Appendix 7: Green Infrastructure Case Study Analysis

Case study research was part of the assessment of green infrastructure analysis. The purpose of gathering comparable case studies was to review existing developments that have successfully incorporated green infrastructure with their community design for comparison with the study of green infrastructure opportunities and constraints within the Chatfield Basin.

1. Highlands Ranch Filing 118 Case Study

Highlands Ranch Filing 118 abuts the northern boundary of the Highlands Ranch Back Country Wilderness Area (HRBCWA), an 8,200 open space area located in the southernmost area of Highlands Ranch, in Douglas County. Of the 8,200 acres in the HRBCWA, 1200 acres are designated for active recreation to support such activities as public and quasi-public facilities, churches/retreat facilities, regional, community and neighborhood parks, colleges/universities, recreation centers, golf courses, equestrian center, and cultural facilities. The remainder of the HRBCWA is intended to function primarily as wildlife habitat, with limited recreational access.

Highlands Ranch Filing 118 is located on the southwestern boundary of developed Highlands Ranch, and has been planned for residential development since the late 1970's. Original development concepts for Filing 118 consisted of typical suburban housing, including curving cul-de-sacs and traditional concrete curb and gutter streets.

Filing 118 abuts a portion of the HRBCWA, where active recreation is allowed, including golf. Shea Homes, the developer, had at one time envisioned a residential golf community within Filing 118. As demonstrated around the Country, there are economic benefits to be gained by the developer from a golf development, with higher premiums paid for homes adjacent to golf courses. However, Shea Homes recognized that most residents in a golf community choose to pay higher premiums for their homes not because they are avid golfers, but because of the open space created by the golf course. Realizing this, Shea Homes proposed a community built around open space instead of a golf course. Shea Homes realized they could achieve the same economic benefits by treating natural open space as golf has traditionally been treated. Additionally, Filing 118 has unique access to an existing open space network within the Highlands Ranch Back Country Wilderness Area to connect their development to visually and physically.

Open space in standard suburban development often consists of open space areas that have no direct access or benefits to the residents, and are usually

unbuildable areas such as drainages. Through the new open space community envisioned for Filing 118, Shea Homes redefined the relationship between existing open space and residential development by focusing on the relationship of open space and open space functions and worked to create a direct relationship to the residential development. Within this new community, open space and its functions become the focus of everyday living and experiences.

However, there were barriers to this new concept that Shea Homes had to overcome. The original zoning for Filing 118 created artificial boundaries between residential development and separated the development from the open space in the HRBCWA. Additionally, Shea Homes wanted to incorporate low-impact development techniques to address water quality and detention, a concept not typically applied in the arid climate of Colorado, but frequently used elsewhere in the Country.

In order to overcome the barriers that standard suburban development patterns and process created for Filing 118, Shea Homes initiated a collaborative team process to share their vision with every agency and stakeholder group. In doing so, Shea Homes was successful at 'selling' their vision, and generating buy-in by a variety of agencies and stakeholders. Through this team process, sustainable development ideas were examined to support the vision of an open space community including innovative low-impact development to manage storm-water, wildlife habitat impacts, and visual impacts. Shea Homes brought together a team of consultants that worked diligently with Douglas County, Highlands Ranch Community Association, water quality agencies, metro districts, Division of Wildlife, and many other referral agencies. The various agencies and groups met regularly with Shea Homes and their consultants to identify and examine issues in a collaborative atmosphere.

As a result of this effort, Shea Homes' willingness to invest in a new concept and idea, and Shea Homes' desire to work collaboratively with all parties, Filing 118 has successfully incorporated open space and its related uses within the development. Open space within Filing 118 was redefined. First, the boundary between Filing 118 and the HRBCWA was modified, creating an undulating line that follows the natural topography, and physically brings the HRBCWA into Filing 118. (See Exhibit 1a and 1b, pg 54 & 55)

Typical curb and gutter street design has been modified to accommodate an open stormwater system, thereby emphasizing the importance of water in an arid climate throughout the development. Grass-lined roadway swales and natural topography are used for water drainage and collection. Detention ponds and water features preserve natural hydrologic function and provide an aesthetic amenity.

Throughout the neighborhood, approximately 240 acres of open space with numerous trails connect local and regional trails. These open space areas and trails also serve as habitat and wildlife corridors. Clustered development preserves significant areas of open space.

