residential, commercial, industrial, transportation, and other sectors) of the broader community; recognizes that, while local government actions can greatly influence, energize, and leverage effective activities in the broader community, the government has less

[12] Appendix 2 provides a hypothetical example of how a household can become carbon neutral in 10 years. Appendix 3 presents a discussion of how to approach this goal from a social and psychological perspective.

direct control over these activities in comparison to a government-only plan. This plan focuses on the community-wide plan.

The measures recommended below provide the basis for the first comprehensive community scale climate action plan specifically for Carrboro. They are a companion to measures presented in the 2014 plan that focused on municipal operations. Other local governments and agencies and UNC continue to be engaged in similar locally relevant efforts[13,14,15]. To emphasize, the Task Force has recommended that the Town pursue a two-part climate action strategy. Strategy 1 is to provide leadership by following through with the recommendations outlined in the 2014 report. The Town of Carrboro efforts to reduce emissions sets an example for residents, businesses, and institutions. Strategy 2 is to further develop a community based initiative as detailed in this document and guided by the recommended Carrboro Climate Action Goal in tandem with a goal to protect and restore local ecosystems. Details for how to pursue these broader goals is provided in the following sections, starting with the critical element of the mobilization of the Carrboro community in support of the goals of this plan.

Community Integration

"Local" climate action planning has important but limited influence within a personal to global continuum (Table 1). The collective behaviors, norms, and plans and agreements at lesser and greater social scales than that of a town of ~20k people arguably have greater influence on GHG than the municipal/community scale. A very large share of the GHG footprint in the community occurs because of the collective impact of private decisions made by residents and businesses for which the Town has very limited involvement and oversight, and also within a global social context and the constraints of state, federal, and international laws, regulations, agreements and corporate (large scale) decisions. In terms of other levels of organization and governance and how they interact with community scale climate action planning, the following are important (and in some cases unique) points in Carrboro and indicate the Town's interdependence with many other entities in pursuing climate action planning:

1) The Chapel Hill-Carrboro City School system and OWASA both have separate policy, fiscal, and administrative processes from the Town, and therefore, different boards and staff. They also have larger emissions, facilities and operating budgets than Carrboro has, and therefore, an ability to have a greater influence on emissions reductions;
2) Transit is a public service that has the ability to significantly mitigate emissions. Chapel Hill Transit is a cooperative effort between Carrboro, Chapel Hill and UNC; GoTriangle is a multi-county/regional transit authority serving over a million people;
3) Carrboro on its own has very limited influence on larger electricity and natural gas utilities. Duke Energy provides electrical service to over 90% of Carrboro. Carrboro is also served by Piedmont Electric Membership Cooperative, which buys its electricity from Duke for resale. PSNC is the local natural gas provider. This is in contrast to local governments operating municipal utilities.

[13] http://www.townofchapelhill.org/town-hall/departments-services/planning-and-sustainability/sustainability
[14] http://www.owasa.org/energy-management
[15] https://climate.unc.edu/GreenhouseGasInventory

4) Carrboro's largest emissions sector is buildings, with most building emissions being residential, and most of the residential sector being non-owner occupied. Oversight by the North Carolina Utilities Commission, management by the above utilities, and regulation by building codes (which are established at state/federal levels) are strong non-market/public sector drivers that influence emissions from buildings. Landowner and landlord management and decisions are strong private sector drivers. Social/cultural norms influence both public and private sectors.
5) The Town has very limited oversight of Homeowners Associations (HOAs) (less in fact than the state of North Carolina). Carrboro did recently update regulations to limit new HOAs ability to constrain an individual homeowner's desire to pursue sustainability measures.

Table 1: Local Climate Action Planning is One Layer in a Continuum [16]

Organizational Scale Examples	**General Scale (population)**	**Climate Action "Primary Domain" Examples**
Personal	1 person	Personal choices (e.g., dietary, housing, transportation, vocation, financial, consumer)
Household/family	~2-10 people	"Home economics" (e.g., housing, transportation, landscaping/gardening, financial, consumer)
Neighborhoods, small businesses, clubs, nonprofits, congregations	~10-100 people	Small organization organizing, management, fossil fuel divestment
Schools, co-ops, businesses, congregations, corporations	~100-1000 people	Business/organization planning and management; fossil fuel divestment
Small towns, colleges, co-ops	~1k-10k people	Sustainability plans; land use and transportation; local living economy; fossil fuel divestment
Towns, small utilities, universities	~10k-100k people	Local climate action plans; land use and transportation; local living economy; fossil fuel divestment
Cities, medium utilities, counties	~100k-1M people	Local climate action plans; land use, transit/transportation; local living economy; fossil fuel divestment
Regions, states, large utilities/utility commissions	~1M-10M people	Transit/transportation/utility policy and regulation; State law; Building Code; fossil fuel divestment
Nations, international	~>10M people	Climate summits/agreements; carbon pricing; IPCC; building code; federal laws; trade agreements; multinational corporate policy; fossil fuel divestment

6) At a municipal scale, Carrboro's "primary domain" or area of most effective focus for local climate action planning could be in partnership with organizations and entities operating at a similar scale. Similarly, for work in the community, it is important to establish initiatives and measures that work at the appropriate scale, and to bridge gaps across the different scales.

[16] This table does not fully address continuums of access to capital and decision making authority, nor to sociological and cultural dimensions; all add complexity.

7) The community sector accounts for 93% of greenhouse gas emissions within Carrboro; the remaining 7% comes from local government operations. Significant community buy-in in every aspect of this plan is essential for emissions reduction and climate change mitigation.

Recommendations are offered in this section that focus on grassroots/neighborhood scale efforts and enhanced Town and community capacity for supporting a variety of climate actions. The recommendations are integrative in that they apply to all of the other recommendations provided, and are focused on community enhancement and participation.

Community Integration Recommendation #1: Create Grass Roots Partnerships to Engage Community

Create new Grass Roots Partnerships and Engage Community to be a Part of the Solution

Widespread community participation is needed to meet the emissions reduction and climate change mitigation goals of this plan. Carrboro is fortunate to have many local groups already involved in environmental outreach and climate action. In addition, many successful models for community engagement in climate action can be adapted and used here. While these are mostly grassroots efforts, leadership is needed to coordinate, adapt, promote, and sustain efforts over the long term.

Implementation Opportunities (UPDATED 10-13-20)	Many local and other groups are involved in environmental outreach and/or climate action. These include but are not limited to Transition Streets, Pete Streets, NW Earth Institute community action courses, the Solarize Carrboro model, Awakening the Dreamer Symposiums and Game Changer Intensive, K-12 Sustainability Curriculums (Chapel Hill-Carrboro City Schools is currently developing a local version), Grey to Green Initiatives, HEAT (Heat Energy Assessment Technologies), Meatless Monday Communities, Backyard Wildlife Habitat Certification Programs, and Incentive Programs. Carrboro can adapt and use programs with proven track records for community engagement~~.~~, create web -based modules to raise awareness of climate action.
Implementation Challenges	• Who will bring partners together? • Who will recruit and train community facilitators? • How can diverse populations be reached? • Who will modify programs if needed? • How will engagement/momentum be sustained considering the relatively transient population? (59% of Carrboro's residential properties are rentals).
Resources Needed (human and material)	• Money for education and promotion materials. • Leadership ideally from a nonprofit, along with Town staff. • Support such as technical assistance and loans or grants for low-income households, stakeholder incentives, etc.

Leadership	Grassroots but will need a leader or nonprofit organization to adapt, promote, and sustain efforts. _A town Sustainability Coordinator would be ideal.
Partners	Pickards Mountain Eco-Institute, Chapel Hill-Carrboro City Schools (including District Sustainability Group and Student Environmental Groups), UNC Sustainability Program, Orange County Solid Waste Program, NC Cooperative Extension Service, Chapel Hill Sustainability Officer and Committee, Transition Carrboro- Chapel Hill, NC Botanical Gardens, Carrboro Greenspace, Carrboro Bike Coalition, Solarize Carrboro, Carrboro Farmers Market, Irvin Learning Farm and Nature Center, NC Sierra Club, Friends of Bolin Creek, Morgan Valley Alliance, Home Builders Association of Durham, Orange, and Chatham, Neighborhood Homeowners Associations, Faith Based Environmental Groups, Carrboro Farmers Market, Carrboro Business Alliance, businesses, utility providers, Homeowner associations, former Pete Street participants and more
Fit with Items	Every section of this Action Plan
Time Frame	This can move forward as soon as leadership is identified. The time frame for a Sustainability Coordinator on board is a key factor.
Next Step(s)	• Identify partners; • Bring partners together and choose programs; • Modify programs for Carrboro if needed; • Work with partners to recruit and train diverse group of facilitators. • Pilot program in facilitator's neighborhoods • Debrief with pilot neighborhoods and modify programs as needed. • Install neighborhood and/or town wide dashboard to show progress, and build a climate change action oriented community.
Evaluation Criteria	People reached. Energy saved. Forest and soil protected or gained.

Community Integration Recommendation #2: Expand Public Partnerships to More Explicitly Consider Climate Action

As a small town with limited capacity and jurisdiction and many existing partnerships, it makes sense for

Pursuing Carrboro's Climate Action Goals Will Require Expansion of Current Partnerships and Creation of New Partnerships.

Carrboro to work cooperatively with a variety of partners to pursue Carrboro's Climate Action goals. In some cases, it may be possible to emphasize these goals through existing partnerships, and in other cases, it could make sense to create a new partnership. Collaborating with other local public sector partners has particular appeal. Examples of opportunities through both existing and new partnerships are discussed below and elsewhere in this report and summarized in the table.

Developing a partnership for improved energy efficiency of buildings is a special challenge. Carrboro and Chapel Hill, with support from federal stimulus funding and the Southeast Energy Efficiency Alliance, put considerable effort towards creating an Energy Efficiency Alliance between 2010 and 2013 that has not come to fruition. Progress on this in the absence of clear interest and initiative from utility providers

and partners may be difficult. In the short term, less ambitious efforts such as focusing on commercial and municipal buildings and focusing on other recommendations provided in this plan may be preferable to attempting to create an alliance. Local staff working on sustainability initiatives have recently begun to more specifically explore collaborative possibilities; some new recommendation(s) may emerge.

Implementation Opportunities (UPDATED 10-13-20)	Existing and new partnerships could support improved building energy efficiency, transportation, renewable energy, community scale composting, and environmental community goals. Examples of existing partnerships include Chapel Hill Transit/Partners Committee, OWASA, Chapel Hill-Carrboro City Schools, Orange County Solid Waste/Solid Waste Advisory Group, GoTriangle, Durham/Chapel Hill/Carrboro Metropolitan Planning Organization. Examples of new partnership opportunities include: creating a building energy efficiency alliance; expanding car/bike/ride sharing and transit services; partnership at the nexus of water supply and wastewater/energy; stormwater utility across municipal boundaries; county/regional scale sustainability partnership (either general or more focused, e.g., on public buildings and/or renewable energy installations); downtown geothermal partnership. Additional opportunities include: • Designate a climate action champion on each advisory board. • Request that the League of Municipalities facilitate notifications related to climate and ecological protection. Request local public hearings near places that will be affected by projects and policies. • Explore the possibility and significance of Carrboro not having a franchise agreement with Duke Energy.
Implementation Challenges	Attempt through WISE program to create Regional Energy Alliance was unsuccessful and indicates general challenges in working in buildings sector Unclear as to interest from others in partnering Town has limited capacity to investigate and work with local partners to pursue these programs on its own. New funding may be needed in some cases
Resources Needed (human and material)	Staffing and funding
Anticipated Cost	Cost of additional staffing/contracting to coordinate
Leadership	Board of Aldermen; staff managers; staff
Partners (selected) (UPDATED 10-13-20)	• Chapel Hill-Carrboro City Schools, UNC Sustainability Program, Orange County Solid Waste Program, Chapel Hill Sustainability Committee, OWASA, NC Botanical Gardens • Possibly in cooperation with other municipalities, seek outside legal advice as needed to resolve questions of state and municipal authority.
Fit with Items	Many of the other recommendations depending on details
Time Frame	Exploration can begin immediately. Some partnerships will take longer to develop.

Next Step(s)	Staff and Board of Aldermen to consider in operating budget development and community champions to self-identify
Evaluation Criteria	Track adoption of efficiency measures incentivized by programs facilitated/supported by the Town.

Community Integration Recommendation #3: Create Green Neighborhood Program

Create Participatory Green Neighborhood Budgeting Program to Reduce Carbon Emissions, Build Community, Save Money and Reallocate Savings to New Green Project Initiatives

It is proposed that Carrboro create a new program that will identify projects to offer neighborhoods that will save the Town money and make the neighborhood's proportion of saved monies available to them to reallocate to new green project initiatives through a participatory democracy process.

Implementation Opportunities (UPDATED 10-13-20)	• Enlists and engages neighborhoods in efforts to reduce CO_2 emissions in community-at-large • Builds community within neighborhoods • Neighborhood based economic development opportunities may spin-off • Possibility of creating a community scale "dashboard" that tracks energy use/emissions/savings • Recycling and composting successes translate into savings associated with less frequent trash pick-ups • Composting reduces trash headed for the landfill = cost savings + reduced methane gas • Neighborhood competitions awards program • Can boost initiatives such as Solarize; Energy Efficiency / Pete Street; Street Lights off for Climate t Project • Hold community organizer trainings
Implementation Challenges	• Identification of mechanism for Town to allocate saved funds to neighborhoods • Development of participatory democracy process and criteria for new green project initiatives • Marketing for participation of neighborhoods • Availability for multi-family complexes?
Resources Needed (human and material)	• Full time person managing neighborhood portfolios and facilitating neighborhood efforts • Common spaces per neighborhood (i.e. for centralized neighborhood composting, solar panels, etc.) • Educational campaign on opportunities for greening ones neighborhood
Anticipated Cost	• Cost of full time person in charge of managing program • Marketing
Leadership	Neighborhood leaders
Partners	• Homeowner associations

	• Next Climate • Former Pete Street participants? • Town staff • Businesses Local building supply companies Solar installers Weatherization installers Local nurseries Local landscapers • Non-profits • Orange County Solid Waste Management – composting
Time Frame	Will depend on identification of leadership
Fit with Items	Many of the other recommendations
Next Step(s)	1. Presentations laying out town's CO_2 responsibilities as measured through social equity lens and the urgency of CO_2 reduction per the latest science • Town-wide initial presentation followed by • Presentations to neighborhoods that want to engage in green neighborhoods initiative 2. Create process for developing further program ideas and mechanism for neighborhoods to initiate • Set neighborhood CO_2 reduction goals in line with town's at large goal • Town recognizes savings achieved through existing green initiative successes and allocates these for neighborhoods to use proportional to neighborhood's impact in making the savings. (recurring) • Identify further potential programs and their contributions to reducing CO_2 for the neighborhood (ongoing) • Develop neighborhood green participatory democracy process and criteria for new green project initiatives • Develop way for town to allocate funds • Support and facilitate neighborhoods participation 3. Awards program for neighborhoods achieving biggest reductions per energy sector (Trash, Transportation, Housing) 4. On-street parking park and ride permits?
Evaluation Criteria	People reached. Energy saved. $ reallocated.

Community Integration Recommendation #4: Integrate Climate Action with Local Living Economy

Integrate Climate Action Implementation Opportunities identified in this Plan into the Update of the Local Living Economy Task Force Report

From 1990 to 2008 the rise in emissions from goods produced in developing countries but consumed in industrialized countries was six times greater than the emissions savings of industrialized countries. The international transportation of goods is not formally attributed to any nation and countries are not responsible for pollution produced by the manufacturing of goods that are shipped to their shores; those are attributed to the country where the goods were produced.

The Carrboro Local Living Economy Task Force Report enumerates many reasons why support of locally owned businesses is vital, including that locally owned businesses have less environmental impact. This recommendation identifies some of the means by which both locally owned businesses and a habitable climate can be simultaneously and further supported.

Implementation Opportunities	Integrate implementation opportunities into the update of the Local Living Economy Task Force report: 1) Include climate change mitigation in local living economy/locally owned marketing messaging 2) Encourage light manufacturing zone in Carrboro, 3) Set-up PACE program for commercial buildings to implement renewable energy.
Implementation Challenges	Time is running out to mitigate climate change!
Resources needed	New Town Sustainability Coordinator
Anticipated cost	Cost of hiring staff
Leadership	• Town of Carrboro • Carrboro Business Alliance, • Town businesses
Partners	• Carrboro Economic Sustainability Commission, • Carrboro Economic Development department, • Carrboro Business Alliance, • County -- ¼ cent sales tax economic development monies
Time Frame	Some steps can be pursued immediately, others will take longer
Fits with items	• Local Living Economy Task Force report and update, • Implementation of locally owned first campaign, • Downtown geothermal heating district • Commercial energy improvement revolving loan fund
Next steps	Further develop each identified implementation opportunity
Evaluation criteria	The locally owned economy campaign is understood as also being a climate change mitigation strategy by the Carrboro community

Community Integration Recommendation #5: Expand Capacity

Expand Capacity to Pursue Community Sustainability Initiatives

Expanded capacity and prioritization and integration of climate action into community life are needed to implement this plan. A strong recommendation of this plan is that the Town hire a Sustainability Coordinator charged with helping implement the plan. The above recommendations (1-4) along with additional recommendations in the sections that follow in this plan will also support expanded community capacity. An online resource hub could also be created.

Implementation Opportunities (UPDATED 10-13-20)	Additional capacity/initiative could facilitate non-profit/ business partnerships to improve energy efficiency in the community, publicly recognize successes, and more effectively pursue grants. A community grant program could be initiated. The Town could create a Climate Advisory Board and add additional sustainability staff.
Implementation Challenges	• Currently, Town has limited capacity to investigate and work with local partners to pursue these programs. • Ability of community advocates to organize • Community organizing requires dedicated volunteers; not clear if sufficient interest exists • Funding to help residents interested in retrofits • Staff capacity is currently limited to support a new advisory board/task force
Resources Needed (human and material)	Additional community volunteers and staff capacity
Anticipated Cost	Cost of staff and any operating budget.
Leadership	Board of Aldermen, Town staff, and community volunteers
Partners	None specific to this recommendation
Time Frame	As soon as possible
Fit with Items	Many of the other recommendations
Next Step(s)	Staff and Board of Aldermen to consider in development of operating budget and community champions to self-identify
Evaluation Criteria	Track adoption of measures facilitated/supported by the Town.

Community Integration Recommendation #6: Facilitate Low Cost Financing for Energy Efficiency and Renewable Energy Projects

Pursue Alternative/ Long Term/Low Cost Financing Approaches

Energy efficiency and renewable energy projects often require low cost/long term financing to be attractive since a short simple payback time can be hard to achieve; savings are realized over longer time frames. Two specific new financing approaches are suggested. The first is to utilize Qualified Energy Conservation Bonds (QECB), which may provide Carrboro and partners with access to low-cost financing

that help projects become financially viable. The second is to make this low-cost financing available for community projects using a revolving loan fund or Property Assessed Clean Energy (PACE) financing.

Implementation Opportunities (UPDATED 10-13-20)	Many of the recommendations listed in this report require low-cost financing. For example, QECBs could provide seed funding for ● efficiency improvements to public buildings ● a revolving loan fund for community projects ● Property assessed clean energy (PACE), a program where the loan is paid using assessments on the property tax bill ● low cost financing for home energy efficiency projects for community members who have difficulty qualifying for traditional financing Use the recently-approved tax increase for climate action in Orange County to increase energy efficiency in low-income housing.
Implementation Challenges	● Reluctance to take on debt ● Clarity about how to use the complex QECB mechanism to obtain state/federal approval ● Capacity and expertise to issue bonds ● Community financing via PACE or a revolving loan fund can have low community participation because (i) onerous loan application process requiring a lengthy municipal approval process, and (ii) maximum loan amounts that are set too low to fund an entire project with one loan.
Resources Needed	● Bond issuance process can be lengthy and the Town would need expertise ● Would be coordinated with other programs that need financing
Anticipated Cost	The cost of low interest debt financing
Leadership	While QECBs have been used in municipalities outside of NC, within North Carolina these bonds have been limited to agricultural programs. There would be some learning required by the Town to get the bonds issued. Also, a PACE program has not yet been implemented by any NC municipality.
Partners	NC Clean Tech Center, UNC Environmental Finance Center, other local governments
Fit with Items	Many recommendations could benefit from low-cost financing
Time Frame	Exploration could begin immediately. For a higher probability of moving forward, either a Sustainability Coordinator or championing by the county or another entity will likely be needed.
Next Step(s)	Identify and/or recruit nonprofit organization/local champion to: ● Identify project/revolving loan fund that could benefit from QECB ● Pursue bond issuing process
Evaluation Criteria	● Life cycle costs and net present value

Community Integration Recommendation #7: Integrate Climate Action and Social/Equity Initiatives

Low income households spend 24% of their income on energy costs. To make housing affordable, we must do more than just lower mortgage payments/rent. We also need to take a look at how to lower utility bills. The installation cost of solar has dropped precipitously in recent years and more and more middle and upper class households are taking advantage of this opportunity to both use clean energy and save money. However, the switch to solar is made easier by income tax credits and access to financing. Both of these are often not available for lower income/wealth households. The mechanisms to make energy more affordable are federal grants, community programs, and Town initiatives/ordinances.

Implementation Opportunities (UPDATED 10-13-20)	• Grants: In July 2015, the federal government announced increased grant and loan guarantee funding for solar installations on "federally assisted housing". This includes HUD's rental housing portfolio (Public Housing, Multifamily Assisted) and USDA's Rural Development Multifamily Programs, as well as rental housing supported through the Low Income Housing Tax Credit (LIHTC). More information is available at the HUD exchange webpage: www.hudexchange.info • Community programs: Community programs have worked to improve energy efficiency and renewable energy access for low-income communities. One example is *Grid Alternatives,* a non-profit that develops solar for low-income, single family homes by deploying donated materials and simultaneously running a training program to complete the installation. The result is lower energy costs and a more skilled workforce. Another example is *Grid Free NC,* a solar company in Chatham County that has partnered with Habitat for Humanity to develop solar for low income families. • Town initiatives/ordinances: When assessing affordability, include the utility costs. Town-led initiatives that improve affordability and livability are preferred over bare-minimum construction. Efficiency improvements with little monetary benefit are not be preferred. For new development or substantial retrofits, the Town could offer leniency on other requirements in exchange for improvements to energy efficiency. For example, the Town could offer a density bonus or fewer required parking spaces in exchange for meeting a higher standard of energy efficiency. • Reach out to refugees and work with partners such as El Centro
Implementation Challenges	• Requirements and construction standards seek to improve the safety and longevity of buildings. However, such requirements should be crafted with care, as increases in cost of construction or delays in the approval process can make housing less affordable. • Federal grants only cover a small portion of affordable housing units.
Resources Needed	• Grant applications development • Facilitating community programs through seed or matching funding

Anticipated Cost	Variable, depending on Town commitment
Leadership	Town staff and community programs
Partners	Federal government, community programs, Triangle Green Building Council
Fit with Items	Works to address both affordable housing and climate change mitigation
Time Frame	Coordination with affordable housing focused efforts can be explored immediately. Significant traction is a long term proposition.
Next Step(s)	● Identify relevant federal grants ● Develop partnerships with community programs ● Investigate legal authority and cost-benefit analysis for Town ordinances
Evaluation Criteria	● Life cycle costs and net present value

Community Integration Recommendation #8: Environmental Justice and Climate Equity (ADDED 10-13-20)

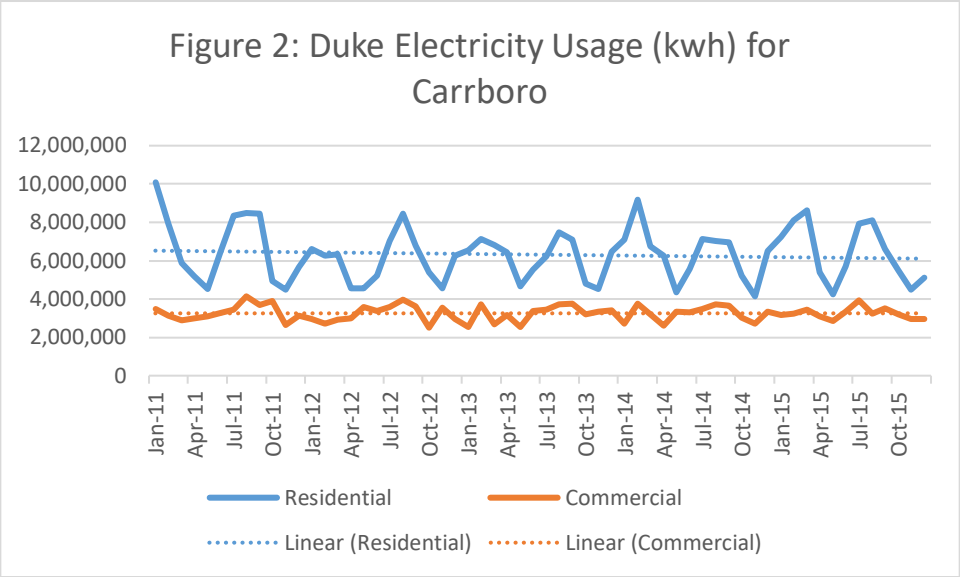
Environmental Justice and Climate Equity must be pursued in all aspects of this plan and the municipal Energy and Climate Protection Plan

Implementation Opportunities	• The Town should utilize the Government Alliance on Race and Equity (GARE) racial equity toolkit to apply a racial equity lens when developing and implementing all climate action initiatives. • Community-based participatory research and participatory democracy concepts should be considered when deciding how best to work with community members to achieve goals. • The Town should utilize relevant mapping tools and other resources when evaluating projects and impacts. • In conjunction with the policies and procedures analyzed using racial equity toolkits through the GARE initiative, utilize racial equity impact assessments. • Implement proactive outreach procedures. • Hold meetings in neighborhoods outside of Town Hall.
Implementation Challenges	Staff time to analyze projects, perform outreach, and hold meetings.
Resources Needed (human and material)	Staff time
Anticipated Cost	Staffing
Leadership	Town Council; staff managers; staff
Partners (selected)	Utilize all partners from the Town's GARE Community Engagement/Partnership Plan
Fit with Items	Entire Community Climate Action Plan as well as the municipal Energy and Climate Protection Plan
Time Frame	Exploration can begin immediately in conjunction with the Town's work on racial equity through GARE.

Building Energy Efficiency Measures

Residential and commercial buildings are the largest emissions sectors in Carrboro, accounting for 2/3 of all emissions. -Duke Energy has been able to provide monthly electricity use data specifically for Carrboro beginning in January, 2011 through the end of 2015, broken out by residential and commercial

accounts. An analysis of this data (Figure 2) indicates that residential electricity use declined by about 1% per annum during this time, while population increased by about 2% per annum. Commercial use remained very stable. The residential use also has a sharp seasonal pattern, with winter and summer peaks presumably associated with heating and cooling loads. - This improved energy efficiency trend will need to be accelerated ~~by 2-3 times~~ to meet the ~~50~~80% reduction by ~~2025~~ 2030 goal. (UPDATED 10-13-20) Any ability to determine how representative the trend is of years prior to 2011 would also be beneficial to the monitoring of overall progress, but is difficult because of the lack of data.



Energy performance rating and auditing can inform interested parties on the overall energy efficiency of the building and provide transparency for market based decisions about property sales and rentals. By influencing a property's appeal to future renters and buyers, ratings can serve as an incentive for building owners to improve energy efficiency. This approach is being tested in cities such as Seattle, WA, Portland, OR, and Austin, TX. A website tracking different jurisdictions efforts for energy efficiency policies, improvements, and benchmarking can be found at http://www.buildingrating.org/jurisdictions .

It is recommended that efforts be pursued so that the results of an energy audit and/or an energy performance rating (including one year of utility bills) are made available at the point of building sale or lease. This could be in the form of a written document and/or a numerical score such as a HERS rating or other recognized format. The information provided could include potential/recommended energy efficiency improvement measures. Carrboro would need to acquire statutory authority from the State to make this a requirement. For new buildings and improvements requiring a building permit, pending the granting of a request for statutory authority, the Town could implement a section of the Building Code[17] with additional energy efficiency requirements that the Town does not currently have authority to

[17] At the December 14, 2010 NC Building Code Council meeting, a 15% residential efficiency part of the code was not approved, instead this code was considered to be voluntary and included as Appendix 4 to the 2012 NC Energy Conservation Code. The Carrboro Board of Aldermen is seeking statutory authority to pilot making Appendix 4 mandatory. This request has not made it out of committee with the NC Legislature.

implement. Alternatively, the Town could look into partnering with the Triangle Green Building Council to develop an optional checklist of efficiency performance/measures that, if implemented, would lead to special designation and public recognition.

Most Carrboro residents rent their homes; 33% of homes are owner occupied, compared to 59% renter occupied (the remaining 8% of homes are vacant)[18]. While some reductions can be achieved via low cost/no cost approaches, to achieve substantial (>10%) GHG reductions, retrofitting or including energy efficiency improvements during rehab work is typically necessary. For many rental properties, renters pay the utility bills and as a result, building owners/landlords may have little or no financial incentive to pursue this work. Conversely, renters have no financial incentive to make capital investments in a property they do not own. Accordingly, there is an underinvestment in energy efficiency improvements in rental units. Without aligning the landlord's costs for retrofits and the renter's benefit in lower energy bills, it will be difficult to voluntarily achieve GHG reductions in rental units. Addressing this issue requires engagement of a diverse set of stakeholders: affordable housing advocates, renters, landlords, new development planners, and energy efficiency contractors. It is recommended that the Town commission a Task Force to bring forward policy recommendations for how to align landlord and renter interests towards achieving energy efficiency in rental units. The Town could also create a voluntary registry or certification program that landlords could include in the advertisements of their properties. This could be in the form of a certification or a points system. Information on how other jurisdictions have approached energy efficiency improvements in buildings is available through the links in these footnotes. (Portland, Seattle, WA[19], Berkeley, CA[20], Austin, TX[21,22])

[18] UNC Capstone Team, 2015. 2012 Greenhouse Gas Emission Inventory for the Town of Carrboro, NC. http://nc-carrboro.civicplus.com/DocumentCenter/Home/View/2788

[19] "Seattle City Council Climate Action Plan Resolution Summary." Emerald Cities Collaborative. Accessed March 16, 2015. http://emeraldcities.org/cities/seattle/resources/summary-of-seattle-city-council-climate-action-plan-resolution .

[20] "Berkeley Climate Action Plan: Tracking Our Progress - Building Energy Use." City of Berkeley. April 14, 2014. Accessed March 16, 2015. http://www.ci.berkeley.ca.us/uploadedFiles/Planning_and_Development/Level_3_-_Energy_and_Sustainable_Development/Green Building and Energy Certification CAP.pdf.

[21] "Energy Conservation Audit and Disclosure Ordinance." Austin Energy. Accessed March 18, 2015. http://austinenergy.com/wps/portal/ae/programs/ecad-ordinance/energy-conservation-audit-and-disclosure-ordinance/!ut/p/a1/jZAxT8MwFIR_S4eMjo0rwGUzpgqhlEykIUvlJq-OpdSObKcR_HpSWChqoW876bt7usMlLnBp5F4rGbQ1sj3o8mZNKKOPgtA0uaWM8ETcL67zl6sZIyPw9hPI5tkDSfMs59lCkERML_SfOU7-8z9d8IC6pVgqXHYyNEibrcUFGHDqHVXWeHD7r7ZI9rUOSJoa1dpXrfW9A2RdrY00FRyCuNlM2RjkYAsOXNy7caEmhM7fRSQiwzDEylrVQlzZXUROWRrrAy6OSbzC5V81-Jz-Bk7s_A2cH7LbvRYfz7BiYZZqPpl8AjKatdw!/dl5/d5/L2dBISEvZ0FBIS9nQSEh/ .

[22] A website tracking different jurisdictions efforts for transparency in energy efficiency, specifically in their buildings, can be found at http://www.buildingrating.org/jurisdictions . BuildingRating.org provides a way to view and compare policies that are being implemented to improve and benchmark building energy efficiency.

Buildings Recommendation #1: ~~50~~80% Challenge (UPDATED 10-13-20)

Reduce Emissions Attributed to Carrboro Buildings by ~~50~~80% by ~~2025~~2030 **(UPDATED 10-13-20)** (UPDATED 10-13-20)

It is proposed that local leaders announce an emissions reduction challenge to reduce community-wide emissions by ~~50~~80% by ~~2025~~2030. The challenge could include a component focused on buildings emissions in Carrboro. (UPDATED 10-13-20)

Implementation Opportunities (UPDATED 10-13-20)	Reduced electricity and gas use from more efficient building envelopes, appliances, HVAC systems, lighting. Healthier buildings; older buildings brought up to code; utility cost savings for building owners/occupants. More efficient buildings result in cost savings and support the green building sector. If the private sector becomes engaged, the downtown area of Carrboro and Chapel Hill could evolve into a recognized "2030 District"[23] • Incentivize lower energy use in buildings by framing actions using economic reasoning. • Perform an inventory of municipally-owned buildings for energy efficiency improvements. • Dedicate a yearly budget amount to implement energy-efficiency projects. • Pursue solar projects on Town buildings, including solar leasing; dedicate adequate funding to these projects. • Create energy efficiency templates/toolkits for residents. • Explore renewable portfolio standards - purchasing Renewable Energy Credits (RECs). • Create a set of guidelines for residents to lead a lifestyle involving owning less and sharing more. • Promote the use of radiant heating and solar-heated water tanks in building design. • Citizen groups and regional governments should utilize resources to agitate for modification of the "third party sale rules" that hinder options for quick adoption of solar. They should also advocate for removing existing impediments to implementing solar such as third party sales prohibition. • The Town should pursue the reinstatement of state solar tax credits. The Town could also pursue local tax credits and low-interest financing through Town-issued bonds. • Promote the use of USDA rural loans.
Implementation Challenges	"Cost, complexity, inertia". High percentage of non-owner occupied buildings; financial challenges especially for lower income residents and renters.

[23] http://www.2030districts.org/

Resources Needed (human and material)	A nonprofit organization to become a community champion. Neighborhood and business champions and grassroots/community organizing, outreach, and education. Broad support from community leaders, utilities, financiers, and contractors. Potentially, fiscal support for nonprofit and organizing/coordination support from Board and staff
Anticipated Cost	Time and potentially salary involved in organizing
Leadership	Potential leaders include: existing and/or new nonprofit(s); the Carrboro Business Alliance; Chamber of Commerce; Triangle Green Building Council
Partners	Potential partners include: existing and/or new nonprofit(s); the Carrboro Business Alliance; Chamber of Commerce; Triangle Green Building Council. Several programs have been developed in North Carolina to lower the barriers to energy efficiency adoption within a community. • The NC Banker's Association pools banks for the financing of low income tax credit apartment complexes. They are interested in partnering with nonprofits to start a small loan pool for energy retrofits.[24] • System Vision program, which partners Advanced Energy Corp, the Self-Help Credit Union, and the NC Housing Finance Authority to finance green home construction/retrofits.[25] • Transition Streets and Pete Street programs. [26] The State Energy Office and Cooperative Extension Service ran the E-Conservation Home Energy Improvements program, which expired in July, 2015. If it is not renewed, it is recommended that Carrboro discuss partnering with Chapel Hill, Orange County, and perhaps others to run a similar program. The State Energy Office has been pursuing this for several years and is a valuable resource for learning what works.
Time Frame	It is recommended that local leaders do this immediately.
Fit with Items	Renewable energy and transportation challenges
Next Step(s)	Local elected officials/community leaders collaborate to initiate challenge
Evaluation Criteria	Reductions in energy use/GHG emissions from buildings. Updated community energy use/emissions inventories for 2016 and 2020

[24] Contact is Michelle Lampert shellielampert@gmail.com

[25] http://www.nchfa.com/nonprofits/HPsystemvision.aspx

[26] In 2013 Carrboro and Chapel Hill contracted with Clean Energy Durham to pilot their "Pete Street" neighbor-to-neighbor energy retrofit program. The approach trains neighborhood volunteers who lead neighborhood workshops where small groups of resident learn simple energy savings projects and behaviors. Clean Energy Durham has recently closed.

Buildings Recommendation #2: Energy Audit/Performance Rating

For Existing Buildings, an Energy Audit and/or Building Energy Performance Rating, Including Utility Bills from Past Year, Could be Conducted at Point of Sale or Lease.

An energy audit is a service that involves inspecting and analyzing energy use, efficiency, and conservation. Different types of audits can be pursued, from simple "walk through" audits to more involved audits that can use equipment (such as blower doors and infrared cameras). A building performance rating is the result of an analysis that rates a building on a standardized scale for buildings of the same type. For example, for homes, the Home Energy Rating System (HERS) is a national recognized rating system. EPA's Energy Star program similarly has created a system for rating and benchmarking different categories of buildings. The purpose of this recommendation is to create a level playing field using recognized standards of information about energy use and efficiency for people in the housing market.

Implementation Opportunities (UPDATED 10-13-20)	· Healthier buildings (better air handling and moisture control) · Lower carbon emissions. · Lower utility bills for occupants. · Provides a service to those looking to buy or rent and reaches a demographic not reached with many incentive based efforts · Addresses the unique situation in Carrboro with a high percentage of non-owner occupied buildings · Heat loss audits could be automated for a neighborhood using thermal IR imagery · The Town's Energy Efficiency Revolving Loan Fund is available for recommended improvements to commercial buildings. · Can potentially support businesses performing energy ratings/audits · Continue to perform energy audits on Town buildings. · For existing buildings, perform energy audits at the point of sale or lease.
Implementation Challenges	· The Town does not have the authority to make this a requirement and would need special enabling legislation if this were to be a regulatory program. · Some building owners, especially those with less efficient buildings, will likely not be in favor of this for reasons of "over regulation" and/or the potential market implications.
Resources Needed (human and material)	Effort associated with outreach and education and crafting the details with stakeholders as well as monitoring for compliance.
Anticipated Cost	Significant costs are not anticipated but would need to be determined as part of implementation
Leadership	Board of Aldermen for policy direction, with support from the Economic Sustainability Commission, Town staff
Partners	Business Alliance, Chamber of Commerce, Board of Realtors, Triangle Green Building Council

Time Frame	Exploration could begin immediately. For a higher probability of moving forward, a champion will likely be needed.
Fit with Items	Rental Task Force; Rental Registry/Certification
Next Step(s)	To be determined
Evaluation Criteria	Reductions in metered utility energy usage and costs.

Buildings Recommendation #3: Demonstrate/Pursue Energy Performance Beyond Minimum Requirements for New Development

In 2010, a 15% residential efficiency part of the building code was not approved by the NC Building

For New Developments and/or Individual New Buildings or Major Retrofits, Pursue Compliance with Voluntary Section of Building Code, or Request Specific Energy Performance Rating/Measures as Part of Land Use and/or Building Permit.

Council, instead this code was considered to be voluntary and included as Appendix 4 to the 2012 NC Energy Conservation Code. The Carrboro Board of Aldermen is seeking statutory authority to pilot making Appendix 4 mandatory. Other approaches could be followed to pursue energy efficiency in new buildings beyond the current minimum code requirements.

Implementation Opportunities (UPDATED 10-13-20)	· Healthier buildings (better air handling and moisture control) · Lower carbon emissions. Lower utility bills for occupants. · Create a rewards program to recognize green builders. · Negotiate with developers, e.g. density bonus. This request may involve a text amendment to the Land Use Ordinance.
Implementation Challenges	Additional Town staff time. Statutory authority, or voluntary compliance from developers/builders
Resources Needed (human and material)	Town staff to expand Building Code implementation and/or work with Triangle Green Building Council to develop checklist and form of recognition.
Anticipated Cost	No significant cost anticipated
Leadership	Town staff, potentially with support from Planning Board
Partners	Triangle Green Building Council
Time Frame	Exploration could begin immediately. Identifying a champion will likely be needed.
Fit with Items (UPDATED 10-13-20)	Pursuing ~~50~~80% reduction
Next Step(s)	TBD
Evaluation Criteria	Number of buildings affected. Reductions in metered utility energy usage and energy intensity (energy use per square foot)

Buildings Recommendation #4: Create Rental Property Task Force and Process

Create a Task Force to Pursue a Facilitative Process to Achieve Greenhouse Gas (GHG) Reductions in Rental Units

Most emissions in Carrboro come from buildings, a very high percentage of buildings are for housing and about two-thirds of housing in Carrboro is rental property. For progress towards Carrboro's Climate Action Goal, it is imperative that emissions reductions efforts address rental property. It is recommended that the Town commission a Task Force to bring forward policy recommendations for how to align landlord and renter interests towards improved energy efficiency in rental units. (This Task Force could be the same as identified below for renewable energy.)

Implementation Opportunities (UPDATED 10-13-20)	• Energy efficiency reduces waste and saves money in the long term. • Energy efficiency retrofits create local jobs. • Engage with the Town attorney to see what the Town could legally require of landlords.
Implementation Challenges	• There is little precedent; organizing and coordinating will require significant effort. • Many rental property owners are not local. • Owners and renters financial incentives are not necessarily well aligned
Resources Needed (human and material)	The Town could partner with an outside organization to facilitate this Task Force.
Anticipated Cost	Staff time and/or contract support to help facilitate Task Force
Leadership	Town staff for giving the group a well-defined mission and keeping the group on track
Partners	Work with organization that facilitates stakeholder groups
Time Frame	Time frame to set up a Task Force depends on Board priority and staff/community capacity. Operating the resulting program would be a long term endeavor.
Fit with Items (UPDATED 10-13-20)	~~50~~80% reduction challenge; Rental Registry; Renewable Energy Task Force
Next Step(s)	1. Develop Task Force charge 2. Identify relevant stakeholders needed to agree to process in order to make impactful change 3. Identify outside organization to facilitate Task Force 4. Commission Task Force

Evaluation Criteria	Savings from lower energy bills could be put towards other projects. Keep energy dollars local. Reduces greenhouse gas emissions.

Buildings Recommendation #5: Create Rental Property Registry/Certification

Create a Certificate Program or Registry for the Energy Performance of Rental Housing

The basis for this recommendation is identical for the above building recommendations. The essence of this recommendation is that, as part of making rental properties more energy efficient, a program be created that makes it easy for those in the rental market to find energy efficient rental listings.

Implementation Opportunities	· Lower residential carbon emissions. · Lower utility bills for tenants. · Provides a service to those looking to rent and reaches a demographic not reached with many incentive based efforts · Addresses the unique situation in Carrboro with a high percentage of non-owner occupied housing · The Town could potentially support performing energy ratings/audits
Implementation Challenges	· The Town does not have the authority to make this a requirement. · The effectiveness of this program would be dependent on widespread adoption by Carrboro landlords. · It may require outreach to the landlords and research on the how to best communicate a potential rating system.
Resources Needed (human and material)	Town staff, or another entity, could run the program and set the program requirements.
Anticipated Cost	Costs would be primarily associated with staff time and marketing.
Leadership	Board of Aldermen for policy direction, Town staff
Partners	Triangle Green Building Council, potentially others
Time Frame	Time frame to set up depends on Board priority and staff/community capacity. Operating it would be a long term endeavor.
Fit with Items	Other buildings recommendations, especially the energy audit/ performance rating.
Next Step(s)	Outreach to determine interest and feasibility
Evaluation Criteria	Reductions in metered utility energy usage and costs.

Transportation Measures

Reducing emissions from transportation in Carrboro will rely on a coordinated, multifaceted effort involving infrastructure improvements, additional transit service, land use changes, outreach and engagement to affect transportation mode choices, and participation broadly with partners and across the community.

Availability of local bicycling and pedestrian infrastructure is strongly associated with overall levels of biking and walking, especially with trips to work, school, or shopping.[27] In September 2010, the League of American Bicyclists recognized Carrboro as a Bicycle Friendly Community at the "Silver" level. There is an aspiration to achieve the "Gold" level during the next review cycle. The Town has the support of the Carrboro Bike Coalition, Chapel Hill Carrboro City Schools and other Safe Routes to Schools partners, a high level of ridership relative to other jurisdictions, and comprehensive bicycling and greenway plans. In order to get even more people out of their cars and onto their feet and bikes, Carrboro must keep working on the gaps, continue to connect neighborhoods to schools, and expand bicycle and pedestrian infrastructure to connect all areas of Carrboro to downtown, surrounding greenways, and bike routes. Improvements such as signals and pavement markings can increase convenience and perceptions of safety, and provide official, visible recognition that bicyclists are legitimate users of the road.

Carrboro (and Chapel Hill and UNC) have sponsored Chapel Hill Transit for several decades, the only fare free transit system and the highest per capita use system in North Carolina. In combination with regional transit provided by GoTriangle, transit options, along with publically and privately supported rideshare/carpooling/vanpooling/car sharing options continue to increase. Nevertheless, for many users and trips, transit and other alternatives to single occupancy vehicle use is a difficult option because of the relative convenience and comparative time relative to single occupancy motor vehicle use. A number of initiatives are in place to help promote and expand use of alternatives to single occupancy vehicle use; suggestions for further pursuing these initiatives are provided. A final recommendation is to reduce vehicle idling in school loading zones.

[27] A Seattle study found that adults living within a half-mile of a bike path were 20 percent more likely to bicycle at least once a week. A Portland study found that cyclists went the furthest out of their way to use off-street bike paths, followed by bicycle boulevards (low speed streets that have been "optimized" for bicycle traffic) suggesting a general preference for facilities protected from motor vehicle traffic.

Transportation Recommendation #1: ~~50~~80% Challenge (UPDATED 10-13-20)

Reduce Greenhouse Gas Emissions from Motor Vehicle Use by ~~50~~80% by ~~2025~~2030.
(UPDATED 10-13-20)

It is proposed that local leaders announce an emissions reduction challenge to reduce community-wide emissions by 50% by 2025. The challenge could include a component focused on transportation/motor vehicle emissions in Carrboro.

