

Trexler-Lehigh County Game Preserve Master Plan

County of Lehigh
Department of General Services

Consultants

Urban Research and Development Corporation
Bethlehem, PA
in association with
Natural Resource Consultants, Inc.
Somerset, PA

May 2006

CONTENTS

	<u>PAGE</u>
Contents	i
Background	1-1
Location	1-1
History of the Site	1-2
Purpose and Structure of the Plan	1-4
Master Plan Process	1-5
Project Management Group	1-5
Field Views	1-5
Interviews	1-6
Public Meetings	1-6
Site Characteristics	1-6
Master Plan	2-1
Vision for the Site	2-2
Recommended Trail System	2-3
Recommended Support Facilities	2-12
Improvements to North and Central Ranges	2-23
Recommended Policies	2-25
Summary of Proposed Improvement Costs	2-30
Maintenance Costs	2-32
Implementation/Other Improvements	2-33
Appendices	
A <i>Observations and Recommendations Regarding the Bison, Elk, Palomino Horse and White-tailed Deer Herds at the Trexler-Lehigh Game Preserve; An Historic Perspective of General Harry C. Trexler's Intentions</i>	
B Project Management Group	
C Interviewees	

Appendices (continued)

D Recommendations from the Report, *Trexler-Lehigh County Game Preserve, Ecological Inventory and Assessment*

E Details

Maps, Tables, and Figures

Map 1.1	Location Map	following 1–2
Map 1.2	Site Location	following 1–2
Map 1.3	Pasture Location	following 1–4
Map 2.1	Trail System	following 2–2
Map 2.2	T1 — Trail A	following 2–4
Map 2.3	T3 — Trail B	following 2–6
Map 2.4	T5 — Trail C	following 2–8
Map 2.5	Entrance and Parking Plan	following 2–12
Map 2.6	Entrance E5, at Covered Bridge	following 2–16
Map 2.7	Central Range	following 2–24
Map 2.8	North Range	following 2–24
Map 2.9	G1 Guide Rail Location	following 2–26
Map 2.10	G2 Guide Rail Location	following 2–26
Table 2.1	Cost Estimate — Trail A	2–4
Table 2.2	Cost Estimate — Trail Segments D5, D6, and D7	2–5
Table 2.3	Cost Estimate — Trail B	2–6
Table 2.4	Cost Estimate — Trail Segments D2 and D3	2–6
Table 2.5	Cost Estimate — Trail C	2–8
Table 2.6	Cost Estimate — Trail Segments D1 and D4	2–11
Table 2.7	Master Plan Cost Summary	2–30
Figure 2.1	E1 Mill Creek Road, North	following 2–12
Figure 2.2	E2 Pathway at CCC Road, West	following 2–14
Figure 2.3	E2 Pathway at CCC Road, East	following 2–14
Figure 2.4	E3 Main Entrance	following 2–16
Figure 2.5	Trail C Crossing	following 2–16
Figure 2.6	E5 Covered Bridge Entrance	following 2–16
Figure 2.7	Exit from Central Range	following 2–18

BACKGROUND

Harry C. Trexler (1854–1933) was an extraordinary businessman, civic leader, and philanthropist with the ability to create and manage large corporations while fostering and maintaining a strong sense of community and social needs. He retired from the Pennsylvania National Guard in 1918, having achieved the rank of Brigadier General. A co-founder of Lehigh Portland Cement, which became one of the largest cement producers in the world, Trexler was also involved with many public utilities and held seats on several corporate boards as well as trusteeships at three area hospitals, two colleges, and a university. He served on the staffs of six Pennsylvania governors.

General Trexler was keenly aware of the value of leisure time and the importance of family and community activities. Instrumental in planning Allentown’s extensive park system, Trexler served as chairman of the city’s first planning commission. The general’s imprint on the landscape of both Allentown and Lehigh County is clearly visible today:

- At his own expense, Trexler hired a renowned landscape architect to beautify a vacant city lot, which later became Allentown’s first park, West Park.
- Trexler’s summer home, Springwood Farm, was conveyed to the City of Allentown after his death and is now known as Trexler Memorial Park.
- The general conveyed his game preserve property to Lehigh County in his will.

The following document presents a brief history and a new beginning for the revitalization of the property known as the Trexler-Lehigh County Game Preserve.

Location

The Trexler-Lehigh County Game Preserve (TLCGP) is located in the northwest portion of Lehigh County, in the townships of North Whitehall and Lowhill, approximately eight miles northwest of the City of Allentown (Map 1.1). Primary access to the site is Game Preserve Road to the west of PA Route 309. Other major roads in the vicinity include PA 100, U.S. 22, and the Pennsylvania Turnpike (I-476).

The TLCGP site contains approximately 1,108 acres, surrounding the 29-acre Lehigh Valley Zoo (Map 1.2).¹ The site is adjacent to Lehigh-Carbon Community College, the KidsPeace Children’s Hospital, and the KidsPeace Orchard Hills Campus.

¹ The Lehigh Valley Zoo is not part of the *Trexler-Lehigh County Game Preserve Master Plan*.

History of the Site

Harry Trexler owned a ranch in Jackson Hole, Wyoming at the beginning of the 20th century. An avid hunter, the general possessed a keen understanding of man's role in nature. As he witnessed the dramatic reduction in game populations, he became interested in protecting and restoring wildlife.

The general began purchasing small farms in the low hills of the Blue Mountain in 1906 with the express purpose of saving the American bison from extinction.² In 1911, he began purchasing the foundation stock of bison, elk, and white-tailed deer. At the time, bison, elk, and deer had all been hunted to the brink of extinction, and Trexler used the game preserve property to protect the animals from hunters as "breeding stock" to assure the species' survival. When the county assumed responsibility in 1935, the preserve was reportedly home to 98 bison, 78 wapiti elk, and 269 Virginia deer.³

Trexler bequeathed the TLCGP site to Lehigh County, and the wording of his will provides important guidance for the master plan:

"Tenth: I further authorize and direct my Executors and Trustees to convey in fee simple to the County of Lehigh, *for use as a public park, by the citizens of that County*, my Game Preserve Property in North Whitehall and Lowhill Townships..." (emphasis added)

The assets of the Trexler estate have grown significantly since his death in 1933, and the administration of the Trexler will has evolved into the nonprofit Trexler Trust. The trust provides millions of dollars annually for the maintenance and improvement of Allentown city parks, the TLCGP site, and various local educational, charitable, and cultural projects.

Under county jurisdiction, the game preserve property became a ritual family destination; a site fondly remembered by virtually every local child, parent, and grandparent for the beautiful scenery, the natural environment, the excitement of fording the Jordan Creek, and the sight of elk, deer, bison, and (after Trexler's death) palomino horses.⁴

Nationwide efforts to restore bison, elk, and deer, of which General Trexler's game preserve was a part, were extremely successful. None of the three animals is considered endangered today. Bison

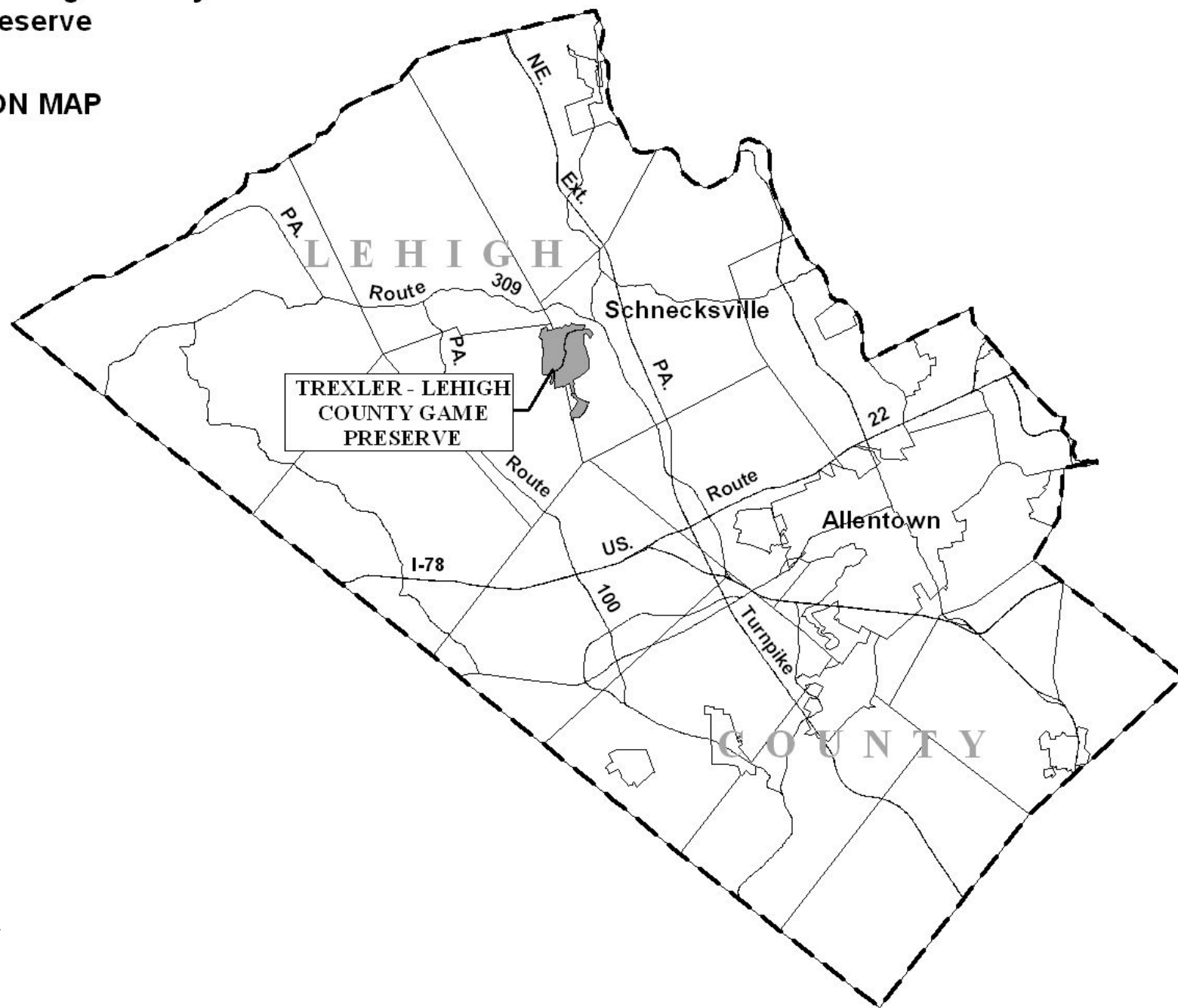
² *The General and His Captain; Memoirs of Nolan P. Benner*, Proceedings of the Lehigh County Historical Society, vol. 36, 1984, p. 66

³ *Ibid.*, p. 74

⁴ For more information on the animal herds on the game preserve property, the reader is referred to *Observations and Recommendations Regarding the Bison, Elk, Palomino Horse and White-tailed Deer Herds at the Trexler-Lehigh Game Preserve*, Natural Resource Consultants, Inc., 2006, which appears in Appendix A.

Trexler - Lehigh County Game Preserve

MAP 1.1 LOCATION MAP



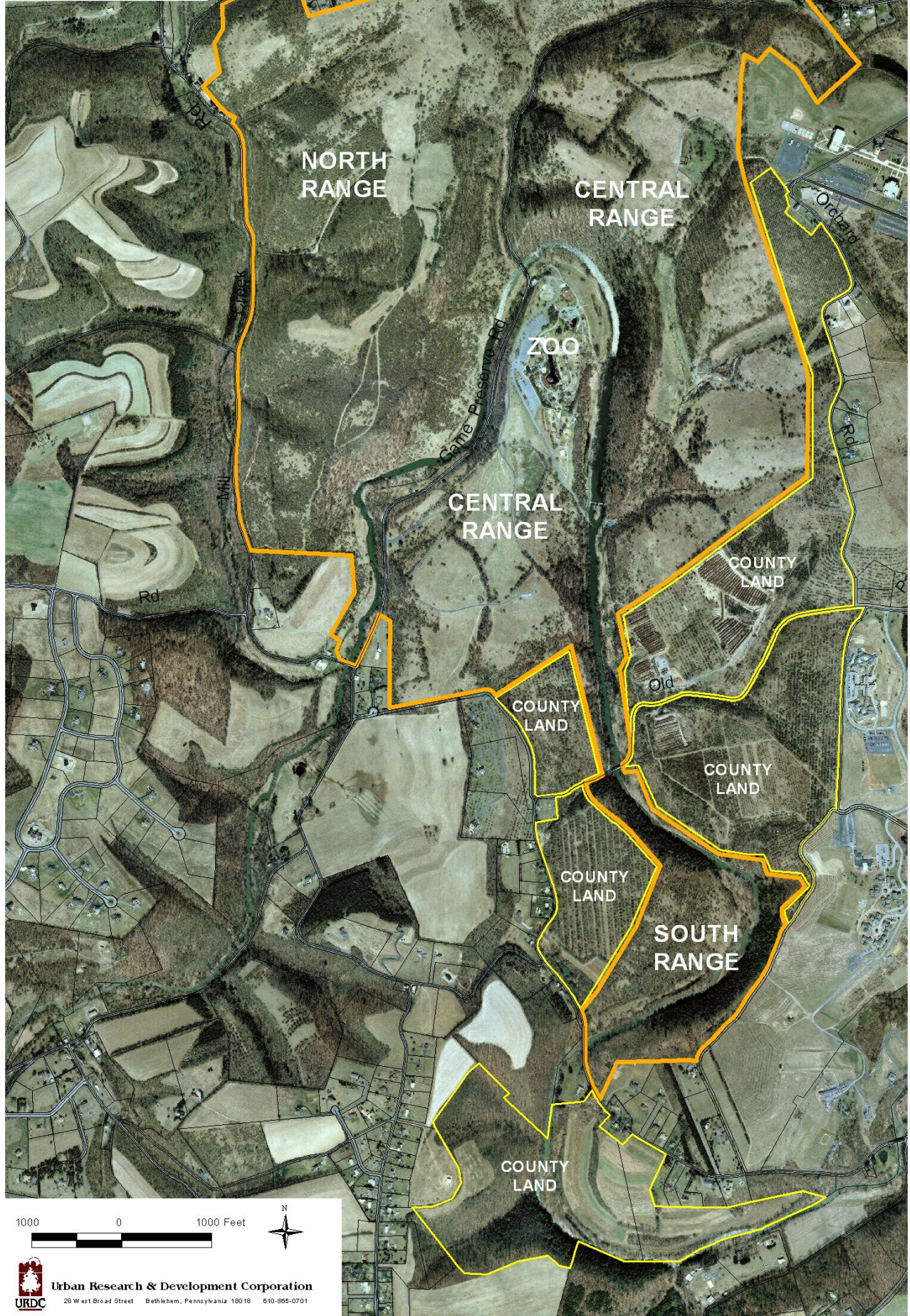
20000 0 20000 Feet



Urban Research & Development Corporation
28 West Broad Street Bethlehem, Pennsylvania 18018 610-865-0701

Trexler - Lehigh County Game Preserve

MAP 1.2 SITE LOCATION



1000 0 1000 Feet



Urban Research & Development Corporation
28 West Broad Street Bethlehem, Pennsylvania 18018 610-865-0701

and elk are considered livestock. Elk roam freely in many parts of northern and western Pennsylvania.

Deer have replenished to the point of controversy, and many Pennsylvanians consider the animal to be too abundant. During the 1980s, the exterior fence of the game preserve was severely compromised, allowing the captive herd out of and wild deer in to the property. Today, the captive deer population has been completely assimilated into the native, wild population that roams freely. Legally, the deer now belong to the citizens of Pennsylvania and are regulated by the Pennsylvania Game Commission.

General Trexler also showed an interest in horse breeding. He purchased 12 Percheron horses (draft horses for working his many farms throughout northwestern Lehigh County), and the herd grew to 100 within ten years. As combines and other machinery became available to increase farm productivity, the need for the horses on the farms declined. General Trexler sold his entire herd of Percherons in 1928.⁵ Palomino horses were reintroduced to the site long after Trexler's death, but the current equine stock has no historical link to the general.

In the decades after the general's death, the captive herds have declined in size. The buffalo herd was reduced to seven yearlings by an outbreak of tuberculosis in 1956 and completely destroyed by an epidemic of tuberculosis in 1960. Today, the captive herds include 14 bison, 15 elk, and six horses.⁶

For 40 years after the county assumed management of the site, the preserve was open only on Sundays, operating with informal petting and feeding exhibits. In 1969, the game preserve commission engaged McFadzean, Everly & Associates to plan and develop a children's zoo at the site. The 29-acre zoo was dedicated on 18 May 1975. The exhibits became more formalized, and the animal collection was expanded to include exotics from Africa, Asia, and Australia. Construction costs, estimated to be \$400,000, ballooned to more than \$2,000,000. According to admission projections, zoo attendance was to reach 650,000 by 1977. Actual 1977 admissions were 112,342.

Unfortunately, local government budgets are extremely difficult to balance and, under county stewardship, funding for the zoo declined to a point that the county had announced plans to close the zoo. In November of 2004, a local nonprofit organization, the Lehigh Valley Zoological Society, assumed management of the zoo under a lease arrangement with the county. The zoo is now formally named the Lehigh Valley Zoo. As a separate operating entity, the Lehigh Valley Zoo is not part of the *Trexler-Lehigh County Game Preserve Master Plan*.

Today, the game preserve site includes both the zoo, the buffalo, elk, and horses, and much open space (Map 1.3). The growth of the zoo and the lease arrangement with the Lehigh Valley Zoo

⁵ Lehigh County Historical Society, op. cit., p. 87

⁶ Natural Resource Consultants, Inc., *Observations and Recommendations Regarding the Bison, Elk, Palomino Horse and White-tailed Deer Herds at the Trexler-Lehigh County Game Preserve*, 2006, pp. 4–7

represented a significant commitment by the county perceived by the Trexler Trust to be to the detriment of the remainder of the game preserve property. The trust filed suit against the county to force the county to devote at least an equal amount of funding to the game preserve property as had been provided to the zoo.

The county and the trust agreed to a settlement of the suit which calls for the county to spend \$1.9 million by the end of 2010 to improve the nonzoo portion of the property for public use. The trust agreed to add \$850,000 to the settlement, giving the county a total of \$2.75 million for improvements to the property.

Purpose and Structure of the Plan

The *Trexler-Lehigh County Game Preserve Master Plan* presents improvements that will open the game preserve to the public, in accord with General Trexler's wishes and the agreement between Lehigh County and the Trexler Trust. The plan is intended to:

- Provide a vision for an improved game preserve site open for the use and enjoyment of Lehigh County citizens.
- Guide Lehigh County in spending the \$2.75 million required by the legal agreement with the Trexler Trust.

