

VT Utility Master Plan: 2047 Campus Plan and Climate Action Commitment Workshop

May 2, 2023





UMP Phases & Schedule

Virginia Tech Utilities Master Plan - Preliminary Project Roadmap

Updated: January 31, 2023

Description of Services																		
	Jan-23	Feb-23	Mar-23	Apr-23	May-23	Jun-23	Jul-23	Aug-23	Sep-23	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24
Field Investigation / Kickoffs			2	2														
Existing Conditions Reports								3										
Update Operational Dwgs.																		
Computer Modeling																		
Load Projections							4											
Eval Service Failure Risks																		
Eval Technical Opportunities																		
Master Plan Proj Development			'								16	6		7				
Draft Master Plan																8		
Final Master Plan																		9
Cost Estimating Support																		
Meetings and Workshops																		
Climate Action Workshops										5	[5]	5						
	PHASE 1 - KICKOFF AND DATA GATHERING																	
						PHASE	2 - EXISTING	G										

CONDITIONS ASSESSMENT

PHASE 3 - ANALYSIS AND FUTURE STATE PROJECTIONS

PHASE 4 - MASTER PLANNING PROCESS

1	Project Kickoff Meetings	Introductions, Logistics, and Planning
2	Existing Conditions Workshops	Interviews with Stakeholders to review existing conditions for the various utilities
3	30% Review Meeting	Review workshop to go over the Existing Conditions Report

4	Master Plan 2047 Review	Team briefing with the Office of University Planning
5	Climate Action Workshops	- Decarbonizing Workshop - Air Emissions Workshop - Measures of Success Workshop
6	Project Development Workshops	Collaboration with Stakeholders to help develop the slate of Master Plan projects

7	Concept Vetting Workshops	Review of draft projects with stakeholders to refine, accept, or reject proposed projects
8	90% Review Meeting	Review of the preliminary Master Plan documents and materials
9	100% Plan Presentation	Presentation of the final Plan to stakeholders and administration









Theme: Aligning the UMP with the 2047 and CAC plans.

Agenda: 9:00 to 9:15 – Matt Stolte: Introductions and Background

9:15 to 10:00 – Liza Morris: 2047 Campus Plan presentation

10:00 to 10:10 – break

10:10 to 10:50 – Nam Nguyen: Climate Action Commitment presentation

10:50 to 11:00 – break

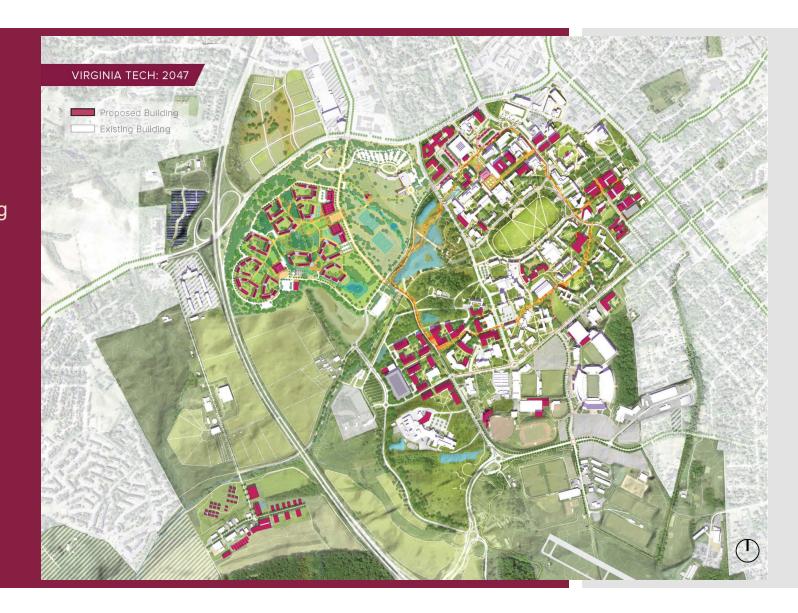
11:00 to 12:00 – Working Group Q&A – Wiley & Wilson



2047 Campus Plan

Liza Morris –

Assistant Vice President for Planning
University Architect





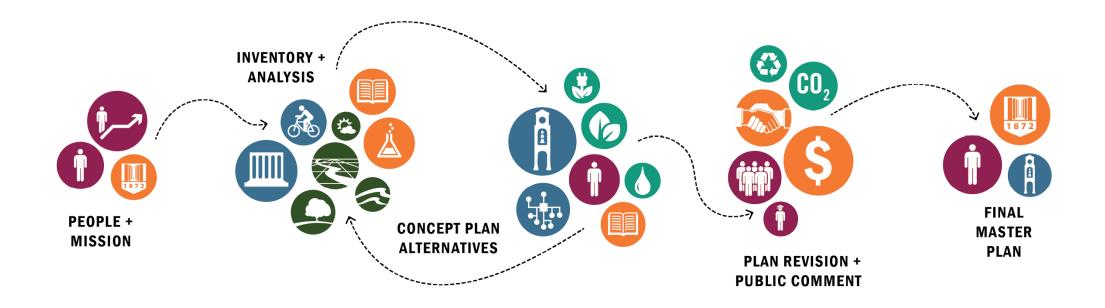


VIRGINIA TECH...

BEYOND BOUNDARIES 2047

THE CAMPUS PLAN

PLANNING PROCESS



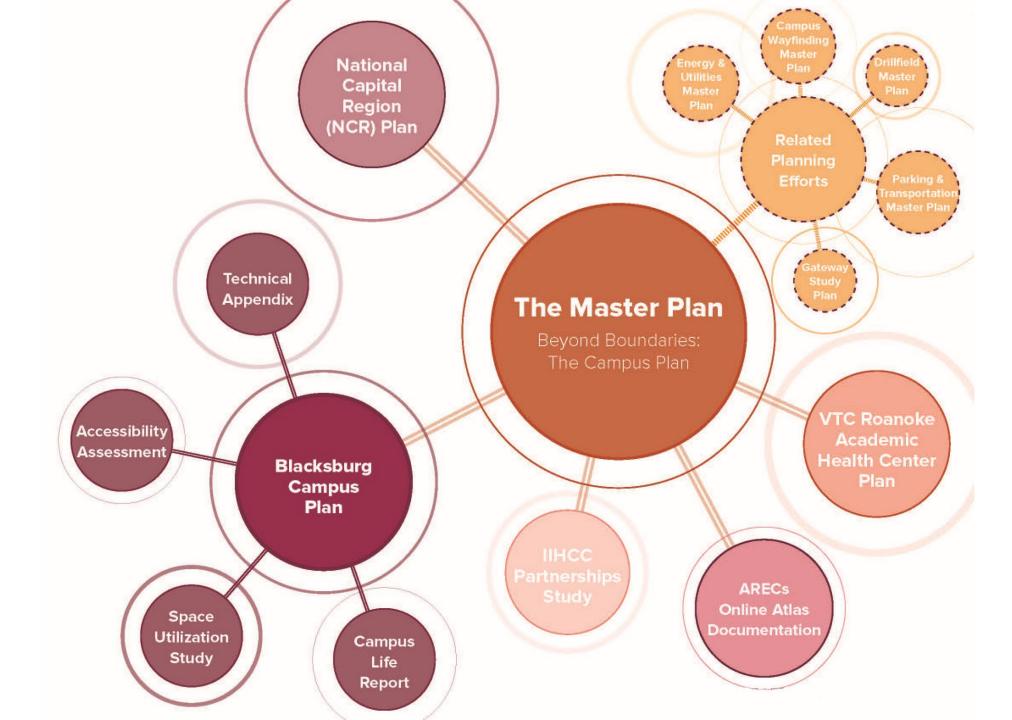


VT-Shaped Discovery

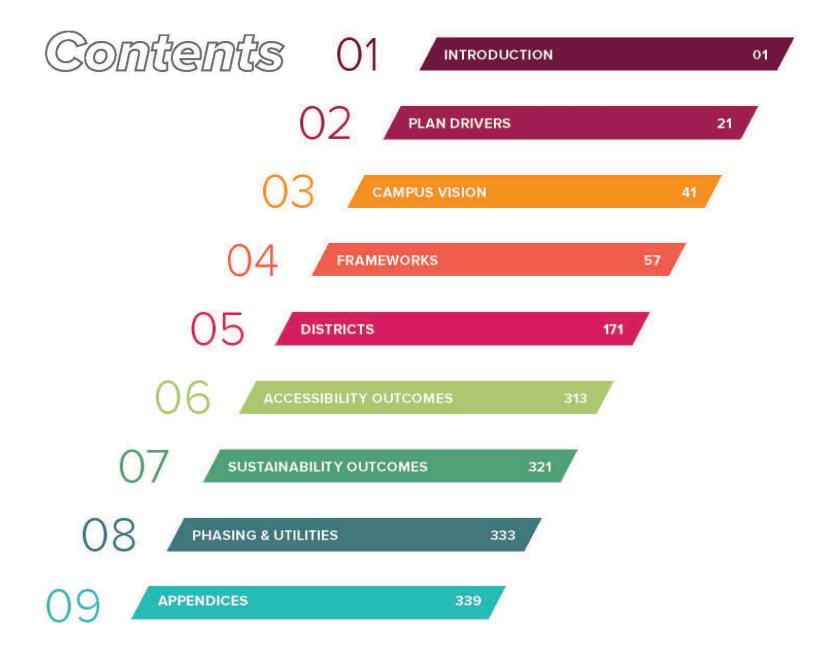
- VT SHAPED STUDENTS
- INTERDISCIPLINARY TEAMS
- PURPOSE-DRIVEN AND PERSON-CENTERED CURRICULUM

The VT student of 2047 learns by doing, creating, and engaging, service to humanity, and does so not in isolation or as an academic exercise but rather with the support of a community.

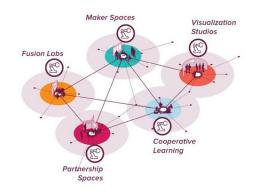
PLAN COMPONENTS



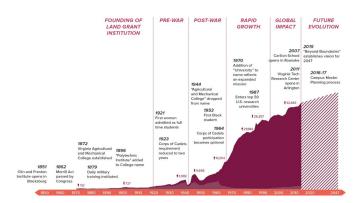
The Campus Plan



PLAN DRIVERS



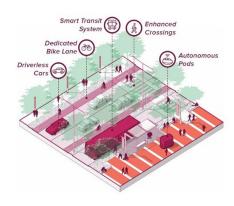
The VT Experience



Growth



Sense of Place



Access for All

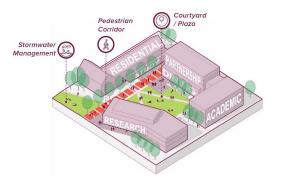


O3 Connections

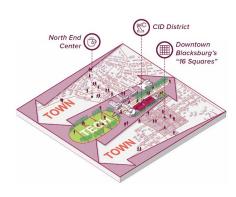


Sustainability

VT Experience



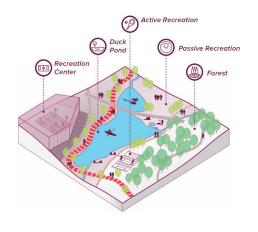


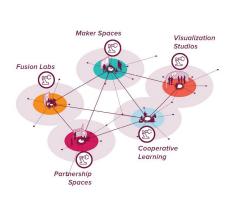


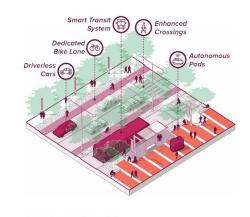
MIXED-USE ENVIRONMENTS

FLEXIBLE LEARNING SPACES

TECH-TOWN









HEALTH & WELLBEING COLLABORATION HUBS COMPLETE STREETS PUBLIC REALM

Sense of Place







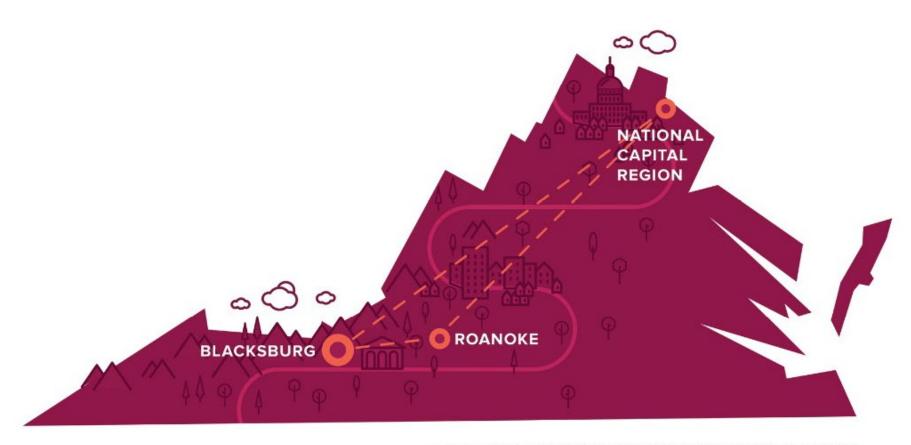








Connections



CROSS-COMMONWEALTH CONNECTIONS

Agricultural Research and Extension Centers

ACROSS THE COMMONWEALTH

- Alson H. Smith, Jr.
- Eastern Shore
- Eastern Virginia
- Hampton Roads
- Middleburg
- Reynolds Homestead

