

The University of Massachusetts  
Supporting a Culture of Planning with Web GIS Technology:  
A Case Study for the “Master Plan Explorer” Web App

Spring NEARC  
May 22<sup>nd</sup> 2012



# Process

## The Campus Master Plan Process

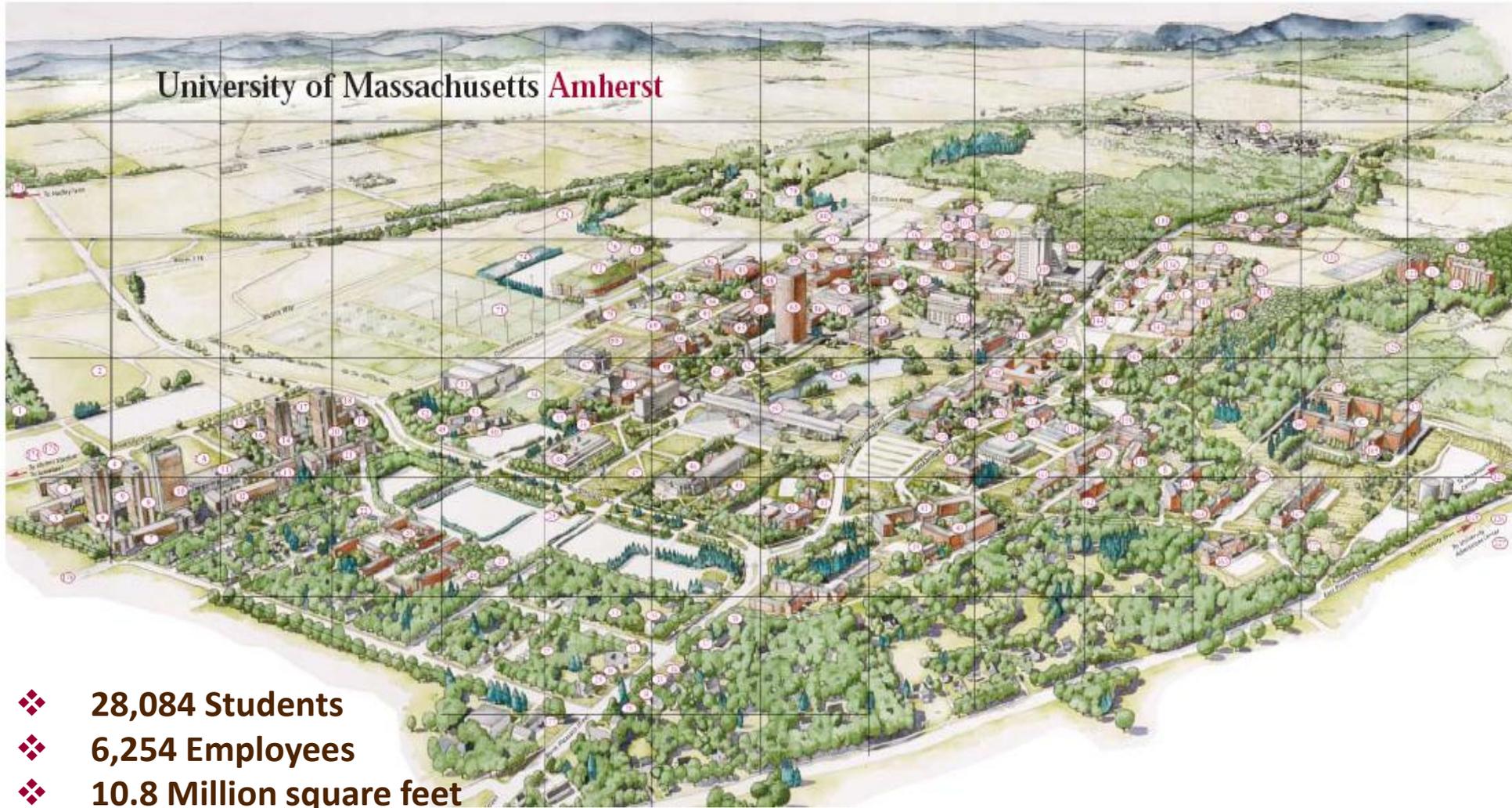
- Purpose of the Plan
- Participants
- Evolution of the Plan
  - Analysis, Idea Gathering, Alternatives, Preferred Alternative, Draft Plan, Approval, Implementation

## The Role of GIS Technology in the Plan

Analysis, Communication/Visualization, Participation/Feedback, Documentation, Implementation

## How we did it

# University of Massachusetts **Amherst**



- ❖ **28,084 Students**
- ❖ **6,254 Employees**
- ❖ **10.8 Million square feet**
- ❖ **200+ Major Buildings (main campus)**
- ❖ **1,450 acre campus**

# Purpose of the Campus Plan



So our short term decisions are part of a long term vision for the campus

To ensure the look, feel and function of our campus is reciprocal with our academic mission



To create a shared and supported framework which will inform our planning decisions campus wide

To create a document which can help us meet our goals, raise our aspirations, and help raise funds

# The Participants

## Division of Capital Asset Management

## The University of Massachusetts Amherst

- Executive Oversight Committee
  - Facilities and Campus Services
  - Campus Planning
  - Campus Master Plan Committee
  - Stakeholder Groups
    - *Teaching, Research and Libraries*
    - *Student Life*
    - *Administration and Support*
    - *Transportation, Land Use and Open Space*
    - *Building, Grounds and OIT*
- Existing Governance and Committees
    - *Faculty Senate*
    - *Student Senate*
    - *Capital Asset Board*
    - *Parking Transportation Advisory Board*
    - *Campus Physical Planning Committee*
    - *University Public Art Committee*
    - *Pedestrian Safety Committee*

## External Participants

- Neighbors
- Local Community Officials and Commissions
- Pioneer Valley Regional Plan Commission

## Consultants

- Wilson Architects
- Ayers Saint Gross
- VHB
- Tighe and Bond



# Over the Past Nine Months

- Nearly 200 Events
- Over 350+ Hours
- With
  - Campus Stakeholder Groups
  - CPPC, UPAC, PTAB, Pedestrian Safety, etc.
  - Faculty Senate
  - Individuals
  - Open Campus Forums
- Over 3,500 Web Visits



Web site was developed as permanent platform for web based participation process, communication and planning resources.

Over 3,500 Visits

**UMASS AMHERST** *campus planning*  
a division of facilities & campus services

[home](#) • [master planning](#) • [maps and information](#) • [related links](#) • [about us](#) • [contact us](#)

**THE PLAN IN PROCESS**

**the long view**  
Understand the issues in campus development and how we're creating "a culture of planning."

**INFORMATION YOU CAN USE**

**more than maps**  
Sure, we have maps, but you can also find reports, meeting schedules, GIS links and more.

**GET INVOLVED**

**it's your campus**  
Contribute to our blog, come to a meeting, or send us email. Tell us what you like, or don't, about your campus.

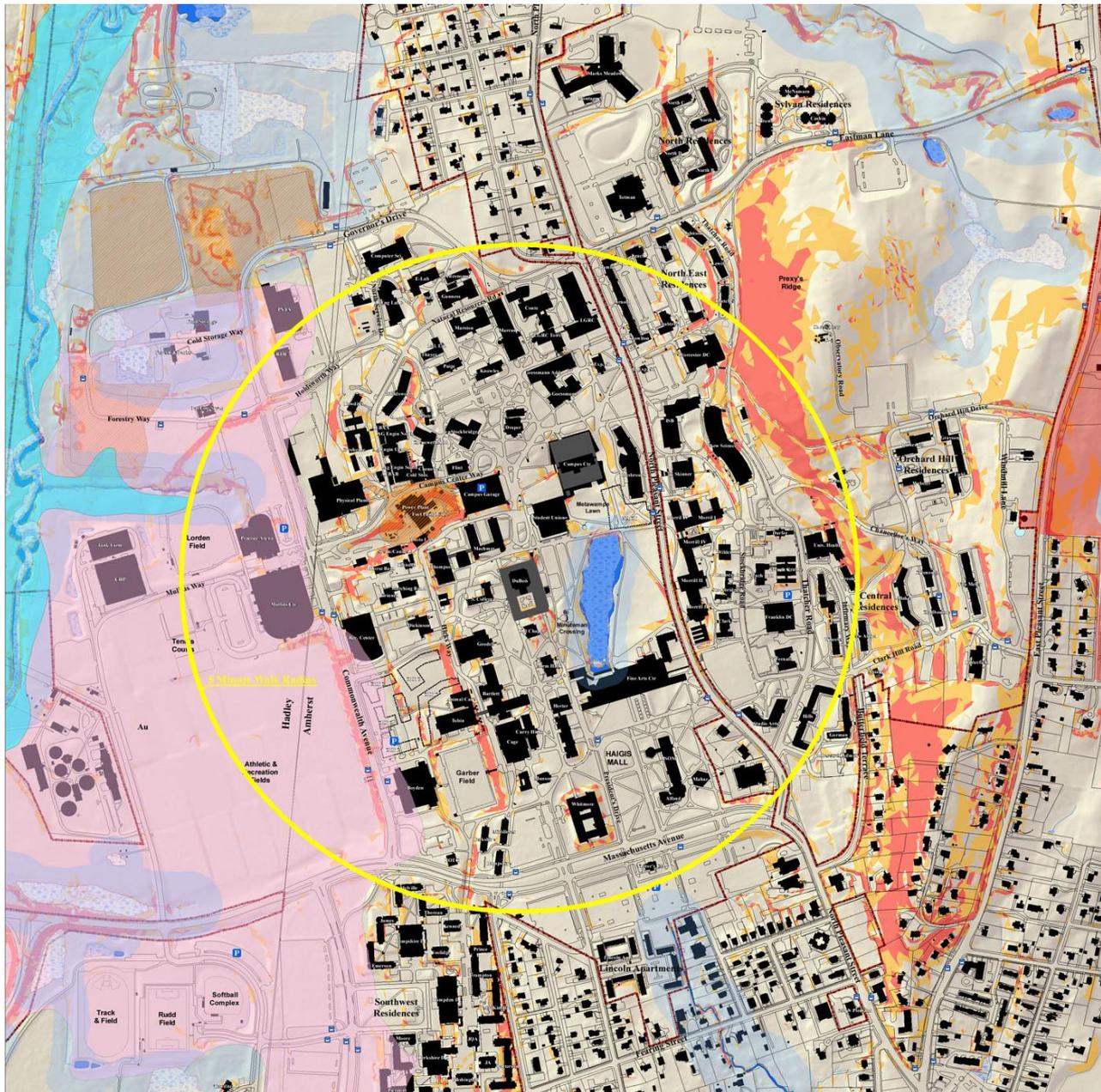
[home](#) • [master planning](#) • [maps and information](#) • [related links](#) • [about us](#) • [contact us](#)

This page is maintained by UMass Amherst Campus Planning

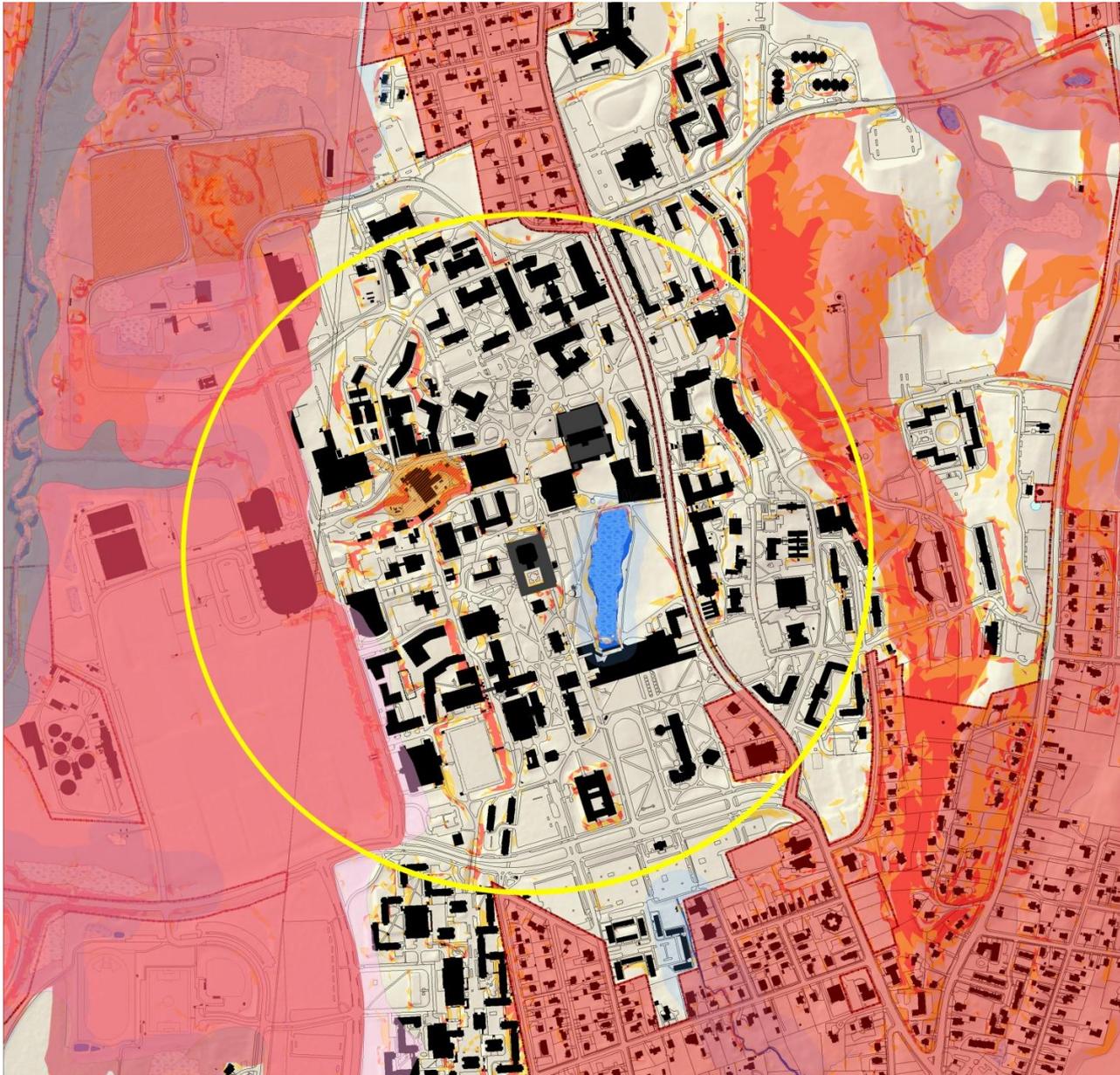
© 2012 University of Massachusetts Amherst • [Site Policies](#) • [Site Map](#) • [f](#) [t](#)

!!!