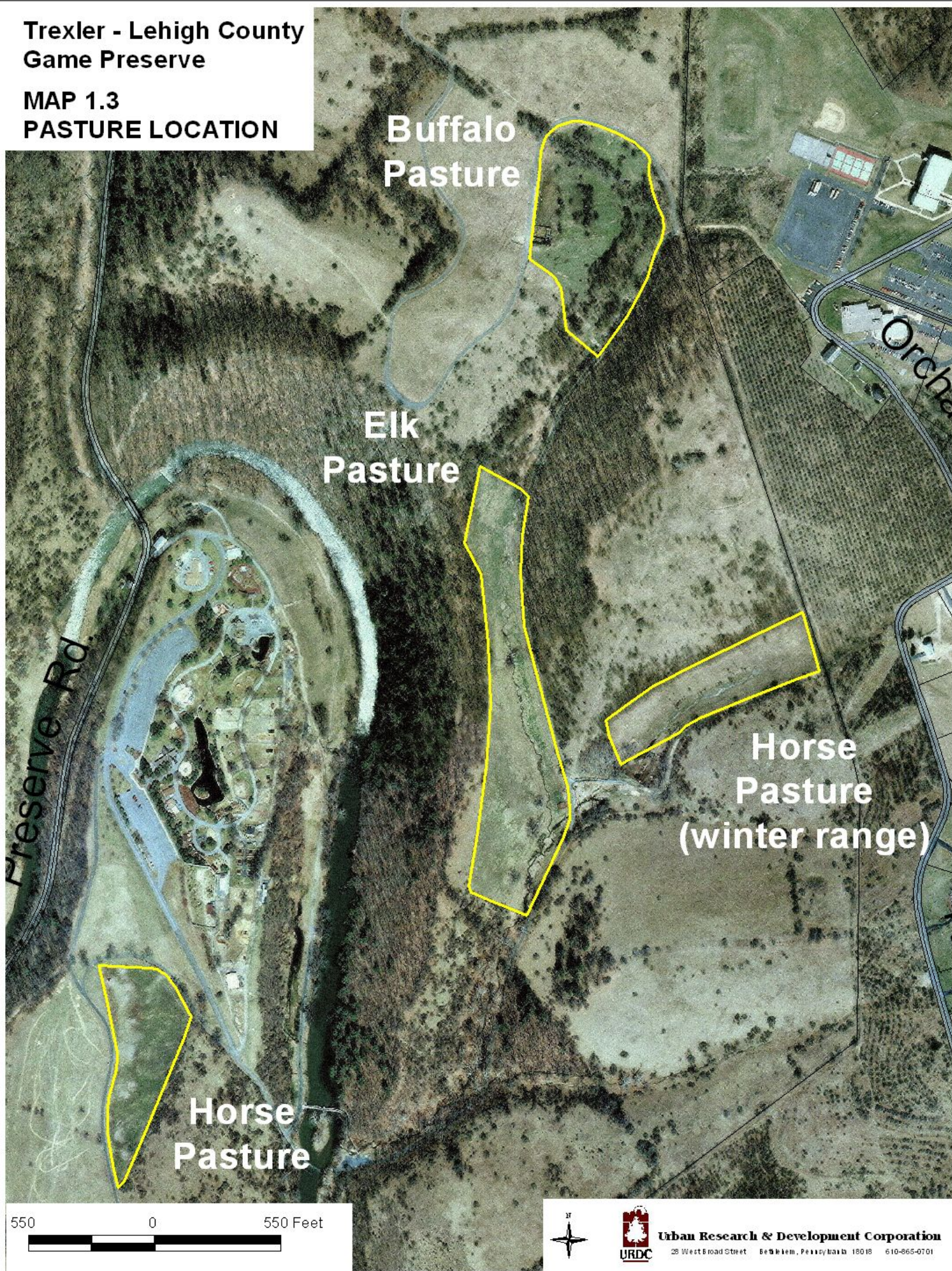
The plan contains two sections:

- **Background** — The background information for the plan includes the history of the site, some information about the site itself, and the process of developing the master plan. The process involved meetings of a Project Management Group (PMG), interviews, and public meetings to determine the most desirable uses of the site.
- **Master Plan** — The second section of the report presents the vision and recommendations of the plan, including both physical improvements and policy recommendations. The vision, developed through the background studies, is perhaps, the most important section of the plan, offering a direction for the site molded from the ideas of the PMG, public meetings, and many on-site visits and discussions. The vision establishes the framework for the recommendations of the plan. The recommendations include cost estimates for capital improvements and an implementation section offering additional guidance to Lehigh County in developing the site.

**Trexler - Lehigh County
Game Preserve**

MAP 1.3

PASTURE LOCATION



Master Plan Process

The master plan process began in August 2005, when Lehigh County retained a consultant⁷ to help prepare the plan. The planning process consisted of four basic elements:

- Project Management Group meetings
- Field views
- Interviews
- Public meetings

Project Management Group

The county also assembled the Project Management Group (PMG) to help guide the plan.⁸ The PMG met on the following six occasions to review progress, discuss key issues, and provide guidance for the master plan:

- | | |
|---------------------|-------------------|
| • 14 September 2005 | • 5 January 2006 |
| • 6 October 2005 | • 2 February 2006 |
| • 3 November 2005 | • 2 March 2006 |

During the initial meetings, as a vision for the property began to emerge, the PMG decided to invite a representative from the Jacobsburg Environmental Education Center (JEEC) in Northampton County to join the group. The members felt that the Jacobsburg site had many attractive features that might be emulated in the improvements to the Trexler-Lehigh County Game Preserve site.

Field Views

Field views provided on-site information for the consulting team and the entire PMG. URDC personnel visited the site 10 times, each for a minimum of ½-day. In addition, the PMG met at the game preserve site for a field view on 8 September 05.

The PMG also visited the JEEC on 28 October 2005 to tour the facility and understand the history of development. The focus of the JEEC is passive recreation. The site includes trails for hiking, biking, and horseback riding and various facilities and exhibits for environmental education.

⁷ The consultant was Urban Research and Development Corporation (URDC — Bethlehem, PA), in association with Natural Resource Consultants, Inc. (Somerset, PA) and Donald R. Marushak (Allentown, PA).

⁸ A complete list of PMG members appears in Appendix B of the master plan.

Interviews

Interviews were a critical part of developing the *Trexler-Lehigh County Game Preserve Master Plan*. The site has a long and emotional history in the county, and many viewpoints were necessary to craft a vision for the site which reflects both General Trexler's intentions and the desires of the people for whom he bequeathed the site. The consultant team conducted meetings/interviews with 34 persons knowledgeable about and having an interest in the TLCGP site.⁹

The interviews resulted in a variety of ideas for use and specific facilities on the TLCGP site. As in any broad interview/opinion process, some views reflected special interests. The interviews also produced information about resources for helping to provide and maintain specific facilities. However, several broad concepts were common to the vast majority of interviews:

- The site is a special asset for the county that must be preserved.
- Activities and facilities should be targeted to the enjoyment of the natural setting.
- JEEC is a good model for use of the TLCGP site.
- Trails are an appropriate use for the site.
- Active recreation facilities, such as fields and courts, should be limited or avoided.
- Motorized vehicles should be prohibited on any trails.

Public Meetings

The PMG hosted two public meetings as part of the *Trexler-Lehigh County Game Preserve Master Plan*. The first meeting, attended by approximately 40 persons, occurred on 17 November 2005. The consultant, URDC, explained the plan process, detailed progress to date, and moderated questions and comments from the audience.

The second public meeting, held on 16 March 2006, attracted approximately 60 persons. Michael Kaiser, Executive Director of the Lehigh Valley Planning Commission, moderated the meeting, which included presentations of plan recommendations by both URDC and NRC, as well as comments from the audience.

Site Characteristics

The Trexler-Lehigh County Game Preserve encompasses approximately 1,108 acres, divided into three distinct areas (Map 1.2): the North Range, the Central Range, and the South Range. The ecological inventory report prepared by the Wildlands Conservancy, notes the distinct character of each range, and the plan recognizes the character of each range:

⁹ A complete list of interviewees appears in Appendix C of the master plan.

- The North Range (471.3 acres) is characterized by steep slopes and ridge tops that offer breathtaking views of surrounding land. At a point in the North Range, one can see both the Blue Mountain, to the north, and South Mountain, to the south, encompassing the entire width of the Lehigh Valley. Activity on the North Range has been relatively sparse. Therefore, the North Range should be open only for limited activity, primarily designed to allow users access to the outstanding scenery and natural setting of the range.
- The Central Range (538.5 acres) includes the pastures for the remaining bison, elk, and horses, the zoo, the pedestrian bridge across the Jordan Creek, the ford, and the picnic area. The Central Range has been the center of activity since Lehigh County began involvement in 1935 and is the focus of the site's identity for many, if not most, Lehigh County residents. Therefore, the Central Range should continue to be the focus of activity, including accessibility for the disabled.
- The South Range (98.6 acres) is both the smallest and the most ecologically sensitive portion of the site. The South Range has experienced the least amount of activity, which is due to the sensitive environmental conditions and which helps to maintain those same environmental conditions. The South Range is currently used for some limited biology assignments by a few faculty and students of the neighboring Lehigh-Carbon Community College. Therefore, the South Range should continue to be limited to the minimum amount of human intervention. Only authorized educational activities should be allowed.

One of the most visible characteristics of the TLCGP site is the poor condition of much of the land. Large areas of the North Range and Central Range are overgrown with Autumn Olive, an invasive, aggressive, exotic (not native) plant. The bison and elk pens are overgrazed. Deer roam freely, since the formerly captive herd has been assimilated into the native population, and cause additional damage for much of the foliage not decimated by the Autumn Olive invasion.

Lehigh County also owns five parcels immediately adjacent to the TLCGP property, encompassing approximately 400 acres (Map 1.2). One of the parcels contains the Lehigh County Solid Waste Recycling Center. Three of the parcels are leased to the Pennsylvania Game Commission as game lands for hunting.

The PMG spent considerable time in discussion about the future of the county-owned land adjacent to the site. The TLCGP is of immeasurable value not simply because of its history but as the largest public open space in the county. At a time when county population is rising and development continues at a rapid pace, the value of the site as open space is one its most important characteristics. Controlling an adjacent 400 acres of undeveloped land presents a significant opportunity. The plan, therefore, addresses the issue of the adjacent lands under county ownership even though the adjacent lands are not part of the TLCGP site.

MASTER PLAN

The *Trexler-Lehigh County Game Preserve Master Plan* is built upon the ideas and concepts from the background activities. The Wildlands Conservancy ecological inventory, PMG meetings, field studies, interviews, and public meetings all contributed to establishing the direction of the master plan. Therefore, the plan begins with a vision. Subsequent sections include recommended trails, support facilities, policies, and considerations regarding implementation of the plan.

The *Trexler-Lehigh County Game Preserve Master Plan* provides complete guidance for the improvement of the TLCGP site, as follows:

- **Environment** — By reference, the plan incorporates the recommendations of the ecological inventory performed by Wildlands Conservancy.¹ The conservancy is also developing plans to address the issues of autumn olive and deer on the site.
- **Land Use** — The major portion of the plan provides recommendations for improvements to the site developed through URDC.
- **Wildlife** — The plan includes a study of the bison, elk, and horses to assess the appropriate place for the herds within the context of the proposed improvements. The study, performed by Natural Resource Consultants, Inc., specifically addresses the ecological and biological importance of the herds as related to General Trexler’s mission of species survival.

Each recommendation is identified for easy reference by letter(s) and number. Letter(s) refer to the subject of the recommendation as follows:

- | | | |
|----------------|---------------------------|------------------------|
| • A Activities | • I Indoor Space | • R Restrooms |
| • E Entrances | • J Jordan Creek Corridor | • RP Roads and Parking |
| • F Fences | • M Management | • T Trails |
| • G Guide Rail | • N Name | • W Wildlife |

The number of each recommendation is for identification only and does not necessarily represent the priority of the recommendation. Recommendations regarding capital improvements include cost estimates. At the direction of Lehigh County, costs are shown for capital improvements only up to the limit of approximately \$2.75 million, the amount of the agreement reached in response to the suit filed by the Harry C. Trexler Trust. The “Implementation” section of the plan includes information that might be used to identify future improvements in the event that Lehigh County wishes to continue improvements to the site beyond the required \$2.75 million.

¹ Appendix D contains a complete list of recommendations from the ecological inventory and assessment conducted by the Wildlands Conservancy.

Vision for the Site

The population and development of Lehigh County are increasing. The Lehigh Valley Planning Commission projects that Lowhill and North Whitehall Townships, where the TLCGP is located, will increase in population from 16,600 in 2000 to 19,683 in 2010, an increase of 18.6 percent, which is more than three times the growth rate for Lehigh County (5.6 percent).

As population increases, open space becomes more and more scarce. Recognizing the value of open space, the needs of Lehigh County citizens, and the wishes of General Trexler, the *Trexler-Lehigh County Game Preserve Master Plan* includes the following vision for the future of the property:

The Trexler-Lehigh County Game Preserve is a safe, public space that fosters an understanding of man's relationship with and impact upon the natural environment. The preserve is the focal point for land conservation efforts within the Jordan Creek watershed. The preserve protects and manages natural resources and offers appropriate educational and passive recreational opportunities for children and adults that promote:

- 1. The physical, mental, and social well-being of people.**
- 2. The health, sustainability, and diversity of the natural environment.**
- 3. The responsible use of resources.**

The game preserve is offered to the citizens of Lehigh County through the will of General Harry C. Trexler and with the support of government, business, educational, social, cultural, philanthropic, and environmental organizations.

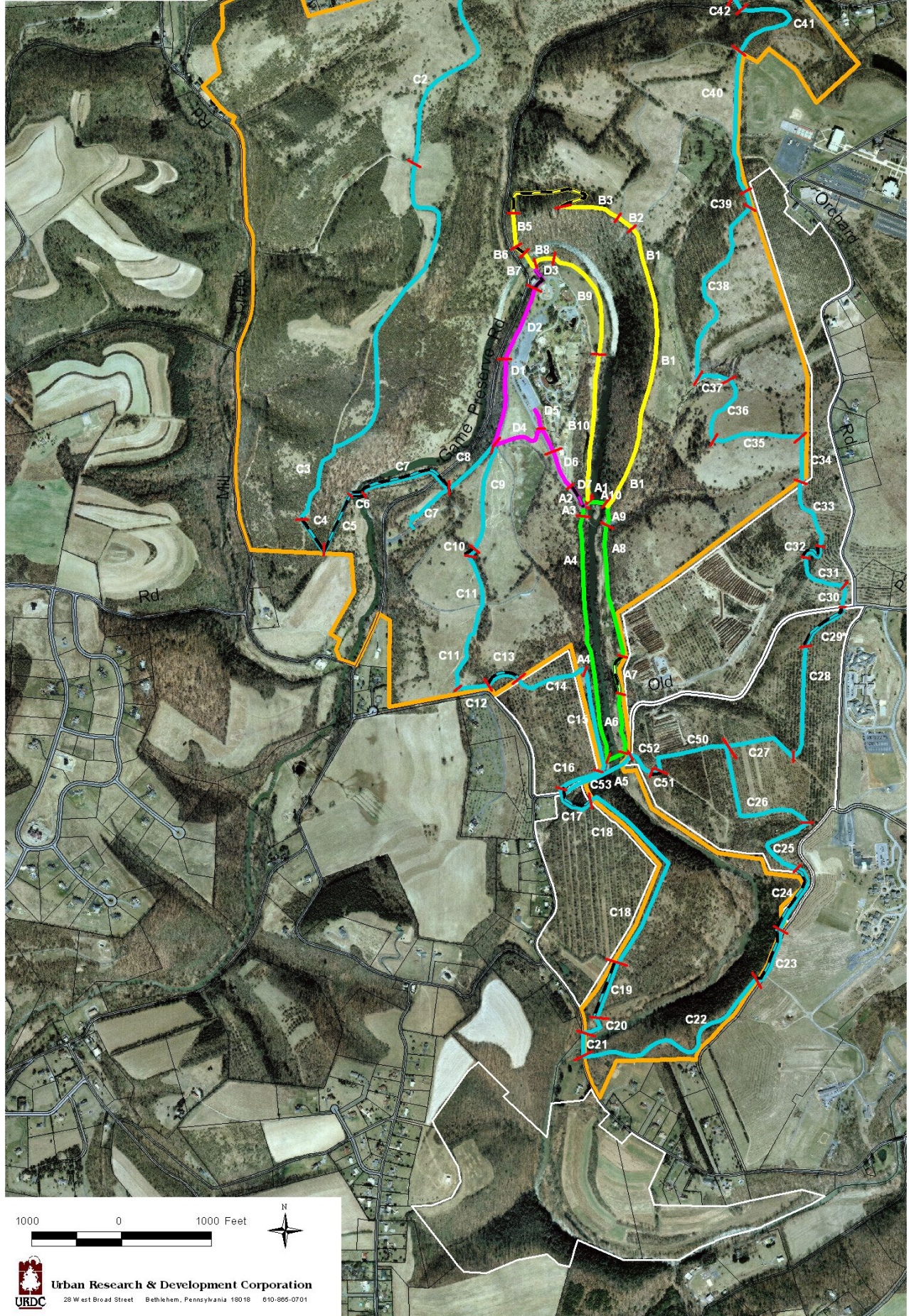
The vision statement provides the foundation for the plan (Map 2.1). The focus of the preserve is clearly the land and the natural environment. The term "passive" is not intended to imply a complete lack of activity, but rather the relationship of the activity to the land and the natural environment. Therefore, in addition to obvious activities, such as walking or hiking, "passive recreational opportunities" can include, for example:

- Bicycling, but not extreme competitive bicycling events.
- Horseback riding, but not horse racing.
- Family picnicking, but not large-scale social events.

Furthermore, more active recreational pursuits involving significant modifications to the land, such as field/court sports, motor sports, and golf, are not consistent with the vision. The issue that should drive all decisions about activity at the preserve is the preservation of the land and the natural environment.

Trexler - Lehigh County Game Preserve

MAP 2.1 TRAIL SYSTEM



1000 0 1000 Feet



Urban Research & Development Corporation
29 West Broad Street Bethlehem, Pennsylvania 18018 610-895-0701

Recommended Trail System

The plan includes a trail system for the use of pedestrians (walkers, hikers, joggers), bicycles (including mountain bikes), and equestrians (Map 2.1). Each recommendation for the trail system includes information on the type of trail and rationale for the trail or trail segment, as well as cost estimates.

Trails (T)–1: Build Trail A to handicapped accessible specifications.

Trail A (Map 2.2) is the primary trail at the center of activity for the site. Trail A, approximately 1.2 miles in length, uses much of the alignment of the pathway currently known as the Covered Bridge Trail. Trail A should be a 12-foot wide gravel path for pedestrian use only. The trail should be built with the following characteristics to encourage use by the disabled community:

- Maximum slope of 5.0 percent.
- Firm and stable surface.
- No barriers on the trail.
- 12-foot width.

Other considerations for Trail A include:

- Make use of the pedestrian bridge over the Jordan Creek in segment A10.
- The west end of the pedestrian bridge (A1) will require a ramp for accessibility, which could be a wooden ramp to maintain the character of the bridge.
- Most of Trail A (segments A4 and A8) is currently an old road that needs upgrading, including a swale on the uphill side and pipes to carry storm water under the trail. The surface also needs to be stabilized.
- A trail bed must be constructed in segments A6 and A7 before laying the gravel surface.
- Segment A5 includes a pedestrian bridge upstream from Geiger’s Covered Bridge for safety to avoid pedestrians on the trail using a vehicular cartway (Old Packhouse Road).
- Trail A will be accessible from Old Packhouse Road (entrances E8 and E9), with a small, four-car gravel parking area at E9.
- Trail A should be built by a contractor instead of volunteers or other unpaid labor due to the large amount of grading and paving and use of heavy equipment required.
- The cost estimate for Trail A is \$401,465 (Table 2.1).

T–2: Build segments D5, D6, and D7 to connect the zoo parking lot to the existing pedestrian bridge area.