Major ridgelines, which create an ecosystem separation boundary between grassland and shrubland, are protected, and used as a focal point for emphasizing the visual uniqueness of the site. From this ridgeline, the entire Front Range is visible from Longs Peak to the North and the Denver City skyline to Pikes Peak, Devils Head, and Dawsons Butte to the south. Protection of these ridgelines and their viewsheds preserves a unique view while providing valuable wildlife corridors. Using and enhancing open space provides community focal point, as well as, realizing economic and ecological benefits.

The functions of the open space network within Filing 118 are essentially green infrastructure elements. These elements that made this project successful in incorporating green infrastructure can be used and applied to future projects and include:

1. A developer that recognized green infrastructure brings value to their project.
2. A developer that proactively created a vision for their project, and worked to create buy-in to their vision with a variety of stakeholders.
3. Demonstration that successful projects that intentionally incorporate green infrastructure involve a variety of parties that collectively explore innovative ways to implement a common vision to broaden the perspective on how development can be done.

Exhibit 7.1a: Original Open Space Boundary

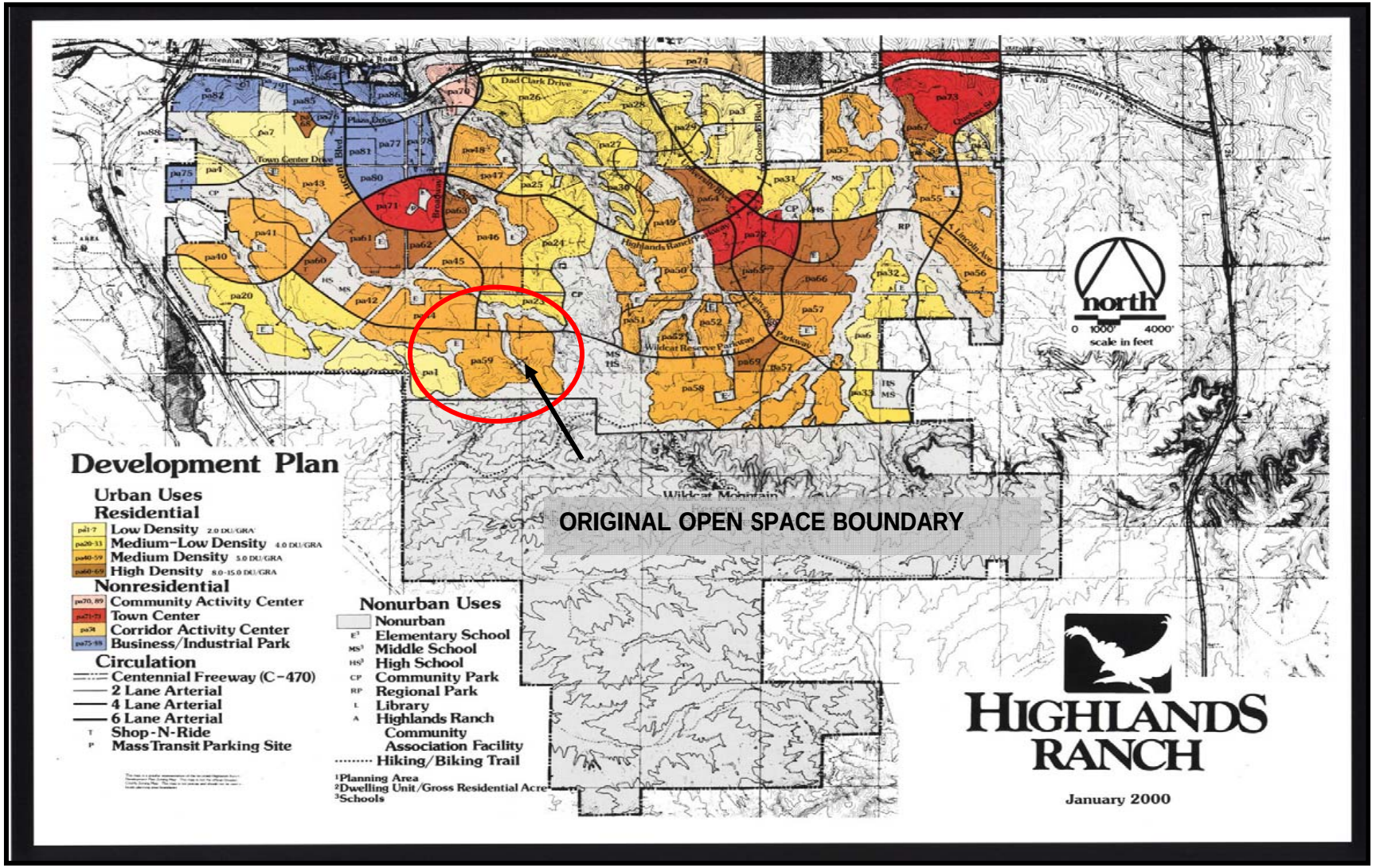
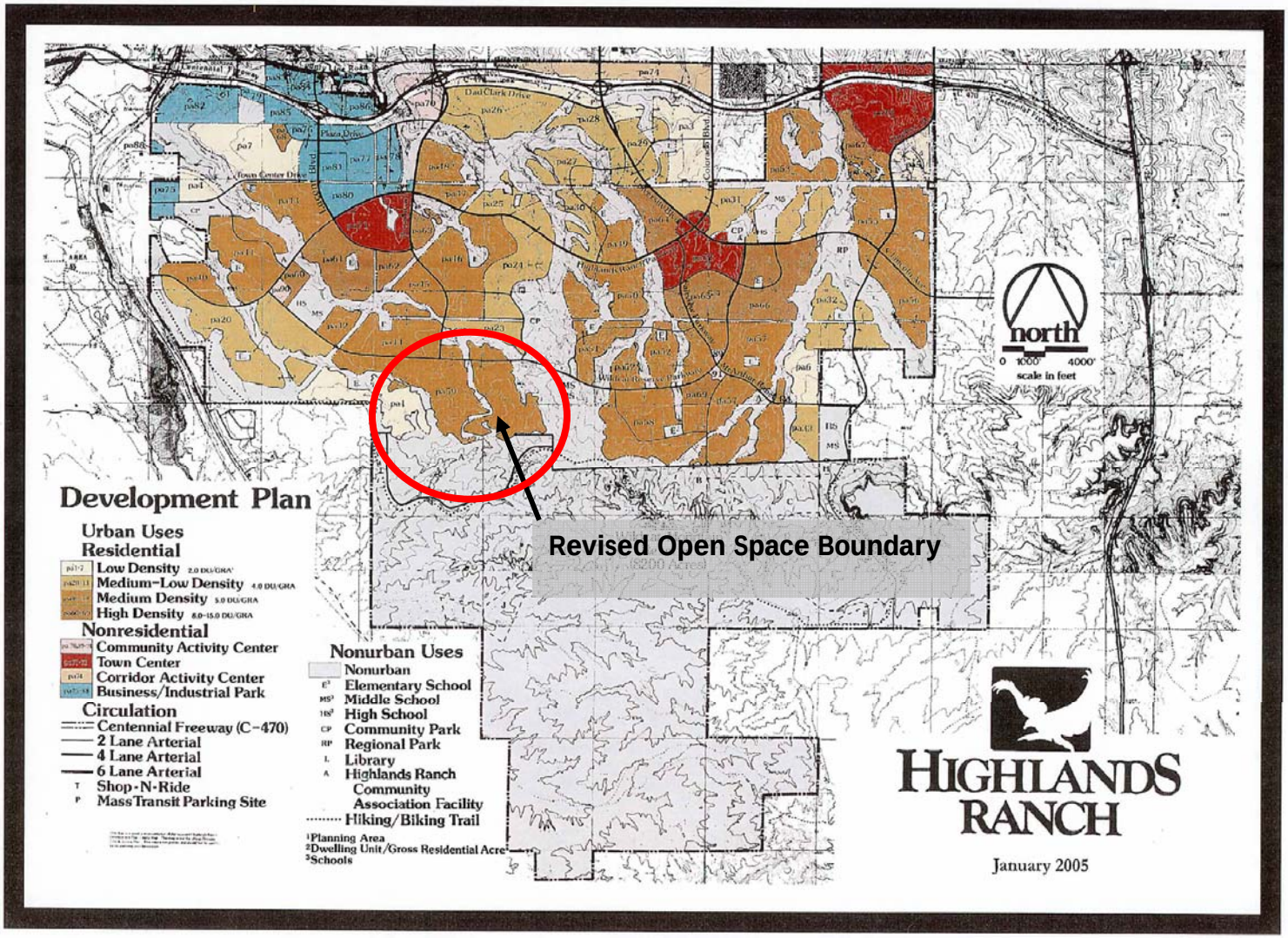


Exhibit 7.1b: Revised Open Space Boundary



2. Auburn, Alabama Green Infrastructure Case Study

The City of Auburn through adoption of its City of Villages Concept Plan in 2003 developed a process and awareness of green infrastructure by identifying green infrastructure as a key element of smart growth.