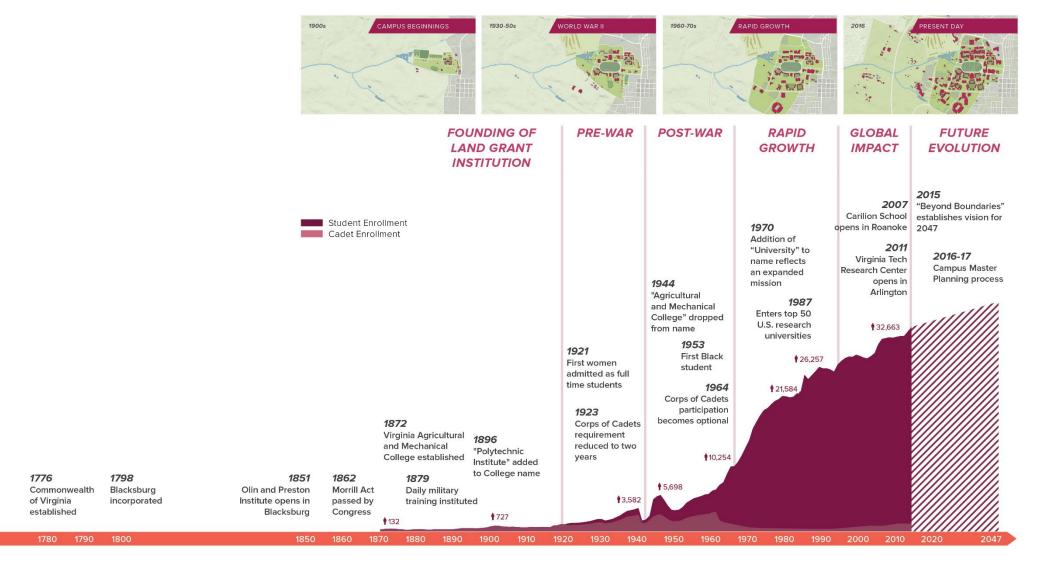
SOUTHWEST VIRGINIA

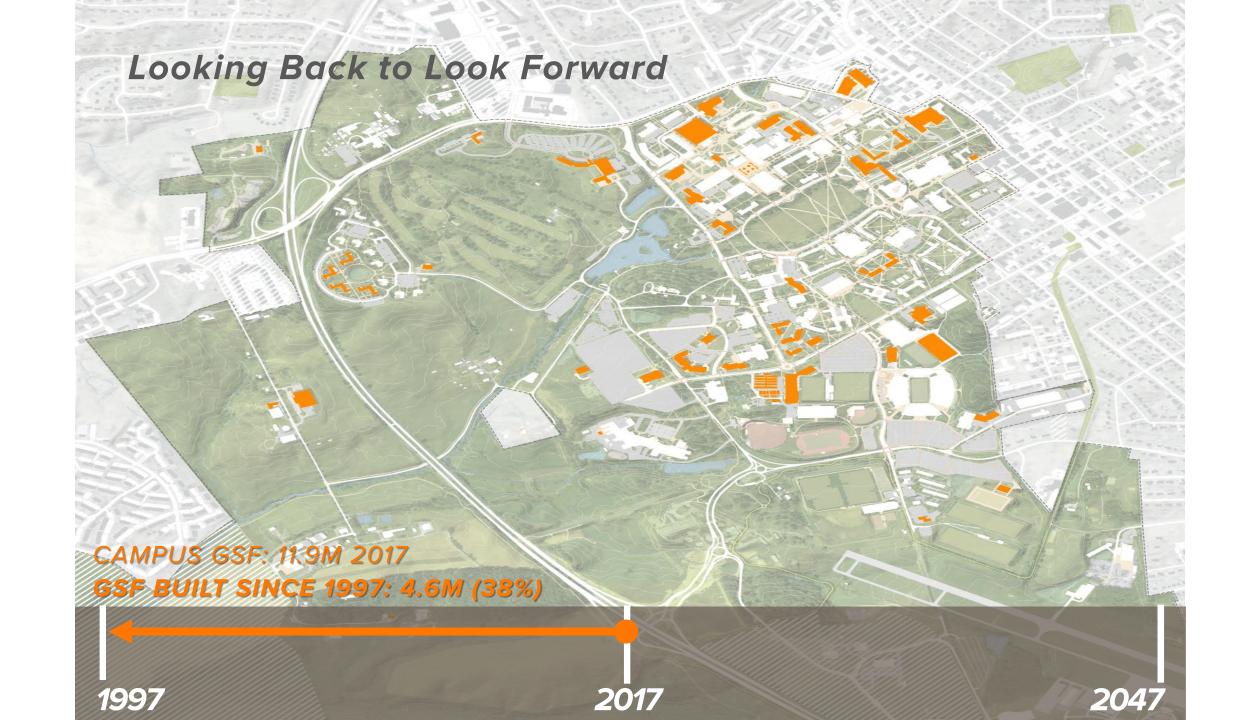
- Shenandoah Valley
- VIRGINIA TECH AREC **Southern Piedmont Southwest Virginia** ALSON H. SMITH, JR. **NATIONAL Tidewater CAPITAL** Virginia Seafood REGION **EASTERN VIRGINIA** SHENANDOAH VALLEY EASTERN SHORE VIRGINIA SEAFOOD **ROANOKE** SOUTHERN BLACKSBURG REYNOLDS HOMESTEAD **HAMPTON**

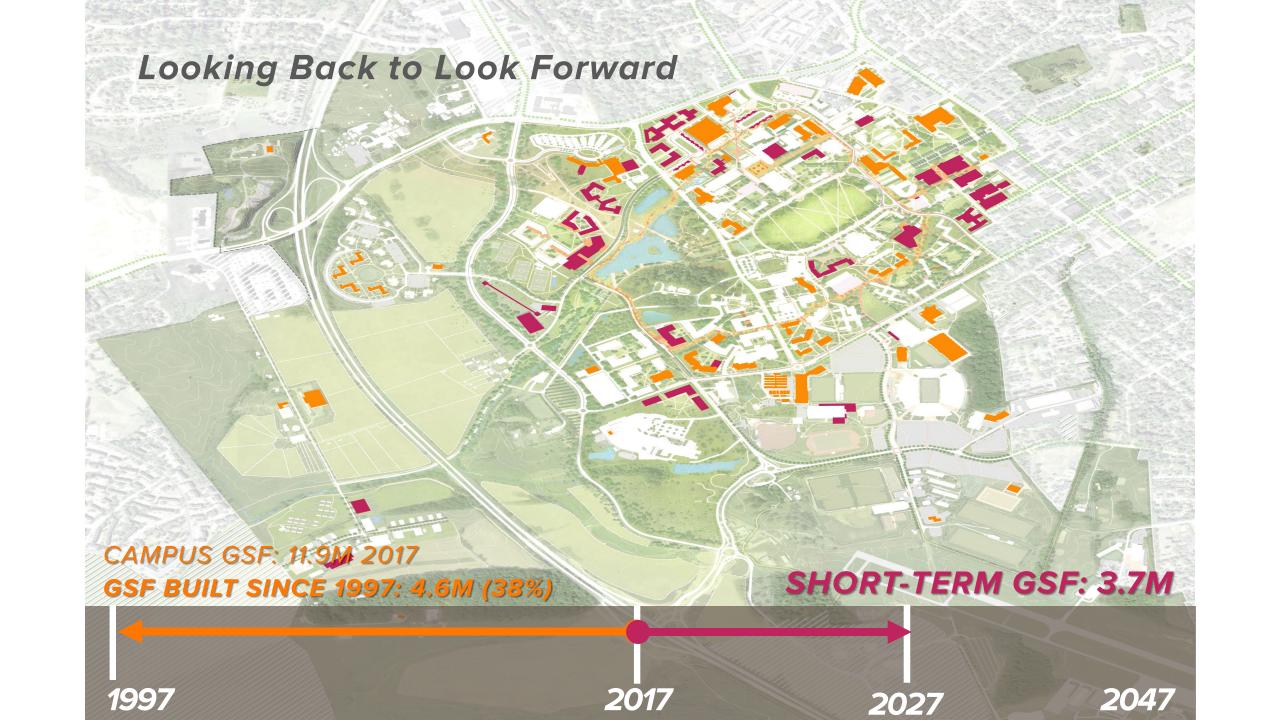
TIDEWATER

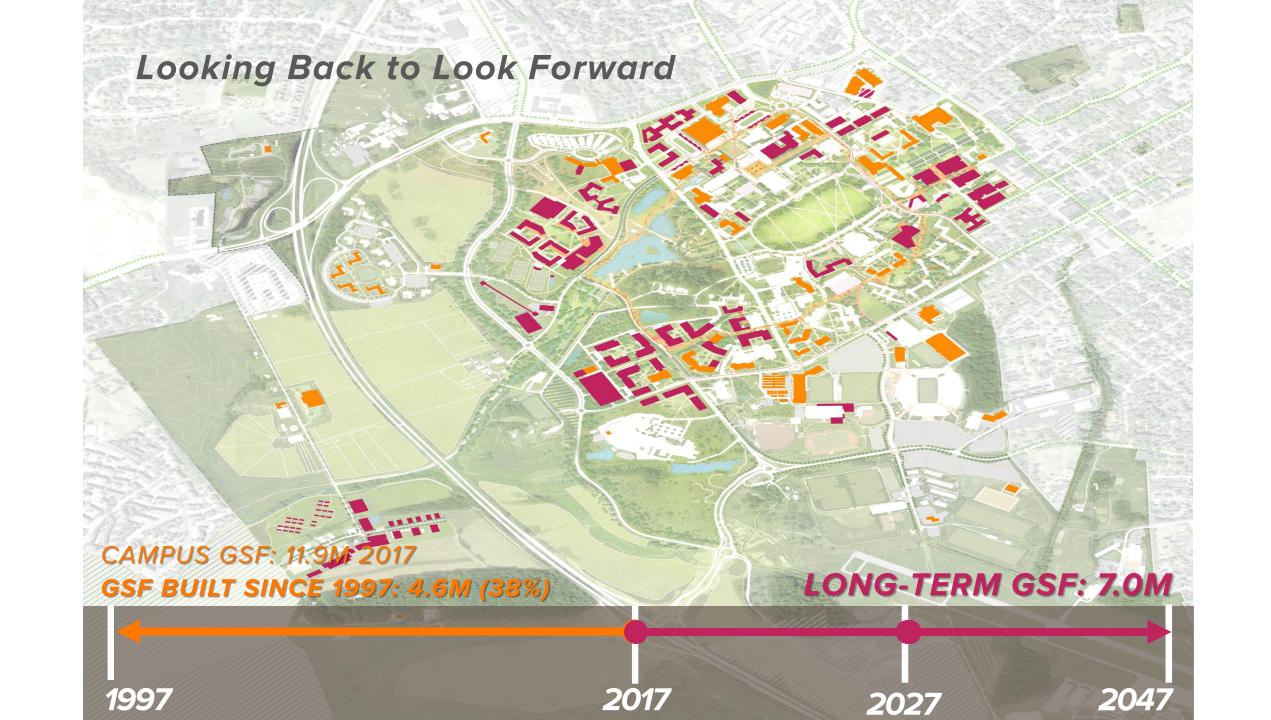
ROADS

Growth





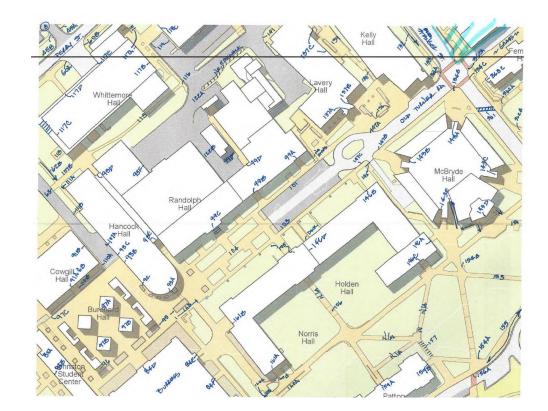




Access for All

Exterior Accessibility Survey

Item#	Location	Element	Feature	Photo(s)	Recommendation/Modification		2010 ADA
						Action Category	Standards Reference #
34	Site Map #13 Perry Street Parking Structure	Signage	Each designated accessible parking space has suright signage with bottom edge more than 60" AFF, has "maximum penally \$250" signage with bottom edge 51" high or more and 12 spaces have "Van Accessible" signage with bottom edge 78" - 79" high.	40-42	Information: Virginia has specific penalty for parking signage requirements. See line item #7.	Information/ VA	
35	Site Map #13 Perry Street Parking Structure	Accessible Parking	1 designated accessible space at southwest P1 does not have an access aisle.	40-42	Provide an 8' wide minimum access able (the space has a "Van Accessible" sign). Options may include striping the dajacent standard parking space. In doing so, verify slopes are 28' maximum (or up to 38's which we consider usable/within reasonable tolerance) as there was a vehicle in the space during the site visit.	А	502
36	Site Map #13 Perry Street Parking Structure	Accessible Parking	Southwest P2 and P3 accessible parking spaces on the right side of the elevator have 5' wide access a lales to the trashcan. With the trashcan removed, there is an 8' wide access a laile. These spaces have "Van Accessible" signs.	48-51, 52	Relocate the trashcams to be out of the 8' wide minimum area of the access aisles.	А	502
37	Site Map #13 Perry Street Parking Structure	Accessible Parking	1 designated accessible space (8-7 1/2" wide) at southwest P5 has 4-9" wide access aisle and "Van Accessible" signage.	55-56	Remove the "Van Accessible" sign and restripe the space to be 8 wide minimum and alse to be 5 wide minimum. If maintaining the "Van Accessible" sign, options may include striping the adjacent standard parking space to be the access asise. In doing so, resurface the aisle to have 24 maximum slope (or uto 13 % winh we consider usable/within reasonable tolerances).	А	502
38	Site Map #13 Perry Street Parking Structure	Accessible Parking	Southeast P2 accessible parking space on the left has access aisle with 4.2% - 5% cross slope throughout. The adjacent standard parking space has slopes 6.1% within 3' of the top of the space.	58	Provide/resurface the access aixle to be sloped 2% maximum in all directions. Options may include resloping and restriping the existing access aixle location OR resloping and striping the adjacent standard parking space to be the access libe access aixle.	B2	502