Trail segments D5, D6, and D7 (Map 2.2) form an important link between the zoo parking lot and Trail A at the covered bridge area. Segments D5 and D6 will be on or adjacent to an existing road. Segment D7 travels through a wooded area and down a slope. Therefore, segment D7 will require

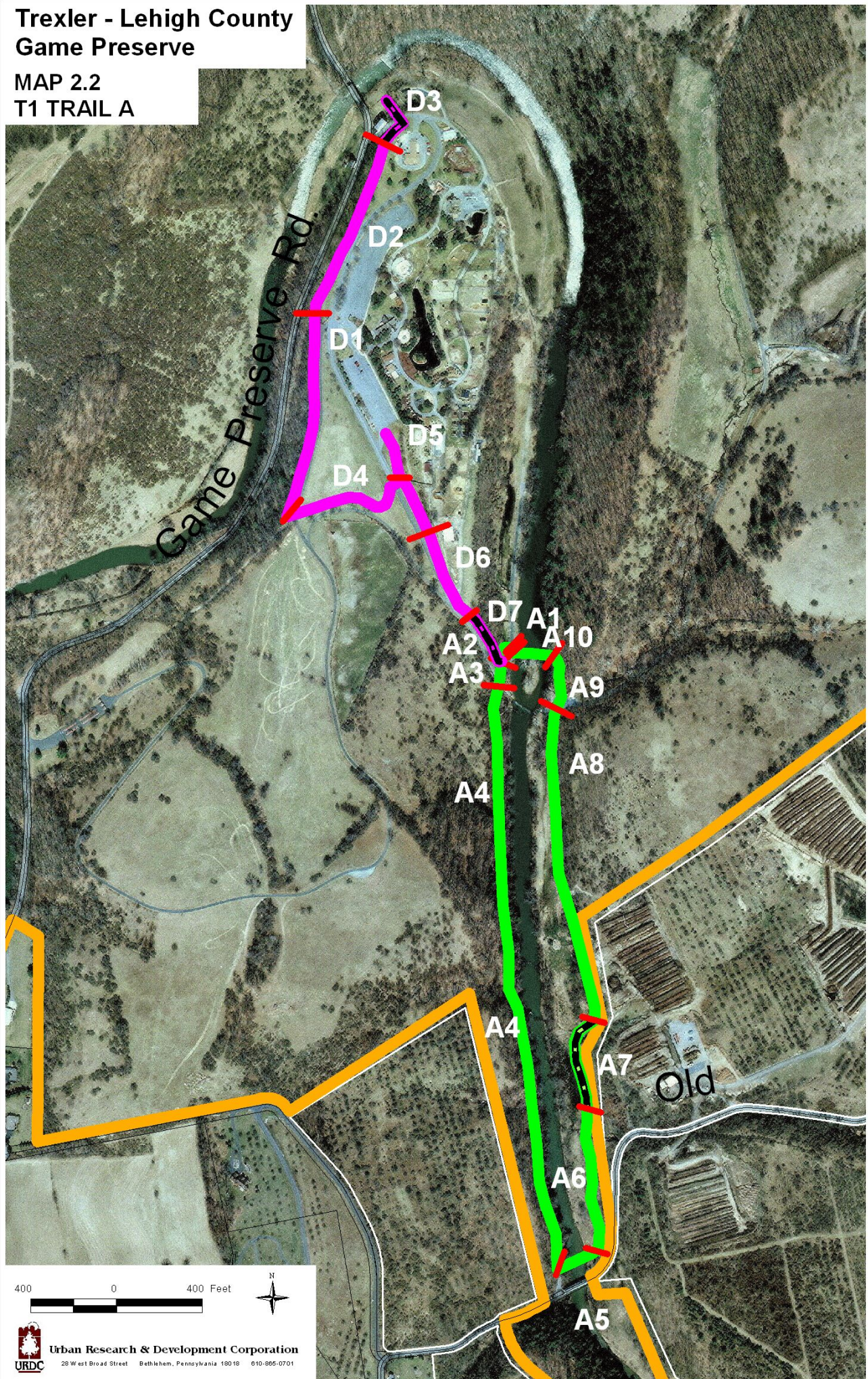
the skill of a contractor with heavy equipment. Segments D5, D6, and D7 are anticipated to cost approximately \$22,040 (Table 2.2)

Table 2.1
Cost Estimate — Trail A

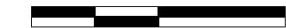
Segment	Length (ft.)	Work Description	Amount	Unit Cost	Unit	Cost
A1	20	Handicapped ramp at bridge	1	\$15,000	ea	\$15,000
A2	96	Kiosk	1	\$2,000	ea	\$2,000
		12' gravel pave	96	\$17	lf	\$1,632
		12' grading and drainage	96	\$8	lf	\$768
A3	115	12' gravel pave	85	\$17	lf	\$1,445
		12' grading and drainage	85	\$20	lf	\$1,700
		Signs	2	\$200	ea	\$400
		Road crossing (1)	1	\$1,500	ea	\$1,500
A4	2,870	12' gravel pave	2,870	\$17	lf	\$48,790
		12' grading and drainage	2,870	\$8	lf	\$22,960
		Road crossing (2)	1	\$4,000	ea	\$4,000
A5	120	4' wide Pedestrien Bridge	1	\$200,000	ea	\$200,000
A6	800	Kiosk	1	\$2,000	ea	\$2,000
		12' gravel pave	800	\$17	lf	\$13,600
		12' grading and drainage	800	\$15	lf	\$12,000
		Road crossing (4)	1	\$4,000	ea	\$4,000
A7	460	12' gravel pave	460	\$17	lf	\$7,820
		12' grading & drainage	460	\$20	lf	\$9,200
A8	1,480	12' gravel pave	1,480	\$17	lf	\$25,160
		12' grading & drainage	1,480	\$8	lf	\$11,840
		Road crossing (2)	1	\$4,000	ea	\$4,000
A9	260	Kiosk	1	\$2,000		\$2,000
		12' gravel pave	230	\$17	lf	\$3,910
		12' grading & drainage	230	\$8	lf	\$1,840
		Signs	2	\$200	ea	\$400
		Road entrance (1)	1	\$1,500	ea	\$1,500
A10	200	Existing Bridge	0			
		Signs	10	\$200	ea	\$2,000
Totals	6,421	(1.2 mi)	—	—	—	\$401,465

**Trexler - Lehigh County
Game Preserve**

**MAP 2.2
T1 TRAIL A**



400 0 400 Feet



Urban Research & Development Corporation

28 West Broad Street Bethlehem, Pennsylvania 18018 610-865-0701

Table 2.2
Cost Estimate — Trail Segments D5, D6, and D7

Segment	Length (ft.)	Work Description	Amount	Unit Cost	Unit	Cost
D5	350	6' gravel pave	350	\$17	lf	\$ 5,950
		6' grading and drainage	350	\$8	lf	\$ 2,800
		Kiosk	1	\$200	ea	\$ 200
		Road Crossing (1)	1	\$1,500	ea	\$ 1,500
D6	600	Use Existing Road	0			\$ -
		Signs	4	\$200	ea	\$ 800
D7	270	6' gravel pave	270	\$12	lf	\$ 3,240
		6' grading and drainage	270	\$15	lf	\$ 4,050
		Kiosk	1	\$2,000	ea	\$ 2,000
		Road Crossing (1)	1	\$1,500	ea	\$ 1,500
Totals	1,220	(0.23 mi.)				\$ 22,040

T3: Build Trail B.

Trail B (Map 2.3), approximately 1.8 miles in length, should be a minimum 3.0 feet wide with a dirt or gravel surface. Located near the zoo in the Central Range, Trail B is for pedestrians only. The trail will make use of the existing pedestrian bridge (A10). Other characteristics of Trail B include:

- Segment B1 is already in use but may need some surface treatment.
- Segment B2 winds through the Central Range, providing outstanding views of the zoo and the surrounding area.
- Segments B3, B5, B9, and B10 are on existing paths that will need upgrading.
- Segment B4 passes through a wooded area and winds down a steep slope, which will require significant construction.
- Segment B6 is very steep and will require steps.
- Trail B requires crossing the Jordan Creek. Schlicher's Covered Bridge is owned by PennDOT, and permission to use the bridge as part of a pedestrian trail would be difficult, if not impossible, to obtain. Therefore, the plan includes a new pedestrian bridge across the Jordan slightly downstream from the covered bridge.
- The estimated cost for Trail B is \$230,314 (Table 2.3).

T4: Build trail segments D2 and D3 to connect the zoo parking to the Game Preserve Road/covered bridge area.

As with segments D5, D6, and D7 above, segments D2 and D3 (Map 2.3) serve primarily as connecting pieces of trail, rather than a separate and distinct trail. Segment D2 will be on a level area adjacent to the zoo parking lot. Segment D3 traverses a steep bank and will require much grading and/or steps. Segments D2 and D3 are estimated to cost approximately \$ 27,580 (Table 2.4).

Table 2.3
Cost Estimate — Trail B

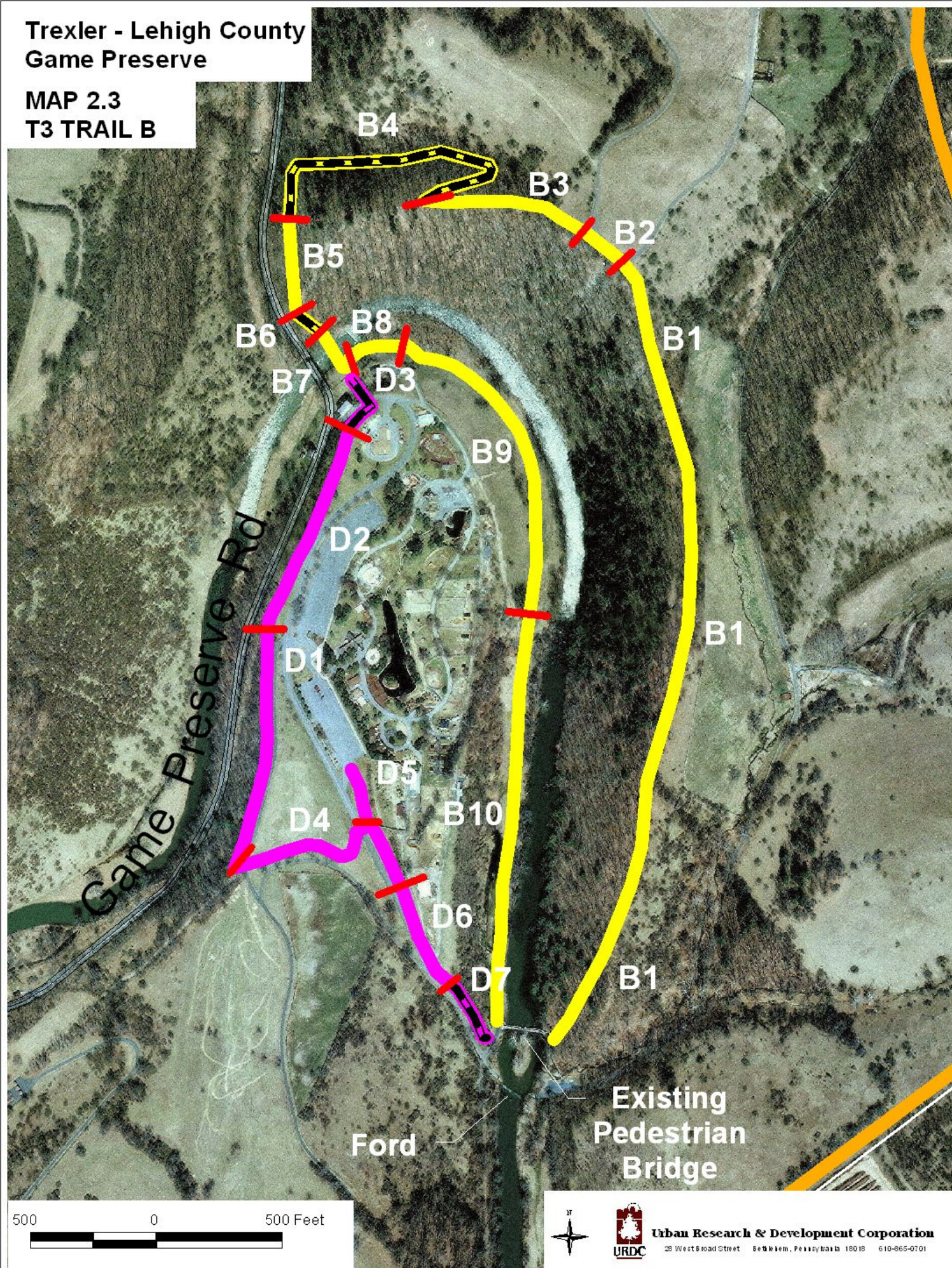
Segment	Length (ft.)	Work Description	Amount	Unit Cost	Unit	Cost
B1	3,240	Clear Vegetation (25%)	810	\$1	lf	\$ 810
		3' gravel pave (5%)	162	\$8	lf	\$ 1,296
		3' grade & drain (5%)	162	\$3	lf	\$ 486
B2	170	Paved Roadway (existing)	0			
B3	680	Clear Vegetation	680	\$1	lf	\$ 680
		3' gravel pave (5%)	34	\$8	lf	\$ 272
		3' grade & drain (5%)	34	\$3	lf	\$ 102
B4	1,320	Clear Vegetation	1,320	\$1	lf	\$ 1,320
		3' gravel pave (70%)	924	\$8	lf	\$ 7,392
		3' grade & drain (70%)	924	\$6	lf	\$ 5,544
B5	370	Clear Vegetation	370	\$1	lf	\$ 370
		3' gravel pave (10%)	37	\$8	lf	\$ 296
		3' grade & drain (10%)	37	\$3	lf	\$ 111
B6	100	Steps	100	\$100	lf	\$ 10,000
B7	100	4" Pedestrian	1	\$180,000	ea	\$ 180,000
B8	430	Clear Vegetation	430	\$1	lf	\$ 430
		3' gravel pave	430	\$8	lf	\$ 3,440
		3' grade & drain	430	\$3	lf	\$ 1,290
B9	1,300	6' gravel pave (25%)	325	\$8	lf	\$ 2,600
		6' grade & drain (25%)	325	\$3	lf	\$ 975
		Road Entrance (3)	1	\$4,500	ea	\$ 4,500
B10	1,630	Up-grade Existing Road (25%)	400	\$17	lf	\$ 6,800
		Signs	8	\$200	ea	\$ 1,600
Total	7,710	(1.8mi)				\$ 230,314

Table 2.4
Cost Estimate — Trail Segments D2 and D3

Segment	Length (ft.)	Work Description	Amount	Unit Cost	Unit	Cost
D2	900	6' gravel pave	900	\$12	LF	\$ 10,800
		6' grading and drainage	900	\$5	LF	\$ 4,500
		Road Crossing (1)	1	\$1,500	ea	\$ 1,500
		Sings	4	\$200	ea	\$ 800
D3	260	6' gravel pave	240	\$12	LF	\$ 2,880
		6' grading and drainage	240	\$15	LF	\$ 3,600
		Steps	20	\$100	LF	\$ 2,000
		Road Crossing (1)	1	\$1,500	ea	\$ 1,500
Totals	3,980	0.75 mi.				\$ 27,580

**Trexler - Lehigh County
Game Preserve**

**MAP 2.3
T3 TRAIL B**



T5: Build Trail C, the Loop Trail.

Trail C (Map 2.4) is an 8.3-mile trail stretching around the entire TLCGP property. Trail C will generally range from 6–12 feet in width, narrowing to a 3-foot path in some steep areas. The Loop Trail should be open to pedestrians, bikes, and horses.

In order to complete the Loop Trail, some portions must be located off the TLCGP site and onto the adjacent county lands. The use of adjacent county lands is consistent with the plan’s vision of land preservation explained earlier. Plans for the Jordan Creek Greenway will also require the use of county lands adjacent to the TLCGP site.

On the west side of the Jordan Creek, segment C14 must cross onto adjacent county land to provide a buffer for the existing wildlife viewing station. Steep slopes prohibit a trail across Old Packhouse Road west of Geiger’s Covered Bridge on TLCGP land. The crossing can be made over smaller slopes at a point further west along Old Packhouse Road (segments C16 and C17). Furthermore, the TLCGP site is very narrow and steep east of the Jordan Creek, also prohibiting a trail crossing.

Segments C24 through C29 and C50 through C53 are located on adjacent county lands. Without the use of adjacent county lands, the Loop Trail cannot be completed.

The length of the Loop Trail, 8.3 miles, is important for the equestrian community. According to the equestrian representatives interviewed, any trails of less than approximately 8–10 miles will not attract significant equestrian use because of the work entailed in transporting the horse. The interviewees were excited about the Loop Trail, not only for its length, but for the outstanding views along the path and interesting character in the wooded areas.

Other considerations for Trail C include:

- The Loop Trail requires two bridges for stream crossings: segment C6 over the Jordan Creek and segment C42 over a small tributary of the Jordan Creek near the Central Range exit onto Game Preserve Road.
- Segments C1 and C2 are an existing, overgrown road bed originally constructed by the Civilian Conservation Corps (CCC). The structure is in excellent condition and needs very little work to be opened as a trail.
- A contractor will be required to complete several steep segments including C4, C5, C13, C23, and C41.
- Section C23 is on the South Range of the TLCGP site. The land between the TLCGP property line and the Jordan Creek is very steep. A site survey must be performed to determine the amount of flat area at the top of the slope that is available for the trail. Building the trail across the slope may require a retaining wall on the low side of the trail to create sufficient width for the trail.

- The cost estimate for Trail C, the Loop Trail, is \$1,187,108 (Table 2.5). No funding is available to construct the segments on adjacent county land, which must, therefore, be constructed with volunteers.

Table 2.5
Cost Estimate — Trail C

Segment	Length (ft.)	Work Description	Amount	Unit Cost	Unit	Cost
C1	4,420	Mow	4,420	\$1	lf	\$ 4,420
		12' gravel pave	4,420	\$17	lf	\$ 75,140
		12' grade and drain (10%)	442	\$8	lf	\$ 3,536
C2	2,350	Clear Vegetation	2,350	\$1		\$ 2,350
		Mow	2,350	\$1	lf	\$ 2,350
		12' gravel pave	2,350	\$17	lf	\$ 39,950
		12' grade and drain (10%)	235	\$8	lf	\$ 1,880
C3	5,090	Clear Vegetation	5,090	\$5		\$ 25,450
		6' gravel pave (40%)	2,036	\$12	lf	\$ 24,432
		6' grade and drain (40%)	2,036	\$5	lf	\$ 10,180
C4	400	Clear Vegetation	400	\$5	lf	\$ 2,000
		6' gravel pave	400	\$12	lf	\$ 4,800
		6' grade and drain	400	\$15	lf	\$ 6,000
C5	700	Clear Vegetation	700	\$5		\$ 3,500
		6' gravel pave	700	\$12	lf	\$ 8,400
		6' grade and drain	700	\$15	lf	\$ 10,500
C6	150	Pedestrian Bridge 8' wide	1	\$350,000	ea	\$ 350,000
C7	1,080	Clear & Grub Trees	1	\$10,000	ac	\$ 5,000
		6' gravel pave	1,080	\$12	lf	\$ 12,960
		6' grade and drain	1,080	\$15	lf	\$ 16,200
		Road crossing (2)	2	\$4,000	ea	\$ 8,000
C8	700	6' gravel pave	700	\$12	lf	\$ 8,400
		6' grade and drain (50%)	350	\$5	lf	\$ 1,750
		Road crossing (1)	1	\$1,500	ea	\$ 1,500
C9	1,200	6' gravel pave	1,200	\$12	lf	\$ 14,400
		6' grade and drain	1,200	\$8	lf	\$ 9,600
C10	100	6' gravel pave	100	\$12	lf	\$ 1,200
		6' grade and drain swale cross	100	\$50	lf	\$ 5,000
C11	1,600	6' gravel pave	1,600	\$12	lf	\$ 19,200
		6' grade and drain	1,600	\$8	lf	\$ 12,800
		Road crossing (1)	2	\$1,500	ea	\$ 3,000
C12	340	Clear & Grub Trees	0	\$10,000	ac	\$ 1,000

Trexler - Lehigh County Game Preserve

MAP 2.4 T5 TRAIL C



♣ Trexler-Lehigh County Game Preserve Master Plan ♣

Segment	Length (ft.)	Work Description	Amount	Unit Cost	Unit	Cost
		6' gravel pave	340	\$12	lf	\$ 4,080
		6' grade and drain	340	\$8	lf	\$ 2,720
C13	330	Clear and Grub Trees	0	\$10,000	ac	\$ 2,000
		3' gravel pave	330	\$8	lf	\$ 2,640
		3' grade and drain	330	\$25	lf	\$ 8,250
C14	780	Clear & Grub Trees	0	\$10,000	ac	adjacent land
		Mow, 6' (50%)	370	\$1	lf	adjacent land
		6' Gravel pave (50%)	370	\$12	lf	adjacent land
		6' grade and drain (50%)	370	\$5	lf	adjacent land
C15	1,100	Clear Vegetation	1,100	\$1	lf	\$ 1,100
		6' Gravel pave (50%)	550	\$12		\$ 6,600
		6' grade and drain (50%)	550	\$5	lf	\$ 2,750
C16	500	Clear Vegetation	500	\$1	lf	adjacent land
		Mow, 6'	500	\$1	lf	adjacent land
C17	370	Clear and Grub Trees (50%)	0	\$10,000	ac	adjacent land
		6' gravel pave	370	\$12	lf	adjacent land
		6' grade and drain	370	\$15	lf	adjacent land
		Stream Crossing	1	\$10,000	ea	adjacent land
		Road crossing (2)	2	\$4,000	ea	adjacent land
C18	2,300	Clear & Grub Trees	2	\$10,000	ac	\$ 16,000
		6' gravel pave	2,300	\$12	lf	\$ 27,600
		6' grade and drain	2,300	\$5	lf	\$ 11,500
C19	650	Clear and Grub Trees	0	\$20,000	ac	\$ 8,000
		3' gravel pave	650	\$8	lf	\$ 5,200
		3' grade and drain	650	\$20	lf	\$ 13,000
C20	315	Clear Vegetation	315	\$1	lf	\$ 315
		6' gravel pave	315	\$12	lf	\$ 3,780
		6' grade and drain	315	\$8	lf	\$ 2,520
		Road Cross. (see Ent. Costs)				\$ -
C21	260	Existing Road & Bridge	0			\$ -
C22	2,440	Clear Vegetation	2,440	\$1	lf	\$ 2,440
		6' gravel pave	2,440	\$12	lf	\$ 29,280
		6' grade and drain	2,445	\$5	lf	\$ 12,225
		Road Cross. (see Ent. Costs)	1	\$1,000	ea	\$ 1,000
C23	670	Clear & Grub Trees	1	\$10,000	ac	\$ 6,000
		Retaining Wall pathway	670	\$100	lf	\$ 67,000
C24	810	Clear Vegetation	810	\$1	lf	adjacent land
		6' gravel pave	810	\$12	lf	adjacent land

