

# UMASS LOWELL STRATEGIC DEVELOPMENT PLAN UPDATE – 2022-2027

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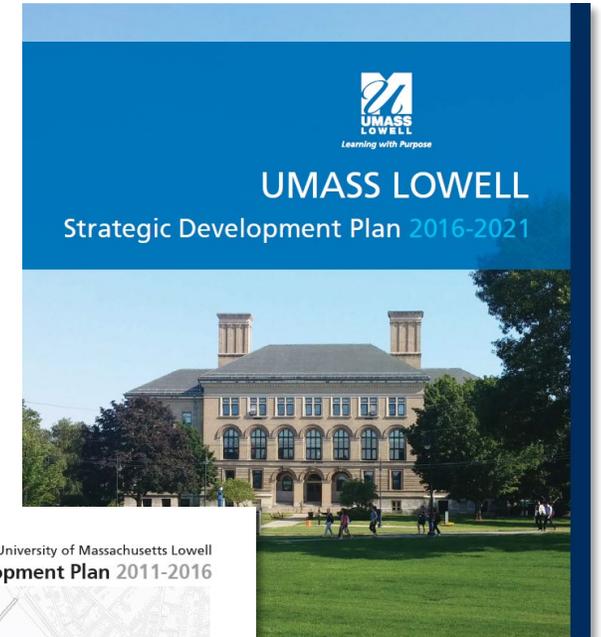
PUBLIC MEETING - NOVEMBER 16, 2022

# AGENDA

- Strategic Development Plan and MEPA Process
- Academic and Physical Evolution of the Campus
- Update on Last Five Years (2016-2021)
- Future Priorities (2022 – 2027)
- Questions

# UMASS LOWELL'S SDP PROCESS AND HISTORY

- Special Review Procedure (SRP) established with Executive Office of Energy and Environmental Affairs (EOEEA) in 2011
- First *UMass Lowell Strategic Development Plan – 2011-2016* filed – August 2012
- Second Update – *UMass Lowell Strategic Development Plan – 2016-2021 Update* filed December 2016
- Extension granted by MEPA during COVID



# MASSACHUSETTS ENVIRONMENTAL POLICY ACT (MEPA) PROCESS

- As a state agency, UMass Lowell projects are subject to applicable reviews by MEPA
- Few campus projects meet MEPA's thresholds applicable to private development activity
- Special Review Procedure(SRP) consolidates MEPA's review
- UMass Lowell prepares and files a Strategic Development Plan which identifies and evaluates the cumulative impacts of five years of campus development

# STRATEGIC DEVELOPMENT PLAN & MEPA PROCESS

- Plan materials and documents available on <https://www.uml.edu/facilities/planning-design-construction/planning/strategic-development-plan-2022-2027.aspx>

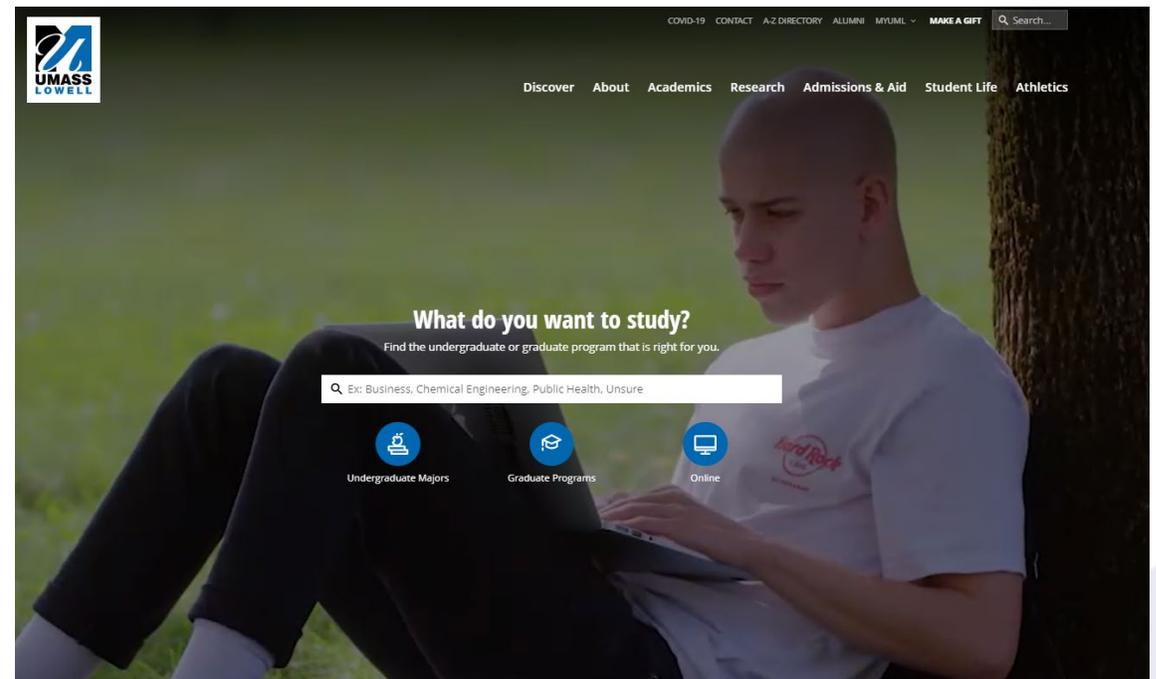
(Search for “Strategic Development Plan 2022” on the UML Website search box)

- Comments can be submitted online on the above webpage or Send an email to [sdp2022@uml.edu](mailto:sdp2022@uml.edu)