# Composite Site Analysis



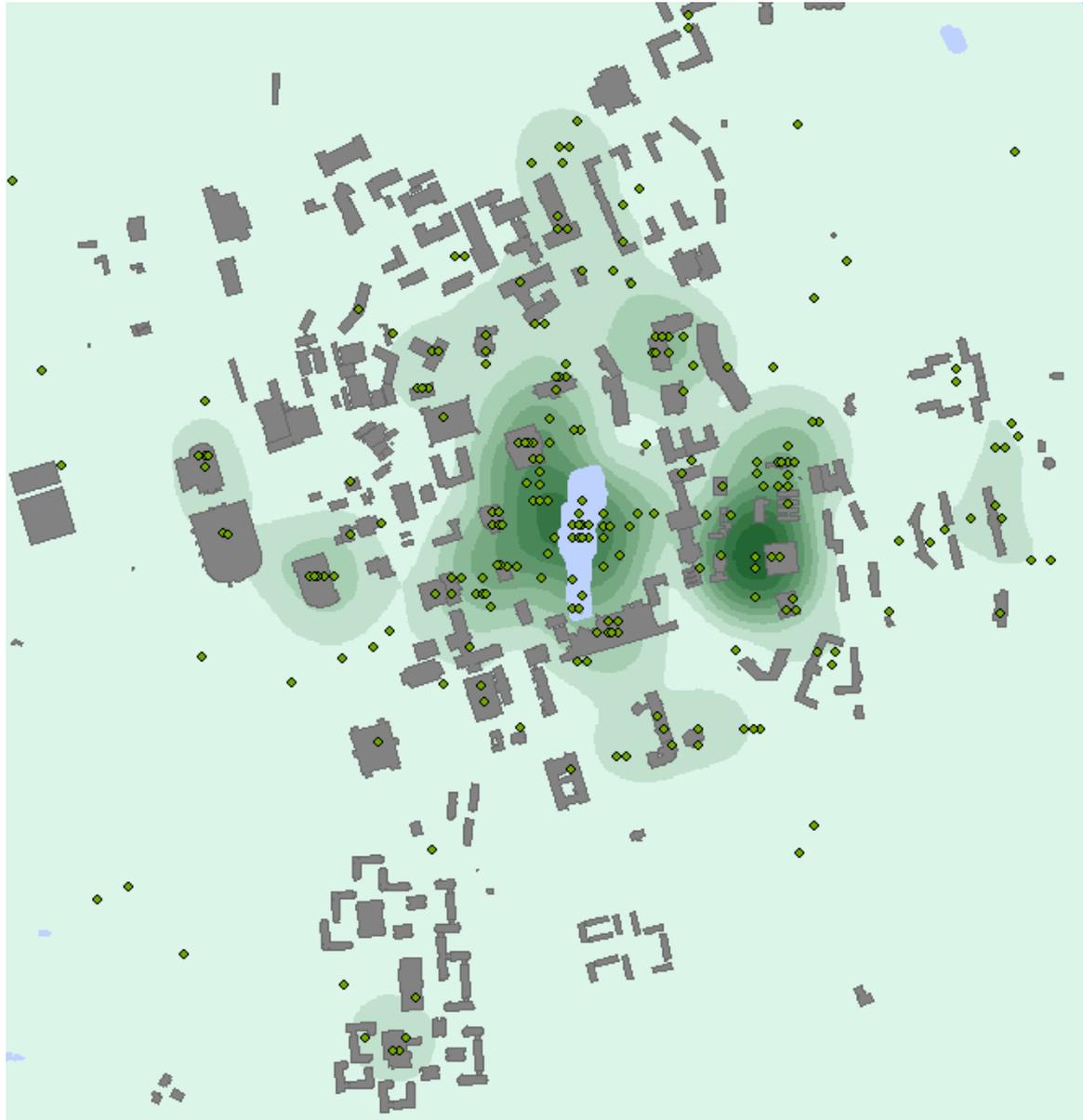
# Non-Buildable and Difficult Zones





## Common Themes

- Build a beautiful pedestrian friendly campus
  - *Remove vehicular barriers*
  - *Expand the super block*
  - *Plant trees*
  - *Build more WOW's and small spaces*
  - *Remove surface parking from within the loop*
  - *Create a strong positive visual character*
- Add and upgrade facilities
  - *Additional Classrooms*
  - *Additional Beds*
  - *Larger/New Student Union*
  - *Wellness and Health Center*
  - *Swimming Pool*
  - *Admissions Center*
  - *Laboratories*
  - *Find uses and renovate historic structures*
  - *Infrastructure to support excellence*



# Web Based Survey “Likes”

People like good outdoor spaces with nice plantings and views.

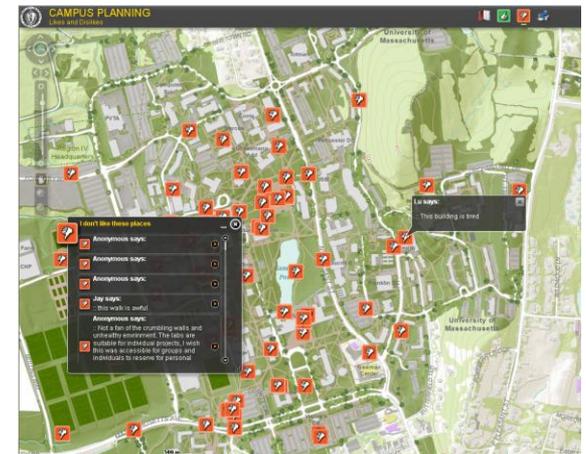
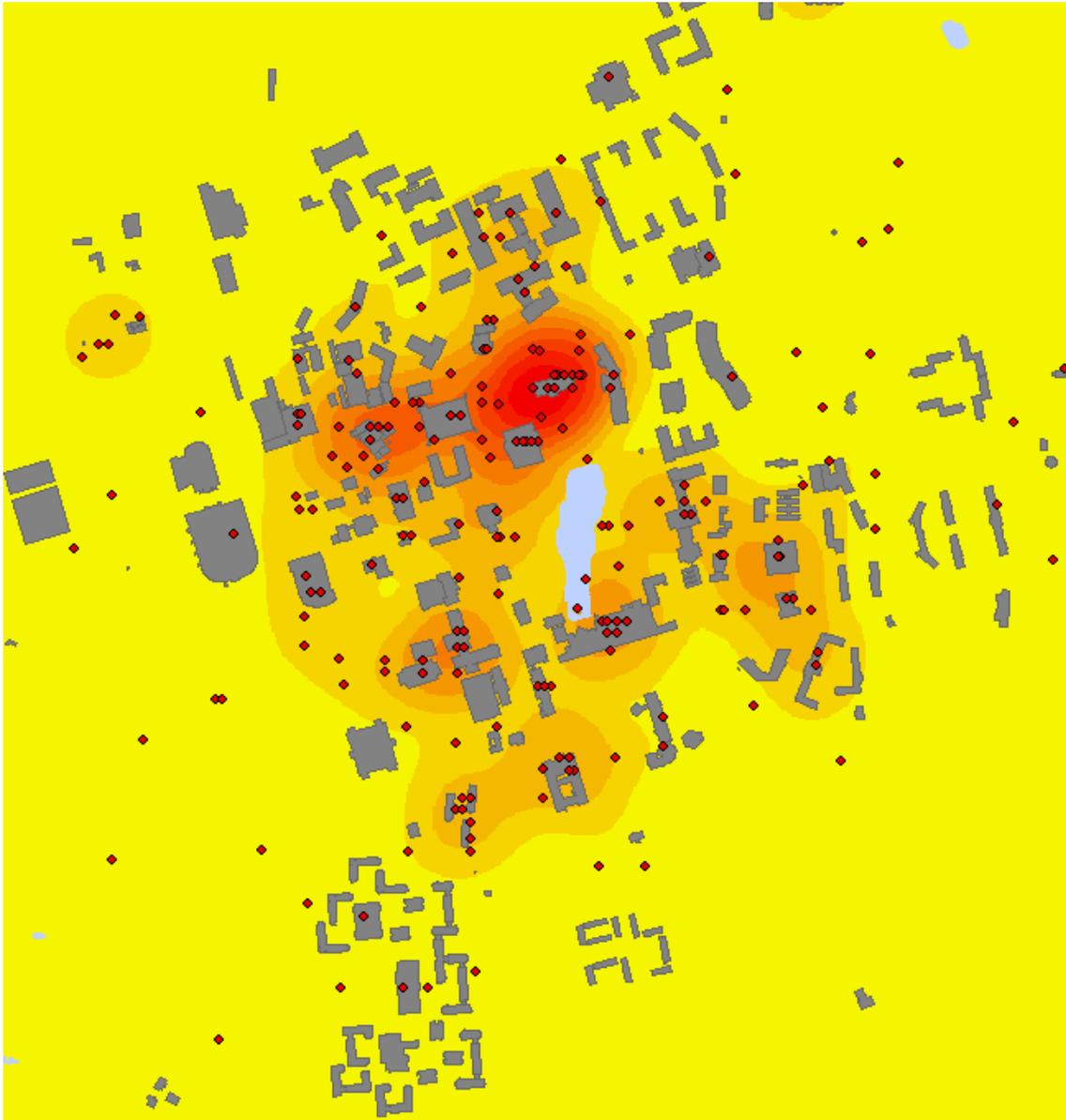
People like the views from the campus core.

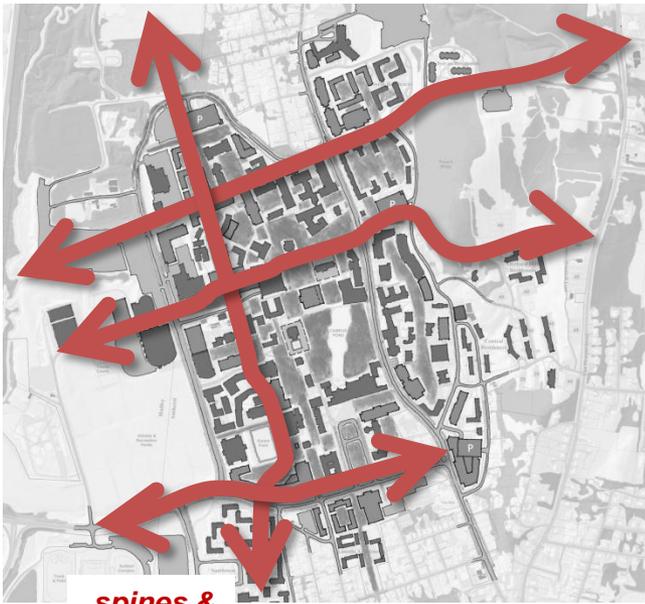


## Web Based Survey “Dislikes”

People comment on tired old buildings that need to be demolished and replaced.

People don't like cars where only pedestrians should be and there are complaints about dangerous crosswalks and intersections.

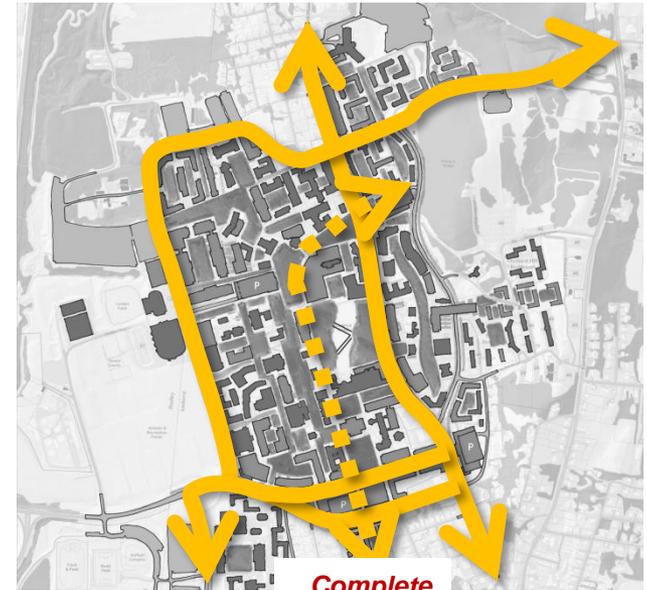




**spines & views**



**courts**



**Complete streets**



# Guiding Principles

- Long-Term 50-Year perspective
- Create growth opportunities in the core
- Form an open space framework to include courts, spines and complete streets
- Build campus not just buildings
- Untangle vehicular and pedestrian circulation
- Develop a 24/7/12 campus core – mixed use
- Unify academic campus
- Respect planning, building & landscape heritage

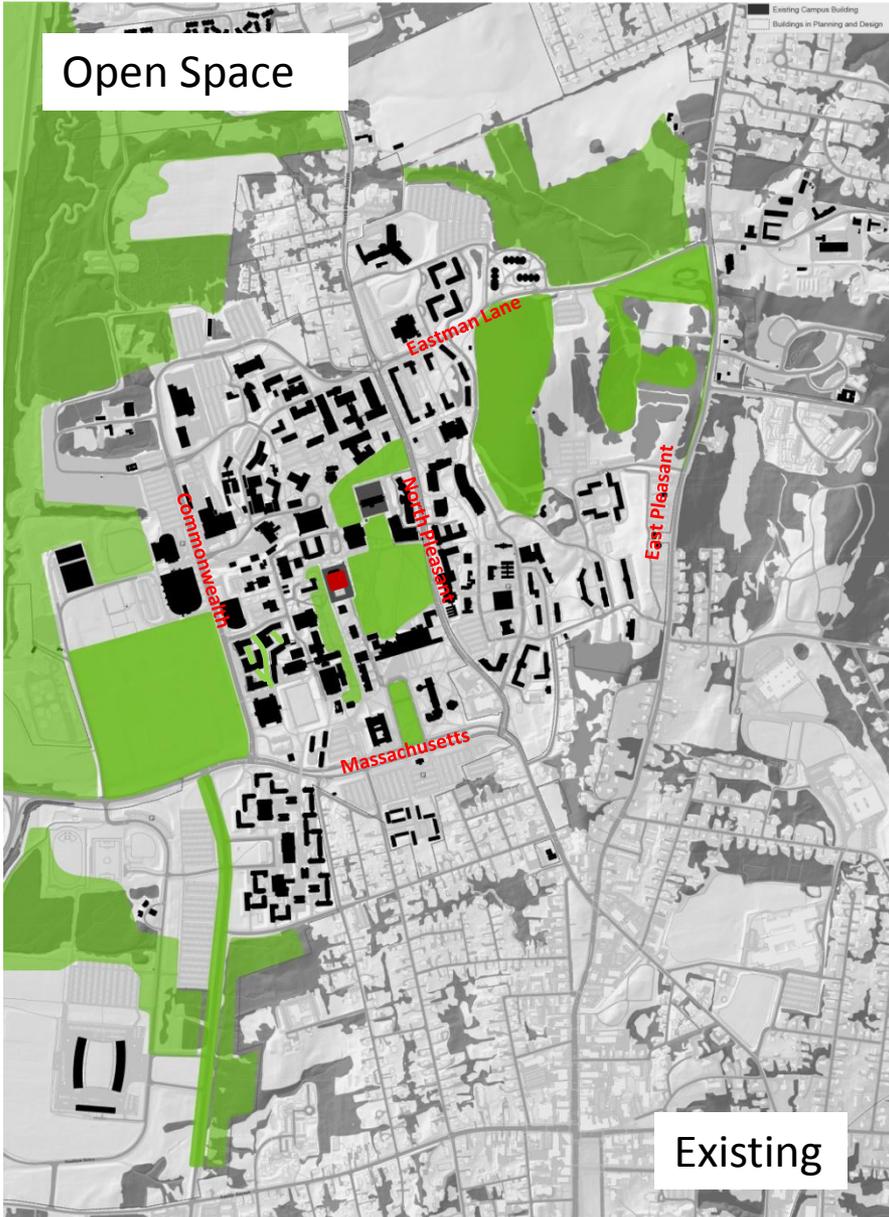


# Creating Campus

- Open Space
- Pedestrian Circulation
- Bike Ways
- Roadways
- Land Use
- Utilities