Accessibility Consultants, in eth - Part 1 www.accessibility.consultants, in August 12-18, 2016 703-756-8660

age 16 of 172

Sustainability

Virginia Tech's Sustainability Goals

The VTCAC lays out the following University-wide sustainability goals:

- 1. VT will be a leader in Campus Sustainability
- 2. VT will ensure that the VTCAC is reflected in the Strategic Plan for the University
- **3.** VT will reduce greenhouse gas (GHG) emissions to the 2000 emissions level of 255,000 by 2025 and to 38,000 tons—80% of the 1990 level—by 2050
- **4.** VT will improve energy efficiency, reduce energy waste, and replace high-carbon fuels
- 5. VT will maintain the Office of Sustainability
- **6.** VT will pursue LEED Silver certification or better for all eligible and applicable new buildings and major renovations and will evaluate the feasibility of LEED for existing buildings certification for its existing buildings
- 7. VT will strive for improved electricity and heat efficiency by exceeding the most current version of the ASHRAE 90.1 standard performance metric by 10% for all new buildings and major renovations; capital budgets will account for future energy price, life-cycle cost of building operation, and environmental benefits of achieving this level of performance.

- 8. VT will work towards a 50% recycle rate by 2020
- 9. VT will make smart purchases by purchasing or leasing Energy Star rated equipment and by considering the life-cycle costs and impacts of potential purchases
- **10.** VT will engage students, faculty, and staff to develop and implement innovative strategies for the efficient and sustainable use of energy, water, and materials in all University-owned facilities
- **11.** VT will aim for transportation efficiency through parking, fleet, and alternative transportation policies and practices
- **12.** VT will develop and implement innovative sustainability-related academic programs in instruction, research, and outreach
- **13.** VT will monitor energy use and GHG emissions and change internal and external conditions and will prepare an annual "report card" showing progress towards targets
- **14.** VT will provide funding to support sustainability programs