♣ Trexler-Lehigh County Game Preserve Master Plan ♣

Segment	Length (ft.)	Work Description	Amount	Unit Cost	Unit	Cost
		6' grade and drain	810	\$8	lf	adjacent land
C25	950	Clear Vegetation	950	\$1	lf	adjacent land
		Mow, 6' (50%)	475	\$1	lf	adjacent land
		6' gravel pave (50%)	475	\$12	lf	adjacent land
		6' grade and drain (50%)	475	\$8	lf	adjacent land
C26	1,570	Existing Mowed Path	0			\$ -
C27	800	Existing Mowed Path	0			\$ -
C28	1,260	Clear Vegetation	1,260	\$3	lf	adjacent land
		Mow, 6'	1,260	\$2	lf	adjacent land
C29	640	Clear Vegetation	640	\$3		adjacent land
		6' gravel pave	640	\$12	lf	adjacent land
		6' grade and drain	640	\$8	lf	adjacent land
		Road crossing (2)	1	\$4,000	ea	adjacent land
C30	240	Clear Vegetation	240	\$2	lf	adjacent land
		6' gravel pave	240	\$12	lf	adjacent land
		6' grade and drain	240	\$8	lf	adjacent land
		Road crossing (2)	1	\$4,000	ea	adjacent land
C31	625	Existing Path	0			\$ -
C32	325	Clear Vegetation	325	\$2	lf	adjacent land
		6' gravel pave	325	\$12	lf	adjacent land
		6' grade and drain	325	\$15	lf	adjacent land
C33	780	Clear Vegetation	780	\$2	lf	adjacent land
		Mow, 6' (50%)	390	\$3	lf	adjacent land
		6' gravel pave (50%)	390	\$12	lf	adjacent land
		6' grade and drain (50%)	390	\$5	lf	adjacent land
C34	500	Mow, 6'	500	\$1	lf	\$ 500
		6' gravel pave (25%)	125	\$12	lf	\$ 1,500
		6' grade and drain (25%)	125	\$5	lf	\$ 625
C35	1,000	Existing Path	0			\$ -
C36	900	Mow, 6' (50%)	450	\$1	lf	\$ 450
		6' gravel pave (50%)	450	\$12	lf	\$ 5,400
		6' grade and drain (50%)	450	\$8	lf	\$ 3,600
C37	400	Existing Path (50%)	200	\$0		\$ -
		6' gravel pave (50%)	200	\$12	lf	\$ 2,400
		6' grade and drain (50%)	200	\$5	lf	\$ 1,000
C38	2,200	Mow, 6' (50%)	1,100	\$1	lf	\$ 1,100
		6' gravel pave (50%)	1,100	\$12	lf	\$ 13,200
		6' grade and drain (50%)	1,100	\$5	lf	\$ 5,500

Segment	Length (ft.)	Work Description	Amount	Unit Cost	Unit	Cost
C39	215	Clear Vegetation	215	\$2	lf	\$ 430
		6' gravel pave	215	\$12	lf	\$ 2,580
		6' grade and drain	215	\$5	lf	\$ 1,075
C40	1,570	Clear Vegetation, Exist. Path	1,570	\$1	lf	\$ 1,570
		6' gravel pave (50%)	3,140	\$12	lf	\$ 37,680
		6' grade and drain (50%)	3,140	\$5	lf	\$ 15,700
		Road crossing (1)	1	\$1,500	ea	\$ 1,500
C41	1,200	Clear & Grub Trees	1	\$10,000	ac	\$ 11,000
		6' gravel pave	1,200	\$12	lf	\$ 14,400
		6' grade and drain	1,200	\$20	lf	\$ 24,000
		Road crossing (1)	1	\$1,000	ea	\$ 1,000
C42	60	8' Pedestrian Bridge	110,000	\$1	ea	\$ 110,000
Totals	43.890	(8.3mi)				\$1,187,108

T6: Build Trail Segments D1 and D4.

As above, segments D1 and D4 (Map 2.3) serve as connecting pieces of the system, rather than a separate trail. Segments D1 and D4 should be pedestrian paths 6–12 feet in width. The estimated cost for segments D1 and D4 is \$33,800 (Table 2.6).

Table 2.6
Cost Estimate — Trail Segments D1 and D4

Segment	Length (ft.)	Work Description	Amount	Unit Cost	Unit	Cost
D1	950	6' gravel pave	950	\$12	LF	\$ 11,400
		6' grading and drainage	950	\$5	LF	\$ 4,750
		Kiosk	1	\$2,000	ea	\$ 2,000
		Sings	4	\$200	ea	\$ 800
D4	650	6' gravel pave	650	\$12	LF	\$ 7,800
		6' grading and drainage	650	\$5	LF	\$ 3,250
		Sings	4	\$200	ea	\$ 800
		Road Crossings (1)	2	\$1,500	ea	\$ 3,000
Totals	1,600	(0.3 mi.)	—	—		\$33,800

Additional Trail Construction Notes

- Trail construction can be done by contractor or volunteers. Cost estimates assume contractor construction.

- Construction must comply with erosion and sedimentation (E&S) control plans and procedures regardless of construction mode (contractor or volunteers). A plan must be available on-site. Review and approval of E&S plans by the Lehigh County Conservation District may be required before construction begins. The plans will require that all surfaces disturbed by grading be stabilized with crushed stone on the pathways and seeding on the side areas. Any seeded areas on slopes will require erosion matting.
- The plan proposes four pedestrian bridges, one each on Trails A and B and two on Trail C. The area of a proposed bridge must be surveyed to determine the exact location of the stream to be crossed and the surrounding area. Soils, wetlands, and other features must be mapped and analyzed to determine the exact location and size of the bridge piers. State and federal permits may also be required.

Recommended Support Facilities

Support facilities for the trail system on the TLCGP site include:

- Entrances
- Roads and Parking
- Restrooms
- Fences
- Guide Rail

Entrances (E)–1: North Range—Open an entrance to the proposed North Range parking area from Mill Creek Road.

The entrance from Mill Creek Road is the only new entrance to the TLCGP site proposed in the plan and the only entrance proposed to the North Range. The location of the proposed entrance to the North Range (Map 2.5) is SR 4009, Seq 0030, offset 1279. The posted speed limit is 30 mph. The existing sight distance (Figure 2.1) is:

- Left: 103 L.F. – 4%
- Right: 500 L.F. + 1%

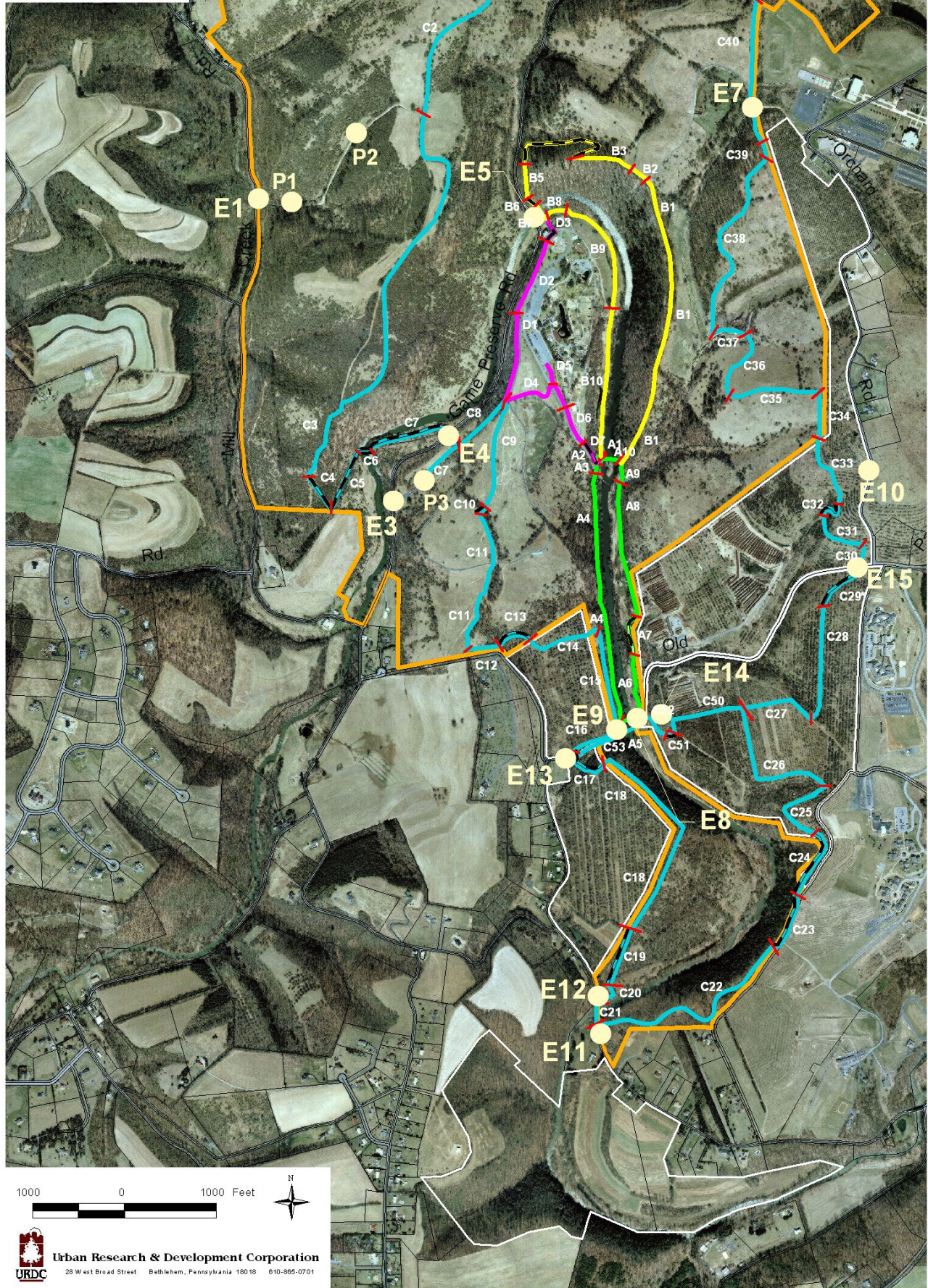
PennDOT required sight distance at 30 mph is:

- Left: 207 L.F.
- Right: 194 L.F.

To the left (south), an 8–10 foot bank must be removed to create the required sight distance. After the bank is removed, sight distance could be lengthened to approximately 500 feet. The bank is tree-

Trexler - Lehigh County Game Preserve

MAP 2.5 ENTRANCE & PARKING PLAN



Urban Research & Development Corporation
28 West Broad Street Bethlehem, Pennsylvania 18018 610-895-0701

Figure 2.1
E1 Mill Creek Rd., North



Sight Distance Left



Sight Distance Right

covered shale, which appears to be machine-rippable without blasting. The bank must be restored after earth removal is completed, including placement of topsoil and vegetation.

To the right (north) is an S-curve with good sight distance. The sight distance is not affected by an existing earth mound with a large tree on top. Removed earth could be used to level the proposed parking area in the North Range and to create earth mound lookout areas along trails in the North Range.

Both a PennDOT Highway Occupancy Permit and an E&S plan will be required for the North Range entrance. Each item should be prepared by a professional engineer or landscape architect. The estimated cost for the Mill Creek Road entrance is \$29,400, as follows:

Earthwork	\$14,000
Planting and Topsoil	\$1,000
Road Shoulder Improvements	\$3,000
Traffic Controls	\$500
Entrance Gate	\$2,000
Entrance Sign	\$1,500
Plans and Approvals (20% approximation)	\$3,700
Contingency (20%)	\$3,700
<hr/>	
Total	\$29,400

E-2: North Range—Add a trail entrance and a four-car gravel parking area off Game Preserve Road where the Civilian Conservation Corps pathway begins.

The location of the proposed trail entrance (Map 2.5) is SR 4009, Seq 0100, offset (not available). The posted speed limit is 35 mph. The existing sight distance (Figure 2.2) is:

<i>West Side</i>	<i>East Side</i>
• Left: 414 L.F. + 4%	• Left: 320 L.F. – 2%
• Right: 260 L.F. – 2%	• Right: 371 L.F. + 4%

PennDOT required sight distance at 35 mph is:

• Left: 236 L.F.	• 256 L.F.
• Right: 256 L.F.	• 236 L.F.

The proposed pathway crossing at E2 meets sight distance requirements. Sight distances could be increased by removing trees to the right on the west side and to the right on the east side. Currently, the best site for a pathway on the east side of the road is 43 L.F. north of the entrance to the CCC road. PennDOT may require realignment to a perpendicular crossing.

A Highway Occupancy Agreement (HOA) from PennDOT will be required for the entrance on the east side. On the west side, the small (4-car) parking area and the maintenance/emergency access will require a Highway Occupancy Permit (HOP) from PennDOT.

The west side entrance will conform to Detail 3, entitled “road entrance with parking”. The east side entrance will conform to Detail 1, entitled “road crossing with ballard”.² Estimated cost for the entrance at E2 is \$6,500, as follows:

Paving of shoulders	\$3,000
Traffic Controls	\$500
Plans and Approvals (20% approximation)	\$2,000
Contingency (20%)	\$1,000
Total	\$6,500

E3: Central Range—Upgrade the main entrance from Game Preserve Road to meet PennDOT standards.

The location of the main entrance to the TLCGP site (Map 2.5) is SR 4007, Seq 0070, offset 1480. The posted speed limit is 35 mph. The existing sight distance at the main entrance (Figure 2.3) is:

<i>at main entrance</i>	<i>35 feet south of entrance (offset 1,445)</i>
• Left: 180 L.F. + 3%	• Left: 700 L.F.
• Right: 250 L.F. + 5%	• Right: 285 L.F.

PennDOT required sight distance at 35 mph is:

- Left: 239 L.F.
- Right: 233 L.F.

The main entrance at the current location does not meet PennDOT requirements for sight distance. Moving the centerline of the entrance 35 feet to the south gains sight over an existing knoll, greatly increasing the sight distance. In addition, the paving at the entrance is now 50 feet wide, but PennDOT allows a paved area only 24 feet wide for the existing type of entrance. Therefore, both the centerline and the paved area must be reconfigured. The estimated cost for the necessary improvements is \$25,500, as follows:

² All details appear in Appendix E of the plan.

Figure 2.2
E2 Pathway at CCC Rd, West



Sight Distance Left



Sight Distance Right

Figure 2.3
E2 Pathway at CCC Rd, East



Sight Distance Left



Sight Distance Right

Remove Paving	\$2,000
Regrade Entrance	\$7,000
Pave New Entrance	\$6,000
Pave Shoulders	\$3,000
Traffic Controls	\$500
Plans and Approvals (20% approximation)	\$3,500
Contingency (20%)	\$3,500
Total	\$25,500

E4: Central Range—Add a trail crossing (Trail C) north of the main entrance from the Central Range to the North Range.

The location of the proposed trail crossing (Map 2.5) is SR 4007, Seq (not available), offset (not available). The posted speed limit is 35 mph. The existing sight distance (Figure 2.4) is:

- Left: 506 L.F. 0% (west side)
- Right: 320 L.F. + 1% (west side)

PennDOT required sight distance at 35 mph is:

- Left: 249 L.F.
- Right: 245 L.F.

The proposed crossing meets sight distance requirements in both directions. Sight distance to the left (north) is restricted by trees and other vegetation. Sight distance to the right (south) is restricted by an existing garage. The estimated cost for improvements is \$6,000, as follows:

Pave Shoulders	\$3,000
Traffic Controls	\$500
Plans and Approvals	\$2,000
Contingency (20%)	\$1,000
Total	\$6,000

E5: Central Range — Rebuild the entrance at Schlicher’s Covered Bridge.

The entrance at Schlicher’s Covered Bridge is critical for current and future activities at the TLCGP site. The location is used regularly by zoo staff as an entrance and exit. In addition, the entrance is used by zoo visitors as an exit when high water levels prohibit using the ford to cross the Jordan Creek.

The location of the covered bridge entrance (Map 2.5) is SR 4007, Seq 0080, offset 2158. The posted speed limit is 35 mph. The existing sight distance (Figures 2.5 and 2.6) is:

- Left: 242 L.F.
- Right: 135 L.F.

PennDOT required sight distance at 35 mph is:

- Left: 265 L.F.
- Right: 256 L.F.

The sight distance at the current driveway is insufficient. The plan identifies three options to address the situation (Map 2.6).

Option 1: Remove the existing barn adjacent to the entrance and realign the driveway approximately 66 feet closer to the covered bridge. Option 1 allows for clear sight distance through the covered bridge (Figure 2.5).

Advantages: – Less cost.
 – Minimal site disruption.
 – No change to the interior traffic flow of the site.

Disadvantage: – Loss of barn for storage and aesthetics.

The estimated cost for Option 1 is \$70,000, as follows:

Remove Barn	\$20,000
Earthwork and Grading	\$20,000
Pave New Entrance	\$10,000
Pave Shoulders	\$3,000
Traffic Controls	\$1,000
Plans and Approvals (15% approximation)	\$8,000
Contingency (15%)	\$8,000
Total	\$70,000

Option 2: Close and abandon the entrance at the covered bridge. Widen the existing road leading to the zoo parking lot. Build a new road on the old road bed to the main entrance along Game Preserve Road. Allow two-way traffic on the new road to permit exiting from the zoo during high water conditions.

Advantages: – Allows more options for exiting the zoo.
 – Shorter than current road, requiring less winter maintenance.

Disadvantages: – Higher cost than option 1.
 – More road to maintain overall.
 – New road creates a longer distance for zoo employees to travel into the zoo from PA 309.

Trexler - Lehigh County Game Preserve

MAP 2.6
ENTRANCE E5, AT
COVERED BRIDGE



300 0 300 Feet



Urban Research & Development Corporation
28 West Broad Street Bethlehem, Pennsylvania 18018 610-865-0701

Figure 2.4 E3 Main Entrance



Sight Distance Left



Sight Distance Right



Figure 2.5
E4 Trail C Crossing

Sight Distance-Left



Sight Distance Right

Figure 2.6
E5 Covered Bridge Entrance



Sight Distance Left
at New Drive Location



Sight Distance Right
at New Drive Location

The estimated cost for Option 2 is \$118,750, as follows:

Widen Existing Road (1,000 L.F. @ \$18/L.F.)	\$18,000
Build New Road on Slope (750 L.F. @ \$70/L.F.)	\$52,500
Build New Road in Field (450 L.F. @ \$45/L.F.)	\$20,250
Plans (15% approximation)	\$14,000
Contingency (15% approximation)	\$14,000
Total	\$118,750

Option 3: Negotiate with PennDOT to have the state build a bypass around the covered bridge with a new vehicular bridge across Jordan Creek, then abandon the covered bridge. Realignment of the entrance with proper sight distance would be possible without removing the barn. Negotiations should result in PennDOT paying all or most of the cost. PennDOT representatives expressed an interest in the project if the county is willing to take responsibility for the covered bridge.

Advantages: – Barn is maintained.
– Covered bridge is a unique attraction on the trail.

Disadvantages: – Potentially long period for negotiations with PennDOT. The project is not in PennDOT's current plans and programs.

The cost for Option 3 is unknown.

E6: Central Range—Upgrade the exit at the north end of the site to PennDOT standards.

The location of the north exit onto Game Preserve Road (Map 2.5) is SR 4007, Seq 0110, Offset 0556. The posted speed limit is 35 mph. The existing sight distance (Figure 2.7) is:

- Left: 406 L.F. + 2%
- Right: 332 L.F. – 5%

PennDOT required sight distance is:

- Left: 242 L.F.
- Right: 269 L.F.

The proposed crossing meets sight distance requirements in both directions. Sight distance to the left (south) is limited by shrubs growing along the road. Sight distance to the right (north) is restricted by a roadside bank and the top of a knoll in the road.

The grade of the entrance drive may be too low to meet PennDOT grading standards. In addition, since trucks use the entrance, the centerline perpendicular to the highway must be increased from the current 40 L.F. to 60 L.F. The estimated cost for the improvements at E6 is \$19,500, as follows:

Earthwork and Grading	\$ 5,000.
Paving of Entrance Drive	5,000.
Paving of Shoulders	3,000.
Traffic Controls	500.
Plans and Approvals (20% approx.)	3,000.
<u>Contingency (20% approx.)</u>	<u>3,000.</u>
Total	\$ 19,500.

E7: Central Range — Provide a gate at the property boundary with Lehigh-Carbon Community College to control access.

The entrance (Map 2.5) is needed to allow emergency access to the TLCGP property. The two covered bridges on Game Preserve Road and Old Packhouse Road restrict fire truck access to the zoo and parts of the Central Range. Necessary improvements to the road are the responsibility of the college. The estimated cost for a new gate and fence is \$4,500, as follows:

Remove Existing Gate and Fence	\$ 500.
<u>Provide and Install New Gate and Fence</u>	<u>4,000.</u>
Total	\$ 4,500.