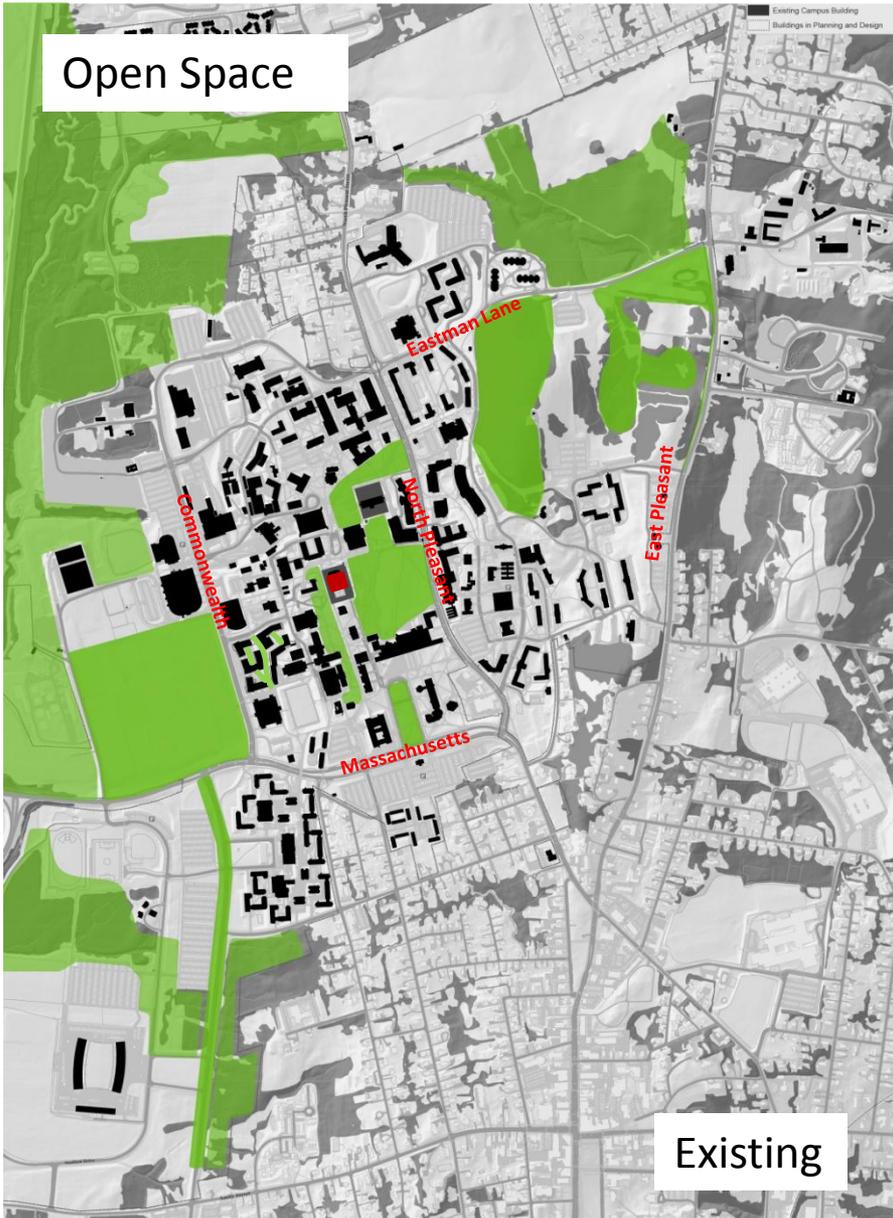


Open Space



Existing

Open Space

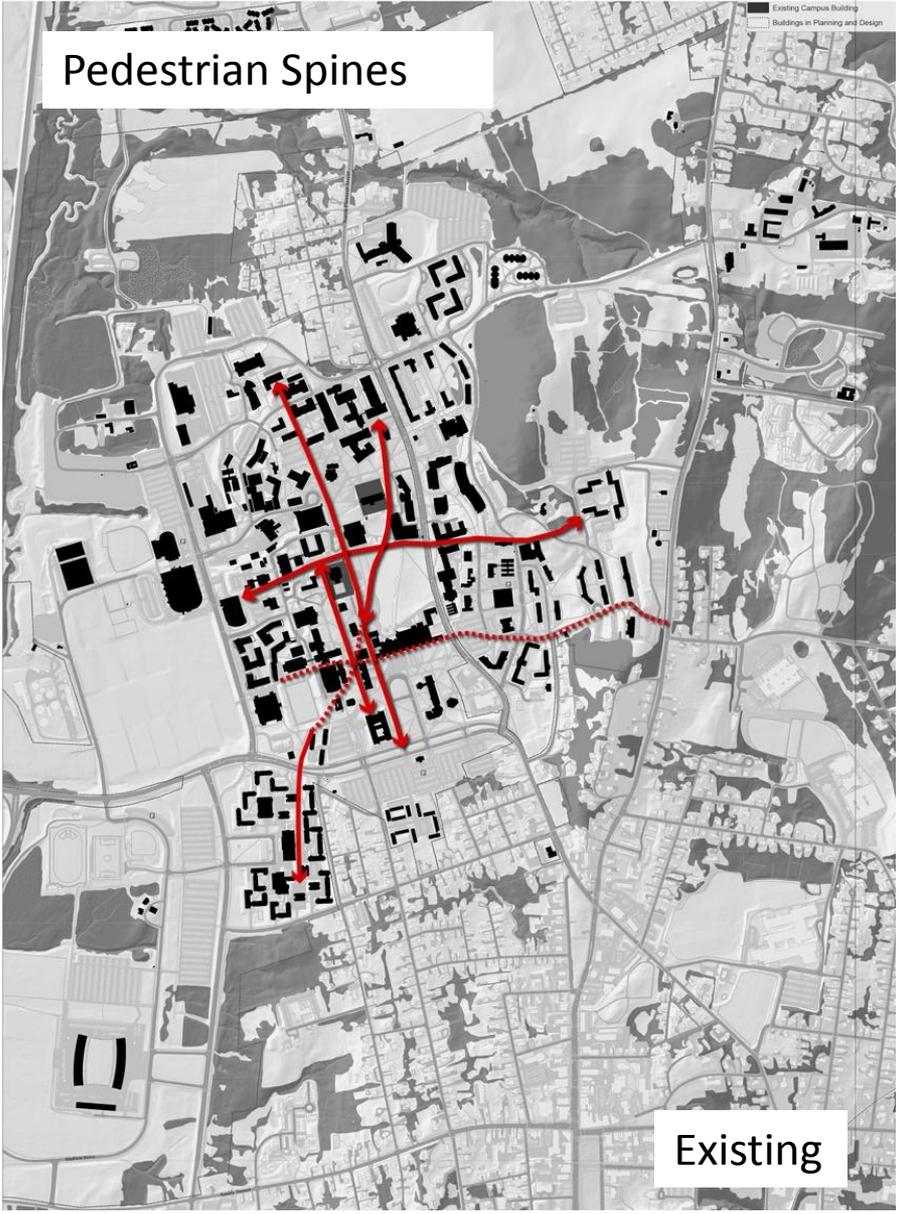


Existing

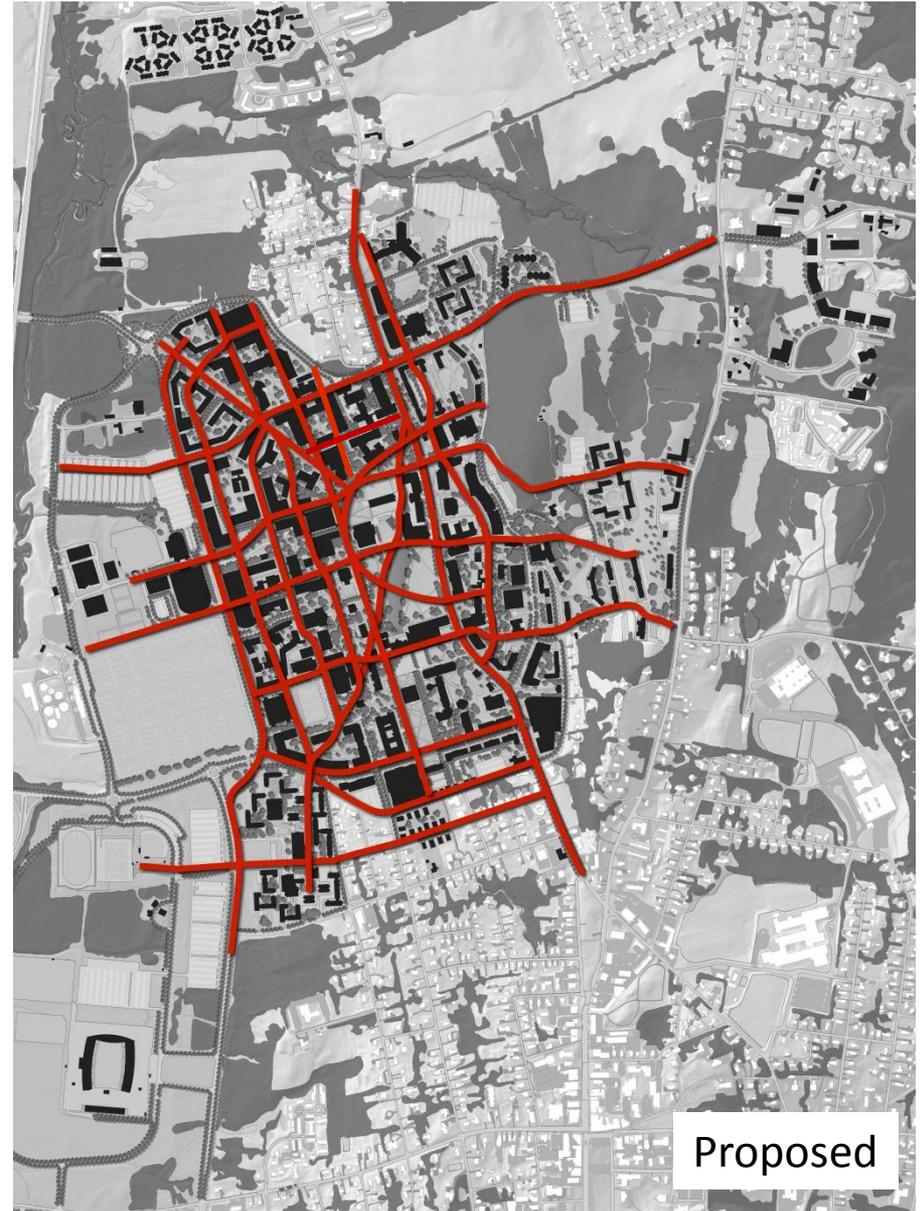


Proposed

# Pedestrian Spines

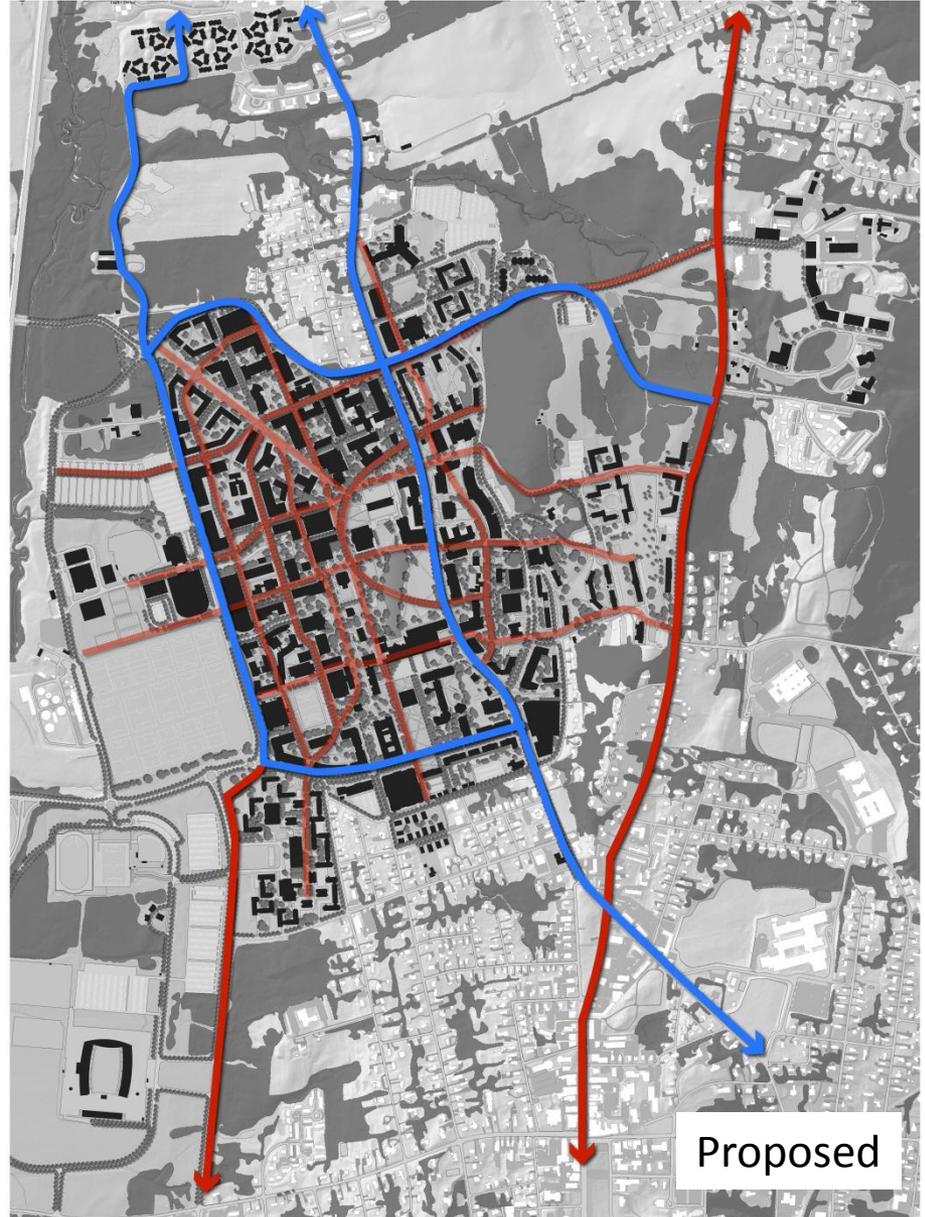


# Pedestrian Spines

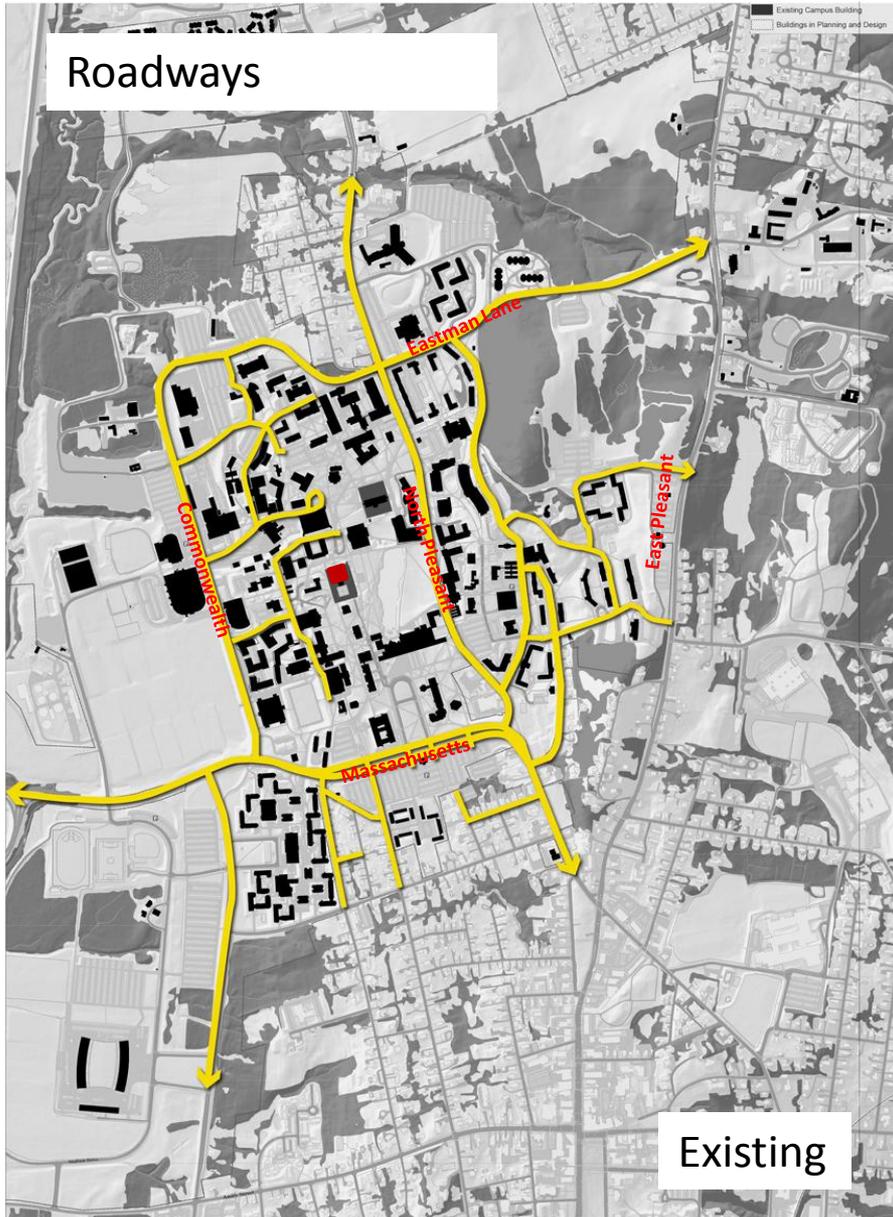




# Bikeways

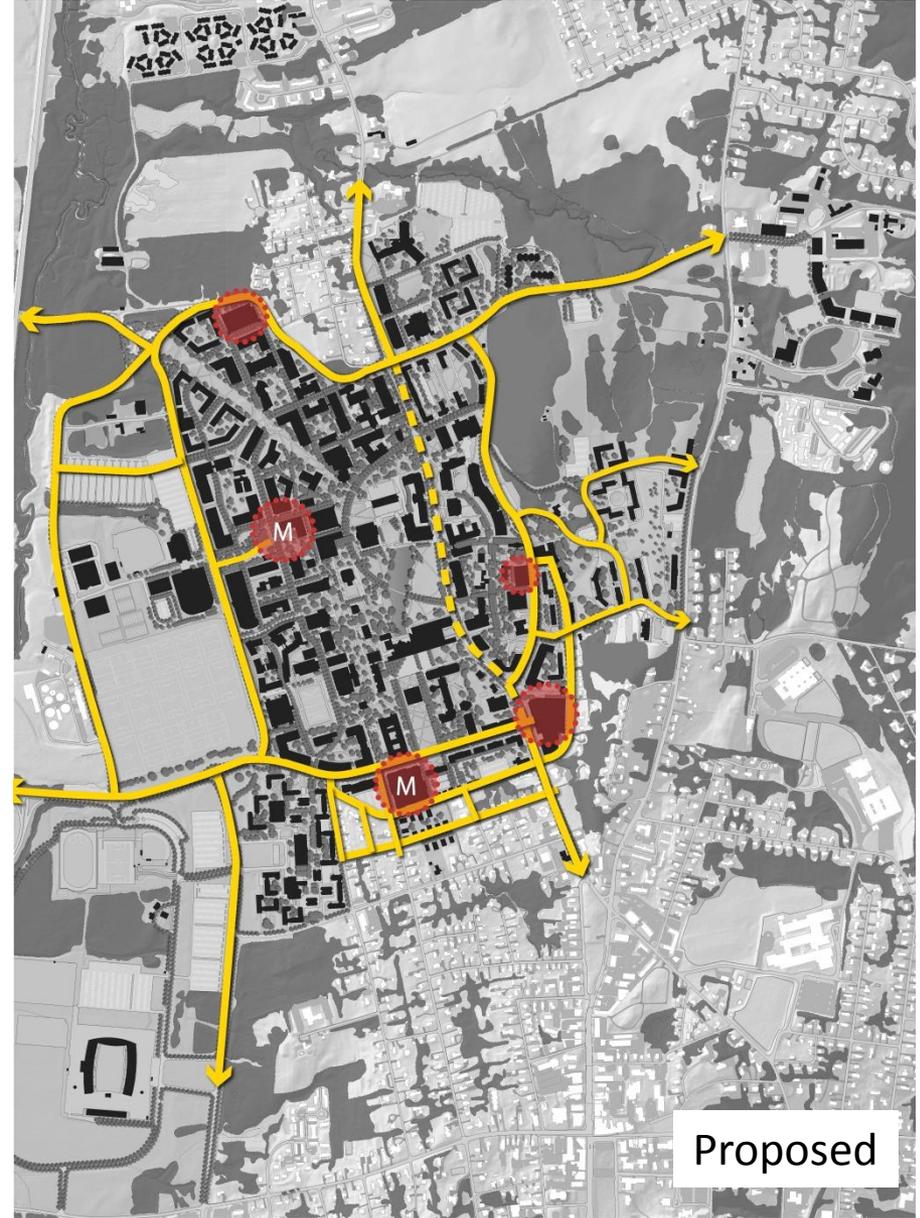
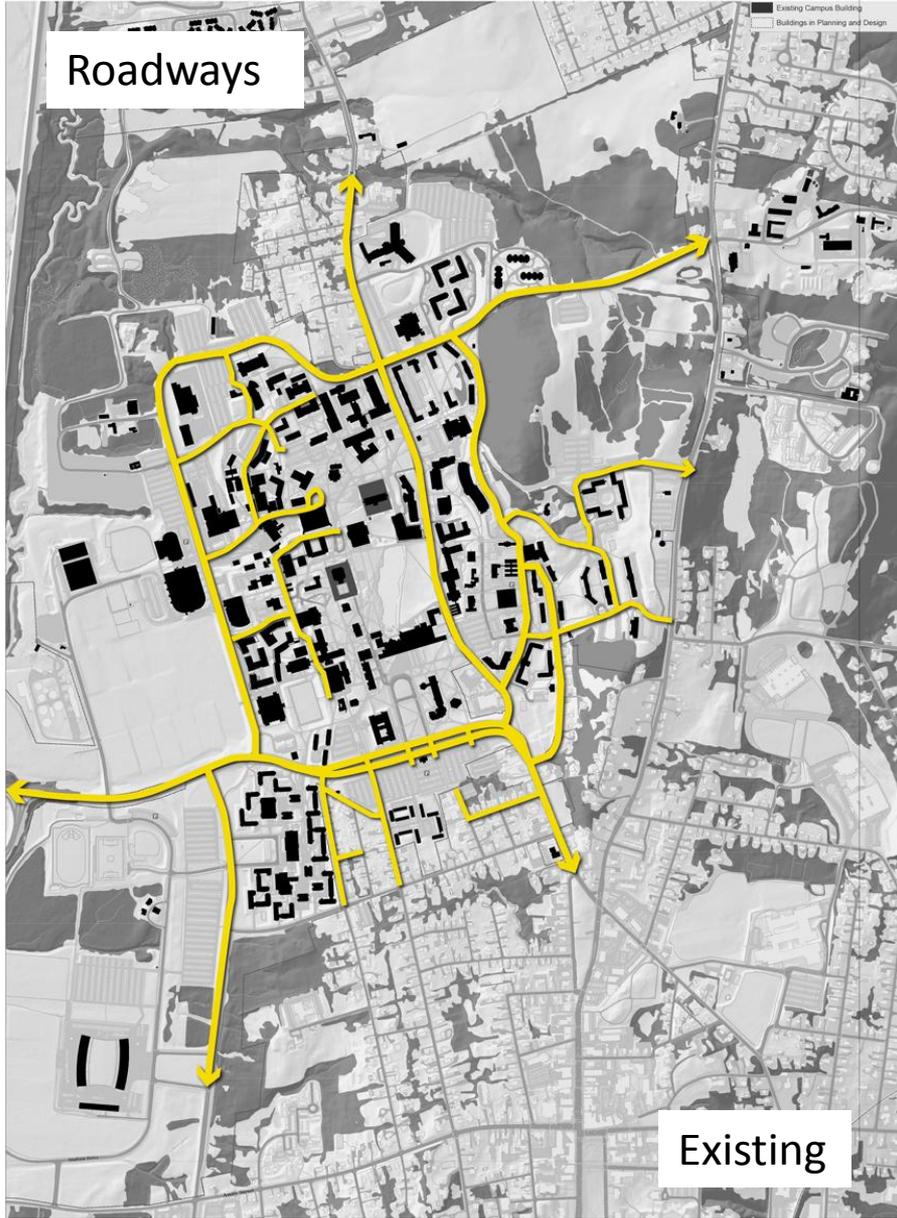


# Roadways



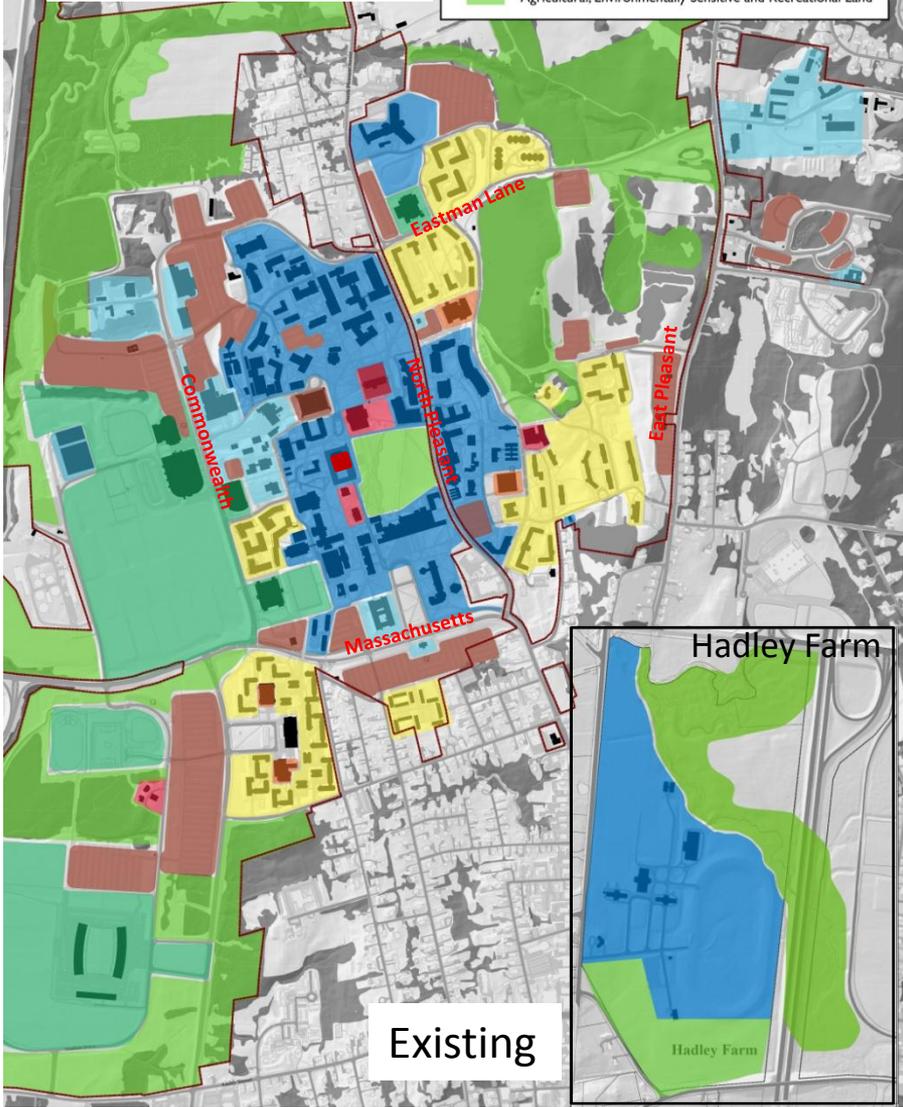
Existing

# Roadways



# Land Use

- |             |   |            |                         |
|-------------|---|------------|-------------------------|
| Blue        | Academic  | Orange     | Dining                  |
| Yellow      | Residential   | Brown      | Parking                 |
| Red         | Campus Life   | Light Blue | Administrative Facility |
| Green       | Athletic  | Purple     | Mixed                   |
| Light Green | Agricultural, Environmentally Sensitive and Recreational Land |            |                         |