CAMPUS VISION



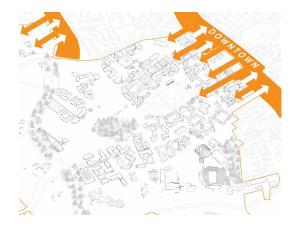
01: The Central Spine



02: The Agricultural Belt



03: The Campus Districts



04: Tech + Town



05: The Infinite Loop



06: The Green Links

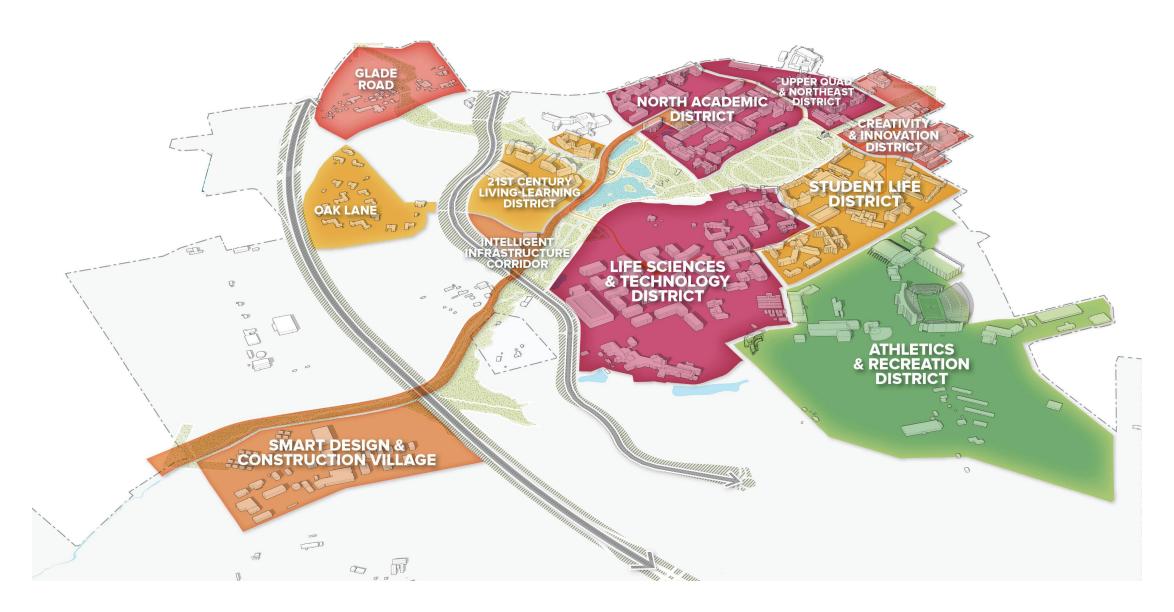
The Central Spine



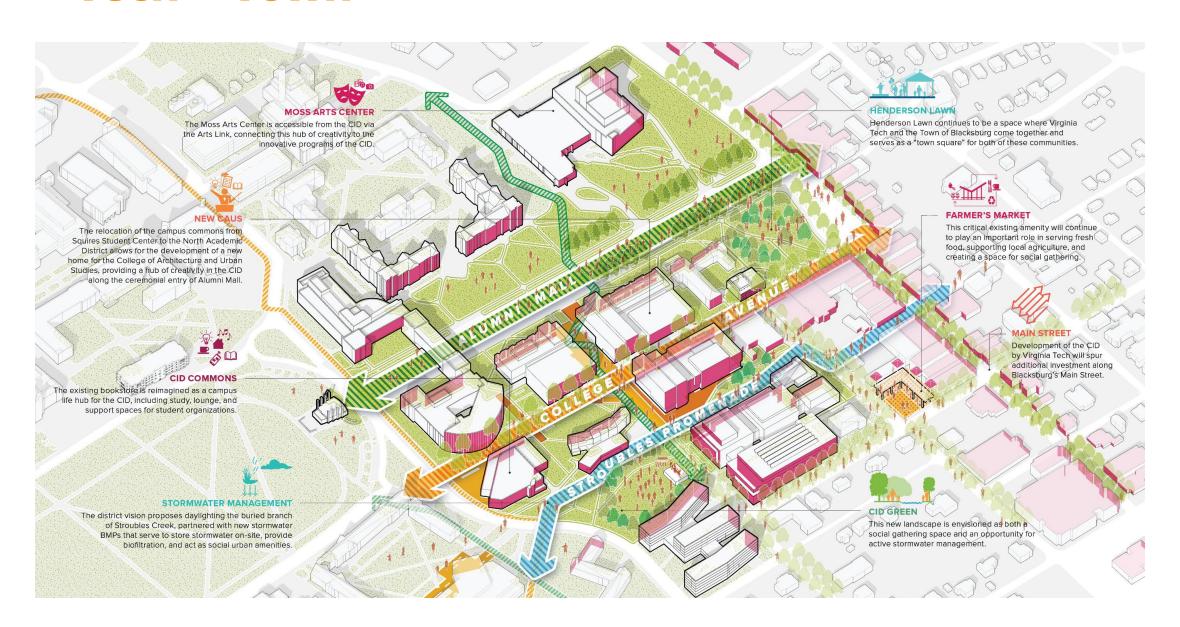
The Agricultural Belt



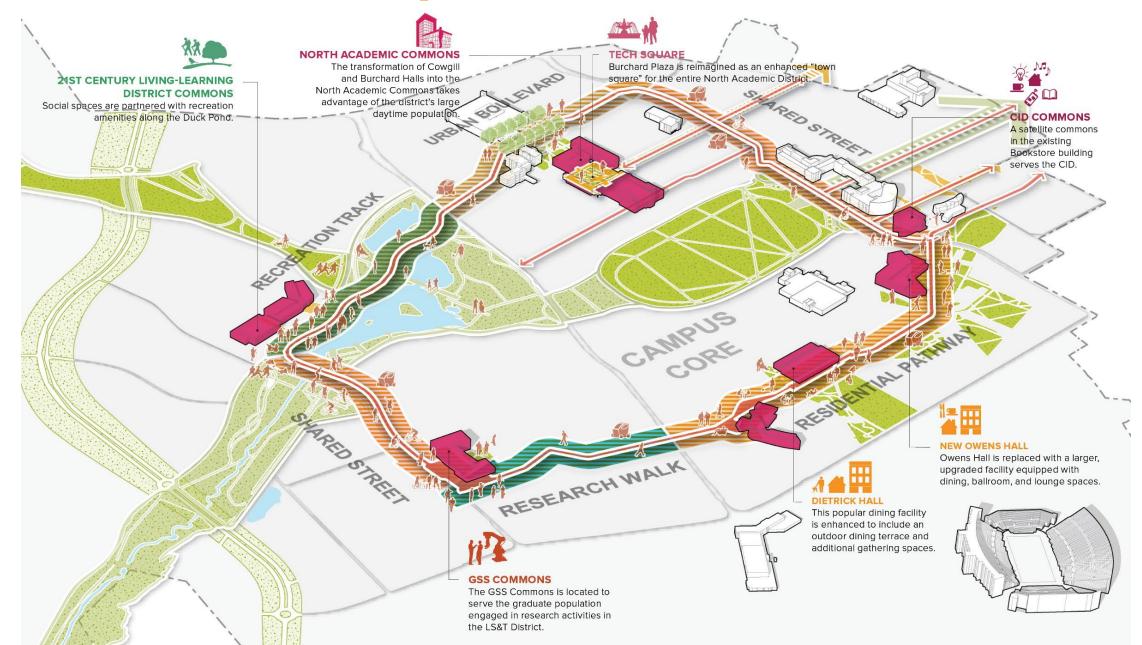
The Campus Districts



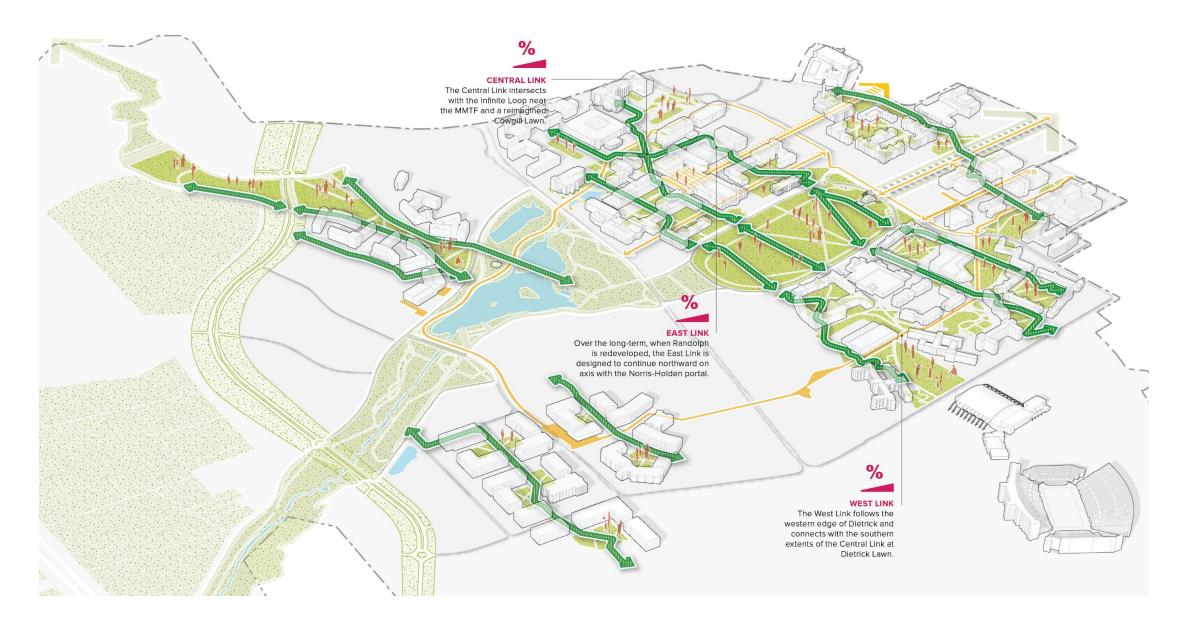
Tech + Town



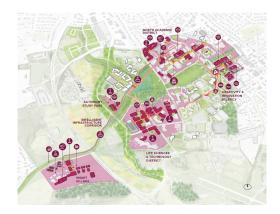
The Infinite Loop



The Green Links

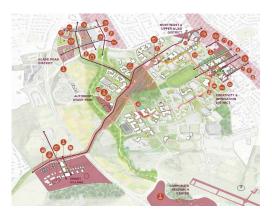


FRAMEWORKS



Academic & Research Framework

ENHANCING LEARNING AND RESEARCH ENVIRONMENTS



Strategic Partnerships Framework

EXPANDING STRATEGIC PARTNERSHIPS



Campus Life Framework

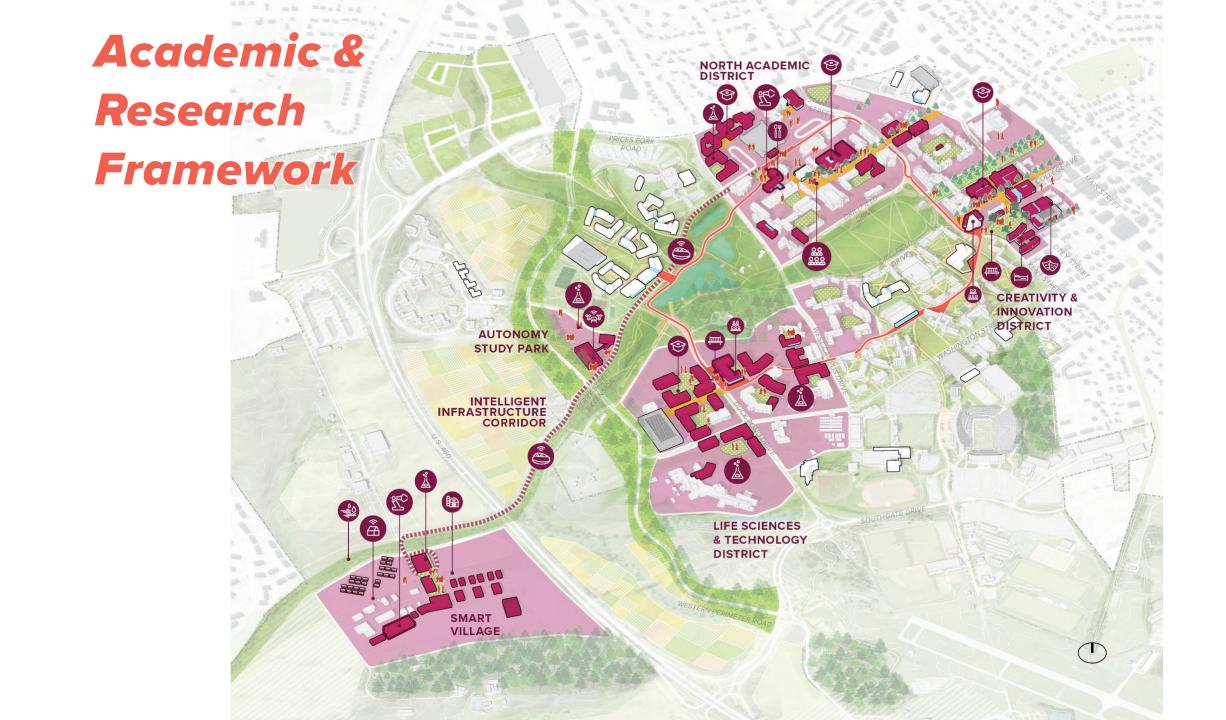
FOSTERING AN INCLUSIVE CAMPUS LIFE EXPERIENCE

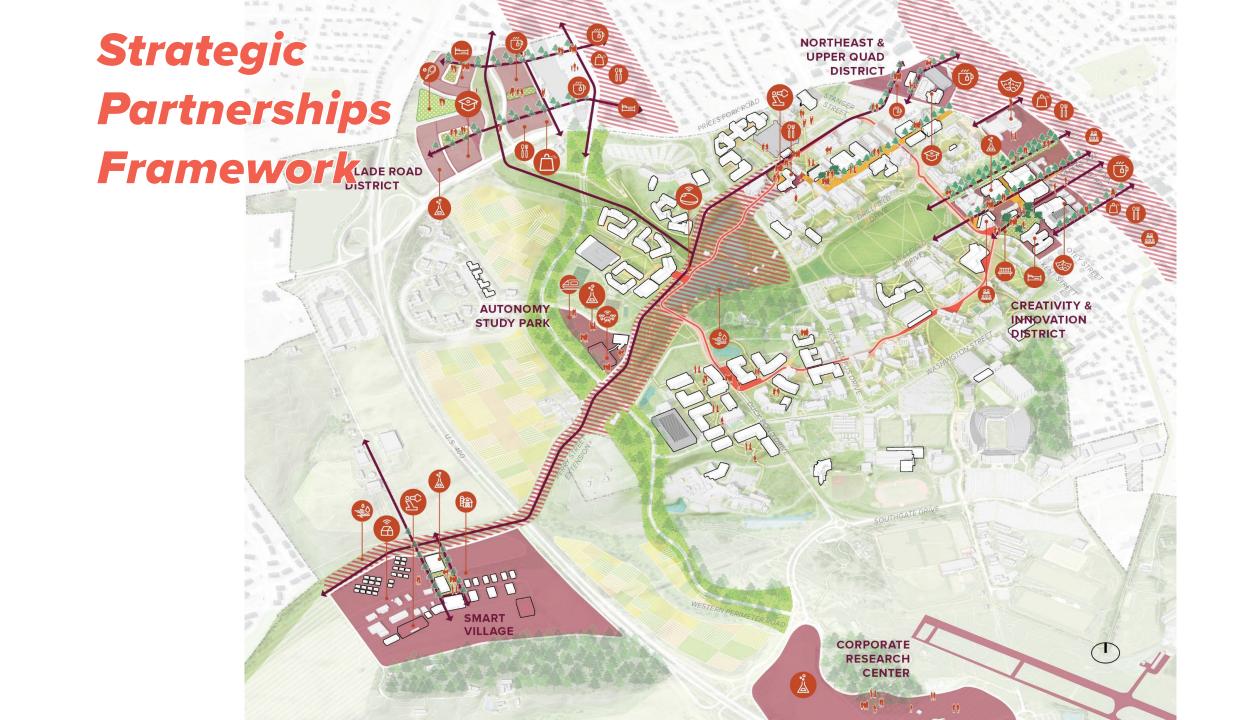


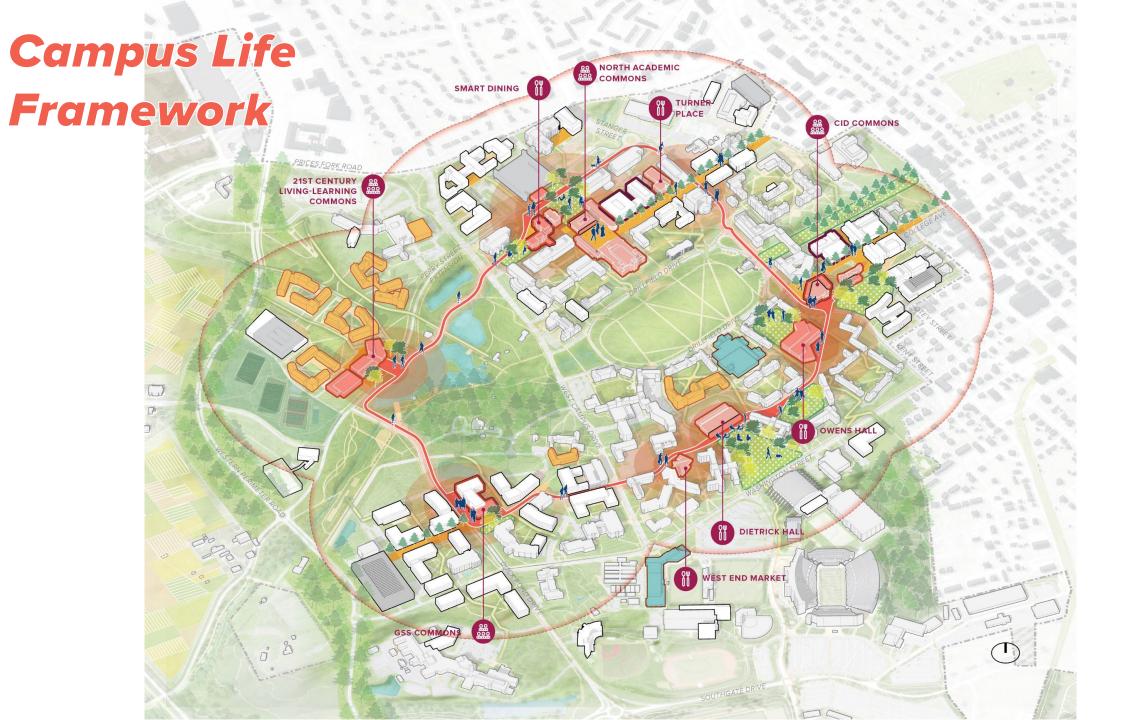
Landscape Framework
PROTECTING THE LAND GRANT
LEGACY