Implementation Opportunities (UPDATED 10-13-20)	• Requirements and market for more fuel efficient/lower emission vehicles and pedestrian and bicycle infrastructure and transit system use continue to improve. • Land use planning is supporting mixed use, infill and redevelopment and community is proactive to further encourage non-vehicular modes. • Strategic placement of EV charging stations combined with increased advertisement of locations. • Require EV charging stations and infrastructure in new developments in the LUO. • Incorporate solar panels to power EV charging stations. • Use B100 biodiesel for half the year in Town vehicles (when the temperatures are above freezing). • Explore the use of rental scooters and bikes • Incentivize EV cars with priority spaces at popular destinations. • Promote catching the school bus. • Solarize fleet.
Implementation Challenges	• High percentage of residents work outside Carrboro with significant challenges for using transit or commuting by bike or on foot. • Constraints such as topography/natural features, ownership, and grey infrastructure exist in some areas for further bicycle and pedestrian facility development. • Non-vehicular transportation options in some parts of Town are more limited. • Ability to monitor and track progress towards emissions reduction is currently quite limited methodologically and in terms of clarity of the responsible party for tracking.
Resources Needed (human and material)	There are no resource requirements associated with a recognized community-wide goal, although there will be resources needed for implementation of different actions.
Anticipated Cost	There are no specific costs associated with a recognized community-wide goal, although there will be resources needed for implementation of different actions.
Leadership	Local elected officials and community leaders could endorse this goal
Partners	Various public, private, nonprofit

Time Frame	It is recommended that local leaders do this immediately.
Fit with Items	Buildings and renewable energy challenges
Next Step(s)	Formal adoption/publicity for challenge
Evaluation Criteria	Ability to track emissions via VMT, fuel type, and vehicle efficiency. CAMPO model? Other methodology?

Transportation Recommendation #2: Enhance Transit Service

Improve/Extend Transit Service

While overall, Chapel Hill Transit is the most successful transit agency in North Carolina and GoTriangle is steadily increasing service, areas farther from downtown have more limited service.

Implementation Opportunities (UPDATED 10-13-20)	• Transit service could be extended to new areas by adding more stops in Carrboro well connected to other transit, bike, and pedestrian access, and including more hours of service. • New Transit Oriented Development could be sited in the Northern Transition Area. • Extend transit service - routes that run into Research Triangle Park and Durham aren't being fully utilized.
Implementation Challenges	• Fleet has many old and inefficient vehicles • Funding is currently stressed. • It is difficulty to site development of sufficient density in northern Carrboro to justify transit. • Service level makes it difficult for many commuters to use transit.
Resources Needed (human and material)	• Increased funding • Landowner, developer, and community support new mixed use/transit oriented development
Anticipated Cost	Improved local transit service costs will depend on different factors, and will be implemented by Chapel Hill Transit and GoTriangle.
Leadership	Board/Transit Partners, NTAAC, Transportation Advisory Board, Town staff for new development. Chapel Hill Transit for improved/expanded local transit service; GoTriangle for regional transit. Other partners below can also provide leadership.
Partners	Local business community, NTA neighbors
Time Frame	Transit development/improvement by nature is an ongoing and long term undertaking.
Fit with Items	See separate recommendation for steps to promote transit service.
Next Step(s)	• Work with GoTriangle and Chapel Hill Transit staff to provide additional feedback on plans for future service and ability to accelerate adding service. • Enhance transit access points along the 54/15-501 corridor from Chapel Hill/Carrboro to Durham and provide more frequent, reliable bus service.
Evaluation Criteria	Number of bus commuters/trips

Transportation Recommendation #3: Improve Vanpool/Carpool Options

A considerable amount of transportation related emissions can be attributed to people commuting in

Improve Vanpool/Carpool Options for Commuters

and out of Carrboro for work. Vanpools and carpools can be an effective approach for reducing vehicle miles traveled and single occupancy vehicle trips, but existing park and ride areas could be more convenient for Carrboro commuters. Adding vanpool parking areas could reduce vehicle miles traveled and emissions.

Implementation Opportunities	Add GoTriangle vanpool/carpool parking in Carrboro (including downtown Carrboro and Northern Carrboro) and nearby in Chapel Hill.
Implementation Challenges	Requires partnership with GoTriangle and local businesses.
Resources Needed (human and material)	Signs to identify vanpool and carpool parking areas
Anticipated Cost	Signs to identify vanpool and carpool parking areas
Leadership	Board of Aldermen; Staff; GoTriangle
Partners	Chapel Hill Transit, GoTriangle; businesses with suitable parking
Time Frame	The main timing consideration is determining who can champion this.
Fit with Items	Reduce transportation emissions by 50% by 2025.
Next Step(s)	Work with GoTriangle to identify currently registered vanpools and carpools and use this info along with expected increase in use to establish carpool and vanpool parking areas, including downtown Carrboro and Northern Carrboro and nearby areas in Chapel Hill.
Evaluation Criteria	Number of vanpool and carpool commuters

Transportation Recommendation #4: Further Promote Walking, Biking, Transit

Take Additional Steps to Promote Walking, Biking, and Transit Use

Carrboro has a considerable base of bicycling, walking, and transit use to build on. In September 2010, the League of American Bicyclists named the Town of Carrboro a Bicycle Friendly Community at the "Silver" level, and there is an aspiration to achieve the "Gold" level during the next review. Carrboro has significant support from the Carrboro Bike Coalition and other partners and already participates in the Safe Routes to School program. Marketing and educational programs, as well as regulations, significantly affect levels of bicycling, walking, and transit use. Investments in infrastructure must be supported by outreach programs to be most effective.

Implementation Opportunities (UPDATED 10-13-20)	• More promotion/outreach for bicycling and walking • Continue to apply for funding from the Triangle Transportation Demand Management (TDM) Program. • Work with Chapel Hill to pursue a redistribution of TDM funding. • Continue to work on TDM funding and have staff member spend more time exploring TDM. • Continue to implement the Safe Routes to Schools Action Plan. Work on programs through middle- and high- schools as well.
Implementation Challenges	• Challenge of changing set behaviors. • Some greenway, bike route, and transit services are not yet complete. • Transit services are spotty or non-existent in some areas • Uncertain funding for new/renovated buses
Resources Needed	• Town Staff and partners support.
Anticipated Cost	TBD
Leadership	Town Transportation Planner, with support from Recreation and Parks staff, Transportation Advisory Board, Greenways Commission.
Partners	UNC, Chapel Hill Transit, GoTriangle, Carrboro Bike Coalition, Carrboro Business Alliance, Chapel Hill-Carrboro City Schools, Walk Bike NC
Fit with Items	Reduce Greenhouse Gas Emissions from Motor Vehicle Use by 50% by 2025; Improve and Extend Bicycling and Pedestrian Infrastructure; Improve and Extend Transit Services
Time Frame	This is ongoing. The main consideration for significantly accelerating efforts is identifying people with capacity.
Next Step(s)	• Continue, accelerate, and intensify efforts to: o Promote bike to work days; consider doing these weekly. Studies have reported long-term increases in bicycling following bike-to-work days. o Work with the Carrboro Bicycle Coalition to put on and publicize on-going bicycle training; o Work with the Carrboro Bike Coalition to hold “Open Streets” days. o Work with Chapel Hill Transit and GoTriangle to develop and implement a marketing and educational program on carpooling, vanpooling, and transit use. Promote official car free, carpool, vanpool, and transit use days. o Support the *Safe Routes to Schools Program*. Work with the Carrboro-Chapel Hill City School System and local PTAs to promote bike and walk to school days; consider doing these weekly. o Pursue efforts to implement land use and development policies that help ensure destinations for daily needs, such as school, work, and shopping, are within convenient bicycling distance from home. Encourage developers to promote multi-modal transportation options. • Promote “park and stroll” programs at schools, where students are dropped off at a remote location and walk or bike the rest of the way to school. • Research and implement a bike sharing system downtown. • Explore new policies that make driving more expensive and less convenient (e.g. reduced parking supply, increased parking fees, and

	reduced road speeds). Lower speed limits for vehicles make bicycling safer and more attractive. One study conducted in Germany found that reducing general speed limits led to a significant increase in bicycling.
Evaluation Criteria	• Number of students biking or walking to school. • Number of residents biking, walking, or using transit, carpooling or vanpooling to commute to work. • Increased transit ridership.

Transportation Recommendation #5: Limit Idling in School Loading Zones

Limit Idling in School Loading Zones

Avoiding idling time has a multitude of benefits including: savings in fuel and maintenance costs, extending vehicle life, and reducing damaging emissions. It is especially appropriate to look at school loading zones because they are focal points in Carrboro for vehicle idling, expose a sensitive population to air pollution, and meaningful reductions could be achievable through simple behavior change. Outreach resources are available at http://daq.state.nc.us/motor/idle/idle_campaign.shtml.

Implementation Opportunities	This is a simple effort that will reduce air pollution and GHG emissions.
Implementation Challenges	Parental resistance, especially at elementary schools, and outreach/enforcement.
Resources Needed	School system employee time. Consider recruiting student and parent volunteers to help with education/outreach.
Anticipated Cost	Costs associated with staff time
Leadership	Board of Aldermen, CHCCS School Board, staff
Partners	PTA; individual school teams;
Time Frame	If the policy direction exists, this could be pursued immediately.
Fit with Items	Community integration and emission reduction recommendations
Next Step(s)	Coordinate with CHCCS
Evaluation Criteria	Monitoring of idling activity

Transportation Recommendation #6: Improve Bicycle and Pedestrian Infrastructure

It is essential to Improve Carrboro's bicycling and pedestrian Infrastructure and safety in combination with stewardship of our forests and creeks.

Implementation Opportunities (UPDATED 10-13-20)	• Greenway and bike plan decision-making could be accelerated, providing options to more users sooner. • Apply for Platinum status through the League of American Cyclists' Bicycle Friendly Communities Program. • Pursue infrastructure-based projects to reduce greenhouse gas emissions and traffic (e.g. roundabouts).
Implementation Challenges	• Limited funding identified for greenway and sidewalk projects • Leadership, capacity, and commitment to resolve remaining planning and routing issues • Uncertain/delayed development plans • Coordinating with multiple entities.
Resources Needed (human and material)	• Town Staff and other support to implement. • Funding for greenway development and new bike and pedestrian facilities.
Anticipated Cost	TBD
Leadership and Partners	Board of Aldermen and Town Staff with support from the Transportation Advisory Board, the Greenways Commission, Friends of Bolin Creek, the Carrboro Bike Coalition, and the general public. NCDOT, Town of Chapel Hill, Chapel Hill-Carrboro City Schools, University of North Carolina, local business community.
Fit with Items	Reduce greenhouse gas emission from motor vehicle use by 50% by 2025. Ecosystem, forest and tree preservation and protection. Aligns with recommendation #4.
Time Frame	Some elements have begun, and could be accelerated depending on the priority of the parties involved. Infrastructure development/improvement by nature is an ongoing and long term undertaking.
Next Step(s)	● Engage in a process with the community to build a common vision for facilitating the decision making that is necessary to advance safe pedestrian and bicycle transportation as well as environmental stewardship. ● Advocate to speed the funding for the approved plans for the north-south Seawell School Road side walk and bike lane completion, the Campus to Campus Connector (approved by Carrboro, Chapel Hill and UNC) and dedicated/safer bike-pedestrian routes ● After studying all other planned connections, with the community, pursue regional collaboration with MPO partners on the missing connections ● Continue to work closely with UNC and the Chapel Hill-Carrboro City Schools bike-pedestrian connectivity issues, plans and funding.

	● Create bicycle boulevards by adding traffic calming features (e.g., speed humps, curb extensions, pedestrian crossways) on streets with a low volume of traffic and/or install cycle tracks (which are on-street bike lanes that are physically separated from motor vehicle lanes). This can be pursued in conjunction with storm water treatment measures to create "Green Streets". ● Consider new forms of pavement markings, including bike boxes, shared lane markings or sharrows, and colored bike lanes, which increase perceptions of safety, help guide bicyclists and motorists, and provide official, visible recognition that bicyclists are legitimate users of the road. ● Improve the pedestrian experience in and around bus stops. ● Provide bike parking at high-demand bus stops. ● Work with the local business community to provide showers and bike locker for commuters. ● In the longer term/larger community, ensure sufficient bike parking is supplied at future Light Rail stations
Evaluation Criteria	● Increase in the number of students biking or walking to school ● Increase in the number of residents biking or walking to work ● Increase in the number of bike trips to downtown Carrboro ● Completion of greenways and dedicated bike routes ● Completion of bicycle boulevards, cycle tracks, and new pavement markings ● Increase in the number of businesses that install showers and bike lockers

Renewable Energy Measures

Carrboro's Climate Action Goal can be pursued by generating more energy from renewable sources and improving energy efficiency. This section provides recommendations for how to increase renewable energy from two sources, solar and geothermal. Solar panels convert light from the sun into electricity. Geothermal heating and cooling employs pumps and wells to take advantage of the near constant temperatures below the Earth's surface. This can be used to reduce the costs to heat buildings in the winter and cool them during the summer. Both of these approaches require considerable initial costs to install the equipment. However these technologies have low maintenance costs and a lifetime of more than 25 years, which creates considerable energy savings over time. Homeowners and businesses that can shoulder the upfront costs have been switching to renewable energy. The focus of these recommendations is to help speed the transition to renewable energy, especially addressing the barrier of initial costs.

The first recommendation is to develop a community solar project for Carrboro. Solar panels can provide low-cost energy without environmental impacts. Many home and business owners are realizing lower energy costs by investing in solar. However, most Carrboro residents either rent or own homes that are shaded by trees, and cannot benefit from solar at their home. A community solar project would

allow people across Carrboro to invest in solar, lower electricity bills, and help bring about a clean energy future for our Town. However, the electric utilities that service Carrboro restrict most forms of community ownership. Legislation currently under discussion in the NC General Assembly would allow a third-party, such as a community entity, to sell electricity directly to power consumers. Under this change, a community group could own a solar installation and sell the energy to a large buyer, such as the Town of Carrboro. The agreement could set the electricity price to a rate that is beneficial to both the Town and the community investment group.

The second recommendation is to explore and encourage geothermal heating and cooling, especially in downtown. The Carrboro Century Center has considerable heating and cooling costs that could be reduced by switching to geothermal. Developing geothermal heating and cooling for the Century Center could reveal economies of scale, where neighboring buildings could be added to the system at lower cost. If it is legally and technically feasible and cost-effective, the opportunity could be extended to explore the formation of a geothermal heating and cooling utility to provide low-cost, sustainably sourced heating and cooling to downtown buildings that is easy for property owners to join.

The third recommendation is to convene an action group to develop policy opportunities to create incentives for renewable energy and energy efficiency upgrades in rental properties (see Buildings Recommendation #3). The majority of Carrboro residents are renters and do not directly have control over their energy efficiency and energy generation. Because renters pay the utility bills, landlords have less financial incentive to invest in energy savings. Lowering electricity costs makes housing more affordable, but the incentives are not aligned to encourage this change. This action group will be charged with finding policy opportunities to better align renter and landlord incentives towards lowering electricity costs. This action group should include advocates from renter, property owner, affordable housing, and green building organizations.

When taken together, these recommendations provide opportunities for Carrboro residents and businesses to further participate in and benefit from the switch to renewable energy.

Renewable Energy Recommendation #1: Pursue Community Solar Projects

Pursue Community Solar Projects

Solar panels can provide low-cost energy without environmental impacts. Many home and business owners are realizing lower energy costs by investing in solar. However, most Carrboro residents have homes that are shaded by trees, and cannot benefit from solar at their home. A community solar project would allow people across Carrboro to invest in solar, lower electricity bills, and help bring about a clean energy future for our Town. However, the electric utilities that service Carrboro restricts most forms of community ownership. Legislation currently under discussion in the NC General Assembly would allow a third-party, such as a community entity, to sell electricity directly to consumers. Under this change, a community group could own a solar installation and sell the energy to a large buyer, such as the Town of Carrboro. The agreement could set the electricity price to a rate that is beneficial to both the Town and the community investment group.

Implementation Opportunities (UPDATED 10-13-20)	• Broadly share solar investment benefits, including keeping dollars local • Town of Carrboro buildings could be first adopters, but this approach could be deployed on other buildings • The community investment group could pay the upfront costs to develop solar. • Work with a non-profit to become a community champion. • Form a utility. • Pursue a utility project on the Eubanks Rd. Landfill. • Create a microgrid under Duke Power. • -Pursue creative financing arrangements (solar leasing, third-party solar, PACE, on-bill financing). • Pursue solar projects in areas beyond solely Town buildings.
Implementation Challenges	• Requires considerable effort to organize support and investment • The loss of the NC Renewable Energy Tax Credit and the absence of third-party sales of electricity significantly limit the market.
Resources Needed (human and material)	This will likely require collaboration between Town staff and one or more outside organizations.
Anticipated Cost	There are options depending on how the electricity purchasing agreement with the community group is defined
Leadership	Town staff for considering Town property; economic development groups for development of community infrastructure
Partners	Work with organization that coordinates community investment group
Time Frame	Projects could take months or more to develop and would have benefits for many decades
Fit with Items	Community Integration recommendations
Next Step(s)	Develop program with community investment group
Evaluation Criteria	Savings from lower energy bills could be put towards other projects. Keep energy dollars local. Reduces greenhouse gas emissions.

Renewable Energy Recommendation #2: Pursue Downtown Geothermal Heating and Cooling

Pursue Geothermal Heating/Cooling, Especially in Downtown

Geothermal heating and cooling employs pumps and wells to take advantage of the near constant temperatures below the Earth's surface. This can be used to reduce the costs to heat buildings in the winter and cool them during the summer.

Implementation Opportunities (UPDATED 10-13-20)	• Lower costs of heating and cooling • Century Center or Town Hall/Town Commons could be candidate for first adopter • If marginal costs of adding adjacent community/commercial buildings to the heating and cooling network are low, then a municipal utility could be an effective way to provide services at low cost • A community geothermal utility would make it easier to adopt geothermal broadly by lowering costs and simplifying construction. • Savings from lower energy bills could be put towards other projects • Use Orange County as an example.
Implementation Challenges	• Unknown technical feasibility • Large upfront costs; requires low-cost financing • New for Carrboro. Orange County buildings in Hillsborough have implemented geothermal in HVAC and are realizing substantial savings
Resources Needed (human and material)	Effort to: explore feasibility; develop engineering design; and policy development towards an approach for other community buildings.
Anticipated Cost	Upfront costs are large but design lifetime of equipment is approximately 50 years. Geothermal systems (on average) reduce heating and cooling costs by 50%. The actual installation costs and benefits depend on the building.
Leadership	Town staff for development for Town buildings, business community for development of community infrastructure
Partners	Technical assistance from Orange County, contractor(s), and investors
Time Frame	An initial assessment of technical feasibility could be pursued quickly. Project development would likely take several years, depending on the scope, with benefits for many decades
Fit with Items	Pursue Partnerships; 50% Reduction Goal for Buildings
Next Step(s)	1. Examine completed projects in Orange County 2. Solicit contracting support for feasibility study 3. If deemed feasible, develop preliminary design for Town of Carrboro buildings including financial assessment and environmental benefits. 4. Explore opportunities to develop a municipal utility 5. Explore ways to encourage developers to install geothermal
Evaluation Criteria	• Reduced energy bills and ~~.~~

	• ~~R~~reduced greenhouse gas emissions. More comfortable work environment for Town staff.

Renewable Energy Recommendation #3: Create Rental Property Task Force and Process

Create a Task Force to Pursue a Facilitative Process to Achieve Greenhouse Gas (GHG) Reductions in Rental Units

It is recommended that the Town commission a Task Force to bring forward policy recommendations for how to align landlord and renter interests towards achieving renewable energy in rental units. (This Task Force could be the same as identified above for building energy efficiency.)

Implementation Opportunities	Renewable energy is clean energy and create local jobs
Implementation Challenges	The policy options to address this issue also have an impact on Town planning and affordable housing
Resources Needed (human and material)	Town staff could partner with an outside organization to facilitate this Task Force.
Anticipated Cost	Staff time and/or contract support to help facilitate Task Force
Leadership	Town staff for giving the group a well-defined mission and keeping the group on track
Partners	Work with organization that facilitates stakeholder groups
Time Frame	Time frame to set up a Task Force depends on Board priority and staff/community capacity. Operating the resulting program would be a long term endeavor.
Fit with Items	Task Force/Facilitative Process for Buildings
Next Step(s)	1. Develop Task Force charge 2. Identify relevant stakeholders needed to agree to process in order to make impactful change 3. Identify outside organization to facilitate Task Force 4. Commission Task Force
Evaluation Criteria	Savings from lower energy bills could be put towards other projects. Keep energy dollars local. Reduces greenhouse gas emissions.

Ecosystem Protection and Enhancement

The ecosystems that Carrboro is located within are being affected by a warming planet, but they also offer opportunities for combating climate change. This section of the plan includes recommendations to improve ecosystem health and resilience by reducing stormwater impacts, increasing tree canopy and biodiversity, better management of invasive plants and encouragement of native plants, managing organic waste and improving soil quality. In addition, there is a need for better information about the impact of climate change as well as herbivory on the health of the community forest. These focus areas are discussed separately, but are highly interwoven. The following is a brief overview of each area to provide context for the recommendations.

Climate change is likely to increase the frequency and intensity of storms and droughts in Carrboro, which will in turn increase the negative impacts of stormwater runoff that include erosion, flooding, nonpoint source pollution (including nitrogen and phosphorus delivery to surface waters), and altered hydrology[28]. Many methods and opportunities exist to aid in curbing stormwater runoff (permeable paving, rain gardens, and green roofs to name just a few), but often landowner interest and available resources are not in place to pursue these projects[29]. Creating a stormwater utility or joining Chapel Hill's utility could ensure a dedicated funding source for stormwater projects that is not subject to discretionary spending in annual budget cycles. Doing so would provide the financial stability and predictability needed for such projects. A utility could also support public education, helping citizens understand the causes and consequences of stormwater runoff and the ways in which individuals can limit the runoff and pollution leaving their property.

Despite climate and land use changes, forests in the southeastern USA will likely continue to provide a sink of atmospheric carbon dioxide (CO_2). There is potential for mitigating $C0_2$ emissions through carbon sequestration in soils and plant biomass. Protection of these natural carbon sinks in the face of development pressures is an important issue for climate change mitigation. The potential savannafication of the southeast, in which forests are converted into more open woodlands due to a combination of hotter and drier conditions, is one of the most significant potential climate change impacts in the USA. [30]A healthy forest, and in particular a healthy riparian forest, is integrally related to healthy creeks and downstream waters. For example, these ecosystems not only store macronutrients in their biomass, but they are also responsible for stabilizing and building soils with rich microbiological processes that recycle nutrients such as nitrogen and phosphorus. In doing so, creeks are protected from being overloaded and over fertilized with sediment and nutrients. Riparian forests shade creeks and help regulate the water temperature, and the creeks and creek valleys create important microclimates.

[28] http://tigerprints.clemson.edu/cgi/viewcontent.cgi?article=1131&context=scwrc
[29] http://www.nrdc.org/water/pollution/storm/chap4.asp
[30] Ingram, K., K. Dow, L.Carter, J. Anderson (eds). Climate of the Southeast United States: Variability, Change, Impacts, and Vulnerability. Washington, D.C. Island Press, 2013.
NRC (National Research Council), 2010. Adapting to the Impacts of Climate Change. Washington, D.C. National Academies Press.

Overgrazing by deer could adversely affect the health of the forest by causing a decrease in plant diversity and aiding in the spread of exotic species. Soil studies have shown that the seed stores in areas with deer overpopulation can shift from native wildflowers and woody plants to invasive plants and grasses. This could threaten the ability of our forests to regenerate in a healthy way and continue to serve as diverse ecosystems and significant carbon sinks.

Trees, whether lining a city street or part of a forest, are an important tool in addressing climate change. Carrboro's urban forest provides innumerable ecosystem services[31] (not just limited to climate protection/resilience and energy management). Trees act as carbon sinks, reduce the heat island effect in urban areas, and reduce the energy used to cool and heat buildings. Trees stabilize and improve soil, reducing erosion and improving stormwater management through infiltration and evapotranspiration. Trees have been shown to increase property values and help to create a sense of community and economic vitality[32]. Trees absorb air pollutants, reducing exposure of dangerous chemicals to people and wildlife. And, of course, trees offer habitat for wildlife such as pollinators and migratory birds. A recent study has shown that Carrboro lost about 4% of its tree canopy between 2002 and 2010[33]. A "Tree Coalition" could be formed to promote the preservation and health of trees and the community forest in Carrboro and be a resource for citizens who have questions about trees on their property.

Unfortunately, native plant species are being threatened by invasive plant species (categorized by the US government as non-native species that are economically and environmentally devastating). Recent studies have shown that as climate change lengthens growing seasons, invasive species are adjusting their flowering schedules more quickly than their native counterparts. This earlier bloom time can allow invasives to shade out natives and "capture a larger share of nutrients, water, or pollinators".[34] It can take decades to discover that a species is invasive, and such a discovery does not necessarily lead States to ban nursery sales of the species. Many people are unaware of the critical importance of native plants to food webs and biodiversity, and often fail to realize the impact that their own landscaping choices have on our local ecosystems. For example, because native plants serve as the host plants on which native insects lay their eggs -- and 96% of North American birds (excepting seabirds) rely on native insects to feed their young-- native plants are important both environmentally and economically. According to The White House, as of 2009, pollination of US crops by native insects was valued at more than nine billion dollars. It is recommended that the Town and community take a three-fold approach to this issue: 1) review and strengthen Town ordinances against invasive species and in favor of native species; 2) educate the community about the link between native species and ecosystem health; and 3) encourage invasive species removal projects that are carried out by citizens but led by a non-profit or task force.

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[31] See Nowak, D. et al., "Sustaining America's Urban Trees and Forests". USDA Forest Service, Northern Research Station. State and Private Forestry General Technical Report NRS-62. June 2010. http://www.fs.fed.us/openspace/fote/reports/nrs-62_sustaining_americas_urban.pdf

[32] Council of Tree and Landscape Appraisers, as reported by City of Raleigh
ICMA, as reported by City of Raleigh

[33] Shields, Shane. 2014. Modeling Carrboro's Tree Canopy Cover 2002 to 2010. Report completed as intern to Carrboro Planning Department.

[34] Niijhuis, Michelle. "How Climate Change is Helping Invasive Species Take Over." Smithsonian.com. Smithsonian Magazine, December 2013. http://www.smithsonianmag.com/science-nature/how-climate-change-is-helping-invasive-species-take-over-180947630/?no-ist

The Town should consider expansion of composting in studies of and plans for waste management for multiple reasons. According to NCDENR, "landfills are the largest human-made contributor of methane into the atmosphere. Methane, a greenhouse gas, is 72 times more potent than CO_2 over twenty years." The organic material buried in landfills is responsible for this methane, releasing the gas through anaerobic decomposition. Orange County has recently begun to utilize the methane in its landfill for energy production. At the same time, reducing future methane production at landfills is a positive climate mitigation measure. Composting is considered to be the most effective way to combat this production of methane[35]. Orange County Solid Waste Management is scheduled to begin offering onsite disposal of household organic waste (i.e. food scraps) at its Chapel Hill facility on Eubanks Road in 2016. This will be in addition to the composting facility offered at its Walnut Grove Church Road Convenience Center in Hillsborough. However, many residents do not utilize these convenience centers, instead throwing their food scraps into the trash. Cities and towns that have implemented curbside composting have been able to move to bi-weekly trash pickup, freeing up funds for commercial hauling and processing of compost. Seattle, Portland, and San Francisco have curbside composting programs that could offer examples for Carrboro[36].

Ecosystem Recommendation #1: Pursue Stormwater Utility

Create a Stormwater Utility in Carrboro, or Join Chapel Hill's Stormwater Utility.

The Town has taken steps to exceed minimum State requirements for stormwater volume control and water quality buffers for new development and instituted land use planning and policies that have to some extent reduced surface water impacts from new development and exceeded what many other jurisdictions have pursued. The Town has also actively worked with the Bolin Creek Watershed Restoration Team to restore the aquatic health of Bolin Creek. Nevertheless, monitoring of aquatic life continues to identify concerns for the health of Bolin Creek, and stormwater runoff is also known to impact Morgan Creek and other creeks in Carrboro. From the viewpoint of residents with properties regularly experience flooding impacts, however, the Town has not yet been able to comprehensively respond to these impacts. The reality of climate change means that it will likely become more difficult in the future to adequately safeguard the health of local streams and citizens properties. In addition, the Town is faced with both current and new future regulatory requirements related to stormwater runoff. The Town administers an NPDES Phase II stormwater permit, and also will be pursuing a multimillion dollar initiative in the next decade to comply with the Jordan Lake Existing Development Rules.

According to the UNC Environmental Finance Center, there are currently 55 utilities operating in North Carolina, including many utilities in small towns. There appears to be a solid foundation from the work of all these communities that there is value in having dedicated, predictable and sufficient funding for

[35] Dennings, Kelly. (2010). The Link between Recycling and Climate Change [SlideShares]. retrieved from http://www.slideshare.net/NCDENR/the-link-between-recycling-climate-change

[36] Seattle composting program: http://www.seattle.gov/council/bagshaw/attachments/compost%20requirement%20QA.pdf
Portland composting program: http://www.portlandoregon.gov/bps/56513
San Francisco composting program: http://www.sfenvironment.org/zero-waste/recycling-and-composting

stormwater management efforts. Chapel Hill has formed a stormwater utility that has significantly increased Chapel Hill's ability to more proactively manage stormwater. Hopefully, a majority of Carrboro residents would be willing to support a utility if the revenue is well managed, especially if provisions are included so that the fee structure not be burdensome to lower income residents.

Implementation Opportunities (UPDATED 10-13-20)	• Fee structure can be set up for greater "environmental equity" (fees are based on actual runoff impact, not property value). • Emerging/innovative financing approaches exist for stormwater and green infrastructure. • Chapel Hill's stormwater utility offers: local lessons (what works well/what is difficult); staff with technical expertise in engineering, science, administration, outreach/education; potential for efficiencies/sharing of resources. • A utility would help address current limited fiscal and staff capacity to meet needs for flooding issues/property impacts, protecting and restoring surface water quality, requirements for federal/state stormwater permit, and planning for compliance with Jordan Lake rules. • Opportunities exist for incorporating incentives for implementation of on-site stormwater management. For example, offering subsidies to help homeowners and businesses pay for part of a project on their land as a way to incentive the implementation of BMPs on private property. • The City of Durham has found that it is less expensive overall to distribute stormwater-related expenses as a utility fee rather than by increasing property taxes.[37] • Pursue the possibility of implementing changes in ordinances related to stormwater management to require developers to absorb the cost of increased stormwater requirements.
Implementation Challenges	• Carefully planning the utility's goals upfront. • Determining whether to create a new utility, join Chapel Hill's utility, or explore an alternative approach that protects the benefits of a utility. • Determining a pathway for helping low-income individuals (exemptions, reimbursements, etc.). • Creating a well-conceived and well-implemented public outreach campaign. This campaign is needed to get public buy-in, ensuring that citizens are understand the purpose of and need for the utility.
Resources Needed (human and material)	• Funds for stormwater management/financing study • Eventually, new staff position(s) • Partnering agreement if collaborating with Chapel Hill • Funds for an education campaign
Anticipated Cost	See footnote[38]

[37] See #7 on the City of Durham's Stormwater Utility Fee Frequently Asked Questions Page: http://durhamnc.gov/ich/op/pwd/GIS/Pages/FAQ.aspx

[38] The average residential fee across 55 utilities in NC is currently about $1/month/1000 sq. ft. of impervious surface. Chapel Hill's utility's fee is about twice the average rate. See http://www.efc.sog.unc.edu/reslib/item/nc-stormwater-utility-dashboard# for details on NC stormwater utility rates.

Leadership	• Policy leadership from Board of Aldermen. • Management, technical, and administrative leadership from staff. • Environmental Advisory Board may be able to provide support. • Chapel Hill and Durham stormwater may be able to provide advice based on their own experiences.
Partners	Potentially Chapel Hill, OWASA
Fit with Items	Creating a new revenue stream for the Town adds capacity (Community Integration Recommendation #5)
Time Frame	Deciding to look into a stormwater utility could happen immediately. Forming a utility or joining Chapel Hill's utility would likely take 1-2 years
Next Step(s)	1) Staff to look into both administrative and policy opportunities and challenges a) Contact nearby jurisdictions and Environmental Finance Center determine best fit for Carrboro in creating a utility. b) Determine whether or not to partner with Chapel Hill's stormwater utility. 2) Craft public outreach/education campaign about negative impacts of stormwater and economic/environmental benefits of a utility.
Evaluation Criteria	• Town can consider annual surveys and other means of measuring public awareness about stormwater impacts and management • Increased number of BMPs created and increased amount of area treated to control stormwater runoff* • Improved stream health as measured by aquatic insects • Changes in stream hydrology based on stream gage monitoring • Availability of harvested rainwater in times of drought • Utility is being funded by fees collected

Ecosystem Recommendation #2: Evaluate Extent to Which the Deer Population and Climate Change affect Native Plant Ecosystems.

Evaluate Extent to Which the Deer Population and Climate Change affect Native Plant Ecosystems.

It is recommended that Carrboro seek professional support to determine whether native plant ecosystem effects from the deer population and climate change are apparent in the community forest. The potential savannafication of the southeast, in which forests are converted into more open woodlands due to a combination of hotter and drier conditions, is one of the most significant potential climate change impacts in the USA. Overgrazing by deer has the potential to adversely affect the health of forests, causing a decrease in plant diversity and forest regeneration, and aiding in the spread of non-native, invasive species.

http://www.efc.sog.unc.edu/project/innovative-financing-approaches-stormwater-and-green-infrastructure has information on innovative financing.

Implementation Opportunities	A better understanding of ecosystem impacts from climate change and herbivory would: • Provide a baseline of forest ecosystem conditions; • Identify if actions are needed to mitigate negative ecosystem impacts; • Yield action options more specific and more consistent with local conditions.
Implementation Challenges	An evaluation of forest ecosystem impacts would: • Require outside assistance from experts in forest/ecological/wildlife assessment; • Require coordination among owners of community forest.
Resources Needed (human and material)	• Administrative support from Town Staff with help from the Environmental Advisory Board. • Information/advice/guidance from organizations such as the NC Forest Service – Orange County, Humane Society of the United States, ecologists/botanists.
Leadership	Policy leadership by the Board of Alderman. Support from Town Staff and the Environmental Advisory Board.
Partners (UPDATED 10-13-20)	Carolina North Forest Management, NC Forest Service – Orange County, university or research entity
Fit with Items	Tree Coalition, Invasive Plant Management
Time Frame	Further study could be pursued immediately.
Next Step(s) (UPDATED 10-13-20)	1. Obtain professional assistance with evaluating impact of climate change and deer herbivory on forest health ~~1.~~2. Partner with a local university for research on impacts of deer population to forest health/invasive species. To start, reach out universities/botanical garden to see if others are currently researching the question. ~~2.~~3. Consider outcome of evaluation and identify response that meets needs of community.
Evaluation Criteria	Forest understory (increase in native flora, decrease in exotic species, and increase in plant and animal biodiversity).

Ecosystem Recommendation #3: Accelerate/Expand Organic Waste Collection/Composting4

Accelerate Efforts to Study and Implement a Comprehensive Organics Collection and Composting Program.

The Solid Waste Advisory Group, along with local government staff, are actively looking at the future of solid waste in Orange County, including implementation of an organics program. Prioritization/acceleration of this effort is encouraged. Details are provided below.

Implementation Opportunities (UPDATED 10-13-20)	• Improved soil quality by increasing soil organic content; • Improved water quality by improving infiltration; • Decreased carbon footprint by decreasing methane gas and decreasing the number of trips to the transfer station. • Potential to move to bi-weekly trash pickup, freeing up funds for commercial hauling and processing of compost. Funding for the program could come entirely from the reduction of trash hauling and tipping fees. • A backyard composting demonstration site(s) in a central location(s) could encourage people to participate in composting. • The Town could consider offering finished compost for sale to the community (currently done at the county level) or providing it for free to program participants. • Set up an educational demonstration on Town property to hold monthly events. • Explore composting at multifamily residences (e.g. contracting with Brooks). • Set up model composting sites/yard waste management sites.
Implementation Challenges	• Educating the public is critical, as contamination of waste streams remains problematic. Contamination is a big problem in composting due to packaging, utensils, and other plastics being discarded with organic matter. Any campaign would need to be multilingual, as Carrboro is home to many people who speak Spanish or Karen as their first (and sometimes only) language. • Residential composting is especially challenging for multi-family housing, which is more prevalent in Carrboro than other jurisdictions in Orange County. Future planning needs to be sensitive to this challenge. • It can be labor-intensive to get businesses on board. Orange County staff currently have to go back to a business two or three times to get the business to agree to participate. In addition, employees need to be retrained as new people are hired. • Questions remain about program financing. Will Pay-As-You-Throw be viable? Would residents be charged for composting services, or given a discount on trash/recycling services if they compost? Would they pay for the collection but then receive free compost in return?

Resources Needed (human and material)	• Potentially, further waste characterization studies • Composting equipment (bins, trucks). • A business to take the food waste if Carrboro isn't going to have its own composting site. • Utility or some way to process fees from participants. • Additional staff resources and/or partnerships with community groups and/or businesses to expand outreach and education. This could include encouragement of a local business to operate the curbside program (such as CompostNow).
Anticipated Cost	The main cost is likely to be the educational campaign aimed at letting people know what can be composted and what still goes in the trash, along with bins. Once the program is running, it could fund itself through money that used to be spent hauling and disposing of trash in landfills.
Leadership	Policy: Solid Waste Advisory Group. Technical: Local government staff.
Partners	Local gardening organizations, environmental groups, local businesses, county staff.
Fit with Items	Community Integration recommendations
Time Frame	Carrboro has initiated a solid waste study. Current trajectory for Solid Waste Advisory Group (SWAG) to consider a residential composting program is three to four years.
Next Step(s)	1. The solid waste study can include lessons learned from other communities with successful curbside composting (e.g., San Francisco, Portland, Seattle, NYC) and locally successful programs (CHCCS, UNC, etc.) as well as how to collaborate with local contractors (Brooks, CompostNow, etc.).[39] 2. Budget for and choose area for pilot program that includes residential and multi-family units. 3. Expand program to entire town. 4. Future plans should consider adding a more central drop-off location downtown. 5. Future studies and plans should include curbside compost collection.
Evaluation Criteria	Set a goal of 30% reduction in organic material being hauled to the transfer station by 2020, then 70% by 2030.

39 http://dusp.mit.edu/sites/dusp.mit.edu/files/attachments/project/Municipal%20Curbside%20Compostables%20Collection%20%20What%20Works%20and%20Why.pdf

Ecosystem Recommendation #4: Tree Preservation, Protection and Conservation

Help Community Members Form an Independent Tree Coalition to Support the Community and Advocate for the Community Forest

Maintain Arbor Day Foundation Tree City USA standards and aim for Tree City USA Growth Award

Trees act as a carbon sink, helping remove carbon dioxide from the air and mitigate climate change. Most of Carrboro's community forest is owned and managed by private landowners. There is a rich community of local arborists, gardeners, landscapers, nurseries, botanists, and ecologists that can support the community in creating healthier and more beautiful yards and ultimately a more resilient and diverse community forest. However, the knowledge and skills are relatively dispersed. Landowners can benefit from a local resource to help with forest, landscape, and tree management and advocacy.

Implementation Opportunities (UPDATED 10-13-20)	• Increase public awareness of the intrinsic value and beauty of trees. • Provide oversight for a community scale urban forestry program. • Educate citizens about proper tree selection, planting, and care. • Educate citizens about the health of the larger community forest, its importance for both human and environmental health, and ways in which they can support it. • Partner with local government and civic groups to improve and expand the Town's tree canopy. • A new community organization could partner with the Town to support the Town's participation in the Arbor Day Foundation's Tree City USA program, and to pursue the Tree City USA Growth Award. • The Town should pursue setting specific standards for arborists in analyzing impacts to trees and determining tree health. • Create a public-private partnership for planting canopy trees on the edges of properties. • Analyze carbon capture on development sites. • Add additional environmental review requirements for developers to the Town's LUO, including tools such as the NC Natural Heritage Program (NHP) Data Explorer and the Green Growth Toolbox. • Ensure environmental reviews are considered early on in the development process. • Perform outreach to environmental policy experts to see what Carrboro can do with broad land-use planning and Zoning, such as creating a Conservation overlay. • Require the EAB to utilize tools such as the NHP data explorer, national wetland inventory, DEQ environmental justice tool, and green growth toolbox before making recommendations.

	• Identify the amount of carbon capture that Carrboro is responsible for (per capita) and how to conserve these forests (OWASA, rural buffer, Bolin forest). • Expand right-of-ways to include tree protection. • Work with Orange County to exchange land in the Rural Buffer to protect properties with high ecological value, such as properties along Eubanks Road.
Implementation Challenges	• Creating a new and sustainable organization or finding an existing organization to lead the coalition. • Connecting with the public.
Resources Needed (human and material)	• A nonprofit organization to become a community champion for education, outreach, and action. • Neighborhood and business champions. • Broad support from community leaders, utilities, and business partners to help fund and provide technical expertise (e.g., arborists, foresters, nurseries, landscapers, NC Botanical Gardens, NC Cooperative Extension Service, Carolina North staff, Duke Forest staff). • Fiscal/policy/staff support from Town, North Carolina Urban Forest Council.
Anticipated Cost	Costs associated with nonprofit establishment/management if an existing nonprofit doesn't offer to take on the task (though this may be unnecessary if a coalition, like the Carrboro Bike Coalition, is formed.)
Leadership	Nonprofit/community members pulled together by Town staff.
Partners	NC Botanical Garden, Arbor Day Foundation, National Wildlife Federation, possibly expanding to Chapel Hill, Hillsborough, and/or Orange County.
Fit with Items	Community forest; native plant ecosystems, invasive plant management, stormwater utility; watershed management
Time Frame	Depends on identifying leadership and ability to mobilize community
Next Step(s)	Establish goals for the coalition Recruit members Form partnerships with those who have technical expertise. Begin education/outreach campaign to community

Ecosystem Recommendation #5: Improve Regulations and Community Capacity to Discourage Invasive Plants and Encourage Native Plants

Pursue both Regulatory and Non-regulatory Approaches to Better Manage Invasive Plant Species and Increase Community Efforts to Improve Plant Communities

The spread of non-native and invasive plants is a threat to forest resilience and biodiversity. Ideas for approaches to reduce the spread of non-native/invasive plants are offered in this recommendation.

Implementation Opportunities (UPDATED 10-13-20)	• Implement a campaign to educate people on the link between native plant species and ecosystem health, particularly for pollinators who face stress due to climate change and other factors. • Encourage naturalized landscaping instead of manicured lawns. These types of landscapes offer critical wildlife habitat, cause a decline in the use of petroleum-based fertilizers and pesticides, more effectively capture stormwater runoff, and reduce the heat island effect.[40] • Pursue invasive species removal projects, especially in Town parks and along greenways/bikeways/right-of-ways. Such projects would be carried out by citizens but perhaps spearheaded by a local non-profit or task force. Projects could initially focus on: 1. Vining invasives (Japanese wisteria, porcelain berry, kudzu, mile-a-minute, English ivy, Japanese honeysuckle, oriental bittersweet, Japanese euonymus) that threaten urban tree health; 2. Japanese stiltgrass and privet that alter soil pH and outcompete many native grasses and shrubs. • The Bolin Forest and Quarterpath Trace neighborhoods have pursued a neighborhood initiative which could be a resource for other neighborhoods.[41] • Provide education and resources about invasives and native plants by adding features on native plants to the Town website or creating informational brochures. • Educate Town staff about treating invasive species on Town properties. • Initiate a Climate Friendly Habitat Program and promote New Hope Audubon Society's Bird Friendly Habitats Certification Program. • Create awareness campaign to encourage residents to leave leaves on the ground in their yard. • Observe Earth Day with large event.
Implementation Challenges	• Many people can't distinguish between native and non-native/invasive plants, nor do they know that the plants they're choosing for their yard are invasive. • Many people don't understand the link between native plants and ecosystem health, choosing their plants based on cost or aesthetics. • Renters don't often have the option to choose what's planted outside their door. • Some landowners and HOAs are resistant to native species or more natural-looking landscapes. • Some developers may need outreach and education. • Large/big box nurseries often sell few (if any) native species • Some people need assistance learning about/accessing local nurseries that specialize in natives.

[40] See this book for more information on the benefits and approaches for more naturalized yards and landscapes: Tallamy, Doug. *Bringing Nature Home*. Portland: Timberpress, 2010. Print.

[41] http://www.townofcarrboro.org/1028/Neighborhood-Urban-Forest-Stewardship

	• Deer tend to ignore non-native species and prefer native species.
Resources Needed (human and material)	• Town staff to examine/amend ordinances. • Someone(s) to head an educational campaign. • Someone(s) to lead invasive species removal projects.
Anticipated Cost	Money for an educational campaign and supplies for projects removing invasives (tools, leaf bags, etc.).
Leadership	Town staff, Environmental Advisory Board, a non-profit or task force to lead invasive removal projects
Partners	NC Botanical Garden, NC Native Plant Society, local nurseries, biologists, local bee keepers, landscapers knowledgeable about native/invasive species, HOAs, Friends of Bolin Creek, Morgan Valley Alliance
Fit with Items	Community forest; Tree Coalition
Time Frame	Town staff are currently looking at the LUO. An outreach campaign is a long term undertaking.
Next Step(s)	• Update the Land Use Ordinance invasive/native plant requirements. • Implement an educational campaign, maybe in partnership with the Botanical Gardens or others, to help citizens and businesses understand the importance of planting natives and avoiding invasives. This could be done in conjunction with the Town's newly established annual Pollinator Day. • Explore options for implementing invasive removal projects. • Develop and update inventory of areas with excessive invasive plant growth
Evaluation Criteria	• Stronger ordinance against invasive species and in favor of native species. • Decrease in the number of invasive species in Carrboro and an increase in the number of natives. • More knowledgeable citizenry concerning the importance of native species.