Existing



# Land Use

- |   |                         |
|---|-------------------------|
| Academic  | Dining                  |
| Residential   | Parking                 |
| Campus Life   | Administrative Facility |
| Athletic  | Mixed                   |
| Agricultural, Environmentally Sensitive and Recreational Land |                         |



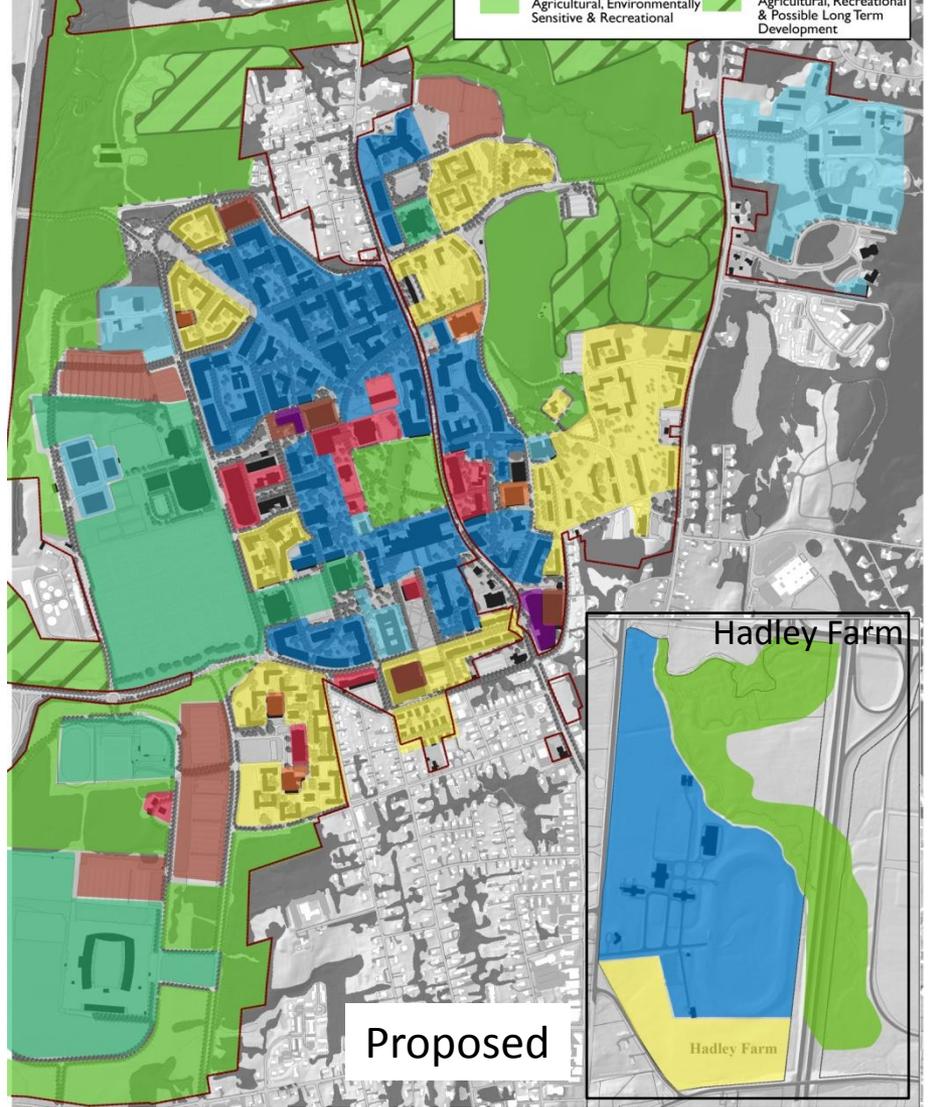
Existing



Hadley Farm

Hadley Farm

- |  |   |
|--|---|
| Academic   | Dining  |
| Residential  | Parking   |
| Campus Life  | Administrative Facility                                     |
| Athletic   | Mixed   |
| Agricultural, Environmentally Sensitive & Recreational | Agricultural, Recreational & Possible Long Term Development |



Proposed



Hadley Farm

Hadley Farm



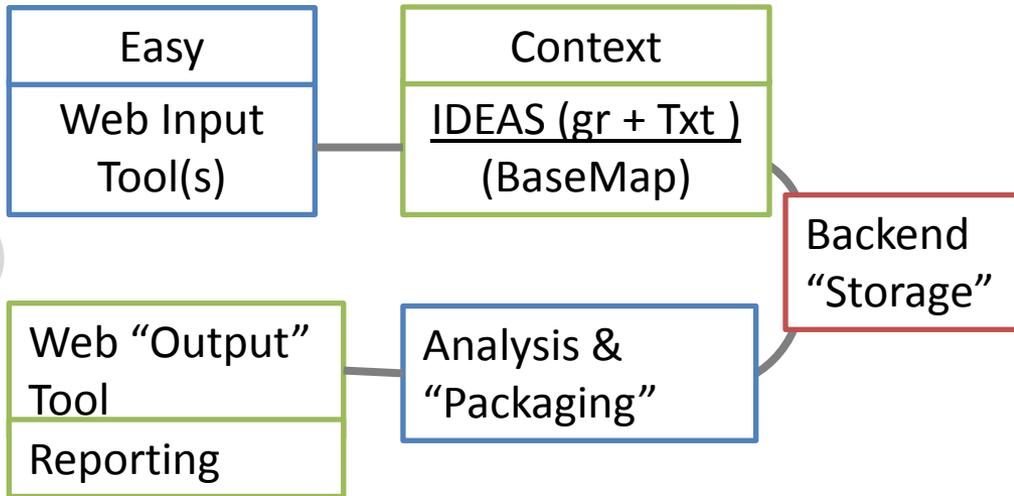
# “Master Plan Explorer” Web App

## Purpose

1

- To outreach & to engage Campus community into the master planning process
- To get feedback & document public’s perception of the Master Plan IDEAS.
- To facilitate Master Plan being “a living document”

## Required Functionality



2



## ? Available Options ?!

3

- UMass Hosted web-services (tiles of the design/planning documents)
- ArcGIS Online: the Community Base Map Program & University Campuses
- ESRI Web APIs: JavaScript, Flex and Silverlight
- SDE and Web-Editing services to get user input

<http://maps.umass.edu/apps/MasterPlanExplorer/>

4

# A Slideshow to introduce application and interface



## Master Plan Explorer: Introduction

campus planning , a division of facilities and campus services

2



The University of Massachusetts  
Campus Master Plan

3

Why is it important?

Having a strategic plan of long-term growth and development is crucial for any successful organization.

The Master Plan outlines major phases of long term development of our Campus, which will sustain and support the University's mission.

4



### Slide group:

- Creating a culture of planning
- Commenting on the Plan's Ideas
- Navigation and Control
- Start the Master Plan Explorer App

### Download:



Complete Report  
48 Mb  
(as November 17, 2011)

5

### Share and Contact:

- Contact Campus Planning
- Facebook
- Twitter

1

<http://maps.umass.edu/apps/MasterPlanExplorer/>

# A Slideshow to introduce application and interface



## Master Plan Explorer: Introduction

campus planning , a division of facilities and campus services



Some stats:

3

- 9 Months
- 15 Committee and Stakeholder Groups
- 117 Events
- 300+ Hours of Meetings with UMass Community
- 600+ Website comments

For ONE Master Plan of your campus



2

### Slide group:

- Creating a culture of planning
- Commenting on the Plan's Ideas
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- t Twitter

<http://maps.umass.edu/apps/MasterPlanExplorer/>

# A Slideshow to Introduce Functionality and Major Features



## Master Plan Explorer: Introduction

campus planning , a division of facilities and campus services



Begin exploring:

Simply hover over the area of the interest to see a short description of the proposed idea.



### Slide group:

- Creating a culture of planning
- Commenting on the Plan's Ideas
- Navigation and Control
- Start the Master Plan Explorer App

### Download:



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48 Mb  
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<http://maps.umass.edu/apps/MasterPlanExplorer/>

# Interface and User Control Elements

**Master Plan Explorer**  
campus planning, a division of facilities and campus services

Find building: Building Name

1: A red circle highlighting a specific building on the map.

2: A vertical zoom slider on the left side of the map.

3: A small 3D building icon in the top left corner.

4: A red circle highlighting the search bar.

5: A red circle highlighting the Windows logo and a help icon in the top right.

6: A red circle highlighting a vertical stack of map thumbnails on the right side.

7: A red circle highlighting a transparency slider and a filter dropdown menu on the right side.

**Legend:**

- Proposed buildings
- Existing buildings

Master Plan

Future Options

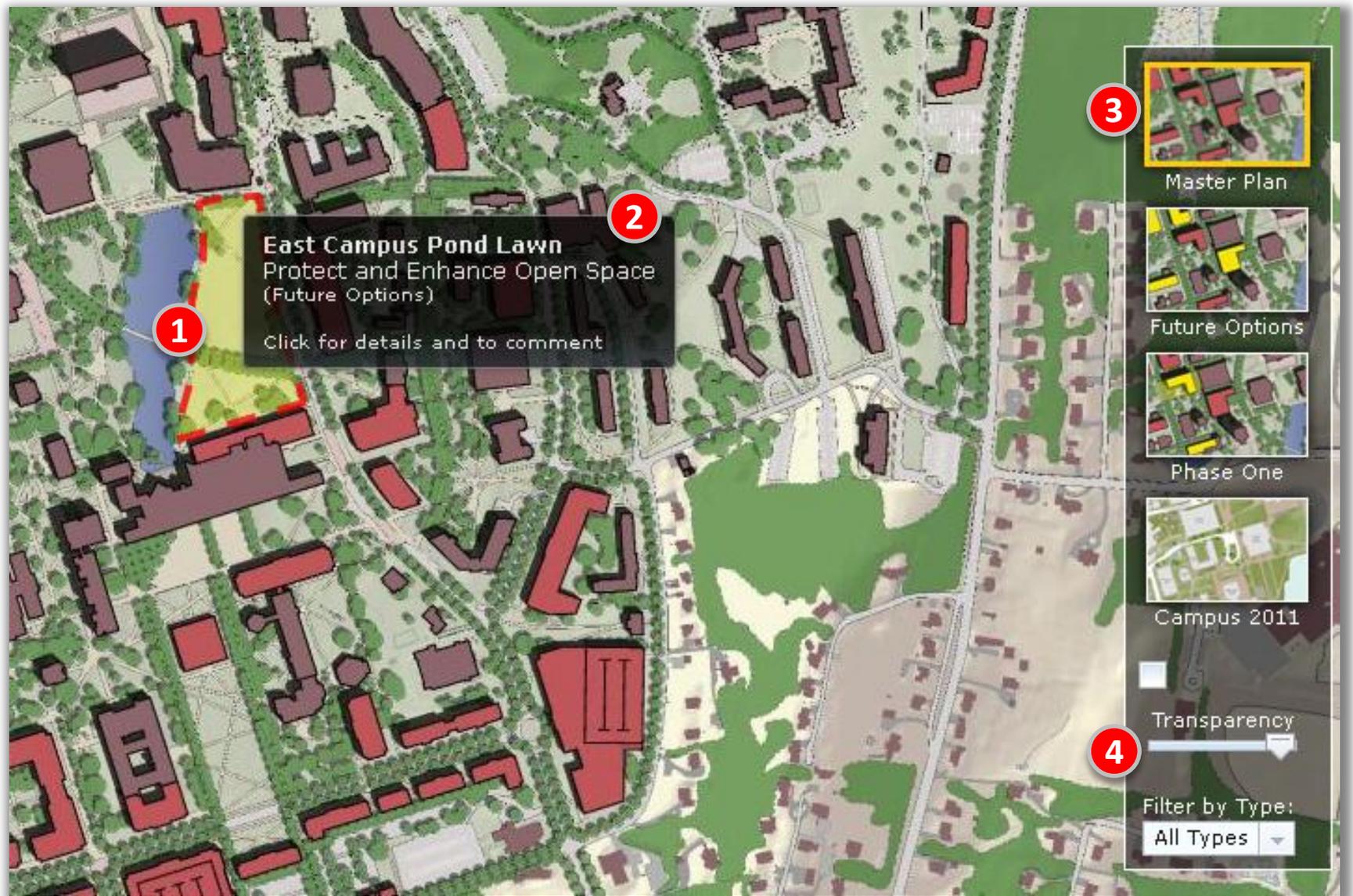
Phase One

Campus 2011

Transparency

Filter by Type: All Types

# Begin Exploring ...



# Learning about ideas ...

es and campus services

Find building:

**2** East Campus Pond Lawn

SubTitle: Protect and Enhance Open Space  
Phase: 2  
SiteDesc: The East Campus Pond Lawn is one of the largest and most visible of the Campus green spaces. It is also one of the most historic landscapes on campus, together with the west lawn, remnants of the "Central Park" or "Campus Green" shown in historic plans. The  
Tags:

**3**

Details Additional Info Comments

**4** **5**

**1**

Master Plan  
Future Options  
Phase One  
Campus 2011  
Transparency

PDF

# Learning About IDEAS ...

The screenshot displays the IDEAS web application interface. At the top, there is a search bar labeled "Find building: Building Name" with a magnifying glass icon. Below the search bar, a map of a campus is shown with various buildings and green spaces. A pop-up window titled "East Campus Pond Lawn" is open, displaying the following information:

- SubTitle:** Protect and Enhance Open Space
- Phase:** 2
- SiteDesc:** The East Campus Pond Lawn is one of the largest and most visible of the Campus green spaces. It is also one of the most historic landscapes on campus, together with the west lawn, remnants of the "Central Park" or "Campus Green" shown in historic plans. The
- Tags:**

At the bottom of the pop-up window, there are three buttons: "Details" (highlighted in yellow), "Additional Info", and "Comments".