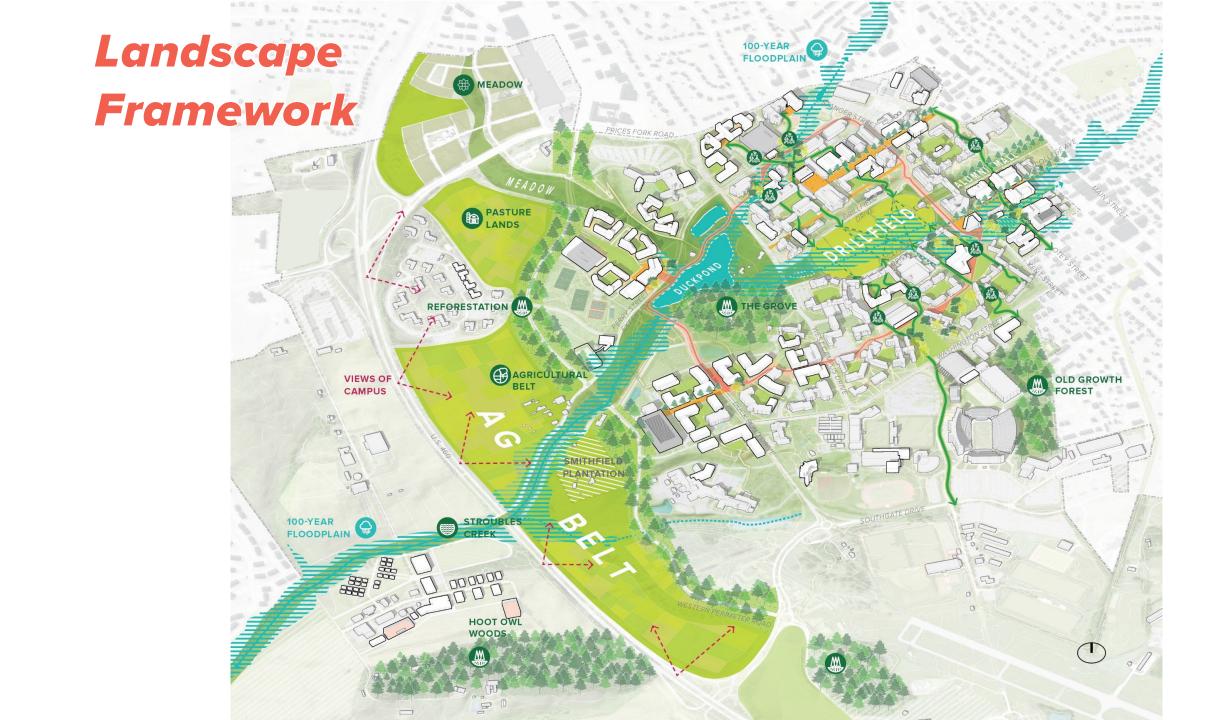


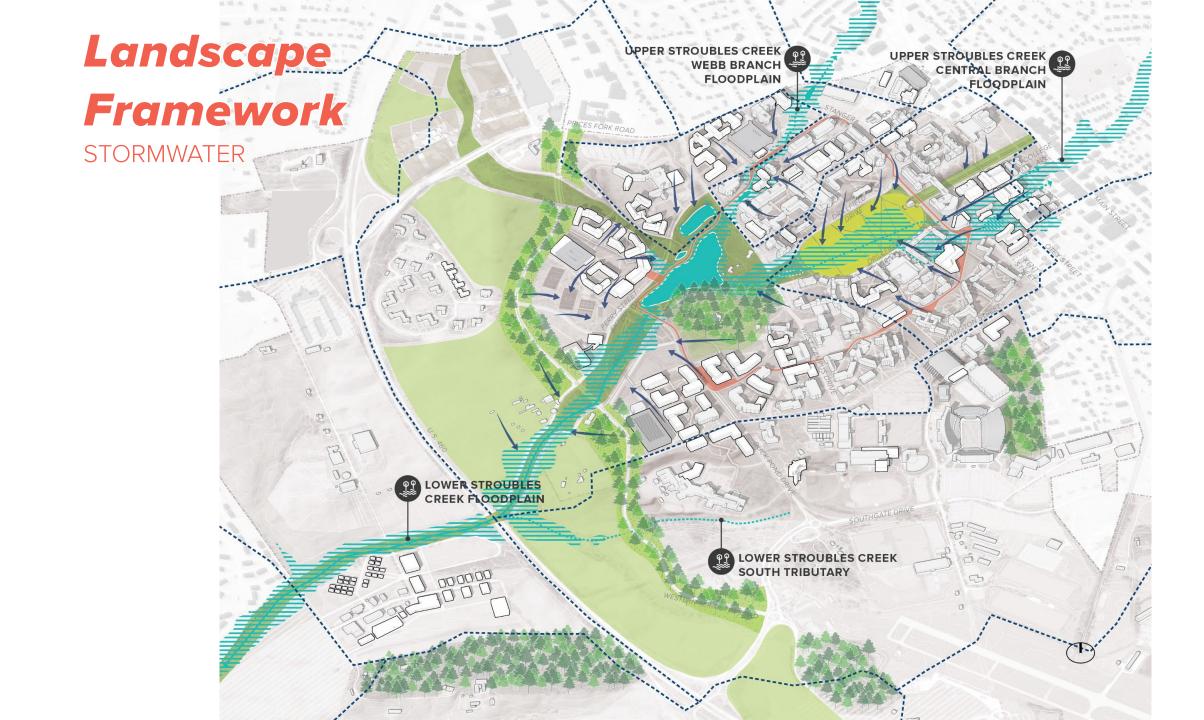
Mobility Framework
PROMOTING ACCESS AND
MOBILITY

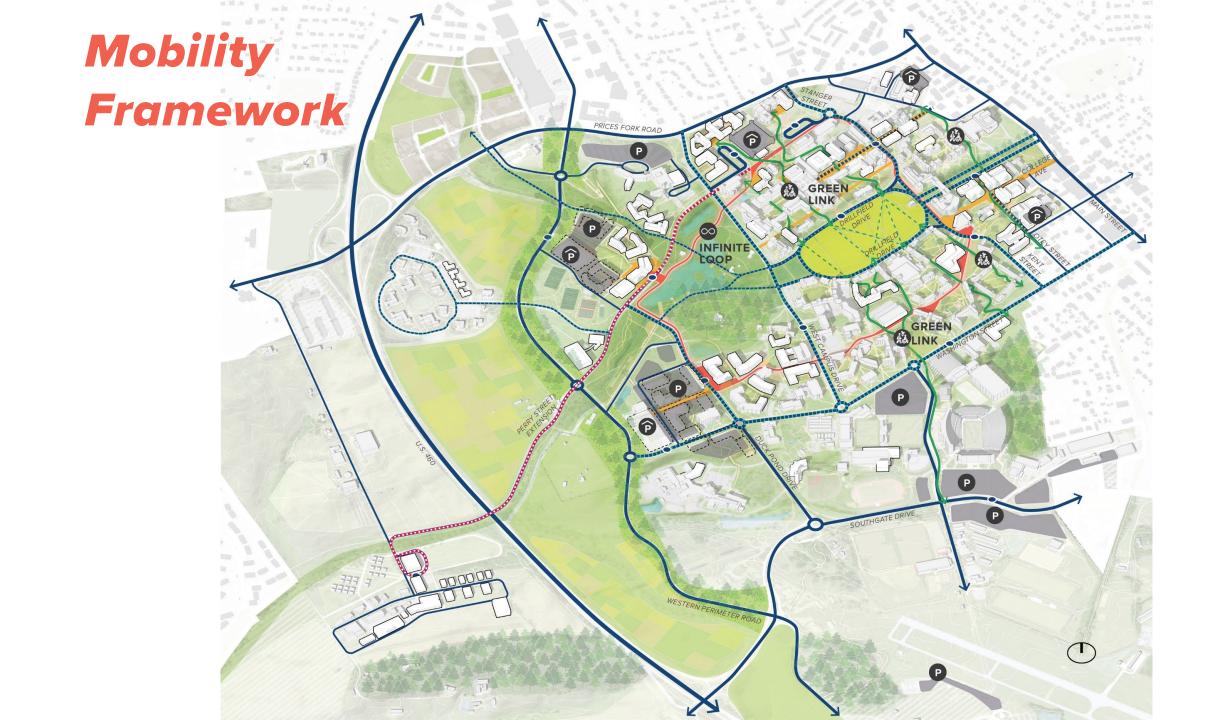








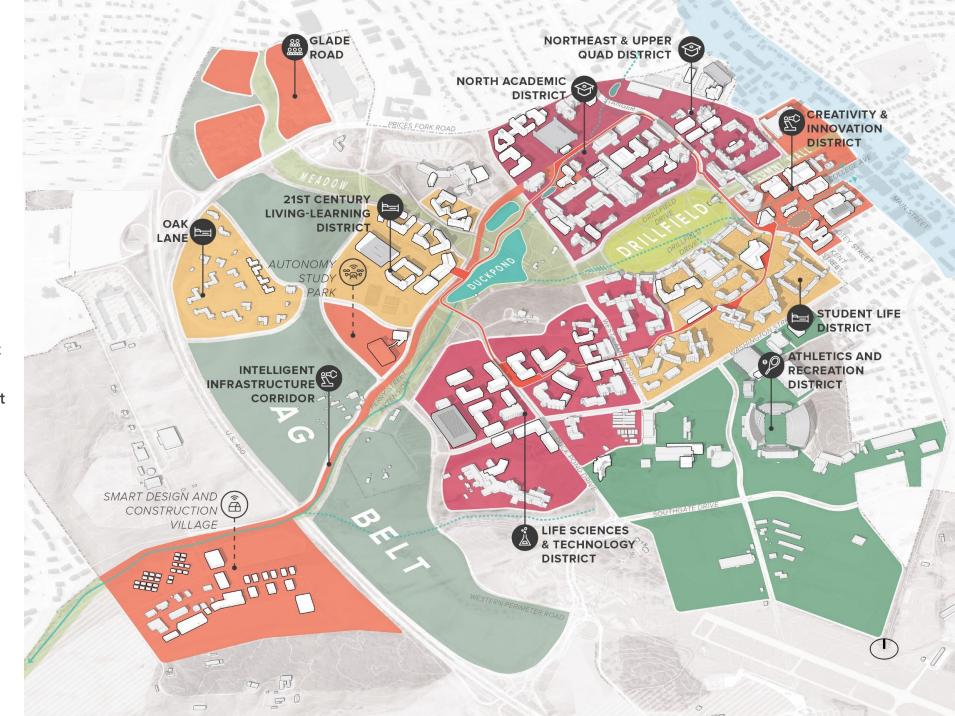




DISTRICTS

- 01 North Academic District
- 02 Northeast & Upper Quad District
- 03 Creativity & Innovation District
- 04 Student Life District
- 05 Life Sciences & Technology District
- 06 21st Century Living-Learning District
- 07 Intelligent Infrastructure Corridor
- **08 Peripheral Districts**