E8: Central Range — Add a four-car gravel parking lot on Packhouse Road at the east side of the covered bridge. Add a trail entrance on each side of the covered bridge to trail A.

The proposed project at E8 (Map 2.5) improves an existing pull-off area along Packhouse Road into a small (4-car) parking area. The proposed entrance will allow access from Old Packhouse Road to Trail A and the TLCGP property. The entrance will conform to Detail 4, entitled “road entrance with parking” (Appendix E). The estimated cost of improvements is \$7,100, as follows:

Remove Existing Fence	\$ 300.
Grade and Pave Area	4,000.
Provide and Install New Fence	2,000.
<u>Provide and Install New Two Signs</u>	<u>800.</u>
Total	\$ 7,100.

Figure 2.7
E6 Exit From Central Range



Sight Distance Left



Sight Distance Right

E9: Central Range — Provide a trail entrance on Jordan Road west of Geiger’s Covered Bridge.

The plan includes a trail entrance at E9 (Map 2.5) to provide access to Trail A from Jordan Road. The entrance will conform to Detail 2 (Appendix E), entitled “road crossing with gate”. All costs associated with entrance E9 are included in the cost estimate for Trail A.

E10: Central Range — Add a gravel horse trailer parking area and trail entrance on the county-owned land off of Orchard Road. (FUTURE PROJECT—See “Implementation” section)

E11: South Range — Add a maintenance/emergency/trail entrance and four gravel parking spaces off of Jordan Road south of the bridge crossing Jordan Creek.

Entrance E11 (Map 2.5) will be used for emergency/maintenance/trail access with a small (4-car) parking lot off Jordan Road. Parking should be at least 25 feet from the road surface, with the entrance gate beyond, allowing a vehicle to pull off the road before opening the gate. Entrance E11 should conform to Detail 3 in Appendix E, entitled “road entrance with parking”. The estimated cost for entrance E11 is \$9,300, as follows:

Remove Existing Fence	\$ 300.
Grade and Pave Entrance	5,000.
<u>Provide and Install New Gate and Fence</u>	<u>4,000.</u>
Total	\$ 9,300.

E12: South Range — Add a maintenance/emergency/trail entrance off of Jordan Road on the north side of the bridge crossing Jordan Creek.

Similar to E11, entrance E12 (Map 2.5) will be used for emergency/maintenance/trail access with a small (4-car) parking lot off Jordan Road. Parking should be at least 25 feet from the road surface, with the entrance gate beyond, allowing a vehicle to pull off the road before opening the gate. Entrance E12 should conform to Detail 2 in Appendix E, entitled “road entrance with gate”. The estimated cost for entrance E12 is \$8,000, as follows:

Remove Existing Gate and Fence	\$ 1,000.
Grade and Pave Entrance	4,000.
<u>Provide and Install New Gate and Fence</u>	<u>3,000.</u>
Total	\$ 8,000.

E13: Build a trail crossing of Jordan Road west of Geiger’s Covered Bridge. (FUTURE PROJECT — See “Implementation” section)

E14: Build a trail crossing of Old Packhouse Road east of Geiger’s Covered Bridge. (FUTURE PROJECT — See “Implementation” section)

E15: Build a trail crossing of Old Packhouse Road west of Orchard Road. (FUTURE PROJECT — See “Implementation” section)

Roads and Parking (RP)–1: Provide a gravel entrance road to the North Range from Mill Creek Road.

The current entrance drive from Mill Creek Road to the proposed parking area in the North Range (Map 2.5) must be upgraded. The plan concurs with a representative of the Lehigh County Conservation District, who suggested that the improvements proposed at RP1 could be funded through the Dirt and Gravel Road grant program. Lehigh County should pursue funding for the necessary improvements.

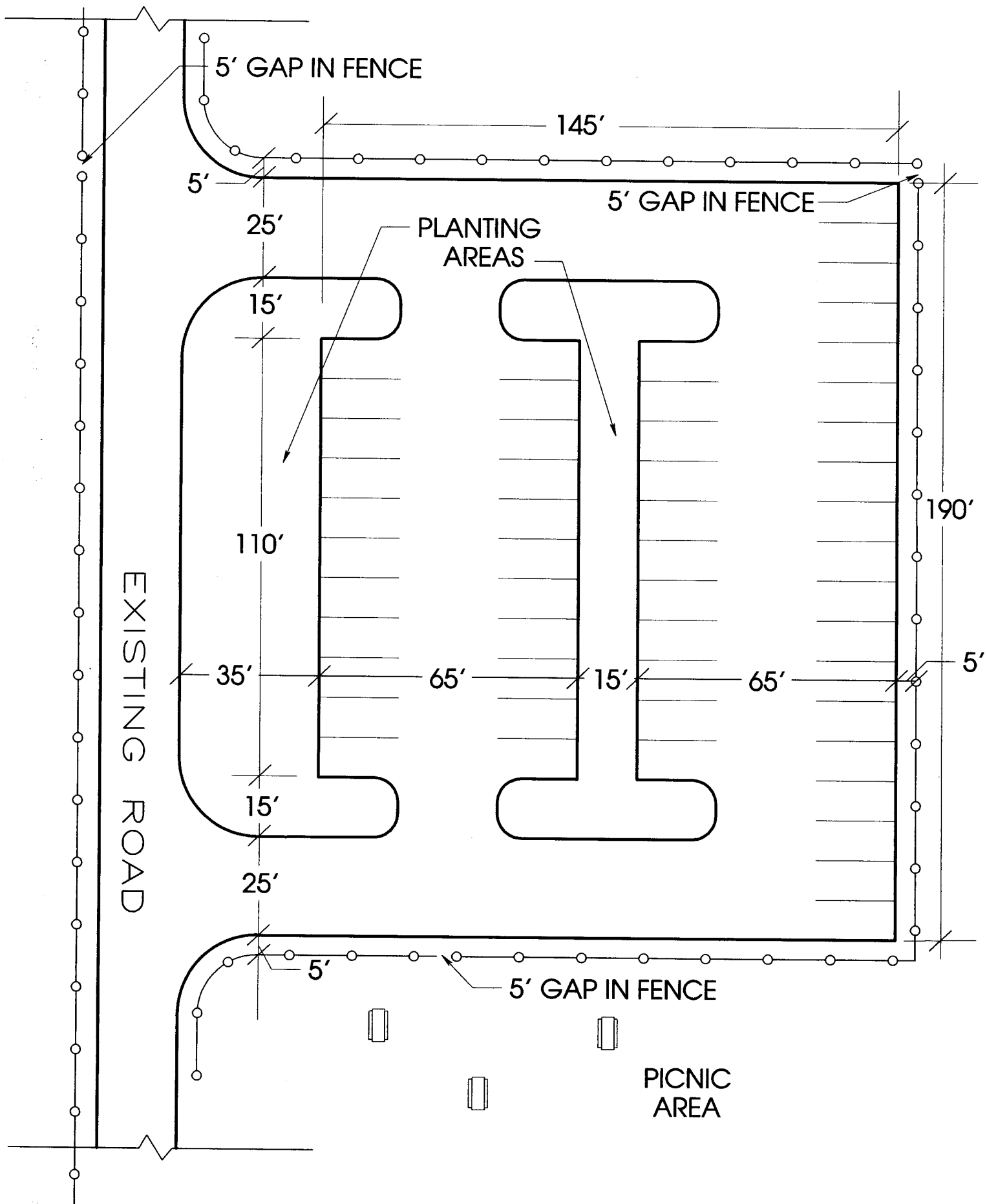
RP2: Provide a gravel parking area on the North Range off of Mill Creek Road.

The plan recommends a gravel parking area in the open area at the storage shed on the North Range (Map 2.5). The area should provide approximately 30 spaces (see sketch on page 2–21) with a grass overflow parking area. The existing storage shed and debris in the area should be removed. The estimated cost for the North Range parking area at RP2 is \$52,000, as follows:

Remove Building and Debris	\$ 5,000.
Gravel paving (1,300 S.Y. @ \$15/S.Y.)	20,000.
Planting (8 trees @ \$250/tree)	2,000.
Signs (5 signs @ \$200/sign)	1,000.
Fence (800 L.F. @ \$15/L.F.)	12,000.
Design and Engineering (15% approx.)	6,000.
<u>Contingency (15% approx.)</u>	<u>6,000.</u>
Total	\$ 52,000.

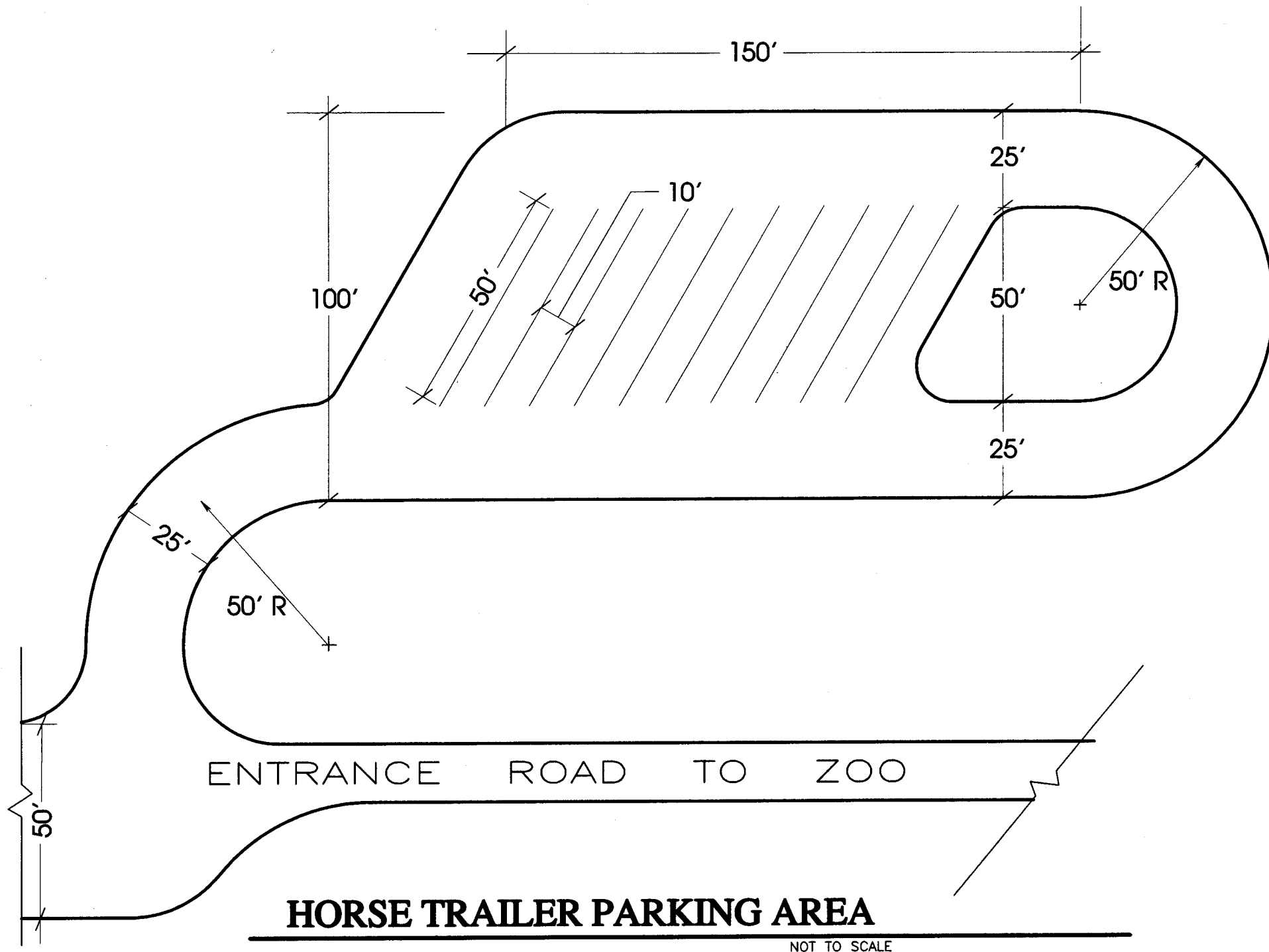
RP3: Provide gravel parking area for horse trailers.

A horse trailer parking area should be developed in the open space west of the main entrance road. The surface should be gravel paving, and the area should accommodate 10–12 horse trailers with 10-foot wide lanes for parking and ample room for vehicle turns (see sketch on page 2–22). The estimated cost for the horse trailer parking area at RP3 is \$63,970, as follows:



NORTH RANGE PARKING AREA

NOT TO SCALE



NOT TO SCALE

Drive Between Main Entrance and Parking (100 L.F., 24' wide grade, drainage @ \$25/L.F.)	\$ 2,500.
Parking Area	
100 x 150 gravel paving (1,667 S.Y. @ \$15/S.Y.)	25,000.
100 x 150 grade and drainage (1,667 S.Y. @ \$10/S.Y.)	16,670.
Gate, one each	4,000.
Signs (4 signs @ \$200/sign)	800.
Design and Engineering (15% approx.)	7,500.
Contingency (15% approx.)	7,500.
Total	\$ 63,970.

RP4: Keep the parking area east of the ford.

The plan recommends maintaining the small parking area east of the ford. No additional cost is involved.

Improvements to North and Central Ranges

The trail, entrance, roads, and parking improvements to the North Range (Map 2.7) and Central Range (Map 2.8) represent the majority of the capital expense identified in the *Trexler-Lehigh County Game Preserve Master Plan*. Remaining capital items concern restrooms, fences, guide rail, and picnic areas.

Restrooms (R)1: Build restrooms at the south end of the zoo parking lot open to the public using the existing water and sewer systems.

Restrooms should be provided on the Central Range, the activity center for the TLCGP, for people visiting the site that do not visit the zoo. The zoo's restrooms are inside the zoo gates and cannot be isolated to separate zoo visitors from site visitors. Therefore, a new restroom facility outside the zoo should be built at the south end of the zoo parking area. The facility should be connected to the zoo's water and sanitary sewer system, which, according to zoo personnel, has ample capacity available. The estimated cost for the R1 restroom facility is \$205,000, as follows:

Restroom Building	\$145,000.
Landscaping	4,000.
Water Line Extension	4,000.
Sewer Line Extension	4,000.
Design and Engineering (15% approx.)	24,000.
Contingency (15% approx.)	24,000.
Total	\$ 205,000.

R2: *Provide portable toilets:*

- A. At the North Range parking area.***
- B. Near the pedestrian bridge to serve the picnic area and nearby trails.***
- C. At the parking area near the ford.***
- D. At the horse trailer parking area.***

Additional restroom facilities should be provided at key locations throughout the TLCGP property. The additional facilities do not have to be permanent restrooms, but rather can be portable restrooms. The plan identifies four strategic locations for portable toilets. The estimated cost of the portable facilities is \$2,000 per site, for a total of \$8,000.

Fence (F)1: Repair and maintain boundary fencing in the area of the composting facility to keep preserve visitors from crossing into the composting facility.

The fencing at the county composting facility must be maintained to identify the boundary between the preserve and the composting site and keep visitors to the preserve from wandering into the facility. The estimated cost to upgrade the fencing (1,500 L.F. @ \$15/L.F.) is \$ 22,500.

F2. Remove the existing fencing and gates at entrances and replace with new posts, 3-rail fence, and gates to control preserve entrances.

Fencing and gates at entrances should be replaced to clearly identify preserve boundaries and help provide some security. Exact locations for fencing and gates at entrances is included in the discussion of each entrance. Likewise, costs for fencing and gates are included in entrance costs.

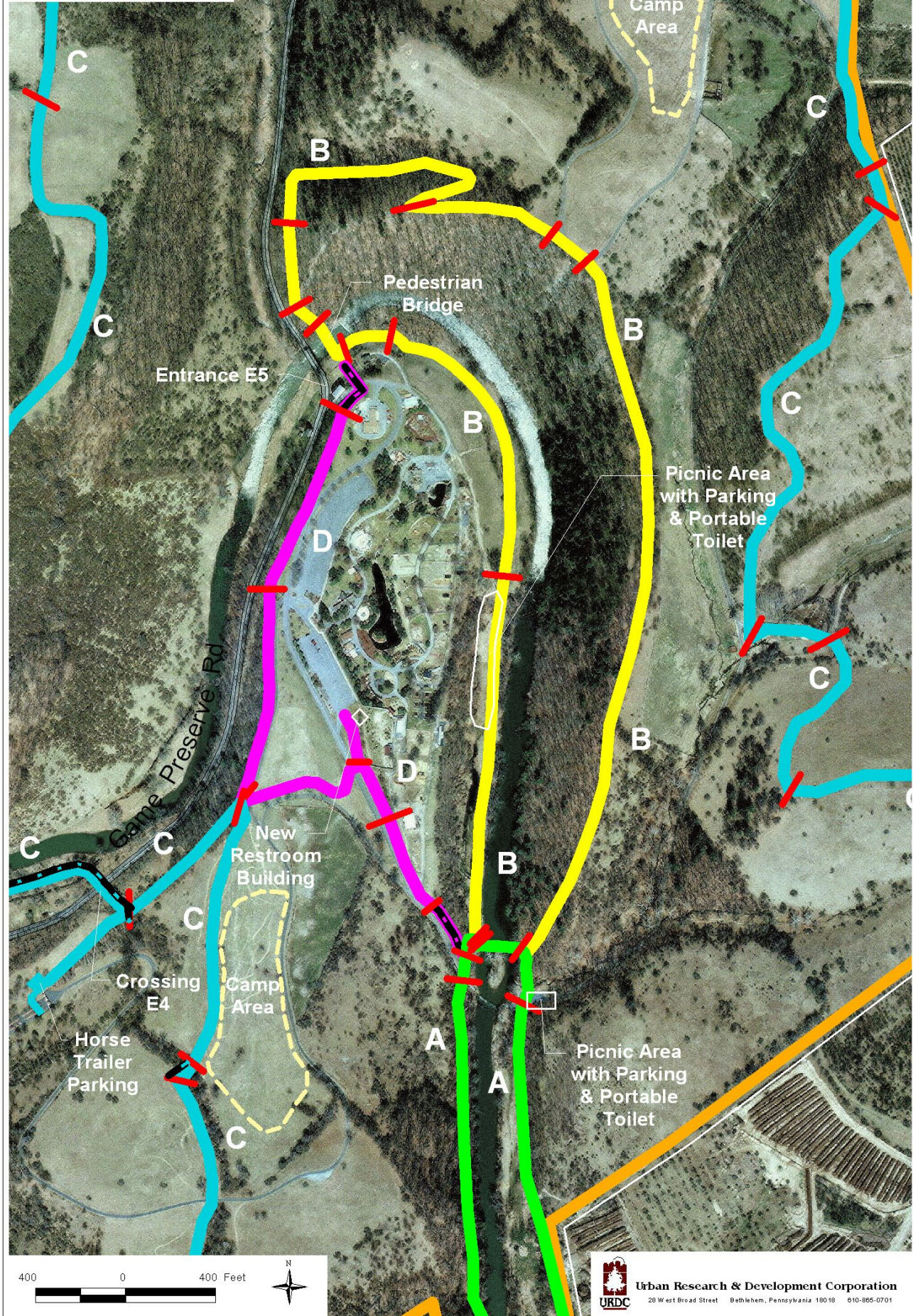
F3. Remove fences from animal enclosures after each of the buffalo, elk, and horses have vacated the property.

The *Trexler-Lehigh County Game Preserve Master Plan* recommends the removal of the remaining bison, elk, and horses (see recommendation on wildlife below). The recommendation follows a study of the current herds by Natural Resource Consultants, Inc., whose report appears in Appendix A of the plan. After the animals have vacated the site, fencing and animal enclosures should be removed. The estimated cost for removal of interior fencing and pens is \$48,300, as follows:

Bison Pasture	2,481 L.F.	\$6/L.F.	\$ 15,000.
Bison Pens			8,000.
Elk Pasture	3,853 L.F.	\$3/L.F.	11,600.
Horses, Summer Pasture	2,122 L.F.	\$3/L.F.	6,400.
<u>Horses, Winter Pasture</u>	<u>2,422 L.F.</u>	<u>\$3/L.F.</u>	<u>7,300.</u>
Total			\$ 48,300.