Ecosystem Protection and Restoration Challenge #6: Pursue Watershed Restoration Actions to Protect Local Streams from Changes in Rainfall Due to Climate Change

One of the ramifications of a changing climate is the changing of precipitation patterns that affect runoff and groundwater recharge dynamics. Both ends of the spectrum are of concern- more frequent and intense rain and runoff events and longer and more pronounced droughts. Both regional and local evidence points to a relatively recent (on a years to decades time scale) increase in storm events ([42,43]). This increase stresses stream channels and threatens their geomorphic stability, which is exacerbated in an urban and urbanizing area. These conditions can also lead to groundwater depletion, and by association, less available water in the soil to support plant ecosystems. Another impact of climate change is the potential for an increase in water temperature which can affect the amount of dissolved oxygen in the water and the suitability as habitat for aquatic species [(44)]. Forested riparian buffers are a critical component of stream health. An established streamside tree canopy plays a crucial role in maintaining cool water temperatures in stream, while supporting many other ecosystem processes and functions such as carbon cycling and sequestration, filtering of upland runoff, providing habitat, and supporting biodiversity.

The Bolin Creek Watershed Restoration Team (BCWRT) worked through a small grant to characterize stream channel conditions, vulnerabilities, and restoration opportunities in 2007 [(45)]. In 2012, the BCWRT published a Watershed Restoration Plan that identified steps that would help protect and restore creek, riparian, and watershed conditions and in doing so, also support adaptation to meteorological and hydrological changes associated with climate change [(46)]. The purpose of this recommendation is to highlight this plan and encourage the pursuit of its implementation.

[42] Ingram, K., et al (ed.). 2013. Southeast Climate Consortium Climate of the Southeast United States. Variability, Change, Impacts, and Vulnerability. Island Press. https://www.sercc.com/ClimateoftheSoutheastUnitedStates.pdf

[43] A Board of Aldermen agenda item included an analysis of stream gage data indicating an uptick in the frequency of high flow storm events. See this link for details: https://carrboro.legistar.com/LegislationDetail.aspx?ID=2546739&GUID=FCFDAECE-5C15-4397-AEA2-AACB60FCE076&Options=ID|Text|&Search=flood

[44] Kaushal, S. et al. Rising Stream and River Temperatures in the United States. 2010. Frontiers in Ecology and the Environment, Ecological Society of America. http://onlinelibrary.wiley.com/doi/10.1890/090037/abstract

[45] Bolin Creek Geomorphic Assessment. Available at http://www.townofchapelhill.org/town-hall/departments-services/public-works/stormwater-management/local-watersheds-water-quality/watershed-assessments-recommendations/bolin-creek-geomorphic-assessment

[46] Bolin Creek Watershed Restoration Plan, available at http://www.townofchapelhill.org/town-hall/departments-services/public-works/stormwater-management/local-watersheds-water-quality/watershed-assessments-recommendations/bolin-creek-watershed-restoration-plan-2012

Implementation Opportunities	Additional actions outlined in the Bolin Creek Watershed Restoration Plan could be pursued to: reduce impacts from "flashy" flows and less groundwater recharge and lower stream baseflow; help stabilize stream channels and improve instream habitat, and restore cleared riparian zones.
Implementation Challenges	1. There is limited land available for watershed restoration practices 2. Permission is needed from the landowners, or land needs to be acquired 3. Funding is needed for engineering design and construction of restoration measures 4. Broad participation is needed to achieve meaningful improvements at a watershed scale.
Resources Needed (human and material)	Funding and broad community participation
Anticipated Cost	TBD
Leadership	TBD
Partners	Bolin Creek Watershed Restoration Team partners
Time Frame	TBD
Fit with Items	Stormwater utility, Tree Preservation, Protection and Conservation
Next Step(s)	TBD
Evaluation Criteria	Changes/improvement in geomorphic and biological indicators

Ecosystem Protection and Restoration Challenge #7: Biodiversity (ADDED 10-13-20)

Develop a plan and create development thresholds to protect biodiversity

Implementation Opportunities	• Develop a biodiversity protection plan as a supplement to this plan, using local resources such as the North Carolina Natural Heritage program and retired professors. • Create thresholds for biodiversity and carbon capture in developments.
Implementation Challenges	• Organizing, coordinating, and developing a new plan will require significant effort. • Biodiversity thresholds must be defined using scientific research. • Staff must consult the Town's legal services to determine the ability to require specific biodiversity thresholds from developers.
Resources Needed (human and material)	The Town could partner with an outside organization or experts in this field.
Anticipated Cost	Staff time and/or contract support
Leadership	Town staff, advisory boards
Partners	Outside organization or biodiversity experts, NC Botanical Garden, NC Native Plant Society, local nurseries, biologists, professors, graduate students, researchers
Time Frame	Long-term, staff will need to determine the scope of work for a plan and research the Town's ability to regulate biodiversity in developments.
Fit with Items	Community forest; native plant ecosystems, invasive plant management.
Next Step(s)	Staff research options for funding or writing these items. Staff consult the Town's legal services.
Evaluation Criteria	Development of plan or Land Use Ordinance amendments

Ecosystem Protection and Restoration Challenge #8: Carbon Offsets and Climate Research Protection (ADDED 10-13-20)

The Town should examine opportunities to purchase carbon offsets and ensure to protect climate research in the Town's vicinity

Implementation Opportunities	• The Town should create a metric to determine how to analyze what to prioritize in terms of buying carbon offsets - it is important to research specific details about projects and their efficiency. • The Town should work to protect local climate action research.
Implementation Challenges	• Researching the types of carbon offsets • Determining when and how to pursue carbon offsets • Potential cost of carbon offsets and the benefit
Resources Needed (human and material)	Town staff will need to research carbon offsets and reach out to experts. Staff will also need to communicate with local universities and scientists about local climate research.
Anticipated Cost	Staff time and/or contract support
Leadership	Town staff, advisory boards
Partners	NC Botanical Garden, biologists, professors, graduate students, researchers
Time Frame	Long-term- staff will need to spend time researching and determining a way to move forward with this recommendation.
Fit with Items	Community forest; native plant ecosystems
Next Step(s)	Staff begin performing research on these topics.
Evaluation Criteria	Development of criteria for purchasing carbon offsets and protection of local climate research from developments.

Food Choice Measures

Reducing emissions from food choices in Carrboro will rely on a coordinated effort involving outreach, engagement, and participation broadly with partners and across the community to encourage Carrboro residents to adopt a climate-friendly diet, which reduces or eliminates meat, dairy, and eggs.

The livestock sector is one of the most significant contributors to serious environmental problems, at every scale from local to global, and must become a major policy focus.[47] Livestock and their byproducts account for at least 32,000 million tons of carbon dioxide (CO_2) per year, or 51% of all worldwide greenhouse gas emissions (GHG).[48]

According to a recent study, the mean GHG emissions in pounds of CO_2 equivalents per day (lbs. CO_2e/day) are 15.85 for high meat-eaters, 12.41 for medium meat-eaters, 10.30 for low meat-eaters, 8.62 for fish-eaters, 8.40 for ovo-lacto vegetarians, and 6.39 for plant-based vegans. Dietary GHG emissions in meat-eaters are approximately twice as high as those in vegans. Changing from a high-meat diet to a vegan diet saves 9.46 pounds of carbon dioxide equivalents per day or 3,452.9 pounds per year (1.73 tons)[49], or the equivalent of 178 gallons of gasoline per year. That's enough to drive a Prius 26 miles per day (or a Hummer 4.5 miles per day) for an entire year. In other words, a vegan who drives a Prius less than 26 miles per day (or a Hummer less than 4.5 miles per day) has a smaller carbon footprint than a high meat eater who commutes by bicycle.

Animal agriculture is a driving force behind virtually every major category of environmental damage: deforestation, erosion, fresh water scarcity, air and water pollution, climate change, biodiversity loss, social injustice, the destabilization of communities, and the spread of disease.[50]

Meat is an inefficient way of turning land into calories. It takes 2,500 gallons of water, 12 pounds of grain, 35 pounds of topsoil and the energy equivalent of one gallon of gasoline to produce one pound of feedlot beef[51]. We're using our limited land to feed animals instead of people: 56 million acres of U.S. land produce hay for livestock, but only 4 million produce vegetables for human consumption. The world's cattle alone consume enough calories to feed 8.7 billion people – more than the global

[47] Steinfeld H, Gerber P, Wassenaar T, Castel V, Rosales M, de Haan C. *Livestock's long shadow: environmental issues and options*. Rome, Italy: FAO; 2006. (ftp://ftp.fao.org/docrep/fao/010/a0701e/a0701e00.pdf)

[48] Goodland, R Anhang, J. Livestock and Climate Change: What if the key actors in climate change were pigs, chickens and cows? *World Watch*, November/December 2009. Worldwatch Institute, Washington, DC, USA. Pp. 10–19. (http://www.worldwatch.org/files/pdf/Livestock%20and%20Climate%20Change.pdf)

[49] Scarborough P, Appleby PN, Mizdrak A, et al. Dietary greenhouse gas emissions of meat-eaters, fish-eaters, vegetarians and vegans in the UK. *Climatic Change*. 2014; 125(2):179-192. doi:10.1007/s10584-014-1169-1., (http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4372775/)

[50] WorldWatch Institute: Is Meat Sustainable? 2004. (http://www.worldwatch.org/node/549)

[51] Food Choices and the Planet (http://www.earthsave.org/environment.htm)

population[52]. You would save more water by eating just one pound of beef less than if you didn't shower for an entire year.[53]

The additional benefits to human health of plant-based diets include reducing cardiovascular diseases, hypertension, many cancers, diverticulitis, diabetes, obesity, osteoporosis, arthritis, appendicitis, gall stones, kidney stones, other chronic diseases, food allergies, and food poisoning. The associated economic benefits are massive. The social justice benefits include greater food security and environmental justice for minority and low-income communities living near factory farms.

Finally, elimination of animal products facilitates backyard composting, as most gardeners advise against composting meat. It also helps reduce the frequency of trash pickup, with rotting meat, dairy, and eggs removed from the trash stream.

For every plant-based meal that each resident of Carrboro consumes, he or she reduces his or her animal-based dietary CO_2e emissions by 4.76%. Of course, each resident of Carrboro who adopts a fully vegan diet (no animal products) reduces his or her animal-based dietary CO_2e emissions by 100%.

If 50% of Carrboro's 20,984 residents make a 50% reduction in their consumption of meat, dairy, and eggs by 2025, and if an additional 25% of Carrboro residents consume no animal products by 2025, Carrboro could eliminate 18,151 tons of CO_2e per year (50% x 10,492 x 1.73 tons/person/year=9,076 tons of CO_2e + 100% x 5,246 x 1.72 tons/person/year=9,076 tons of CO_2e per year).

Moving to a plant-based diet is a much quicker way to affect climate change than most, as the turnover rate for farm animals (especially factory produced animals) is much greater than that for cars, busses, or buildings. And while CO_2 can remain in the air for more than a century, methane cycles out of the atmosphere in just eight years, producing a further potential for quicker reduction in climate change.

Food for thought – You can change your light bulbs, buy a hybrid car and plant more trees, but nothing is as effective, available, inexpensive, quick, and powerful for the individual in affecting climate change as the choice of where to stick your fork.

[52] Gold and Porritt. 2004. *The Global Benefits of Eating Less Meat*. (https://www.ciwf.org.uk/media/3817742/global-benefits-of-eating-less-meat.pdf)

[53] Earthoria. 2008: Global Hunger: The more meat we eat, the fewer people we can feed. (http://www.earthoria.com/global-hunger-the-more-meat-we-eat-the-fewer-people-we-can-feed.html)

Food Choice Recommendation #1: ~~50~~80% Challenge (UPDATED 10-13-20)

Reduce Greenhouse Gas Emissions from Diets by ~~50~~80% by ~~2025~~2030 (UPDATED 10-13-20)

It is proposed that local leaders announce an emissions reduction challenge to reduce community wide emissions from animal consumption by ~~50~~80% by ~~2025~~2030. The challenge could include a component focused on emissions from meat, dairy, and eggs in Carrboro. (UPDATED 10-13-20)

Implementation Opportunities (UPDATED 10-13-20)	• Awareness and demand for plant-based meals continue to grow. • A growing percentage of residents are aware of the financial, health, environmental, and justice aspects of plant-based diets. • Local nonprofits and organizations such as Triangle Vegfest and Triangle Vegetarian Society have experience and expertise in educating on the how-to and benefits of plant-based diets. • Local interest in active, healthful living is already strong. • Improved health of Carrboro residents • Town functions could reduce or eliminate red meat and dairy (products with the highest emissions) and offer prominently labeled plant-based and locally-produced options. • The Town web site could host a Climate-Friendly Diet pledge. • Community programming could involve something as simple as a monthly vegan potluck and movie night at the Century Center. • Cooking class options could be expanded to include plant-based meal preparation and nutrition at low or reduced costs. • Restaurants could offer a "Climate Friendly Menu Options" window sticker and/or a Carrboro Vegan Challenge modelled after the Bull City Vegan Challenge in Durham, increase plant-based diet patronage and benefit Carrboro's economy. • The Cooperative Extension Family and Consumer Science programs and Master Gardner program could partner with young people to expand learning about growing and preparing foods that support plant-based diets. • Interfaith Council food pantry and kitchen provide opportunities for cooking and serving plant-based meals and for requesting donations of supplies and ingredients to support plant-based diet meal preparation at home for pantry patrons. • Carrboro Farmers' Market participates in SNAP/EBT , WIC, and SENIORS FMNC programs and provides bonus Market Bucks for any of these users checking in at the Market Booth before shopping, making local products more accessible to lower income members of the community. Consider working with the market to provide outreach on the benefits of local and plant-based dietary choices.

	• Use behavioral information about motivations for food choices to encourage residents to choose plant-based options, e.g. menu placement. • Work with local restaurants to promote plant-based meals and promote ideas such as Meatless Mondays.
Implementation Challenges	• Public schools have strict food guidelines that present unique challenges to changing meal choices in cafeterias. • High percentage of residents may be unaware of the financial, health, environmental, and justice aspects of plant-based diets. • Cultural and social conditioning is present that suggests that eating meat, dairy, and eggs is necessary for human health. • Plant-based options in many restaurants and institutions are limited. • Access to quality food and knowledge on how to prepare it can also affect dietary choices. • Disconnects between information and reality – plant-based diets can be very economical but focus is often directed to local and particularly organic foods, which are perceived to be more expensive.
Resources Needed (human and material)	• Volunteers and groups to host educational programs and work with restaurants and schools. • Staff time or monetary resources for web page development • Staff time or monetary resources for implementation of plant-based programs in Carrboro schools. • Printed educational materials about plant-based foods and food choice impacts on the environment. • A nonprofit organization could become a community champion, as could neighborhoods and businesses.
Anticipated Cost	There could be costs associated with printing educational materials and developing web pages. Depending on the incentives provided to the Carrboro Farmer's Market participants, monetary resources may be required. Plant-based menus typically cost less than meat-based menus, so, these programs have the opportunity to save the town money.
Leadership	Local elected officials and community leaders could endorse this goal.
Partners	Food Policy Council, Triangle Meatless Mondays, Triangle Vegfest, Triangle Vegetarian Society, CHCCS, Carrboro Business Alliance, especially local food providers (retail groceries, restaurants, food trucks), Chapel Hill-Carrboro Chamber of Commerce
Time Frame	It is recommended that local leaders begin these measures immediately. Especially the measures which take little to no monetary resources.

Fit with Items	Local living economy, social justice, ecosystem protection, composting
Next Step(s)	1. Formal adoption/publicity for challenge 2. Begin offering more clearly labeled plant-based options, eliminating or high carbon foods at town functions. 3. Begin conversations with organizations on opportunities for partnerships in educational programs.
Evaluation Criteria	• Increase in plant-based options at Town functions, local restaurants, and schools. • Number of individuals who take a plant-based pledge on Carrboro website • Increase in sales of plant-based foods at restaurants

Food Choice Recommendation #2: Develop Local Dietary Consumption and Associated GHG Profile

Develop Data and Method to Better Capture Diet-Related Greenhouse Gas Emissions and Measure Progress Towards Reduction Goal

Monitoring progress towards diet-related greenhouse gas emissions relies on understanding consumption patterns that occur outside of Carrboro in the development and creation of food, and consumption occurring in Town as well. Greenhouse gas inventories developed for Carrboro have focused on the more directly accountable community scale activities, such as fossil fuel consumption from motor vehicles and metered utilities that occur within the geographic confines of the community. These emissions account for a percentage of the full scale "life cycle" direct and indirect emissions associated with the behaviors and activities of community members. In relation to food, emissions for local transport, storage, and processing, cooking, and waste management are included within total estimates for transportation, electricity, natural gas, and waste. Emissions associated with other aspects of food production and consumption are not yet captured. Establishing a broader baseline of food consumption emissions will raise awareness and support individual and household choices to shift from more carbon-intensive to less carbon-intensive diets.

Implementation Opportunities (UPDATED 10-13-20)	• UNC researchers (or others) could be approached about pursuing a research project to track changes in emissions associated with dietary choices. • The Food Council, Chapel Hill Carrboro City Schools, Carrboro Farmers Market, and perhaps others could help track local food production and consumption. • Tracking consumption prior to and following outreach and education related to benefits of plant-based dietary choices will help determine impact. • The ICLEI protocol and Berkeley Cool Climate Calculator[54] are resources that can help assess total GHG from adoption of plant-based diets and other changes in household activities. • Purchase local sales data and grocery store loyalty data.
Implementation Challenges	Community level data collected to date has not included household consumption of goods and services, including food. The ability to monitor and track progress towards emissions reduction from dietary changes is currently limited.

[54] http://coolclimate.berkeley.edu/calculator

Resources Needed (human and material)	Some labor/human resources will need to be dedicated to establishing the technical basis and coordinating efforts Funding may be needed for contractual support
Anticipated Cost	TBD
Leadership	Potential leaders include: existing and/or new nonprofit(s); the Carrboro Business Alliance; Chamber of Commerce. Local elected officials and other community leaders could endorse this goal
Partners	Potential partners include: existing and/or new nonprofit(s); the Carrboro Business Alliance; Chamber of Commerce; Triangle Meatless Mondays; Triangle Vegfest, Triangle Vegetarian Society; CHCCS.
Time Frame	This would take some time to scope out and find partners/researchers. Maybe one year to begin with development of data collection strategy that could be replicated every 3 years
Fit with Items	Local living economy, social justice, ecosystem protection, composting
Next Step(s)	Local elected officials/community leaders collaborate to initiate challenge
Evaluation Criteria	Reductions in GHG emissions from residents as reported through tracking mechanism – (e.g., household calculator)?

Implementation Recommendations

This plan identifies a number of recommendations that include elements of implementation, however it is beyond the scope of the plan to include a detailed implementation plan. The following suggestions are offered as a starting point for pursuing implementation, and focus on categorizing the recommendations into (somewhat arbitrary) timeframes for consideration. "Work has already begun" refers to recommendations which are currently being pursued, and the predominant need is for acceleration, mobilization, and/or additional resources. "Begin immediately" refers to recommendations that could be prioritized because they support other recommendations, can potentially be pursued with more limited partnering requirements, outside or new resources or statutory authority, and in general have a lower risk/higher reward. Those listed "Within one year" are likely to involve more effort/resources, rely more heavily on the creation of partnerships, the development of educational campaigns, and/or input from the community. Items listed under "Within two years" will likely require significant effort and reliance on potential partners and are subject to some uncertainties. Finally, a regulatory based approach to two recommendations is likely to be possible only through changes in state law. While this

prioritization is offered to attempt to make the entire pallet of recommendations more manageable from an implementation perspective, considerable flexibility is needed, and reasons to adjust the priorities will no doubt arise as part of implementation. Additional suggestions on the time frame and next steps are included in the more detailed recommendations in previous sections of the plan.

Work has already begun:
Transportation Recommendation #3: Improve Vanpool/Carpool Options
Transportation Recommendation #4: Further Promote Walking, Biking, Transit
Ecosystem Recommendation #3: Accelerate/Expand Organic Waste Collection/Composting
Ecosystem Recommendation #5: Improve Regulations and Community Capacity to Discourage Invasive Plants and Encourage Native Plants

Begin immediately:
Community Integration Recommendation #4: Integrate Climate Action with Local Living Economy
Buildings Recommendation #1: ~~50~~80% Challenge (UPDATED 10-13-20)
Transportation Recommendation #1: ~~50~~80% Challenge (UPDATED 10-13-20)
Ecosystem Recommendation #1: Pursue Stormwater Utility

Begin Within 1 Year:
Community Integration Recommendation #1: Create Grass Roots Partnerships to Engage Community
Community Integration Recommendation #2: Expand Public Partnerships to More Explicitly Consider Climate Action
Community Integration Recommendation #3: Create Green Neighborhood Program
Community Integration Recommendation #5: Expand Capacity
Community Integration Recommendation #6: Facilitate Low Cost Financing for Energy Efficiency and Renewable Energy Projects
Community Integration Recommendation #7: Integrate Climate Action and Social/Equity Initiatives
Buildings Recommendation #4 and Renewable Energy Recommendation #3: Create Rental Property Task Force and Process
Buildings Recommendation #5: Create Rental Property Registry/Certification
Transportation Recommendation #5: Limit Idling in School Loading Zones
Renewable Energy Recommendation #1: Pursue Community Solar Projects
Ecosystem Recommendation #2: Evaluate Extent to Which the Deer Population and Climate Change affect Native Plant Ecosystems
Ecosystem Recommendation #4: Create a Tree Coalition

Begin Within 2 years:
Transportation Recommendation #2: Enhance Transit Service
Renewable Energy Recommendation #2: Create a Downtown Geothermal District

Statutory Authority May Be Needed to Pursue Recommendation as a Requirement:
Buildings Recommendation #2: Require Energy Audit/Performance Rating
Buildings Recommendation #3: Demonstrate/Pursue Energy Performance Beyond Minimum Requirements for New Development

(For these two recommendations, a non-regulatory approach is also offered in the recommendation for which statutory authority is not needed.)

Appendix 1

Summary of 2016 Public Outreach

The public outreach pursued in the spring of 2016 has resulted in a diversity of community input. The discussion that follows offers some summary observations. Those interested in the range and specifics of input are encouraged to review the April 26th Public Hearing agenda item and minutes, and details in the appendices of this memo.

1. As far as participation:
    - Approximately 20 people participated in the April 6th drop in session
    - 13 people spoke at the Public Hearing, including the 5 Task Force members
    - 5 people participated in the May 31st drop in session
    - 4 people participated in the June 9th drop in session
    - 26 responses to the initial Survey Monkey survey were received; 170 responses (as of June 15th) to the follow up Google Form survey have been received
2. General results of the surveys:
    - The objective/multiple choice responses indicated broad support for the plan's recommendations that were addressed by the survey questions. For example, half or more of respondents to the second survey (Google form) indicated strong support for each of 9 of the 10 plan recommendations addressed in the survey, and over 95% of respondents were either neutral or supported all the recommendations included. The recommendation for more carpooling and vanpooling support, while having fairly broad support, did not receive quite as enthusiastic support as the other recommendations addressed by the questions. While the longer Survey Monkey survey only had 26 responses, it in general displayed a similar response of support for the plan's recommendations.
    - A majority of respondents indicated that they are currently pursuing, or intend to pursue in the future, recommendations in the plan related to: improving the energy efficiency of buildings; biking/walking/bus/carpooling more; making improvements to their land/yards; and supporting local sustainable businesses. Somewhat fewer but still a significant percentage of respondents indicated plans to install solar energy and work in the community on issues related to climate change and social equity and climate mitigation.
    - The most frequently received supplemental comments addressed a need for the plan to include an endorsement for plant-based diets. 43 responses spoke to this topic; there is some double counting of respondents since this includes supplemental comments under two separate questions.

- Respondents offered other supplemental comments. From a very broad brush perspective, these comments addressed transportation infrastructure, other transportation topics, solar energy, and several miscellaneous comments.
- Supplemental comments for actions respondents are currently pursuing addressed adoption of a plant-based diet (most frequent), involvement in education, choices for transportation modes, and various other actions.

Climate Action Survey

(Open in May and June, 2016 through Google Forms)

Survey Questions

1. **Please rate the following recommendations from the Community Climate Action Plan**

   (Choices: Great idea; Good idea; Neutral; Bad idea; Terrible idea)

   A. Develop and implement a strategy to reduce greenhouse gas emissions from buildings by 50% by 2025

   B. Make it easier for renters and buyers to access information about the energy efficiency of existing buildings

   C. Pursue energy efficiency features in new buildings that exceed minimum requirements

   D. Develop and implement a strategy to reduce greenhouse gas emissions from motor vehicle use by 50% by 2025

   E. Add more bus stops and trips in Carrboro

   F. Add more carpool and vanpool options in Carrboro

   G. Do more to promote walking, biking, and transit

   H. Provide more opportunities for citizens to invest in community solar projects

   I. Do more to support and encourage composting

   J. Do more to encourage native, noninvasive plants and discourage invasive plants

2. **Please add any other community climate actions you'd like to see included in the plan (open ended for text response)**

3. **Please check any actions you expect/intend to do over the next decade (check all that apply)**

   A. Invest in solar energy

   B. Make my home more energy efficient

   C. Bike, walk, bus, and carpool more and drive less

D. Make choices on my land that improve the soil, reduce erosion and runoff impacts, favor native plants over invasive plants, and in general support the local ecosystem

E. Increase my support of local businesses, especially those pursuing sustainable practices

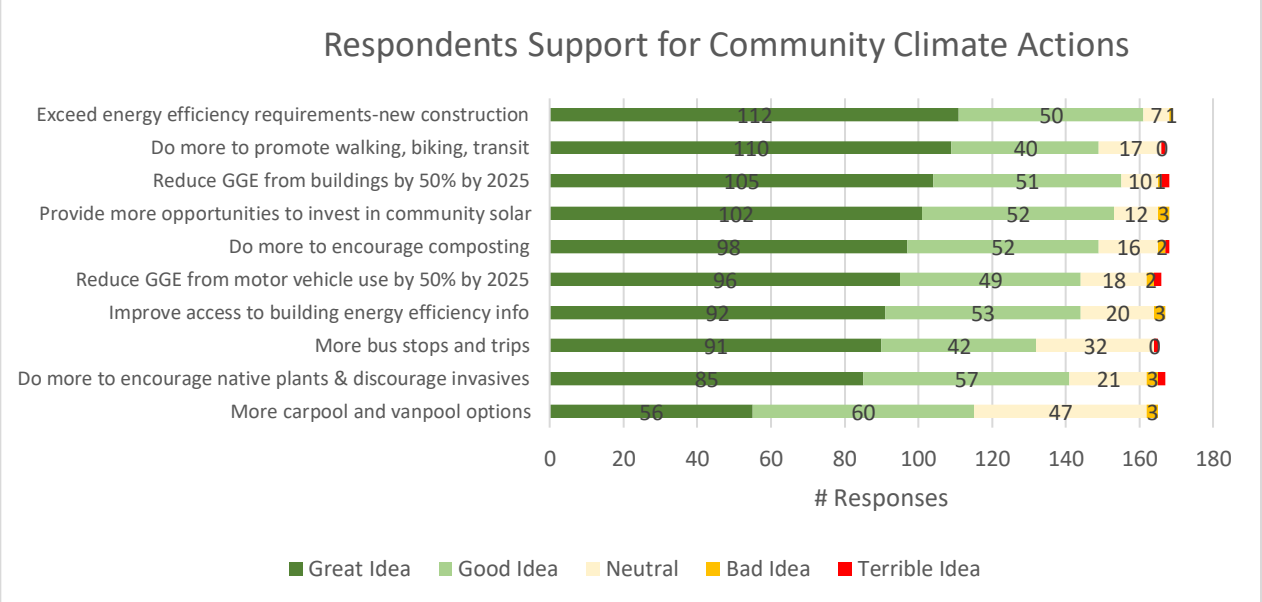
F. Work in the community on issues related to climate change and social equity (e.g., food security, green economy for all, affordable utility costs)

G. Work with neighbors, coworkers, and/or others in the community on efforts that reduce greenhouse gas emissions

4. **Please add any actions related to climate change and resilience not included above that you are currently doing or plan to do. (open ended for text response)**
5. **Is there anything else that you would like to share on the topic of community climate action? (open ended for text response)**
6. **If you would like, please feel free to provide your name and address. Anonymous responses are also welcome. (open ended for text response)**

Survey Responses

1. **Please rate the following recommendations from the Community Climate Action Plan**



2. **Please add any other community climate actions you'd like to see included in the plan**

5. **Is there anything else that you would like to share on the topic of community climate action?** (open ended for text response)

Responses to these two questions are compiled and organized below under major topic headings.

Endorse a Plant-Based Diet

While all these things are good, without the inclusion of plant-based diet recommendations, I fear the document is all but meaningless. Animal agriculture is destroying the environment far faster and with more devastating results than anything else.

I am very discouraged to see no recommendation for encouraging a change in diet on the part of Carrboro citizens. It is becoming more and more evident that animal agriculture is the single biggest cause of climate disruption yet there is zero mention of the single most important change that individuals can make to be part of the solution. Of course, I realize that laws and ordinances cannot be put into effect to regulate what people eat, but the city of Carrboro ought to be forward thinking enough to create a honest and effective campaign to alert people to the devastation caused by the choices on their plates. Any community climate action is weak without recognizing the elephants in the room that are the dairy industry, the meat industry, and the egg industry. Of course, what I am suggesting will take courage, but that is something we should be able to expect of a community that is actually serious about this enormous problem.

Since animal agriculture is the leading cause of climate change and environmental degradation, there should be a section about educating the public about the effects of their food choices.

Encourage people to cut their consumption of products from animal agriculture (meat, dairy, etc).

Reduce meat consumption, decrease the negative environmental impacts of animal agriculture

Include change in diet

Encourage more plant based fare and less need for animal agriculture. With all the information available about saving your life with a plant based diet, you also save the earth.

Promote plant based diets, as animal agriculture is the number ONE reason by far for climate change. Encourage local restaurants and businesses to provide more plant-based options over meat centered options.

Encourage eating more plant-based foods. Meat agro is the #1 cause of greenhouse gases in the atmosphere according to UN data.
Educate people about the environmental problems associated with mass animal agriculture and encourage eating less animal products (Meatless Mondays, vegan/vegetarian options and recipes).
Address the issue of animal foods' contribution to climate change. More focus on plant food initiatives.
Encourage a move away from animal agriculture. Promote Plant based diets to reduce the release of greenhouse gasses into the environment
Educate citizens on impact of animal products on climate change. Provide support and incentives to businesses and citizens to move toward more plant-based diets or just reducing meat consumption. Reducing meat consumption will do far more to limit our carbon footprint than transportation changes. For lower income citizens especially, plant-based diets are more accessible than many of the other solutions presented below (I don't own a home, I can't ride a bus or bike to work, I don't own land, etc.
Promote plant-based diets
When approving restaurants and new places of business, encourage vegan and plant based options. It's one of the greatest ways to fight climate change due to the excessive resources meats use in their production.
There is no mention of animal agriculture which is by far a greater threat to the environment. Encouraging a plant-based diet would have more impact than anything mentioned here. Please consider this fact.
Animal Agriculture is now the leading cause of environmental pollution
Consider the impact of animal agriculture on the environment and increase vegan-friendly restaurants!
Cut out animal products from our diets! Animal agriculture contributes more greenhouse gas emissions than all of transportation combined!
Ending Animal Agriculture
According to the WorldWatch Institute, livestock and their byproducts account for at least 51% of all worldwide greenhouse gas emissions. A community climate action plan is completely ineffective without including a recommendation to eliminate animal flesh and secretions from our plates.
Animal agriculture is one of the leading causes of climate change (even more so than all transportation combined), so I think that any plan to combat climate change must encourage plant-based diets among residents. Some ideas could include plant-based cooking and nutrition classes and incentives for restaurants to offer plant-based meals.

Educate about big impact of animal agriculture on climate change (eg. World Watch attributes 51 percent of annual worldwide GHG emissions to 'livestock and their byproducts' http://www.worldwatch.org/node/6294) Get behind Meatless Mondays, etc. Make it positive!

It is so important that we educate people about the harmful effects of animal agriculture. "Shifting less than 1 day per week's (i.e., 1/7 of total calories) consumption of red meat and/or dairy to other protein sources or a vegetable-based diet could have the same climate impact as buying all household food from local providers." This study found that transportation is only responsible for 11% of GHG emissions in food production. A vast majority comes from production.
http://pubs.acs.org/doi/full/10.1021/es702969f

Animal agriculture is a huge contributor to climate change, and that should be addressed by discouraging the practice, as well as the consumption of animal products. Animal agriculture is the number one cause of global climate change, so efforts to minimize the impacts from this industry should be taken.

Changing to a plant based life takes some doing but check out Physicians Committee for Responsible Medicine.

Carrboro has the ability to make a huge impact on reducing greenhouse gases because it is such a small community and many people are open to making small changes in their lifestyle. If Carrboro can adopt meatless Mondays, and provide education to the community as to how this significantly helps our environment, it has the potential of being quite successful.

Eating less animal products can greatly reduce climate impact as animal agriculture is responsible for more greenhouse gases than all transportation combined.

Please include diet and animal agriculture in this climate change action plan.

Some have suggested that encouraging plant based diets or less animal product based diets is "elitist". When looking through the other suggestions presented in the climate action plan I do not understand how this suggestion is seen as anymore elitist or inaccessible than other suggestions. It seems hard and it makes us uncomfortable, but our future depends on it. Please consider including plant-based diets or at the very least reducing animal product consumption, like many other cities have done in their plans

Please research the effects of animal agriculture. It is the elephant in the living room here.

Livestock is responsible for 65% of all human-related emissions of nitrous oxide – a greenhouse gas with 296 times the global warming potential of carbon dioxide, and which stays in the atmosphere for 150 years. "Livestock's Long Shadow: Environmental Issues and Options." Food and Agriculture Organization of the United Nations. 2006.

Promote plant-based diets to reduce global warming/climate change
Since animal agriculture is a main driver of climate change, please include animal agriculture and diet in this climate change action plan. include animal agriculture and diet in their climate change action plan
Animal agriculture & diet contributes to greenhouse gas (methane), water pollution, water usage, and land destruction
Please consider animal agriculture because it accounts for over 41% of greenhouse gas emissions and forest destruction and water pollution.
Animal agriculture has an enormous effect on climate change. Addressing this issue is more important than any of the above suggestions combined:
http://www.fao.org/docrep/010/a0701e/a0701e00.HTM
Promote a whole food plant based diet to eliminate factory farming which is the largest producer of greenhouse gas, greater than any other sector.
Encouraging a meat free diet.
You should focus more on animal agriculture's massive impact on creating climate change. Until you do this, you are ignoring a large part of the problem.
Encourage more plant based diets, like meat free Mondays.
Promotion of plant-based diets-schools, restaurants, community events.
Animal agriculture is the top producer of greenhouse gasses. It's about time that we acknowledge the fact, and act accordingly. Carrboro should emulate Asheville in it's vegan-friendliness/environmentalism.

Transportation: Infrastructure and Service

I would like to see additional bike lanes added to more roads in Carrboro. I would especially like to see a bike lane added to Greensboro Rd. by the farm.
Whenever possible, include bike lanes in plans for new roads or resurfacing
Roads should be built with shoulders so that there is room for people to safely bike and walk.
Build more greenways! If it's safe for children and old people to bike, everyone bikes!
I support greenways and bike paths that make alternatives to vehicles possible. Often these alternatives are challenged. I welcome open forums about these issues exploring whether there are indeed negative environmental ramifications for these projects or if it is a case of NIMBY politics.
I strongly advocate designing better bike paths throughout our cities. We need to look at the amazing ways in which Colorado, a much larger state, has managed to create bike paths that link neighborhoods and cities throughout the state. The park system is

funded by the lottery and bonds. Coloradoans value parks and communities much more than North Carolinians seem to do.
Provide more park & ride options
Greater Number of residential and commercial charging stations for electric vehicles, like the ones made by GE.
One electric vehicle charging station/school
CHCCS makes million dollar buildings that are LEED certified but CHCCS will not support alternative fuel vehicles on site. Even when private individuals will pay for installation.
More charging stations for electric vehicles to promote their adoption.
Sync those traffic lights as best you can to move traffic along efficiently.
Bus stops to Carr Mill Mall so people can easily grocery shop without driving.
More sidewalks - particular on Simpson St. There is already a park and folks walk to the bus stop! Where is the sidewalk?
Increase bus routes and transportation
Municipal fleet non-fossil fueled
Reducing emissions from cars is not something the town can realistically take on.
Concentrate on community actions that are within the control of the town.
Reduce hardscape coverage throughout town, especially surface car parking

Transportation: Education and Outreach

Discourage driving for people who are able to walk, promote walking/biking as "cool" and "the Carrboro way"
Create carpooling options for town events like Parks and Rec events and camps.
Would like crossing guards on Seawell School Road, and Homestead Road to promote walking to school by elementary and middle school children. Lots of homes in walking distance but no crossing guards for bike riders and walkers.
Reducing emissions from motor vehicles seems like more of a national than local issue.
Promoting walking, biking, and transit seems like a good idea but can be controversial.
In principle I love that you are thinking about all of this. In practice there may be aspects that are unrealistic for the town to act on. For example reducing greenhouse gas emissions from vehicles.

Buildings

Require new buildings to be "solar ready". Pursue joint policies with Chapel Hill, schools, County, Durham. Hire staff to manage this, maybe could be shared with Chapel Hill, Orange County.
Please, find a way to erect solar panels on suitable public buildings, or commercial building if the owner is inclined, AND find a way that private citizens can invest in the

project. My roof is not suitable for solar panels, but I still would like to contribute to having more solar energy powering Carrboro

The best way to save in residential construction is by using thermostats correctly. (Setback during the day) Making Smart Thermostats easier to attain or providing training on how to use existing thermostats would go A LONG way.

Is there any way to control the size of houses and mixed use projects, some of which can be energy gluttons?

Allow for nontraditional structures to be built like shipping container homes.

Landscaping/gardening

Encourage people to conserve water and to reduce consumption of meat products by offering incentives to create your own vegetable garden and subsidize rain barrels for irrigation. Also plant bee-friendly flowers.

If, by "invasive" plants, you are including poison ivy/oak, I will be thrilled!

Plant more trees, implement green infrastructure on current and future development projects

More education on planning for a backyard vegetable garden and which bushes, trees, flowers are native and environmentally aligned here (and not preferred by deer). I'm new here, so if this is already available, I just haven't found it yet...

Plant edible gardens in town-owned spaces.

Emission free lawn equipment

More community gardening - how about y'all buy 303 Jones Ferry for one!

Preserving green space within and around Carrboro, also city funds going to planting trees in the area and development of more community garden space.

Promote and facilitate residential organic gardening, permaculture, rain water catchment.

Education

General education about climate change

We need to get the schools involved in teaching our children to make climate-friendly choices, especially in food.

ACE would love to help out. I'll let my advisor know. The Climate Summit would be another great venue, and events at Weaver Street or places with more publicity.

Educate regarding how food choices have different impacts

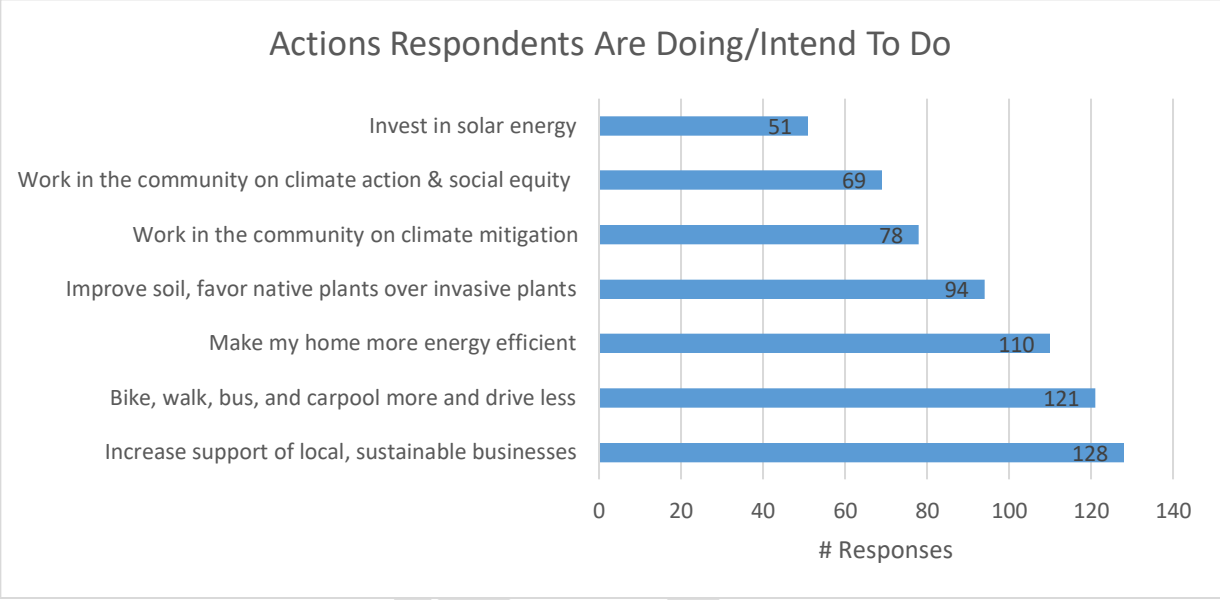
We have to lead by example and then effectively tell the story about how implementing all of these practices has saved us money and created a more vibrant community.

Share with other similarly-sized towns and learn from their progress.

Other Feedback

Require that whatever goes in the northwest corner of Greensboro and Weaver be a showcase for sustainability (not LEED, necessarily)
We did consult regarding converting our home to solar power and were told there were too many trees in the way. We didn't want to give up our trees so what other options would there be? Are trees and solar power incompatible?
We should do this stuff to keep our air clean and environment healthy. Climate changes. READ your history books! Ask the dinosaurs.
Be sure that these actions do not systemically drive out any residents or small business owners who cannot afford to pay for or invest in the initiatives related to any "community" climate plan. The people are the most important force within the community. It is important not to lose the unique character of Carrboro, NC. Gentrification has already began to show its true colors in other affluent areas of Orange County.
Take action against animal cruelty or neglect, and find more humane ways to control the population of unwanted animals in the town limits to replace hunting and poison.
Gondolas!
Ban plastic bags and bottle, continue to improve hybrid and electric bus fleet, add additional solar/ electric charging stations
Ban Plastic Bags!!! Get all food businesses and non-profits involved in commercial composting; Initiate a food waste reduction plan;
Solid waste diversion (beyond composting, mentioned above)- key driver of GHG emissions
I applaud the town of Carrboro, where I live, for doing something about this serious problem.
Thank you for the work on this vital issue!
I appreciate the work that the creators of this survey are trying to do.
I love that Carrboro is taking the initiative and doing this! Proud to live here!
These initiatives are incredibly important. It is great to see Carrboro leading the way on this. Encouraging other communities to follow suit is probably the most important and most difficult thing.
We don't need any more 'strategies' researched and implemented. Everything is going in the right direction but please leave it alone. Don't need any more rules.

3. **Please check any actions you expect/intend to do over the next decade** (check all that apply)



4. **Please add any actions related to climate change and resilience not included above that you are currently doing or plan to do.** (open ended for text response)

Responses are compiled and organized below under major topic headings.

<u>Plant Based Diet</u>

I will continue to educate people about the importance of plant-based diets.
My family and I are vegan.
I plan to educate the public about the harmful effects of animal agriculture.
I have eliminated my demand for animal products which use a lot of resources. I don't plan to reproduce (humans use so many resources!)
Reduce meat (and other animal product) consumption, stop the negative environmental effects of animal agriculture
I am a vegan, for the earth, the animals and my health.
I have adopted a plant-based diet.
I eat a plant-based diet.
Eat a vegan diet which saves thousands of gallons of water every day.
Promote Meatless options/ Meatless Mondays!!!
I have adopted a vegan lifestyle in part because animal agriculture is the biggest driver of climate change.

Continue to refuse to utilize any animal agriculture products and deny support of animal agriculture businesses.
Hosting vegan potlucks and educating friends, coworkers, family, etc on the role of animal products play on climate change
Eating an environmentally friendly diet of plants.
Meatless Mondays
Eat vegan; support those places that offer sustainable food and beverage options.
Eating totally plant-based for 4 years now.
Making vegan food choices to lower water and air pollution
Eat vegan
I am involved with promoting veganism; it is, by far, the most impactful choice that we have to make a difference in the environment. Let me know if I can help! --Dilip dilip@trianglevegsociety.org
Go vegan! It's the most environmentally-conscious decision any of us can make that will have a far greater impact than almost anything else. Watch Cowspiracy on Netflix if you're in doubt.
Ending Animal Agriculture
We do not purchase or consume animal flesh or secretions. We donate only low-carbon-footprint foods to food banks. We do not support local restaurants that offer foods that are GHG-intensive.
Eat plant based diet to reduce climate change
Educate the public about the negative impact that animal agriculture has on the planet.
Plant-based eating
Plant-based diet.
I eat a plant based diet and that is the single best way to impact climate change. I'm always shocked when I see so-called energy ideas and plans to save our planet which neglect to include eliminating animal flesh and dairy and eggs. Please do more to promote Veganism along with these other efforts.
As I am aware of animals ag's huge impact on climate change, I am vegan and would encourage everyone to participate in a wholesome, delicious vegan diet
Eat local foods and no meat
Eating sustainably--for me, this means a vegan diet.
I am promoting plant-based (vegan) diet; educating the community about animal agriculture's significant contribution to the production of greenhouse gasses (which is more than automobiles). Continue to encourage schools to offer vegan lunches to students,

Education

Teach my students about sustainability, climate change affected by human action, and teach them how to grow their own food at home.