## Schedule

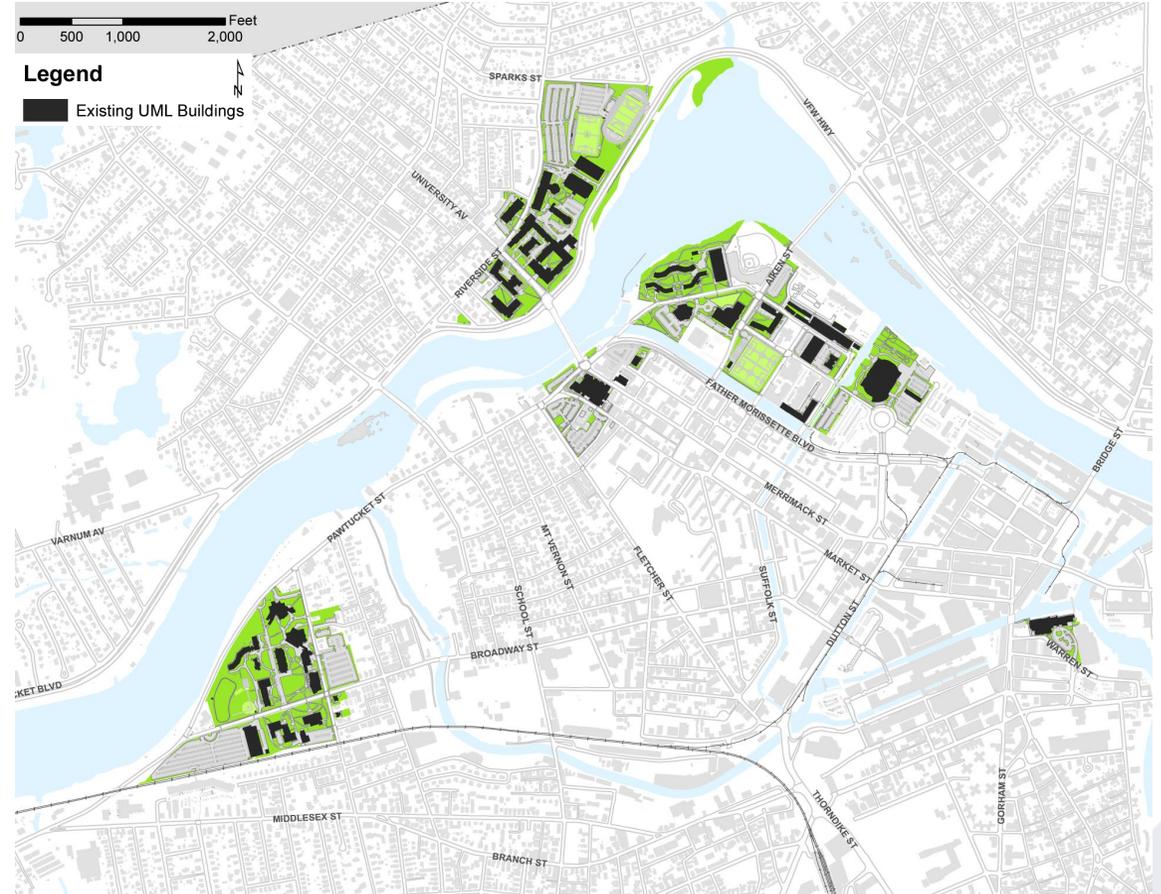
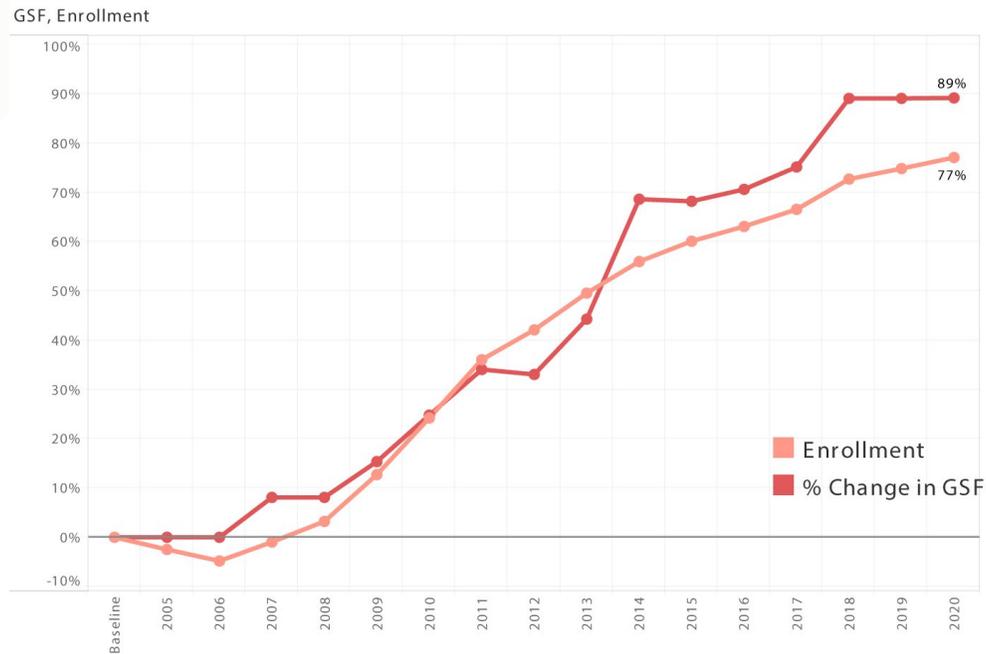
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Anticipated Environmental Monitor Notice Date	January 11, 2023
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# EVOLUTION OF THE CAMPUS

- 2.9% Decline in Enrollment from 2016-2022
- 2.3 % Growth in Full Time Faculty from 2016-2022
- Addition of 2.4 million square feet of campus building space
- 240+ bachelors, masters, and doctoral degrees and professional certificates



# EVOLUTION OF THE CAMPUS SINCE 2016

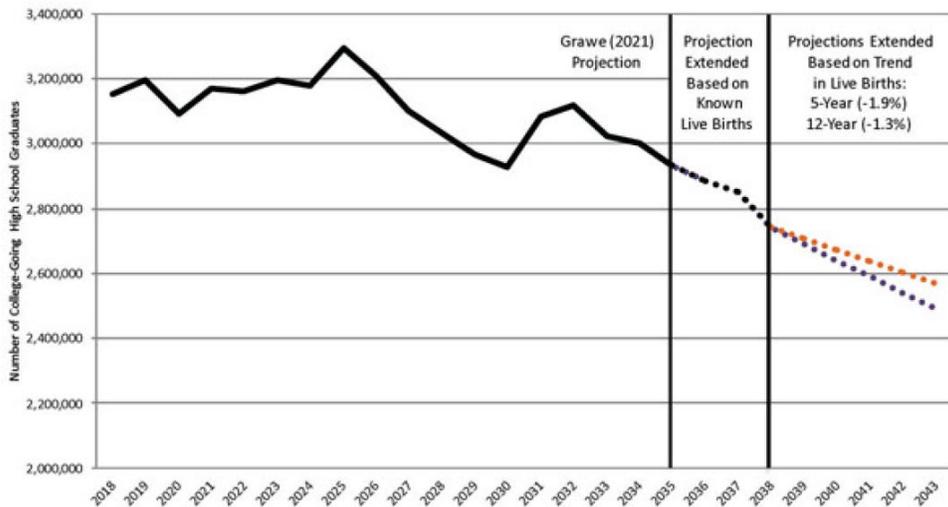
- New Construction
  - Pulichino Tong Business Center
- Acquisitions & Leases
  - River Hawk Village
  - Recreation Fields
  - Graduate & Professional Studies Center
- Substantial Renovations
  - Coburn Hall
  - Dandeneau Hall
  - Perry Hall
  - McGauvran Student Center



