

GEORGE MASON UNIVERSITY

WEST CAMPUS AND SHIRLEY GATE

ECOLOGICAL TYPOLOGIES

WETLAND STUDIES AND SOLUTIONS, INC.



WEST CAMPUS



SHIRLEY GATE

INTRODUCTION

Celebrating the natural setting as a place for active learning is a cornerstone of George Mason's master plan, which is incorporated into the planning and programming of each of its campuses. Integrating campus buildings and landscapes with the natural landscape can enhance academic curricula and quality of life for community members. West Campus and Shirley Gate are located close to George Mason's core campus, on the outskirts of Fairfax. Both sites encompass mature forest, riparian corridors, and wetlands that provide valuable ecosystem services, including:

- Food and shelter for native fauna
- Water and air purification
- Carbon sequestration
- Flood and erosion control
- Climate regulation
- Educational, research and recreational spaces
- Cultural, intellectual, and spiritual inspiration

The two sites are also slated for development as the University grows. Both sites offer significant acreage for development that can incorporate ecological elements within the built environment to create a vibrant campus for people, flora, and fauna.









CORE ECOLOGICAL THEMES

A LIVING CAMPUS

The ecological tenets incorporated into George Mason's master plan guide the successful integration of civic development and ecological planning as the University strives to maximize the potential of its campuses. Each of these core ideas relating to local ecology will be explored in detail at the West Campus and Shirley Gate locations.

- **Protect and Strengthen Ecological Corridors and Connectivity.** In the rapidly developing landscape of northern Virginia, animals and people coexist closely. As George Mason expands, the movement and habits of these animals can be integrated into the design of its campuses to provide connections between patches of natural habitat. This is possible at all scales and across multiple campus typologies.

- **Recognize and Celebrate Natural Features.** Natural features on campus—such as meadows, forests, and water resources—provide critical ecosystem services. Careful planning can ensure that these important resources are recognized, cherished, and protected. The streams, wetlands, and forests at West Campus and Shirley Gate present opportunities to honor and enhance natural features.

- **Activate Outdoor Learning.** George Mason students and faculty can benefit tremendously from outdoor spaces, whether they are conducting ecological research in forest plots, playing softball, or taking a walk along one of the many streams that traverse the campuses. Programming at West Campus and Shirley Gate has already activated a variety of outdoor spaces. As the campuses change over time, George Mason can continue to find new ways to welcome community members outside.



Open space at Shirley Gate and West Campus can provide habitat linkages between undeveloped parcels in the area.



Animal trails and sign are prevalent along the stream corridors traversing George Mason's campuses.

CORE ECOLOGICAL THEME:

PROTECT AND STRENGTHEN ECOLOGICAL CORRIDORS AND CONNECTIVITY

The Shirley Gate and West Campus areas at George Mason provide a variety of habitat types and qualities. On both sites, animal sign is prevalent in the upland and riparian forests, and wetlands. Trails, tracks, burrows, scat, bones, food remnants, and other indicators show that these sites provide refugia for animals in a developing region.

Situated on the outskirts of Fairfax, West Campus and Shirley Gate are located at the northern end of a less densely developed region that extends south to the Occoquan Reservoir. There are many parks in close proximity. Fairfax Villa Park, a forested 60-acre preserve, is just northeast of Shirley Gate. Reserving some areas for habitat, particularly along stream corridors, on campus can ensure connectivity between the remaining patches of undeveloped land in the area.

Tributaries to Pope's Head Creek cross Shirley Gate and West Campus, creating corridors with higher habitat value. The quality of these streams has degraded due to erosion from increased flows, given the vast areas of impervious surface nearby. While these streams are impaired, they still provide a source of water for terrestrial animals and habitat for aquatic invertebrates and amphibians. At Shirley Gate, a major tributary flows across the southwest corner of the site, and the headwaters of three smaller tributaries are present on the eastern side.

On West Campus, a tributary flows onto the campus from the north and forms a wetland at an impoundment. Another tributary follows Campus Drive, joining the main channel to flow south and form the property boundary. The steep topography in the western, forested section of the site is divided by several tributaries that drain runoff from the developed, upland campus. Protecting and enhancing these valuable stream corridors can keep George Mason's campus connected to the surrounding natural environment.