Working at school to promote conservation and energy efficiency.

Alliance for Climate Education, North Carolina Climate Justice Summit

Transportation

I drive an electric vehicle for my 96 mile roundtrip commute.

I would love better buses from QPT to UNC campus.

I plan to move to a neighborhood from which I can walk or bike to town.

Eat at home more, fly less

Reducing Waste, Recycling, Reuse, Composting

Compost

Reducing overall consumption in an effort to become a minimalist. Many people in this community feel really good about recycling, and rightfully so, however any member of that group failing to realize the effects of over consumption is as irresponsible as a person who does not recycle at all. I am personally unaware of the recycling loop here in North Carolina, but I wonder what percentage of "recycled" materials (paper, plastic, glass, cardboard, etc.) around our country still go into a landfill. I believe more education on how recycling helps the community should also reflect its loop (the process in which recycled materials are turned into new materials) and finally the overall economic impact (positive or negative).

Other/Multiple Topics

Increase the biodiversity of the plants on my property.

Make these things affordable... the reason my family is terrible at this is that it is cheaper to use the nonpreferred way.

I already compost. I am 65, still employed, and would gladly use public transportation but it does not fit my exercise and work schedule. I would consider biking, if traffic were not so deadly. I patronize local businesses and combine errands to minimize driving time. I use native plants in my garden.

Switch from incandescent to LED bulbs

I drive very little, am a vegetarian, and try to recycle everything I can.

Vote anyone out of office who gets in the way of these things and promote local and sustainable ag

Within the last few years, I already have added solar panels, purchased an electric car and renovated the entire house to be more energy & water efficient. Next up: Learning what to do/not do with our land....

Conserving and re-using water. Growing my own produce. Burning firewood instead of non-renewable fuels.
Plant a tree!!! Simple!
I do research related to climate change at UNC. Additional actions include: reducing use of / eliminating plastic products that cannot be recycled from daily life (and minimizing plastic use in general), consuming less meat, composting, using heat/ AC sparingly, driving a hybrid vehicle, etc...
At home we are working to significantly reduce our dependence on plastics; Home composting and energy reduction measures (lights out curfew), educating kids about energy reduction in daily lives, etc.
Start a vegetable garden

6. **If you would like, please feel free to provide your name and address. Anonymous responses are also welcome.**

1. Carrie Monette, 302 Lindsay Street, Carrboro, NC
2. Linda Nelson
3. Lisa Baxter, 2006 Camden Lane, Chapel Hill, NC
4. Beverly_swaim@yahoo.com
5. Sylvia Badger
6. Katie Steinheber
7. Sandra Lynch
8. Cedric Bush, 215 Eubanks Road, Chapel Hill, NC, 27516
9. I work for CHCCS and live in downtown Carrboro
10. jwthompson@chccs.k12.nc.us
11. Sharon Thomas. 358 Deerhaven Lane, Thomasville, NC. 27360. 336-862-0160
12. Daniel Turbert, Edwater Circle 27516
13. Shahab (Shawn) Siahpoosh
14. Dilip Barman
15. William Nievaart
16. Ellen Weiss, QPT
17. A Carrboro resident.
18. Sabannah/Carrboro

19. Suzanne Setti
20. Olivia Wander; owander98@gmail.com
21. Laurakaywenzel@gmail.com
22. Ben Berolzheimer, 910 Tallyho tr
23. Erin Nelson
24. Erica Wolak, 143 Torrey Heights Lane Durham, NC 27703
25. Cindy Yates 105 Linville Dr., Castle Hayne, NC
26. Melody Kramer 102D Todd Street
27. Anthony Holderied - 105 Phipps Street
28. Justin Baumann 106 W Poplar Ave
29. Lindsay Griffin 115 Barnes St.
30. Pamela Tandy, 601 West Rosemary, Unit 305/Chapel Hill, 27516
31. Jeffrey Clayton
32. Laura Pellicer
33. Karin Yates

Appendix 2

Boulder's Local Climate Action Plan and Climate Commitment

The Task Force recommends that Carrboro pay close attention to Boulder, Colorado, a community that is leading the pack with local climate action planning in the US[55]. For example, Boulder is:

1) A leader in energy efficiency according to the American Council for an Energy Efficient Economy. Boulder has distinguished itself through:
   a. excelling in improving access to energy usage information;
   b. implementing the SmartRegs program, which mandates baseline energy efficiency requirements for rental housing;
   c. receiving the highest rating from ACEEE by having staff dedicated to implementing community-wide efficiency goals and implementing programs to mitigate the urban heat island effect, including instituting an Urban Forestry program.
   d. Piloting Community Power Partnership, a program designed to help residents and businesses better understand their electricity use at a whole-building and circuit levels.
   e. Piloting Boulder Energy Challenge, a grant program launched in 2014 that has provided $300,000 funding for innovative solutions from the community to reduce emissions.
   f. Running EnergySmart, a program that offers energy efficiency assessments, advising services and rebates for residents and businesses. Since EnergySmart began in 2010, more than 7,500 housing units and 2,300 businesses have participated in the program, more than $3.4 million in rebates have been paid and over $18 million in private investments made.
2) Working to become a zero waste community that reuses, recycles and composts at least 85 percent of its waste stream by the year 2025.
3) Becoming a Platinum Bicycle Friendly Community (one of 4 in the US).
4) Pursuing owning and operating a local electric utility, a process known as municipalization. For the city, it's an opportunity to move away from getting electricity from a for-profit investor-owned utility with a carbon-intensive coal-powered energy supply.
5) Becoming a platinum-level Solar Friendly Community in 2014, with one of the highest per-capita solar installations in the country. Since 2007, Boulder residents, businesses and institutions have installed more than 15 megawatts of solar on more than 1,900 rooftops.
6) Supporting climate action initiatives by the Climate Action Plan (CAP) tax (since 2007). The tax funds city-funded programs and services designed to reduce local greenhouse gas emissions.
7) Pursuing a GHG reduction goal of 80% by 2050, having already made substantial progress.

[55] More information about what Boulder is doing is available at https://bouldercolorado.gov/climate and https://bouldercolorado.gov/climate/boulders-climate-commitment .

Appendix 3

[How the Jones Household Goes Carbon Free in 10 Years]

In July 2008, Al Gore challenged the country to generate all our electricity carbon free in just 10 years. He believes it's possible, and so do we. We also think it's possible for individual families to go carbon free in 10 years.

How the Jones Household Goes Carbon Free in 10 Years

HERE'S HOW YOU CAN DO IT ...

yes! magazine

Reprinted from
Issue 45
Spring 2008

CLIMATE SOLUTIONS

yes! *magazine*

Related articles at www.yesmagazine.org/climatesolutions

Beyond Lightbulbs

The Jones Household Goes Carbon Free in 10 Years

START HERE

YEAR 1

A Big Difference from Small Changes

The family starts off with easy changes: They wash clothes in cold water and air dry them in the summer, replace incandescent bulbs with compact fluorescents (CFLs), turn off their computer when not in use. That's an instant, virtually free savings of 6,200 pounds of CO_2. They make one simple transportation change: One of the adults commutes by bus three days a week—enough to see whether it can be done, but keeping the second car just in case. That's worth another 2,200 pounds. They're down to 51,600 pounds and it hasn't cost them anything but the price of the CFLs and a clothesline. They're actually saving money.

YEAR 2

Home Improvement

They stop donating so much heat to the outdoors: attic and basement insulation, sealing and insulating heat ducts, and patching the large air leaks typical of standard construction saves them a whopping 7,100 pounds. These savings aren't free up front, but the savings in heating and cooling bills will repay the cost over time. Besides, Mrs. Jones is handy with home repair, and does a lot of this work herself. Down to 44,500 per year.

YEAR 3

House and Car

The bus commute's gone well, so Mr. Jones now buses to work all the time. They've worked on consolidating trips outside work, and find they can do without the second car altogether. That's 5,900 pounds gone. They finish weatherproofing their house: beefing up wall insulation, weatherizing doors and windows, and upgrading to high performance windows. Another 1,800 pounds disappear. They're at 36,800.

YEAR 4

Shed Carbon on Vacation

Instead of flying for their annual vacation, the Joneses take the train: a leisurely way to save 7,200 pounds every year. (If they took the bus, they'd save even more.) They're at 29,600 pounds per year—halfway there a year early.

YEAR 5

Car Upgrade

Time to replace the car. Thanks to consumer demand, electric cars have become widely available, and they buy one. Even charging on dirty power, they save 9,000 pounds. Household total is now 20,600.

60,000 lbs − 8,400 lbs = 51,600 lbs → 51,600 lbs − 7,100 lbs = 44,500 lbs → 44,500 lbs − 7,700 lbs = 36,800 lbs → 36,800 lbs − 7,200 lbs = 29,600 lbs → 29,600 lbs − 9,000 lbs = 20,600 lbs

Brooke Jarvis and Doug Pibel

Meet the Joneses. They're your average U.S. energy consumers. They haven't yet upgraded to energy-efficient appliances, their house needs better insulation, and they keep the place as cool in the summer and warm in the winter as most Americans do. The two adults commute 30 miles each per day, in separate cars with average fuel efficiency, and every year they each drive an additional 4,500 miles running errands and taking their child to soccer games and violin practice. The family takes one vacation trip per year, flying to visit grandparents 1,350 miles away. How much CO_2 do their house and cars produce? We figure it at 60,000 pounds, or 10 tons for each family member.

Lately, though, the Joneses have been reading about climate change, and they're getting worried. Ecological crisis has never felt so urgent before. Even little Joey Jones is talking greenhouse gases—he learned at school that scientists are predicting a worldwide climate catastrophe that will change the rest of his life, unless we stop the worst effects by making big changes in the next ten years. The Joneses decide: change is necessary, and they're ready to do their part. But how much can they really do? A lot, it turns out.

In 10 years, without sacrificing their way of life, the Jones family eliminates the CO_2 emissions that their home and transportation used to create—the bulk of their carbon footprint.

Count Your Carbon

Want to keep up with the Joneses? Here are the numbers we used. Use them to find—then shrink—your own carbon footprint.

	CO_2 output, in pounds
Gallon of gas	**19.36**
Gallon of fuel oil or diesel	**22.38**
Kilowatt hour of electricity (national average)	**1.43**
Therm of natural gas	**11.71**
Gallon of propane	**12.67**
Per passenger:	
Airplane mile	**1.28**
Train mile	**0.42**
Long-distance bus mile	**0.18**
Local mass transit mile	**0.50**
Electric bike mile	**0.02**

The Rest of the Story

The Joneses only changed their housing and transport habits. How can you go further?

Eat meatless. For every day of the week you skip meat, you'll save 215 lbs. per year.

Buy local. Most food eaten in the U.S. has traveled 1,500 miles to your plate.

Be a low-impact consumer. Choose local products, reduce the stuff you buy, and save embedded energy by buying used.

Reduce waste. Stop junk mail, reduce packaging, and reduce the 2,020 lbs. each American's waste produces annually.

Avoid the McMansion. A smaller house saves a lot of carbon: on average, 11.4 lbs. of CO_2 per square foot per year.

YEAR 6

Hot and Cold

They improve their water system, including insulating their hot water heater and their pipes, and also lower the temperature of their water heater: 1,000 pounds down. When the old refrigerator kicks the bucket, the Joneses buy a new energy-efficient one and finally unplug a second fridge in the garage, knocking off another 1,300. Total remaining: 18,300.

YEAR 7

Close to Home

Grandma and Grandpa retire and move nearby. The Joneses now vacation within the range of their electric car, saving 3,300 pounds of CO_2 each year. The city converts its bus fleet to clean electricity, which saves another 1,200 pounds. They're down to 13,800.

YEAR 8

A Few More Things Around the House

An efficient clothes washer saves carbon on its own, and saves dryer time. With all the money they're saving, they decide it's time to invest in a solar hot water system. Total: 2,000. Leaving 11,800.

YEAR 9

Electric Bikes

While the Joneses have been on this journey, their town has responded to citizen pressure and gone bike friendly. The new bike paths make it easy for both to ride to work. To ease the hills, they buy electric bikes. There are four months of the year when they can't bike, so they continue their usual commute patterns then. Savings: 3,500. Total remaining: 8,300.

YEAR 10

Green Power

The Joneses' furnace has been groaning and working overtime. They replace it with an electric heat pump, which also cools the house in summer. They also buy certified green, renewable power from their electric company, and the switch from coal plants eliminates the remaining 8,300 pounds of CO_2 produced by the electricity for their house and car.

20,600 lbs − 2,300 lbs = 18,300 lbs → 18,300 lbs − 4,500 lbs = 13,800 lbs → 13,800 lbs − 2,000 lbs = 11,800 lbs → 11,800 lbs − 3,500 lbs = 8,300 lbs → 8,300 lbs − 8,300 lbs = 0 lbs

Sources: Rocky Mountain Institute, Bureau of Transportation Statistics, Environmental Protection Agency, Department of Energy, University of Chicago.
Illustration by Kayann Legg / I-S

Appendix 4

10 Things You Want to Know about Human Nature if you're Fighting Climate Change

By Lisa Bennett, posted at http://grist.org/climate-energy/10-things-you-want-to-know-about-human-nature-if-youre-fighting-climate-change/ June 10, 2015.

I've spent nearly a decade thinking about why people get stuck on climate change: stuck in debates, denial, what looks like indifference, and the awful discomfort that comes with the question "But what can I do?" In search of answers, I've interviewed dozens of experts in psychology, neuroscience, sociology, economics, political science, and other fields — and many more Americans across a broad spectrum of political affiliations, income brackets, and ages. I've also read widely to tap the thinking of those who were once more commonly looked to for insights into human nature, such as poets, philosophers, and spiritual leaders. What I've come up with is my own climate-centric version of Robert Fulghum's *All I Really Need to Know I Learned in Kindergarten.* Climate change has been my window into learning about human nature — or, at least, about what we humans do when faced with a challenge much greater than ourselves. The experience has also persuaded me that a better understanding of our own nature can help inspire a more effective response to what is happening to the natural world.

Here then are 10 things I've learned, along with some ideas about how these insights might be applied by those working on climate change:

1. We are overly optimistic about the future — *our* future, that is. Neuroscientist Tali Sharot has observed that when newlyweds are asked about their chances of getting divorced, they tend to say zero, despite the widely known fact that the odds are 50-50. We instinctively overestimate the probability of positive events and underestimate the probability of negative events in our own lives, she writes in *The Optimism Bias*, for two reasons: We think we have more control over our lives than we actually do, and we tend to see ourselves as better than average.

Applied to climate change, this means that I might think that you — and surely those poor Pacific Islanders — might be negatively affected but I'll be OK. The problem, of course, is that this reflects a bias grounded in delusion. But don't try to tell me or anyone else that. You'll have a better chance of engaging others in climate action, experts like Sharot say, if you keep a laser-like focus on how climate change is affecting people now.

2. We can be blasé about the most important issues in the world because the global perspective is way beyond ordinary human scale. "Trying to convince people of the magnitude of the climate problem through large-scale statistics is essentially useless," says Scott Huettel, chair of the Department of Psychology and Neuroscience at Duke University. "The iconic global warming image of the polar bear on the iceberg is evocative precisely because it is one polar bear. Thousands of polar bears on a glacier that is receding would be irrelevant. Our brains cannot process it."

Put another way, climate change seems like an abstraction because it is so much bigger than us. Humans relate to human-sized stories — the kind that speak to a family living in a home like ours, having dreams and struggles like ours, and maybe discovering one day that their home is on a map of places expected to soon be under water.

3. We are wired to refute imperatives. "If you say I have to act now on climate change, my first reaction will be, 'No, I don't,'" says Huettel. The reason, he explains, is that our brains are very well designed to come up with counterarguments. So no matter how good the reasons to switch to solar energy or demand that government take bolder action on climate change, people can always come up with reasons why they don't need to do anything, such as: "If I don't act right now, the world will basically be the same."

Passing a law that requires people to change their behavior (especially if those changes are relatively easy to make) is one effective way around this. But short of that — just as in other aspects of human relationships — efforts to attract people to a cause are much more likely to yield a positive response than those that threaten or make demands.

4. We are vulnerable to peer pressure, especially about things that confuse us. We can watch the news, see photos of melting glaciers, even experience changing weather patterns. But if our neighbors aren't doing anything about climate change, we're unlikely to do anything either because, as much as we hate to admit it, we are herd animals who use social cues to adapt to our environment, according to Robert Cialdini, author of *Influence*: *The Psychology of Persuasion.* And if you doubt how powerful this instinct is, consider the experiment Cialdini conducted in which his team hung four different kinds of flyers on people's doorknobs in San Diego, with the goal of inspiring residents to reduce their energy consumption. Three of the flyers directly asked them to reduce their energy use, offering three different motivations: save money, save the environment, and benefit future generations. But none of these appeals made a significant difference. Only the fourth flyer did, which read simply: "The majority of your neighbors are undertaking energy-saving actions every day." The lesson: Don't be afraid to appeal to our instinct to fit in.

5. We shy away from topics that remind us of our mortality but can be motivated to take action on behalf of beings more vulnerable than us. Janis L. Dickinson, a professor of natural resources at Cornell University, conducted an experiment a few years ago in which she asked 3,546 people (largely birders) if they would be willing to reduce their energy consumption after learning that climate change was, among other things, a threat to people or to birds, and then she compared the results. It turned out that people were left unmoved by considering the threat to humans, but envisioning the threat to birds was another story. One possible reason, Dickinson says, is that considering climate change as a threat to humans may trigger thoughts of death (which we also tend to deny) whereas we like to think of ourselves as helping cute little creatures that seem to need us. This suggests that emphasizing the threat climate change poses to beloved animals could be an effective way of motivating people.

6. We perceive and respond to risks only when we feel them. While riding a roller coaster with my children one day, my youngest son took his hands off the bar and raised them in the air. The amusement park, I was sure, anticipated antics like this and did not expect people to remain in their seats by the strength of their grip. Still, I screamed, insisting he hold on because I was scared and, for the moment,

that made the risk I imagined feel real. This, says Columbia University professor of psychology Elke Weber, is how we perceive and respond to risk: through our emotions more than an analysis of the facts.

When it comes to climate change, this means that no matter how much scientific and journalistic evidence we are presented with, we will not be moved to action unless something makes us feel the risk. As a result, it may be more effective to tell a short, detailed story that can evoke people's feelings — for example, about an individual or family encountering some specific impact of climate change — than present yet more scientific evidence about the global or even national implications of a warming planet.

7. We are motivated more by hope than fear, at least in matters of social change. While research shows that fear is a more powerful motivator than hope when it comes to behaviors such as diet and fitness, inspiring social change seems to depend more on a positive vision of the future, according to the social movement, political science, and neuroscience experts with whom I spoke. "This rhetoric about we only have a certain amount of time is a killer. It doesn't make people engaged, it makes them give up," says David Meyer, professor of sociology at U.C. Irvine and author of *The Politics of Protest: Social Movements in America*. Sharot confirmed this, saying: "Our studies show that people don't process information — they don't pay attention — when what is being communicated is how things will get worse." In a widely shared opinion, Meyer said the implication was clear: "You have to be hopeful."

8. We are more likely to take action when we know precisely what we can influence. It would take a fantastic and deluded leap of the imagination to think that, as individuals, we can control rising seas, melting glaciers, or heat waves. As a result, when people hear messages that encourage them to broadly act on climate, it can strike them as unrealistic and trigger what psychologist Martin Seligman called learned helplessness — specifically because it appears so far outside their sphere of influence. But, as Seligman and others have also found, it is possible to cut through learned helplessness (or apparent indifference) by appealing to what people think they can control, such as their own attitudes and behavior. For this reason, Huettel recommends emphasizing how people will feel about themselves, for example, after they take some realistic action, such as riding a bike or buying a hybrid.

9. We need to believe our actions will make a difference. "We have to have some sense of efficacy to motivate us to make changes in our lifestyle that are beneficial to the planet," says Paul Slovic, a professor of psychology at the University of Oregon and expert in decision making around risk. But when it comes to big issues like genocide or climate change, his research suggests that people can be demotivated by a sense of inefficacy as well as what he calls "pseudo-inefficacy" or the illusion of inefficacy. For example, Slovic explained, some people fail to do anything because they think their action will be just a drop in the bucket, even though that drop is important. This finding suggests that it could be useful to explicitly speak to people's suspicion that individual actions don't matter and creatively show them how such drops add up.

10. We will continue to behave the same way we always have — even after we know it is problematic — until there is a realistic alternative. It is a safe bet that if you are reading this, you know that fossil fuels contribute to climate change and yet you continue, either directly or indirectly, to rely upon them, as most of us do.

But the reason for this, I have firmly come to believe, is not because most people don't care, don't get it, or have been duped by climate denial propaganda. I find a more believable reason in the words of Thomas

Kuhn, widely considered one of the most influential philosophers of science of the 20th century. “People are unlikely to jettison an unworkable paradigm, despite many indications it is not functioning properly,” Kuhn said, “until a better paradigm can be presented.” While individual behavior changes are essential, in other words, many of them remain dependent on systemic public- and private-sector changes. To fully succeed, we need a “moon shot”-style rapid transition to a clean energy economy, like the one proposed by a group of scientists and economists led by the U.K.’s former chief scientist, Sir David King.

But in the end, even the best of plans depends on understanding, communicating, and acting with a fuller appreciation not just of the state of the natural world but of our own nature, which means bringing today’s global climate story down to a human scale. The good news is that doing so requires that we engage some of the best aspects of human nature, including our ability to be present in the here and now, to care more about people than facts, to be drawn to hope more than fear, to be willing to defend those weaker than us, and to focus our actions on things that are in our control — all the while being capable of believing in, even being thrilled by, the vision of a moon shot.

Lisa Bennett, coauthor of Ecoliterate*, is a writer and communications strategist focused on climate change and what helps people rise to challenges great and small. She blogs at lisabennett.org/blog, and is on Twitter at @LisaPBennett.*

Appendix 5

Energy in the 21st Century: Excerpts from Post Carbon Institute's Energy Primer[56]

We are now facing a transformational moment in our energy story. As we leave the age of seemingly cheap and plentiful fossil fuels and enter an era of extreme energy, the ever-rising financial, social, and environmental costs of fossil fuels can no longer be ignored. The essential problem is not just that we are tapping the wrong energy sources (though we are), or that we are wasteful and inefficient (though we are), but that we are overpowered, and we are overpowering nature.

– Richard Heinberg, from the Introduction to ENERGY: Overdevelopment and the Delusion of Endless Growth

The Energy Picture

In order to make the right choices and investments, we must have a more comprehensive understanding of our energy predicament, including:

- The true costs, potential benefits, and limitations of all energy options, including renewables;
- The impact of each form of energy production on human societies and nature; and
- The true relationship between energy, our economic system, and the environment.

It's tempting to take the micro-view and look for ways to target each of our energy problems with a technical fix. Can't we improve the energy efficiency of vehicles, insulate our buildings, and develop renewable energy sources? Yes, of course. Can't we regulate the fossil fuel industry better, and allow the vast, recently unlocked North American reserves of shale gas and shale oil to be produced responsibly? Possibly. We could do all of those things, and many more besides, to lessen the current energy economy's impacts on natural and human communities—and still there would remain serious obstacles ahead. Why? Let's move out from the details of our dilemma and take in the big picture.

What is Energy?

Though we cannot hold a jar of pure energy in our hands or describe its shape or color, it is nevertheless the basis of everything. Without energy, nothing could happen; matter itself could not exist in any meaningful sense. But because energy as such is so elusive, physicists and engineers define it not in terms of what it is, but what it does—as "the ability to do work," or "the capacity to move or change matter."

In traditional societies, most useful energy came from the sunlight annually captured by food crops and forests; people exerted energy through muscle power and obtained heat from firewood. Modern industrial societies obtain enormously greater amounts of energy from fossil fuels, nuclear power, and

[56] http://energy-reality.org/primer/

hydroelectric dams, and they exert energy through a vast array of machinery. Industrial energy production is essential to every aspect of modern life, but no matter how far our technology for capturing or using energy advances, energy itself always remains the same.

In the nineteenth century, physicists formulated two fundamental laws of energy that appear to be true for all times and places. These are known as the First and Second Laws of Thermodynamics. The First Law is known as the law of conservation. It states that energy cannot be created or destroyed, only transformed. Think of energy as a singular reality that manifests itself in various forms—nuclear, mechanical, chemical, thermal, electromagnetic, and gravitational—and that can be converted from one form to another.

The Second Law states that in every energy conversion, some energy is dissipated (typically as heat). When the gas gauge in a car moves from "full" to "empty," it may appear that the energy that is chemically stored in gasoline is being consumed. But all the energy that was originally present in the gasoline still exists. In reality, the stored energy is merely being released and doing some work as it moves from a condition of higher concentration to one of lower concentration. It is converted from chemical storage (via the atomic electromagnetic bonds within hydrocarbon molecules) to mechanical motion and heat (as combustion within the engine's cylinders pushes the car forward and also increases the rate of motion of molecules in the cylinder and the surrounding environment).

We might be able to get some work out of the "wasted" heat being given off by the burning of gasoline in the car engine; but heat tends to radiate quickly into the general environment, so we would have to use that heat both immediately and close to the engine. If we could gather up all the heat and mechanical energy that was released by burning the tankful of gasoline, it could do just as much work for us yet again; but the act of re-concentrating and storing it would require more energy than we could regather. Thus, in effect, available energy is always being lost.

The Second Law is known as the law of entropy (entropy is a measure of the amount of energy no longer practically capable of conversion into work). The Second Law tells us that the entropy within an isolated system inevitably increases over time. Energy that is sufficiently concentrated (relative to background energy levels) so that it can do work for us is called a source. There are two kinds of energy sources: flows (examples include sunlight, winds, and rivers) and stocks (a word that in this context refers to energy chemically stored in substances such as wood or fossil fuels). Flows tend to be variable, whereas stocks deplete.

Energy-fueled Population Growth

Humanity's current population explosion is an aberration. During the vast majority of human history, population levels were low and quite stable. Demographer Joel Cohen estimates that from the time our species emerged until roughly twelve thousand years ago, when local agriculture appeared, the population growth rate was less than 1/500th of 1 percent. After the widespread adoption of farming the growth rate ticked up by a factor of ten or more, but for thousands of years thereafter remained at around 1/50th of 1 percent. It took all of human history until the early eighteen hundreds for global population

to reach one billion. Then the population doubled—a second billon was added—in just a century or so. Adding the next billion humans to the planet took only thirty years. The next billion, fourteen years. The next, twelve years. After another dozen years, in 1999, world population reached six billion, and the seven billion mark was passed in 2011.

When charted graphically, the human demographic explosion takes the familiar "hockey stick" shape of a classic exponential growth curve. Many factors contributed to demographic expansion, including: the global agricultural revolution in the sixteen hundreds when new foods were shared between continents; the dispersal of scientific and public health knowledge; and increasing urbanization. But central to the runaway population growth of the past two centuries is the incredible windfall of energy that fossil fuels presented to humanity. The ability to command energy, especially highly energy-dense fuels like coal, precipitated the Industrial Revolution and allowed its descendant, the techno-industrial growth culture, to flourish. Food could now be produced in far larger quantities, and local scarcity could be overcome through global transport networks.

Leading ecologists agree that humanity has already surpassed Earth's ecological carrying capacity. Exploiting the onetime reserve of fossil energy has allowed us to temporarily escape the constraints that kept early human population levels in check. Today's global extinction crisis, massive poverty and malnutrition, rising social inequity, and unraveling ecosystems around the globe suggest that the age of abundance is nearly over. As economist Lisi Krall tells her students, "The defining fact of this historical moment is the reality of exponential growth. With exponential growth, if you do the same things as your parents, you'll get entirely different results." Confronting the population problem is the preeminent challenge of our time.

Net Energy

A business may have high gross receipts and still go broke; it is the net, the profit after costs are subtracted, that determines viability. For any potential energy resource, the fundamentals are the same. How much energy is available after subtracting the energy costs to extract, process, and deliver the resource? To know how much energy from a particular source can actually be deployed by society, we must factor in both the production costs and the system costs—that is, the energy required to make energy available to the end user. With gasoline, for instance, this calculation would include energy costs related to oil exploration, drilling, refining, transportation, and the infrastructure that supports each step of the process. With coal-derived electricity, the calculation would include the life cycle from mine to power plant to electric grid.

Experts who study this use the terms "net energy ratio" or "energy returned on energy invested" (EROEI). Decades ago when the most accessible reserves were drilled, an oil company might produce 100 barrels of oil or more for each barrel's worth of energy invested. Declining oil field productivity has brought the average net energy ratio for conventional oil down to approximately 20:1 globally, with more remote or hard-to-refine oil significantly worse. For fossil energy generally, the trend is downward despite technological advances in exploration and drilling. For biofuels, the net energy ratio is lower still. Some

studies suggest that corn-derived ethanol actually has a negative net energy ratio—that is, more energy than a gallon of ethanol can deliver is used to produce a gallon of ethanol. Sugarcane-based ethanol has a superior net energy ratio, but it is still low compared to fossil fuels.

Any produced energy resource can be analyzed for its net energy ratio, although the process raises a difficult question: What are the boundaries of consideration? For example, when tallying the energy required to build a solar photovoltaic panel, what should be included in the accounting? The energy needed to mine the bauxite for the aluminum frame? The energy needed to manufacture the heavy equipment that did the mining? The energy needed to construct the factory that produced the panel? Where the boundaries are drawn affects the final net energy ratios.

A society that depends on inexpensive energy to maintain a high standard of living and constant growth faces a predicament—it cannot maintain itself over the long run without high net energy fuels. Oil, natural gas, and coal have provided a huge, high-quality energy subsidy to the modern world. That subsidy, which has enabled human population and wealth to grow exponentially, is based on finite resources and cannot continue indefinitely. Renewable energy sources, excluding hydropower, are generally more diffuse and have lower net energy ratios than fossil fuels. If high net energy sources are in decline, and no reasonable replacements are available, the result may be a painful restructuring as society rearranges economic activity to fit a diminishing energy supply.

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Energy-fueled Economic Growth

World economic activity has historically grown slowly. From the Middle Ages to until the early eighteen hundreds, average per capita income rose only about 50 percent. But since the advent of the Industrial Revolution the pace has picked up, with global per capita income rising more than eightfold in just the last two hundred years.

Energy consumption has also risen dramatically, from under 20 gigajoules (GJ)[57] per person per year in the pre-industrial era to over 75 GJ per person today (and more than 300 GJ per person in the United States). During this period, energy consumption and economic activity have stoked each other in a self-reinforcing feedback loop. Once the fossil fuel tap was opened for the modern world in eighteenth-century Britain, the high-energy content of coal (and, later, oil) enabled unprecedented productivity—

[57] One joule is defined as the work required to produce one watt of power for one second. A gigajoule is a billion joules

spurring more consumption, more demand for energy, and better technology to get at yet more fossil fuels.

Despite the clear link between energy and economic growth, economists have interpreted and normalized growth as resulting from factors such as "market efficiency" and "labor productivity," which (it is assumed) can be counted upon to produce more and more growth, ad infinitum. Policy makers have therefore built dependence on growth into the design of our economic system. Investors demand constant growth and high rates of return. Future growth is assumed to wipe away the debts taken on today by governments, businesses, and households. Most Americans are even betting their retirement savings, sitting in mutual funds on Wall Street, on continued growth.

As the global bonanza of cheap fossil fuels winds down, what will happen to economic growth? Certainly it's possible to get more benefit per joule through smarter use of energy, but using energy efficiency to "decouple" economic growth from energy consumption can only go so far. After the easy efficiencies are found, further efficiency measures often require greater cost for less benefit; and while greater efficiency may reduce costs at first, it can have the effect of spurring yet more consumption.

It's intuitively clear that it takes energy to do things, and modern civilization has exploited high-energy-content fossil fuels to dramatically reshape the living conditions and experiences of billions of people. (Altering the climate and destroying natural ecosystems around the globe were unintended consequences.) In the future, humanity will need to cope with both more expensive energy and less energy available per capita. Maintaining an acceptable level of productivity—let alone growth—may constitute one of society's foremost social, political, technical, and economic challenges.

Energy Density

Different fuels contain more or less potential energy per unit of weight or volume, and even within fuel types, such as wood or coal, the heat value varies. Anthracite packs more energy than bituminous coal, and putting oak rather than pine in the woodstove before bedtime makes a big difference in how warm the house will feel on a winter morning. The fossil fuel age has been such a bonanza because oil and coal are extremely energy-dense fuels. They have benefited from the long work of geological processes to concentrate the carbon molecules from ancient plant and animal matter.

On average, coal has approximately twice the energy density of wood. Liquid fuels refined from petroleum including gasoline, kerosene, diesel, and heating oil all contain more than three times the energy value of wood. It is no accident that when human societies have had the opportunity to transition from locally harvested biomass to concentrated fossil energy fuels, they have chosen to do so.

The miraculous quality of fossil fuel energy density is easy to understand if one imagines trying to push an automobile for twenty miles. Given enough time, and some help from athletic friends, it would be possible to push a 3,000-pound car that distance. But it would require a tremendous amount of effort. And yet a mere gallon of gasoline (which, despite recent price increases, still costs far less in the United States than an equivalent amount of good coffee) can easily power a car that far in the time it takes to drink a mocha

latte. The fact that renewable energy is, in general, more diffuse than fossil fuel presents the primary challenge to transitioning from the current energy economy to a renewables-powered future.

Peak Oil and Resource Depletion

Every individual gas or oil well, every oil field, and every oil-producing country experiences a similar lifecycle. After a well is drilled, extraction ramps up to its maximum sustained output and eventually begins to decline as the reservoir is depleted. Then we search for the next well, which is generally a little harder to find, a little more expensive to produce. The price of any fossil energy determines what reserves are economically recoverable, and technological innovations can temporarily reverse the decline or extend well life. But as with any finite, nonrenewable resource—coal, natural gas, uranium, etc.—depletion is inevitable at some point.

In recent years, a large body of literature has begun exploring the many ramifications of "peak oil"—the moment when aggregate global oil production reaches its apex. The late American geologist M. King Hubbert predicted in the mid-1950s that U.S. oil production would reach the top of its production curve around 1970 and then begin to decline. That assessment was remarkably prescient: America's production of crude did peak in 1970 and has been generally declining since, despite the addition of new sources on the Alaska North Slope and in the Gulf of Mexico. The United States, the first great power of the oil age, was also the first nation to explore, exploit, and begin to deplete its conventional oil reserves.

Oil of course is a global commodity. From a global perspective, reaching Hubbert's peak means that roughly half of the world's total oil resources are still in the ground, waiting to be tapped. Practically, however, the second half of the global oil resource is more difficult to access, making it less profitable (in terms of net energy) and more environmentally destructive than the earlier-exploited reserves.

The exact timing of the global oil production peak will only be recognizable in hindsight. Some energy experts predict that the peak will occur sometime during the first two decades of the twenty-first century. Others project continued growth in oil extraction through 2050. Based on data published by the International Energy Agency, global conventional oil production has been essentially flat since 2004, despite record-high prices, and likely peaked in 2006. Increased production of unconventional oil (deepwater oil, tar sands, oil shale, and shale oil) is officially projected to help meet growth in demand in the near future, but some energy experts insist that new production from these sources will be unable to make up for accelerating declines in production from conventional oil fields. Whether peak oil has occurred, is imminent, or remains years or decades off makes little difference to the salient fact: the era of abundant, inexpensive oil is closing, and all the systems for modern life designed around that earlier reality are bound to be affected.

Embodied Energy

Every material artifact—a carrot bought at the grocery store, the cooler where it was displayed, the supermarket building, the car driven there, and the road network it travels—requires a certain amount of energy in its manufacture, maintenance, and eventual disposal. The methods used to analyze the total

embodied energy of manufactured objects vary, but in general, studies over the decades have used life-cycle analysis to quantify embodied energy in computers, household appliances, automobiles, and other common products.

The embodied energy in our physical infrastructure—from water mains and buildings to superhighways and airports—is immense, and thus infrastructure is one of the most important areas where energy use (and associated greenhouse gas pollution) could be reduced. In addition to building smaller, or building less, we can also build differently. Wood, for example, has the lowest embodied energy of common building materials; plastic has approximately six times as much embodied energy by weight, glass 16 times as much, steel 24 times as much, and aluminum a whopping 126 times as much embodied energy as wood. Erecting the scaffolding of civilization took a great deal of energy, and maintaining and expanding it takes more all the time. This vast amount of embodied energy, along with psychological and financial investments in the current energy distribution system, is a key obstacle to fundamental changes in that system.

Another useful metaphor that communicates the idea of embodied energy across a product's life cycle is the "energy train." Take for example that ubiquitous artifact of modern civilization, the mobile phone. To its owner, a cell phone is simply a handy gadget that offers convenience and a feeling of connection. But the phone does not exist in isolation—it isn't a single locomotive chugging down the tracks; rather, it pulls a train of cars behind it, all of which have ecological and energetic costs. Those metaphorical railroad cars are filled with packaging to ship the phone; an advertising industry to inculcate desire for it; a retail store to sell it; a communications network that allows it to function; an assembly plant to build it; factories to manufacture plastic cases and computer chips and other components; mines where copper, silver, and rare earth elements are dug from the ground; the transportation infrastructure to move raw materials; and of course the energy system (oil wells, coal mines, power plants, hydroelectric dams, etc.) that support the entire operation. It is a very long train, and every car being pulled along must be in place for even one mobile phone to make its first call.

Energy Sprawl

The foremost criterion by which to judge any existing or potential energy source is its systemic ecological impact. A key subset of this analysis is its physical footprint. The useful term "energy sprawl" refers to the ever-increasing area—on land and offshore—that is devoted to energy production. Quantifying the area affected by different energy sources raises challenging methodological questions. It's obvious, for instance, to take into account the drilling pad when considering the energy sprawl impact of oil and gas development. But one should also include the land affected by pipelines, access roads, refining facilities, and other related infrastructure in the calculation. Nuclear power plants occupy a small area relative to their electrical generation output, the smallest physical footprint of any major energy source. That energy sprawl impact grows considerably, however, when one factors in uranium prospecting, mining, processing, nuclear waste disposal, and any new power lines needed for an expanded nuclear industry. Moreover, as past accidents have demonstrated, when nuclear power plants fail, a large area can be contaminated.

Because of their high energy densities, coal, oil, and natural gas have a medium-size footprint if judged on an energy-output-per-acre ratio; but in practice these extractive industries affect a huge and growing area because they dominate energy production, and because of the enormous quantities of energy being consumed. Oil shale development in the American West is a potential area of fossil fuel exploitation that would create massive energy sprawl. Renewables, which harness the diffuse energy sources of wind and solar power, can have a large physical footprint relative to energy produced; they constitute such a small part of the current energy mix in North America that their aggregate energy sprawl impact at present is modest but growing. Because wind turbines require minimum spacing distances to maximize wind energy capture, the physical footprint of wind power is extensive but can be mitigated, whereas decapitated mountains in Appalachia sacrificed for surface coal mining will never grow back. Siting wind turbines in existing agricultural landscapes need not fragment any additional wildlife habitat. Putting solar arrays on rooftops, parking lots, and urban brownfields need not contribute to energy sprawl at all while generating significant energy close to where it is needed, eliminating the sprawl precipitated by new transmission lines.

Devoting land to growing feedstock for liquid biofuels, or growing biomass for generating electricity, augurs the greatest potential energy sprawl of the major energy alternatives under discussion. The energy density of these fuels is low and the amount of land that must be effectively industrialized, even for relatively small quantities of biofuels or biomass-derived electricity, is massive. In the end, the most effective strategy for fighting energy sprawl is to reduce energy consumption.

Energy Slaves

During the vast majority of our species' history, work was done by human muscles (sometimes the muscles of human beings enslaved by others). After people learned to domesticate wild creatures, beasts of burden such as oxen and horses added to our ability to harness the Sun's energy—captured by plants and channeled into the muscles of work animals. (This relationship between domestic animals and the machines we use today is enshrined in the "horsepower" rating of modern engines.) More recently, people began using wind and waterpower to amplify human labor. But with the dawn of the fossil fuel age, the average person was able to command amounts of energy previously available only to kings and commanders of armies.

Where people or work animals formerly toiled in the fields, the petroleum-powered machines of industrial agriculture now do the work of growing food. Need to be on the other side of the planet tomorrow? Jet travel can get you there. Want to sit in the sunshine, gamble, and overeat with a few thousand strangers in a gigantic floating hotel? The cruise "industry" can make your dreams come true. Energy-dense fossil fuels make the seemingly impossible or ridiculously extravagant whims of people a reality.

In effect, the modern energy economy provides power equivalent to that of vast numbers of human or animal servants. That is the idea behind the concept of "energy slaves." Although top athletes can do far better, a typical adult male at sustained labor is estimated to produce 75 to 100 watts of power. Calculate the total energy use of an average American and it seems that there are the energetic equivalent of more

than 100 energy slaves working around the clock to prop up the easy lifestyle offered by modern civilization.

Energy Future: A Positive Vision

Everyone engaged in combating human-caused climate change or specific elements of the current energy economy knows that the work is primarily oppositional. It could hardly be otherwise; for citizens who care about ecological integrity, a sustainable economy, and the health of nature and people, there is plenty to oppose—burgeoning biomass logging, mountaintop-removal coal mining, inadequately regulated natural gas and oil drilling, poorly sited solar and wind developments, river-killing megadams, and new nuclear and coal plants around the globe. These and many other fights against destructive energy projects are crucial, but they can be draining and tend to focus the conversation in negative terms. Sometimes it's useful to reframe the discourse about ecological limits and economic restructuring in positive terms, that is, in terms of what we're for. The following list is not comprehensive, but beauty and biodiversity are fundamentals that the energy economy must not diminish. And energy literacy, conservation, relocalization of economic systems, and family planning are necessary tools to achieve our vision of a day when resilient human communities are embedded in healthy ecosystems and all members of the land community have space enough to flourish. In short, what we're for is leaving behind the current energy economy, which is wasteful, polluting, and centralized; assumes perpetual growth; and is anchored by nonrenewable fuels. We envision a bold leap toward a future energy economy that fosters beauty and health; that is resilient because it emphasizes renewable, community-scale energy generation; that supports durable economies, not growth; and that is informed by nature's wisdom. Recognizing that all human economic activity is a subset of nature's economy and must not degrade its vitality is the starting point for systemic transformation of the energy system. While such a transition may seem daunting, reforms may be implemented incrementally, and the destination offers exciting possibilities for building vibrant human communities embedded in healthy ecosystems.

Energy Literacy

Energy is arguably the most decisive factor in both ecosystems and human economies. It is the fulcrum of history, the enabler of all that we do. Yet few people have more than the sketchiest understanding of how energy makes the world go around. Basic energy literacy consists of a familiarity with the laws of thermodynamics, and with the concepts of energy density and net energy (also known as energy return on energy invested, or EROEI). It requires a familiarity with the costs and benefits of our various energy sources—including oil, coal, gas, nuclear, wind, and solar. It also implies numeracy—the ability to meaningfully compare numbers referring to quantities of energy and rates of use, so as to be able to evaluate matters of scale. Without energy literacy, citizens and policy makers are at the mercy of interest groups wanting to sell us their vision and products for the future energy economy. We hear from the fossil fuel industry, for example, that Canada's oil reserves (in the form of "tar sands") are second only to Saudi Arabia's, or that the United States has over one hundred years of natural gas thanks to newly tapped "shale gas" resources. And it's tempting to conclude (as many people do) that there are no real constraints to national fossil fuel supplies other than environmental regulations preventing the exploitation of our

immense natural treasures. On the other end of the spectrum, we hear from technooptimists that, with the right mix of innovative energy generation and efficiency technologies, we can run the growth economy on wind, solar, hydropower, and biofuels. And it's tempting to conclude that we only need better government incentives and targeted regulatory reform to open the floodgates to a "green" high-tech sustainable future. Energy literacy arms us with the intellectual tools to ask the right questions: What is the energy density of these new fossil fuel resources? How much energy will have to be invested to produce each energy unit of synthetic crude oil from oil shale, or electricity from thin-film solar panels? How quickly can these energy sources be brought online, and at what rate can they realistically deliver energy to consumers? When we do ask such questions, the situation suddenly looks very different. We realize that the "new" fossil fuels are actually third-rate energy sources that require immense and risky investments and may never be produced at a significant scale. We find that renewable energy technologies face their own serious constraints in energy and material needs, and that transitioning to a majority-renewable energy economy would require a phenomenal retooling of our energy and transportation infrastructure. With energy literacy, citizens and policy makers have a basis for sound decisions. Householders can measure how much energy they use and strategize to obtain the most useful services from the smallest energy input. Cities, states, and nations can invest wisely in infrastructure to both produce and use energy with greatest efficiency and with minimal damage to the natural world. With energy literacy, we can undertake a serious, clear-eyed societal conversation about the policies and actions needed to reshape our energy system.