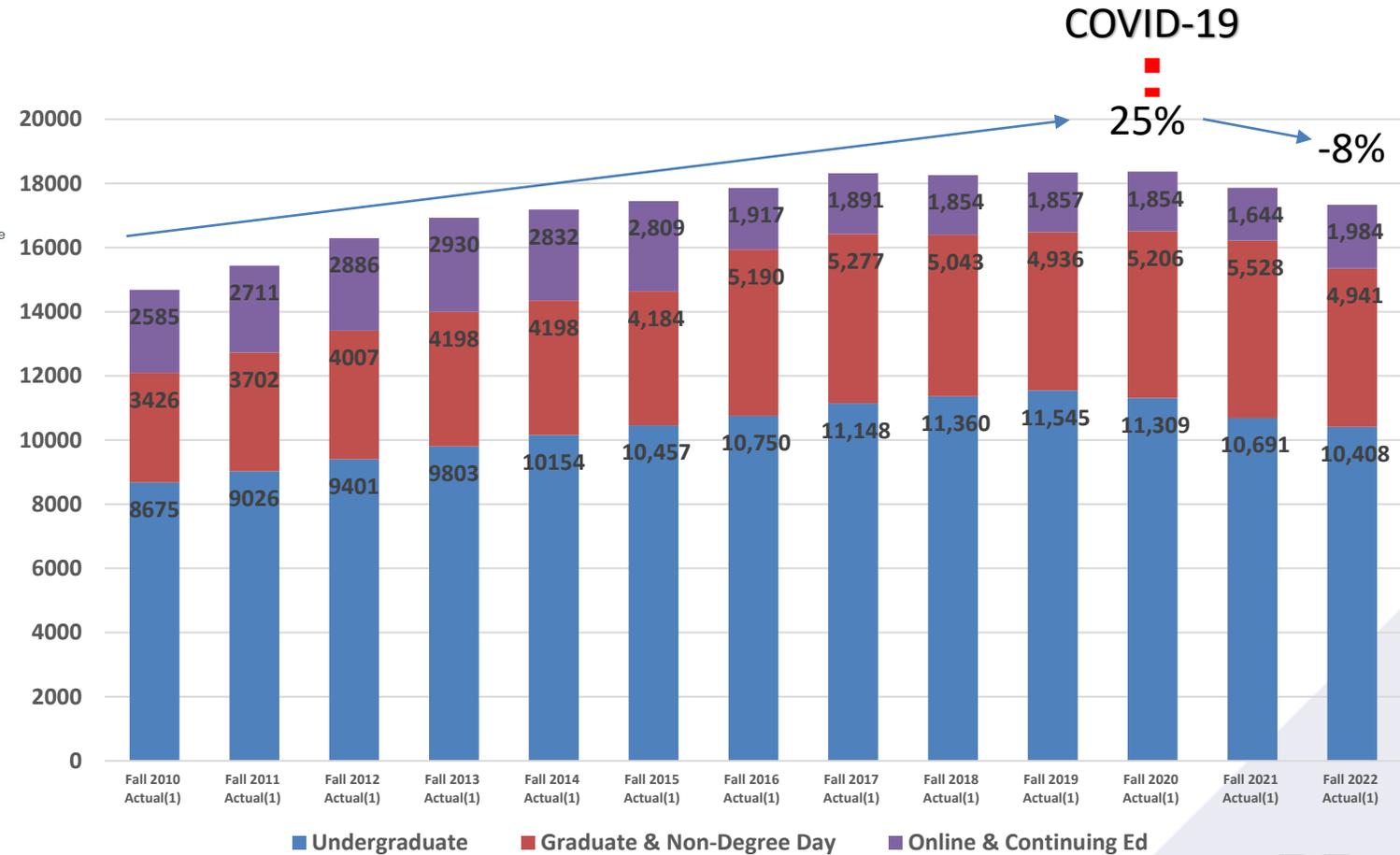
# IMPACTS OF COVID 19 & DEMOGRAPHIC TRENDS

- 2016 SDP projected Fall 2020 enrollment: 20,000
- Actual Fall 2022 enrollment: 17,333
- Current Fall 2027 projection: 17,950

Figure 2. Projection of College-Going High School Graduates (2018-35) and Illustration of Possible Impact of Ongoing Declines in Birth Rate (2036-43)



Sources: 2018-2035: Supplemental material for Grawe, Nathan D. The Agile College: How Institutions Successfully Navigate Demographic Changes. Johns Hopkins University Press, 2021b. <https://nrgrawe.sites.carleton.edu/the-agile-college/27>; 2036-2038: Author's calculations based on Grawe (2021b) and CDC birth data (2018, 2019, 2020 provisional data); 2039-2043: Author's calculations based on Grawe (2021b), CDC (2018-2020), and recent trends in CDC birth data.



## National Demographic Trends

Learning with Purpose

UMass Lowell Enrollment 2010 - 2022



# SIGNIFICANT TRENDS AFFECTING UMASS LOWELL

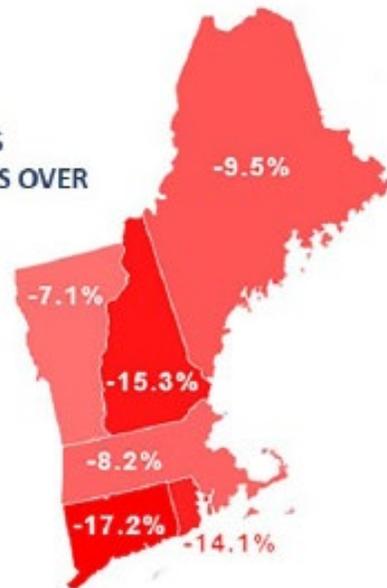
- Projected 8% drop in MA high school graduate over the next decade
- Remote/hybrid work patterns
- Expansion of online programs

**-8.2%**

**DROP IN MASSACHUSETTS  
HIGH SCHOOL GRADUATES OVER  
THE NEXT DECADE**

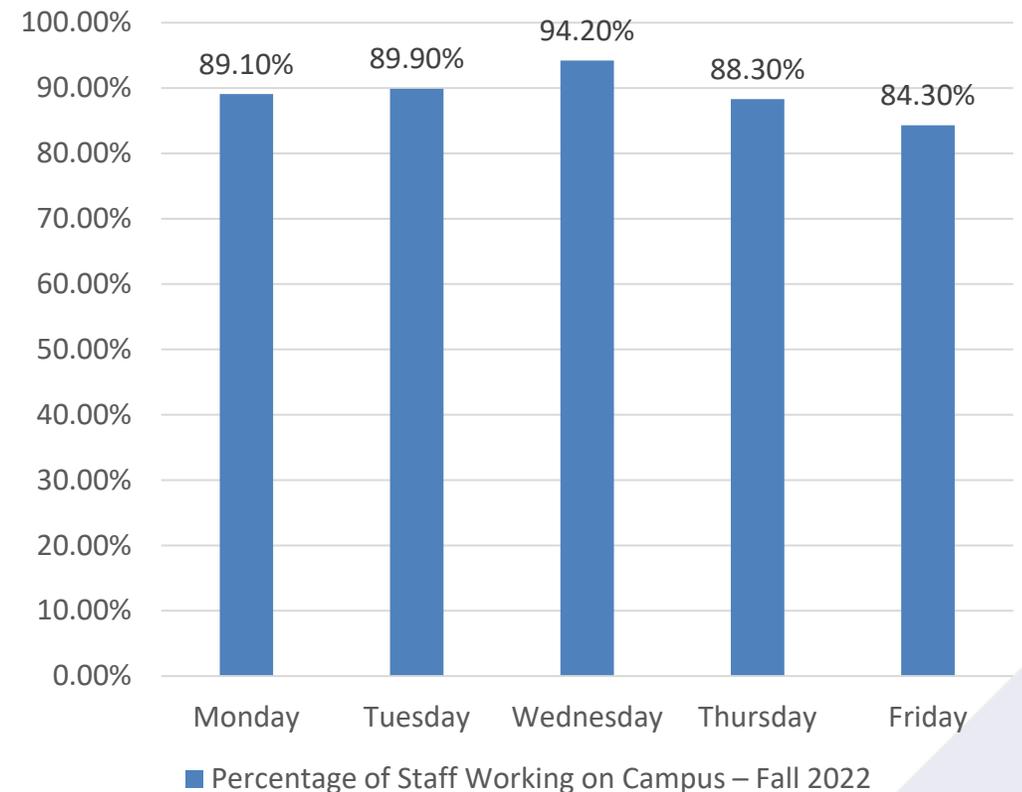
**SIMILAR, DEEPER  
TREND IN OTHER  
NEW ENGLAND  
STATES**

The Chronicle of Higher Education  
<https://www.chronicle.com/article/alm-anac-2020-states>