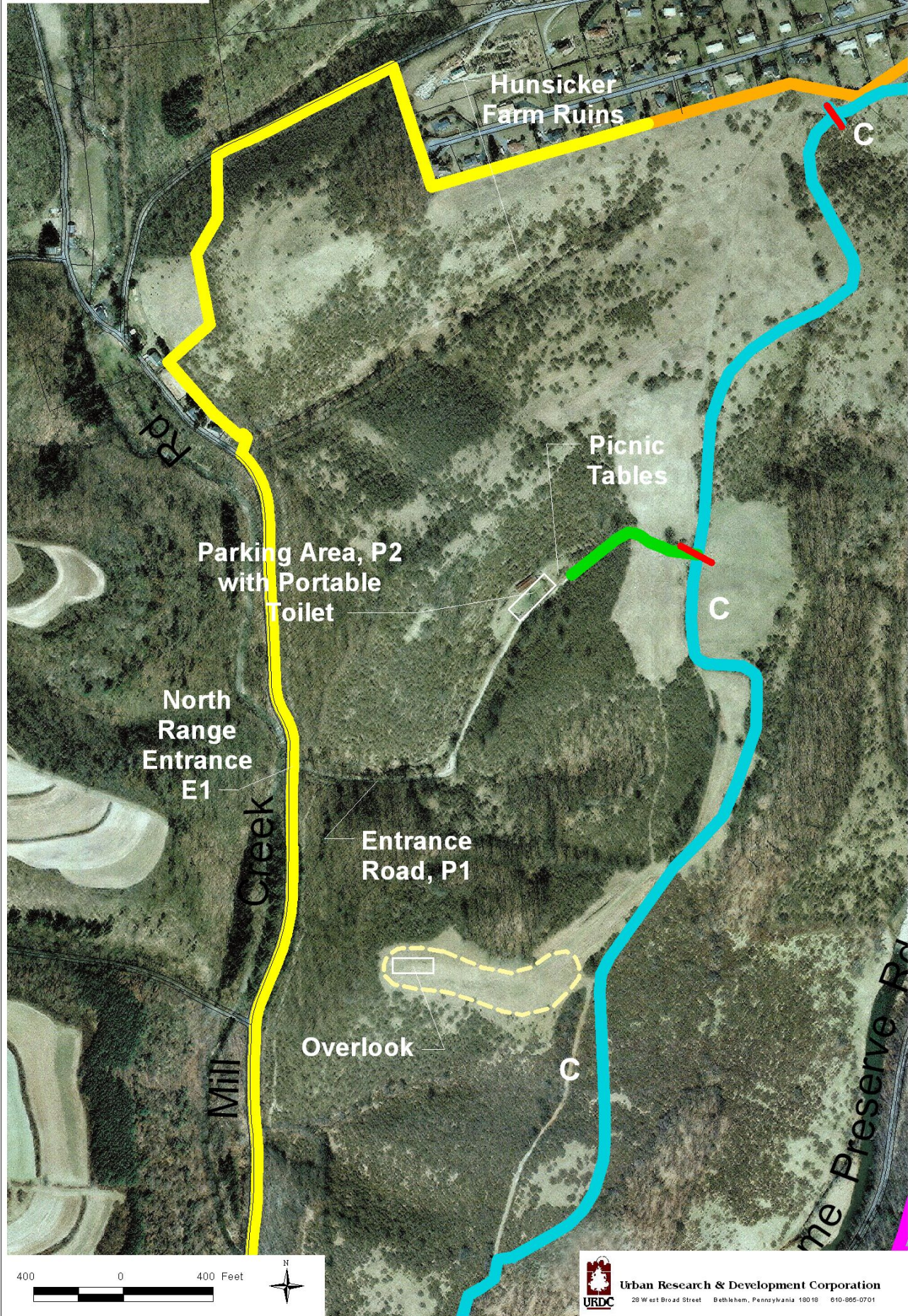
MAP 2.7

CENTRAL RANGE



Trexler - Lehigh County Game Preserve

MAP 2.8 NORTH RANGE



F4: Add fencing in the picnic area.

The cost for fencing in F4 is part of the cost of improvements in A2.

F5: Add fencing around the North Range parking area to contain vehicles.

The cost for fencing in F5 is part of the cost of improvements in RP2.

F6. Add fencing around the horse trailer parking area to contain vehicles. (FUTURE PROJECT — See “Implementation” section)

Guide Rail (G)1: Add guide rail at entrance drive.

G2: Add guide rail at exit drive.

Two sections of road require additional guide rail:

G1: along the single-lane entrance road to the site between the entrance and the zoo.

G2: along the exit road shortly before the exit.

Two options are available for guide rail:

- Continue to use planted posts.
- Install wooden guide rail.

Wooden guide rail is considerably more expensive than planted posts and is, therefore, not recommended. The estimated cost of the needed guide rail is \$5,340, as follows:

G1 (Map 2.9):	600 L.F. (1 post/10 ft. = 60 posts @ \$30/post)	\$ 1,800
G2 (Map 2.10):	1,180 L.F. (1 post/10 ft. = 118 posts @ \$30/post)	\$ 3,540
Total		\$ 5,340

Recommended Policies

In addition to capital recommendations, the *Trexler-Lehigh County Game Preserve Master Plan* also includes recommendations regarding county policies for the improvement of the preserve. The following section provides policy guidance regarding:

- Jordan Creek Corridor
- Activities encouraged at the site
- Indoor space requirements
- Maintenance area on the site
- Wildlife, specifically the bison, elk, and horses
- Management of the site

Jordan Creek Corridor (J)1: Permit fishing in the Jordan Creek when the water level is high enough to support fish.

The water level of the Jordan Creek can fluctuate drastically and has frequently been too low to support significant fish populations. When the water is low, fishing should be prohibited until water levels have risen to or above normal.

J2: Continue to allow/encourage wading in the Jordan Creek near the ford and pedestrian bridge.

Wading in the Jordan is one of the fun activities known to many Lehigh Valley residents. The area near the ford allows easy access to the creek, and children and adults should be allowed to enjoy the creek safely.

J3: Redesign the picnic area along the Jordan Creek upstream of the pedestrian bridge.

The improvements in J3 have been incorporated into A2 below.

Activities (A)1: Camping — Allow only organized, responsible groups, such as Boy Scouts, Girl Scouts, and similar groups, to use the preserve for camping events.

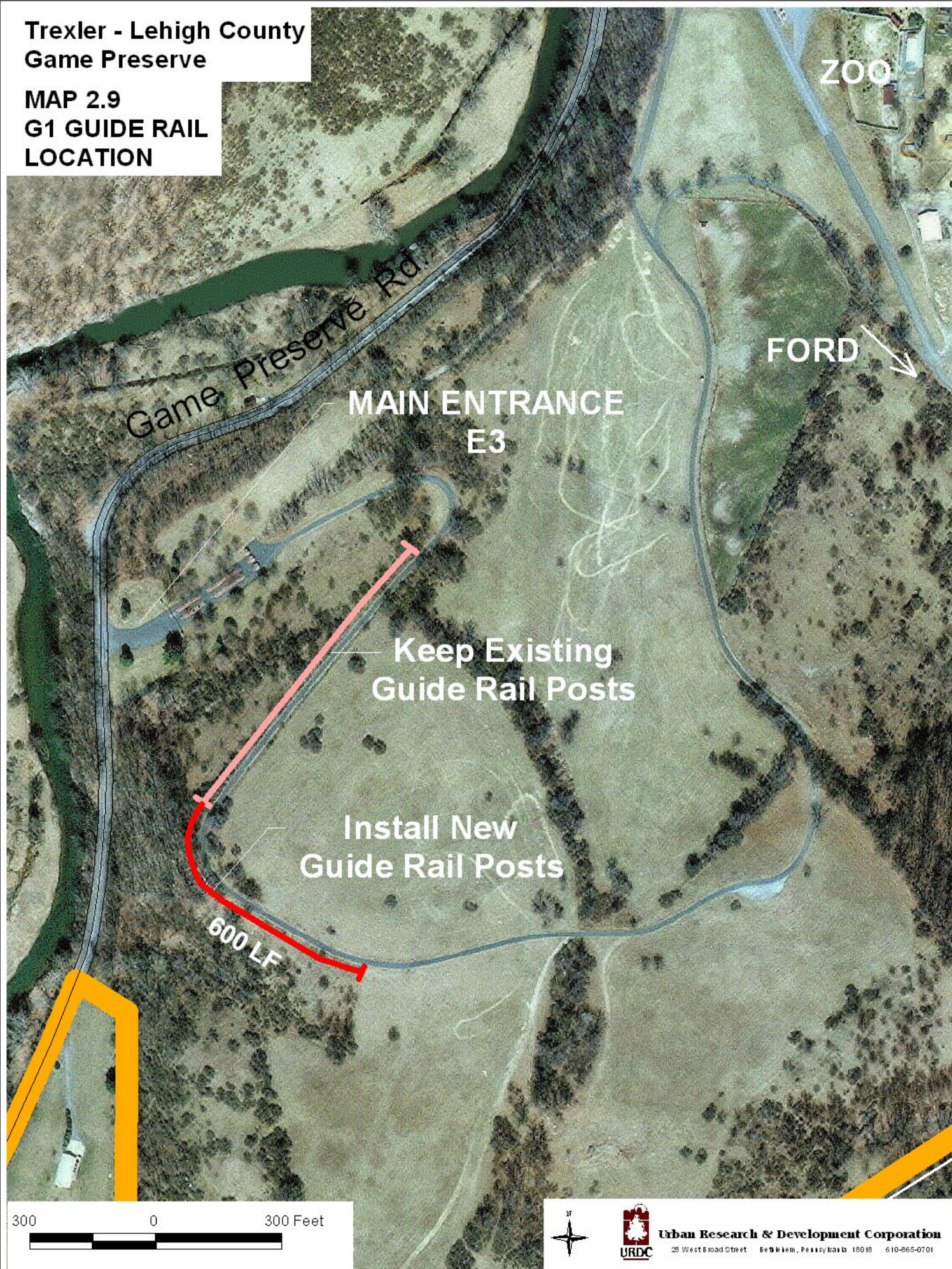
Camping can be a wonderful event on a site as breathtaking as the preserve. However, camping groups must be very responsible if the site is to be maintained for future generations to enjoy. Organized groups, such as the Boy Scouts, Girl Scouts, and others, are strong advocates of personal responsibility and respect for nature. The organized groups will most likely be responsible for providing and removing all necessary facilities and for cleaning and restoring the area to pre-existing conditions.

A2: Picnicking — Relocate the picnic area along Jordan Creek upstream of the ford.

The picnic area should be reorganized to encourage walking or sitting on the stream side of the gravel road and picnicking and parking on the zoo side of the road. Picnic tables upstream of the ford should be moved from the stream side of the road to the zoo side of the road. More benches should be installed on the stream side of the road. “No parking” signs should also be placed on the stream

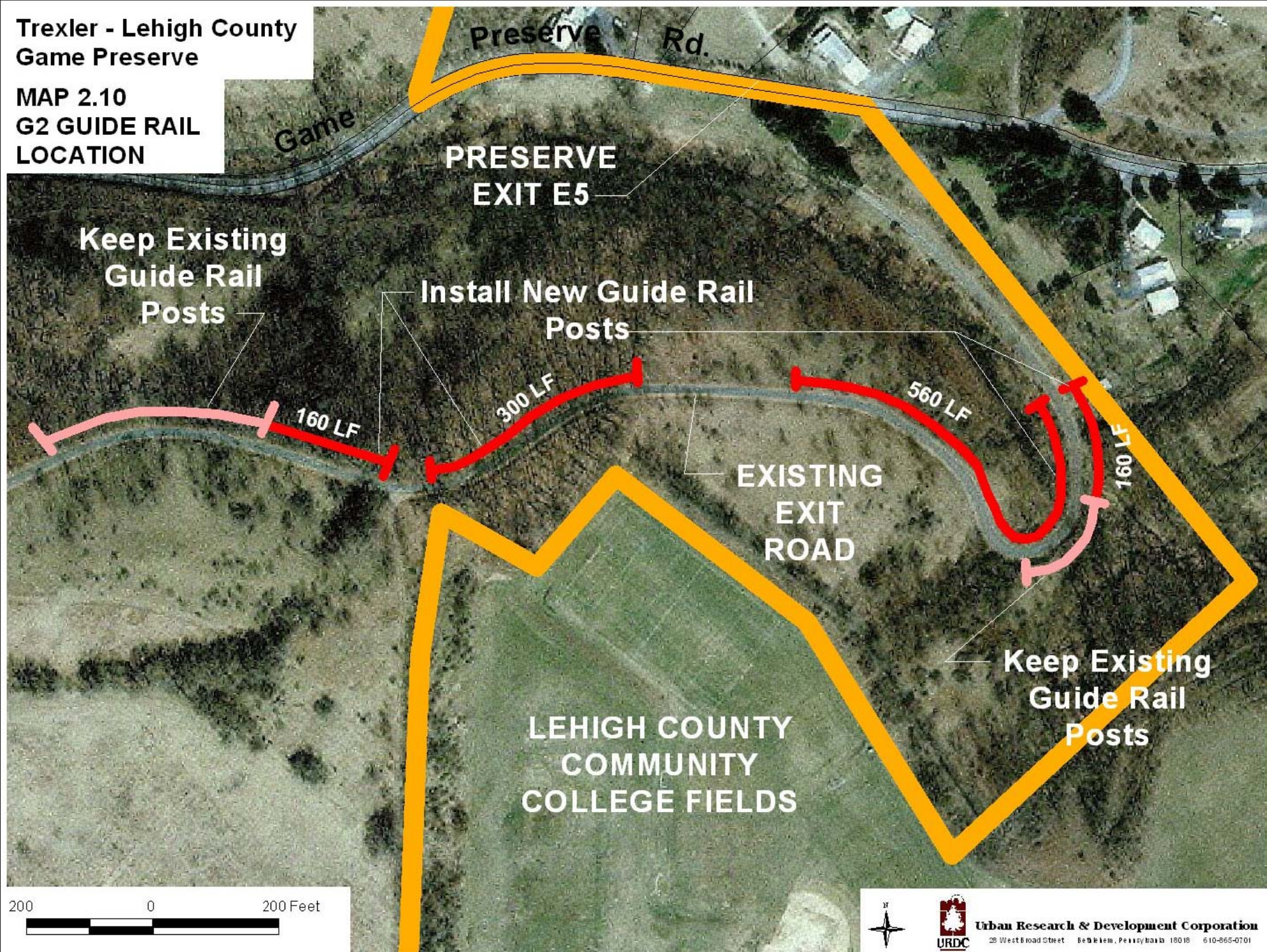
**Trexler - Lehigh County
Game Preserve**

**MAP 2.9
G1 GUIDE RAIL
LOCATION**



**Trexler - Lehigh County
Game Preserve**

**MAP 2.10
G2 GUIDE RAIL
LOCATION**



side of the road. Picnic tables should be grouped into three areas with parking between the picnic areas (see sketch on page 2–28). Perimeter posts should be used to clearly define the areas. The cost of proposed improvements to A2 is \$12,350, as follows:

Perimeter Post (7.0 feet between posts)	
Area 1: 200 L.F. / 7 = 29 posts x \$30/post	\$ 870.
Area 2: 160 L.F. / 7 = 23 posts x \$30/post	690.
Area 3: 160 L.F. / 7 = 23 posts x \$30/post	690.
Tables (10 @ \$500/table)	5,000.
Benches (8 @ \$400/bench)	3,200.
<u>Signs (8 @ \$200/sign)</u>	<u>1,600.</u>
Total	\$ 12,350.

A3: Picnicking — Keep the picnic area east of the ford.

The small picnic area east of the ford adjacent to the existing parking area should be maintained.

A4: Picnicking — Add picnic tables at the parking area in the North Range.

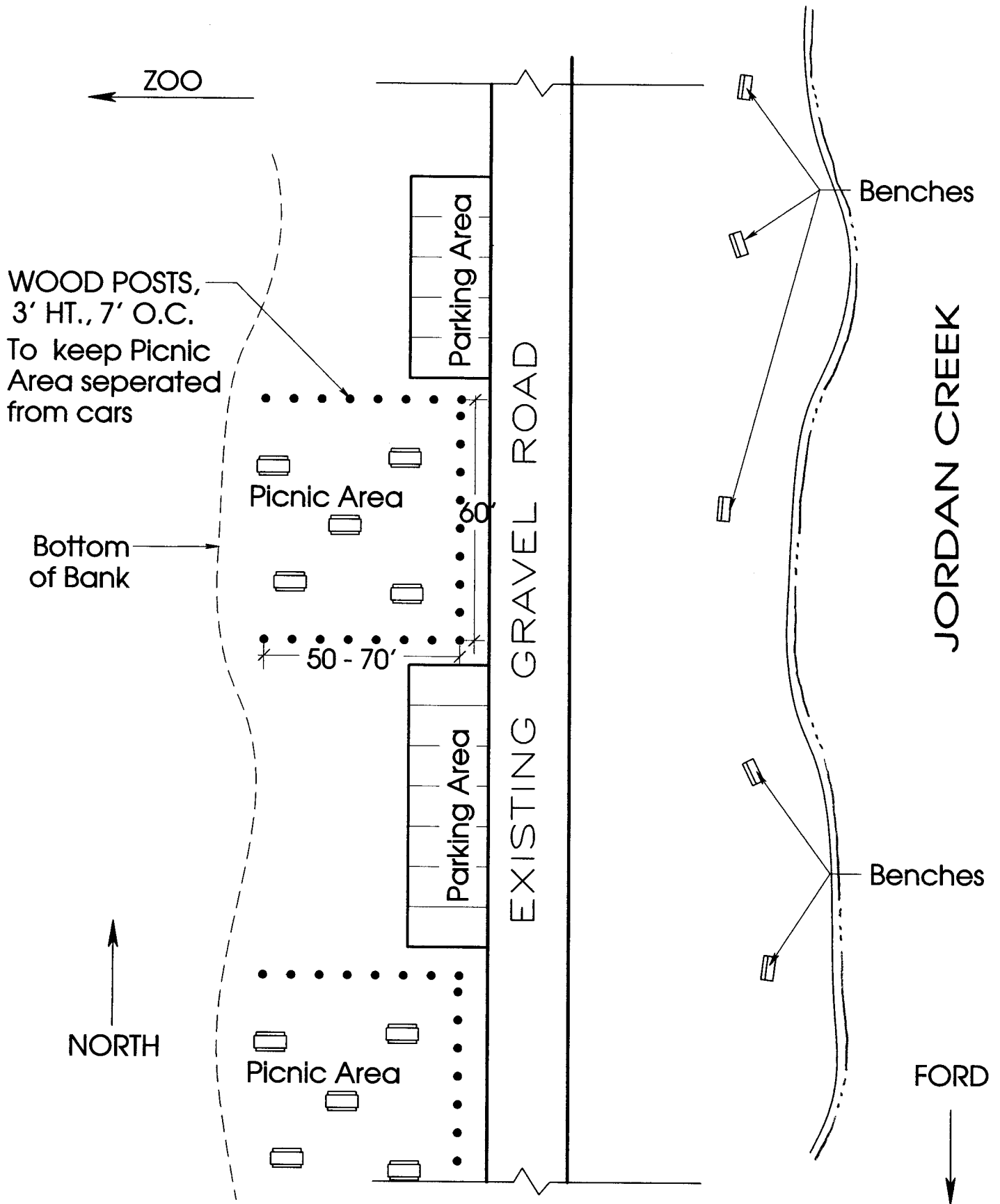
To enhance the utilization of the North Range without encouraging overuse, a few picnic tables should be placed adjacent to the proposed North Range parking lot just outside the perimeter fence. The estimated cost of eight tables at \$500 per table is \$4,000.

A5: Nature Watching — Relocate the trail to the existing nature watching area west of Trail A.

The trail to the nature watching area approaches from the front. Therefore, a trail user must get to the shelter, wait for the environment to settle, then hope no other user approaches. The trail should be relocated to approach the shelter from behind so wildlife watchers will disturb the area as little as possible. There is no cost associated with A5.

Indoor Space (I)1: Use/modify existing space for administrative purposes, rather than constructing a new administration building.

One of the tasks initially established for the *Trexler-Lehigh County Game Preserve Master Plan* was to assess the need for on-site, indoor, administrative space. On-site administrative tasks at the preserve require very little space. Existing space in storage and maintenance buildings appears sufficient for the foreseeable future without the need to construct new facilities.



NOTE: Place 3 Picnic Areas West of Existing Road along Jordan Creek

PICNIC AREA UP STREAM OF FORD

NOT TO SCALE

I2: Work with the Lehigh-Carbon Community College to make optimum use of the preserve for college classes and site-based environmental education programs.

The Lehigh-Carbon Community College (LCCC) is a tremendous asset to Lehigh County and an equally valuable neighbor to the preserve. LCCC professors use the preserve for student experiences in learning about and caring for the natural environment. The college has expressed a strong willingness to work with the county to develop sites and programs that are mutually beneficial to both the college and to the public.

Wildlife (W): Remove the bison, elk, and horses.

The bison, elk, and horses have been an attraction at the preserve for decades. Clearly, General Trexler was a leader in helping to rescue the bison and elk from the brink of extinction, and the TLCGP was a significant part of that effort.