Conservation

The current energy economy is toxic not simply because of its dependence on climate-altering fossil fuels, but also because of its massive scale and wastefulness. A first step toward reducing its global impacts is simply using less energy, a goal readily accomplished through conservation practices that are widely available and cost-effective. Energy conservation consists of two distinct strategies: efficiency and curtailment. Energy efficiency means using less energy to produce a similar or better service. For example, we can exchange old incandescent lightbulbs for compact fluorescents or LEDs that use a fraction of the electricity and still enjoy satisfactory levels of indoor illumination. Curtailment means exactly what you'd think: cutting out a use of energy altogether. In our previous example of indoor lighting, this strategy might take the form of turning off the lights when we leave a room. Efficiency is typically more attractive to people because it doesn't require them to change their behavior. We want services that energy provides us, not energy per se, and if we can still have all the services we want, then who cares if we're using less energy to get them? Much has been achieved with energy efficiency efforts over recent decades, but much more remains to be done: Nearly all existing buildings need to be better insulated, and most electric power plants are operating at comparatively dismal efficiencies, to mention just two examples. Unfortunately, increasing investments in energy efficiency typically yield diminishing returns. Initial improvements tend to be easy and cheap; later ones are more costly. Sometimes the energy costs of retooling or replacing equipment and infrastructure wipe out gains from efficiency. Nevertheless, the early steps toward efficiency are almost always rewarding. While curtailment of energy use is a less inviting idea, it offers clearer savings. By simply driving fewer miles we unequivocally save energy, whether

our car is a more or less efficient model. We've gotten used to using electricity and fuels to do many things that can be done well enough with muscle power, or that don't need doing at all. Conservation helps us appreciate the energy we use. It fosters respect for resources, and for the energy and labor that are embodied in manufactured products. It reduces damage to already stressed ecosystems and helps us focus our attention on dimensions of life other than sheer consumption. During the latter decades of the twentieth century, most Americans achieved a standard of living that was lavish from both historical and cross-cultural perspectives. They were coaxed and cajoled from cradle to grave by advertising to consume as much as possible. Simply by reversing the message of this incessant propaganda, people might be persuaded to make do with less—as occurred during World War II—and be happier as well. Many social scientists claim that our consumptive lifestyle damages communities, families, and individual self-esteem. A national or global ethic of conservation could even be socially therapeutic.

Resilience

Resilience is "the capacity of a system to withstand disturbance while still retaining its fundamental structure, function, and internal feedbacks." Resilience contrasts with brittleness—the tendency to shatter and lose functionality when impacted or perturbed. Ecologists who study resilience in natural systems have noted that ecosystems tend to progress through a series of phases: growth, consolidation and conservation, release (or "collapse"), and reorganization. Each turning of this adaptive cycle provides opportunities for individual species and whole systems to innovate in response to external and internal change (i.e., disturbance). Resilient ecosystems (in the early growth phase) are characterized by species diversity; many of the organisms within such systems are flexible generalists, and the system as a whole contains multiple redundancies. In contrast, less resilient ecosystems tend to be more brittle, showing less diversity and greater specialization particularly in the consolidation phase. Resilience can be applied to human systems as well. Our economic systems, in particular, often face a trade-off between resilience and efficiency. Economic efficiency implies specialization and the elimination of both inventories and redundancy (which typically guarantee greater resilience). If a product can be made most cheaply in one region or nation, manufacturing is concentrated there, reducing costs to both producers and consumers. However, if that nation were to suddenly find it impossible to make or ship the product, that product would become unavailable everywhere. Maintaining dispersed production and local inventories promotes availability under crisis conditions, though at the sacrifice of economic efficiency (and profits) in "normal" times. From a resilience perspective one of the most vulnerable human systems today is the American transportation system. For over seventy years we've spent trillions of dollars building transportation infrastructure that is completely dependent (i.e., "specialized") on affordable petroleum fuels, and we've removed or neglected most alternative methods of transport. As petroleum fuels become less affordable, the effects reverberate throughout the system. Resilience becomes more of a priority during periods of crisis and volatility, such as the world is experiencing today. Households, towns, and regions are better prepared to endure a natural disaster such as a flood or earthquake if they have stores of food and water on hand and if their members have a range of practical self-sufficiency skills. While the loss of economic efficiency implies trade-offs, resilience brings incidental benefits. With increased local self-sufficiency comes a shared sense of confidence in the community's ability to adapt and endure. For the foreseeable

future, as global energy, finance, and transport systems become less reliable, the rebalancing of community priorities should generally weigh in favor of resilience.

Eco-Localism

A central strategy needed to increase societal resilience is localization—or, perhaps more accurately, relocalization. Most pre-industrial human societies produced basic necessities locally. Trade typically centered on easily transportable luxury goods. Crop failures and other disasters therefore tended to be limited in scope: If one town was devastated, others were spared because they had their own regional sources— and stores—of necessities. Economic globalization may have begun centuries ago with the European colonization of the rest of the world, but it really took hold during the past half century with the advent of satellite communications and container ships. The goal was to maximize economic growth by exploiting efficiency gains from local specialization and global transport. In addition to driving down labor costs and yielding profits for international corporations, globalization maximized resource depletion and pollution, simplified ecosystems, and eroded local systems resilience. As transport fuel becomes less affordable, a return to a more localized economic order is likely, if not inevitable. The market's methods of rebalancing economic organization, however, could well be brutal as global transport networks become less reliable, transport costs increase, and regions adapt to less access to goods now produced thousands of miles away. Government planning and leadership could result in a more organized and less chaotic path of adaptation. Nations can begin now to prioritize and create incentives for the local production of food, energy, and manufactured products, and the local development of currency, governance, and culture. Natural ecological boundaries—such as watersheds— bordered traditional societies. Bioregions defined by waterways and mountain ridges could thus become the basis for future relocalized economic and political organization. Deliberate efforts to relocalize economies will succeed best if the benefits of localism are touted and maximized. With decentralized political organization comes greater opportunity for participation in decision making. Regional economic organization offers a wide variety of productive local jobs. Society assumes a human scale in which individuals have a sense of being able to understand and influence the systems that govern their lives. People in locally organized societies see the immediate consequences of their production and waste disposal practices, and are therefore less likely to adopt an "out of sight, out of mind" attitude toward resource depletion and pollution. Local economic organization tends to yield art, music, stories, and literature that reflect the ecological uniqueness of place—and local culture in turn binds together individuals, families, and communities, fostering a sense of responsibility to care for one another and for the land.

Beauty

Discussions about energy rarely focus on beauty. But the presence or absence of this ineffable quality offers us continual clues as to whether or not society is on a regenerative and sustainable path, or on the road to further degrading nature. From the time of the earliest cave paintings, human ideals of beauty have been drawn from the wild world. Animals, plants, rivers, oceans, and mountains all tend to trigger a psychological response describable as pleasure, awe, and wonder. The sight of a great tree or the song of a goldfinch can send poets and mystics into ecstasy, while the deep order inherent in nature inspires

mathematicians and physicists. Nature achieves its aesthetic impact largely through anarchic means. Each part appears free to follow its own inner drives, exhibiting economy, balance, color, proportion, and symmetry in the process. And all of these self-actualizing parts appear to cooperate, with multiple balancing feedback loops maintaining homeostasis within constantly shifting population levels and environmental parameters. The result is beauty. Ugliness, by contrast, is our unpleasant aesthetic response to the perception that an underlying natural order has been corrupted and unbalanced—that something is dreadfully out of place. Beauty is a psychological and spiritual need. We seek it everywhere and wither without it. We need beauty not as an add-on feature to manufactured products, but as an integral aspect of our lives. With the gradual expansion of trade—a process that began millennia ago but that quickened dramatically during the past century—beauty has increasingly become a valuable commodity. Wealthy patrons pay fortunes for rare artworks, while music, fashion, architecture, and industrial design have become multibillion-dollar industries. Nature produces the most profound, magnificent, and nurturing examples of beauty in endless abundance, for free. Industrialism, resulting from high rates of energy use, tends to breed ugliness. Our ears are bombarded by the noise of automobiles and trucks to the point that we can scarcely hear birdsong. The visual blight of highways, strip malls, and box stores obscures natural vistas. With industrial-scale production of buildings, we have adopted standardized materials produced globally to substitute for local, natural materials that fit with their surroundings. But industrialism does not just replace and obscure natural beauty—it actively destroys it, gobbling up rivers and forests to provide resources for production and consumption. Large-scale energy production—whether from coal mines and power plants, oil derricks and refineries, or massive wind and solar installations—comes at a cost of beauty. While some energy sources are inherently uglier than others, even the most benign intrude, dominate, and deplete if scaled up to provide energy in the quantities currently used in highly industrialized nations. The aesthetic impact of industrial processes can be mitigated somewhat with better design practices. But the surest path to restoring the beauty of nature is to reduce the scale of human population and per capita production and consumption. Returning to a sustainable way of life need not be thought of as sacrifice; instead it can be seen as an opportunity to increase aesthetic pleasure and the spiritual nourishment that comes from living in the midst of incalculable beauty.

Biodiversity

The family of life on Earth is large: More than a million species have been identified and formally described by taxonomists, and estimates of the total number of species on the planet range from 3 million to 100 million. We humans depend for our very existence on this web of life of which we are a part. Indeed, it is part of us: Each human is inhabited by thousands of species of microbes that enable digestion and other basic functions. Yet through our species' appropriation and destruction of natural habitat we are shredding microbial, forest, prairie, oceanic, riparian, desert, and other ecosystems. Habitat loss, overharvesting, climate change, and other results of human numbers and behavior endanger untold numbers of species with extinction. Extinction is nothing new: It is an essential part of the process of evolution. Throughout the billions of years of life's history, life forms have appeared, persisted for thousands or millions of years, and vanished, usually individually but occasionally in convulsive mass events triggered by geological or astrophysical phenomena. There were five ancient extinction events so catastrophic that 50–95 percent of all species died out. Today humans are bringing about the sixth mass extinction in the history of life on Earth. While the normal rate of extinction is about one in a million species per year, the extinction rate today is roughly a thousand times that. According to recent studies, one in five plant species faces extinction as a result of climate change, deforestation, and urban growth. One of every eight bird species will likely be extinct by the end of this century, while one-third of amphibian and one-quarter of mammal species are threatened. As species disappear, we are only beginning to understand what we are losing. A recent United Nations study determined that businesses and insurance companies now see biodiversity loss as presenting a greater risk of financial loss than terrorism—a problem that governments currently spend hundreds of billions of dollars per year to contain or prevent. Nonhuman species perform ecosystem services that only indirectly benefit our kind, but in ways that often turn out to be crucial. Phytoplankton, for example, are not a direct food source for people, but comprise the base of oceanic food chains, in addition to supplying half of the oxygen produced each year by nature. The abundance of plankton in the world's oceans has declined 40 percent since 1950, according to a recent study, for reasons not entirely clear. This is one of the main explanations for a gradual decline in atmospheric oxygen levels recorded worldwide. Efforts to determine a price for the world's environmental assets have concluded that the annual destruction of rainforests alone entails an ultimate cost to society of $4.5 trillion—roughly $650 for each person on the planet. Many species have existing or potential economically significant uses, but the value of biodiversity transcends economics: The spiritual and psychological benefits to humans of interaction with other species are profound. Most fundamentally, however, nonhuman species have intrinsic value. Shaped by the same forces that produced humanity, our kin in the community of life exist for their own sake, not for the pleasure or profit of people. It is the greatest moral blot, the greatest shame on our species, for our actions to be driving other life forms into the endless night of extinction.

Appendix 6

Amendments

October 13, 2020

- Executive Summary
- Establishing Emissions Reductions Goals
- Community Integration Recommendation #1: Create Grass Roots Partnerships to Engage Community
- Community Integration Recommendation #2: Expand Public Partnerships to More Explicitly Consider Climate Action
- Community Integration Recommendation #3: Create Green Neighborhood Program
- Community Integration Recommendation #5: Expand Capacity
- Community Integration Recommendation #6: Facilitate Low Cost Financing for Energy Efficiency and Renewable Energy Projects
- Community Integration Recommendation #7: Integrate Climate Action and Social/Equity Initiatives
- Community Integration Recommendation #8: Environmental Justice and Climate Equity
- Building Energy Efficiency Measures
- Buildings Recommendation #1: 80% Challenge
- Buildings Recommendation #2: Energy Audit/Performance Rating
- Buildings Recommendation #3: Demonstrate/Pursue Energy Performance Beyond Minimum Requirements for New Development
- Buildings Recommendation #4: Create Rental Property Task Force and Process
- Transportation Recommendation #1: 80% Challenge
- Transportation Recommendation #2: Enhance Transit Service
- Transportation Recommendation #4: Further Promote Walking, Biking, Transit
- Transportation Recommendation #6: Improve Bicycle and Pedestrian Infrastructure
- Renewable Energy Recommendation #1: Pursue Community Solar Projects
- Renewable Energy Recommendation #2: Pursue Downtown Geothermal Heating and Cooling
- Ecosystem Recommendation #1: Pursue Stormwater Utility
- Ecosystem Recommendation #2: Evaluate Extent to Which the Deer Population and Climate Change affect Native Plant Ecosystems.
- Ecosystem Recommendation #3: Accelerate/Expand Organic Waste Collection/Composting
- Ecosystem Recommendation #4: Tree Preservation, Protection and Conservation
- Ecosystem Recommendation #5: Improve Regulations and Community Capacity to Discourage Invasive Plants and Encourage Native Plants
- Ecosystem Protection and Restoration Challenge #7: Biodiversity
- Ecosystem Protection and Restoration Challenge #8: Carbon Offsets and Climate Research Protection

Town of Carrboro
2019 Community Climate Action Plan Survey Report

March 2020

Conducted by

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Research & Consulting
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Town of Carrboro
2019 Community Climate Action Plan Survey Report

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Town of Carrboro
2019 Community Climate Action Plan Survey Report

Methodology

The Town of Carrboro 2019 Community Climate Action Plan Survey was conducted from November 25th through January 16th. BKL Research administered a telephone survey to 401 residents of Carrboro. This resulted in a margin of error of ± 4.89%. Both listed/unlisted landline and wireless telephone numbers coinciding with census tracts in the Carrboro area were included in the sampling frame. These numbers were contacted using a random selection process. The breakdown for the sample was 97.5% wireless versus 2.5% landlines. A minimum of four separate callbacks was attempted on each number not screened (eliminated) from the sampling frame. The potential respondents were screened with regards to residence in Carrboro and whether they were over the age of 18. The average survey completion time was approximately 6 to 8 minutes and the refusal rate was very good at 17.1%.

The survey consisted of 31 core questions (Appendix A). Respondents were asked a set of questions relating to their composting including participation, reasons for composting, incentives to start composting, food waste storage, most challenging aspect, motivation to continue, and curbside collection changes. Another set of questions examined growing food at home/community garden and weekly consumption of dairy, meat, and beef. The respondents were also asked about participation in vegan, vegetarian, pescatarian, and dairy-free diets and if they considered eating fewer meals with meat and its challenges. There were questions about purchasing locally grown and/or organic foods as well as what most influences their food choices. Finally, they were asked about their work commute including usage of public transit, mileage, bike/walking usage, and most challenging aspect to using alternative transportation. In addition, there were six demographic questions included in the survey.

Demographic Characteristics of the Sample

The demographic profiles of the sample are exhibited in Figures 1-5. The age profile of the sample indicates a large percentage of the respondents (69.5%) fell between the ages of 26 to 55 with the largest portion in the 46-55 (26.7%) and 36-45 (23.6%) age groups followed by 19.2% in the 26-35 age group (Figure 1). Figure 2 shows the sample to be a highly educated

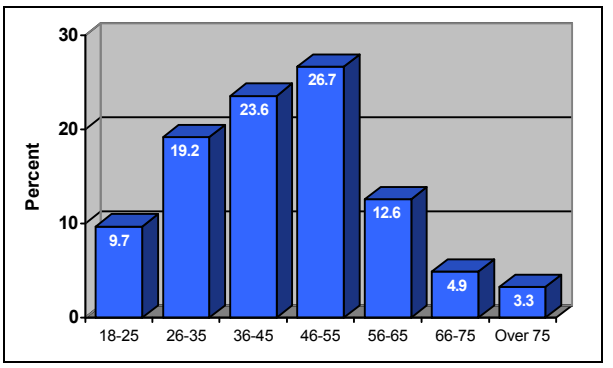

Figure 1. Sample: Age Distribution

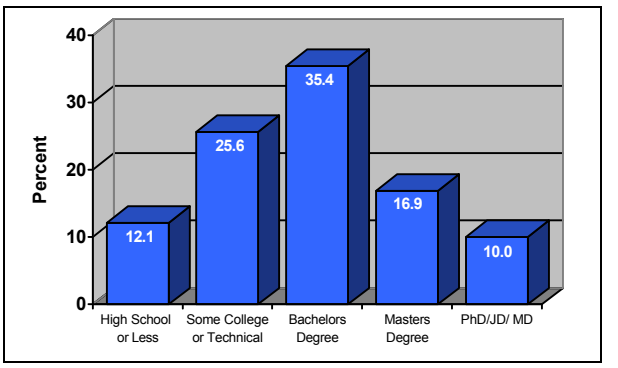

Figure 2. Sample: Education

group with 62.3% of the respondents earning a bachelor's degree or higher (master's or PhD/JD/MD). Figure 3 shows the income distribution of the sample with 22.6% in the $15,001-$45,000 range followed by $100,001-$150,000 (20.5%) and over $150,000 (19.5%).

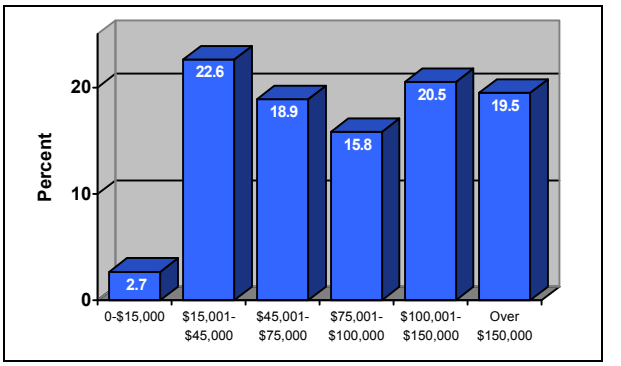

Figure 3. Sample: Income

Caucasians were 79.1% of the sample followed by African-Americans (6.9%), Hispanics (5.8%), and 1.9% were Asians (Figure 4). There were also 5.0% responding as "other" races and 1.1% who prefer not to answer. Figure 5 indicates that 74.2% of the respondents resided in a single-family home followed by apartment (12.1%), townhouse (5.6%), condo (3.8%), duplex (3.0%) and 1.3% in the "other" category which includes mobile homes. In terms of gender identity, 51.5% of the sample were male versus 48.5% female.

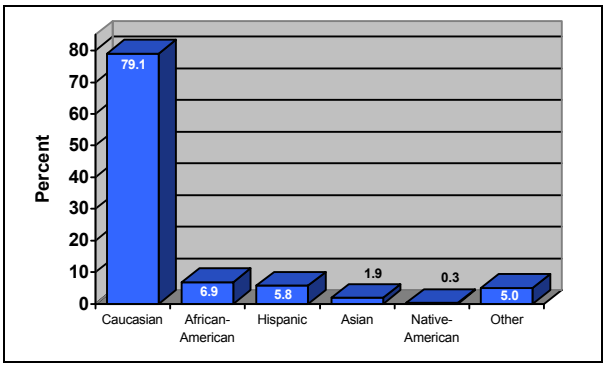

Figure 4. Sample: Race

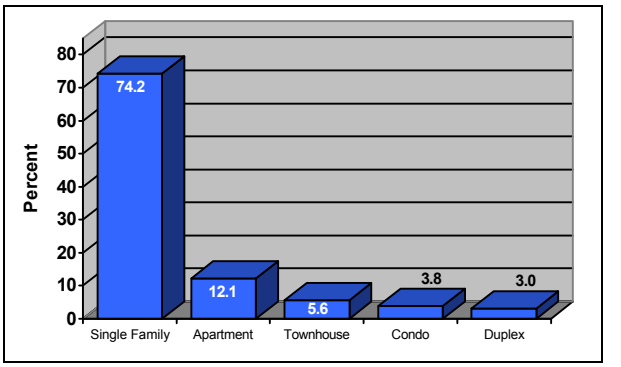

Figure 5. Sample: Household

Crosstabulations

The report will include the selected crosstabulations from the demographic variables. These are included in Appendix B. It is important to exercise caution in the interpretation and generalization of crosstabulations. They will act to segment or slice up the sample size and in turn, increase the margin of error for that particular question. In some cases, this increase in the margin of error can be quite large depending on the sample size of the demographic variable in question. For that reason, the crosstabulations will not be discussed within the report and are included in the appendices for exploratory purposes only. They may represent areas for further research and investigation with more focused research. The percentages shown in all the tables within the report are rounded off to one decimal place. Due to rounding, this may result in row totals that do not always add up to exactly 100.0% in every instance.

Composting

The first set of questions examined several aspects relating to the composting behaviors of the respondents. There were asked questions about familiarity, participation, how long they have composted, food waste storage, reasons for starting, most challenging aspect, and motivation to continue composting. There was also a question for nonparticipants about incentives to make them want to start composting. Finally, a question was included about reducing the frequency of curbside garbage collection if food waste was diverted by composting.

The respondents were first asked if they were familiar with composting (Table 1). The results show a relatively high degree of familiarity with composting in general. Most of the respondents were somewhat familiar (31.0%) or moderately familiar (25.8%) including 18.5% who were extremely familiar. There were only 10.5% who were not familiar at all.

Table 1. Familiarity with Composting (%)

Mean	Not at all Familiar	Slightly Familiar	Somewhat Familiar	Moderately Familiar	Extremely Familiar
3.28	10.5	14.3	31.0	25.8	18.5

The next question asked the respondents if they currently were composting and approximately 36% of the respondents answering they were presently composting (Figure 6). Those who were not composting were then asked about incentives that would motivate them to start composting. A listing of four possible incentives was examined including online resources, educational workshops, additional drop-off locations, and residential food scrap collection (Table 2). The preferred incentive was residential food scrap collection (32.4%) followed by additional drop-off locations (19.1%). There was minimal support for online resources (3.1%) and educational workshops (2.7%). However, a majority of the respondents (60.5%) indicated none of these incentives would start them composting. Note that more than one incentive could be selected by a respondent so the total percentages were over 100%. The respondents who gave "other" responses to this question are shown in Appendix C. The most support was for providing bins/neighborhood bins with 6 comments and curbside collection with 2 comments. There were also several of the respondents who essentially gave reasons why incentives would not work for them including composting is not feasible where they live (9 comments), don't have time (4 comments), don't produce enough food waste (3 comments), lack of knowledge about composting (2 comments), and cannot find correct balance in compost pile (2 comments).

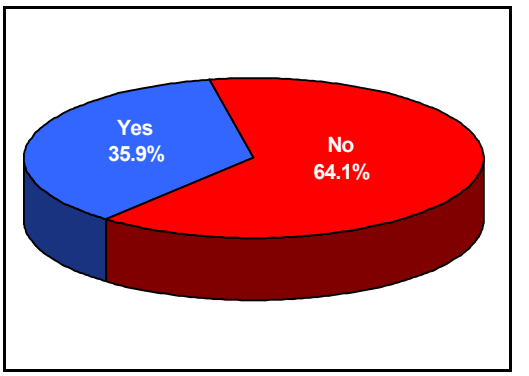

Figure 6. Percentage Who Compost

Table 2. Incentives to Start Composting for Respondents Not Composting (Yes %)

Online Resources	Educational Workshops	Additional Drop-off Locations	Residential Food Scrap Collection	Other	None
3.1	2.7	19.1	32.4	5.9	60.5

The respondents who were presently composting were then asked how long they have been doing so (Table 3). A majority of them have been composting over 10 years (35.0%) or between 3-5 years (29.4%). A relatively small percentage of only 4.9% have been composting for less than one year with 14.7% composting for 1-2 years.

Table 3. How Long the Respondents Have Been Composting (%)

Less Than 1 Year	1-2 Years	3-5 Years	6-10 Years	More than 10 Years
4.9	14.7	29.4	16.1	35.0

The respondents were then asked why they initially started composting (Table 4). Several reasons were examined including for use in lawn/garden, reducing emissions, saving water, saving money, reducing food waste, encouragement by family/friends, and because their neighbors compost. The results indicate the two major reasons for starting to compost were to reduce food waste (65.0%) and for use on lawn or garden (57.3%). There was also a level of support for reducing emissions (36.4%) and encouragement from family/friends (19.6%). There was minimal support for saving water (4.2%) and saving money (4.2%) with the least support overall for because their neighbors compost (0.7%). Keep in mind, more than one reason could be selected resulting in the percentages totaling over 100%. Two other questions in the survey examined whether the respondents were growing food at home or in a community garden. The results show 37.8% of the respondents currently grow food at home and only 3.0% grow food in a community garden.

Table 4. Why Respondents Started Composting (Yes %)

Use in Lawn/Garden	Reduce Emissions	Saves Water	Saves Money	Reduce Food Waste	Encouraged by Family/Friends	My Neighbors Compost
57.3	36.4	4.2	4.2	65.0	19.6	0.7

There was an open-ended question included in this section that asked the respondents what their motivation is to continue composting. Very little has changed from their initial reasons to start composting. Table 5 shows reducing food waste garnered 57 comments followed by garden use with 28 comments. There were also 19 comments for it is the right thing to do and 10 comments each for it is easy to do and it is a habit. A complete listing of all the comments is shown in Appendix D.

Table 5. Motivation to Continue Composting

Composting Motivations	# Comments
Reduce food waste	57
Garden use	28
It is the right thing to do	19
It is easy to do	10
It is a habit	10
Good for the environment	9
For healthy soil	6

The respondents were next asked what they perceive as the most challenging aspect to composting. The survey included several key aspects to consider including odor, attracting pests, not producing enough food waste, hard to incorporate into daily routine, hard to learn, compost pile not working, time consuming, and household members not participating. The results indicate that attracting pests (41.0%) was the most significant challenge by a considerable margin (Table 6). Other challenges to a lesser extent include hard to incorporate into daily routine (19.0%), odor (15.2%), time consuming (13.3%), and compost pile not working (9.5%). There was less support for hard to learn (6.7%) with minimal support for do not produce enough food waste (1.9%) and people in household don't participate (1.9%). Note that more than one challenge could be selected resulting in the total percentages over 100%. A few of the respondents suggested additional challenges including issues with bringing the waste to Farmer's Market (3 comments), producing too much food (2 comments), and the need for a bin that is picked up weekly (2 comments).

Table 6. The Most Challenging Aspect to Composting (Yes %)

Odor	Attracts Pests	Do Not Produce Enough Food Waste	Hard to Incorporate into Daily Routine	Hard to Learn	Compost Pile Not Working	Too Time Consuming	People in Household Don't Participate
15.2	41.0	1.9	19.0	6.7	9.5	13.3	1.9

The survey next asked the respondents where they store their food waste before placing it outside in their compost heap. The choices examined were kitchen bucket, fridge/freezer, compostable bag, or outdoor bin. A large majority of the respondents stored their food waste in a kitchen collection bucket (71.1%) before taking to the compost heap (Table 7). There was also a relatively high degree of usage for an outdoor bin (23.9%) and to some extent a fridge/ freezer (9.9%). However, there was minimal usage of a compostable bag (4.2%). Again, more than one storage location could be selected resulting in the total percentages over 100%. The responses to the "other" category are shown in Appendix E. There were only 5 total responses which included 2 comments for using a garbage disposal into a storage container.

Table 7. Where Food Waste is Stored Before Placing in Compost Pile (Yes %)

Kitchen Collection Bucket	Fridge/Freezer	Compostable Bag	Outdoor Bin	Other
71.1	9.9	4.2	23.9	3.5

One final question in this section asked the respondents if they would consider reducing the frequency of curbside collection if food waste was diverted through composting. Table 8 shows a large percentage (34.4%) were neutral on this issue; however, 33.0% were very uninterested in reducing curbside collection. There were 40.3% on the uninterested side of the scale (below neutral) versus 25.4% on the interested side (above neutral) indicating less support overall.

Table 8. Interest in Reducing Curbside Collection by Diverting Food Waste Through Composting (%)

Mean	Very Uninterested	Somewhat Uninterested	Neutral	Somewhat Interested	Very Interested
2.59	33.0	7.3	34.4	17.9	7.5

Dietary Choices

The next set of questions examined the dietary choices of the respondents. They were asked about consuming dairy and meat as well as participation in vegan, vegetarian, or pescatarian diets. The respondents were also asked questions about consuming local and organic foods.

The first question asked the respondents how many meals consumed weekly (21 meals) contained dairy products. The overall average for all respondents was 12.1 meals per week contain dairy. The next question asked how many meals consumed weekly (21 meals) contained meat (beef, pork, chicken, or fish). The overall average was 9.5 meals per week included meat. Finally, the respondents were asked of the 9.5 meals that contained meat, how many of those contained beef. The overall average was 2.7 meals included beef.

The respondents were next asked if they follow a vegan, vegetarian, or pescatarian diet. The highest level of participation was for the vegetarian diet (6.6%). This was followed by 3.8% for the pescatarian diet and 2.8% for the vegan diet (Table 9). Finally, when asked if they consume dairy products, 4.6% of the respondents were dairy-free.

Table 9. Participation Levels of Specific Diets (%)

Participation in Specific Diets	Yes	No
Vegan Diet	2.8	97.3
Vegetarian Diet	6.6	93.4
Pescatarian Diet	3.8	96.2
Dairy-Free Diet	4.6	95.4

The respondents were also asked if they have considered eating fewer meals with meat. The results indicate 52.7% considered this option. Those responding yes were asked what was the most challenging aspect about eating fewer meals without meat. There were 84 comments it was not a challenge (Table 10). Other key responses were health concerns without meat (21 comments), getting adequate protein (19 comments), keeping a balanced diet (14 comments), and the taste of meatless meals (13 comments). See all the comments listed in Appendix F.

Table 10. Most Challenging Aspect About Eating Fewer Meals Without Meat

Challenges	# Comments
Nothing/none	84
Health concerns without meat	21
Getting adequate protein	19
Keeping a balanced diet	14
Taste of meatless meals	13
Enjoy eating meat	10
Children	9
Family preference	8
Finding recipes	5
Options when going out to eat	5

Those responding no were asked what would be an incentive to eat fewer meals with meat. A very large number of the respondents indicated that nothing/none (130 comments) would be an incentive to eat less meat (Table 11). In fact, several of the comments were more supportive of having meat in the diet including I enjoy eating meat (17 comments) and meat is needed for health (6 comments). The only actual incentive mentioned would be medical/health reasons garnering 10 comments. See all the comments listed in Appendix G.

Table 11. Incentives to Eat Fewer Meals Without Meat

Incentives	# Comments
Nothing/none	130
I enjoy eating meat	17
Medical/health reasons	10
Meat is needed for health	6

A set of questions examined the consumption of locally grown food and organic food. The respondents were first asked what percentage of the food they eat was produced locally. The results show 20.6% on average was produced locally. They were then asked what types of food they eat produced locally in the categories of produce, meat, dairy, and baked goods (Table 12). The highest percentage was for produce (98.4%) followed by baked goods (34.9%), meat (30.5%), and dairy (26.4%). Again, more than one food type could be selected resulting in the total percentages over 100%. The "other" responses included eggs (13 comments), honey (8 comments), and beer.

Table 12. Types of Food Eaten That Are Produced Locally (Yes %)

Produce	Meat	Dairy	Baked Goods	Other
98.4	30.5	26.4	34.9	5.0

The next question asked the respondents what percentage of the food they consumed was organic. The results show 28.3% on average was organic. The respondents were subsequently asked what types of food they bought were organic using the same categories of produce, meat, dairy, and baked goods (Table 13). The highest percentage was for produce (97.4%) followed by dairy (51.2%), meat (43.9%), and baked goods (38.3%). Again, more than one food type could be selected resulting in the total percentages over 100%. The "other" responses to this question included eggs (14 comments) and honey (2 comments). In addition, jelly, noodles, and beer were mentioned once.

Table 13. Types of Food Bought That Were Organic (Yes %)

Produce	Meat	Dairy	Baked Goods	Other
97.4	43.9	51.2	38.3	6.3

The final question in the set asked the respondents what most influences their daily food choices (Table 14). The two biggest influences were eating healthy (160 comments) and convenience/ease (129 comments). Another major influence was taste/what I want that day (90 comments). Lesser influences included family/children choice (29 comments) and cost/price (16 comments). Although balanced diet (14 comments) was relatively low, it could easily be bundled into eating healthy. See all the comments listed in Appendix H.

Table 14. What Most Influences Daily Food Choices

Influences	# Comments
Eating healthy	160
Convenience/ease	129
Taste/what I want that day	90
Family/children choice	29
Cost/price	16
Balanced diet	14
Whatever spouse/parent prepares	13
Nothing specific	11
Availability/what is in season	8
Medically restricted diet	5

Commute and Travel Habits

The final set of questions examined the respondent's work commute and travel habits including methods to get to work, miles traveled, use of alternative transportation, and public transportation. The respondents were first asked if they have worked in the past year and 74.9% indicated they had done so. Those who had worked were then asked their method to get to work. A large majority use a passenger vehicle (74.5%) for their commute (Table 15). There was also a small degree of commuting by walk/bike (5.3%) and bus (5.0%). There was minimal use of light truck (2.0%), motorcycle (0.7%), train (0.3%), and none for heavy truck. There were also 14.2% who work from home. Keep in mind, that more than one method could be selected resulting in the total percentages over 100%. For those who used public transportation, virtually all used walking for their first and last mile; although, one respondent used a car.

Table 15. Method to Get to Work (Yes %)

Passenger Vehicle	Bus	Train	Walk/Bike	Light Truck	Heavy Truck	Motorcycle	Work from Home	Other
74.5	5.0	0.3	5.3	2.0	0.0	0.7	14.2	1.7

Those who commute were next asked how many miles they travel to work one-way each day. The overall one-way trip was 10.1 miles (median was 7.0 miles). They were also asked how many days each week they use public transportation instead of driving to work. There were 94.6% who did not use any public transportation. The percentages in the table reflect only those respondents (n=15) who use public transportation (Table 16). The mean was 4.3 times per week with the majority of the respondents using public transportation all 5 days a week (66.7%). Note one respondent answered between 3 and 4 days which is included in the table as 3.5 days.

Table 16. Days Per Week Using Public Transportation for Those Who Use It (%)

Mean	1 Day	2 Days	3 Days	3.5 Days	4 Days	5 Days
4.3	0.0	13.3	6.7	6.7	6.7	66.7

All the respondents were then asked how often they walk/bike instead of driving (Table 17). A large percentage (44.6%) of the respondents never walk or bike instead of drive. For those who do, 26.0% will do so weekly followed by daily (16.1%) and monthly (13.3%).

Table 17. How Often Walk/Bike Instead of Driving (%)

Never	Daily	Weekly	Monthly
44.6	16.1	26.0	13.3

The final question in this set on commuting asked the respondents what is the most challenging aspect about using alternative transportation. The key issue was the time factor/convenience in using alternative transportation with 147 comments (Table 18). There were also other concerns related to time factor/convenience including scheduling (53 comments), my

location/distance (21 comments), lack of availability/routes (18 comments), and pick-up and drop-off locations/stops (9 comments). On a positive note, many of the respondents did not see any problems using alternative transportation with 49 comments. Other key issues included I don't need it (31 comments), my job/need to use a vehicle (23 comments), just don't use it/don't like it (21 comments), and it is difficult with children/daycare (16 comments). Finally, there were 19 respondents who were unaware of available alternative transportation options. See all the comments in Appendix I.

Table 18. Most Challenging Aspect About Using Alternative Transportation

Challenges	# Comments
Time factor/convenience	147
Scheduling	53
None/nothing	49
I don't need it	31
My job/need to use a vehicle	23
Just don't use it/don't like it	21
My location/distance	21
Unaware of options	19
Lack of availability/routes	18
Difficult with children/daycare	16
Pick-up and drop-off locations/stops	9
Weather	8
I am disabled/medical	6
Transferring buses to get to the location	6
Lack of sidewalks/connectivity	6

Appendix A

Town of Carrboro
2019 Community Climate Action Plan Survey Instrument

Hello, my name is _____ and I am calling for the Town of Carrboro. We are collecting information on the habits of residents related to composting, gardening, dietary choices, and travel habits to implement our Community Climate Action Plan. Your opinion is very important to Carrboro.

Are you a resident of the Town of Carrboro?

❑ Yes (Continue) ❑ No (Stop and thank the respondent)

Are you over the age of 18?

❑ Yes (Continue) ❑ No (Ask politely to speak with someone over 18)

1. How familiar are you with composting? (Read choices)

1	2	3	4	5
Not at all Familiar	**Slightly Familiar**	**Somewhat Familiar**	**Moderately Familiar**	**Extremely Familiar**

2. Do you currently compost?

❑ Yes (Go to #3) ❑ No (Ask follow-up and skip to #8)

(If no) Are there any incentives that would make you start composting? (Read choices)

❑	❑	❑	❑	❑	❑
Online Resources	**Educational Workshops**	**Additional Drop-Off Locations**	**Residential Food Scrap Collection**	**Other** _____	**None**

3. How long have you been composting? (Read choices)

❑	❑	❑	❑	❑
Less than one year	**1-2 years**	**3-5 years**	**6-10 years**	**More than 10 years**

4. Where do you store your food waste before placing it outside in your compost heap? (Read choices)

❑	❑	❑	❑	❑
Kitchen Collection Bucket	**Fridge or Freezer**	**Compostable Bag**	**Outdoor Bin**	**Other** _____

5. Why did you start composting? (Read choices)

❑	❑	❑	❑	❑
Use in Lawn/Garden	**Reduce Emissions**	**Saves Water**	**Saves Money**	**Reduce Food Waste**

❑	❑
Encouraged by Family/Friends	**My Neighbors Compost**

6. What do you find is the most challenging aspect of composting? (Read choices)

❑	❑	❑	❑	❑
Odor	**Attracts Pests**	**Do Not Produce Enough Food Waste**	**Hard to Incorporate Into Daily Routine**	**Hard to Learn**

❑	❑	❑
Compost Pile Not Working	**Too Time Consuming**	**People in My Household Don't Participate**

7. What motivates you to continue composting?

_____

8. If your food waste was diverted through composting, how interested would you be in reducing the frequency of your curbside garbage collection? (Read choices)

1	2	3	4	5
Very Uninterested	**Somewhat Uninterested**	**Neutral**	**Somewhat Interested**	**Very Interested**

9. Do you currently grow food at your home?

❑ Yes ❑ No

10. Do you currently grow food in a community garden?

❑ Yes ❑ No

We now have a few questions regarding dietary choices

11. Out of an average of 21 meals per week (3 daily), how many of these meals on average contain dairy products?

_____

12. Out of an average of 21 meals per week, how many of your meals on average contain meat (beef, pork, chicken, fish)?

_____ (If zero, skip to #14)

13. Out of those (#12 response), how many of these meals on average contain beef?

_____

14. Do you follow a vegan diet?

❑ Yes (Skip to #20) ❑ No (Continue)

15. Do you follow a vegetarian diet?

❑ Yes (Skip to #19) ❑ No (Continue)

16. Do you follow a pescatarian diet?

❑ Yes (Skip to #19) ❑ No (Continue)

17. Have you considered eating fewer meals with meat/meat products?

❑ Yes (Continue)
❑ No What would be an incentive for you to do so? (Ask and skip to #19)

_____

18. What do you find is the most challenging aspect about eating fewer meals with meat?

_____

19. Do you follow a dairy-free diet?

❑ Yes ❑ No

20. What percentage of the food you eat was produced locally? (If zero, skip to #22)

_____

21. What types of food do you eat that are produced locally? (Read choices)

❑ Produce ❑ Meat ❑ Dairy ❑ Baked Goods ❑ Other _____

22. What percentage of the food you eat is organic? (If zero, skip to #24)

_____

23. What types of food do you buy organic? (Read choices)

❑ Produce ❑ Meat ❑ Dairy ❑ Baked Goods ❑ Other _____

24. What most influences your daily food choices?

_____

Now we have a few questions about your commute and travel habits.

25. Have you worked within the past year?

❑ Yes ❑ No (Skip to #30)

26. How do you get to work? (State the single method of transportation used for the longest distance)

❑ Passenger Vehicle ❑ Bus (Ask #27) ❑ Train (Ask #27) ❑ Walk/Bike ❑ Light Truck ❑ Heavy Truck ❑ Motorcycle

❑ Work from Home ❑ Other _____

27. (Ask only if Bus or Train) If you use public transit, what method of transportation do you use for your first or last mile?

❑ Walk ❑ Bike ❑ Other _____

28. How many miles do you travel one-way in your commute each day? _____

29. How many days per week do you use public transit instead of driving to work?

_____

30. How often do you walk/bike instead of driving?

❑ Never ❑ Daily ❑ Weekly ❑ Monthly

31. What do you find is the most challenging aspect about using alternative transportation?

_____

That concludes our survey questions. Now tell us a little about yourself.