On the right side of the map, there is a sidebar with several navigation options, each with a small thumbnail image:

- Master Plan
- Future Options
- Phase One
- Campus 2011
- Transparency

At the bottom of the sidebar, there is a "PDF" button with a download icon and a question mark icon. The map also features a search bar and a magnifying glass icon at the top right.

Red circles with numbers 1 through 5 are overlaid on the image to highlight specific features:

- 1: Points to the East Campus Pond Lawn on the map.
- 2: Points to the title of the pop-up window.
- 3: Points to the SiteDesc text in the pop-up window.
- 4: Points to the "Additional Info" button in the pop-up window.
- 5: Points to the "Comments" button in the pop-up window.

# Providing Feedback ...

The screenshot displays a web application interface for providing feedback on campus planning. The background is a satellite-style map of a campus with various buildings and green spaces. A search bar at the top left contains the text "Find building:" followed by a magnifying glass icon. A "PDF" download icon is visible in the top right corner. A central modal window titled "East Campus Pond Lawn" is open, containing a feedback form. The form has four numbered red circles highlighting specific elements: 1. The "Name" field, which contains the text "Alexander". 2. The "Affiliation with UMass" dropdown menu. 3. The "Comments" text area, which contains the text "Spring NEARC 2012 Demo: I think this is an appropriate use of the space". 4. The "Submit" button. Below the form are three tabs: "Details", "Additional Info", and "Comments", with the "Comments" tab selected and highlighted in yellow. On the right side of the map, there is a vertical menu with four map thumbnails labeled "Master Plan", "Future Options", "Phase One", and "Campus 2011", and a "Transparency" slider at the bottom.

Find building:

PDF

### East Campus Pond Lawn

1 Name:  2 Affiliation with UMass

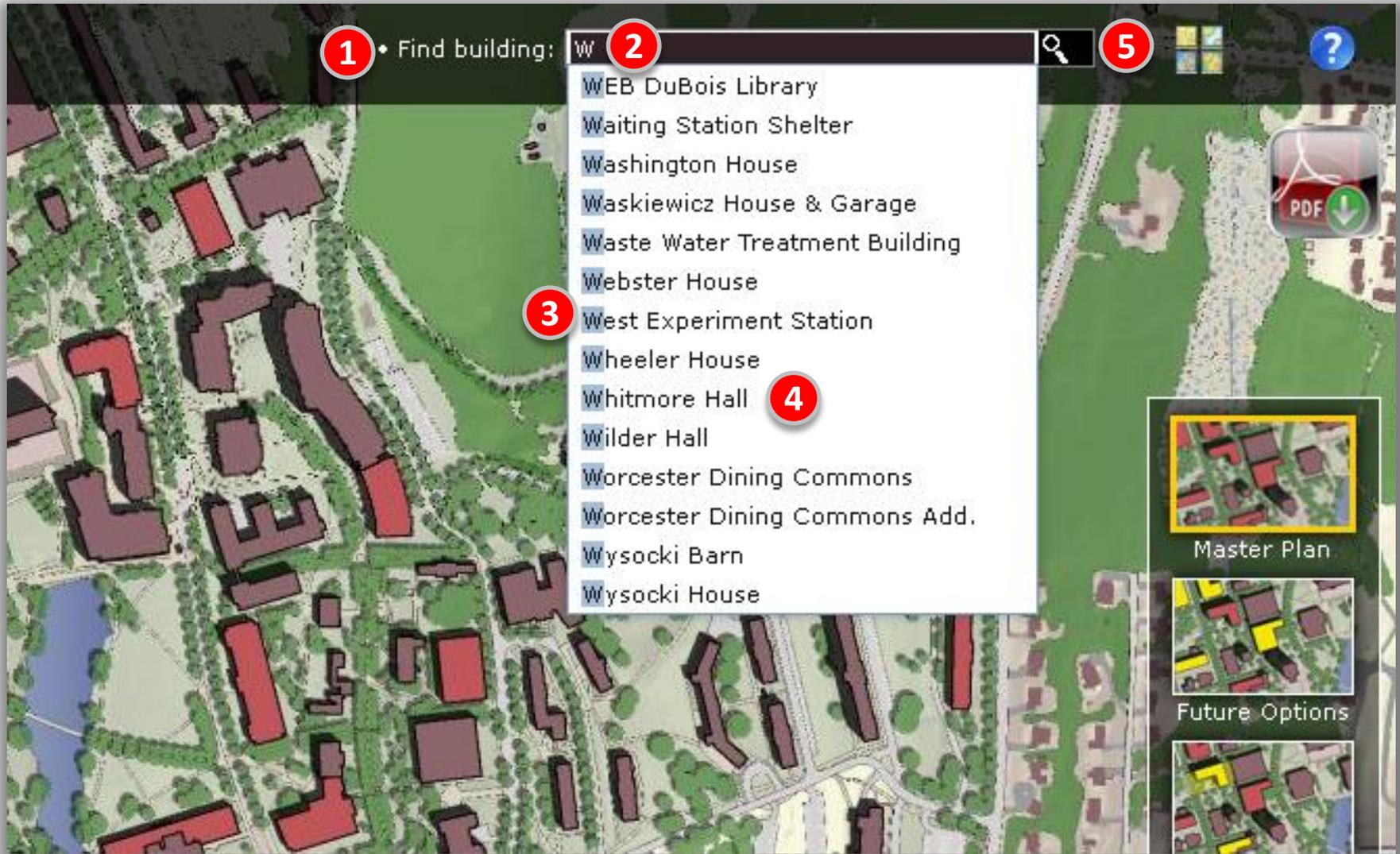
3 Comments:

4

Details Additional Info Comments

Master Plan  
Future Options  
Phase One  
Campus 2011  
Transparency

# Searching ( AutoComplete Function)



# Searching ( AutoComplete Function)

The screenshot displays a web-based interface for campus planning. On the left, a satellite-style map shows various buildings in red and brown. A search bar at the top center contains the text "House" and is marked with a red circle containing the number "1". Below the search bar is a list of building names, each with a small 'X' icon to its right. A red circle with the number "2" is positioned to the right of the list. On the right side of the interface, there are several navigation and utility elements: a "PDF" button with a download icon, a "Master Plan" thumbnail, a "Future Options" thumbnail, a "Phase One" thumbnail, and a "Campus 2011" thumbnail. A question mark icon is also visible in the top right corner.

Find building: House

- Lewis House
- Cance House
- Leach House
- James House
- Hills House
- Moore House
- Baker House
- Dakin House
- Field House
- Brett House
- Brown House
- Brooks House
- Nelson House
- Arnold House
- Gorman House
- Cashin House
- Prince House
- Dwight House
- Nelson House
- Hamlin House
- Kennedy House
- Thoreau House
- Webster House
- Grayson House

PDF

Master Plan

Future Options

Phase One

Campus 2011

# Showing results of search (center & zoom)

**Master Plan Explorer**  
*campus planning*, a division of facilities and campus services

Find building:

**Massachusetts Ave. Reconfiguration**  
21st Century College Street  
(Phase One)  
Click for details and to comment

1

**Legend:**  
■ Proposed buildings  
■ Existing buildings

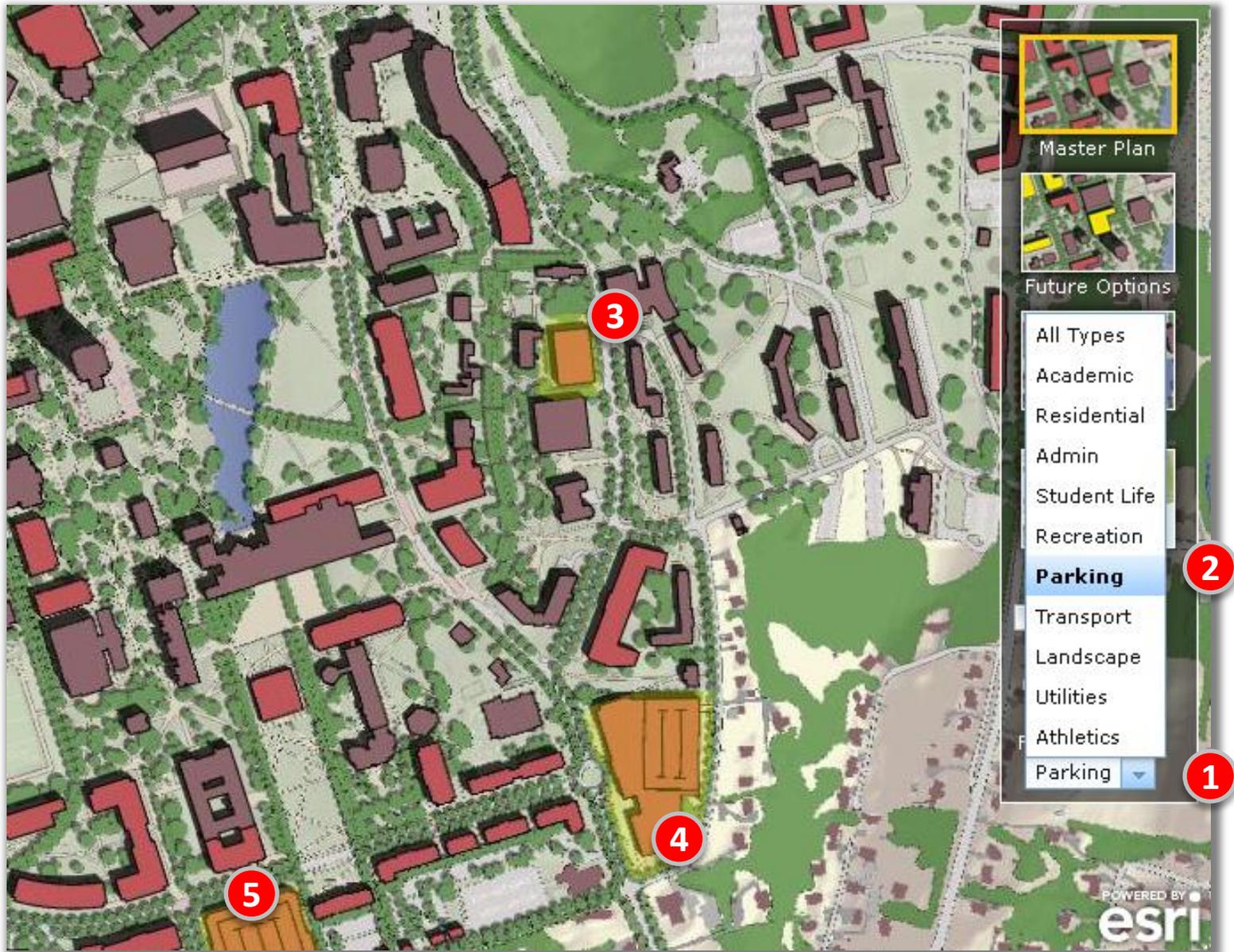
Master Plan  
Future Options  
Phase One  
Campus 2011  
Transparency  
Filter by Type:  
All Types

POWERED BY **esri**

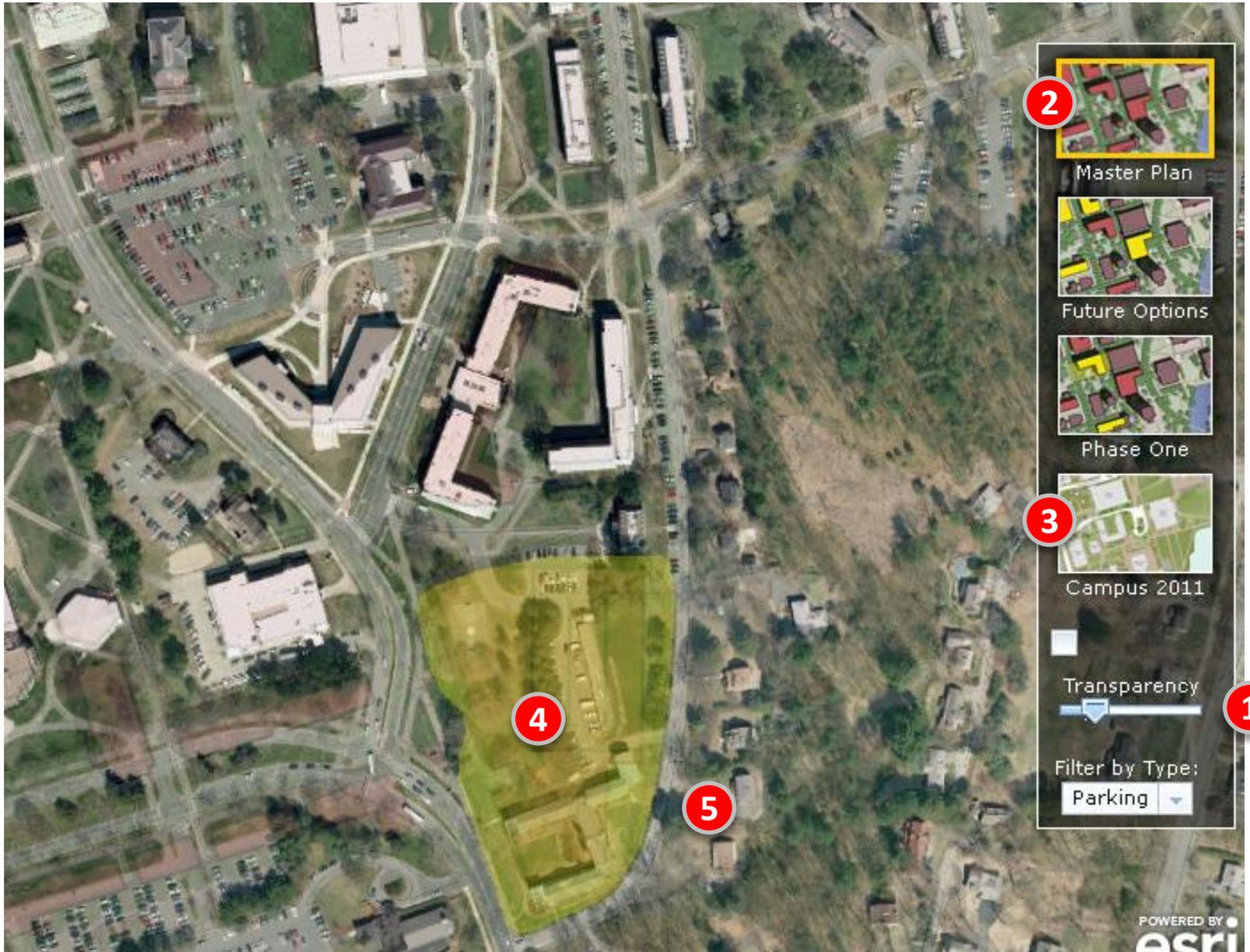
# Exploring Phases



# Exploring Projects ...



# Comparing the Scenarios ...



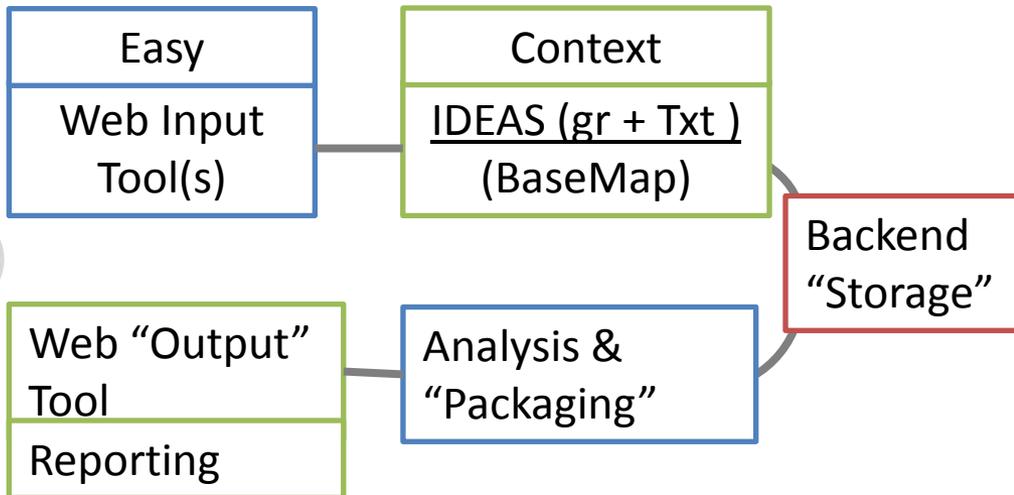
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## Required Functionality