CORE ECOLOGICAL THEME:

RECOGNIZE AND CELEBRATE NATURAL FEATURES

West Campus
On West Campus, natural elements are interwoven with the built environment. Forested areas buffer streams from roads and athletic fields. The wetland impoundment provides stormwater runoff quantity and quality control. Streams and wetlands also provide vital resources for animals. The forests are relatively young, at no more than 70 years old. They are striking in their aesthetic, with tall, linear tulip poplars forming the canopy layer while beech and evergreen hollies shape the understory. The shrub layer is largely absent, and edges are prone to colonization by invasive species. These forests are worthy of appreciation for their ability to slow and filter runoff, store carbon, produce oxygen, provide shelter and food to animals, and create a naturalistic setting for campus users.

Shirley Gate
The undeveloped landscape at Shirley Gate is an older forest dominated by oaks and hickories, with little to no understory or shrub layer, suggestive of heavy deer browse. In some areas, beech and holly trees fill in the understory, with smilax vines providing groundcover. Oak decline is taking a toll on this forest. There are many fallen trees, and dead or dying trees still standing. While under duress, the forest and streams still provide valuable ecosystem services and appear to be utilized by George Mason community members as well as deer, turkey, woodpeckers, squirrels, and other small mammals and birds.









CORE ECOLOGICAL THEME:

ACTIVATE OUTDOOR LEARNING

West Campus and Shirley Gate provide ample opportunity for outdoor learning now and in the future. The athletic fields and accessory structures, and recreational trails through the woods are essential to creating balance in campus life. These trails, and portions of the stream corridors, could connect to the Green Necklace on GMU's core campus, further extending the ecological and cultural benefits of this feature.

Formalized outdoor learning spaces like the wetland mesocosm compound, ecological observatory areas, and forest plots at Shirley Gate provide opportunities for students and faculty to participate in environmental research. Features like the dry pond create teaching opportunities around campus sustainability. As campus infrastructure expands, additional stormwater treatment facilities can integrate water into the landscape as a design feature. Environmentally beneficial projects like stream restoration can also provide a platform for student learning and help offset impacts from development.



TYPE **A**
CIVIC LANDSCAPE
High population and building density.

TYPE **B**
PERIMETER LANDSCAPE
Minimize maintenance, meadows and tree perimeter streets, parking lots, and athletic perimeter.

TYPE **C**
CIVIC PRESERVES
Stream environment, forest and managed understory for sightlines, safety, and access.

TYPE **D**
CAMPUS PRESERVES
Untouched or fully restored habitats.

ECOLOGICAL TAXONOMY

West Campus and Shirley Gate can be divided into four ecological typologies based on those described in the Ecological Planning Appendix of George Mason's Master Plan: Civic Landscapes (Type A), Perimeter Landscapes (Type B), Civic Preserves (Type C), and Campus Preserves (Type D). The typologies, shared by all campuses, are defined by their levels of use, population density, and maintenance.

The typologies shown for West Campus and Shirley Gate describe the current conditions of these campuses. Both of the sites are located near George Mason's core campus and high population center, presenting many opportunities to preserve and expand the civic and perimeter landscapes. Civic preserves may be expanded or enhanced to accommodate a growing population of users, while some riparian areas and forest habitat can be retained as campus preserves. Core ecological themes persist throughout all typologies, providing guidance for sustainable development.