32. Which of the following best describes where you live?

❑	❑	❑	❑	❑	❑	❑
Single Family Detached Home	**Apartment**	**Townhouse**	**Condominium**	**Mobile Home**	**Duplex**	**Other** _____

33. Stop me when I reach the age group you fall in.

❑	❑	❑	❑	❑	❑	❑
18-25	**26-35**	**36-45**	**46-55**	**56-65**	**66-75**	**Over 75**

34. Please tell me the last grade or degree completed in school.

❑	❑	❑	❑	❑
High School or less	**Some College or Technical**	**Bachelors Degree**	**Masters Degree**	**Doctorate: (PhD, JD, MD)**

35. May I ask your race?

❑	❑	❑	❑	❑	❑	❑
Caucasian	**African-American**	**Native-American**	**Asian**	**Hispanic/Latin**	**Other**	**Prefer Not to Answer**

36. Stop me when I reach your household income level?

❑	❑	❑	❑	❑	❑
0-$15,000	**$15,001-$45,000**	**$45,001-$75,000**	**$75,001-$100,000**	**$100,001-$150,000**	**Over $150,000**

37. What is your gender identity? _____

Appendix B

Familiarity with Composting Crosstabulations

Table B1. Familiarity with Composting by Household (%)

Household	n	Not at all Familiar	Slightly Familiar	Somewhat Familiar	Moderately Familiar	Extremely Familiar
Single Family	294	9.2	12.2	33.0	25.2	20.4
Apartment	48	22.9	12.5	33.3	20.8	10.4
Townhouse/Condo/Duplex	48	6.3	20.8	18.8	37.5	16.7
Other	5	0.0	40.0	20.0	20.0	20.0

Table B2. Familiarity with Composting by Age (%)

Age	n	Not at all Familiar	Slightly Familiar	Somewhat Familiar	Moderately Familiar	Extremely Familiar
18-35	113	14.2	14.2	32.7	22.1	16.8
36-45	91	5.5	15.4	29.7	33.0	16.5
46-55	104	7.7	13.5	30.8	27.9	20.2
56-65	49	12.2	10.2	30.6	16.3	30.6
Over 65	32	12.5	15.6	31.3	31.3	9.4

Table B3. Familiarity with Composting by Education (%)

Education	n	Not at all Familiar	Slightly Familiar	Somewhat Familiar	Moderately Familiar	Extremely Familiar
High School/Some College/Technical	146	21.2	14.4	37.7	16.4	10.3
Bachelors	138	5.1	12.3	26.8	34.8	21.0
Masters	66	0.0	13.6	33.3	19.7	33.3
PhD/JD/MD	39	2.6	15.4	23.1	41.0	17.9

Table B4. Familiarity with Composting by Race (%)

Race	n	Not at all Familiar	Slightly Familiar	Somewhat Familiar	Moderately Familiar	Extremely Familiar
Caucasian	299	4.7	12.4	32.1	30.8	20.1
African-American	26	26.9	23.1	19.2	19.2	11.5
Hispanic/Latin	22	40.9	27.3	27.3	0.0	4.5
Asian	6	0.0	0.0	16.7	50.0	33.3
Other	20	25.0	5.0	45.0	5.0	20.0
Prefer Not to Answer	4	25.0	50.0	25.0	0.0	0.0

Table B5. Familiarity with Composting by Income (%)

Income	n	Not at all Familiar	Slightly Familiar	Somewhat Familiar	Moderately Familiar	Extremely Familiar
0-$45,000	74	18.9	10.8	32.4	28.4	9.5
$45,001-$100,000	103	6.8	17.5	31.1	26.2	18.4
$100,001-$150,000	61	1.6	14.8	26.2	29.5	27.9
Over $150,000	58	0.0	15.5	31.0	36.2	17.2

Table B6. Familiarity with Composting by Gender Identity (%)

Gender	n	Not at all Familiar	Slightly Familiar	Somewhat Familiar	Moderately Familiar	Extremely Familiar
Male	206	9.7	11.7	34.0	26.7	18.0
Female	193	11.4	17.1	27.5	24.9	19.2

Do You Currently Compost Crosstabulations

Table B7. Do You Currently Compost by Household (%)

Household	n	Yes	No
Single Family	294	40.1	59.9
Apartment	48	16.7	83.3
Townhouse/Condo/Duplex	49	32.7	67.3
Other	5	20.0	80.0

Table B8. Do You Currently Compost by Age (%)

Age	n	Yes	No
18-35	113	38.9	61.1
36-45	92	39.1	60.9
46-55	104	33.7	66.3
56-65	49	40.8	59.2
Over 65	32	21.9	78.1

Table B9. Do You Currently Compost by Education (%)

Education	n	Yes	No
High School/Some College/Technical	147	22.4	77.6
Bachelors	138	42.8	57.2
Masters	66	50.0	50.0
PhD/JD/MD	39	41.0	59.0

Table B10. Do You Currently Compost by Race (%)

Race	n	Yes	No
Caucasian	299	42.1	57.9
African-American	26	15.4	84.6
Hispanic/Latin	22	9.1	90.9
Asian	7	42.9	57.1
Other	20	15.0	85.0
Prefer Not to Answer	4	0.0	100.0

Table B11. Do You Currently Compost by Income (%)

Income	n	Yes	No
0-$45,000	75	21.3	78.7
$45,001-$100,000	103	45.6	54.4
$100,001-$150,000	61	52.5	47.5
Over $150,000	58	34.5	65.5

Table B12. Do You Currently Compost by Gender Identity (%)

Gender	n	Yes	No
Male	206	33.0	67.0
Female	194	39.2	60.8

Incentives to Start Composting for Respondents Not Composting Crosstabulations

Table B13. Incentives to Start Composting for Respondents Not Composting by Household (Yes %)

Household	n	Online Resources	Educational Resources	Additional Drop-Off Locations	Residential Food Scrap Collection	Other	None
Single Family	177	3.9	4.0	18.1	32.8	6.8	59.3
Apartment	40	0.0	0.0	15.0	22.5	7.5	65.0
Townhouse/Condo/Duplex	33	3.0	0.0	30.3	45.5	0.0	51.5
Other	4	0.0	0.0	0.0	0.0	0.0	100.0

Table B14. Incentives to Start Composting for Respondents Not Composting by Age (Yes %)

Age	n	Online Resources	Educational Resources	Additional Drop-Off Locations	Residential Food Scrap Collection	Other	None
18-35	69	2.9	2.9	20.3	34.8	5.8	59.4
36-45	57	5.3	1.8	19.3	42.1	8.8	49.1
46-55	69	4.3	2.9	14.5	26.1	2.9	66.7
56-65	29	0.0	3.4	24.1	24.1	10.3	65.5
Over 65	25	0.0	4.0	24.0	36.0	4.0	52.0

Table B15. Incentives to Start Composting for Respondents Not Composting by Education (Yes %)

Education	n	Online Resources	Educational Resources	Additional Drop-Off Locations	Residential Food Scrap Collection	Other	None
High School/Some College/Technical	115	1.7	0.9	9.6	21.7	0.9	75.7
Bachelors	79	5.1	2.5	29.1	40.5	11.4	48.1
Masters	33	2.9	6.1	27.3	45.5	12.1	36.4
PhD/JD/MD	23	4.3	8.7	17.4	39.1	4.3	52.2

Table B16. Incentives to Start Composting for Respondents Not Composting by Race (Yes %)

Race	n	Online Resources	Educational Resources	Additional Drop-Off Locations	Residential Food Scrap Collection	Other	None
Caucasian	173	4.6	2.9	23.7	38.7	8.1	50.9
African-American	22	0.0	9.1	13.6	13.6	0.0	81.8
Hispanic/Latin	20	0.0	0.0	5.0	30.0	0.0	70.0
Asian	4	0.0	0.0	50.0	75.0	0.0	25.0
Other	18	0.0	0.0	5.6	11.1	0.0	88.9
Prefer Not to Answer	4	0.0	0.0	0.0	0.0	25.0	75.0

Table B17. Incentives to Start Composting for Respondents Not Composting by Income (Yes %)

Income	n	Online Resources	Educational Resources	Additional Drop-Off Locations	Residential Food Scrap Collection	Other	None
0-$45,000	59	1.7	1.7	15.3	27.1	3.4	69.5
$45,001-$100,000	57	1.8	3.5	24.6	31.6	5.3	56.1
$100,001-$150,000	29	16.7	10.3	34.5	62.1	10.3	24.1
Over $150,000	38	2.6	2.6	23.7	44.7	7.9	44.7

Table B18. Incentives to Start Composting for Respondents Not Composting by Gender Identity (Yes %)

Gender	n	Online Resources	Educational Resources	Additional Drop-Off Locations	Residential Food Scrap Collection	Other	None
Male	138	1.4	1.4	16.7	27.5	6.5	64.5
Female	119	5.0	4.2	21.8	37.0	5.0	55.5

How Long the Respondents Have Been Composting Crosstabulations

Table B19. How Long Respondents Have Been Composting by Household (%)

Household	n	Less Than One Year	1-2 Years	3-5 Years	6-10 Years	More Than 10 Years
Single Family	117	3.4	13.7	27.4	17.9	37.6
Apartment	8	12.5	12.5	37.5	12.5	25.0
Townhouse/Condo/Duplex	16	12.5	25.0	31.3	6.3	25.0
Other	1	0.0	0.0	100.0	0.0	0.0

Table B20. How Long Respondents Have Been Composting by Age (%)

Age	n	Less Than One Year	1-2 Years	3-5 Years	6-10 Years	More Than 10 Years
18-35	44	4.5	27.3	36.4	13.6	18.2
36-45	35	8.6	11.4	37.1	14.3	28.6
46-55	35	2.9	5.7	20.0	22.9	48.6
56-65	20	0.0	10.0	20.0	15.0	55.0
Over 65	7	14.3	14.3	0.0	14.3	57.1

Table B21. How Long Respondents Have Been Composting by Education (%)

Education	n	Less Than One Year	1-2 Years	3-5 Years	6-10 Years	More Than 10 Years
High School/Some College/Technical	32	3.1	18.8	46.9	12.5	18.8
Bachelors	59	6.8	15.3	23.7	15.3	39.0
Masters	33	3.0	12.1	21.2	18.2	45.5
PhD/JD/MD	16	0.0	12.5	25.0	25.0	37.5

Table B22. How Long Respondents Have Been Composting by Race (%)

Race	n	Less Than One Year	1-2 Years	3-5 Years	6-10 Years	More Than 10 Years
Caucasian	126	5.6	13.5	28.6	16.7	35.7
African-American	4	0.0	25.0	50.0	0.0	25.0
Hispanic/Latin	2	0.0	50.0	50.0	0.0	0.0
Asian	3	0.0	33.3	33.3	33.3	0.0
Other	2	0.0	0.0	0.0	0.0	100.0
Prefer Not to Answer	--	--	--	--	--	--

Table B23. How Long Respondents Have Been Composting by Income (%)

Income	n	Less Than One Year	1-2 Years	3-5 Years	6-10 Years	More Than 10 Years
0-$45,000	16	6.3	31.3	25.0	12.5	25.0
$45,001-$100,000	46	4.3	17.4	19.6	17.4	41.3
$100,001-$150,000	32	0.0	6.3	37.5	12.5	43.8
Over $150,000	20	20.0	5.0	30.0	30.0	15.0

Table B24. How Long Respondents Have Been Composting by Gender Identity (%)

Gender	n	Less Than One Year	1-2 Years	3-5 Years	6-10 Years	More Than 10 Years
Male	68	4.4	16.2	29.4	13.2	36.8
Female	75	5.3	13.3	29.3	18.7	33.3

Do You Currently Grow Food at Home or in a Community Garden Crosstabulations

Table B25. Do You Currently Grow Food at Home or Community Garden by Household (Yes %)

Household	n	Grow Food a Home	Grow Food in Community Garden
Single Family	293	42.0	3.1
Apartment	47	20.8	0.0
Townhouse/Condo/Duplex	48	30.6	6.3
Other	5	40.0	0.0

Table B26. Do You Currently Grow Food at Home or Community Garden by Age (Yes %)

Age	n	Grow Food a Home	Grow Food in Community Garden
18-35	110	34.5	0.9
36-45	92	42.4	4.3
46-55	103	36.9	6.7
56-65	49	49.0	0.0
Over 65	32	25.0	0.0

Table B27. Do You Currently Grow Food at Home or Community Garden by Education (Yes %)

Education	n	Grow Food a Home	Grow Food in Community Garden
High School/Some College/Technical	144	29.9	1.4
Bachelors	138	39.1	2.9
Masters	66	53.0	4.5
PhD/JD/MD	38	36.8	7.7

Table B28. Do You Currently Grow Food at Home or Community Garden by Race (Yes %)

Race	n	Grow Food a Home	Grow Food in Community Garden
Caucasian	298	42.6	3.4
African-American	26	15.4	0.0
Hispanic/Latin	20	18.2	0.0
Asian	7	14.3	14.3
Other	20	30.0	0.0
Prefer Not to Answer	4	0.0	0.0

Table B29. Do You Currently Grow Food at Home or Community Garden by Income (Yes %)

Income	n	Grow Food a Home	Grow Food in Community Garden
0-$45,000	74	22.7	1.4
$45,001-$100,000	102	39.2	5.8
$100,001-$150,000	61	44.3	3.3
Over $150,000	58	41.4	3.4

Table B30. Do You Currently Grow Food at Home or Community Garden by Gender Identity (Yes %)

Gender	n	Grow Food a Home	Grow Food in Community Garden
Male	203	39.0	3.0
Female	194	36.6	3.1

Why Respondent Started Composting Crosstabulations

Table B31. Why Respondents Started Composting by Household (Yes %)

Household	n	Use in Lawn or Garden	Reduce Emissions	Saves Water	Saves Money	Reduce Food Waste	Encouraged by Family/Friends	My Neighbors Compost
Single Family	117	58.1	35.9	2.6	2.6	62.4	19.7	0.9
Apartment	8	50.0	50.0	25.0	25.0	87.5	25.0	0.0
Townhouse/Condo/Duplex	16	50.0	37.5	6.3	6.3	81.3	18.8	0.0
Other	1	100.0	0.0	0.0	0.0	0.0	0.0	0.0

Table B32. Why Respondents Started Composting by Age (Yes %)

Age	n	Use in Lawn or Garden	Reduce Emissions	Saves Water	Saves Money	Reduce Food Waste	Encouraged by Family/Friends	My Neighbors Compost
18-35	44	50.0	40.9	6.8	6.8	75.0	38.6	2.3
36-45	35	60.0	45.7	2.9	2.9	65.7	11.4	0.0
46-55	35	51.4	34.3	2.9	2.9	65.7	11.4	0.0
56-65	20	80.0	25.0	5.0	5.0	45.0	5.0	0.0
Over 65	7	57.1	14.3	0.0	0.0	71.4	14.3	0.0

Table B33. Why Respondents Started Composting by Education (Yes %)

Education	n	Use in Lawn or Garden	Reduce Emissions	Saves Water	Saves Money	Reduce Food Waste	Encouraged by Family/Friends	My Neighbors Compost
High School/Some College/Technical	32	65.6	25.0	3.1	3.1	65.6	28.1	3.1
Bachelors	59	59.3	40.7	3.4	3.4	72.9	23.7	0.0
Masters	33	60.6	39.4	6.1	6.1	57.6	6.1	0.0
PhD/JD/MD	16	31.3	37.5	6.3	6.3	56.3	12.5	0.0

Table B34. Why Respondents Started Composting by Race (Yes %)

Race	n	Use in Lawn or Garden	Reduce Emissions	Saves Water	Saves Money	Reduce Food Waste	Encouraged by Family/Friends	My Neighbors Compost
Caucasian	126	57.9	34.9	4.0	4.0	65.9	18.3	0.8
African-American	4	50.0	75.0	25.0	25.0	75.0	25.0	0.0
Hispanic/Latin	2	50.0	0.0	0.0	0.0	50.0	50.0	0.0
Asian	3	66.7	66.7	0.0	0.0	66.7	0.0	0.0
Other	2	0.0	100.0	0.0	0.0	100.0	50.0	0.0
Prefer Not to Answer	--	--	--	--	--	--	--	--

Table B35. Why Respondents Started Composting by Income (Yes %)

Income	n	Use in Lawn or Garden	Reduce Emissions	Saves Water	Saves Money	Reduce Food Waste	Encouraged by Family/Friends	My Neighbors Compost
0-$45,000	16	62.5	43.8	6.3	6.3	75.0	12.5	6.3
$45,001-$100,000	46	58.7	37.0	8.7	8.7	65.2	19.6	0.0
$100,001-$150,000	32	62.5	28.1	0.0	0.0	71.9	18.8	0.0
Over $150,000	20	50.0	45.0	0.0	0.0	65.0	5.0	0.0

Table B36. Why Respondents Started Composting by Gender Identity (Yes %)

Gender	n	Use in Lawn or Garden	Reduce Emissions	Saves Water	Saves Money	Reduce Food Waste	Encouraged by Family/Friends	My Neighbors Compost
Male	68	57.4	29.4	1.5	1.5	61.8	20.6	0.0
Female	75	57.3	42.7	6.7	6.7	68.0	18.7	1.3

Most Challenging Aspect to Composting Crosstabulations

Table B37. Most Challenging Aspect to Composting by Household (Yes %)

Household	n	Odor	Attracts Pests	Not Enough Food Waste	Incorporate in Daily Routine	Hard to Learn	Compost Pile Not Working	Too Time Consuming	Household Not Participate
Single Family	116	11.2	34.5	1.7	14.7	4.3	6.9	11.2	1.7
Apartment	8	12.5	12.5	0.0	25.0	12.5	0.0	0.0	0.0
Townhouse/Condo/Duplex	16	12.5	6.3	0.0	12.5	6.3	12.5	6.3	0.0
Other	1	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0

Table B38. Most Challenging Aspect to Composting by Age (Yes %)

Age	n	Odor	Attracts Pests	Not Enough Food Waste	Incorporate in Daily Routine	Hard to Learn	Compost Pile Not Working	Too Time Consuming	Household Not Participate
18-35	44	13.6	40.9	0.0	15.9	4.5	4.5	4.5	2.3
36-45	35	14.3	25.7	2.9	20.0	5.7	8.6	11.4	0.0
46-55	34	8.8	23.5	2.9	14.7	2.9	11.8	8.8	2.9
56-65	20	5.0	25.0	0.0	5.0	10.0	5.0	25.0	0.0
Over 65	7	14.3	42.9	0.0	0.0	0.0	0.0	0.0	0.0

Table B39. Most Challenging Aspect to Composting by Education (Yes %)

Education	n	Odor	Attracts Pests	Not Enough Food Waste	Incorporate in Daily Routine	Hard to Learn	Compost Pile Not Working	Too Time Consuming	Household Not Participate
High School/Some College/Technical	32	18.8	34.4	0.0	21.9	6.3	0.0	3.1	3.1
Bachelors	59	11.9	39.0	3.4	11.9	3.4	10.2	8.5	0.0
Masters	33	3.0	24.2	0.0	9.1	9.1	12.1	9.1	3.0
PhD/JD/MD	15	6.7	6.7	0.0	26.7	0.0	0.0	33.3	0.0

Table B40. Most Challenging Aspect to Composting by Race (Yes %)

Race	n	Odor	Attracts Pests	Not Enough Food Waste	Incorporate in Daily Routine	Hard to Learn	Compost Pile Not Working	Too Time Consuming	Household Not Participate
Caucasian	125	12.8	33.6	1.6	12.8	4.8	8.0	9.6	1.6
African-American	4	0.0	0.0	0.0	25.0	0.0	0.0	25.0	0.0
Hispanic/Latin	2	0.0	0.0	0.0	50.0	50.0	0.0	0.0	0.0
Asian	3	0.0	0.0	0.0	0.0	0.0	0.0	33.3	0.0
Other	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prefer Not to Answer	--	--	--	--	--	--	--	--	--

Table B41. Most Challenging Aspect to Composting by Income (Yes %)

Income	n	Odor	Attracts Pests	Not Enough Food Waste	Incorporate in Daily Routine	Hard to Learn	Compost Pile Not Working	Too Time Consuming	Household Not Participate
0-$45,000	16	18.8	37.5	0.0	12.5	0.0	6.3	6.3	0.0
$45,001-$100,000	46	6.5	34.8	0.0	13.0	8.7	6.5	8.7	2.2
$100,001-$150,000	32	12.5	31.3	0.0	9.4	6.3	6.3	12.5	3.1
Over $150,000	19	15.8	21.1	10.5	10.5	0.0	15.8	15.8	0.0

Table B42. Most Challenging Aspect to Composting by Gender Identity (Yes %)

Gender	n	Odor	Attracts Pests	Not Enough Food Waste	Incorporate in Daily Routine	Hard to Learn	Compost Pile Not Working	Too Time Consuming	Household Not Participate
Male	67	7.5	23.9	3.0	14.9	4.5	10.4	14.9	1.5
Female	75	14.7	36.0	0.0	14.7	5.3	4.0	5.3	1.3

Where Food is Stored Before Placing in Compost Heap Crosstabulations

Table B43. Where Food is Stored Before Placing in Compost Heap by Household (Yes %)

Household	n	Kitchen Collection Bucket	Fridge or Freezer	Compostable Bag	Outdoor Bin	Other
Single Family	116	75.9	6.9	2.6	25.9	2.6
Apartment	8	50.0	25.0	25.0	0.0	0.0
Townhouse/Condo/Duplex	16	50.0	25.0	6.3	18.8	12.5
Other	1	0.0	0.0	0.0	100.0	0.0

Table B44. Where Food is Stored Before Placing in Compost Heap by Age (Yes %)

Age	n	Kitchen Collection Bucket	Fridge or Freezer	Compostable Bag	Outdoor Bin	Other
18-35	43	74.4	16.3	4.7	14.0	4.7
36-45	35	74.3	8.6	2.9	22.9	5.7
46-55	35	77.1	2.9	0.0	31.4	0.0
56-65	20	50.0	10.0	5.0	40.0	5.0
Over 65	7	71.4	14.3	14.3	14.3	0.0

Table B45. Where Food is Stored Before Placing in Compost Heap by Education (Yes %)

Education	n	Kitchen Collection Bucket	Fridge or Freezer	Compostable Bag	Outdoor Bin	Other
High School/Some College/Technical	32	71.9	0.0	12.5	28.1	3.1
Bachelors	58	75.9	19.0	1.7	19.0	0.0
Masters	33	63.6	6.1	3.0	27.3	9.1
PhD/JD/MD	16	68.8	0.0	0.0	31.3	6.3

Table B46. Where Food is Stored Before Placing in Compost Heap by Race (Yes %)

Race	n	Kitchen Collection Bucket	Fridge or Freezer	Compostable Bag	Outdoor Bin	Other
Caucasian	125	72.0	8.8	2.4	24.8	4.0
African-American	4	75.0	0.0	25.0	25.0	0.0
Hispanic/Latin	2	50.0	0.0	50.0	0.0	0.0
Asian	3	66.7	33.3	0.0	0.0	0.0
Other	2	50.0	50.0	0.0	0.0	0.0
Prefer Not to Answer	--	--	--	--	--	--

Table B47. Where Food is Stored Before Placing in Compost Heap by Income (Yes %)

Income	n	Kitchen Collection Bucket	Fridge or Freezer	Compostable Bag	Outdoor Bin	Other
0-$45,000	16	50.0	25.0	6.3	12.5	6.3
$45,001-$100,000	46	60.9	15.2	4.3	30.4	2.2
$100,001-$150,000	31	80.6	3.2	3.2	19.4	0.0
Over $150,000	20	90.0	0.0	0.0	20.0	5.0

Table B48. Where Food is Stored Before Placing in Compost Heap by Gender Identity (Yes %)

Gender	n	Kitchen Collection Bucket	Fridge or Freezer	Compostable Bag	Outdoor Bin	Other
Male	67	67.2	7.5	3.0	32.8	3.0
Female	75	74.7	12.0	5.3	16.0	4.0

Interest in Reducing Curbside Collection by Diverting Food Waste Through Composting Crosstabulations

Table B49. Interest in Reducing Curbside Collection by Diverting Food Waste Through Composting by Household (%)

Household	n	Very Uninterested	Somewhat Uninterested	Neutral	Somewhat Interested	Very Interested
Single Family	284	30.6	8.1	33.8	21.1	6.3
Apartment	27	63.0	3.7	29.6	0.0	3.7
Townhouse/Condo/Duplex	37	21.6	5.4	45.9	5.4	21.6
Other	5	60.0	0.0	20.0	20.0	0.0

Table B50. Interest in Reducing Curbside Collection by Diverting Food Waste Through Composting by Age (%)

Age	n	Very Uninterested	Somewhat Uninterested	Neutral	Somewhat Interested	Very Interested
18-35	97	40.2	2.1	28.9	22.7	6.2
36-45	78	16.7	11.5	42.3	19.2	10.3
46-55	99	35.4	10.1	34.3	12.1	8.1
56-65	47	38.3	6.4	34.0	14.9	6.4
Over 65	26	23.1	7.7	34.6	26.9	7.7

Table B51. Interest in Reducing Curbside Collection by Diverting Food Waste Through Composting by Education (%)

Education	n	Very Uninterested	Somewhat Uninterested	Neutral	Somewhat Interested	Very Interested
High School/Some College/Technical	128	47.7	6.3	30.5	14.1	1.6
Bachelors	121	26.4	9.1	29.8	24.0	10.7
Masters	61	23.0	4.9	39.3	18.0	14.8
PhD/JD/MD	37	16.2	10.8	51.4	13.5	8.1

Table B52. Interest in Reducing Curbside Collection by Diverting Food Waste Through Composting by Race (%)

Race	n	Very Uninterested	Somewhat Uninterested	Neutral	Somewhat Interested	Very Interested
Caucasian	266	25.9	6.8	35.3	22.2	9.8
African-American	23	65.2	4.3	26.1	4.3	0.0
Hispanic/Latin	20	50.0	10.0	30.0	10.0	0.0
Asian	7	14.3	14.3	57.1	0.0	14.3
Other	15	73.3	13.3	13.3	0.0	0.0
Prefer Not to Answer	4	50.0	50.0	0.0	0.0	0.0

Table B53. Interest in Reducing Curbside Collection by Diverting Food Waste Through Composting by Income (%)

Income	n	Very Uninterested	Somewhat Uninterested	Neutral	Somewhat Interested	Very Interested
0-$45,000	58	51.7	1.7	27.6	17.2	1.7
$45,001-$100,000	92	28.3	8.7	35.9	13.0	14.1
$100,001-$150,000	57	15.8	10.5	31.6	29.8	12.3
Over $150,000	54	20.4	7.4	33.3	31.5	7.4

Table B54. Interest in Reducing Curbside Collection by Diverting Food Waste Through Composting by Gender Identity (%)

Gender	n	Very Uninterested	Somewhat Uninterested	Neutral	Somewhat Interested	Very Interested
Male	189	36.0	9.5	36.5	11.6	6.3
Female	169	29.6	4.7	32.0	24.9	8.9

Meals Per Week (21 Meals) Containing Dairy, Meat, and Beef Crosstabulations

Table B55. Meals Per Week Containing Dairy, Meat, and Beef by Household

Household	n	Meals That Contain Dairy	Meals That Contain Meat	Meat Meals That Contain Beef
Single Family	264	12.1	9.4	2.6
Apartment	46	12.2	10.5	3.4
Townhouse/Condo/Duplex	46	11.3	8.8	2.5
Other	4	14.3	11.2	3.6

Table B56. Meals Per Week Containing Dairy, Meat, and Beef by Age

Age	n	Meals That Contain Dairy	Meals That Contain Meat	Meat Meals That Contain Beef
18-35	106	12.9	9.9	3.2
36-45	84	11.2	8.9	2.0
46-55	95	12.3	9.9	3.0
56-65	44	12.9	9.4	2.9
Over 65	27	9.3	7.1	1.5

Table B57. Meals Per Week Containing Dairy, Meat, and Beef by Education

Education	n	Meals That Contain Dairy	Meals That Contain Meat	Meat Meals That Contain Beef
High School/Some College/Technical	136	12.5	10.9	3.5
Bachelors	123	11.8	8.9	2.4
Masters	61	11.4	8.2	2.3
PhD/JD/MD	35	12.3	7.4	1.5

Table B58. Meals Per Week Containing Dairy, Meat, and Beef by Race

Race	n	Meals That Contain Dairy	Meals That Contain Meat	Meat Meals That Contain Beef
Caucasian	274	12.0	8.9	2.3
African-American	23	12.2	11.8	2.8
Hispanic/Latin	21	11.1	11.2	5.8
Asian	6	11.3	7.3	1.1
Other	20	13.0	10.9	3.3
Prefer Not to Answer	3	6.8	6.0	12.0

Table B59. Meals Per Week Containing Dairy, Meat, and Beef by Income

Income	n	Meals That Contain Dairy	Meals That Contain Meat	Meat Meals That Contain Beef
0-$45,000	70	12.6	9.7	3.5
$45,001-$100,000	93	11.5	9.2	2.7
$100,001-$150,000	55	10.7	7.7	1.7
Over $150,000	52	11.8	8.5	1.7

Table B60. Meals Per Week Containing Dairy, Meat, and Beef by Gender Identity

Gender	n	Meals That Contain Dairy	Meals That Contain Meat	Meat Meals That Contain Beef
Male	191	12.3	10.5	3.4
Female	172	11.9	8.3	2.0

Participation Levels in Specific Diets Crosstabulations

Table B61. Participation Levels in Specific Diets by Household (Yes %)

Household	n	Vegan Diet	Vegetarian Diet	Pescatarian Diet	Dairy-Free Diet
Single Family	272	2.7	5.9	4.4	4.6
Apartment	45	2.1	6.3	0.0	2.1
Townhouse/Condo/Duplex	43	4.1	8.5	4.7	6.3
Other	4	0.0	20.0	0.0	20.0

Table B62. Participation Levels in Specific Diets by Age (Yes %)

Age	n	Vegan Diet	Vegetarian Diet	Pescatarian Diet	Dairy-Free Diet
18-35	107	3.5	3.6	2.8	2.7
36-45	84	2.2	8.9	8.3	5.6
46-55	96	2.9	5.0	4.2	6.9
56-65	44	4.1	8.5	0.0	0.0
Over 65	28	0.0	9.4	0.0	9.4

Table B63. Participation Levels in Specific Diets by Education (Yes %)

Education	n	Vegan Diet	Vegetarian Diet	Pescatarian Diet	Dairy-Free Diet
High School/Some College/Technical	140	0.7	5.4	2.1	4.8
Bachelors	123	5.8	6.9	1.6	5.4
Masters	59	3.0	9.4	10.2	3.1
PhD/JD/MD	36	0.0	5.1	8.3	5.1

Table B64. Participation Levels in Specific Diets by Race (Yes %)

Race	n	Vegan Diet	Vegetarian Diet	Pescatarian Diet	Dairy-Free Diet
Caucasian	275	2.7	6.2	5.1	5.9
African-American	22	3.8	12.0	0.0	0.0
Hispanic/Latin	21	4.5	4.5	0.0	0.0
Asian	6	14.3	16.7	0.0	0.0
Other	20	0.0	0.0	0.0	0.0
Prefer Not to Answer	2	0.0	50.0	0.0	25.0

Table B65. Participation Levels in Specific Diets by Income (Yes %)

Income	n	Vegan Diet	Vegetarian Diet	Pescatarian Diet	Dairy-Free Diet
0-$45,000	68	1.3	10.7	1.5	4.0
$45,001-$100,000	95	1.9	5.9	3.2	5.0
$100,001-$150,000	53	11.5	3.6	5.7	3.6
Over $150,000	53	1.7	7.0	7.5	8.8

Table B66. Participation Levels in Specific Diets by Gender Identity (Yes %)

Gender	n	Vegan Diet	Vegetarian Diet	Pescatarian Diet	Dairy-Free Diet
Male	190	3.4	4.5	4.2	5.5
Female	178	2.1	8.9	3.4	3.7

Considered Eating Fewer Meals with Meat Crosstabulations

Table B67. Considered Eating Fewer Meals with Meat by Household (%)

Household	n	Yes	No
Single Family	262	55.0	45.0
Apartment	45	48.9	51.1
Townhouse/Condo/Duplex	41	48.8	51.2
Other	4	25.0	75.0

Table B68. Considered Eating Fewer Meals with Meat by Age (%)

Age	n	Yes	No
18-35	105	51.4	48.6
36-45	78	60.3	39.7
46-55	92	54.3	45.7
56-65	43	46.5	53.5
Over 65	29	51.7	48.3

Table B69. Considered Eating Fewer Meals with Meat by Education (%)

Education	n	Yes	No
High School/Some College/Technical	135	34.8	65.2
Bachelors	122	60.7	39.3
Masters	54	74.1	25.9
PhD/JD/MD	35	68.6	31.4

Table B70. Considered Eating Fewer Meals with Meat by Race (%)

Race	n	Yes	No
Caucasian	265	58.9	41.1
African-American	21	47.6	52.4
Hispanic/Latin	21	14.3	85.7
Asian	5	100.0	0.0
Other	20	35.0	65.0
Prefer Not to Answer	2	0.0	100.0

Table B71. Considered Eating Fewer Meals with Meat by Income (%)

Income	n	Yes	No
0-$45,000	66	47.0	53.0
$45,001-$100,000	93	52.7	47.3
$100,001-$150,000	50	76.0	24.0
Over $150,000	51	70.6	29.4

Table B72. Considered Eating Fewer Meals with Meat by Gender Identity (%)

Gender	n	Yes	No
Male	186	44.1	55.9
Female	170	61.8	38.2

Percentage of Food Eaten Produced Locally and Organic Crosstabulations

Table B73. Percentage of Food Eaten Produced Locally and Organic by Household (%)

Household	n	Produced Locally	Organic
Single Family	272	20.4	29.6
Apartment	45	17.8	22.7
Townhouse/Condo/Duplex	47	26.4	27.1
Other	5	6.0	11.0

Table B74. Percentage of Food Eaten Produced Locally and Organic by Age (%)

Age	n	Produced Locally	Organic
18-35	103	21.0	23.8
36-45	89	24.1	31.1
46-55	96	18.2	31.5
56-65	45	21.2	27.2
Over 65	30	18.8	27.7

Table B75. Percentage of Food Eaten Produced Locally and Organic by Education (%)

Education	n	Produced Locally	Organic
High School/Some College/Technical	132	14.3	19.7
Bachelors	131	26.1	33.8
Masters	63	22.0	34.2
PhD/JD/MD	37	23.4	31.3

Table B76. Percentage of Food Eaten Produced Locally and Organic by Race (%)

Race	n	Produced Locally	Organic
Caucasian	279	23.1	31.0
African-American	25	9.6	11.2
Hispanic/Latin	20	16.9	18.6
Asian	7	25.0	46.4
Other	18	11.9	18.5
Prefer Not to Answer	2	7.2	57.5

Table B77. Percentage of Food Eaten Produced Locally and Organic by Income (%)

Income	n	Produced Locally	Organic
0-$45,000	72	17.8	18.9
$45,001-$100,000	97	21.7	30.5
$100,001-$150,000	57	24.7	38.5
Over $150,000	51	25.0	34.1

Table B78. Percentage of Food Eaten Produced Locally and Organic by Gender Identity (%)

Gender	n	Produced Locally	Organic
Male	187	18.9	26.8
Female	185	22.4	29.9

Types of Foods Eaten That Are Produced Locally Crosstabulations

Table B79. Types of Food Eaten that are Produced Locally by Household (Yes %)

Household	n	Produce	Meat	Dairy	Baked Goods	Other
Single Family	239	99.2	30.1	25.9	34.3	4.6
Apartment	33	90.9	33.3	24.2	48.5	3.0
Townhouse/Condo/Duplex	41	95.1	22.0	31.7	34.1	7.3
Other	3	66.7	0.0	0.0	0.0	33.3

Table B80. Types of Food Eaten that are Produced Locally by Age (Yes %)

Age	n	Produce	Meat	Dairy	Baked Goods	Other
18-35	88	97.7	34.1	26.1	34.1	5.7
36-45	81	96.3	30.9	32.1	43.2	3.7
46-55	81	97.5	25.9	23.5	38.3	7.4
56-65	41	97.6	24.4	19.5	24.4	4.9
Over 65	22	100.0	27.3	31.8	27.3	0.0

Table B81. Types of Food Eaten that are Produced Locally by Education (Yes %)

Education	n	Produce	Meat	Dairy	Baked Goods	Other
High School/Some College/Technical	98	98.0	33.7	20.4	29.6	3.1
Bachelors	119	96.6	27.7	30.3	40.3	5.9
Masters	57	100.0	26.3	28.1	35.1	7.0
PhD/JD/MD	37	94.6	27.0	21.6	35.1	5.4

Table B82. Types of Food Eaten that are Produced Locally by Race (Yes %)

Race	n	Produce	Meat	Dairy	Baked Goods	Other
Caucasian	253	97.6	30.0	28.5	37.9	6.3
African-American	16	93.8	37.5	12.5	37.5	0.0
Hispanic/Latin	16	100.0	31.3	18.8	18.8	0.0
Asian	5	100.0	20.0	40.0	40.0	0.0
Other	12	91.7	25.0	25.0	33.3	0.0
Prefer Not to Answer	3	100.0	0.0	0.0	0.0	0.0

Table B83. Types of Food Eaten that are Produced Locally by Income (Yes %)

Income	n	Produce	Meat	Dairy	Baked Goods	Other
0-$45,000	54	92.6	24.1	20.4	24.1	5.6
$45,001-$100,000	89	98.9	28.1	22.5	29.2	4.5
$100,001-$150,000	55	100.0	27.3	23.6	34.5	3.6
Over $150,000	49	95.9	40.8	42.9	51.0	8.2

Table B84. Types of Food Eaten that are Produced Locally by Gender Identity (Yes %)

Gender	n	Produce	Meat	Dairy	Baked Goods	Other
Male	156	97.4	32.1	28.8	36.5	7.7
Female	163	97.5	27.0	23.9	35.0	2.5

Types of Foods Bought That Were Organic Crosstabulations

Table B85. Types of Food Bought that were Organic by Household (Yes %)

Household	n	Produce	Meat	Dairy	Baked Goods	Other
Single Family	233	97.4	42.1	51.9	36.1	6.9
Apartment	30	96.7	56.7	50.0	50.0	3.3
Townhouse/Condo/Duplex	35	94.3	37.1	48.6	48.6	5.7
Other	4	100.0	25.0	25.0	0.0	0.0

Table B86. Types of Food Bought that were Organic by Age (Yes %)

Age	n	Produce	Meat	Dairy	Baked Goods	Other
18-35	74	97.3	44.6	48.6	39.2	5.4
36-45	76	97.4	48.7	61.8	46.1	5.3
46-55	88	95.5	36.4	44.3	33.0	6.8
56-65	38	100.0	44.7	52.6	36.8	7.9
Over 65	22	100.0	36.4	50.0	40.9	4.5

Table B87. Types of Food Bought that were Organic by Education (Yes %)

Education	n	Produce	Meat	Dairy	Baked Goods	Other
High School/Some College/Technical	96	94.8	35.4	37.5	30.2	5.2
Bachelors	109	99.1	45.9	56.9	45.0	4.6
Masters	56	100.0	51.8	64.3	48.2	8.9
PhD/JD/MD	36	91.7	44.4	55.6	30.6	11.1

Table B88. Types of Food Bought that were Organic by Race (Yes %)

Race	n	Produce	Meat	Dairy	Baked Goods	Other
Caucasian	235	97.9	45.1	56.2	42.6	6.4
African-American	13	76.9	53.8	38.5	46.2	7.7
Hispanic/Latin	17	100.0	23.5	11.8	11.8	0.0
Asian	6	83.3	50.0	83.3	33.3	16.7
Other	15	100.0	40.0	40.0	26.7	13.3
Prefer Not to Answer	4	100.0	0.0	25.0	0.0	0.0

Table B89. Types of Food Bought that were Organic by Income (Yes %)

Income	n	Produce	Meat	Dairy	Baked Goods	Other
0-$45,000	47	97.9	42.6	44.7	23.4	4.3
$45,001-$100,000	81	98.8	44.4	51.9	39.5	6.2
$100,001-$150,000	56	100.0	51.8	67.9	42.9	0.0
Over $150,000	45	93.3	48.9	60.0	46.7	13.3

Table B90. Types of Food Bought that were Organic by Gender Identity (Yes %)

Gender	n	Produce	Meat	Dairy	Baked Goods	Other
Male	154	98.7	44.2	46.1	42.2	6.5
Female	151	95.4	41.7	55.6	35.1	6.0

Worked in the Past Year Crosstabulations

Table B91. Worked in the Past Year by Household (%)

Household	n	Yes	No
Single Family	292	75.0	25.0
Apartment	48	70.8	29.2
Townhouse/Condo/Duplex	49	79.6	20.4
Other	5	60.0	40.0

Table B92. Worked in the Past Year by Age (%)

Age	n	Yes	No
18-35	113	84.1	15.9
36-45	91	85.7	14.3
46-55	104	83.7	16.3
56-65	49	59.2	40.8
Over 65	32	12.5	87.5

Table B93. Worked in the Past Year by Education (%)

Education	n	Yes	No
High School/Some College/Technical	146	58.9	41.1
Bachelors	138	82.6	17.4
Masters	66	84.8	15.2
PhD/JD/MD	39	94.9	5.1

Table B94. Worked in the Past Year by Race (%)

Race	n	Yes	No
Caucasian	298	77.5	22.5
African-American	26	57.7	42.3
Hispanic/Latin	21	85.7	14.3
Asian	7	71.4	28.6
Other	20	60.0	40.0
Prefer Not to Answer	4	50.0	50.0

Table B95. Worked in the Past Year by Income (%)

Income	n	Yes	No
0-$45,000	75	65.3	34.7
$45,001-$100,000	103	81.6	18.4
$100,001-$150,000	61	85.2	14.8
Over $150,000	58	87.9	12.1

Table B96. Worked in the Past Year by Gender Identity (%)

Gender	n	Yes	No
Male	204	80.4	19.6
Female	193	68.9	31.1

Method to Get to Work Crosstabulations

Table B97. Method to Get to Work by Household (Yes %)

Household	n	Passenger Car	Bus	Train	Walk/Bike	Light Truck	Motorcycle	Work from Home	Other
Single Family	221	75.1	3.2	0.0	5.0	1.8	0.5	16.3	0.9
Apartment	36	80.6	13.9	2.8	5.6	0.0	0.0	8.3	0.0
Townhouse/Condo/Duplex	39	66.7	7.7	0.0	7.7	2.6	2.6	10.3	5.1
Other	3	33.3	0.0	0.0	0.0	33.3	0.0	0.0	33.3

Table B98. Method to Get to Work by Age (Yes %)

Age	n	Passenger Car	Bus	Train	Walk/Bike	Light Truck	Motorcycle	Work from Home	Other
18-35	94	79.8	9.6	1.1	4.3	0.0	1.1	7.4	2.1
36-45	80	77.5	5.0	0.0	10.0	0.0	1.3	11.3	0.0
46-55	87	71.3	1.1	0.0	2.3	4.6	0.0	20.7	1.1
56-65	30	60.0	0.0	0.0	3.3	6.7	0.0	26.7	3.3
Over 65	5	60.0	20.0	0.0	20.0	0.0	0.0	20.0	0.0

Table B99. Method to Get to Work by Education (Yes %)

Education	n	Passenger Car	Bus	Train	Walk/Bike	Light Truck	Motorcycle	Work from Home	Other
High School/Some College/Technical	87	82.8	3.4	0.0	2.3	4.6	0.0	6.9	1.1
Bachelors	116	75.9	3.4	0.0	3.4	1.7	0.9	16.4	0.9
Masters	56	69.6	5.4	1.8	8.9	0.0	1.8	17.9	3.6
PhD/JD/MD	37	59.5	13.5	0.0	13.5	0.0	0.0	18.9	0.0

Table B100. Method to Get to Work by Race (Yes %)

Race	n	Passenger Car	Bus	Train	Walk/Bike	Light Truck	Motorcycle	Work from Home	Other
Caucasian	233	71.7	5.6	0.4	6.4	1.3	0.9	16.7	1.7
African-American	15	73.3	6.7	0.0	0.0	13.3	0.0	6.7	0.0
Hispanic/Latin	18	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Asian	5	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other	12	66.7	8.3	0.0	8.3	0.0	0.0	16.7	0.0
Prefer Not to Answer	3	66.7	0.0	0.0	0.0	33.3	0.0	0.0	0.0

Table B101. Method to Get to Work by Income (Yes %)

Income	n	Passenger Car	Bus	Train	Walk/Bike	Light Truck	Motorcycle	Work from Home	Other
0-$45,000	49	81.6	6.1	0.0	8.2	2.0	2.0	10.2	2.0
$45,001-$100,000	84	76.2	7.1	0.0	2.4	3.6	0.0	8.3	2.4
$100,001-$150,000	53	73.6	0.0	0.0	3.8	1.9	0.0	18.9	1.9
Over $150,000	51	62.7	0.0	0.0	11.8	0.0	2.0	29.4	0.0

Table B102. Method to Get to Work by Gender Identity (Yes %)

Gender	n	Passenger Car	Bus	Train	Walk/Bike	Light Truck	Motorcycle	Work from Home	Other
Male	166	72.3	4.2	0.6	5.4	3.6	1.2	12.7	2.4
Female	135	77.0	5.9	0.0	5.2	0.0	0.0	16.3	0.7

Miles Traveled One-Way on Commute to Work Crosstabulations

Table B103. Miles Traveled One-Way on Commute to Work by Household

Household	n	One-Way Miles to Work	Median Miles
Single Family	182	10.2	8.0
Apartment	33	9.1	5.0
Townhouse/Condo/Duplex	34	11.5	10.0
Other	2	2.0	2.0

Table B104. Miles Traveled One-Way on Commute to Work by Age

Age	n	One-Way Miles to Work	Median Miles
18-35	79	10.9	8.0
36-45	68	9.8	6.3
46-55	72	11.0	10.0
56-65	25	7.4	5.0
Over 65	5	5.3	5.0

Table B105. Miles Traveled One-Way on Commute to Work by Education

Education	n	One-Way Miles to Work	Median Miles
High School/Some College/Technical	72	10.5	9.5
Bachelors	100	11.4	7.0
Masters	46	9.2	5.5
PhD/JD/MD	31	7.1	5.0

Table B106. Miles Traveled One-Way on Commute to Work by Race

Race	n	One-Way Miles to Work	Median Miles
Caucasian	196	10.0	7.0
African-American	13	11.1	7.0
Hispanic/Latin	13	11.4	10.0
Asian	6	8.9	7.5
Other	10	8.3	5.5
Prefer Not to Answer	3	10.3	10.0

Table B107. Miles Traveled One-Way on Commute to Work by Income

Income	n	One-Way Miles to Work	Median Miles
0-$45,000	44	8.5	5.5
$45,001-$100,000	71	11.1	8.5
$100,001-$150,000	44	11.4	7.0
Over $150,000	45	9.6	10.0

Table B108. Miles Traveled One-Way on Commute to Work by Gender Identity

Gender	n	One-Way Miles to Work	Median Miles
Male	134	11.0	9.5
Female	119	9.2	7.0

Days Per Week Using Public Transportation For Those Who Use It Crosstabulations

Table B109. Days Per Week Using Public Transportation for Those Who Use It by Household (%)

Household	n	1 Day	2 Days	3 Days	3.5 Days	4 Days	5 Days
Single Family	7	0.0	14.3	14.3	14.3	0.0	57.1
Apartment	5	0.0	20.0	0.0	0.0	0.0	80.0
Townhouse/Condo/Duplex	3	0.0	0.0	0.0	0.0	33.3	66.7
Other	0	--	--	--	--	--	--

Table B110. Days Per Week Using Public Transportation for Those Who Use It by Age (%)

Age	n	1 Day	2 Days	3 Days	3.5 Days	4 Days	5 Days
18-35	8	0.0	12.5	0.0	12.5	12.5	62.5
36-45	5	0.0	20.0	20.0	0.0	0.0	60.0
46-55	2	0.0	0.0	0.0	0.0	0.0	100.0
56-65	0	--	--	--	--	--	--
Over 65	0	--	--	--	--	--	--

Table B111. Days Per Week Using Public Transportation for Those Who Use It by Education (%)

Education	n	1 Day	2 Days	3 Days	3.5 Days	4 Days	5 Days
High School/Some College/Technical	2	0.0	0.0	0.0	0.0	0.0	100.0
Bachelors	3	0.0	0.0	0.0	33.3	0.0	66.7
Masters	4	0.0	25.0	25.0	0.0	25.0	25.0
PhD/JD/MD	6	0.0	16.7	0.0	0.0	0.0	83.3

Table B112. Days Per Week Using Public Transportation for Those Who Use It by Race (%)

Race	n	1 Day	2 Days	3 Days	3.5 Days	4 Days	5 Days
Caucasian	13	0.0	15.4	7.7	7.7	7.7	61.5
African-American	0	--	--	--	--	--	--
Hispanic/Latin	0	--	--	--	--	--	--
Asian	1	0.0	0.0	0.0	0.0	0.0	100.0
Other	1	0.0	0.0	0.0	0.0	0.0	100.0
Prefer Not to Answer	0	--	--	--	--	--	--

Table B113. Days Per Week Using Public Transportation for Those Who Use It by Income (%)

Income	n	1 Day	2 Days	3 Days	3.5 Days	4 Days	5 Days
0-$45,000	3	0.0	33.3	0.0	0.0	33.3	33.3
$45,001-$100,000	6	0.0	0.0	16.7	16.7	0.0	66.7
$100,001-$150,000	1	0.0	100.0	0.0	0.0	0.0	0.0
Over $150,000	1	0.0	0.0	0.0	0.0	0.0	100.0

Table B114. Days Per Week Using Public Transportation for Those Who Use It by Gender Identity (%)

Gender	n	1 Day	2 Days	3 Days	3.5 Days	4 Days	5 Days
Male	7	0.0	0.0	14.3	0.0	14.3	71.4
Female	8	0.0	25.0	0.0	12.5	0.0	62.5

First and Last Mile Method of Transportation for Public Transit Crosstabulations

Table B115. First and Last Mile Method for Public Transportation by Household (%)

Household	n	Walk	Bike	Other
Single Family	6	83.3	0.0	16.7
Apartment	5	100.0	0.0	0.0
Townhouse/Condo/Duplex	3	100.0	0.0	0.0
Other	0	--	--	--

Table B116. First and Last Mile Method for Public Transportation by Age (%)

Age	n	Walk	Bike	Other
18-35	9	100.0	0.0	0.0
36-45	4	75.0	0.0	25.0
46-55	1	100.0	0.0	0.0
56-65	0	--	--	--
Over 65	0	--	--	--

Table B117. First and Last Mile Method for Public Transportation by Education (%)

Education	n	Walk	Bike	Other
High School/Some College/Technical	3	100.0	0.0	0.0
Bachelors	3	66.7	0.0	33.3
Masters	3	100.0	0.0	0.0
PhD/JD/MD	5	100.0	0.0	0.0

Table B118. First and Last Mile Method for Public Transportation by Race (%)

Race	n	Walk	Bike	Other
Caucasian	12	91.7	0.0	8.3
African-American	1	100.0	0.0	0.0
Hispanic/Latin	0	--	--	--
Asian	0	--	--	--
Other	1	100.0	0.0	0.0
Prefer Not to Answer	0	--	--	--

Table B119. First and Last Mile Method for Public Transportation by Income (%)

Income	n	Walk	Bike	Other
0-$45,000	3	100.0	0.0	0.0
$45,001-$100,000	6	100.0	0.0	0.0
$100,001-$150,000	0	--	--	--
Over $150,000	0	--	--	--

Table B120. First and Last Mile Method for Public Transportation by Gender Identity (%)

Gender	n	Walk	Bike	Other
Male	7	85.7	0.0	14.3
Female	7	100.0	0.0	0.0

How Often Walk/Bike Instead of Driving Crosstabulations

Table B121. How Often Walk/Bike Instead of Driving by Household (%)

Household	n	Never	Daily	Weekly	Monthly
Single Family	287	46.0	14.6	24.4	15.0
Apartment	47	48.9	17.0	25.5	8.5
Townhouse/Condo/Duplex	49	28.6	24.5	36.7	10.2
Other	5	80.0	0.0	20.0	0.0

Table B122. How Often Walk/Bike Instead of Driving by Age (%)

Age	n	Never	Daily	Weekly	Monthly
18-35	113	37.2	14.2	31.9	16.8
36-45	89	38.2	14.6	37.1	10.1
46-55	101	44.6	16.8	20.8	17.8
56-65	49	51.0	22.4	18.4	8.2
Over 65	30	70.0	16.7	6.7	6.7

Table B123. How Often Walk/Bike Instead of Driving by Education (%)

Education	n	Never	Daily	Weekly	Monthly
High School/Some College/Technical	145	55.9	11.7	19.3	13.1
Bachelors	137	40.1	19.0	24.8	16.1
Masters	64	32.8	20.3	37.5	9.4
PhD/JD/MD	35	34.3	14.3	40.0	11.4

Table B124. How Often Walk/Bike Instead of Driving by Race (%)

Race	n	Never	Daily	Weekly	Monthly
Caucasian	292	39.0	16.8	29.5	14.7
African-American	25	56.0	20.0	12.0	12.0
Hispanic/Latin	22	68.2	4.5	13.6	13.6
Asian	7	42.9	28.6	14.3	14.3
Other	20	60.0	15.0	15.0	10.0
Prefer Not to Answer	4	100.0	0.0	0.0	0.0

Table B125. How Often Walk/Bike Instead of Driving by Income (%)

Income	n	Never	Daily	Weekly	Monthly
0-$45,000	75	54.7	10.7	25.3	9.3
$45,001-$100,000	100	44.0	13.0	30.0	13.0
$100,001-$150,000	60	26.7	18.3	40.0	15.0
Over $150,000	55	40.0	20.0	20.0	20.0

Table B126. How Often Walk/Bike Instead of Driving by Gender Identity (%)

Gender	n	Never	Daily	Weekly	Monthly
Male	200	45.5	16.0	27.5	11.0
Female	191	44.0	16.2	24.6	15.2

Appendix C

Are there any incentives that would make you start composting – Other category.