More than 70 years after the general's death, the circumstances of the animal herds have changed considerably. The animals are no longer endangered. Indeed, both buffalo and elk are now considered livestock instead of game. The horses, although pleasant, are not even part of the game preserve's original history, arriving years after the general's death.

In today's world, too, transportation has become much more available than in decades past. Seeing bison in their natural habitat in the western parts of the country is no longer only a dream, but a relatively short flight of a few hours. Elk have regenerated in the wild here in Pennsylvania, a 4-hour drive from Lehigh County.

One of the major tasks of the *Trexler-Lehigh County Game Preserve Master Plan* was to assess the current circumstances of the bison, elk, and horses and outline options for the future of the herds. Natural Resource Consultants, Inc, prepared the report, *Observations and Recommendations Regarding the Bison, Elk, Palomino Horse and White-Tailed Deer Herds at the Trexler-Lehigh County Game Preserve; An Historic Perspective of General Harry C. Trexler's Intentions*, as part of the master plan. The report appears as Appendix A of the plan.

The report examines the biological and cultural significance of the herds at the preserve and analyzes four options for the herds. From the biological and cultural viewpoints, the NRC report, and the master plan of which the report is a part, recommends that the herds be removed. Many factors contribute to the recommendation and are explained in Appendix A.

Management (M): Provide a permanent full-time, on-site park manager or an organized group to accomplish the same result.

The preserve is a major asset to the county that requires the full professional attention to properly manage its resources. Lehigh County should either hire a full-time director for the preserve, as is the

case at the Jacobsburg Environmental Education Center, or contract with a consulting organization capable of providing the necessary service.

Name (N): *Consider changing the name of the site to the Trexler Nature Preserve to emphasize the environmental education and outdoor experiences available at the site.*

The preserve is, first and foremost, a large amount of open space. Activities at the preserve should be focused on environmental education and enjoyment. To reflect the evolving character of the site, the name should be changed to the ***Trexler Nature Preserve***. The new name maintains the homage necessary to General Trexler’s life and great work and instills a clear understanding of the character and purpose of the site.

Site (S): *Consider expanding the preserve site to include adjacent county lands in order to promote land conservation, expand the proposed trail system, and unify the identity of the preserve.*

As noted from the beginning of the plan, the Trexler Nature Preserve is a cornerstone of land preservation in Lehigh County, particularly in the Jordan Creek Valley. The adjacent county lands are made all the more valuable as open space by proximity to the preserve. The county should explore ways to unite the Trexler Nature Preserve and the adjacent county lands to enhance the land preservation effort in the Jordan Creek Valley not only for current residents, but for future generations as well.

Summary of Proposed Improvement Costs

The *Trexler-Lehigh County Game Preserve Master Plan* estimates that the estimated cost of improvements specifically identified in the plan is \$2,749,567 (Table 2.7). Additional potential improvements are provided in the following section.

Table 2.7
Master Plan Capital Cost Summary

Recommendation		Cost	Subtotals
T1 Trail A	Build Covered Bridge Trail	\$ 401,465	
T2 Trail D	Build sect D5,D6 & D7	\$ 22,040	
T3 Trail B	Build Elk View Trail	\$ 230,314	
T4 Trail D	Build sect D2 & D3	\$ 27,580	
T5 Trail C	Build Loop Trail	\$ 1,187,108	
T6 Trail D	Build sect D1 & D4	\$ 33,800	
		Subtotal	\$ 1,902,307

Recommendation		Cost	Subtotals
E1	Mill Creek, North	\$ 29,400	
E2	Pathway at CCC Rd.	\$ 6,500	
E3	Main Entrance	\$ 25,500	
E4	Trail C crossing	\$ 6,000	
E5	Covered Bridge Entrance	\$ 70,000	
E6	Exit from Central Range	\$ 19,500	
E7	Preserve from LCCC	\$ 4,500	
E8	Packhouse Rd. parking	\$ 7,100	
E9	Jordan Rd. at Covered Bridge	Future project	
E10	Orchard Rd. horse parking	Future project	
E11	Jordan Rd., South	\$ 9,300	
E12	Jordan Rd., North	\$ 8,000	
E13	Jordan Rd. trail crossing	Future project	
E14	Packhouse Rd. entrance	Future project	
E15	Packhouse Rd. crossing	Future project	
		Subtotal	\$ 185,800
RP1	Entrance Road to North Range	Funded by state grant	
RP2	North Range parking	\$ 52,000	
RP3	Horse parking area	\$ 63,970	
		Subtotal	\$ 115,970
R1	Restroom building at zoo	\$ 205,000	
R2.A	North Range, portable toilet	\$ 2,000	
R2.B	Picnic area, portable toilet	\$ 2,000	
R2.C	Ford parking, portable toilet	\$ 2,000	
R2.D	Horse parking area, port.toilet	\$ 2,000	
		Subtotal	\$ 213,000
F1	add at composting facility	\$ 22,500	
F2	Remove fence at entrances	see others	
F3	Remove fence at herds		
	Buffalo	\$ 15,000	
	Buffalo pens	\$ 8,000	
	Elk	\$ 11,600	
	Horses, summer	\$ 6,400	
	Horses, winter	\$ 7,300	
F4	Add fencing at picnic area	see A2	
F5	Add fencing at North Range parking	see R2	
		Subtotal	\$ 70,800

Recommendation		Cost	Subtotals
G1	Entrance drive	\$ 1,800	
G2	Exit drive	\$ 3,540	
		Subtotal	\$ 5,340
A2	Picnic, pedestrian bridge	\$ 12,350	
A4	Picnic, North Range parking	\$ 4,000	
		Subtotal	\$ 16,350
O1	Autumn Olive Control	\$ 208,000	
O2	Deer Control (study and management)	\$ 32,000	
		Subtotal	\$ 240,000
		Total	\$ 2,749,567

NOTE: Table 2.7 is not a complete summary of all recommendations of the *Trexler-Lehigh County Game Preserve Master Plan*. Policies, future projects, and projects funded without any county funding are not included in the listing. The summary only includes capital items for initial recommended improvements to the site plus an amount to begin addressing the ongoing concerns of deer management and autumn olive control. At the request of Lehigh County, the items in Table 2.7 approximate the county liability of \$2.75 million in the settlement of the suit brought by the Harry C. Trexler Trust

The \$2.75 million shown in Table 2.7 includes two items that were not a formal part of the master plan: control of the autumn olive and management of the deer population. The plan recognizes both tasks as imperative to restore and maintain a healthy preserve. The Wildlands Conservancy, in an informal but ongoing role as a major steward of the site, has prepared plans and cost estimates to begin both tasks. A total of \$240,000 is included for both tasks as part of the plan's \$2.75 million and represents an initial investment in dealing with both circumstances. The \$208,000 shown for the autumn olive problem is an estimate for addressing only the areas necessary to build the trail system. The \$32,000 shown for deer management includes \$17,000 for a study of the herd and a management plan and \$5,000 per year for each of the following three years to implement the recommended strategy. Both the autumn olive and the deer herd will require additional expenditures over many years as part of the operating costs at the Trexler Nature Preserve. However, both activities should be eligible for funding from the Pennsylvania Department of Conservation and Natural Resources.

Maintenance Costs

The improvements proposed to the Trexler-Lehigh County Game Preserve pose not only a capital cost but ongoing maintenance costs as well. The amount of maintenance costs is difficult to anticipate because many variables are involved.

As an example, the maintenance cost to Lehigh County will depend, for instance, on whether the site manager is a full-time county employee or a professional under contract. As another example, the largest single component of O&M is and will continue to be labor, but debate continues in public

and nonprofit circles about the *cost* of labor for O&M. Some agencies make extensive use of volunteer labor, which includes environmental organizations, scout troops, community groups, or prison labor. Other agencies refuse to use volunteers as a matter of policy because of the cost to organize the work tasks and supervise the volunteers.

To provide some information on O&M costs for a similar site, the 2005–2006 budget for Jacobsburg Environmental Education Center, which is formally operated as a state park, was \$455,500. Maintenance (as opposed to education) accounts for approximately \$214,200 of the budget. Jacobsburg has 20.5 miles of trails, which is approximately \$10,500 per trail mile per year.³ At a rate of \$10,500 per mile, annual maintenance of the 12.58 miles of trails presented in Tables 2.1 through 2.6 would be approximately \$132,090.

Implementation/Other Improvements

At the request of Lehigh County, the *Trexler-Lehigh County Game Preserve Master Plan* recommends only the tasks on which to spend the \$2.75 million required by the settlement of the suit brought by the Harry C. Trexler Trust. Additional funds in the form of matching grants may be available to expand the amount of money available for improvements. The plan recommends that Lehigh County aggressively pursue additional funding for the Trexler Preserve beyond the \$2.75 million cited in the plan as part of ongoing support for the preserve.

The *Trexler-Lehigh County Game Preserve Master Plan* recommends that Lehigh County begin to implement the proposed policy changes as soon as possible. In addition, the plan establishes two top priorities for implementing the capital recommendations of the plan:

1. *Highway Occupancy Permits* — Four proposed entrances (E1, E3, E5, and E6) will require Highway Occupancy Permits. PennDOT procedures take time to complete. A qualified engineer should begin meeting with PennDOT as soon as possible to begin the process of obtaining each of the four permits.
2. *Bridges* — The plan includes four new bridges for the trail system. Qualified professionals (e.g., land planner, landscape architect, engineer, surveyor) should begin studies as soon as possible to determine the exact placement of the bridge and to prepare plans and specifications. Collectively, the four bridges are the single most expensive item in the master plan, estimated to cost a total of approximately \$840,000. As a high-cost, easily identifiable item, the four bridges would be an ideal candidate to package as a single project for possible grant funding. The county should immediately begin to look for possible grants to underwrite the cost of the bridges.

³ In 2005–2006, Jacobsburg also benefitted from approximately 1,200 volunteer hours, approximately 35% of which were devoted to maintenance.

As additional funds become available, the plan suggests the following projects for consideration:⁴

- Trail E: bicycle trail through the North Range.
- Trail F: multiuse trail through the North Range near the Hunsicker Homestead.
- Trail G: realigned trail from the wildlife viewing area to Trail A.
- Trail H: multiuse trail through the North Range along Mill Road.
- Trail J: loop trail in the Central Range across a ridge from trail segments B3 and B4.
- Trail K: pedestrian trail through the Central Range connecting trail segments A8 and C37.
- Trail L: pedestrian loop trail in the Central Range to provide access to a new wildlife viewing area east of the ford.
- Wildlife Viewing Area: second wildlife viewing area east of the ford in former feeding station.
- Orchard Road horse trailer parking: second horse trailer parking area on the east side of the preserve.
- Maintenance area/
Outdoor storage area: areas to be provided on county-owned lands adjacent to the preserve east of Old Packhouse Road across from the county composting facility.
- Trail overlook: earth mound overlook on the Loop Trail (segment C1) to highlight the view down the valley to the Jordan Creek.

⁴ The order of projects is not intended to indicate priority.

APPENDICES

A *Observations and Recommendations Regarding the Bison, Elk, Palomino Horse and White-Tailed Deer Herds at the Trexler-Lehigh Game Preserve; An Historic Perspective of General Harry C. Trexler's Intentions*

B Project Management Group

C Interviewees

D Recommendations from the report, *Trexler-Lehigh County Game Preserve, Ecological Inventory and Assessment*

E Details

APPENDIX A

Observations and Recommendations Regarding the Bison, Elk, Palomino Horse and White-tailed Deer Herds at the Trexler-Lehigh Game Preserve

An Historic Perspective of General Harry C. Trexler's Intentions

Prepared by:

Natural Resource Consultants, Inc.
1723 Fort Hill Road
Fort Hill, PA 15540
(814) 395-5335
Toll Free: 866-795-3337
Email: nrc@qcol.com
www.nrcdeer.com

**Observations and Recommendations Regarding the
Bison, Elk, Palomino Horse and White-tailed Deer Herds
at the
Trexler-Lehigh Game Preserve
An Historic Perspective of General Trexler's Intentions**

It is likely that we will never know precisely what General Harry C. Trexler's personal long-term plans were for his captive bison, elk and white-tailed deer at the Trexler-Lehigh Game Preserve. However, there are clear inferences as to his intentions and values regarding these animals that, when viewed in the context of his time, provide some possible insights.

General Trexler was born into an age when the phenomena of North America's abundant wildlife was still at its peak. Buffalo swarmed across the plains by the millions, passenger pigeons blacken the skies for hours and our rivers and bays were choked with shad, stripped bass and waterfowl. America was still primarily an agrarian society where year-round subsistence hunting for meat remained a common practice even as society began to focus more on commerce, industry and resource extraction. These endeavors required vast quantities of labor for mining ore, harvesting timber and operating factories. That labor demanded a ready supply of protein which the country's teeming wildlife populations could readily supply. Thus, market hunting was expanded to a scale, extent, and efficiency that was prodigious. No longer was hunting limited to men attempting to feed themselves, their families, and the village. It had become a profession and an industry involving a natural resource that needed to be killed, processed, shipped and sold.

And, sell it we did. Wildlife was harvested for hides, meat and feathers. Fish were harvested for oil, fertilizer and food. Wading birds were slaughtered at their nest sites for their breeding plumes to be used on women's hats. Hunters were able to exploit this seemingly endless supply of wildlife and ship it to hungry markets in cities and towns. The harvest by individual hunters was staggering, with as many as 8,000 ducks in a season, or 35,000 lbs. of elk in three months. The local markets were filled not with beef, pork and domestic poultry but ducks from the Chesapeake Bay, elk from western grasslands and shad from the Susquehanna River. People paved their driveways with oyster shells, stayed warm under buffalo robes and adorned the finest women's hats with feathers from egrets, herons and hummingbirds.

The effects of year-round and unlimited subsistence hunting by a largely rural society combined with large scale market hunting to feed burgeoning cities and towns put tremendous pressure on the wildlife resources of North America. Indeed, by the 1880's the inconceivably abundant and seemingly inexhaustible wildlife resource which had sustained native cultures and greeted European settlers had suffered dramatic declines. By the end of the nineteenth century, many wildlife populations had collapsed, with many species including passenger pigeons, wood ducks, bison, eastern elk, and white-tailed deer on the brink of extinction. It happened so quickly that only the most observant recognized it was occurring.

For the most part, however, society never missed a beat in its march to conquer the continent. Most Americans simply shifted gears from wild game to their domestic cousins. Meat

was meat and society forged ahead fueled on the protein of chickens, hogs and longhorns rather than elk, deer and buffalo. America was becoming an industrialized giant and appeared more than willing to use up its waters, wildlife and forests to get there.

Ironically, while hunting and hunters were the primary driving force for the decimation of the wildlife resource, a small, socially elite group of hunters were the first and most outspoken advocates for its conservation. Beginning in the 1870's national newspapers like *American Sportsman* (1871), *Forest and Stream* (1873), and *Field and Stream* (1874), began to call for the end of the commercial exploitation of wildlife and for hunters to follow a well-defined code of conduct and thinking based on English hunting traditions. These publications promoted the ideas of "sportsmanship," proper etiquette in the field, giving game a fair chance and an aesthetic appreciation of the concept of sport. This elite group of hunters, who defined themselves as sportsmen, advocated that a hunter should pursue game for pleasure and make no profit of his success. They held in low regard "pot-hunters," who committed such offenses as shooting grouse on the ground or geese in the water; the "meat hunter," who took wildlife only to fill his stomach and knew nothing of the subtleties of sport; the poacher, who killed without regard to season or sex, often trespassing in the process; and worst of all, the "market hunter," who destroyed everything from trout to elk for the money they would bring.

In the years and decades to follow, the "sportsman"/conservationist appeared, determined to bring back game. This movement was led not by the subsistence farmers and frontiersmen, but by members of the American aristocracy, old families who were educated, monied and lived in the east. Men who hunted in the west not to put food on the table or money in their pockets but similar to European aristocracy, as a recreational pursuit. They understood that it was unregulated, unrestricted hunting for the purpose of procuring meat and profit that had brought the wildlife resource to the brink of extinction and were determined to stop it and restore America's wildlife and game through the protection and restocking of game animals and the regulation of hunters.

One of these men was General Harry C. Trexler, who in 1900 owned a ranch at Jackson Hole, Wyoming where he hunted with his friends and where they witnessed the dramatic reduction of game populations. It was on these hunting expeditions that the general became interested in the protection and restoration of wildlife populations. As a result, in 1906 he began to establish his "game preserve" back East in his home state of Pennsylvania, where he would stock the then endangered elk, bison and white-tailed deer. All three of the species were likely pursued as game by Trexler during his Western hunts.

The Pennsylvania Game Commission (PGC), which was organized in part to bring back white-tailed deer populations, received 175 deer from General Trexler during the commission's efforts in the early 20th century to re-establish deer populations in the state. These animals were released by the Commission in the Northeastern and Central parts of the commonwealth. During this time, the PGC also established fenceless "game preserves" where hunting was barred and wildlife was protected from hunters by patrolling game wardens. The concept of game preserves

was popular at the time and rooted in the acknowledgment that over-harvesting by hunters was a threat to wildlife populations. Game preserves, whether fenced or unfenced, were designed to protect “breeding stock” that would assure the species’ survival. As state and federal wildlife agencies became better equipped through regulation and education to control hunting impacts while also enforcing seasons and bag limits and introducing the concepts of sport, fair chase and equitable distribution, game preserves were no longer seen as a necessary or effective tool for wildlife conservation. The PGC ended its game refuge program in the 1940’s.

Today, the three species of concern and focus of General Trexler are no longer endangered. The wildlife restoration efforts led by men similar to General Trexler and the regulation of hunting by organizations like the PGC has allowed bison, elk and white-tailed deer to return to abundance.

Conclusion

In 1900 when General Trexler became interested in the protection of bison, elk and white-tailed deer, the outlook for these species was bleak with many believing they would never recover in the wild. Whether General Trexler's vision to save these species from what seemed like certain extinction included their restoration to the wild is unknown. However, given the conservation efforts at the time, which focused on the protection of game species breeding stock, it would seem likely that it did. Today bison, elk and white-tailed deer have recovered and once again thrive in wild places in a way that may have far exceeded the general’s expectations.

Given the general’s life as an active hunter of these species and his harvesting of individual animals in both the wild and later in captivity for meat, it seems apparent that his interest in wildlife conservation and management was at the species population level and not the individual animal.

Current Status of The Trexler-Lehigh Game Preserve Captive Animals and Their Conservation and Ecological Significance

Today the Trexler-Lehigh County Game Preserve retains only a small captive group of elk and bison. The captive white-tailed deer that General Trexler established has long ago been assimilated into native populations that roam free on and off the game preserve property. A small group of Palomino horses, which were acquired more than a decade following General Trexler's death, remain on the property. The zoo, established in the 1940’s following the

general's death, has expanded but is now limited to a 29 acre parcel leased to the Lehigh Valley Zoological Society and is operated independently by a 501(c)(3) as the Lehigh Valley Zoo.

American Bison (*Bison bison*)

The Trexler-Lehigh Game Preserve currently has 14 bison ranging in age from 1 to 19 years old. There are 3 males and 11 females. The herd is contracepted by treating the female animals annually in June using Porcine Zona Pellucida (PZP). This treatment allows the females to enter estrus and ovulate but blocks fertilization thereby preventing pregnancy. Males, who are untreated and females, will display mating and breeding behaviors, but will not conceive. Contraception with PZP began several years ago with 100% efficacy to date.

The animals are fed approximately 73 lbs. of a commercially prepared food mix and 5 to 6 bales of alfalfa hay daily with mineral salt blocks available and supplemental random food enrichment items. The bison receive regular veterinary care.

The bison are housed in a 9.22 acre pen surrounded by a 9 gauge chain link fence of varying height (6 to 7 ft.) supported by wooden posts. The pasture is over-browsed but dragged monthly to break up and distribute fecal material.

There is some debate over the subspecies of bison native to Lehigh County and the eastern woodlands. Some argue that the subspecies native to Pennsylvania was the Eastern Wood Bison (*Bison bison pennsylvanicus*) that was darker, smaller and without the large hump of the western plains subspecies (*Bison bison bison*) but closely related to the Wood Bison of the boreal forest (*Bison bison athabasca*). It is believed the last Eastern Bison in Pennsylvania was killed in 1801 and that the *pennsylvanicus* subspecies went extinct around 1825 due to over-hunting and habitat destruction. Others argue that the Eastern Wood Bison and the Plains Bison were one in the same and the Northern Wood Bison was the only distinct subspecies.