2



## ? Available Options ?!

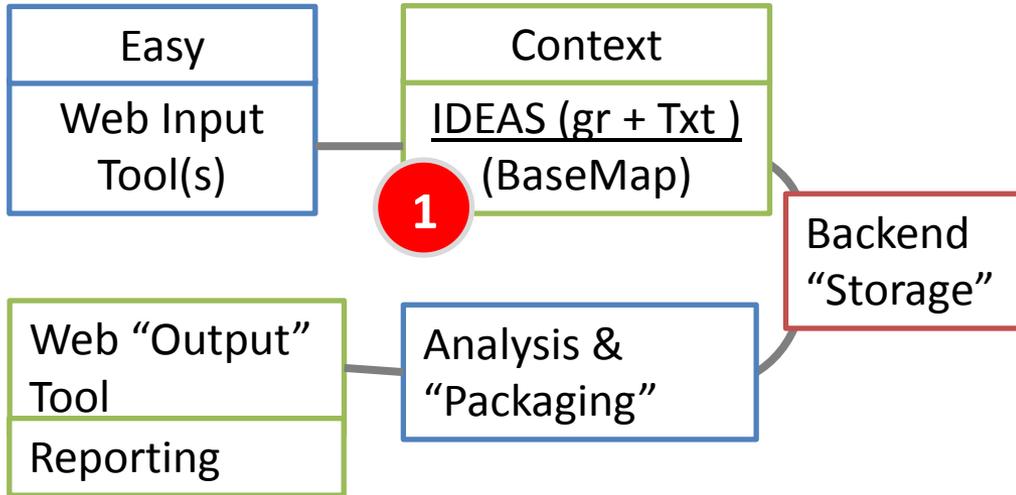
3

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4

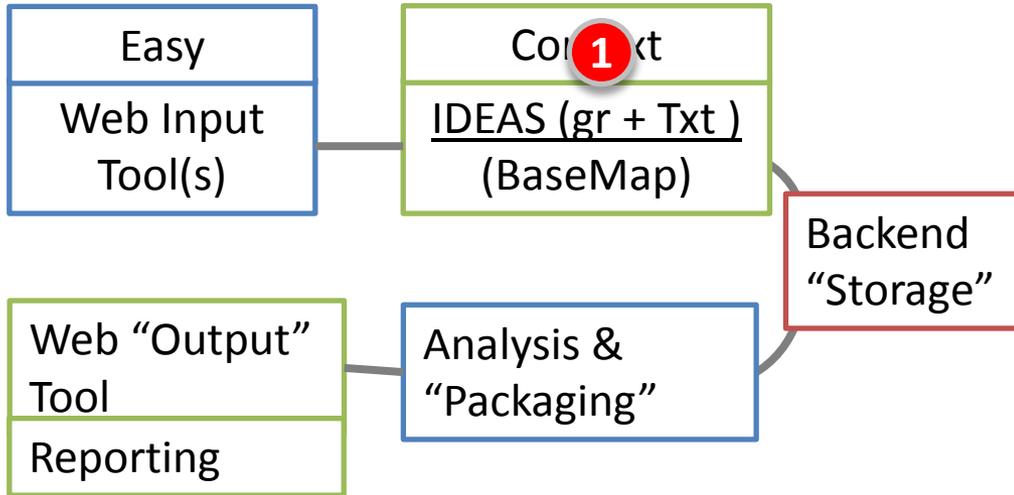
# Design & Implementation



University of NC Chapel Hill  
University of Kentucky  
University of Massachusetts  
University of Minnesota  
Harvard  
McMaster University  
Pasadena City College  
Cal State Domingue Hills

Please refer to ArcGIS Online  
For more examples ....

# Design & Implementation



## Folder: planning

Current Version: 10.0

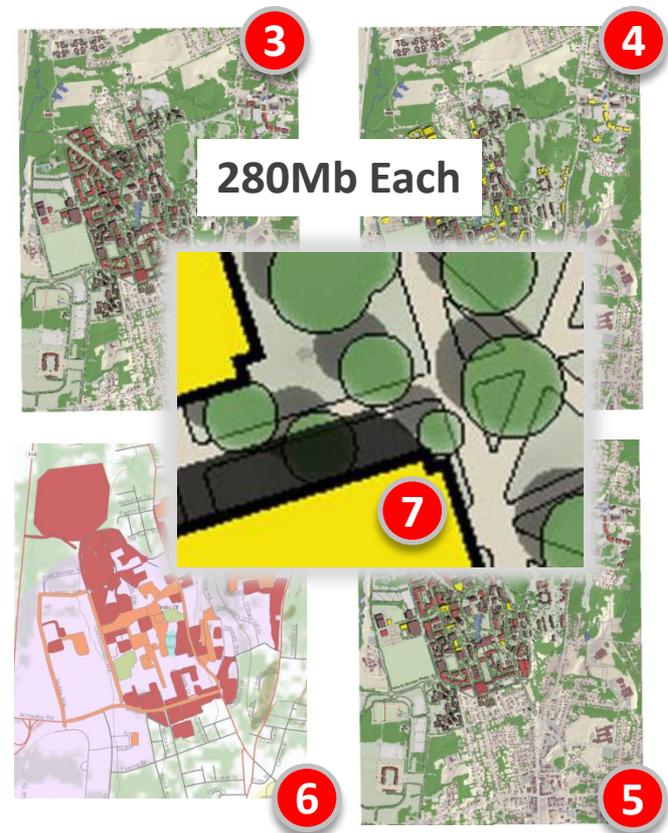
View Footprints In: [Google Earth](#)

2

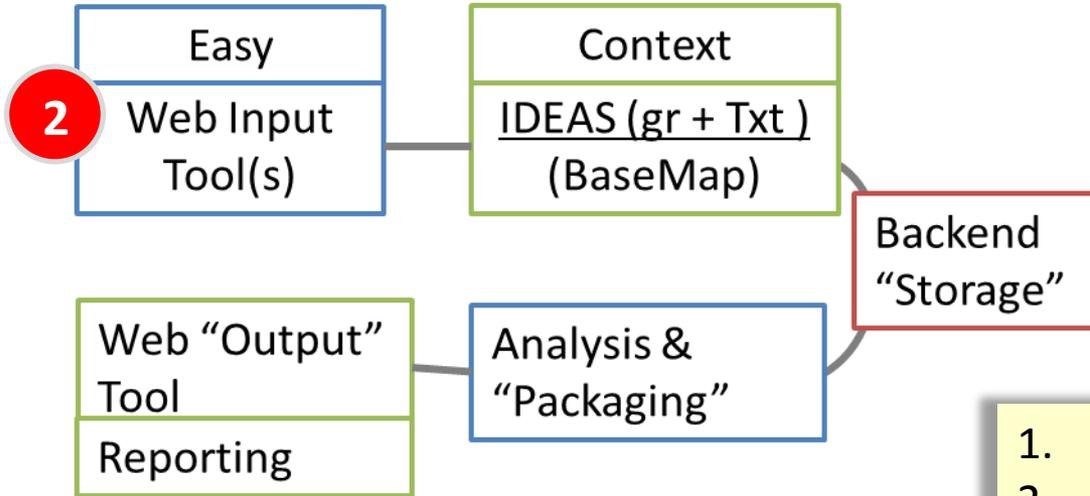
Services:

- [planning/pubImgrCampusMasterPlanPhase1](#) (MapServer)
- [planning/pubImgrCampusMasterPlanPhase2](#) (MapServer)
- [planning/pubImgrCampusMasterPlanPhase3](#) (MapServer)
- [planning/WEDT\\_CPMP\\_IdeasPublicComment](#) (MapServer)
- [planning/WEDT\\_CPMP\\_IdeasPublicComment](#) (FeatureServer)

Supported Interfaces: [REST](#) [SOAP](#) [Sitemap](#) [Geo Sitemap](#)



# Design & Implementation



1. Evaluated JavaScript v.2.4 (now 2.8)
2. Land Use Public Comment App !!!
3. HTML, JS, CSS (separation)
4. Configuration (How-To)
5. **Custom Controls**

## Web APIs

The ArcGIS Web APIs offer similar GIS functionality; you choose your preferred developer platform.

Each API provides the resources you need. Read the API reference; view working samples that help you get started and show you what's possible; and communicate with others through the forums, blogs, and code galleries.

### JavaScript

Develop custom JavaScript applications that mashup ArcGIS services. Use the ArcGIS API for JavaScript to take full advantage of powerful mapping, editing, geocoding, and geoprocessing services. Also provided are libraries for ArcGIS Extension for Bing Maps and ArcGIS Extension for the Google Maps API.



Filter results to show items that are:

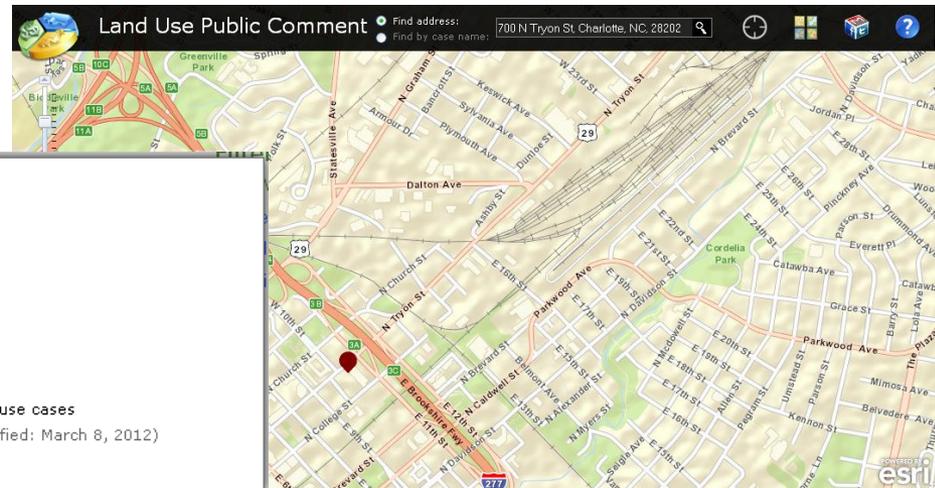
- code samples
- ready to use applications
- configurable applications

Interactive, visually rich, and expressive applications for clients.

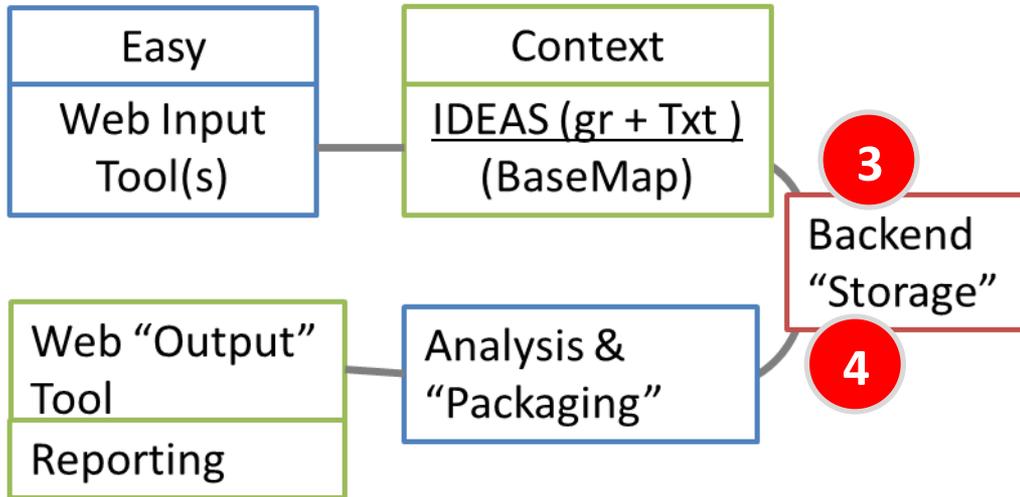


Open Details  
**Land Use Public Comment App**

App for allowing citizens to comment on proposed land use cases  
Web Mapping Application by [kevin.armstrong](#) (last modified: March 8, 2012)  
☆☆☆☆☆ (0 ratings, 0 comments, 5 views)



# Design & Implementation



1. ArcGIS Server Web-Editing Service

2. One-To-Many

3. Standard Tables in SDE

4. Regular use

ArcGIS Services Directory

Home > [planning](#) > [WEDT\\_CPMP\\_IdeasPublicComment \(Features\)](#)

**planning/WEDT\_CPMP\_IdeasPublicComment**

View In: [ArcGIS.com Map](#)

**Service Description:** a feature map service to solicit feedback from

**Layers:**

- [Master Plan Ideas, Elements and Sites](#) (0)

**Tables:**

- [GISWEBEDIT.DBO.CPMP\\_NEWSITES\\_COMMENTS\\_UMA\\_INFO](#) (1)