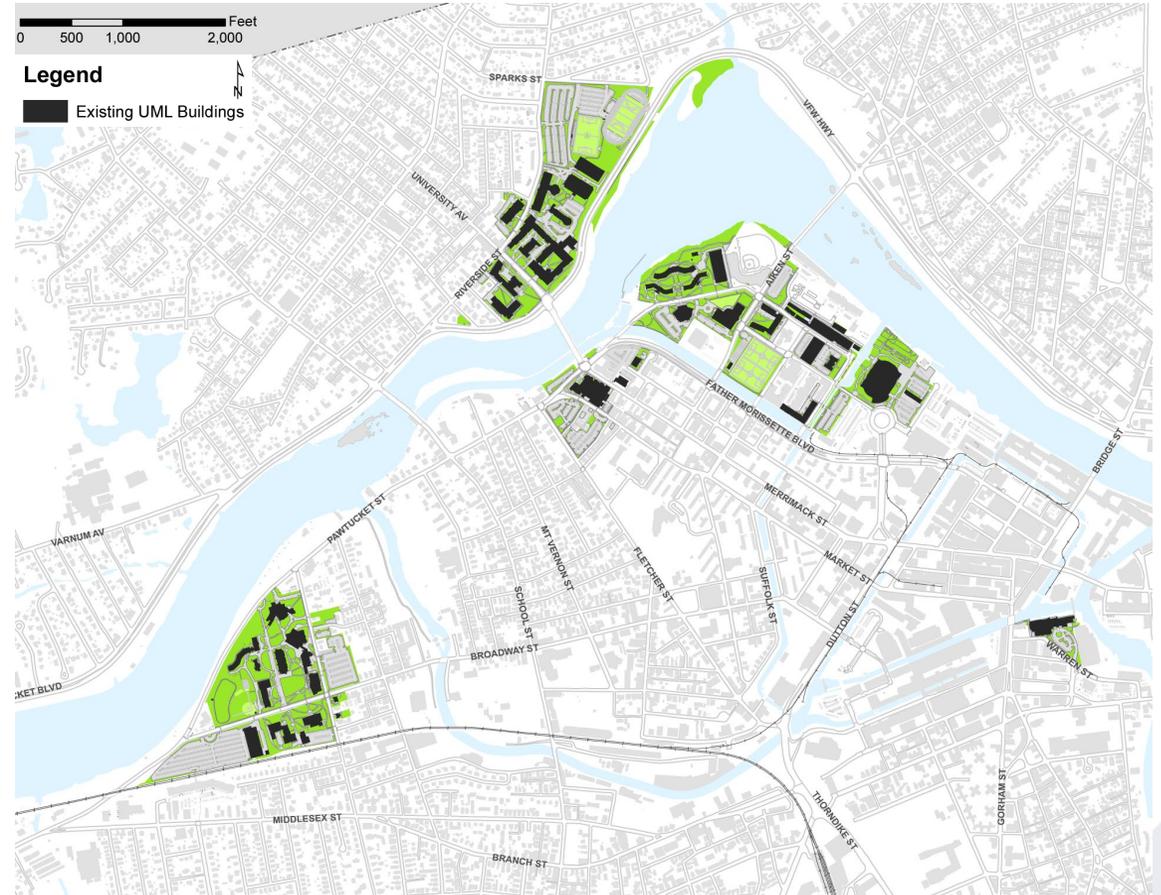
<https://www.chronicle.com/article/almanac-2020-states>

Percentage of Staff Working on Campus – Fall 2022



# CAMPUS DEVELOPMENT: 2022 - 2027

- No significant growth in university-owned space
  - LeLacheur Park acquisition in progress
- Focus on renewing the existing space, addressing deferred maintenance, energy efficiency upgrades and future enabling projects
- Existing building renewal projects
  - Olsen Hall, Ball Hall, Olney Hall, Weed Hall
- Energy Projects
  - North Campus Boiler Replacement, South Campus Steam and Electrical Infrastructure, River Hawk Village Central Hot Water System, Tsongas Center HVAC
- North and South Campuses to remain predominantly academic and research uses
- East Campus Development Initiative:
  - Public private partnership under discussion
  - Mix of uses including research, education, athletics, and residential with University and private tenancies
  - Private developer partner will have the responsibility for applicable land use and environmental permitting



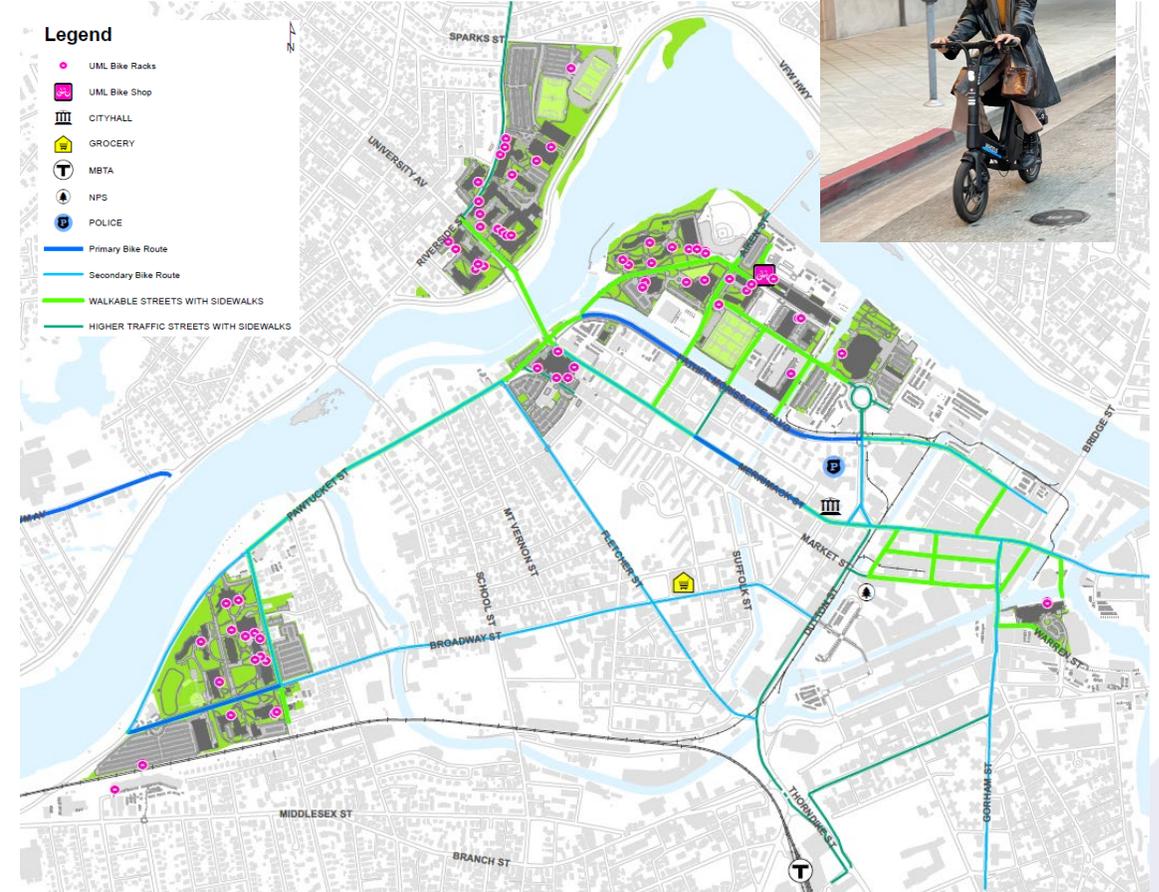
# STUDENT HOUSING

- Student Housing Today
  - Transformation from commuter campus to a residential campus
  - 42% of the undergraduates live on campus
  - Current student bed inventory 4,570 student beds
- Benefits of on-campus living
  - Reduces student vehicle use
  - Reduces parking demand
  - Promotes local economy
- Priorities for the future 2022 - 2027
  - No net new student housing planned
  - Focus will be on improving physical condition of residence hall inventory and aligning types of housing with student demand