- Not feasible where I live currently – condo, apartment. (9)
- Provide bin/neighborhood bin. (6)
- I don't have time. (4)
- I don't produce enough food waste. (3)
- Curbside collection. (2)
- I know nothing about composting. (2)
- Can't find correct balance of compost pile. (2)
- I have in the past, but have not set up anything at new home.
- I will begin composting soon.
- I would love to but just moved in and have not looked into it.
- I just need to start a compost pile.
- I look forward to the Town starting to compost.
- I will when the time is right. The church does now.
- I just moved here and have not started a pile yet but I plan to.
- Notifications sent out about drop-off locations and what they accept.
- It attracts pests so I am not interested.
- My neighbors compost so I have the how to do it. I will start when work allows me time.

Appendix D

What motivates you to continue composting?

- Reduce food waste. (57)
- Garden use. (28)
- It is the right thing to do. (19)
- It is easy to do. (10)
- It is a habit. (10)
- Good for the environment. (9)
- For healthy soil. (6)
- Family. (4)
- Less waste to the landfill. (3)
- Food waste feeds my chickens. (2)
- Fresh worms from compost pile for fishing.
- I like the idea of using old food to grow new food.
- Worms.
- Neighborhood grass pile to take compost to.
- My husband wants me and everyone in the house to participate. I am not a fan of rotting food sitting on the counter.
- Worms are like pets and enjoy feeding them.
- If I had a more convenient place to compost, I would do it more often.
- The Town should provide a compost bin if residents want - it is like recycling. I would like to compost but there are so many aspects to it.
- UNC has a lot of waste (mattresses and bottles). They act like they care but waste more than most.
- Parents.
- Emissions.
- No reason not to.
- Composting is done at my work by everyone.
- To be clean.

Appendix E

Where do you store food waste before placing it outside in your compost heap – Other category.

- Garbage disposal into a container. (2)
- A bucket in laundry room.
- Bin that goes to Farmer's Market.
- Outdoor bed.

Appendix F

What do you find is the most challenging aspect about eating fewer meals without meat?

- Nothing/none. (84)
- Health concerns without meat. (21)
- Getting adequate protein. (19)
- Keeping a balanced diet. (14)
- Taste of meatless meals. (13)
- Enjoy eating meat. (10)
- Children. (9)
- Family preference. (8)
- Finding recipes. (5)
- Options when going out to eat. (5)
- Time for food preparation. (4)
- Preparing a meat-free meal. (4)
- I am hungry more often without meat. (3)
- No energy. (3)
- Lack of meat-free products/choices. (3)
- Knowledge of what to cook. (3)
- Convenience. (3)
- Cost. (2)
- Getting iron. (2)
- Changing habits. (2)
- Tofu.
- Not organized enough with meal planning.
- Lifestyle.
- Peer pressure.
- Local farmer's market close to home would help.
- I had to educate myself. Most people lack the proper knowledge and fail.
- I feel guilty for eating meat, but I can't seem to quit.

Appendix G

What would be an incentive for you to eat fewer meals with meat/meat products?

- Nothing/none. (130)
- I enjoy eating meat. (17)
- Medical/health reasons. (10)
- Meat is needed for health. (6)
- A not so expensive protein powder.
- If I could save money and have an equal alternative.
- Something good to replace it with that is healthy.
- Not really bad for you.
- A substitute that equals meat.

Appendix H

What most influences your daily food choices?

- Eating healthy. (160)
- Convenience/ease. (129)
- Taste/what I want that day. (90)
- Family/children choice. (29)
- Cost/price. (16)
- Balanced diet. (14)
- Whatever spouse/parent prepares. (13)
- Nothing specific. (11)
- Availability/what is in season. (8)
- Medically restricted diet. (5)
- Something everyone will eat. (3)
- Quality. (2)
- Meal planning. (2)
- Ethical treatment of animals/land. (2)
- Work and scheduling.
- Macro diet.
- My employer's cafeteria.
- Losing weight and getting protein for energy.
- Low carb and high protein diet.
- Not eat same thing every day.
- I try to eat a vegetarian lifestyle.
- Habit.
- Variety.
- German cooking.
- Plant based diet.
- Long refrigerator shelf life.
- Sustainability.
- Depends on the day; many factors come into play; I have young children.
- I am a nutritionist and follow a diet plan.
- What you see other people eat.
- Inspiration.
- Emissions.
- Activity.
- Fast food.
- Who will be eating with me at that time.
- Organic and pesticide free.
- Local.

Appendix I

What do you find is the most challenging aspect about using alternative transportation?

- Time factor/convenience. (112)
- Scheduling. (53)
- None/nothing. (49)
- I don't need it. (31)
- My job/need to use vehicle. (23)
- Just don't use it/don't like it. (21)
- My location/distance. (21)
- Unaware of options. (19)
- Lack of availability/routes. (18)
- Difficult with children/daycare. (16)
- Pick-up and drop-off locations/stops. (9)
- Weather. (8)
- I am disabled/medical. (8)
- Transferring buses to get to the location. (6)
- Lack of sidewalks/connectivity. (6)
- Need bike lanes/improve bike lanes. (4)
- Hard to carry things with you. (3)
- No bus system to RTP in the morning. (3)
- I can walk to work. (3)
- Better apps are needed. (3)
- Poor walkability in town. (3)
- They don't run late or at night. (2)
- Not sure. (2)
- Great bus system. (2)
- Bus needs to run on weekends. (2)
- When it is on-time and available.
- The bus came early twice last week so I missed it and had to wait for the next bus to come 20 minutes later. I ended up late for work both days and lost pay.
- It stops too much and does not run on Saturday.
- Easy access to my bike in backyard.
- Cost.
- One bus every half hour is good and needed during day. There are only three buses on my schedule that used to be different times now all come about the same time.
- Can't take dog along.
- Need a light rail system to Raleigh and Durham.
- I walk 5 miles.
- I have an electric car so not needed.
- I do not like tight spaces.
- It is a 2 mile walk to the stop.
- The walking distance to and from the bus. The fact that it is free makes it worth it.
- Rentals all over the state.
- My age.

- Carrboro needs to put more benches out for people.
- I have a car out front that I have to walk by.
- Needing it.
- Lack of public transportation.
- I like alternative transportation and trains at this time, so bus is not needed much.

Agenda Item Abstract

File Number:20-368

Agenda Date: 10/13/2020 **File Type:**Agendas

In Control: Board of Aldermen

Version: 1

TITLE:
Focused Transportation Projects Update

PURPOSE: The purpose of this agenda item is to provide Council focused updates and presentation on specific transportation topics.

DEPARTMENT: Planning, Public Works

CONTACT INFORMATION: Zachary Hallock, 919-918-7329, zhallock@townofcarrboro.org <mailto:zhallock@townofcarrboro.org>; Tina Moon, 919-918-7325, cmoon@townofcarrboro.org <mailto:cmoon@townofcarrboro.org>; Trish McGuire, 919-918-7327, pmcguire@townofcarrboro.org <mailto:pmcguire@townofcarrboro.org>; Joe Guckavan, 919-918-7427, jguckavan@townofcarrboro.org <mailto:jguckavan@townofcarrboro.org>

INFORMATION: The following detailed reports have been included in this agenda item:

Laurel Ave Parking Status Report
Planning staff have worked to respond to resident concerns related to spillover parking from the Saturday Morning Farmer's Market. Currently, Recreation & Parks staff have taken over responsibility for coordinating with the Farmer's Market to ensure "No Parking" signs are placed on Laurel Ave on Saturday Morning. The detailed report can be found as Attachment B.

Traffic Calming on Starlite Drive and Plantation Acres
Planning staff held in-person public input sessions for both Starlite Drive and Plantation Acres in March 2020 (prior to COVID-19 restrictions). Work has progressed over the summer to develop concept plans and return to the community for feedback. The initial plan was to hold these feedback meetings in person, but staff are working to develop methods to garner feedback in a safe manner. A detailed report can be found as Attachment C.

Bikeshare Pilot Program Summary
Planning staff have coordinated with staff from the Town of Chapel Hill, and UNC Parking & Transportation, and Gotcha (UNC's current bike share provider) to develop a framework for a pilot program. These are the result of several months of ongoing conversation, and do not represent a finalized structure. Staff are looking for feedback from Council to ensure these conversations are headed in the right direction. Amendments to the Town Code will be needed to properly regulate such a system, include new definitions, restrictions on operating space, and enabling sidewalk sales. A detailed overview of the specifications of the potential program and

necessitated Town Code amendments can be found as Attachment D.

Gravel Roads Speed Limit Report
In the fall of 2019, staff responded to a request to change the speed limit on Laughing Bird Lane, an unpaved street. The Council has directed staff to consider changes to other unpaved streets in Town, and staff have reviewed state level statutes setting speed limits and EPA guidance on dust generation to recommend speed limits for gravel roads in Town. A detailed report can be found as Attachment E

FISCAL & STAFF IMPACT: There is no impact associated with receiving the update. The impacts associated with the individual items reported are described in the table below:

Project Name	Staff Impact	Fiscal Impact
Laurel Ave Parking	Continued staff time	None
Starlite Drive	Staff time to facilitate next round of public engagement	Estimated ~$6,000 to install identified traffic calming measures
Plantation Acres	Staff time to facilitate next round of public engagement and develop concept plan	Cost for traffic calming installation not yet estimated
Bike Share	Staff time to review and finalize contract, permits for station locations	No cost for implementing system, cost associated with developing & administering a cash payment system so people without a credit card, bank account, or smartphone can access the system.
Gravel Roads Speed Limit	Staff time to perform public outreach to determine resident preference for speed, installation of signs, enforcement	Material costs associated with fabricating new signs

RECOMMENDATION: Staff recommend that council consider the resolution (Attachment A) to receive the updates and provide comments.

A RESOLUTION RECEIVING AN UPDATE ON TRANSPORTATION PROJECTS

Section 1

WHEREAS, the Town Council has received presentations on important long range regional and statewide transportation plans; and

WHEREAS, the Town of Carrboro has a number of local transportation projects that are in process and working towards implementation; and

WHEREAS, Town staff have requested Council input and have provided the Council with updates related to specific projects at regular intervals.

NOW, THEREFORE, BE IT RESOLVED by the Carrboro Town Council that the Council receives this update on status of Laurel Avenue Parking, Starlite Drive & Plantation Acres Traffic Calming, and the Potential Bike Share Pilot Program.

Section 2

WHEREAS, in 2019 staff worked with residents of Laughing Bird Lane to identify a locally preferred speed limit for their unpaved street and brought a Town Code amendment to Council for approval; and

WHEREAS, Council directed staff to assess the speed limits on unpaved streets throughout the Town; and

WHEREAS, Staff have provided recommendations and will utilize a procedure in which resident feedback is used to inform selection of speed limits for unpaved streets.

NOW, THEREFORE, BE IT RESOLVED by the Carrboro Town Council that the Council receives the recommendation for speed limits on unpaved streets, and requests that Staff gather resident input and return Town Code amendments for approval at a later date.

BE IT FURTHER RESOLVED that the Carrboro Town Council provides the following comments:

_____

_____

_____

_____

_____

This the 13th day of October, 2020.

TOWN OF CARRBORO

NORTH CAROLINA

TRANSMITTAL **PLANNING DEPARTMENT**

DELIVERED VIA: ☐ *HAND* ☐ *MAIL* ☐ *FAX* ☒ *EMAIL*

To: **David Andrews, Town Manager**
Mayor and Town Council

From: **Zachary Hallock, Transportation Planner**

Date: **October 9, 2020**

Subject: **Update on Laurel Avenue Parking**

Planning Staff first received communication from the residents along Laurel Avenue in the Summer of 2018 asking if something can be done to prevent spill over parking from the Saturday Morning Farmer's Marking from parking on the street south of Jones Ferry Road and limit on-street parking to residents. The Staff Traffic and Parking Committee was held within a month following the communication and included staff from Planning, Police, Fire, Public Works, and Economic Development. Currently, there are no parking restrictions on Laurel Avenue south of Jones Ferry. The Town does not currently have a mechanism for restricting parking to residents only (which would require additional administration and enforcement). Furthermore, parking cannot be defined along the street (i.e. no parking from 8a-12p Saturday but allowed other times), as the requirements of the Fire Code specify minimum clearance widths. The pavement on Laurel Avenue is 21 feet wide, too narrow for the town to codify that parking is allowed while also meeting the Fire Code. Staff determined that the best course of action was to coordinate with the Farmer's Market to have their staff place 'No Parking' yard signs along the section of Laurel Ave closest to Jones Ferry Road.

In May of 2019, staff received a second inquiry regarding the status parking restrictions along Laurel Avenue, and indicating that the problem had begun occurring again. Staff observations during the week of 6/22/19 indicated that during a typical weekday morning (Thursday, hourly observations from 9 AM to 12 PM) there was on average 5 vehicles parked along the length of Laurel Avenue (south of Jones Ferry Road) and 0 parked within the 200' closest to Jones Ferry Road. On Saturday morning (during the Farmer's Market) there was observed an average of 9 vehicles parked along the length of Laurel Avenue and with an average of 4.5 of those vehicles parked within the 200' closest to Jones Ferry Road. The "No Parking" signs had not been in place during this observation.

At the end of August 2019, Planning staff coordinated an input session with some residents from Laurel Avenue and discussed the process to change parking on the street, the process for resident participation, and the details of how a residential parking permit program could work. The Town does not currently have a residential parking permit program, additional information can be provided to Town Council, if desired, at a later date. However, due to the requirements of the Fire Code, staff do not recommend changing parking regulations on Laurel Avenue. The only change that could be made and still conform with Fire Code would be to completely prohibit on-street parking from occurring, which is contrary to what the residents on the street desire.

In September 2019, Planning and Recreation & Parks department staff met to discuss how to handle unexpected on-street parking during major events such as the Carrboro Music Festival, as the increased demand for parking can result in spill over onto local streets that are unregulated. Staff determined that the best course of action was to create special temporary "No Parking" signs to be placed on existing signs where possible (as opposed to the smaller, yard signs), and coordinated with public works for major events.

As of September, staff from the Recreation & Parks department have been coordinating to ensuring "No Parking" signs are placed on Laurel Avenue by the Farmer's Market while the Market is open. They will continue to do in the future. Despite social distancing requirements put in place to minimize the spread of COVID-19, they still see sufficient demand for parking, such that removing the signs would likely result in a return of Farmer's Market patrons parking on Laurel Avenue. The most recent Saturday morning observation by Recreation & Parks staff found no vehicles parked along Laurel Avenue near where the signs where place. Staff will continue to monitor the situation and respond to requests from residents. Staff can bring back additional information about a residential parking permit program, if desired by Council, at a later date.

TOWN OF CARRBORO

NORTH CAROLINA

TRANSMITTAL **PLANNING DEPARTMENT**

DELIVERED VIA: ☐ *HAND* ☐ *MAIL* ☐ *FAX* ☒ *EMAIL*

To: **David Andrews, Town Manager**
Mayor and Town Council

From: **Zachary Hallock, Transportation Planner**

Date: **October 9, 2020**

Subject: **Update on Residential Traffic Calming Projects**

Summary

This document is intended to update the Town Council on the status of current residential traffic calming projects: Plantation Acres and Starlite Drive.

Both projects last had in person public input sessions on March 7, 2020 prior to any restrictions put in place to limit the spread of COVID-19. The purpose of these meetings (for both Starlite Drive and Plantation Acres) was to assess resident concerns based on their observations, coupled with vehicle speed and volume data collect by Town Staff. Moving forward, staff have worked to develop concept level drawing that could be use for a follow up public input session, to better incorporate feedback from residents and ensure their needs are met. These meetings have not been scheduled yet.

Plantation Acres

With the approval of the Lloyd Farm Phase 1 Conditional Use Permit, Town staff organized a neighborhood meeting to discuss resident observations of traffic patterns and preferences for traffic calming on Saturday, March 7th. Staff are using the feedback received from that meeting to develop a conceptual traffic calming plan for the neighborhood and plan on returning to the neighbors for additional feedback. This concept focuses primarily on short term treatments which can be installed for a low cost such pavement markings or curb extensions using paint and delineators. Furthermore, because this neighborhood operates as a network, staff want to to allow for proper consideration of how changes made in one locations will affect other places in the neighborhood. Modifications to the access of Carol Street at Old Fayetteville Road will be discussed with residents through a separate process dedicated to that topic. Staff will continue to

work to determine the best route to gather public input on a concept plan, and will present to the public once finalized.

Starlite Drive

Starting in later 2018, staff had begun to receive regular comments from residents indicating concern about speeding vehicles conflicts on curves in the road. Council directed staff to implement traffic calming measures at this location, and a neighborhood meeting was held on March 7th to assess the primary concerns of residents and discuss potential treatments.

Our partners at the DCHC MPO have entered into contract with Remix, a company which provides a transportation data and concept planning platform which is a valuable tool for visualizing changes to streets. Staff have utilized this tool to develop a concept plan for Starlite Drive, which includes speed tables, pavement markings, and painted curb extensions. Staff had originally intended to present this concept plan to the community via an in-person meeting. However, due to the restrictions in place to limit the spread of COVID-19, this is no longer feasible. Staff are developing an information sheet about the proposed types and locations of traffic calming measures to be mailed to residents along with the concept plan, feedback form, and stamped return envelope in order to facilitate community input on the design of the traffic calming measures.

The concept plan for Starlite Drive that was developed using Remix can be found on the next page.


Starlite Dr Concept Plan
Starlite Dr
Starlite Dr
Starlite Dr
Paint curb extension to provide visual cue and help prevent vehicles from turning too sharply.
Construct mid-block speed table to manage vehicle speed along the straightaway
Paint centerline along curves to visually define roadway and help keep vehicles in their lane and reduce speed
mapbox
© Mapbox © OpenStreetMap Improve this m

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NORTH CAROLINA

TRANSMITTAL **PLANNING DEPARTMENT**

DELIVERED VIA: ☒ *HAND* ☐ *MAIL* ☐ *FAX* ☒ *EMAIL*

To: **Carrboro Town Council**
David Andrews, Town Manager

From: **Zachary Hallock, Transportation Planner**

Date: **October 9, 2020**

Subject: **Specifications of potential bike share pilot program**

Below is a set of summary points which detail the specifications of a potential bike share pilot program. These details are based on staff conversations between Gotcha (the current bike share provider for UNC), the Town of Carrboro, the Town of Chapel Hill, and UNC Transportation & Parking who are currently working towards development of a contract for a system based on the structure outlined below. Staff are seeking feedback from Council to ensure that this structure meets Council's expectations and addresses the needs of the Carrboro community.

- **Pilot Overview**
  a. Gotcha would provide e-bikes and bike share parking infrastructure at no cost to the Towns
  b. Gotcha's revenue stream is derived from subscriptions, user fees, and advertisements on the bikes and parking.
     i. Advertisements will use the already established Chapel Hill Transit advertising rules and regulations.
  c. The bike share system which is proposed to operate within the Towns would be separate from the current bike share system which operates on UNC campus.
     i. This is a function of the fact that UNC still relies on older equipment that does not have an electric assist, and uses a dedicated Tar Heel Bikes smartphone app to access.
  d. Pilot program would last up to one year, at that point, the Towns could decide to extend or end the pilot.
     i. If ended, the Towns and UNC could decide if they want to collaborate and issue a separate RFP to select a bike share service provider for our area.

- **System Planning & Hub Locations**
  a. A total of around 100 bikes in the system spread across both Towns is the anticipated amount. There is expected to be 10 to 20 hub locations with about 10 bikes per hub.
  b. Gotcha uses data to identify hub locations: Commuter data, ½ mi walk distance, age demographics (avoiding kids due to requirements for app), bicycle counts, site planning, discussion with local staff, and other factors.

c. Hubs may be added or moved over the course of the pilot depending on demand and interest expressed from residents.
    i. Bikes may be added or removed from the system depending on demand
d. General hub zones, as shown on pages 4-6, (which are defined as an area in which at least one hub will be placed) will be included as part of the contract
    i. Detailed hub locations, shown on pages 7-10, also indicate a 500 ft, 1000 ft, and 1500 ft buffered around each hub to prevent excessive overlap and help establish coverage.
        1. These are in no means final locations and the pilot program may provide opportunity to adjust locations over time.
    ii. Gotcha has experience with ground leasing space from private entities if needed
    iii. A later phase program (during or after the pilot) could be used to expand the system if/when agreed upon
e. Specific details of hub location sites will be finalized once the contract is executed and site planning can begin.
    i. Based on conversations with the Zoning division, it is expected that the permit requirements for locating a bike share station would be an insignificant deviation or at most a minor modification to an existing permit.
        1. Staff will review and determine if the fees can be waived

- **Access and Payment Structure**
    a. Base use rate of $2 to unlock a bike, plus $0.10 per minute of riding.
    b. Monthly subscription rate of $9.99, includes unlimited rides of up to 1-hour in length.
    c. Any ride longer than the 1-hour threshold will be charged at the $0.10 per minute rate for any overage.
    d. Services are generally accessed via a smartphone app with a credit/debit account
    e. Gotcha system and smartphone application would only be useable by people over of 18.
        i. Payment can also be loaded onto a reusable card via cash or without using the app but this would need to be administered by the Towns
    f. Discounts to the base monthly rate can be subsidized by the Towns if desired for certain groups (town employees, lower-income residents, students, etc)
    g. A small amount of revenue sharing (approximately $0.03 per ride), for the Towns to dedicate to bicycle infrastructure, has been included in the contract.
        i. Gotcha no longer typically provides this sharing but, since this idea has been part of the conversation since we began discussing the pilot, they have allowed it to remain.

Additionally, a number of Town Code amendments are need to enable and regulate the operation of e-bikes, e-scooters, and shared active transportation systems, including a bike share system. These would include new definitions, exceptions to existing definitions, regulations permitting and prohibiting areas of operation, setting of speed limits, allowance of sidewalk sales, and regulation of parking within public rights of way. Another consideration is the application of the existing LUO when permitting bike share hub locations. Potential questions for Council to consider are outlined below.

- Within Chapter 6 (Motor Vehicles and Traffic) of the Town Code:

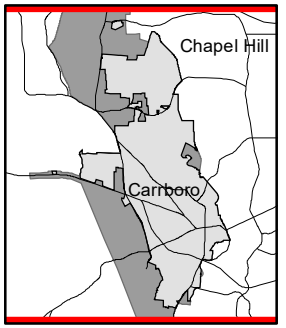
1. Consider creating a definition for Electric Bicycle (or e-bike)
2. Consider creating a definition for Electric Scooter (or e-scooter)
3. Within the definition of Motor Vehicle, consider adding exceptions for both Electric Bicycle and Electric Scooter
4. Consider creating a definition for Shared Active Transportation System (or SATS is a company or business which provides any bike-share or scooter-share service)
5. Consider creating a definition for Shared Device (any bicycle, e-bike, or e-scooter which belongs to a Shared Active Transportation System).
6. Where should Electric Bicycles, Electric Scooters, and Shared Devices be explicitly permitted to operate?
7. Where should Electric Bicycles, Electric Scooters, and Shared Devices be explicitly prohibited from operating?
8. What should the established speed limit for Electric Bicycles, Electric Scooters, and Shared Devices be, if not riding in a street with an established speed limit?
9. Other recommendations from Council

- Within Chapter 7 (Streets and Sidewalks) of the Town Code:
    1. Should an exception to sidewalk sales and obstructions related to Shared Active Transportation Systems be established, in order to allow them to operate?
    2. Should Shared Active Transportation Systems be allowed to operate within other places of the public rights of way?
    3. What should the rules for parking and storage of Shared Devices within the public right of way be?
    4. Other recommendations from Council

- LUO/Permits for locating Bike Share hubs
    1. What parts of existing ordinance should apply to permit?
        a. Bike Parking? Lighting? Other?
    2. What permits would be required for a bike share hub?
    2. Would a zoning permit be required for a hub located on public property?
    3. If a permit modification is required, it could be either an insignificant deviation or a minor modification.
    4. The Town could consider waiving permit fees for bike share hubs located on public properties in the contract with Gotcha.

Attachment D-4 of 10

Bikeshare Zones and Stations



N

Town Limits

Planning Jurisdiction

Streets

Historically Underserved Neighborhoods

Draft Bikeshare Zones

DRAFT

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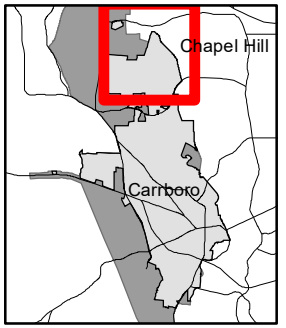
Attachment D-5 of 10

Bikeshare Zones and Stations



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Town Limits

Planning Jurisdiction

Streets

Historically Underserved Neighborhoods

Draft Bikeshare Zones

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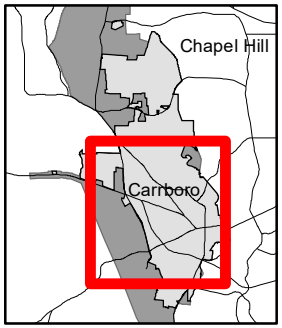
DRAFT

OLD NC 86
DROMOLAND
DUBLIN
EUBANKS
LEAK
MEADOW RUN
PRISCILLA
ROGERS
EDGAR
PUREFOY
SANDBERG
BUGLE
LIEGER
RUSCH
LAIR
BRENDAN
TALLYHO
KIT
REYNARD
HOUND
BRACE
HUNTSMAN
STAFFIELD
JUBILEE
SYLVAN
BILLABONG
LEGENDS
HOGAN HILLS
DAIRY GLEN
LONG MEADOWS
SHADOW RIDGE
DAIRY
BAY VIEW
FIELDS
LAKE HOGAN FARM
BURNS
HAWICK
CLAYMORE
STERLING BRIDGE
SKYE
COMMONS
HOGAN WOODS
CAMDEN
CELTIC
HIGH SCHOOL
HOMESTEAD
LAKE MANOR
LAKE RIDGE
STONY HILL
PIANO
CAMELLIA
RUSKIN
WINMORE

Attachment D-6 of 10

Bikeshare Zones and Stations



- Town Limits
- Planning Jurisdiction
- Streets
- Historically Underserved Neighborhoods
- Draft Bikeshare Zones

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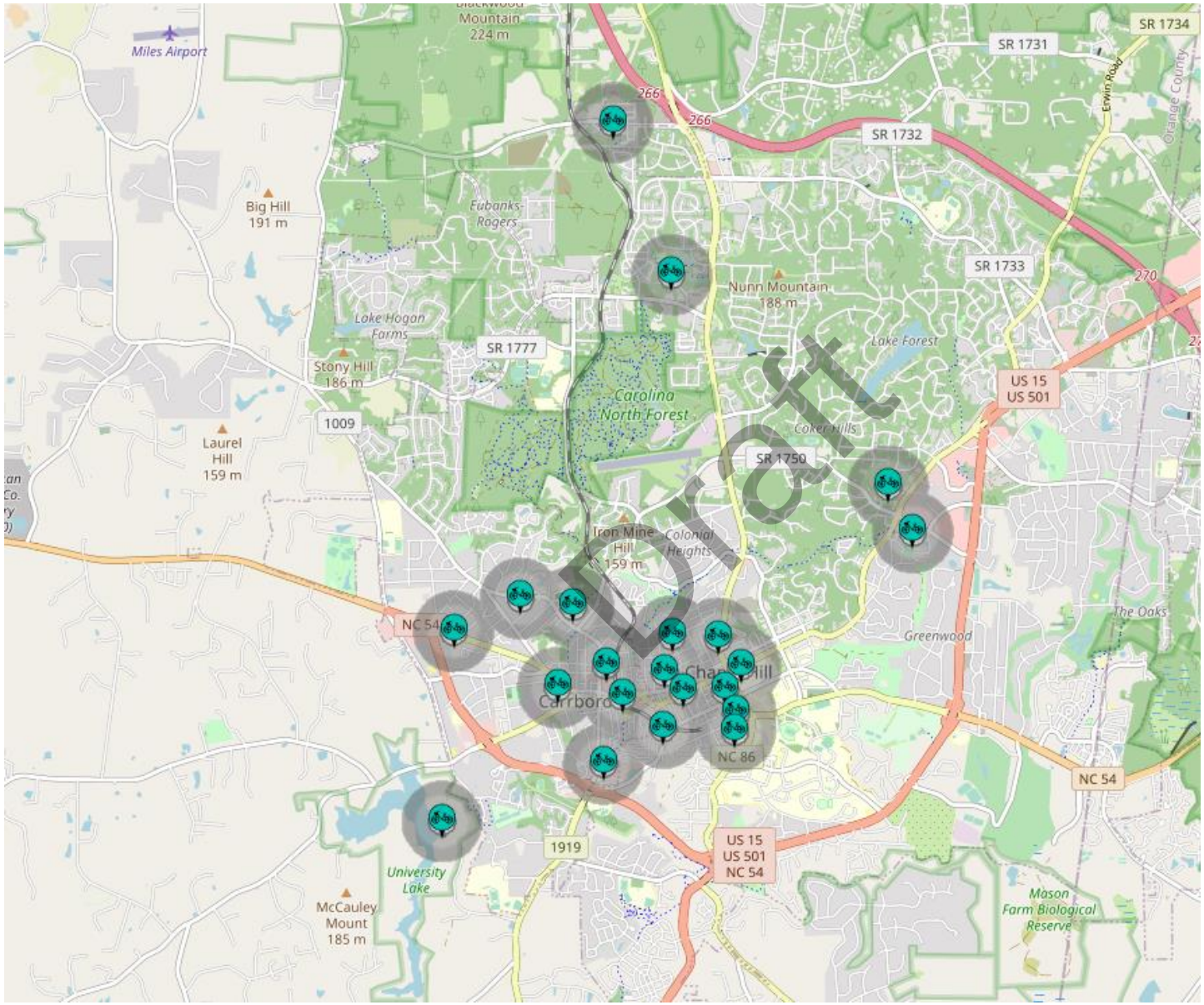
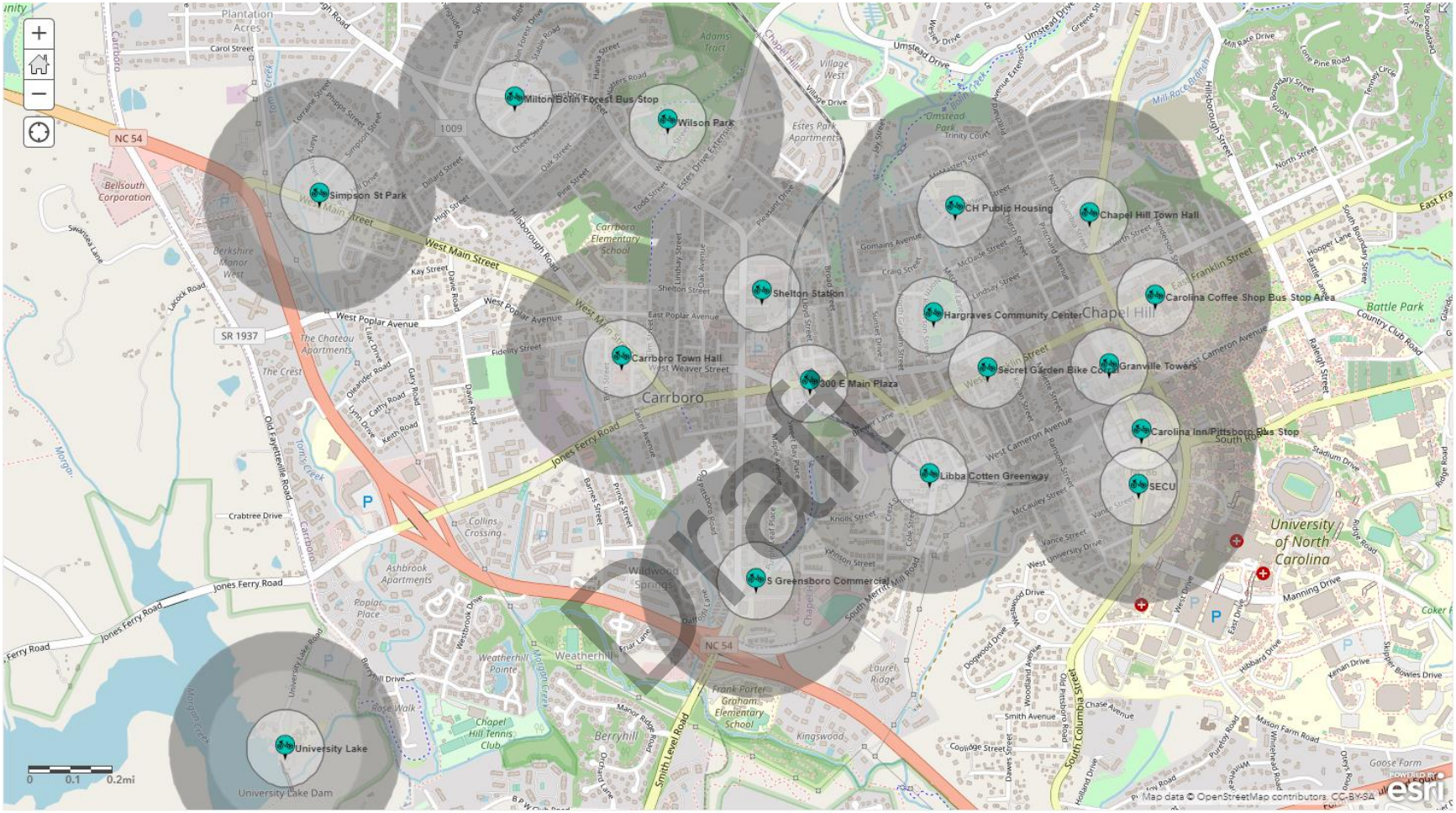
500ft, 1000ft, & 1500ft buffer around each zone of interest




Milton Bohn Forest Bus Stop
Wilson Park
Simpson St Park
CH Public Housing
Chapel Hill Town Hall
Shelton Station
Hargraves Community Center
Carolina Coffee Shop Bus Stop Area
Carrboro Town Hall
300 E Main Plaza
Secret Garden Bike Co
Granville Towers
Carolina Inn/Pittsboro Bus Stop
Libba Cotten Greenway
SECU
S Greensboro Commercial
University Lake
Carrboro
Chapel Hill
West Main Street
Jones Ferry Road
NC 54
SR 1937
West Poplar Avenue
Franklin Street
West Cameron Avenue
University of North Carolina
Draft
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Map data © OpenStreetMap contributors, CC-BY-SA
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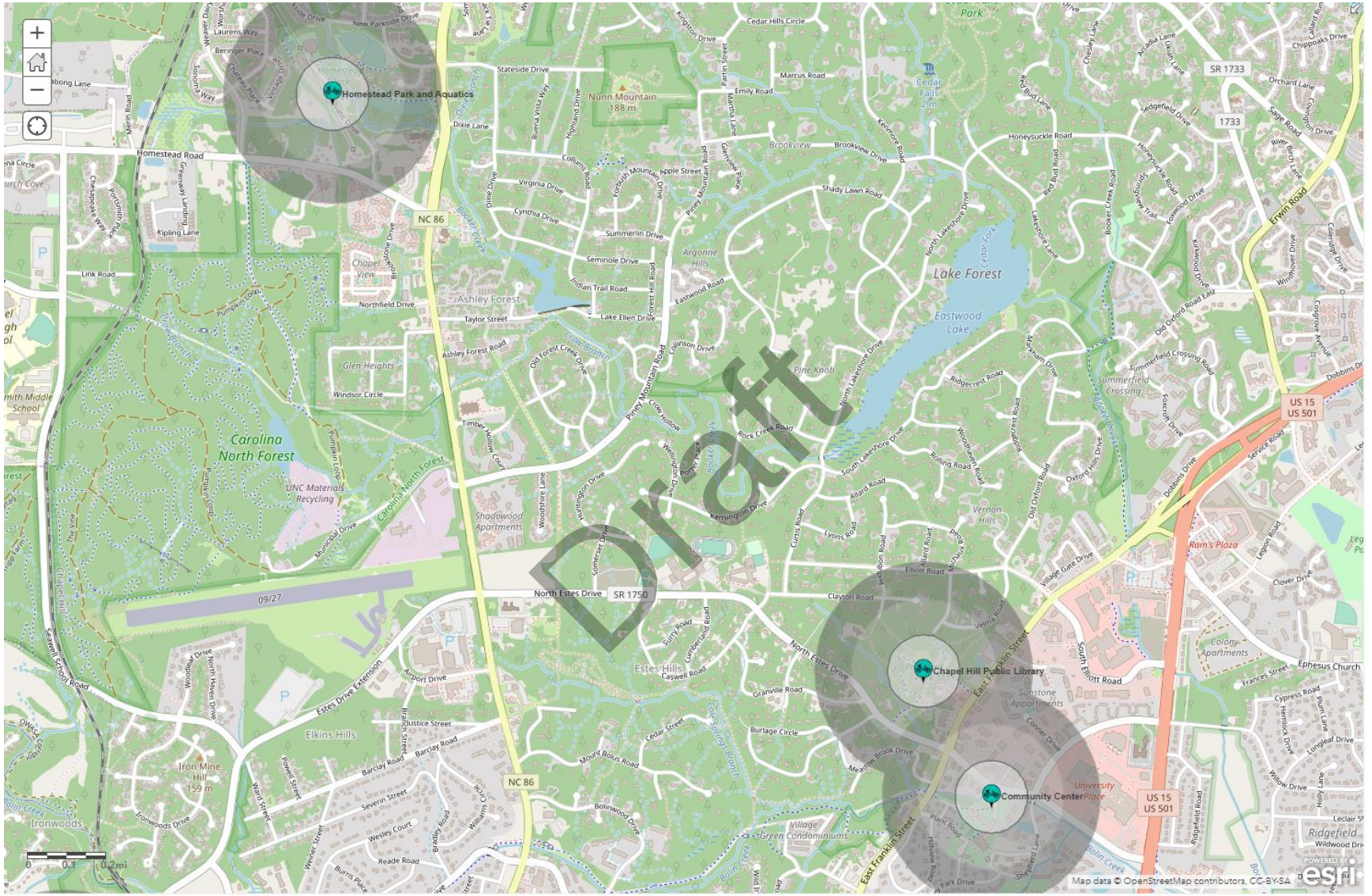
Homestead Park and Aquatics
Chapel Hill Public Library
Community Center
Draft
Homestead Road
NC 86
North Estes Drive
SR 1750
SR 1733
1733
US 15
US 501
Carolina North Forest
Ashley Forest
Lake Forest
Eastwood Lake
Nunn Mountain
188 m
Iron Mine Hill
159 m
Elkins Hills
Estes Hills
Vernon Hills
Ram's Plaza
Colony Apartments
Sunstone Apartments
Village Green Condominiums
Ridgefield
Ironwoods
Map data © OpenStreetMap contributors, CC-BY-SA
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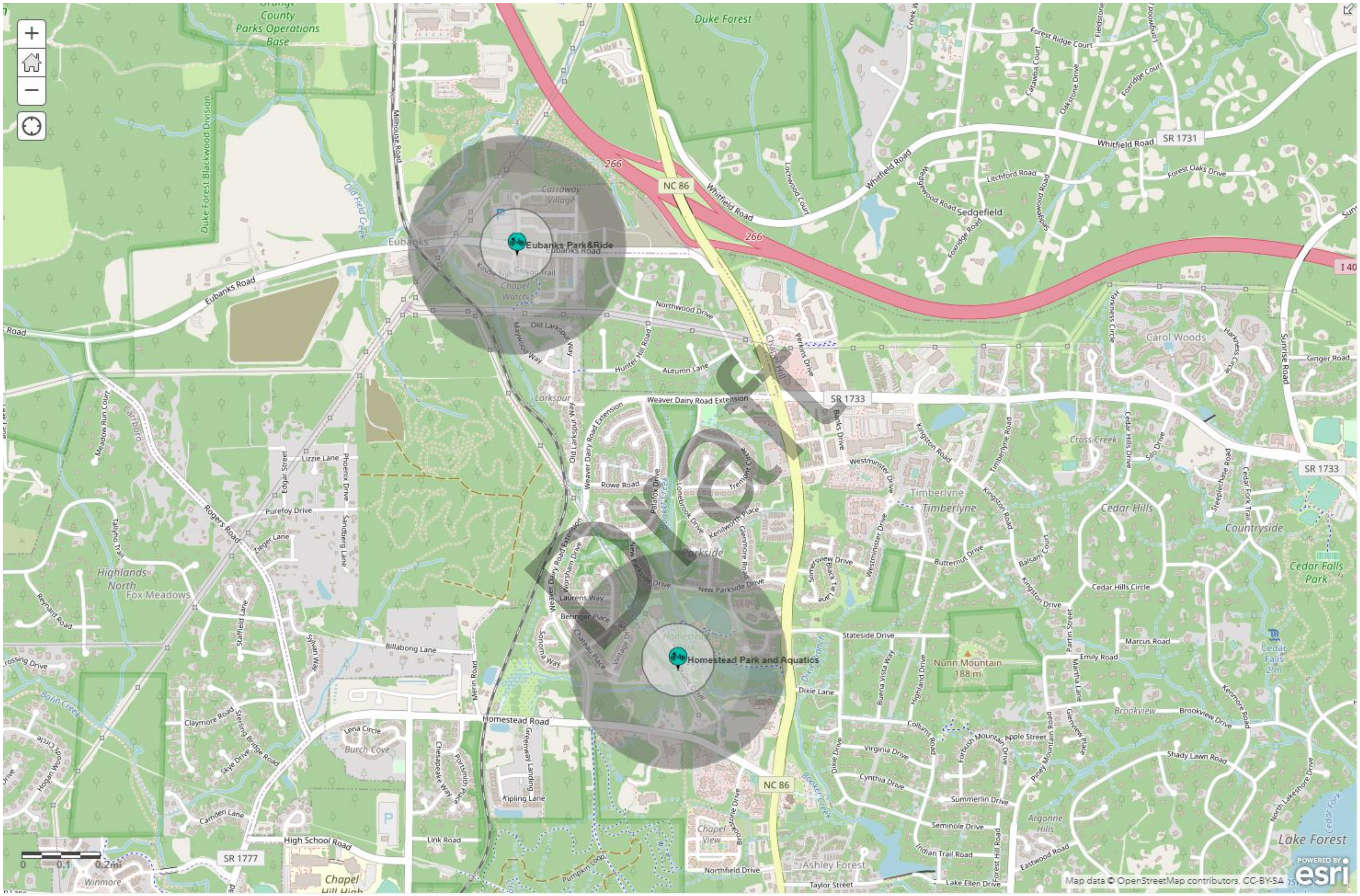
Eubanks Park&Ride
Homestead Park and Aquatics
Draft
Duke Forest
Orange County Parks Operations Base
Carraway Village
Chapel Watch
Larkspur
Parkside
Timberlyne
Cedar Hills
Countryside
Cedar Falls Park
Carol Woods
Sedgefield
Highlands North
Fox Meadows
Burch Cove
Chapel View
Ashley Forest
Brookview
Argonne Hills
Lake Forest
Nunn Mountain 188 m
Eubanks Road
Homestead Road
Weaver Dairy Road Extension
Whitfield Road
NC 86
I 40
266
SR 1733
SR 1731
SR 1777
High School Road
0 0.1 0.2mi
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TOWN OF CARRBORO

NORTH CAROLINA

TRANSMITTAL **PLANNING DEPARTMENT**

DELIVERED VIA: ☐ *HAND* ☐ *MAIL* ☐ *FAX* ☒ *EMAIL*

To: **David Andrews, Town Manager**
Mayor and Town Council

From: **Zachary Hallock, Transportation Planner**

Date: **October 9, 2020**

Subject: **Staff Recommendation for Speed Limit Setting on Unpaved Streets**

Summary

This document is intended to provide a summary of the staff recommendation for a process to setting speed limits on unpaved roads within the Town's jurisdiction. Review of available literature and state statues reveals there is limited guidance available, as most unpaved streets are rural and tend to have higher posted speed limits. Two sources have been used to guide consideration of speed limits: State Statutes, which regulate speed on unpaved streets (page 3) and EPA guidance on level of dust generation by average speed on unpaved streets (pages 4-6). This information was used in conjunction with an assessment of existing unpaved streets, considering length and posted speed limit, to recommend changes to minimize dust generation (page 7).