Athletics and Recreation Glade Road Oak Lane

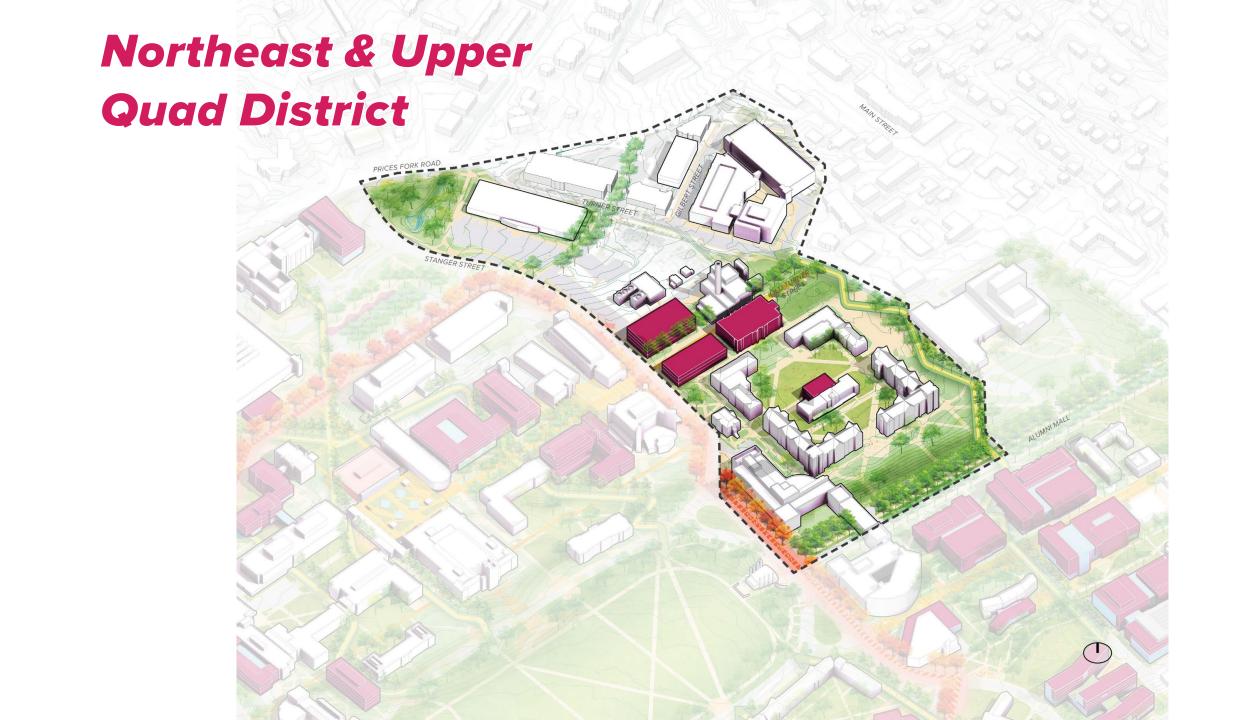






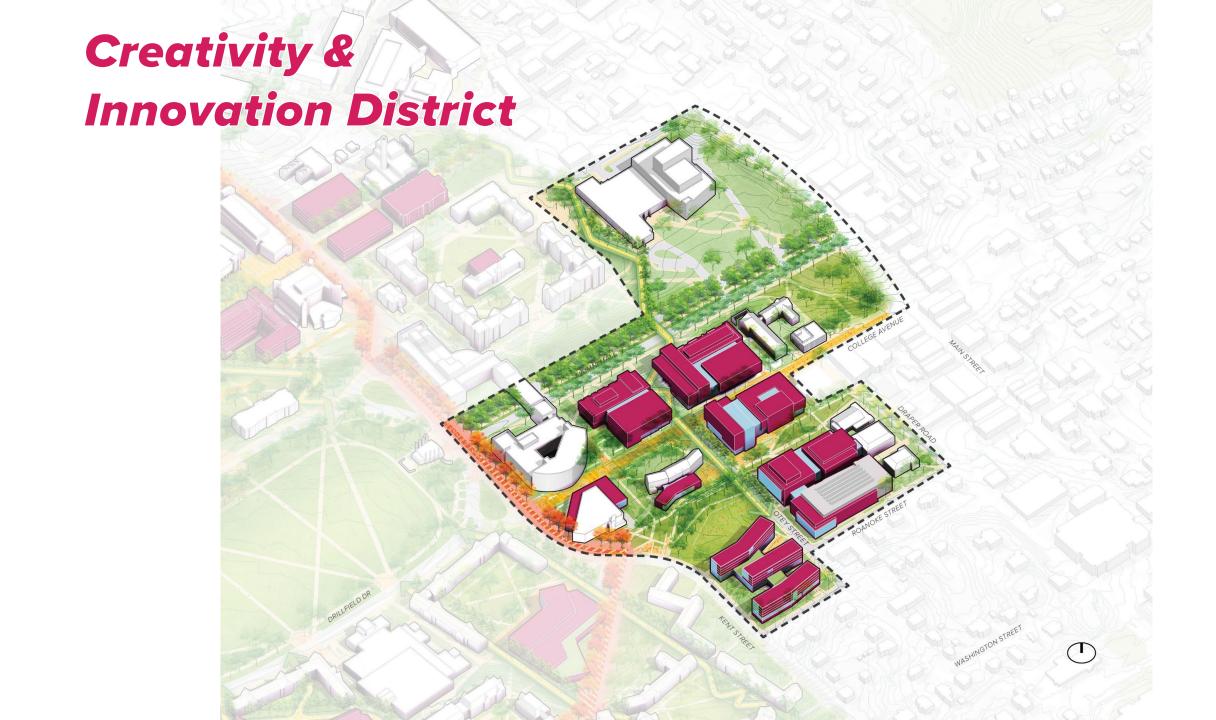


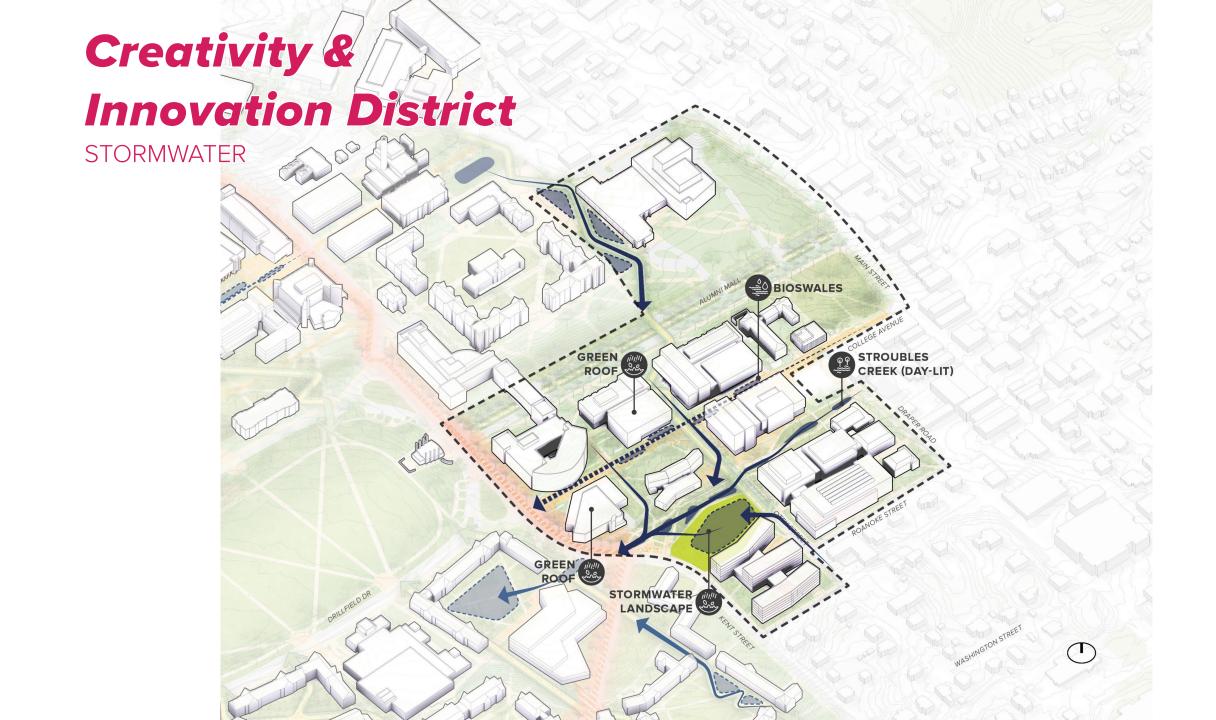
PROPOSED CONDITIONS





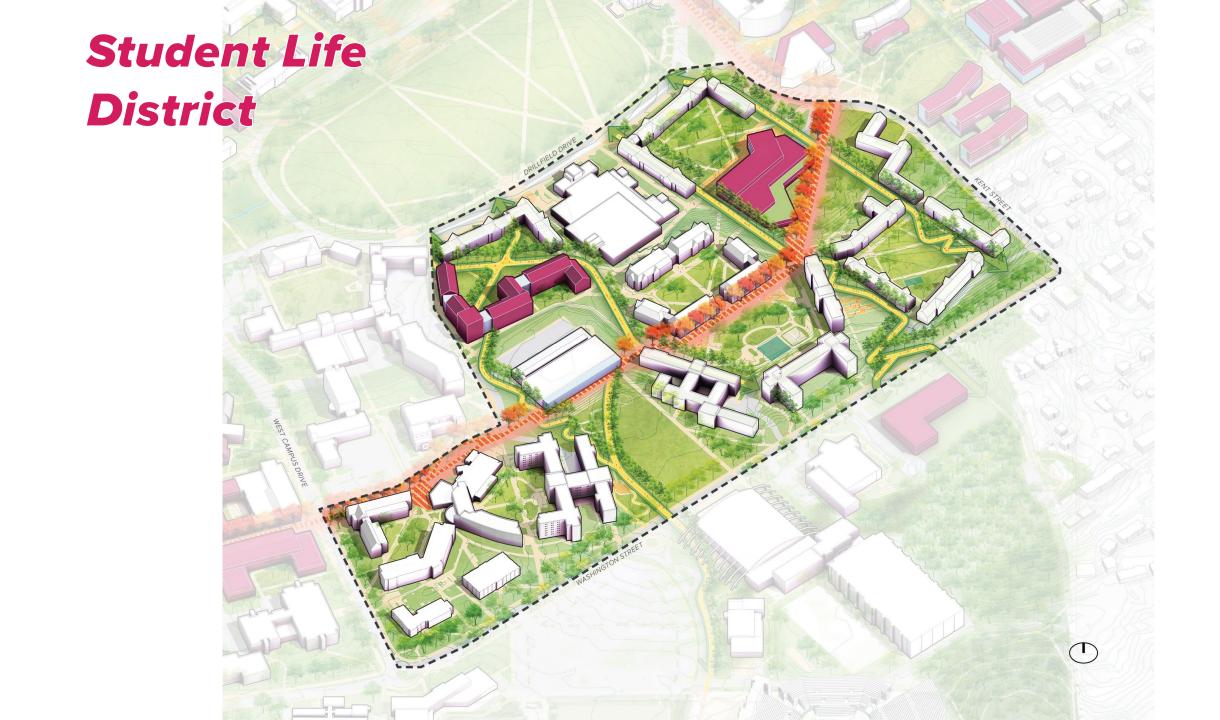


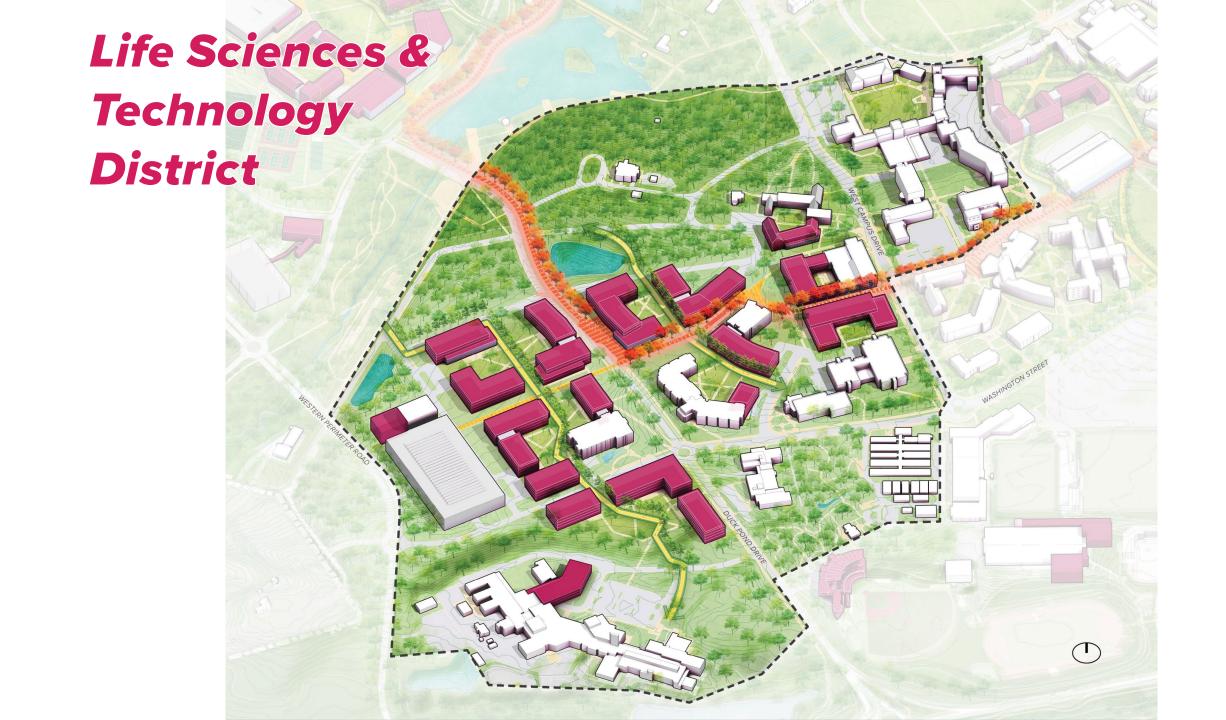


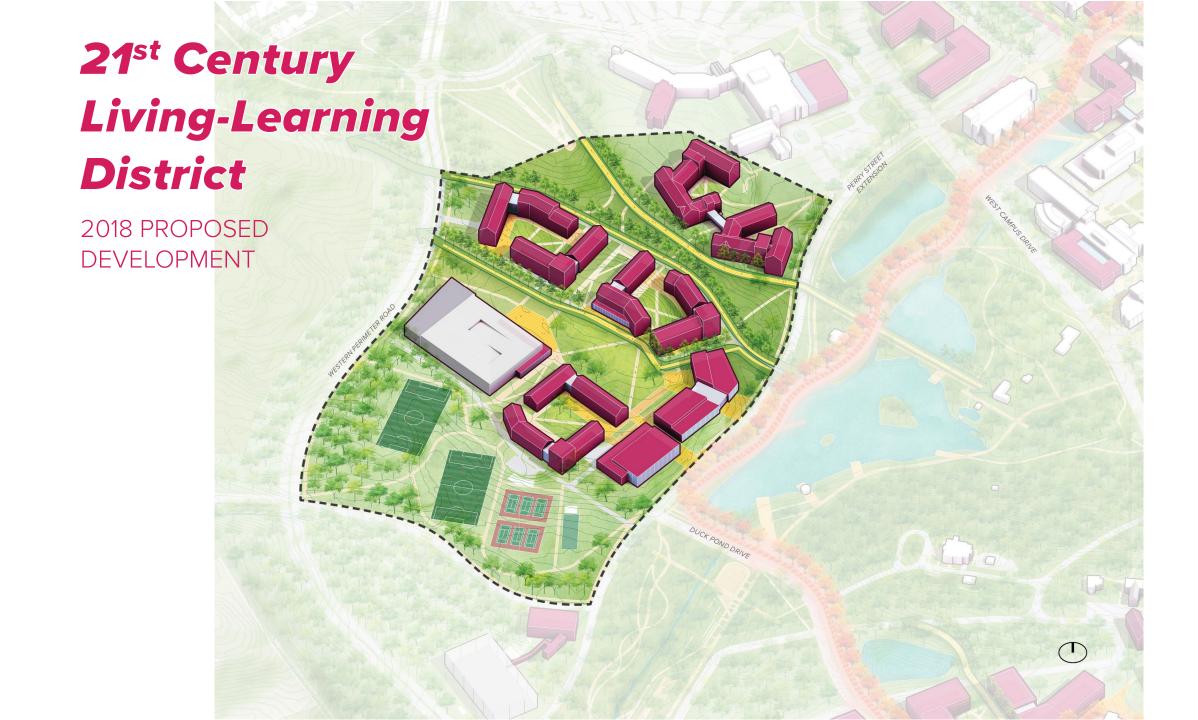










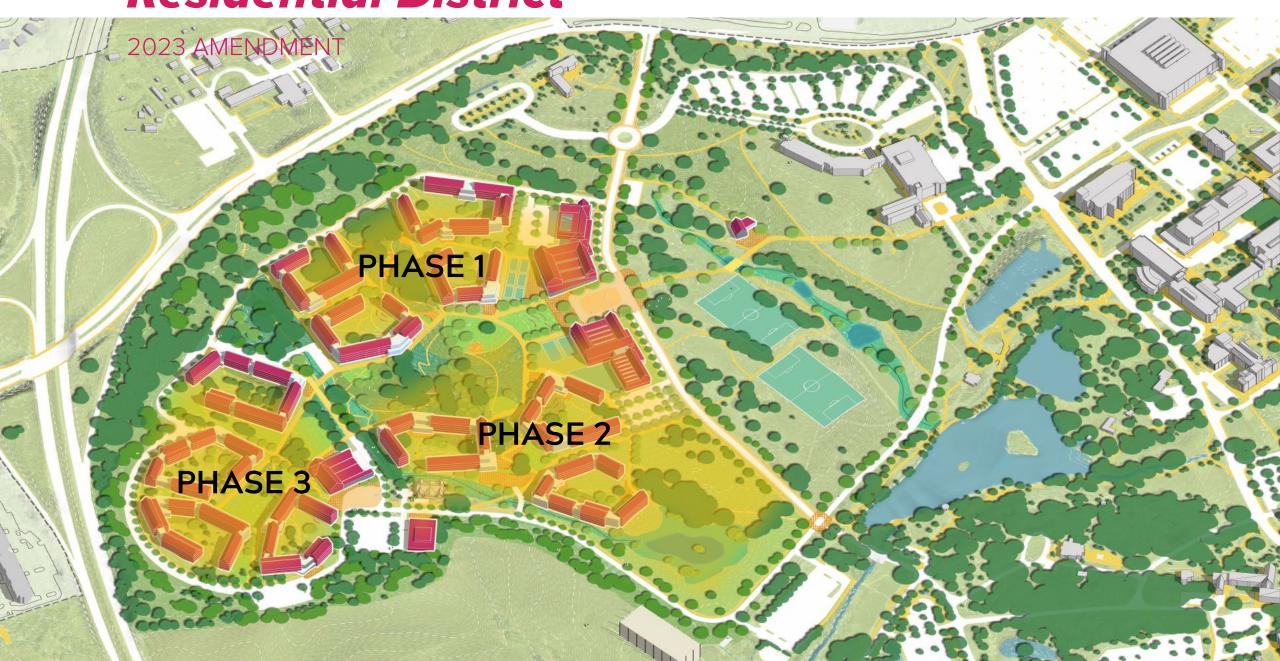


Peripheral Districts:
Oak Lane

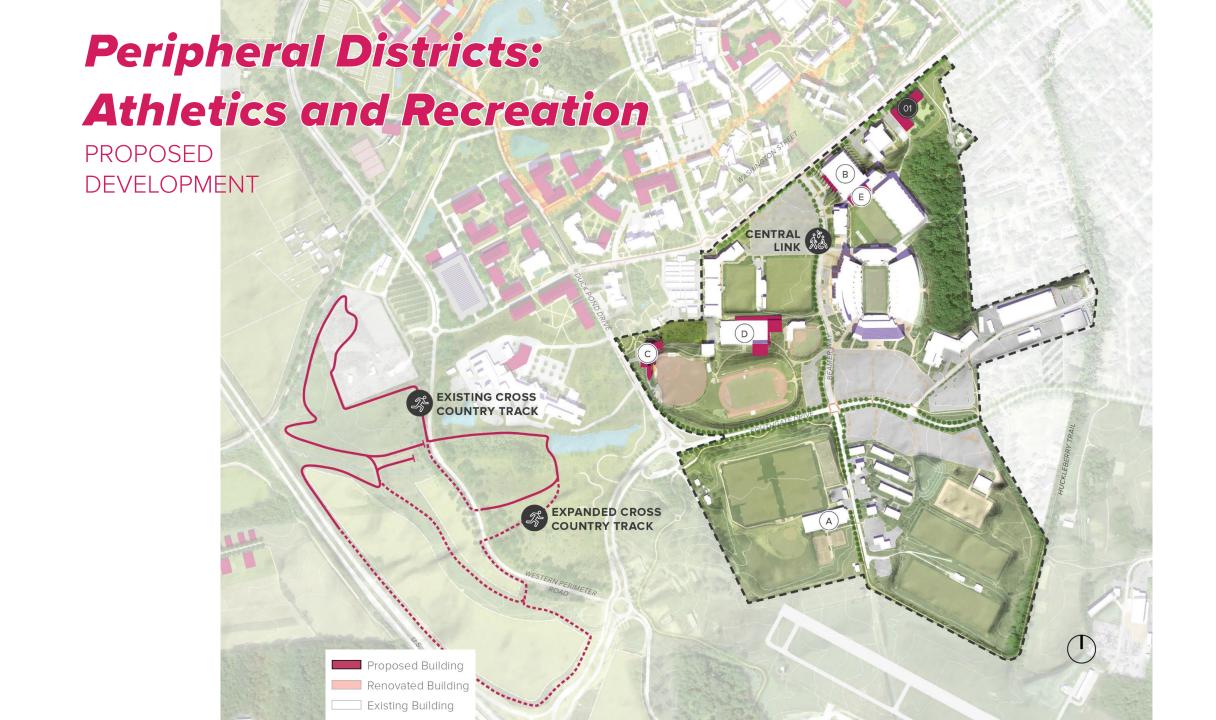
2018 PROPOSED DEVELOPMENT



Residential District

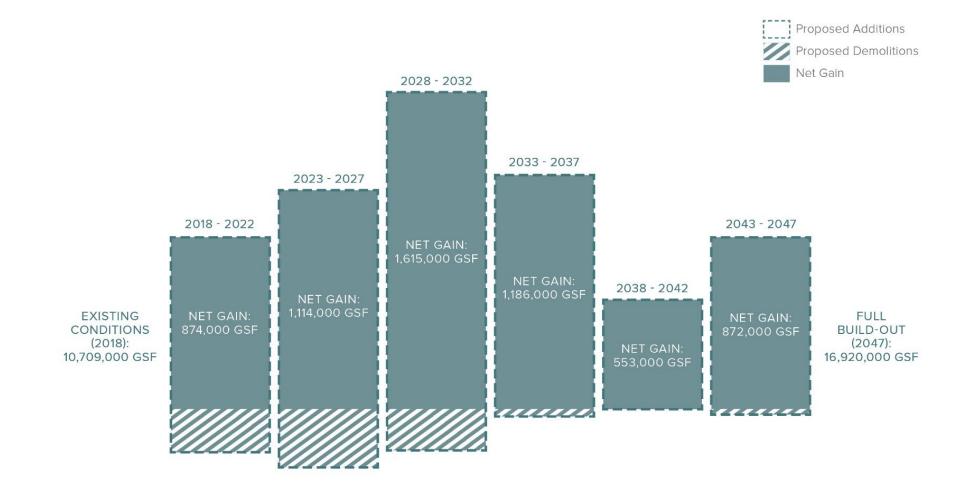


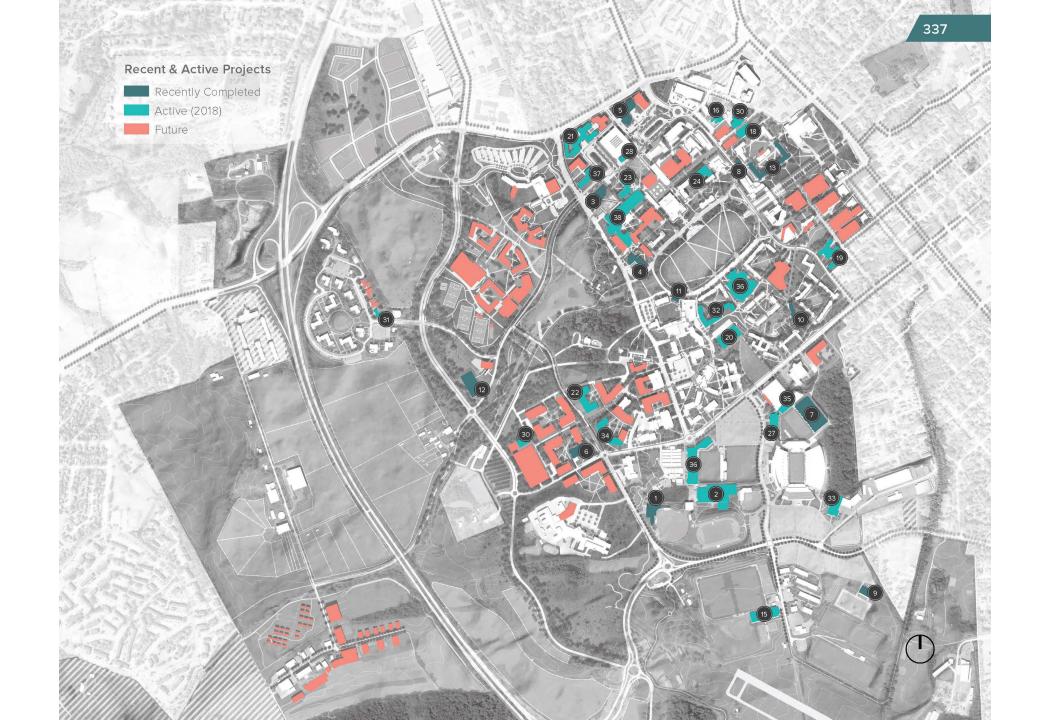


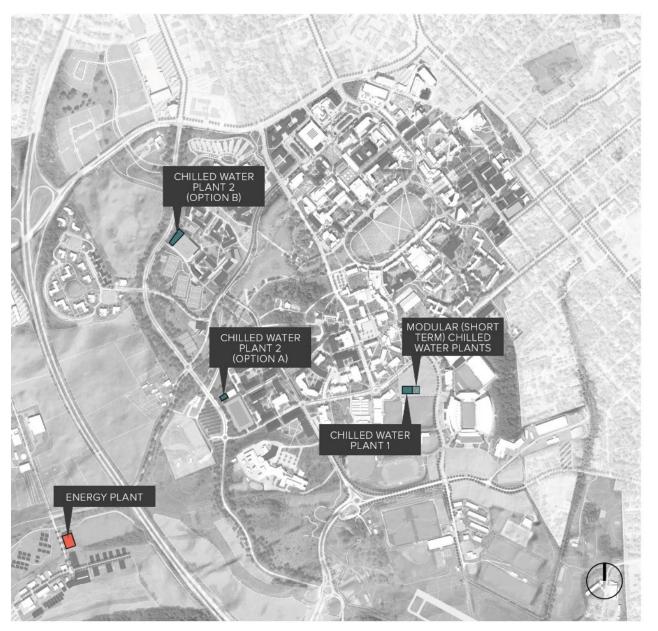