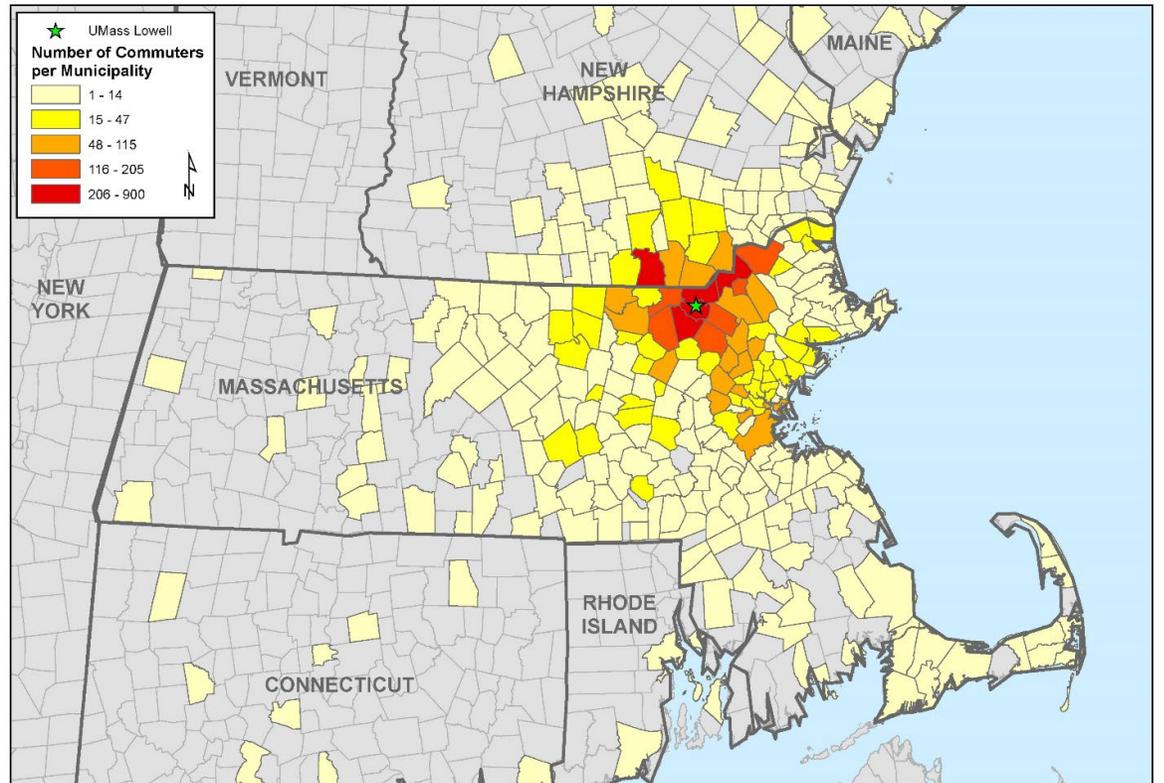
# TRANSPORTATION – WALKING AND BIKING

- Recent Improvements
  - Infrastructure
    - Pawtucket Street bridges over Northern and Pawtucket Canals
    - Northern Canal Overlook
    - Bicycle parking
  - Freewheelers bikeshare
- Priorities for 2022 - 2027
  - Pawtucket Street Corridor
  - Micro-mobility
  - Coordination with City on infrastructure improvements



# TRANSPORTATION – MOTOR VEHICLES

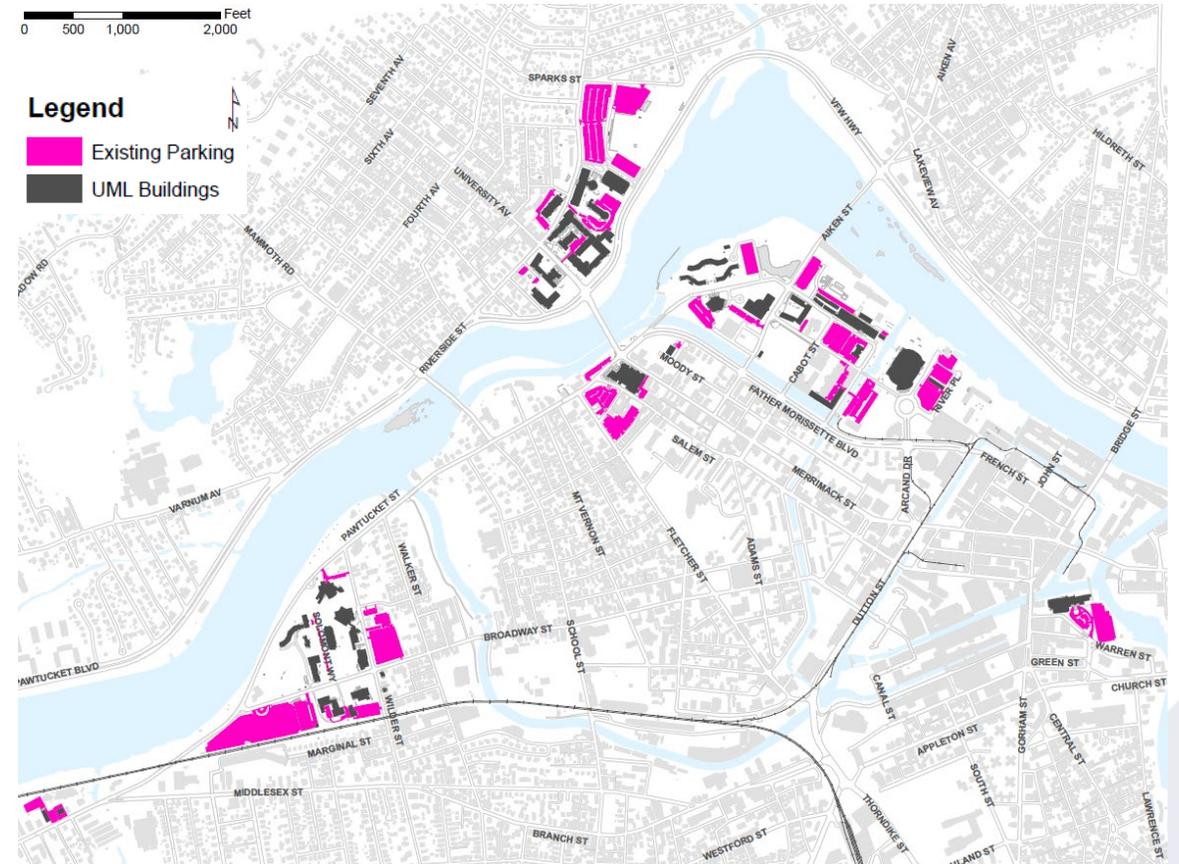
- Average daily vehicle trips are lower than in 2016
- UMass shuttle system & free transit on LRTA and MVRTA
- Projected 2027 ADT is below level projected for 2021 in prior SDP that MEPA approved
- 2022 – 2027 Priorities
  - Hybrid work and online learning to reduce trips to campus
  - Promote transit ridership
  - Preferential parking for electric vehicles
  - Increase EV charging stations on campus
  - Improve pedestrian and cycling infrastructure for intercampus travel
  - Live in Lowell Program



Outside of Lowell, the highest density of commuters came from the nearby towns of Chelmsford, Billerica, Dracut, Methuen, and Nashua, NH, as well as a cluster of communities along major highway routes, such as Interstate 495 and US Route 3.