Report

In the fall of 2019, staff handled a request from a resident of Laughing Bird Lane requesting an establishment of a speed limit for that unpaved street. After consulting with residents along the street, the local preference for a speed limit of 15 MPH was established in the Town Code. More information can be found at:
https://carrboro.legistar.com/LegislationDetail.aspx?ID=4225140&GUID=DD854AF6-E6CD-4F2F-97D9-6CF48C2AB3E6

Staff have conducted additional research into guidance on the establishment of speed limits for unpaved streets. North Carolina statue does not set any statutory speed limits for unpaved roads, but does set them for roads within municipal boundaries. Volumes on unpaved streets tend to be lower and in some cases, speeds can be naturally traffic calmed due to the uneven nature of the

rough surface. Some states establish a statutory speed limit or other regulations on speed limit setting for unpaved roads, a summary of this information can be found on page 3.

The EPA provides research documenting the effects of average speed on particulate matter generation (dust) on unpaved streets and staff propose using this information to guide selection of speed limits. In summary, reducing the speed limit (or average speed) from 35 mph results in a change in dust generation of approximately -6% per every 5 mph reduction in average speed. The relevant excerpt from EPA research document can be found on pages 4-6 of this report and the full document is online at: https://www3.epa.gov/ttnchie1/ap42/ch13/bgdocs/b13s02-2.pdf

Based on the EPA research, the interest in mitigating dust generation, and the interest in promoting public safety staff will look at amending the Town Code for unpaved streets to reduce the speed limit to 25 MPH or lower, depending on the length of the street. The staff recommendations for posted speed limits for each unpaved street in Town can be found on page7 of this report. The residents of these streets will be consulted to determine if they have a preferred speed limit different from the staff recommendation, using a similar procedure to that when the speed limit on Laughing Bird Lane was changed in November of 2019. Staff plan to develop address lists for each street and mailing a survey requesting residents indicate their preferred posted speed of potential options (between 10 MPH & 25 MPH in increments of 5) with a pre-stamped envelope to return their feedback. Based on the community input received, staff will bring back town code amendments for individual streets to be approved by Council at a later date.

Summary of State Statues setting speed limits on unpaved roads

- Alabama: Statutory 35 MPH on unpaved roads (AL ST §32-5A-171)
- California: Statutory 55 MPH on two-lane undivided road, but cities may establish a speed limit on unpaved roads lower than the statutory speed limit in order to comply with air quality standards (CA Veh Code § 22365)
- Georgia: Statutory 35 MPH on unpaved roads (GA ST §40-6-181(b))
- Montana: Unpaved roads outside of urban areas cannot have a speed limit lower than 25 MPH (MT ST § 61-8-310(1)(c))
- North Dakota: 55 MPH on gravel, dirt or loose surface (NDCC§ 39-09-02(1))
- South Carolina: 40 MPH on unpaved roads (SC ST § 56-5-1520(B))
- Tennessee: School buses limited to 35 MPH on unpaved roads (TN ST § 49-6-2110(b))
- Vermont: Municipalities may set speed limits on an unpaved road no more than 50 MPH nor less than 35 MPH (VT ST Title 23 § 1007(a))
- Wyoming: 55 MPH on unpaved roads (WY ST § 31-5-301(b))

The following empirical expressions may be used to estimate the quantity in pounds (lb) of size-specific particulate emissions from an unpaved road, per vehicle mile traveled (VMT):

For vehicles traveling on unpaved surfaces at industrial sites, emissions are estimated from the following equation:

$$E = k\,(s/12)^a (W/3)^b \quad (1a)$$

The below equation is used to assess public roads

and, for vehicles traveling on publicly accessible roads, dominated by light duty vehicles, emissions may be estimated from the following:

$$E = \frac{k\,(s/12)^a (S/30)^d}{(M/0.5)^c} - C \quad (1b)$$

Holding all variables other than S and C constant, the equation simplifies to:
E = (S/30)^d - C
d is defined on page 5
C is defined on page 6

where k, a, b, c and d are empirical constants (Reference 6) given below and

E = size-specific emission factor (lb/VMT)
s = surface material silt content (%)
W = mean vehicle weight (tons)
M = surface material moisture content (%)
S = mean vehicle speed (mph)
C = emission factor for 1980's vehicle fleet exhaust, brake wear and tire wear.

The source characteristics s, W and M are referred to as correction parameters for adjusting the emission estimates to local conditions. The metric conversion from lb/VMT to grams (g) per vehicle kilometer traveled (VKT) is as follows:

1 lb/VMT = 281.9 g/VKT

The constants for Equations 1a and 1b based on the stated aerodynamic particle sizes are shown in Tables 13.2.2-2 and 13.2.2-4. The PM-2.5 particle size multipliers (k-factors) are taken from Reference 27.

Table 13.2.2-2. CONSTANTS FOR EQUATIONS 1a AND 1b

Constant	Industrial Roads (Equation 1a)			Public Roads (Equation 1b)		
	PM-2.5	PM-10	PM-30*	PM-2.5	PM-10	PM-30*
k (lb/VMT)	0.15	1.5	4.9	0.18	1.8	6.0
a	0.9	0.9	0.7	1	1	1
b	0.45	0.45	0.45	-	-	-
c	-	-	-	0.2	0.2	0.3
d	-	-	-	0.5	0.5	0.3
Quality Rating	B	B	B	B	B	B

*Assumed equivalent to total suspended particulate matter (TSP)
"-" = not used in the emission factor equation

Table 13.2.2-2 also contains the quality ratings for the various size-specific versions of Equation 1a and 1b. The equation retains the assigned quality rating, if applied within the ranges of source conditions, shown in Table 13.2.2-3, that were tested in developing the equation:

Table 13.2.2-3. RANGE OF SOURCE CONDITIONS USED IN DEVELOPING EQUATION 1a AND 1b

Emission Factor	Surface Silt Content, %	Mean Vehicle Weight		Mean Vehicle Speed		Mean No. of Wheels	Surface Moisture Content, %
		Mg	ton	km/hr	mph		
Industrial Roads (Equation 1a)	1.8-25.2	1.8-260	2-290	8-69	5-43	4-17[a]	0.03-13
Public Roads (Equation 1b)	1.8-35	1.4-2.7	1.5-3	16-88	10-55	4-4.8	0.03-13

[a] See discussion in text.

As noted earlier, the models presented as Equations 1a and 1b were developed from tests of traffic on unpaved surfaces. Unpaved roads have a hard, generally nonporous surface that usually dries quickly after a rainfall or watering, because of traffic-enhanced natural evaporation. (Factors influencing how fast a road dries are discussed in Section 13.2.2.3, below.) The quality ratings given above pertain to the mid-range of the measured source conditions for the equation. A higher mean vehicle weight and a higher than normal traffic rate may be justified when performing a worst-case analysis of emissions from unpaved roads.

The emission factors for the exhaust, brake wear and tire wear of a 1980's vehicle fleet (*C*) was obtained from EPA's MOBILE6.2 model [23]. The emission factor also varies with aerodynamic size range

as shown in Table 13.2.2-4

Table 13.2.2-4. EMISSION FACTOR FOR 1980'S VEHICLE FLEET EXHAUST, BRAKE WEAR AND TIRE WEAR

Particle Size Range[a]	*C*, Emission Factor for Exhaust, Brake Wear and Tire Wear[b] lb/VMT
$PM_{2.5}$	0.00036
PM_{10}	0.00047
PM_{30}[c]	0.00047

[a] Refers to airborne particulate matter (PM-x) with an aerodynamic diameter equal to or less than x micrometers.
[b] Units shown are pounds per vehicle mile traveled (lb/VMT).
[c] PM-30 is sometimes termed "suspendable particulate" (SP) and is often used as a surrogate for TSP.

It is important to note that the vehicle-related source conditions refer to the average weight, speed, and number of wheels for all vehicles traveling the road. For example, if 98 percent of traffic on the road are 2-ton cars and trucks while the remaining 2 percent consists of 20-ton trucks, then the mean weight is 2.4 tons. More specifically, Equations 1a and 1b are *not* intended to be used to calculate a separate emission factor for each vehicle class within a mix of traffic on a given unpaved road. That is, in the example, one should *not* determine one factor for the 2-ton vehicles and a second factor for the 20-ton trucks. Instead, only one emission factor should be calculated that represents the "fleet" average of 2.4 tons for all vehicles traveling the road.

Moreover, to retain the quality ratings when addressing a group of unpaved roads, it is necessary that reliable correction parameter values be determined for the road in question. The field and laboratory procedures for determining road surface silt and moisture contents are given in AP-42 Appendices C.1 and C.2. Vehicle-related parameters should be developed by recording visual observations of traffic. In some cases, vehicle parameters for industrial unpaved roads can be determined by reviewing maintenance records or other information sources at the facility.

In the event that site-specific values for correction parameters cannot be obtained, then default values may be used.In the absence of site-specific silt content information, an appropriate mean value from Table 13.2.2-1 may be used as a default value, but the quality rating of the equation is reduced by two letters. Because of significant differences found between different types of road surfaces and between different areas of the country, use of the default moisture content value of 0.5 percent in Equation 1b is discouraged. The quality rating should be downgraded two letters when the default moisture content value is used. (It is assumed that readers addressing industrial roads have access to the information needed to develop average vehicle information in Equation 1a for their facility.)

The effect of routine watering to control emissions from unpaved roads is discussed below in Section 13.2.2.3, “Controls”. However, all roads are subject to some natural mitigation because of rainfall and other precipitation. The Equation 1a and 1b emission factors can be extrapolated to annual

Established and Proposed Speed Limits for Unpaved Streets

Street Name	Current Speed Limit (MPH)	Length (Feet)	Proposed Speed Limit (MPH)	Dust reduction if speed limit changed (%)
OLD CEMETERY RD	35	229	10	-42%
BIKE ALLEY	10	300	10	N/A
BROAD ST	25	581	20	-9%
LAUGHING BIRD LN	15	394	15	N/A
DEER ST	25	1094	25	0%
ROBERTS ST	25	370	15	-20%
GOLDSTON DR	25	470	20	-9%
HUNTER PL	25	246	10	-32%
DILLARD ST	25	842	25	0%
BERT ST	25	487	20	-9%
PARKER ST*	25	427	15	-20%
RAINBOW DR	25	579	20	-9%
WATTERS RD	25	1267	25	0%
RAINBOW DR	25	411	15	-20%
COLSON ST	25	495	20	-9%
B ST	25	312	15	-20%
NEVILLE DR	25	341	15	-20%
HILLCREST AVE	35	598	20	-21%
DOVE ST	25	614	25	0%
HOSIERY ST	35	143	10	-42%

*GIS indicates NCDOT maintenance

No Town speed limit established, uses State Stautory speed limt

Low speed limit already established, will not change

EPA Dust Reduction Calculation

Average Speed (MPH)	Dust Reduction vs 35 MPH
10	-42%
15	-31%
20	-21%
25	-14%
30	-6%

Agenda Item Abstract

File Number:20-267

Agenda Date: 10/13/2020

File Type: Agendas

In Control: Board of Aldermen

Version: 1

TITLE:
Check-in on the Comprehensive Plan Process
PURPOSE: The purpose of this agenda item is to provide the Town Council with an update on the current process and progress of this effort.
DEPARTMENT: Planning

CONTACT INFORMATION: Patricia McGuire, 919-918-7327, pmcguire@townofcarrboro.org

INFORMATION: The Town's Comprehensive Planning process has begun! Carrboro Connects is its name and community engagement is its focus. With the assistance of Teska Associates, Inc., The Center for Neighborhood Technology and Lockamy Consulting Services, the Carrboro Connects Task Force met for the first time on September 17th in a videoconference.

Mayor Lydia Lavelle and Mayor Pro Tempore Barbara Foushee welcomed the task force. Chair Catherine Fray and Co-Chairs Quinton Harper and David Jessee relayed the task force's charge. And, Anita Jones-McNair oriented all to the Town's Race and Equity program. The group of 50 or so got right down to work. The second meeting of the task force is coming up on October 22.

Briefly, since the last project report in June, the following has been underway: interviews with 59 task force members, Town Council, Town staff in 22 virtual sessions (there are more to come!); data compilation, including map layers, statistics, existing plans and documents; research on issues and opportunities; development of project brand/logo and project website.

A plan summary, plan approach and team overview, and interview summary (*Attachments A-C*) are included. With this report, staff of the Town and Teska will present the project website, check in on the outreach strategies and plan, and outline the next steps. A town-website hosted page is available at

<http://www.townofcarrboro.org/2389/Town-of-Carrboro-Comprehensive-Plan>; the project website with full functionality is coming soon.

FISCAL & STAFF IMPACT: None noted with the Town Council receiving this report.

RECOMMENDATION: The staff recommends that the Town Council review the information on the process and respond with questions and/or directions.

CARRBORO CONNECTS

Creating a More Resilient, Inclusive, and Equitable Community

The Town of Carrboro is launching our first comprehensive plan in the Fall of 2020. The plan aims to involve all residents, organizations, businesses and other stakeholders from throughout the Town – from multiple generation families to students and new residents; from younger to older; all races, ethnicities and genders.

This plan is about our people, community and togetherness to form a vision and the tools to implement that vision. Whether it is addressing the urgency of climate change or overcoming the legacy of racial and ethnic barriers, this planning process aims to bring the spirit of our community together across a broad spectrum of interests, passion and expertise.

WHAT IS A COMPREHENSIVE PLAN?

A comprehensive plan provides a guide to coordinated, long-range growth and development. The plan will provide the goals, policies and projects to implement the Town's vision. The Town Council has laid out planning themes including climate action, addressing race and equity, economic sustainability and the need for affordable housing and addressing income inequality.

HOW CAN I GET INVOLVED?

- **Website:** Share ideas, map input, ask questions! A project website is being developed that will provide tools and guideposts on ways to become involved in the planning process. The website will include an interactive map for posting place-based input, a general idea board for sharing insights, and an evolving FAQ forum on plan topics: **www.CarrboroConnects.org**
- **Events**: Over the next 18 months a series of events are planned where you can make your voice heard. These will be a mix of virtual and in-person get togethers to ensure everyone can share in the way that is most comfortable to them!
- **Mix-Match**: In addition to online, in person and virtual events, there will also be opportunities to connect and share via Carrboro comment cards, focus groups, interviews, or simply by picking up the phone. No internet, no problem!

QUESTIONS/THOUGHTS/IDEAS? PLEASE CONTACT:

Patricia McGuire · Planning Director, Town of Carrboro, pmcguire@townofcarrboro.org (919) 918-7327
Scott Goldstein · Project Manager, Teska Associates, sgoldstein@TeskaAssociates.com (847) 563-9724

CARRBORO CONNECTS

Connecting People, Places, Environment and Equitable Opportunities

The Carrboro Connects Approach is based on equal parts community outreach, policy development and creative solutions. One of the main goals is to ensure everyone in Town has a chance to participate! The aim is to go beyond a typical planning process, to reach and inspire residents to form new relationships and deepen old ones. To instill a spirit where artists, students, residents, business owners, climate activists, and people of all races and ethnicities will feel comfortable listening, learning and crafting ideas together.

ABOUT THE PLANNING TEAM – TOWN OF CARRBORO

The plan is being coordinated out of the Planning, Zoning & Inspections Department. Patricia McGuire, Planning Director is leading the effort with the close cooperation of all of the Town's department heads and staff – from Recreation, Parks & Cultural Resources to Public Works to Economic Sustainability, Police, Fire and all other departments.

THE TESKA TEAM

Teska Associates, Inc. has been retained by the Town of Carrboro to lead the planning and community engagement efforts along with Lockamy Consulting and Center for Neighborhood Technology (CNT). Our team brings together both experience and a listening and learning approach to create a dynamic process that can lift up great ideas that come through outreach and offer tools, best practices and grounded research for those ideas to be implemented.

- **Teska Associates, Inc**. will manage the process and lead land use, economic sustainability, affordable housing aspects. Teska's experience in innovative planning, community development and urban design will bring a creative approach to both outreach and policy development.
- **Lockamy Consulting**, based out of Greensboro, will support community outreach.
- **Center for Neighborhood Technology (CNT)** will be leading environmental sustainability, transportation and infrastructure. As one of the leading non-profit organizations in the U.S. promoting livable and sustainable urban communities, CNT will bring innovative solutions that address climate change and race and equity to help fulfill the Town's vision.

FLIP THE PAGE TO MEET OUR TEAM MEMBERS

CARRBORO CONNECTS

Meet the Members of our Team
Teska · Lockamy · CNT

TESKA ASSOCIATES, INC.

Scott Goldstein FAICP LEED AP, a principal with deep experience in community and equitable development, will serve as project manager

Erin Cigliano AICP, principal, will lead community outreach strategy, technology and design for the plan

Francesca Sallinger, AICP and **Benito Garcia LEED AP BD+C** will help lead planning, data analysis and mapping

LOCKAMY CONSULTING

Teresa Lockamy has contributed to the success of local governments, institutions of higher learning, non-profit organizations for over 30 years, bringing her skills of active listening and problem solving to the team

CENTER FOR NEIGHBORHOOD TECHNOLOGY

Heidy Persaud, director of transportation equity, will lead CNT's team, brings experience in both multi-modal transportation policy and equitable planning and development

Marcella Bondie Keenan, a project manager, will lead climate resilience policy for the plan, bringing her experience in environmental consulting, academia and the non-profit sector

Drew Williams-Clark, managing director, urban resilience; **Jen McGraw,** director of sustainability innovation; and **Anna Wolf,** project manager, water and transportation, will bolster CNT's analytical and community solution-based approach

QUESTIONS/THOUGHTS/IDEAS? PLEASE CONTACT:

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Scott Goldstein · Project Manager, Teska Associates, sgoldstein@TeskaAssociates.com (847) 563-9724

Introduction

Carrboro Connects is being built on a foundation of community outreach. In order to frame out the issues and opportunities that will be explored in the comprehensive planning process, a series of twenty-two (22) virtual meetings were held over the summer of 2020. In small groups of three to five individuals, the consultant team and staff interviewed a total of 59 residents, representing a very broad range of expertise and perspectives. The interview questions covered everything from what people loved about Carrboro, why people move to Carrboro, what the Town's biggest challenges and opportunities are, and what people would most like to get out of the plan once it is completed. In addition, participants were asked for ideas for additional people to interview and get involved in Carrboro Connects (particularly those who may not already be involved in the Town).

Interviews, outreach, and other engagement techniques will continue to take place throughout the planning process, with a focus on giving everyone the chance to participate and be heard in the process. A list of everyone interviewed to date is included in the Appendix.

1. What do you love about Carrboro? What are its biggest assets?

"How the Town works to be inclusive, open to change and listens to new opinions." Transportation Advisory Board member

"It's always moving. We have a population that is always churning. Students, faculty. Quickly growing region." Town Council member

"I can walk out my door to Wilson Park, Carolina North. Connection to green space is important to me. I appreciate inclusivity, how outspoken and involved community members are." Stormwater Advisory Commission member

"We are a community that values community." Town Council member

"Carrboro is very different than 40 years ago and that was by design -- I was involved with the charrette from 20 years ago. Happy with what it has become and the fact that we have done so much of what we set out to do is such a wonderful thing. Very different than Chapel Hill – farmers, artists, creative types is such a wonderful thing. Our elected officials listen to us, if we have a complaint, they are on it. It's something you may not find in most towns." Carrboro Connects At-Large Task Force member

"I appreciate the walkability, accessibility of Carrboro, diversity of Carrboro. Moving here recently I was surprised how distinct Carrboro can be." Carrboro Connects At-Large Task Force member

"Carrboro has both the feel of being in and of N. Carolina and also being a very cosmopolitan approach, different from towns of a similar size. Carrboro has a lot of amenities and is close to amenities in Central Carolina." Planning Board member

2. Why do people choose to live in Carrboro?

"People are drawn to the sense of community, sense of place, I'm not saying we're perfect, but people are connected--during the current crisis people are trying to take care of each other." Town Council member

"I came here as a student but not considering moving [now] – the amenities here, and the small town feel -- choosing to stay for the accessibility." Stormwater Management Commission member

"Easy decision (not to leave). I was in the movement. All of my friends were moving north. I am going to stay here and change Carrboro. A lot of people come to Carrboro because they feel comfortable. Not many instances where neighbors make people feel uncomfortable in Carrboro. That's not who we are." Planning Board member

"I love it here. Everything that my children need--they could ride to town, Franklin St. I feel comfortable, I walk everywhere." Planning Board member

"I grew up here. Carrboro has changed so much, was a blue collar mill town until 1980s, transformed to eclectic environment with all different types of people living here. Carrboro has adapted well to changing demographics and not tried to stay stuck in time. Welcoming community for people who have lived here their entire lives and for people who have just moved here." Business owner

"Came to the South to go to UNC as a grad student--Carrboro was where grad students lived. It has grown quite a bit, and it's the link to the university that gives a huge vitality, generates different, interesting people, easy living, walking, riding bikes, excellent schools." Planning Board member

"Very diverse group here in Carrboro, we are in a transitional period, very important for towns to look ahead, not just 20 years but 100 years to reorient our economy to a repair economy rather than a use and throw away economy." Retired professor

"People who live in Carrboro have made a very distinct decision to live in Carrboro." Business owner

3. What keywords would you use to describe Carrboro?

4. Where would you bring out-of-towners to get a real sense of the community?

"Places like the Farmer's Market and Weaver Street, are they accessible to everyone? What do we mean for a real sense of community?" Transportation Advisory Board member

"We're not just downtown." Town Council member

"Diverse community--like that it is walkable in urban area, with easy access to suburban area. Like locally owned businesses, concept of infill in downtown area is smart, provides more opportunity to live and take advantage of downtown, Music Fest, Arts Fest." Appearance Commission member

5. What do you see as the main opportunities in Carrboro today?

Community and Place

Indoor community spaces

More integration of Weaver St. Market / Lawn

"Utilizing younger folks to build on the Town's representation, progressiveness. Carrboro is already most progressive in NC, but lots of young people starting their careers--living here can be expensive, could drive people to live somewhere else. Encouraging homeownership for younger folks to highlight the DNA of the town." Planning board member

"Get the community involved in strategic planning, this plan, more input from residents." Appearance Commission member

"Need to attract people in through beauty." Appearance Commission member

"Jones Ferry Corridor - entry point from 54 that ties to downtown is not as developed and could tie different parts of town together." Economic Sustainability Commission member

"Scale – promote more density in limited geographic places." Town staff

Affordable Housing

"Increase and build density in the downtown to address affordability in Carrboro. Number of new houses spring up that are large single-family homes--opportunity to think about different types of residences." Carrboro Connects At-Large Task Force member

"See more opportunities for more housing downtown, 3-, 4- or 5-story--would love to see condos." Economic Sustainability Commission member

"Housing is the biggest challenge, we have a serious problem with affordable housing--really strong will to talk about affordable housing as a value statement, but when it comes to building a new development, we see another side of these neighborhoods come out. Sometimes NIMBYism, but it can be 'I want housing, but not that kind of housing.' I've seen developments strangled by neighborhood complaints. When homeowners come out, they get listened to. Carrboro is getting whiter. The space is getting narrowed." Planning Board member

"Changing parameters of density bonus and expedited review." Developer

Economic Sustainability

Opportunity for redevelopment

Viable, new investment

Fostering small businesses to work together

High Quality Restaurants, Restaurants in general

Lloyd Farm--connect to downtown

Local Business Start-up

"Business opportunity, maintain the balance of property taxes, residential v. commercial." Town Council member

"Researching the future of work--a lot of the work from home, lots of jobs that can be done remotely, broader pool of employees. We are a place that can have smaller office buildings that could be headquarters. We draw innovative people because of our progressive politics. When this crisis is over, we are going to be in a good position to capture." Town Council member

"This new normal, might become the normal (working from home)--do we need this entire building? We do have space in Carrboro for that--there was a co-working space that is going to close, the rent was expensive. Start-ups don't need to be downtown where properties are expensive." Town Council member

"Opportunities for development, where strategic areas are for change. So much of jurisdiction is developed. Rural buffer restricts development, new development needs to be

infill or displace something that is existing. Don't want to see gentrification take over all of Carrboro." Carrboro Connects At-Large Task Force member

"Breathe some new life into different parts of Carrboro--do it in a very thoughtful way, maintain the feel of Carrboro, but there are opportunities to do it right," Business Owner

Climate Change

"Very concerned about climate action, given our scale we are supposed to be more nimble. Can imagine a solely bikeable, walkable, transit downtown, aligning ourselves with the science to mitigate climate change in 10 year window--ramping up electric vehicles, solarizing, composting, transportation demand management, aligning ourselves with a necessary future." Town Council member

"New green deal--bring in new live work spaces, small weatherization business, solar panel installation business, businesses that work in triple bottom line. Revolving loan funds can support, support incubation of tech industry, 203 project has opportunity to expand to fourth floor to have more space. Move from restaurant and entertainment destination to those opportunities that are more resilient. What does resiliency look like in the long term?" Town Council member

Race and Equity

"We can think about a phase of reimagining some of the structures we are under--Town Council already thinks proactively. Form a Racial and Gender Justice Initiative, create a budget to compensate for expertise. Are we capturing everyone's voice?" Greenways Commission member

"Opportunity to be a leader on the forefront of issues on diversity and inclusion." Carrboro Connects At-Large Task Force member

Recreation, Parks and Culture

Promote more music & arts

Engaging minority owned businesses

Improved trail marks, attract people to visit Carrboro to enjoy the outdoors

"Need for more in-town public usage space, for multi-use activities." Carrboro Connects At-Large Task Force member

"Arts Center – listen to what different communities want, need. What are their priorities? How can I have the most impact with the budget I have." Organization executive

6. What challenges exist? What needs to be improved?

Community and Place

"Almost everything has trade-offs, environmental impacts, housing impacts. The challenge is how to make progress and not close the gate to newcomers." Department Head

"Carrboro needs to be redeveloping, stay current, cool place to be. Challenge is to keep the community affordable for residential and commercial [while doing this]." Town Manager

"Carrboro is rigorous (for development approval). I wish people had a better understanding of the relationship between not wanting to pay high property taxes but not wanting more development." Town Council member

"Broadband is very spotty, my friends say 'I may not make it some days.' We live in a technology-oriented way." Connor Lopez, Youth Advisory Board member

"I've been on that divide soapbox. You can't just annex - you need to get people engaged. The divide is deep. I'm worried – invisible challenge – our false sense of inclusivity." Department Head

"Update how zoning works." Town Council member

"Totally rethink the planning process--current land use plan, need to simplify land use planning, set the goals and not be as prescriptive. Give the creative license without being so prescriptive." Developer

Affordable Housing

"Housing that is being built is very expensive," Town Council member

"Gentrification – we have lots of very expensive homes, apartments are getting expensive, we make an effort to address the needs of lower-income people, but middle class ignored. We're going to have wealthy liberals to make an effort to take care of poor people. The cooler we become the less I can afford to live here." Town Council member

"Affordable housing, not just for low income, but missing middle. Have larger scale of townhomes, triplexes, but super-high demand, a lot is owned by leasing companies, college oriented market, difficult to retain families who may want to buy, not rent." Town Council member

"Some of our neighborhoods are being gentrified. Don't think there is anything we can do to prevent that. But can we contain it. Especially lower income residents and people who have lived here for generations. Having more housing options." AHAC member

"Biggest challenges are cost of land and time. Rents are going up; wages are not." Department Head

"People here always say that diversity is important but we need to do more about affordable housing and access." Planning Board member

"Housing that is affordable. Most [people who work for the Town] have to move further out when many would like to live closer." Department Head

Economic Sustainability

"Resources of a small town, expectations of a major city." Planning Board member

"Concern of COVID recovery with restaurants." Town Council member

"Postponement of care and maintenance of facilities, tension of how to spend money." Town Council member

"No big businesses--manufacturing to bring the taxes down." Planning Board member

[Strong sources of revenue] Property tax and sales tax, [and the] pandemic cut into sales tax." Department Head

Climate Change

"Getting an understanding of the emergency that is leading to demanding change at a regular level--prioritizing our budget so we are implementing emergency action. Setting up a plan that addresses this emergency. We are not there politically. Especially with COVID we are more atomized. So many other issues that can easily distract. Opportunity to get a sense of interconnectedness of everything." Town Council member

"Fundamentally it is our sense of understanding connection, there's a danger in advancing one without the other (climate change and racial equity). Are we talking about what we mean about equity for a different type of system? We need to get a sense of what is life giving and align our actions with that--maximizing walkability, addressing all of these interconnected things while respecting the bioregion." Town Council member

Race and Equity

"Voices of all Colors are Heard," Carrboro Connects At-Large Task Force member

"How to connect and communicate with minority-owned businesses." Department Head

"Some issues are countywide – will be more resources for more solutions if Carrboro can work with Orange Co, Chapel Hill, Hillsborough." Economic Sustainability Commission member

"A lot of our citizens don't feel comfortable, competent to sit and talk with some folks. I don't care who it is. You can leave that degree at the door. You should be talking with citizens, about things that interest them. You gotta come. You gotta be heard. If you are staying in some areas of town, people feel like if you stay in an apartment you don't have a voice. That's not true. They gotta hear you, feel what you feel." Braxton Foushee, Planning Board member

Recreation, Parks and Culture

"Limited park space" Department Head

"Limited outdoor access" Carrboro Connects At Large Task Force member

Transportation and Infrastructure

"Would like to see more walkability. Don't want things like storage facilities--pockets of places designed for students to store things rather than places for culture, arts, venues." Planning Board member

"Public works is in a flood zone--huge flood 2 years ago." Town Staff

7. What are challenges facing racial, ethnic and income barriers in Carrboro?

"A lot of diverse people would feel welcome but can't afford it." Planning Board member

"Historically African American neighborhoods have been gentrified. Some families have continued to live there. There is no draw for minority communities downtown. I see people at Cook's Meat Market. You're not going to see Black Latinx. Not the type of establishments we frequent. They'll go to Chapel Hill. They'll go to Durham, Raleigh." Town Council member

"Dual pandemics: more obvious than ever before that we have to do something," Department Head

"We do not want to have outcomes determined on race. We have a fundamental commitment to do things differently." Department Head

"Engagement fatigue rooted in historical experience--what it means for certain groups to engage, and feel like they have or haven't been heard. A lot of the time groups get tokenized and that turns people off from participating. We tend to keep going back to the same people rather than authentically communicating. Trying to be more intentional from the very get go in steering the project." Town Council member

"We are living at a time of understanding systemic nature, the way in which historically marginalized have been disinvested from growth. Asheville through reparations. If people are too busy to make ends meet, they don't have the time/energy to engage. Starting to address through police transformation, thinking about community health rather than band aids. Cultural mindset of how we think about things. We've been treating our planet how we have treated people – enslaved people. All levels need to change and change the mindset of what we see, creating space for provision of fundamental needs." Town Council member

"Building on premise of how to best serve the community, looking at racial equity tools and starting to roll out the work now, such as the community ambassador program and listening sessions with minority-owned businesses." Department Head

"In many instances there is a language barrier, education barrier. People feel like they have to have a certain level of education to participate on these boards. Be mindful of who we want to be involved, and we can get people who have been here for decades but felt they didn't have a degree in the U.S. so they "weren't qualified." Eliazar Posada, Planning Board member

"There have been many attempts to connect, but the efforts were not uniform. There are structural barriers that need to be overcome. Organization is important to elevate the issues [and be able to follow-through]." Department Head

"Huge divide between white communities and communities of color. Huge part is transportation, huge food access issues, still have food insecurities." Recreation and Parks Advisory Board member

"We need to make sure people feel comfortable participating in government. One of the things that makes people feel comfortable is when people look like them. It takes a more hands-on approach and targeted messages." Town Council member

"What's important to minority businesses – we need to ask rather than rely on assumptions" Department Head

"We need to find non-traditional ways for communication, from yard signs to electronic message boards, to radio programs, posters hung on telephone poles, and other ways." Department Head

"Consider a stipend for people of lower resources to participate in advisory commissions" Town Council member

"Topography leads down to Hwy 54, but physical barriers to accessing downtown, lack of sidewalks, wooded areas, no paths, barrier to NOAH...can't safely walk downtown." Transportation Advisory Board member

"Work with the County, Chapel Hill so that everyone who is homeless has some game plan to end homelessness. Haven't addressed the needs. Mobilizing engagement by going to the neighborhoods. Need to be improved to trust again in government. How do we make sure people are spending your dollars as they need to be spent." Department Head

8. What do you think should be Carrboro's main priorities over the next 5-10 years?

Community and Place

"Housing, race, equity, diversity, inclusion, climate change, environmental justice, bold moves we are making that deal with race, equity, diversity, inclusion. Housing – we missed the mark. We have a lot of high-end homes. We don't have enough affordable housing, workforce housing, middle-class housing." Town Council member

"Opportunity to have a plan – sets out certain expectations of different types of housing types, addressing affordability, making it possible to live in Carrboro, shifting expectations of land use ordinance for how residential and commercial development, affects access, environmental impacts." Town Council member

"We have seen a lot of changes in Carrboro. Plan for ecological impacts, opportunities for retrofitting built out areas of Carrboro, improve stormwater management, ecological health, impacts on property--flooding correlates with property values." Stormwater Advisory Commission

"Inclusive and diverse representation at all levels of government, affordable housing, and climate change." Planning Board member

"Build relationships with new people and new faces. There is a monolith of thinking that all people need the same things. We need to have a mix of people." Soteria Shepperson, Carrboro Connects At-large Task Force Member

Affordable Housing

"Full range of housing, not just low-income and high-income so that a middle-class couple or family doesn't have to qualify for some program to find a place they can afford to live. Preserve our natural infrastructure, our forest and our trees. Need to redouble efforts to be more inclusive community. It's a lot more progressive--a lot less racist on paper but sure is a lot whiter. Include everybody when we say inclusive. We are good with LGBTQ rights. We need to make sure Black rights are just as strong and just as focused." Town Council member

"Maximize limited land availability." Department Head

"Look for opportunities to add affordable housing to existing developments, such as along Highway 54." Department Head

"Provide incentives for more affordable units." Economic Sustainability Commission member

"Would love to have a housing bond."

"When we do weatherization, are there ways to keep property affordable?" Department Head

"Expand affordable housing along transit corridors." Department Head

"Expand tools of Community Home Trust." Town Staff

"Build more affordable units, Town has some land, I would like to see that developed as affordable units--town already owns the land." Department Head

"Housing – have our hands tied into terms of NC laws, but should encourage developers to bring forth affordable housing, should continue to provide social services, food pantry – new building downtown." Town Council member

Economic Sustainability

"Keyword is sustainability and the breadth of what that can mean--environment, sustainable tax base, sustainable people. Those who want to live in Carrboro can live in Carrboro." Department Head

"Expansion is a huge issue, we want a small community but needs to be financially viable, so how does growth happen, needs to be a limit on growth." Carrboro Connects At-Large Task Force Member

"Shore up small business community and broaden tax base benefit of maintaining diversity. Limit displacement of long-term residents from gentrification. Develop dense nodes that would be walkable, bikeable, accessible to transport." Town Council member

"Renovating Town buildings--more space or more efficient space. Annual Budget." Town Council member

Climate Change

"We need to sustain in a systematic way rather than one-off projects." Town Council member

"Biophilic city – urban nature and green strategies." Town Council member

"Climate change - awareness, momentum, a big part is a grassroots effort, talking to neighbors about climate, how we as a town can facilitate these conversations, find the resources they need, especially in post COVID world. Had great successes with volunteer initiatives, clean-up in streams. What can we as a Town do to focus on solutions?" Town staff

"Come up with more certainty of how our Town will grow. Implement the Climate Action Plan to interface with everything we do and promote an equity agenda in everything we do." Town Council member

Race and Equity

"Helping to support the minority business community." Department Head

"Dismantling systemic racism takes time, but if we have things that are present and harmful to working towards that then we should look at those (street names, statues, etc.). Carrboro Connects At-Large Task Force member

"Take a racial equity lens in every move that we make—Carrboro may need to get uncomfortable to actually grow." Carrboro Connects At-Large Task Force member

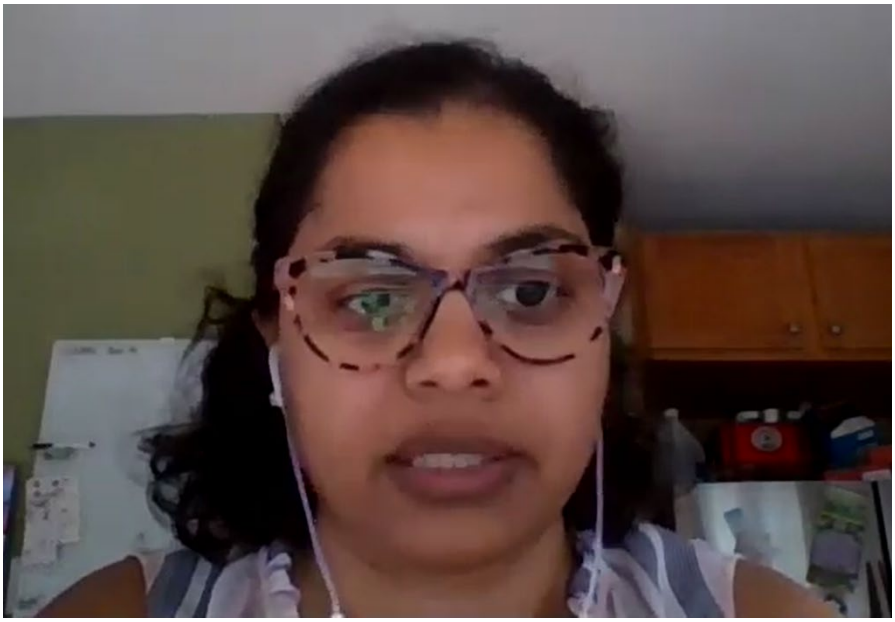
Transportation and Infrastructure

"No more budget into lane expansions, needs to go into improving bike and pedestrian." Transportation Advisory Board member

"Improving green infrastructure." Greenways Commission member

"Improving bus stops." Greenways Commission member

"Like our environment to stay clean, country living, not being the storage facility for Chapel Hill. Need the outdoor spaces, less traffic." Town Council member



"We have a transportation problem, not a parking problem. I'd love to take a look at the way we get around without needing a car, make that safer for people, make people aware that it's the preferred method." Abi Raja, Carrboro Connects At-Large Task Force member

"Look to mobilize our effort – get people to know people – Burmese, Latinx, Tin Top, Old Mill Communities, go to the people and have 6 foot distanced conversations. Engaging only through Zoom isn't going to work, a lot of people are not available on Zoom." Carrboro Connects At-Large Task Force member

9. What would you most like to get out of the Plan once it is complete?

"People come to ask what we want them to do and our Council can't tell. Have more definitive guidance to give persons who want to expand. Use flexible tools that we can use in NC." Town Council member

"Inclusive and equitable plan along racial and ethnic lines, along with deep community engagement. Goes to corralling as many voices as possible." Town Council member

"I'm excited for the Comp Plan to shape the future that is consistent with the values we have as a community." Town Council member

"Ask what is it that you can't find in Carrboro? [We should have] opportunities to be able to do everything you need to do in Carrboro." AHAC member

"Appetite for more defined goals for where we want to be in next 10,20, or 30 years. Opportunity to define areas we want to preserve, areas we want to grow more dense, where we want affordable housing, encourage mixed-use. Create more of a degree of certainty for people who come to us." Town Council member

"In order to reach the vision we have set--monitoring, evaluation and learning plan. Not being afraid to undo what we have done before." Stormwater Advisory Commission member

"Centralized place where everything you need is located, we have so many different plans, created by different bodies of people. Makes our work as staff more difficult."

"Shorter meetings – get people involved in the plan, they would have more sense of what people want, may inform the hearing process."

"I want it to be a comprehensive plan--touch all areas of the town, somehow we will have heard from voices we haven't heard before. Plan to encourage developers to build the kind of units that are missing." Planning Board member

"Best practices for inclusion of affordable housing--how to get developers onboard." Economic Sustainability Commission member

"Plan should enumerate what type of community we want to be. Goal of eventually becoming 80,000 people. How do we do that? We go up, we become dense. Think longer range view. We don't have a whole lot to work with." Former Professor

"Decide what Carrboro wants to be and where it can happen. Need to have a reasonable expectation of what can be approved." Developer

"What downtown needs to be is a beacon of activity, that people crave to go and experience. If you are in the suburban area, there needs be a better link to the downtown. Parking is also essential. Once suburban kids get out of school, neighboring counties with lower taxes are attractive to aging parents. The attractiveness of downtown must be maintained." David Markiewicz, Appearance Commission

Who else should be involved? Think about who isn't usually heard from. How do we reach them?

Youth – through the schools, Youth Council

Immigrant groups, Burmese community, important to go to them rather than expect people to come to a meeting

El Centro, Refugee Support Center

Reach out to apartment buildings along 54

Contact the Truth Plaque Committee members – there are years of experience among them

Coordinate with the new Community Ambassadors program

It's a priority to reach out to minority businesses

"Speak to real people. Not just who is most active." Town Council member

"Focus on actionable items that make a difference after talking to people and facilitating meetings," Department Head

"Make sure to get to all of the neighborhoods from Northside, Rogers Road, Weather Hill, Wildwood, bottom of Smith Level," Town Council member

Faith centers and churches

People who invest in Carrboro

Community Works – youth focused non-profit, community members where English is not first language

Orange County literacy center

Orange County Affordable Housing Commission

Carrboro Business Alliance

Yard signs, electronic message boards, posters hung on telephone polls

Local radio show, work with Mayor who is on weekly

"Success of the plan will depend on significant participation by all members of the community," Department Head

Appendix: Interviews To Date (as of September 4, 2020)

Catherine Adamson Fray, Planning Board

David Andrews, Town Manager

Sara Brown, Transportation Advisory Board

Rebecca Buzzard, Project Manager

Wamiq Chowdhury, Comprehensive Plan Task Force

David Dixon, Comprehensive Plan Task Force

Randy Dodd, Stormwater Utility

Cathy Dorando, Town Clerk

Julie Ecenrode, HR Director

Eliazar Eposada, Planning Board

Miles Fitch, Business

Braxton Foushee, Planning Board

Barbara Foushee, Town Council

Maggie Funkhouser, Rec and Parks Advisory Board

Rachel Gaylord-Miles, Planning Board

Jackie Gist, Town Council

Joe Guckavan Director

Zach Hallock, Planning

Jon Hartmen-Brown, Economic Development Director

Randee Haven. Council Member

Jackie Helvey, Carrboro Connects Task Force

Mariela Hernandez, Orange County Health Department

Walter Horton, Police Chief

Laura Janway, Planning

David Jesse, Economic Sustainability Commission

Lauren Joca, Stormwater Advisory Commission

Lydia Lavelle, Mayor

Connor Lopez, Comprehensive Plan Task Force

Elmira Mangum. Planning Board

David Markiewicz, Comprehensive Plan Task Force

Daniel Mayer, Econ Sustainability, Arts and Tourism Commission

Anita Jones-McNair, Recreation, Parks and Culture Director

Cary McNallan, Finance Director

Tina Moon, Planning

Mark Moshier, Business

Jim Porto, Business

Eliazar Posada, Planning Board

Abirami Raja, Carrboro Connects Task Force

Susan Romaine, Council Member

Marty Roupe, Public Works

David Schmidt, Fire Chief

Elizabeth Scott Bertram, Interim Dept. Head

Damon Seils, Town Council

Soteria Shepperson, Comprehensive Plan Task Force

Amy Singleton, Affordable Housing Advisory Commission

Sammy Slade, Town Council

Dan Snipes, Superintendent

Jackie Thompson, Comprehensive Plan Task Force

Anahid Vrana, Northern Transition Area Advisory Commission

Alyson West, Greenways Commission