Phasing & Utilities

PROPOSED DEVELOPMENT PHASING







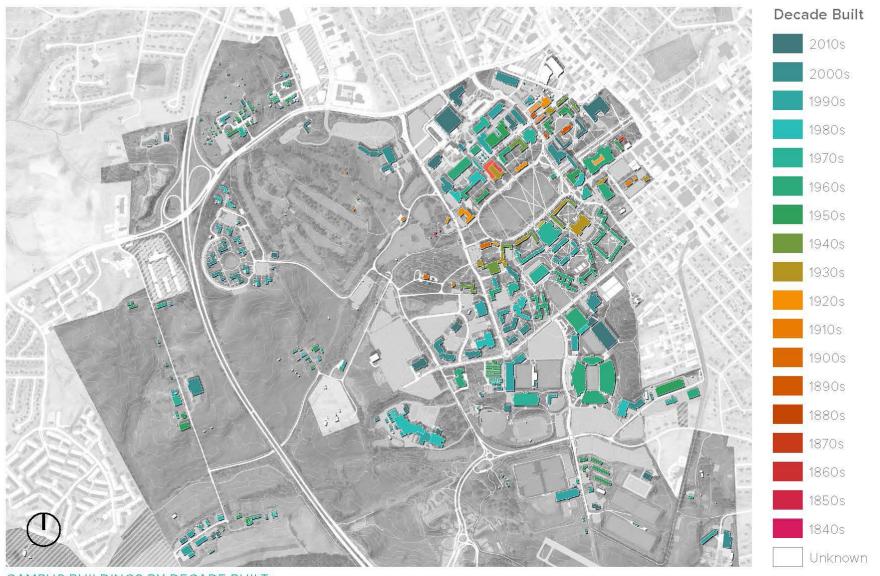
Proposed Utility Plants







Historic Resources



CAMPUS BUILDINGS BY DECADE BUILT

Blacksburg Campus

The Historic Resources Survey identifies several buildings on the Blacksburg Campus that contribute to the historic legacy of the campus due to their age, quality, or style. These facilities include:

HISTORIC REGISTER

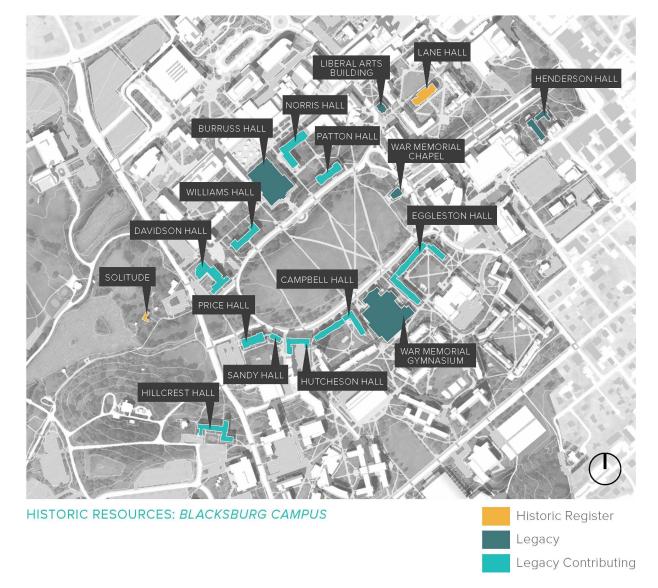
- Lane Hall
- Solitude

LEGACY

- > Burruss Hall
- Henderson Hall
- Liberal ArtsBuilding
- War Memorial Chapel
- War Memorial Gymnasium