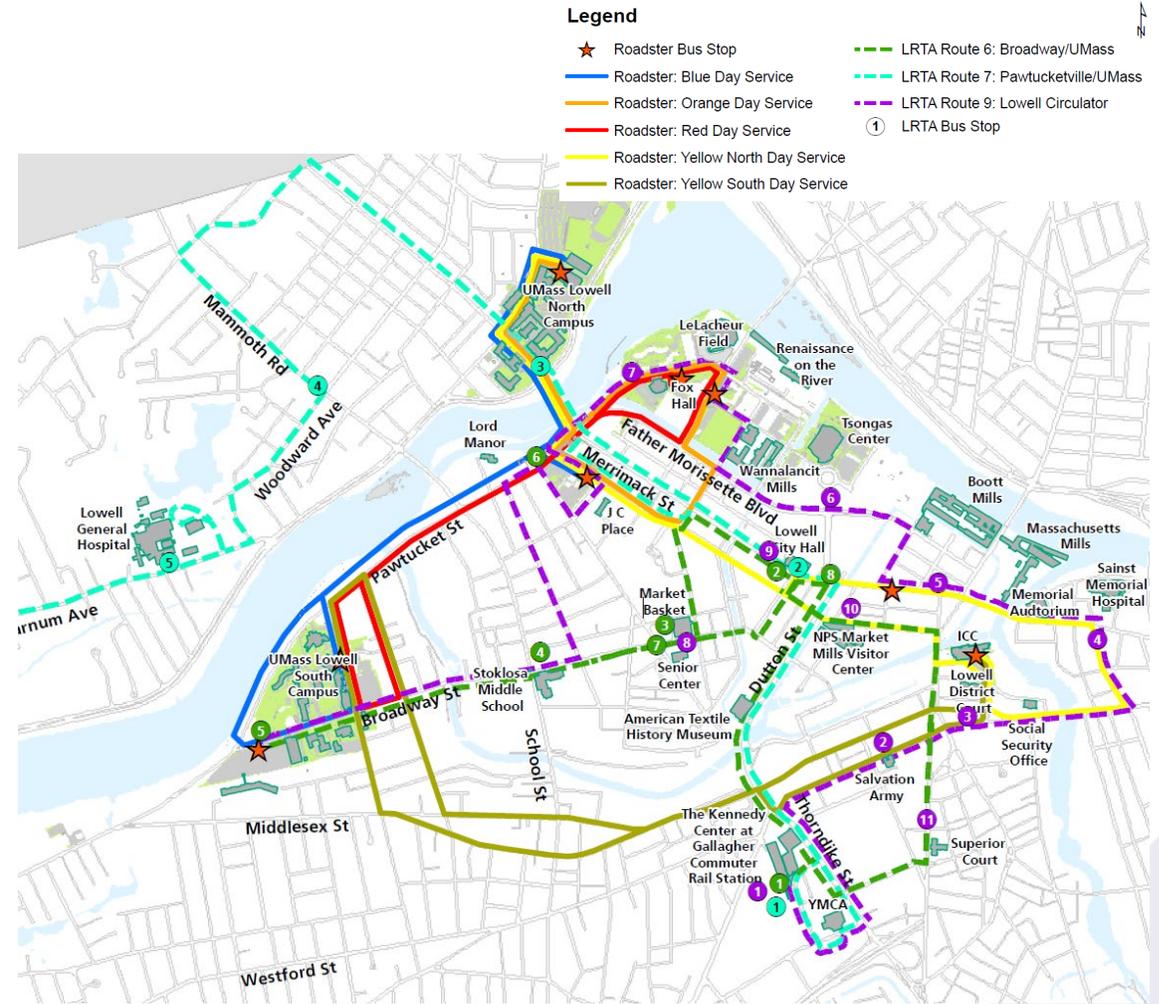
# TRANSPORTATION – PARKING

- Most parking decal holders live more than 5 miles away
- 6,677 parking spaces on three campuses in parking garages and surface lots
- Park once requirement for commuter students
- Faculty, staff, and visitor parking located adjacent to administrative buildings
- Faculty and Staff decal owners reduced by 3% between 2016 and 2022
- Students decal owners increased by 13%
- **2022 – 2027 Priorities**
  - Reduce parking demand with hybrid work and online courses
  - Encourage alternative modes of transportation among students, faculty and staff
  - Maintain adequate level of parking for campus users
  - Use parking costs to manage behavior
  - Discourage parking on neighborhood streets
  - Collaborate with the City on enforcement



# TRANSPORTATION – PUBLIC TRANSIT AND SHUTTLES

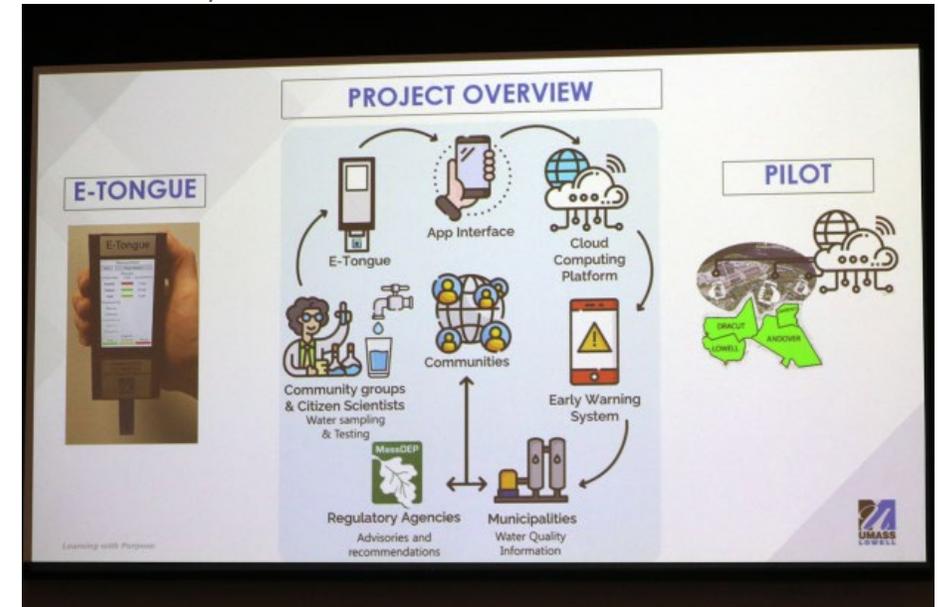
- Public Transit and Roadster Shuttle
  - 5,000 average daily riders on typical school days (6,400 on peak school days) pre-COVID
  - Currently 4,400 average daily riders
  - Campus affiliates ride free on all LRTA and selected MVRTA bus routes
- 2022 – 2027 Priorities
  - Incentivize shuttles and transit use among campus constituents
  - Collaborate with transit agencies to streamline service on shared routes
  - Electrify shuttle fleet



# WATER AND WASTEWATER

- Water consumption on campus increased between 2016 and 2019 and then decreased significantly during COVID
  - River Hawk Village Acquisition (700 additional student beds)
  - Increase in use of water for irrigation and research
  - More accurate metering and tracking
- Priorities for the future 2022 – 2027
  - Install water efficient fixtures
  - Apply design standards that promote water efficiency in capital projects
  - Improve efficiency of irrigation system with remote water management
  - Assist City of Lowell with projects to separate combined sanitary sewers and storm drainage infrastructure
  - Strengthen systems to prevent wastewater contamination