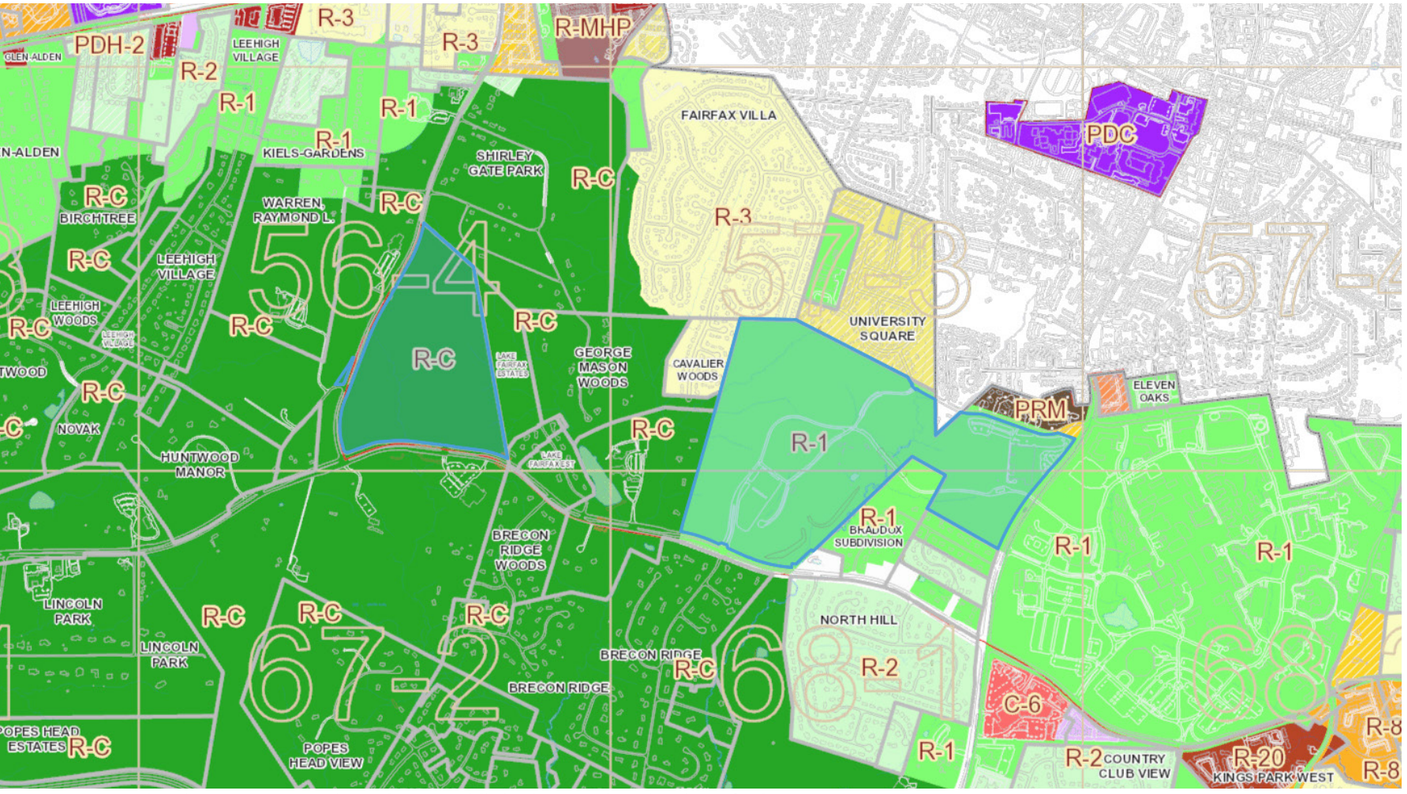


CIVIC CAMPUS

Higher population and building density define the Civic Campus typology. The focus is on the built landscape, with designed learning spaces that may be confined by buildings. Greater impervious surface and maintenance efforts characterize this typology. Ecological functions may be diminished while the built environment takes precedence.

The Civic Campus is centralized and located in areas that are easy to access via existing roads. Currently, the field house is the only location at Shirley Gate or West Campus that fits this typology. The greatest density of users can be found in this area. The field house is located along University Drive, forming an extension of the Civic Campus on George Mason's core campus, located just across Ox Road.

As George Mason expands its facilities, growth of the Civic Campus typology is expected on both parcels. Targeting areas with existing development, like athletic fields, can help minimize ecological disturbance. Ecologically sensitive areas near streams and wetlands are not appropriate locations for the Civic Campus typology. Topography is also a consideration for the Civic Campus—flatter, upland sites are most conducive to the types of development that will expand this typology.



Residential areas ("R-") surround West Campus and Shirley Gate, as indicated on the Fairfax County Zoning Map (2023).

CIVIC CAMPUS FOCUS: COMMUNITY CONNECTIVITY

As the Civic Campus expands at Shirley Gate and West Campus, it is important to acknowledge that the areas surrounding the two sites are primarily residential. Many of the surrounding residential lots are low density with a high percentage of forested area.