Annual citizen surveys showed a strong majority believed that Auburn should have a system of connected trails and open spaces throughout the city. They also believed it was very important for development to protect natural resources. This clear mandate gave direction to adoption of the Land Use Plan with its very strong green infrastructure elements.

Auburn planners, public officials and citizens collaborated in evaluating and identifying green infrastructure. The Land Use Plan has elements of green infrastructure throughout, representing the citizens' desires. The Auburn green infrastructure system consists of open spaces and natural resource areas that can be used to provide a framework to organize, locate, and interconnect urban development. City policy toward these natural resources has been codified in the Auburn Zoning Ordinance.

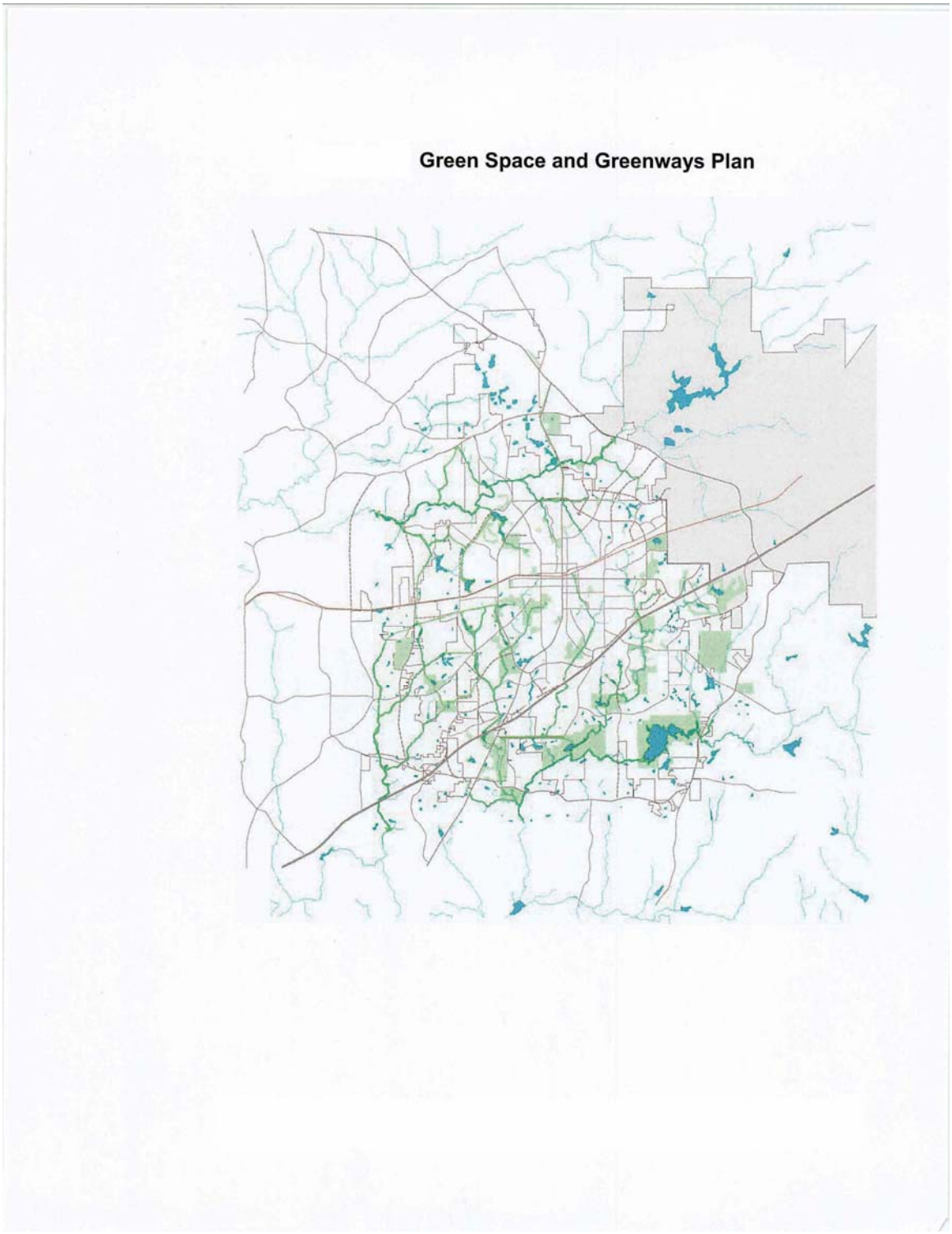
Auburn's City of Villages Concept was built upon the idea that a green infrastructure is critical to the quality of life for the community as a part of planning for community conservation and development. The first step was to identify resources, sites and areas that may be critical to the community. These included environmental conditions associated with water, soils, slopes and public and semi-public parks and open space. Resources and environmental conditions were mapped, including the Green Space and Greenways Plan Map. (See attached Green Space and Greenways Plan Map.)