Julia Malakie/Lowell Sun



# STORMWATER MANAGEMENT

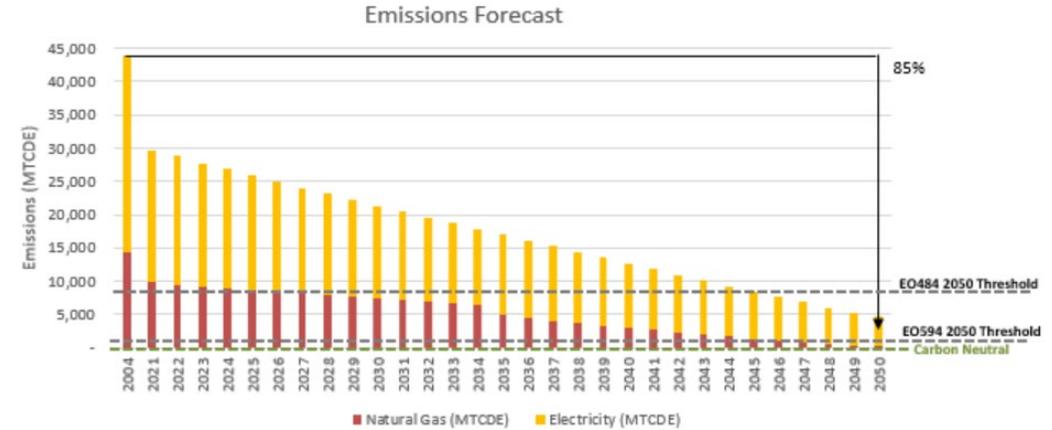
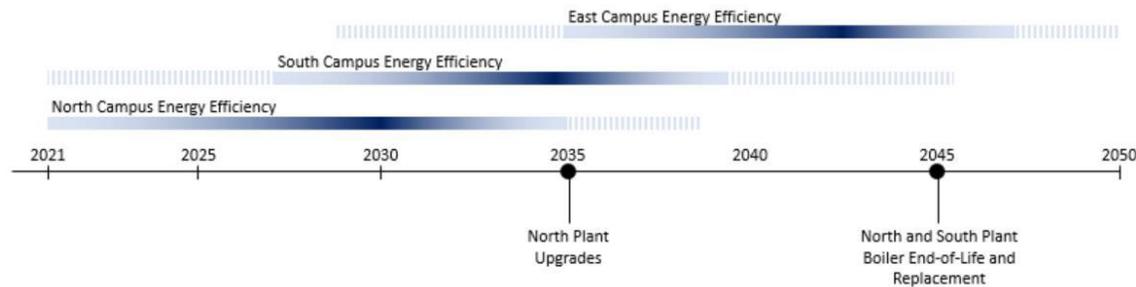
- UMass Lowell permitted to maintain and implement its own storm drainage system under Small Municipal Separate Storm Sewer System (MS4 General Permit) in Massachusetts
- UMass Lowell Stormwater Management program regulated by EPA's National Pollutant Discharge Elimination System (NPDES) permit
- UMass Lowell applies best practices to reduce discharge of pollutants in water and reports activity annually
  - Stormwater drainage
  - Catch basin upgrades and stenciling
  - Storm-sewer separation projects
  - Underground tank removals
  - Impervious surface reduction
  - Public awareness and education programs
  - Ongoing outfall screenings and catchment investigations
- Demonstration green roof and rainwater capture projects
- Educating Engineering students in sustainable stormwater management practices



As authorized by the Clean Water Act, the NPDES Permit Program **controls water pollution by regulating point sources that discharge pollutants into waters of the United States.**

# STEAM AND POWER

- Alternative Energy Master Plan
  - Upgrade infrastructure
    - Steam leak detection and repair
    - Electrical efficiency
    - North Plant boiler replacement
  - Energy saving measures in capital projects
- Align projects with the requirements of the Executive Order 594
- Deferred maintenance projects
- Increase renewable energy production and use on campus
  - Solar PV generation doubled from 246 kWh to 484 kWh between 2016-2021



**Olney Hall**

Campus: North Campus  
 Core End Use: Lab  
 Square Footage: 205550  
 Last Major Renovation: 1974

**Building Summary**  
 Olney Hall is an lab building on the North Campus. It has a Building Score of 67. This makes it a higher priority for energy efficiency improvements as a pilot project particularly given direct steam systems. The business as usual case assume dry lab and cooling operations will be expanded. The EUI reduction in the Good and Best cases are a result of energy recovery, decoupled heating/cooling and ventilation systems, lighting controls, domestic hot water heater, and low flow fixtures. Future carbon reduction is in result to decoupled heating strategy. Air-side energy recovery and envelope upgrades reduce heating and cooling loads.

**EUI Breakdown**

BAU Good Best

**Carbon Emissions**

BAU Good Best

**Heating Load**

BAU Good Best

**Cooling Load**

BAU Good Best

**Current**

- Steam-to-HW
- Water-cooled Chiller
- Candidate for envelope improvements

**Goals**

- ECM 1a - Wall Insulation - R-10 continuous insulation
- ECM 2a - Roof Insulation - R-30 continuous insulation
- ECM 3a - Glazing U-value/SIGC - Double-pane
- ECM 4a - Infiltration - 0.25 cfm/ft<sup>2</sup>
- ECM 5a - Air-side Systems - Decoupled systems
- ECM 5d - Air-side Systems - Constant to variable volume
- ECM 5e - Air-side Systems - Airflow setbacks
- ECM 5c - Air-side Energy Recovery - 50% Runaround Coil
- ECM 7c - Water-side Systems - Pump VFDs
- ECM 8a - Lighting - LED Conversion
- ECM 8b - Lighting - Occupancy Sensors
- ECM 8c - Lighting - Daylight Sensors
- ECM 9a - Plumbing - Low Flow Fixtures
- ECM 9c - Plumbing - Electric Water Heater
- ECM 10a - Controls - DDC Sequence Upgrades
- ECM 11a - Process Loads - Behavior Change
- ECM 11b - Process Loads - Filtered Fume Hoods
- ECM 11c - Process Loads - Low Flow Fume Hoods
- ECM 11d - Process Loads - Fume Hood Velocity Sensors
- ECM 11f - Process Loads - Energy Star Office Equipment

**Good**

- ECM 1b - Wall Insulation - R-20 continuous insulation
- ECM 2b - Roof Insulation - R-50 continuous insulation
- ECM 3b - Glazing U-value/SIGC - Triple-pane
- ECM 4b - Infiltration - 0.1 cfm/ft<sup>2</sup> @ 75 Pa
- ECM 5f - Air-side Systems - Anularly particulate counters
- ECM 5d - Air-side Energy Recovery - 70% Runaround Coil
- ECM 9b - Plumbing - Instantaneous Water Heater

**Best**

- ECM 1c - Wall Insulation - R-30 continuous insulation
- ECM 2c - Roof Insulation - R-50 continuous insulation
- ECM 3c - Glazing U-value/SIGC - Triple-pane
- ECM 4c - Infiltration - 0.1 cfm/ft<sup>2</sup> @ 75 Pa
- ECM 5g - Air-side Systems - Anularly particulate counters
- ECM 5d - Air-side Energy Recovery - 70% Runaround Coil
- ECM 9b - Plumbing - Instantaneous Water Heater