An optimal mix of Civic Campus, Perimeter Landscapes, Civic Preserves, and Campus Preserves typologies will provide an opportunity to create a gateway into the campus core that is both a reflection of the surrounding community and a vibrant destination. Vegetative buffers are naturally created in areas that cannot reasonably support development while encouraging massing in the interior to create vibrancy and activity.







PERIMETER LANDSCAPES

Perimeter Landscapes at George Mason are defined by athletic fields, road corridors, parking, maintained open space, and stormwater ponds. In these areas, the Civic Campus transitions into Preserves. Perimeter Landscapes are especially important at West Campus, as athletics fields are critical for training and recreation. Surrounding pathways and landscapes provide pedestrian access between core elements and additional opportunities for informal gathering, plantings, and/or green infrastructure.



PERIMETER LANDSCAPE FOCUS: INCREASE VEGETATIVE COVER

George Mason's Perimeter Landscapes present an opportunity to tie the built environment into the natural world, blending the Civic Campus with Civic Preserves. As Perimeter Landscapes expand, maximizing native vegetative cover can reduce maintenance efforts over time, improve water quality, and provide additional habitat. Incorporating native plants into landscaping is an excellent way to grow and strengthen ecological corridors on campus.

Meadows planted with native, pollinator-friendly species reduce the need for mowing while providing visual interest and preserving sight lines. Increasing tree cover around parking lots and roads can reduce the heat island effect and calm traffic. While sight lines are an important part of this typology, the area is so vast that there are many opportunities to enhance habitat value in wooded areas with the addition of understory plantings. Additionally, continuing to add innovative stormwater management features like the existing West Campus dry pond can serve to improve water quality and activate opportunities for outdoor learning.







CIVIC PRESERVES

The Civic Preserves typology includes large, readily accessible patches of naturalistic landscapes. Trails and other built infrastructure are more prevalent here than in Campus Preserves, striking a balance between ecological and cultural uses. Forested areas are directly adjacent to Perimeter Landscapes and may be managed for safety and sight lines.

On West Campus, Civic Preserves encompass much of the riparian corridor. Forests, streams, and wetlands are all included in this typology. The network of maintained trails currently crossing forested areas and utility easements on these sites can be enhanced to accommodate more users and integrate with the Green Necklace on George Mason's core campus. Opportunities for outdoor learning are abundant, from the wetland mesocosm research area to the orienteering trails. As Shirley Gate develops, large swaths of the existing forest can be retained as Civic Preserves, hosting trails to connect various areas of the Civic Campus and Perimeter Landscape.







CIVIC PRESERVE FOCUS: INVASIVE SPECIES MANAGEMENT

Trails through the Civic Preserves are important for George Mason community members, but they create long corridors of edge habitat that is easily colonized by non-native invasive species. Bamboo, English ivy, Japanese barberry, Japanese honeysuckle, and pachysandra are among the invasive species that can be found in Civic Preserves.

Seeds are transported by the people and animals who use these trails, and tree canopy gaps provide plenty of sunlight for invasive species to proliferate and spread throughout the forest. Trails connect near residential yards as well, where escaped ornamental species have begun to colonize the Preserves. Controlling invasive species along trails, especially as they are created and used more frequently, can go a long way to ensure the quality of forested habitat.







CAMPUS PRESERVES

The Campus Preserves typology represents large tracts of undeveloped land in good condition, an increasingly rare and valuable feature in the region's developing landscape. This typology is located furthest from the Civic Landscape and may not be included in routine maintenance. Mature forests and streams provide food, water, and structure, creating refugia for animals.

On West Campus, the tributaries and forest in the northwest corner of the parcel support a variety of plant and animal life. Reserving this area as Campus Preserves will help protect existing ecological corridors on site and throughout the region. At Shirley Gate, oak decline has substantially decreased the quality of the forest, to the extent that the remaining land is better suited for the other typologies including Civic Campus, Perimeter Landscapes, and Civic Preserves.



Stream restoration projects like the one underway at George Mason's core campus can provide ecological uplift to degraded streams within the Campus and Civic Preserves.



CAMPUS PRESERVE FOCUS: STREAM RESTORATION

The Campus Preserve typology includes multiple tributaries to Pope's Head Creek, and the riparian corridors surrounding them. These streams provide valuable resources in their current state, but they are degraded and could support higher quality habitat if restored.