**Supported Interfaces:** [REST](#) [SOAP](#)

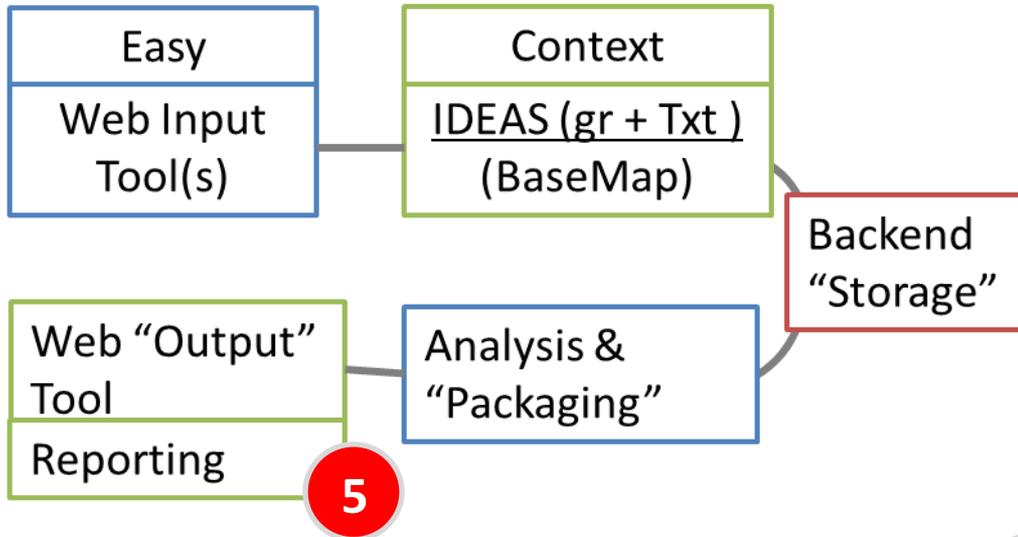
```

# records: 164

Attributes:
  o OBJECTID: 44
  o IdeaID: 37
  o UserName: cobusier
  o UserRel: 6
  o UserGender: 0
  o Comment: great!
  o SubmitDate: 2011/11/17 16:50:55 UTC
  o Score: 0
  o LikeDislikeScore: 0
  o UserStamp: 13215486351560.782961
  o GroupCode: UUU

Attributes:
  o OBJECTID: 45
  o IdeaID: 63
  o UserName: Le Cr
  o UserRel: 6
  o UserGender: 0
  o Comment: Sounds a good plan!
  o SubmitDate: 2011/11/17 16:51:29 UTC
  o Score: 0
  o LikeDislikeScore: 0
  o UserStamp: 13215486351560.782961
  o GroupCode: UUU
  
```

# Design & Implementation



Report on Ideas Feedback

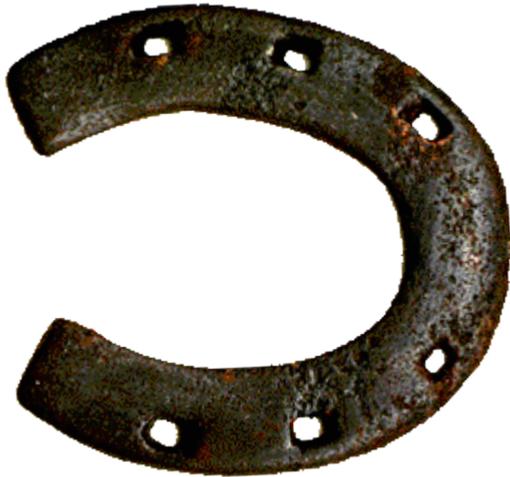
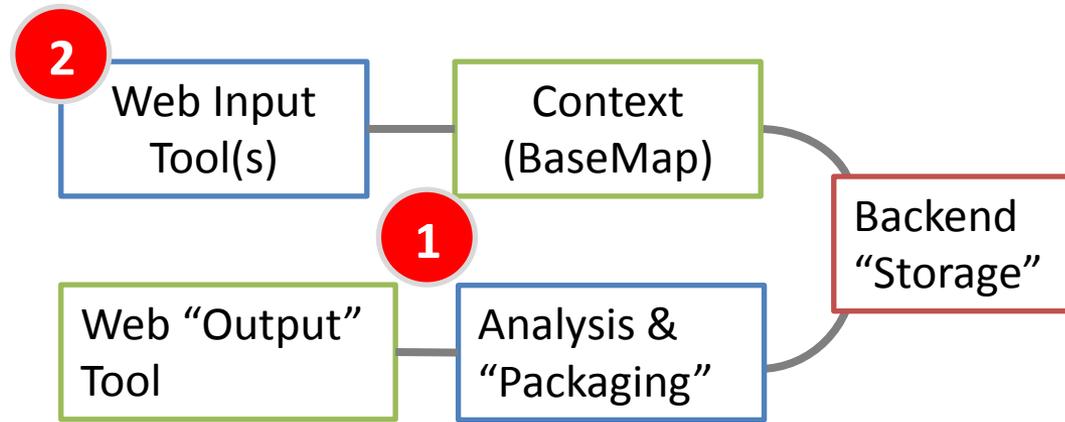
Idea ID:	1	Title:	Massachusetts Ave. Reconfiguration
Phase:	1	SubTitle:	21st Century College Street
SiteDesc:	Elimination of Mass Avenue's north barrel (westbound lane) of traffic resulting in two 11' travel lanes, 5' bike lanes, 10' planting strips, and 10' sidewalks on each side. Design would also include a roundabout at the southeast intersection with North Pleasant Street. This complete street would be much safer for pedestrian crossings and the scale of the corridor would be more appropriate in relation to the surrounding neighborhoods.		
	Transportation	Landscape	
Name:	Diana	User Category:	5
Comment:	Please ensure the complete street accommodates all bus service needs - stops near Haigis get heavy use when Haigis is closed to vehicles. See related comment in 12/16/11 email.		
Name:	Doug	User Category:	5
Comment:	Suggest showing a bicycle lane coming in from the west. Current master plan does not show any connection to the west		
Name:	Jake	User Category:	2
Comment:	Like the idea of decreasing roadway size for more trees, bikeways, and pedestrian walks. I would like to see all of the mature trees currently along Mass Ave stay!		
Name:	Joseph	User Category:	3
Comment:	I support this reconfiguration. This was originally pitched as the "Gateway" to the campus. Is this still the case?		

5

**Any regular GIS tool with connection to the web-services or database:**

- ArcGIS Desktop
- ETL for analysis
- Web App
- MS Access Report

# Design & Implementation



1

System of components,  
Not one supersize, do-it-all component



2

Only one custom component,  
Combine existing and working solutions!

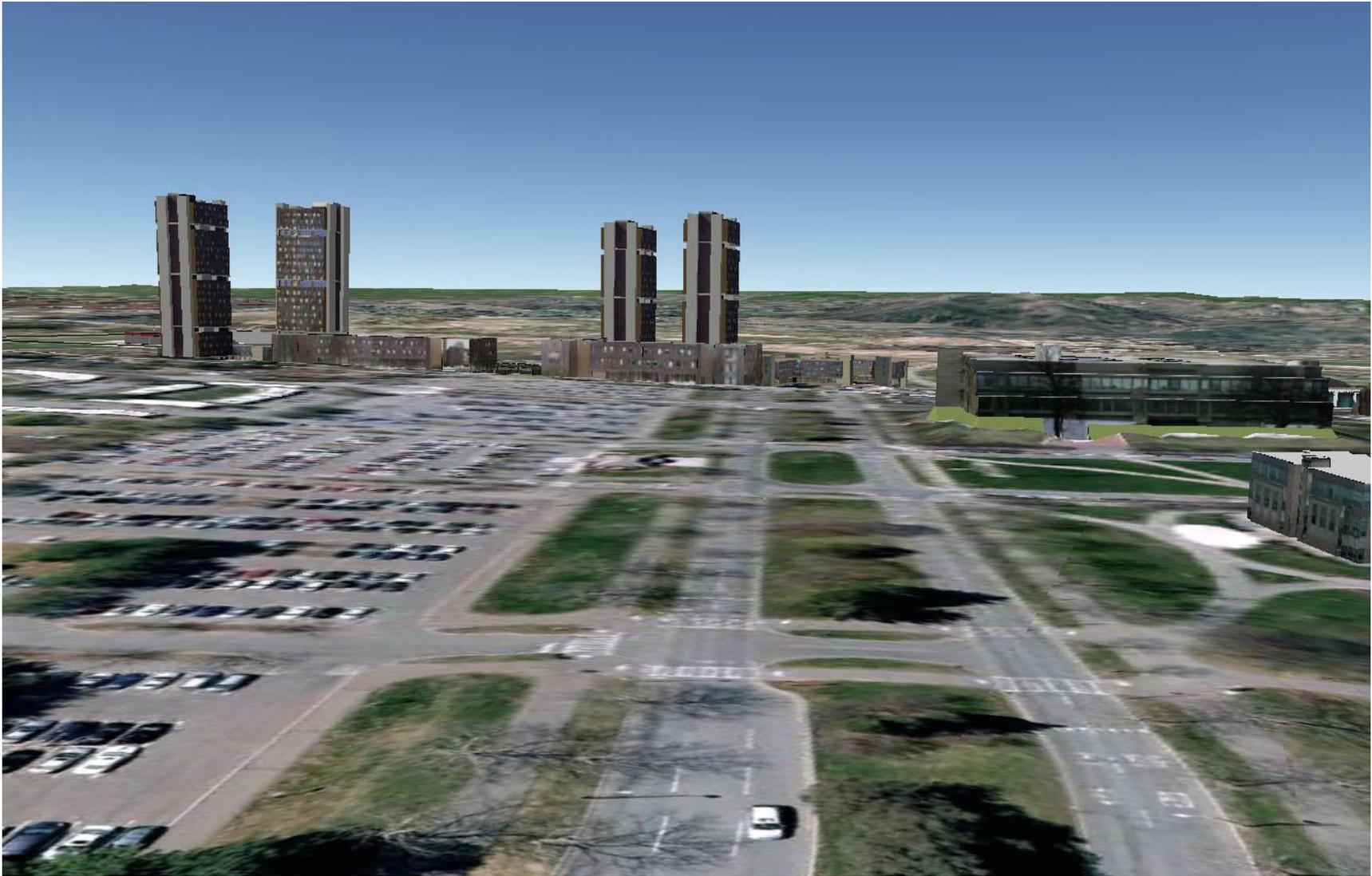


3













# chewes's endeavours in CityEngine and the Campus Master Plan

a collaborative resource and journaling blog



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## Lamps, cars, and trees!

Posted on [May 7, 2012](#)

My goal for today was to add more street furniture, and as you can see below, I think I succeeded! (though it took a lot longer, as always, than I thought!!)



SEARCH



CATEGORIES

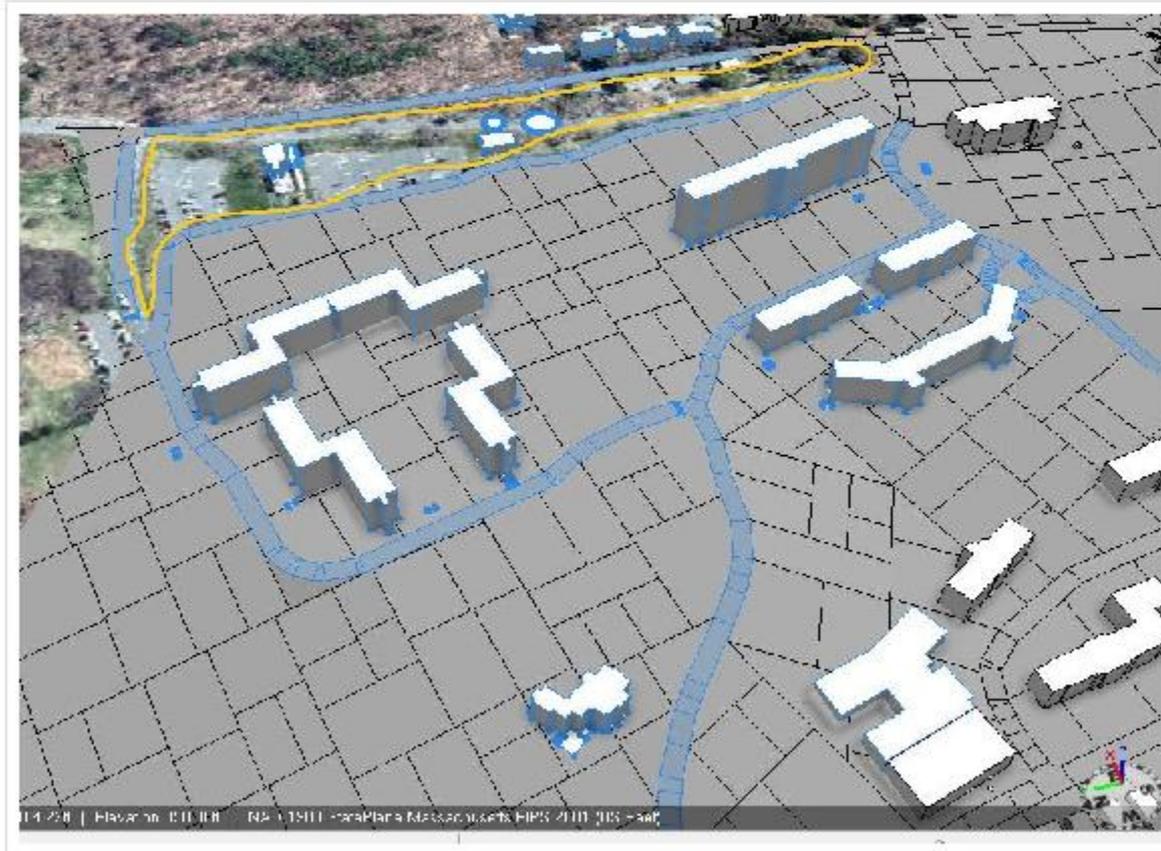
[Journal Entry](#) (22)

[Resources](#) (18)

[Shape Grammar Editing](#) (13)

UPDATE:

I was able to turn on "block creation" for the street network. As you can see below, there is a highlighted section which did not create blocks. This "upper parking lot" is completely enclosed by streets and SHOULD generate blocks. I adjusted a bunch of settings and attributes to try to engage block creation, but to no avail.



I went ahead and tried Aligning Terrain to Shapes again:

# Updated Facades — ALL of Orchard Hill



Posted on [April 19, 2012](#)

After updating the comp.index for all four buildings in Orchard Hill, I re-did some of the facades in the Facade Wizard, being a little more careful this time, and added some new ones.



The University of Massachusetts  
Supporting a Culture of Planning with Web GIS Technology:  
A Case Study for the “Master Plan Explorer” Web App

Spring NEARC  
May 22<sup>nd</sup> 2012