**Olney Hall Detailed Options Matrix**

Classification	BAU	Good	Best
Target EUI (kBtu/sq ft)	210	99	84
Architectural		R-10 continuous insulation (exterior)	R-30 continuous insulation (exterior)
Wall Performance	Masonry and Brick, 1.12" spray insulation, ~R-3 noncontinuous (1970s)	R-30 continuous insulation, white	R-50 continuous insulation, white
Roof Performance	Black TPO, 2" rigid R-8 (exterior) (1970s)	Double glazing curtain wall and punched assembly u-value: 0.3, SHGC: 0.25	Triple glazing punched assembly u-value: 0.20, SHGC: 0.26
Glazing Performance	Single pane (fixed and operable)		
Heating/cooling system	Steam to hot water (original to building) Constant volume pumps	(4) 30 ton modular air-to-water heat pumps (2) 30 ton air cooled chiller (peak and 50% redundancy) (5) chilled water pumps @ 10 HP (includes 1 on standby) (3) hot water pumps @ 10 HP (includes 1 on standby) Chiller Constant volume pumps Cooling tower Split AC	(1) 30 ton modular air-to-water heat pumps (2) 30 ton air cooled chiller (peak and 50% redundancy) (4) chilled water pumps @ 20 HP (includes 1 on standby) (4) hot water pumps @ 7.5 HP (includes 1 on standby)
Air distribution	Individual AHUs (constant volume)	DOAS Runaround Coil - Qty 4 - 60,000 CFM @ 120 MHP each	DOAS Konvekta + Heat Pump Qty 2 - 70,000 CFM @ 140 MHP each Heat Pump - (7) 30 ton modules (multistage Heat Recovery) DOAS General exhaust through wheel Supply Qty 1 - 54,000 CFM @ 100 MHP Exhaust Qty 1 - 54,000 CFM @ 50 MHP
Individual exhaust fans (constant volume)	Qty 4 - 80,000 CFM @ 30 MHP each	Qty 4 - 35,000 CFM @ 30 MHP each	
Individual return fans			
Zone systems	Unvent system (1-2 per lab)	4-pipe fan coil units	4-pipe fan coil units
Controls	DDC HW and CHW resets included BAC reset included	Complete BDC Static pressure reset opportunity No effective reset coil multiple spaces (Lab 02A, 04, 05) - Retro-commissioning opportunity	Complete BDC Static pressure reset opportunity No effective reset coil multiple spaces (Lab 02A, 04, 05) - Retro-commissioning opportunity
Domestic Hot Water	Steam to hot water DHW boiler	Electric boiler with metric	Instantaneous electric DHW
Fixture Flow Rates	Bathroom renovation 2.2 gpm	1.0 gpm lavatory 1.0 gpm kitchen sink	1.0 gpm lavatory 1.0 gpm kitchen sink
Interior Lighting	Fluorescent	LED	LED

# SUSTAINABILITY AND GREENHOUSE EMISSIONS

## RIST INSTITUTE FOR SUSTAINABILITY & ENERGY

Sustainability Tracking, Assessment & Rating System (STARS)



- Previous Submissions
  - 2015, 53.85 – SILVER
  - 2017, 68.95 - GOLD
  - 2019, 77.56 – GOLD
  - **2022, 83.36 – GOLD**



- Path to Platinum
  - Platinum rating is reached with a score of 85
  - 11 Universities Globally
  - Opportunity Areas – Dining, Academics, Facilities

Massachusetts		UMass	
Boston University	53.67	Boston	
Boston College	54.99	Chan	
MIT	69.20	Dartmouth	
WPI	72.46	Amherst	

*“UMass Lowell is accomplishing where sustainability matters: academics, research, engagement, planning, community partnerships, and more. I am impressed with the Rist Institute for Sustainability and Energy creating hands-on sustainability, climate change, and energy research opportunities for students, faculty, and staff.”*

**- Lisa Bjerke, Director GreenerU**

# SUSTAINABILITY AND GREENHOUSE EMISSIONS

## Operational highlights

2021 Scope 1 Emissions:

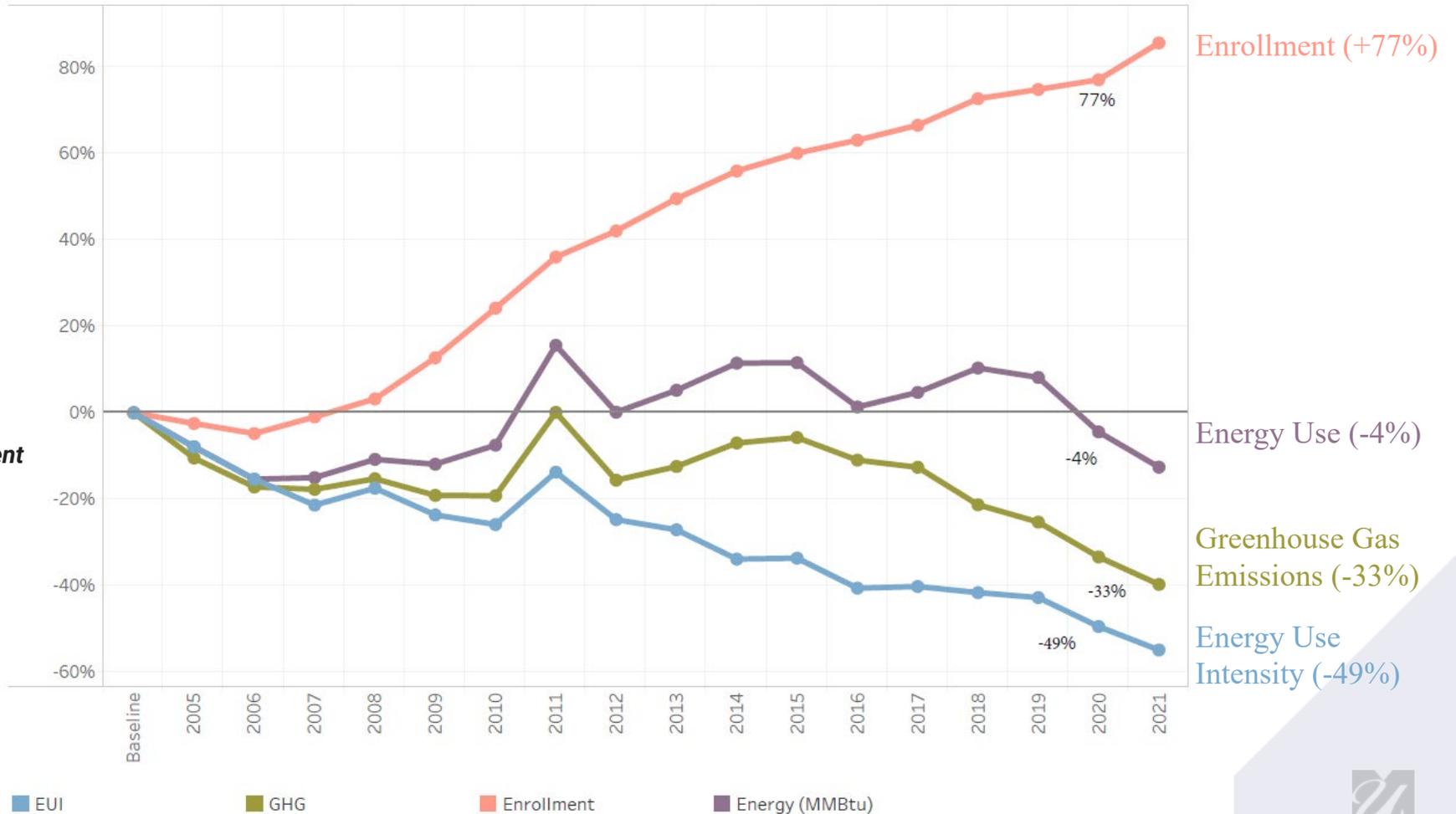
11,464 MTCO<sub>2</sub>e

2021 Scope 2 Emissions:

4,634 MTCO<sub>2</sub>e

*MTCO<sub>2</sub>e - Metric tons of carbon dioxide equivalent*

EUI, GHG, Enrollment, MMBtu





# COMMUNITY ENGAGEMENT

- Regular communication with city officials and community leaders
- Neighborhood groups meetings
- Construction best practices
  - Green building standards
  - Building materials recycling
  - Traffic, access and safety
  - Noise and dust control
  - Snow and stormwater management
  - Excavation and vibration monitoring
  - Responsive communications
  - Contaminated material treatment and disposal



# COMMENTS AND QUESTIONS

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