As part of the Auburn Land Use Plan, Auburn adopted a *Green Space and Greenways Master Plan* to guide acquisition and appropriate use and development of the City's green infrastructure. Through plan implementation the City will continue to provide high quality parks and open spaces for residents and visitors. Goals for this open space system include providing or requiring usable open space within walking distance of the majority of the City's population; providing recreational greenways and green spaces; and serving large scale recreational needs in appropriate locations.

In general, greenways provide:

- Opportunities for alternate forms of transportation
- Act as wildlife corridors
- Development buffers
- Storm water recharge areas
- Linked public park system.

Exhibit 7.2: Green Space and Greenways Plan Map



3. Prince George County, Maryland, Preliminary Green Infrastructure Plan

The Maryland-National Capital Park and Planning Commission of Prince George's County Planning Department created the Preliminary Countywide Green Infrastructure Plan, which is the first comprehensive, functional master plan ever developed for environmental ecosystems in Prince George's County. The Commission used the following definition of green infrastructure:

Green infrastructure is defined as an interconnected network of waterways, wetlands, woodlands, wildlife habitats, and other natural areas of countywide significance.

The goal of Prince George County's Preliminary Green Infrastructure Plan is to preserve, enhance, and/or restore an interconnected network of countywide significant environmental features that retain ecological functions, maintain or improve water quality, and support the desired development pattern of the General Plan. The goal, objectives, policies, and strategies seek to preserve, protect, and enhance these elements by the year 2025. The Green Infrastructure Plan supports the desired development pattern in the General Plan administered by the Prince George's County Planning Department.

The Green Infrastructure Plan was developed with substantial input from numerous stakeholders, which gathered maximum input from concerned citizens, residents, and entities and included the following:

- Public forum;
- Four focus group meetings;
- Hosted a plan review group work session;
- Met with planners and other representatives from adjoining jurisdictions and municipalities;
- Developed and conducted an urban resident survey;
- Mailing lists were created, e-mail and regular mail, to keep participants updated; and
- Sponsored an active website to obtain input throughout the plan development process.

The Green Infrastructure Plan is a comprehensive vision for conserving significant environmental ecosystems in Prince George's County. It includes a map of interconnected sensitive habitats of countywide significance, along with implementation recommendations to help make the vision a reality. (See attached Green Infrastructure Network Interim Map.)

Sensitive and important environmental features throughout the County were identified and evaluated to provide a comprehensive interconnected system. A measurement of countywide significance was developed and mapped as the Green

Infrastructure Network. The green infrastructure network was divided into three categories:

1. Regulated areas containing environmentally sensitive features, such as streams, wetlands, buffers, the 100-year floodplain and steep slopes, that are currently regulated (i.e., protected) during the land development process.

2. Evaluation areas containing environmentally sensitive features, such as interior forests, colonial waterbird nesting sites and unique habitats, that are not currently regulated (i.e., not protected) during the development review process.

3. Network gaps comprising areas that are critical to the connection of the regulated and evaluation areas and are targeted for restoration to support the overall functioning and connectivity of the green infrastructure network.

The identification of the green infrastructure network will allow land management and policy decisions to be made with a larger picture in mind. The Green Infrastructure Plan is intended to influence individual decisions to help realize a long-term vision for ecosystem preservation and restoration. The Green Infrastructure Plan will bring decision-making, land use policy, and infrastructure investments together under the umbrella of a guiding vision to help maintain critical corridors, and to target restoration and mitigation.

The Green Infrastructure Plan includes measurable, quantifiable objectives that will be monitored and reported on with a timeline of completion in the year 2025.

Successful strategies that may be used for development of green infrastructure include:

- Working cooperatively with individuals and agencies to preserve and enhance green infrastructure;
- Acquiring substantial input from numerous stakeholders;
- Multiple group meetings and work sessions;
- Identification and evaluation of environmental features to create an interconnected system of green infrastructure;
- Identification of critical network gap areas, especially unprotected areas;
- Creation of green infrastructure maps;
- Recommendations with measurable, quantifiable objectives; and
- Implementation timeline.

Exhibit 7.3: Prince George County Green Infrastructure Network