LEGACY CONTRIBUTING

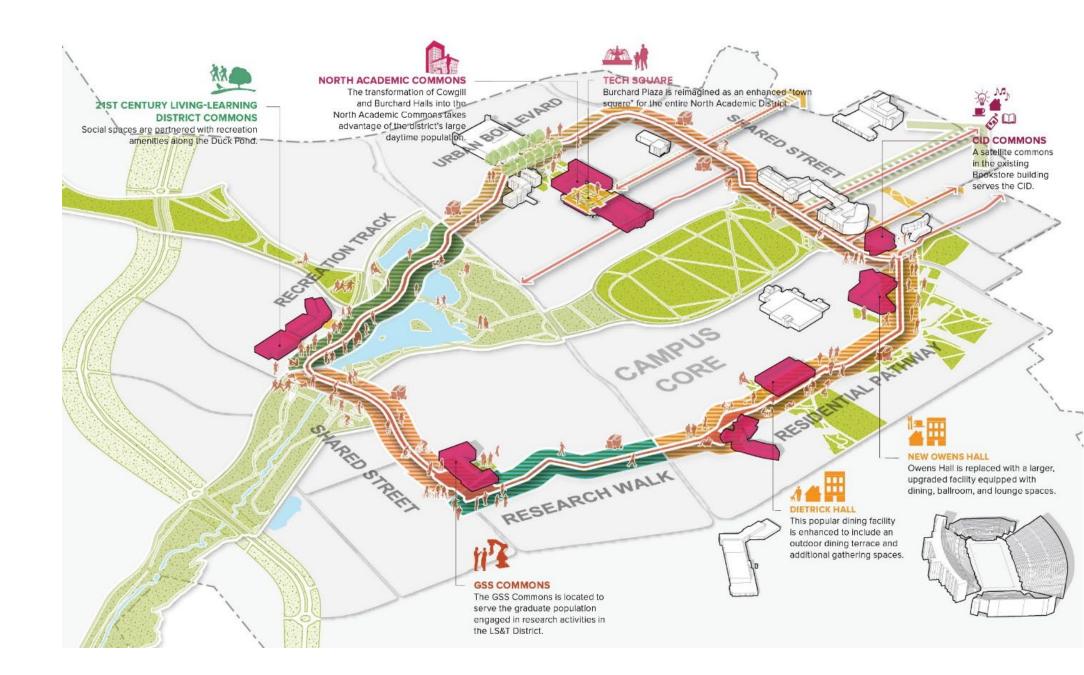
- > Campbell Hall
- Norris Hall
- Davidson Hall
- Patton Hall
- > Eggleston Hall
- Price Hall
- > Hillcrest Hall
- Sandy Hall
- > Hutcheson Hall
- Williams Hall



Major Outcomes

MAJOR OUTCOMES

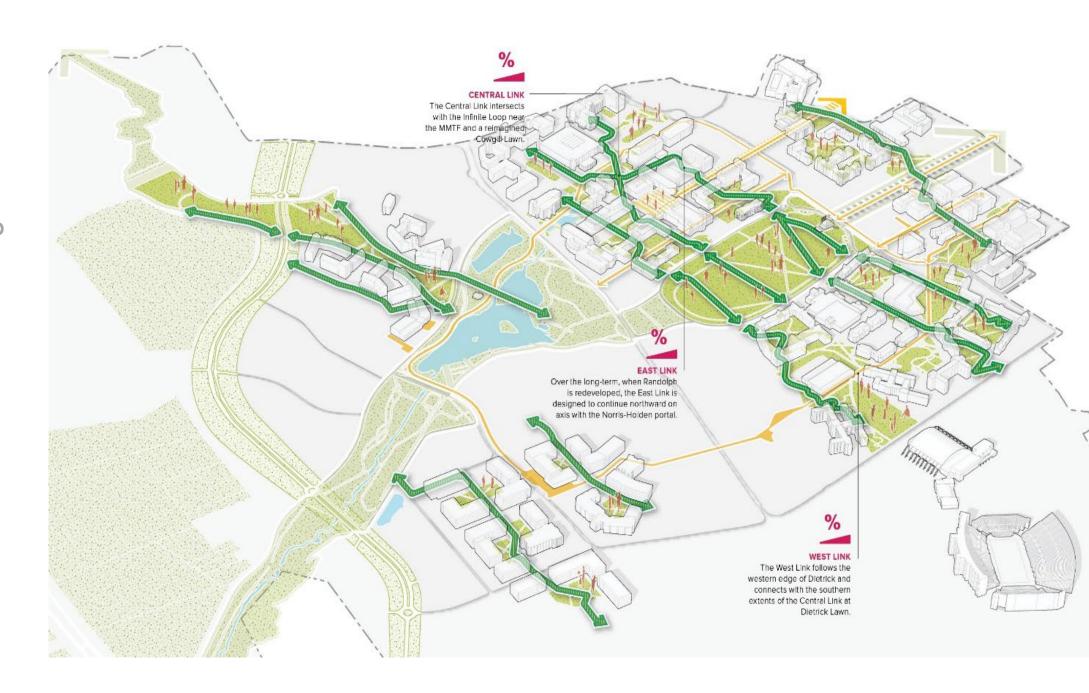
Infinite Loop



MAJOR OUTCOMES

Infinite Loop

Green Links



MAJOR OUTCOMES

Infinite Loop

Green Links

North Academic Commons



ILLUSTRATIVE PLAN





Climate Action Commitment (CAC)



UMP Stakeholders' Group - Nam Q Nguyen, Senior Director & Deputy to AVP May 2, 2023



Contents

- VT 2020 CAC Overview
- UMP Program Overview
- Campus Energy Utility Infrastructure
- Sample Paths to Net Zero with UMP
- Questions and Next Steps

VT 2020 CAC Overview





15 Goals of the VT 2020 Climate Action Commitment approved by BOV March 2021

- 1. Achieve a carbon-neutral Virginia Tech campus by 2030.
- 2. Achieve 100 percent renewable electricity by 2030.
- **3.** Complete the total conversion of **steam plant fuel to natural gas by 2025** and plan for a full transition to renewable steam plant fuel after 2025. Continue to improve the efficiency of campus energy systems.
- 4. Reduce building energy consumption to enable carbon neutrality by 2030.
- 5. Operations of new buildings initiated by 2030 will be carbon neutral.



15 Goals of the VT 2020 Climate Action Commitment approved by BOV March 2021

- 6. Agricultural, forestry, and land use operations will be carbon neutral by 2030.
- 7. Virginia Tech to become a Zero-Waste Campus by 2030.
- **8.** Establish the **Sustainable Procurement** Policy and Procedures by 2022.
- **9. Reduce single-occupancy vehicle commuting to campus by 20 percent by 2025** and reduce transportation-related GHG emissions by 40 percent by 2030.
- 10. Integrate the Climate Action Commitment into Virginia Tech's educational mission through the Climate Action Living Laboratory (CALL) beginning in 2021.



15 Goals of the VT 2020 Climate Action Commitment approved by BOV March 2021

- **11.** Establish **climate justice as a core value** of the Virginia Tech Climate Action Commitment.
- **12.** Diminish barriers to **sustainable behaviors** through institutional change, education, and social marketing.
- 13. Implement the Virginia Tech Climate Action Commitment at a high level of university administration and governance by integrating goals for facilities, education, and campus culture; Ensure stakeholder engagement for evaluation of goals and progress.
- **14.** Develop **innovative budgeting and financing** mechanisms to generate funding and staffing to achieve Climate Action Commitment goals.
- **15.** Develop pathways after 2030 to **eliminate fossil fuels and carbon offsets by 2050**.



UMP Program Overview



Catalysts for Utilities Master Plan



Key drivers for the establishment of the Utilities Master Plan study:

- Aging energy systems
- Increasing deferred maintenance
- Central Energy Plant ("CEP") experiencing frequent, significant technical issues
- Expiring electricity supply contract with AEP
- Ensuring sustainability goals of CAC

Benefits & outcomes:

- Stakeholder collaboration campus wide
- Asset Management centric program
- Methodology to prioritize service level risks
- Align with existing capital & renewal programs
- Programmatic utility planning process

VT UMP Project Expectation













Address University's Energy Requirements

 Select optimal technology that meets strategic and operational goals

Renew thermal distribution system

 The steam distribution and condensate return system network is a key source of efficiency loss to VT's system

Ensure World-Class Operations and Maintenance services

- Focus on maintaining the value of assets
- Optimize Chiller Plant operations
- Develop key performance indicators

Upgrade resiliency and deliver renewable energy strategies

- Consider micro grid technology, hot water districts and renewable energy systems
- Strengthen energy performance data collection to improve operations and preventive maintenance

Account for Affordability Limitations

- Optimize plant controls to achieve energy savings
- Develop a commercial structure that maximizes value for money while considering budget limitations



Bridging Goals and Objectives

Campus Master Plan

In 2018, Virginia Tech completed its most recent master planning effort resulting in 'Beyond Boundaries 2047: The Campus Plan.'

Utilities Master Plan

The Utilities Master Plan will provide a comprehensive roadmap to align campus wide utility systems with the strategies of the Campus Master Plan and the sustainability goals of the Climate Action Commitment.

Climate Action Commitment

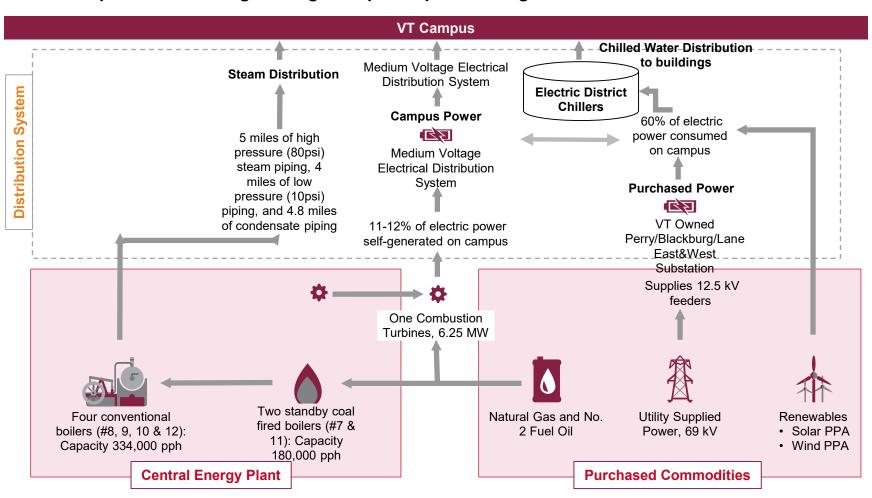
In 2020, Virginia Tech revised its Climate Action Commitment, setting sustainability goals and milestones thru 2050.

Campus Energy Utility Infrastructure



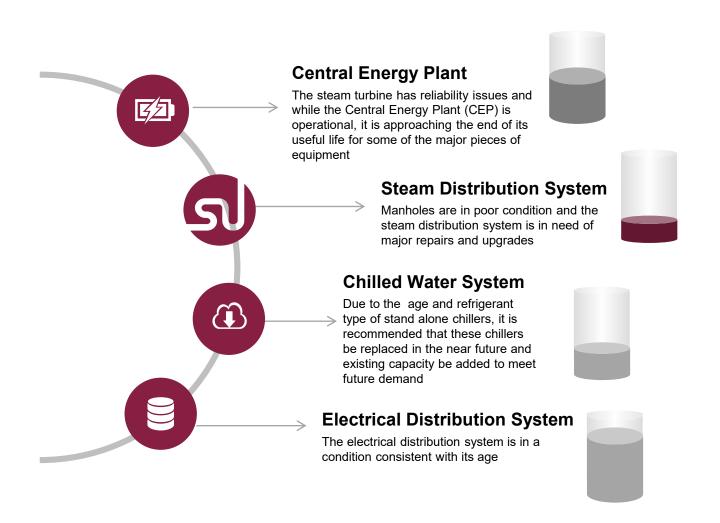
Campus Energy Utility Infrastructure Overview

The University generates approximately 12% of the electricity consumed on campus with the remainder purchased through a long term power purchase agreement with AEP



Campus Energy Utility Infrastructure (continued)

While VT's energy system is able to satisfy current load requirements, signs of an aging system are beginning to surface, presenting a threat to future reliability



Aging Infrastructure

Impact

- Reliability issues of power and pipe failures
- Increased reputational and safety concerns
- Disruptions to campus operations
- Potential lost research and unexpected costs
- Deferred maintenance backlog has contributed to system financial costs

Opportunities

- Repower central energy plant
- Renew steam distribution system
- Deploy smart grid
- Distributed energy resources (DERs)





Possible Paths to Net Zero



UMP helps on Path to Net Zero

- Improved System Efficiency and Reduced Losses
 - Efficient generation equipment
 - Renewed distribution
 - Enhanced Condensate Recovery Systems
- Flexibility to Incorporate Low Carbon Fuel Options
 - Renewable Natural Gas
 - Renewable Energy Districts
 - Biomass
 - Geothermal
 - Solar Thermal or PV
 - Energy Storage
- Energy Conservation Measures
 - Building Controls
 - Behavioral Changes
 - Community Effort (everyone has a role and responsibility)
 - Enhanced Monitoring Systems

Questions and Next Steps