In many locations, the stream channel is incised, with badly eroded streambanks that have exposed soil and tree roots. There are sharp meanders, headcuts near outfalls, and the channel splits at some locations where it has become clogged with debris. Sediment from raw banks and the stream bed is transported downstream, causing water quality issues as it accumulates in receiving water bodies. The increased sediment also alters habitat quality in the stream, blocking light from the foraging and reproductive areas of fish and invertebrates. Substantial tree loss can also be expected as bank erosion continues.

Techniques from Natural Channel Design—a method that seeks to restore degraded streams by mimicking characteristics of stable, "natural" streams—are effective and widely utilized in similar circumstances. The stream restoration project on George Mason's core campus is an example of this method, which could be applied to many of the degraded stream channels in the Campus Preserve and Civic Preserve typologies.



EXISTING TYPOLOGIES

- CIVIC LANDSCAPE
- CIVIC PRESERVES
- PERIMETER LANDSCAPE
- CAMPUS PRESERVES

OVERALL FOCUS: TRAIL CONNECTIONS

Trails are a defining element of George Mason's campuses. They can synthesize the core ecological themes, creating routes for pedestrian transportation, activating spaces for outdoor learning, ensuring the protection of ecological corridors, and bringing community members closer to the natural environment in a safe, accessible manner. As Shirley Gate and West Campus develop, it will be important to create linkages within and between trail systems.

The Green Necklace trail system on George Mason's core campus extends to meet Campus Drive, which continues on West Campus. Sidewalks along Campus Drive can connect the core campus trail system with the existing trail on West Campus that follows the easement and stream near the southeast property boundary. Connections can be made from this trail to new Civic Campus areas, which may feed into the existing trail network on the western side of the parcel. Trails in this area can be formalized and expanded as necessary.

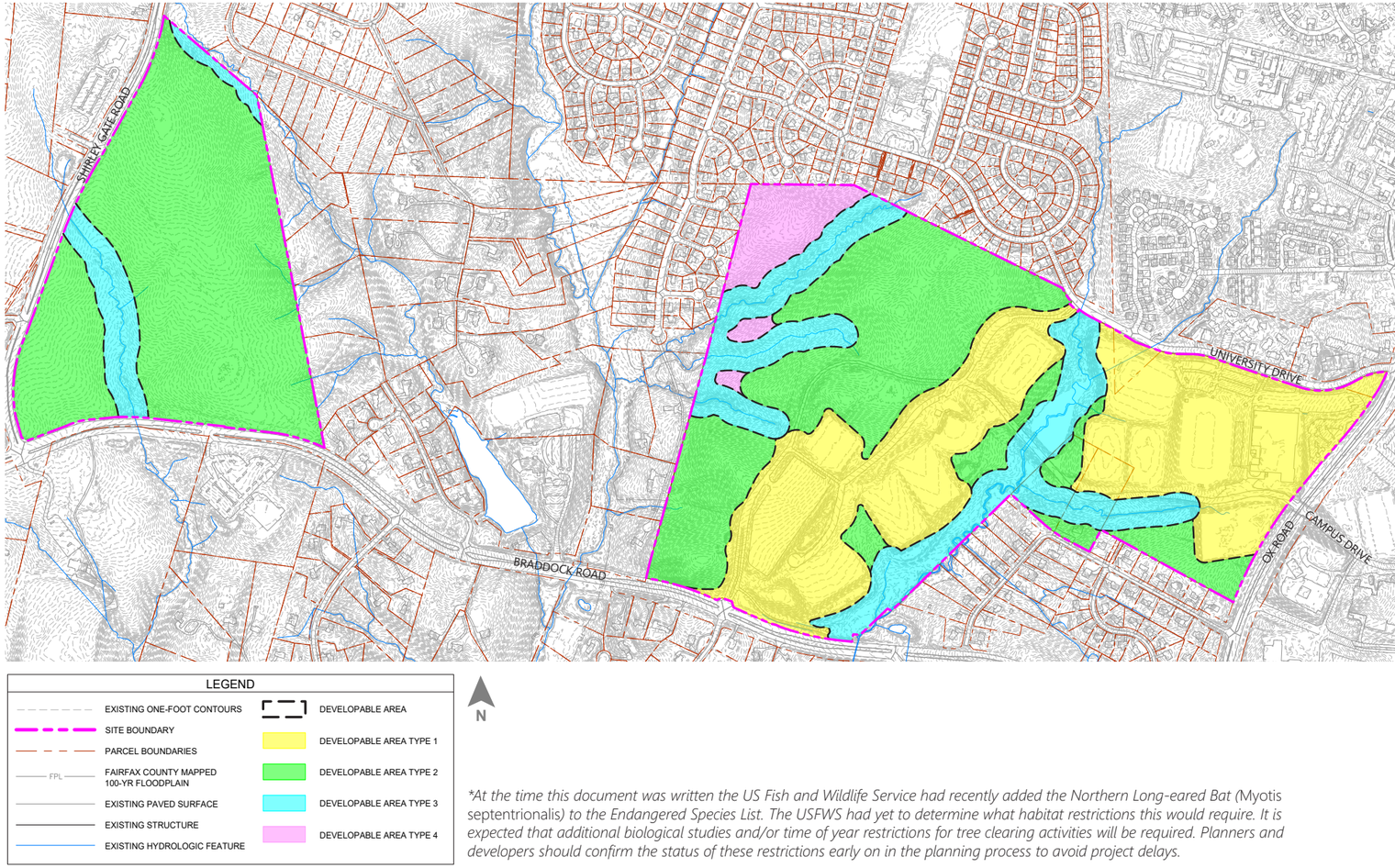
The sidewalk along Braddock Road can provide an east-west connection with the Shirley Gate site. New trails at Shirley Gate can provide multiple access points to new Civic Campus areas, as well as the riparian corridor, passing through Civic Preserves and Perimeter Landscapes.

DEVELOPABLE AREAS

The Shirley Gate and West Campus parcels present excellent opportunities for development. Their proximity to George Mason's core campus provides easy access for pedestrians and forms a natural extension of the campus. Because of their location, these parcels would be especially suitable for additional athletics fields and stadia, accessory structures, housing, dining, outdoor learning and recreation areas, and many other uses. In the figure at left, Shirley Gate and West Campus are divided into four types of developable area, each with opportunities and constraints.

Significant portions of both parcels lie within a Fairfax County designated Resource Protection Area (RPA), a 100-foot buffer between waterways and upland areas. In order to protect the quality of adjacent water resources, there are significant restrictions on land use within these areas per the Chesapeake Bay Preservation Ordinance (CBPO). Buffers around waterways are shown on the opposite page, but they represent only an approximation of the site-specific, delineated RPA. The site-specific RPA must be delineated prior to any site planning, as RPA restrictions limit the type of development that can occur.

- **Type 1**: These areas encompass the Civic Campus and Perimeter Landscape areas that are not currently forested. They are relatively flat, cleared of large vegetation, often already developed or paved, and lie outside the mapped RPA. For these reasons they are most favorable for general development, both in terms of cost and required regulatory action.
- **Type 2**: These currently undeveloped areas are located outside of the mapped RPA. Suitability for development is dependent on the extent of desired and/or allowable tree clearing per regulations.*
- **Type 3**: These areas are located within the RPA, but may be able to support certain types of development per the CBPO, with County approval of appropriate applications. There are exemptions from and exceptions to the CBPO that may apply, such as 118-5-3(a), which can permit "site amenities for passive recreation," like pathways in the RPA. Fairfax County must approve applications for exemptions and exceptions, and additional permitting may be necessary.* Existing driveways can be maintained per Section 118-5-1(a), and the re-development of driveways in the RPA may also qualify as allowed use (Section 118-2-1(d)). Maintenance of the existing wetland mesocosm research area may qualify as allowed use as well.
- **Type 4**: Due to their location, these areas are among the least suitable for development. They are isolated from the Civic Campus by considerable distance, and fragmented by RPA.



**At the time this document was written the US Fish and Wildlife Service had recently added the Northern Long-eared Bat (*Myotis septentrionalis*) to the Endangered Species List. The USFWS had yet to determine what habitat restrictions this would require. It is expected that additional biological studies and/or time of year restrictions for tree clearing activities will be required. Planners and developers should confirm the status of these restrictions early on in the planning process to avoid project delays.*