Whatever the reality, there is no serious proposal for a recovery plan to reintroduce Eastern Bison herds into the wild. Bison are a species that on average travels 3 miles per day circulating in a home range of 30-100 square kilometers. Adult males can weigh from 1200 to 1800 lbs. and run 30 mph. Whether the genetics of the Eastern Wood Bison exists, or are extinct can be debated, but what is clear is that the native grasslands of the East necessary to support bison herds in the wild are gone as is the space required to support wild herds of bison in the East.

Captive herds of bison, whatever their genetic composition, are no longer seen as a conservation tool of any ecological significance. Indeed, the American Zoo and Aquarium Association classifies bison as livestock for which standards of management are set by the United States Department of Agriculture. As livestock bison are raised for meat which is sold primarily to restaurants and custom meat stores. Over 7.5 million pounds of bison meat is raised

and sold annually in the United States. The USDA's Meat and Poultry Inspection Directory lists about 100 bison-processing facilities nationwide. The USDA occasionally purchases bison meat for federal food assistance programs. Because bison meat has a low fat content and a cholesterol content that is lower than that of beef, organizations such as the American Heart Association and Weight Watchers recommend bison meat as a healthy alternative to beef. Prior to the general's death, the Trexler-Lehigh Game Preserve herd was managed by the routine harvesting of bison from the herd for meat that was supplied to clubs, restaurants, and food distributors in the Lehigh Valley and New York City. Several restaurants in the Lehigh Valley today serve bison, some of which is raised on local farms.

Elk (*Cervus elaphus*)

The Trexler-Lehigh Game Preserve currently has 15 elk, one male and 14 females. Herd reproduction was ended by vasectomizing the single male in 2003 with 100% efficacy to date. This treatment allows the females to enter estrus and ovulate and the male to exhibit breeding behavior but prevents conception.

The elk are fed approximately 107 lbs. of a commercially prepared food mix and 1 to 2 bales of alfalfa hay daily with mineral salt blocks available and supplemental random food enrichment items. The elk receive regular veterinary care. The antlers are removed from the male every fall prior to the breeding season to prevent injury to the female elk.

The elk are housed in an 11.05 acre pen surrounded by a 9 gauge chain link fence of varying height (6 to 7 ft.) supported by wooden posts. The pasture is over-browsed but dragged monthly to break up and distribute fecal material.

The elk at the Trexler-Lehigh Game Preserve are not native to Lehigh County or Pennsylvania. The Eastern Elk (*Cervus elaphus canadensis*) is one of six North American subspecies, of which only four exist today. The Eastern Elk inhabited the forests of Eastern Canada and eastern United States. The Eastern elk was extirpated from Southeastern Pennsylvania and rare in the rest of the state by the beginning of the 19th century due to over hunting. By the 1850's what remained of the once abundant animal was limited to the remote North Central area of the state and by 1870 they were gone from Pennsylvania and extinct overall before the beginning of the 20th century. The elk brought by the general to the Game Preserve are a western elk subspecies he hunted and unlike the Eastern Elk are more adapted to grazing than browsing.

In 1913, the PGC "reintroduced" elk to the state by shipping Eastern Elk from Yellowstone by train to Pennsylvania. And while the elk population survived, it never thrived as a result of its inability to adapt well to a primarily forested habitat. In the mid 1970's the commission began an active habitat management plan for elk, creating food plots of high quality agricultural grasses and legumes that provide elk with the nutrition more typical of their native western grassland habitats. Elk reproduction and survival increased dramatically as did their numbers growing from a herd which numbered under 50 for decades to well over 600 animals

today. The geographic distribution of elk in Pennsylvania today is limited primarily by the extent to which food plots are established and maintained and by their conflicts with agriculture.

Captive elk herds today are seen as agricultural operations and are common in the East where elk are raised for antler velvet, antlers, meat and hunting preserves. Mature bull elk may produce 30-40 lb. of velvet per year. Elk meat meets the American Heart Association's guidelines for fat, cholesterol and calories and is sold to gourmet restaurants.

White-tailed Deer (*Odocoileus virginianus*)

The captive white-tailed deer that the general established in the Trexler-Lehigh Game Preserve in 1911 was essentially lost in the 1980's, when the perimeter fence of the game preserve was no longer maintained to a level that prevented deer movements in and out of the preserve. This lack of maintenance allowed the movement of the captive herd out and populations of wild deer in so that today the captive herd has been assimilated into the native populations that roam free on and off the game preserve property. All white-tailed deer on the property today belong to the citizens of the commonwealth and are now regulated by the PGC. White-tailed deer in Pennsylvania are considered overabundant from both an ecological and cultural carrying capacity perspective. Pennsylvania has received extensive national press regarding the problem and become the center of a national debate regarding deer management. Pennsylvania annually kills more deer by accident on its highways (>80,000-100,000) than many states kill intentionally during their hunting seasons.

Palomino horse (*Equus caballus*)

The Trexler-Lehigh Game Preserve currently has 6 horses ranging in age from 9 to 20 years old. There are no males and 6 females. Since 1996 the herd has been prevented from reproducing by having only female animals.

The animals are fed approximately 24 lbs. of a commercially prepared food mix and 3 bales of timothy hay daily with mineral salt blocks available and supplemental random food enrichment items. The horses receive regular veterinary care.

The horses are housed in a 4.9 acre pen over the spring and summer and have traditionally been moved to a similar size pasture on-site for winter. The current horse pen is formed by 9 gauge chain link fence of varying height (6 to 7 ft.) supported by wooden posts. The pasture is over-browsed but dragged monthly to breakup and distribute fecal material.

It was between 8,000 and 12,000 years ago, at the end of the last major ice age, that all the horse species that existed in the Americas died out as part of a mass extinction that included such animals as the woolly mammoth, sabertooth cat and giant short-faced bear. Domesticated selectively bred descendants of the original wild horse species were brought back to the continent by Europeans upon their discovery of the "new world" and are today considered domestic livestock. The horses at the game preserve were introduced 12 years after the death of General Trexler.

Conclusions

None of the animal herds currently maintained at the Trexler-Lehigh Game Preserve are considered native wildlife but are instead viewed as livestock animals. The current captive herds have no conservation or ecological significance. Indeed, their only relevance to the property's ecological health is the negative impacts that result from their overgrazing, nutrient loading and the displacement of native habitats and the species that would normally occupy them. This is not to suggest that these animals do not have either aesthetic, recreational or romantic value. Maintaining animals for recreation, education or aesthetic purposes can be a value independent of conservation or ecological goals.

Current Ecological Condition of the Trexler-Lehigh Game Preserve The Goal: To Help Conserve Some of Our Wildlife In Its Proper Setting and White-tailed Deer Management

The desire to view and appreciate the beauty and magnificence of animals is as old and as human as the ancient cave drawing that express those artists respect, awe and honor for their subjects. It may have been this strong regard for wildlife that motivated General Trexler's attempts to save the bison, elk and white-tailed deer from what seemed like certain extinction at the beginning of the twentieth century. General Trexler, with his goal of conserving these species in a captive setting, at a time when their extinction in the wild seemed a certainty, could not have envisioned the remarkable wildlife restoration effort he and men like him would inspire. The recovery of America's wildlife during the first half of the 20th century was nothing less than remarkable as species thought to be doomed were plucked from the brink of extinction by dedicated conservationists. It was during this period that the fields of wildlife and forest management first emerged in North America and organizations like the U.S. Forest Service, National Wildlife Refuges, Cooperative Wildlife Research Units, National Park Service, Cooperative Wildlife Extension and the various state wildlife agencies all came into being.

Today bison, white-tailed deer and elk once again thrive in the wild. The recovery of the white-tailed deer has been so remarkable that they are considered overabundant throughout much of the country, including Pennsylvania. The vision of conserving these species in their proper setting has been achieved far beyond the general's expectations by restoring them in the wild, making captive herds unnecessary and irrelevant from a wildlife conservation perspective. In addition, our knowledge of animal behavior, ecology and ecosystem management has grown to the point of allowing us to recognize that the goal of maintaining these animals in their "proper

setting” within the preserve is simply not possible, if “proper setting” means something representative of their original native habitat.

Elk and bison are herd animals with large home ranges, big appetites and behavioral adaptations that allow them to disperse their impacts seasonally to facilitate range recovery and maintenance. Such adaptations cannot be expressed within enclosures measured in a few acres per animal, even with rotational grazing. Professionals displaying large herbivores for recreational viewing are always challenged to balance the herd’s impacts with the goal of maintaining surroundings that are visually similar to their representative habitat. A visit to many zoos that displays cervids or bovine species speaks to this challenge.

Elk and bison can be displayed at the preserve on well managed agricultural pastures by establishing such pastures through planting, and soil amendment and rotational grazing as with any domestic livestock. However, due to the current condition of the preserve’s vegetative communities and the small scale of the facility, it is not possible to recreate something representative of their original native habitat.

In the Wildlands Conservancy’s *Ecological Inventory and Assessment of the Trexler-Lehigh Game Preserve* it is acknowledged that the facility’s landscape is dominated by exotic invasive plants. Indeed, all of the plant communities at the game preserve have been highly disturbed and negatively impacted by a history of over-grazing and over-browsing by captive herds of elk, bison and deer, resulting in extensive stands of exotic invasive plants in every community type. In 1935 when the Trexler-Lehigh Game Preserve was gifted to the county, deer, bison and elk numbers exceeded 250 animals per square mile on the property. During the 1970’s deer populations alone, based on county staff counts, reached over 200 animals per square mile. Today we know that deer densities compatible with managing native plant communities in forested habitats should be under 20 deer per square mile.

Those areas of the preserve that were cleared and plowed for agriculture in the past were most vulnerable to over-browsing and are the most seriously impacted. However, even those stands that were never plowed and have remained forest, have been extensively grazed and lack native wildflowers, shrubs and advanced regeneration while having understories that are dominated by invasive, exotic plants. Whatever the stand history, type or location, the Trexler-Lehigh Game Preserve is challenged throughout by having its vegetation extensively dominated by invasive exotics with well established seed banks. Autumn olive, stilt grass and garlic mustard are dominate throughout the property.

The current unnatural domination of the game preserve’s vegetation by invasive exotics is, in large part, the result of overgrazing by captive animals during the last century. A challenge that was neither recognized nor apparent in the early 1900’s, but which is recognized today. Indeed, the well-intended introduction of plants like autumn olive, multiflora rose, tartarian honeysuckle, Japanese barberry, privet and many other, now acknowledged, as invasive exotics, was done intentionally by wildlife agencies and landowners in an effort to “improve” wildlife habitat. These “conservation plantings” preceded our current ecological knowledge regarding the impacts these invasive species have on native plant and wildlife communities. So too, the subtle negative ecological consequences of maintaining high numbers of animal units on limited

pastures within enclosures was unforeseen and predated both the field of range management and an understanding of the role of herbivory within ecosystems.

Deer, based on their recorded numbers at the preserve, played a major role in creating the current challenges through over-browsing. Deer are perceived as overabundant when they limit the abundance or occurrence of some other valued resource or interfere with some valued ecological process or human activity. And while ecologists know that deer perform important ecological functions within the forest, the evidence is overwhelming that deer populations when unrestricted by some form of mortality have dramatic negative impacts on forested ecosystems and agricultural operations with cascading effects on wildlife, ecosystem services, biodiversity and forest sustainability. In Pennsylvania where deer have become “overabundant” they have 1) reduced or eliminated forest regeneration, 2) slowed or stopped succession, 3) eliminated or

reduced other wildlife species through direct or indirect competition, 4) shifted species dominance and equability, and 5) driven some plant species locally extinct, while facilitating the establishment and spread of invasive exotic plant species.

The primary method by which deer facilitate invasive plants is through the enemy-release principle which is based on the observation that a plant introduced to a new area outside its normal range leaves all or most of its herbivores and pathogens behind, thus releasing the species from some of the mechanisms that normally regulate their populations. Because many exotic plants are less palatable to deer than native plants or not palatable at all, they have a competitive advantage over native species where deer browsing pressure is high. By favoring native species and avoiding the exotics, deer provide a competitive advantage to the exotic plants in environments where they grow together with natives. Autumn olive, stilt grass, garlic mustard, *Ailanthus*, Japanese barberry, and oriental bittersweet are examples of non-native plants at the preserve that are avoided or not preferred by deer.

The upshot is that excessive browsing by deer, elk and bison at the preserve has facilitated the spread and current domination of the preserve’s plant communities by exotic, invasive species that has actually changed the trajectory of the native vegetation development. If the Wildlands Conservancy’s recommendation to develop strategies and priorities to monitor, eradicate and/or control these species is to be realized, deer browsing impacts will need to be controlled.

The challenge of reducing deer browsing impacts to levels that will allow the restoration of the game preserve’s native vegetation is exacerbated by the degree of dominance of the site by less palatable or not palatable at all, invasive exotic plants. Well established invasive plants can suppress native plant establishment, reproduction and expansion by competing for sunlight, growing space, water and nutrients. At the same time, as native plants attempt to become re-established, they are more vulnerable to being eaten by deer because they grow in a landscape dominated by less palatable plants. As a result, only a few deer can retard their recovery. In addition, defoliation caused by browsing can eliminate or reduce seed production of native plants which after many decades may have diminished native seed banks. The longer an ecosystem has been over-browsed the more difficult it is to restore the original vegetation and the lower deer numbers must be to facilitate the recovery.

The threshold level of deer impact required for these systems at the preserve to recover will be dependent on the strategy, methods, time frame and scale of the restoration effort itself. The various ecosystems impacted as a result of overabundant deer and the establishment of exotic invasive plants will not fully recover without intervention and restoration. Best estimates suggest that deer densities at the preserve should be well under 20 deer per square mile to facilitate the recovery of native plant communities.

Currently, no estimate of deer densities for the Trexler-Lehigh Game Preserve, Lehigh County, Wildlife Management Unit 4C or adjacent Game Lands 205 are available. The PGC, as of this year, either no longer estimates deer densities or does not make those estimates public. However, a visual inspection of the preserve reveals that the current level of deer impact is far in excess of that which will allow these habitats to recover. Deer browsing rates on both preferred and non-preferred species is high and well above levels that will allow recovery. Several approaches to balancing deer impacts with efforts to restore the health of the preserve's ecosystems and wildlife populations are possible. However, their evaluation should be in the context of the final Trexler-Lehigh Game Preserve Master Plan and vegetation restoration efforts. Only within that context can potential deer management options be evaluated for compatibility, effectiveness and efficiency with the other property uses and land management treatments.

Conclusions

The vision of conserving these species in their proper setting has been achieved far beyond the general's expectations by restoring them to the wild where they can be viewed in their native habitats. Continued maintenance of these herds at the Trexler-Lehigh Game Preserve is not unlike maintaining livestock in an agricultural setting similar to scores of bison and cervid operations throughout the state. It does not represent the native plant communities in which these animals evolved.

Currently, the captive herds at the preserve are housed in overgrazed pastures that do not meet the Lehigh Valley Zoo's standards for presenting these animals to the public in an appropriate aesthetic or natural setting. Pasture quality could be improved by reducing the number of animal units per acre within existing pastures or by expanding fenced pasture areas, but deficiencies in location, fence type and quality and other infrastructure issues would remain. The display of large herbivores in fenced facilities for recreational or educational purposes is the focus of the zoo and their professional managers, not public parks that encourage open public access without supervision.

Furthermore, the game preserve is currently challenged by the dominance in its plant communities by exotic invasive plants as a result of decades of overgrazing and will require extensive restoration if it is to be returned to a healthy condition representative of the region's native plant and wildlife communities. Part of that restoration effort will require deer impact reductions which are unlikely to be achieved through traditional recreational hunting alone.

Options for the Maintenance or Discontinuance of the Bison, Elk and Palomino Horse Herds at the Trexler-Lehigh Game Preserve

Option 1 In cooperation with the Lehigh Valley Zoo, maintain animal herds for public display but relocate to redesigned, and expanded facilities that meet AZA requirements for accreditation. **Not Recommended**

If the County of Lehigh decides to retain the current herds of bison, elk and horses for public viewing and wishes to upgrade its facilities for doing so it is recommended that the new facilities be designed to meet AZA standards. Furthermore, it is recommended that the ownership and responsibility of these animals be transferred fully to the Lehigh County Zoo, if they are agreeable, and moved to additional leased lands closer to the zoo and on the same side of the Jordan Creek.

Dr. Steve Marks, Director of the Lehigh Valley Zoo feels the zoo would be receptive to a facility design based on allowing the public visitor to drive through an area where bison, elk and horses ranged free within an 8' perimeter fence while the public is separated from the animals by remaining within their cars. This would require cattle guards and staff at both entrance and exit gates. The general enclosures, would be subdivided to facilitate rotational grazing and the separation of species during periods of aggressive behavior, such as the breeding season. A corral and chute system with sides 7' to 8' high equipped with catwalks, feed bunks, water, lighting, spring-loaded, locking slam gates are recommended. The squeeze chute should have a crash gate and palpitation cage.

The area of the Central Range southwest of the zoo framed by the Jordan Creek and containing the current palomino horse pen is the most logical location. This site could use the existing game preserve entrance road to below the current horse pens where the road intersects with the road leading into the zoo parking lot. With the exception of some steep slopes, which could mostly be avoided, this area does not contain any environmentally sensitive areas while providing a mosaic of upland meadows, forest and shrublands attractive to all three species. This cover with the varying topography will provide these animals with the pasture, rugged areas, thickets and woods they prefer and allow them to seek protection from the elements. The soils on site are acceptable for pasture but not highly productive due to shallow depth to bedrock, noncalcareous shale, siltstone and sandstone parent material, low available moisture capacity and low fertility. Areas with slopes over 25% should be avoided.

While the specific facility design and fence locations should be done in collaboration with zoo professionals, several suggestions are offered. Due to the modest soil quality a minimum of 2 acres per animal should be provided requiring approximately 70 acres which is

available in this area. The corral and chute system could be located in the area adjacent to the zoo parking lot

minimizing the distance power and water would need to be run. Water could be provided inside and out at the corral and chute location and at the existing horse pen where it is available today. A second water trough outside the existing horse pen should be added. Subdivisions of the enclosure should focus on the needs for rotational grazing, separation of species as may be necessary, maintaining pastures that provide reasonably predictable viewing opportunities by the public from vehicles on the road and which minimize infrastructure costs. The existing horse pen could serve as one subdivision.

The enclosure should be built of 8' high-tensile, woven wire material designed for wildlife. Given the public access that is anticipated to the preserve area outside the enclosure, electric fence seems inappropriate. Interior fences should be 6.5' high tensile-electric with eight wires three of which carry high voltage. The work that will need to be completed will include the 1) clearing of areas of brush for pasture improvement, 2) refurbishing pastures by controlling invasive plant species, 3) amending soils, 4) preparing seedbeds, 5) planting, clearing and grading the fence line, 6) clearing and maintaining visual corridors along the existing road, 7) road

improvements, 8) building the exterior and interior fences, 9) installing cattle guards and electronic gates at road entrance and exit, 10) building a chute/crusher system, 11) installing watering devices, 12) extending water and electric lines, 13) building animal shelters, 14) transporting animals, 15) signage and 16) the removal and disposal of the existing bison and elk facilities. In addition, whatever facilities are desired to handle admissions, security and supervision of visitors while in the enclosure with the animals will need to be considered. The cost of these improvements, not including project design, administration and approximately 85 acres of land would be at a minimum \$150,000. If the county retains the responsibility for the cost of maintaining and operating the facility, annual costs when including operating expenses, insurance and continued herd care, could easily exceed \$250,000/year. It is recommended that the county only explore this option if the Lehigh Valley Zoo takes full responsibility for facility maintenance and animal care following improvements.

Option 2 Maintain current animals with contraception at existing facilities allowing herds to decline through attrition.- **Not Recommended**

The current herds at the Trexler-Lehigh County Game Preserve are young. Efforts to end reproduction have only recently been implemented. Over half of the bison, for example, are five years of age or younger. Bison can live for 30 years or longer. Therefore any plan to retire the herds through attrition will require decades and be quite expensive. The cost over the next ten years alone will be over \$1,000,000.

There are two basic standards for animal care facilities. The first is based on animal care guidelines set by the PGC and USDA, Animal and Plant Health Inspection Service for public menageries. The PGC for example, requires that an elk or bison be provided with 1000 sq. feet

plus 25% more area for each additional animal. The current facilities far exceed this area requirement. Fresh drinking water, wind shelter and/or woods or brushy habitat are required which are also provided. The current facilities meet the Animal Welfare Act guidelines for animal care and those of PGC. The USDA, Animal and Plant Health Inspection Service guidelines have been met but may or may not continue with increased, unsupervised, public access.

The second standard is that of the American Zoo and Aquarium Association (AZA) for animals to be displayed to the public in accredited AZA facilities. Dr. Marks observes that current AZA recommendations for exhibiting these animals include a sufficient exhibit fence (charged high tensile) enclosed with an 8 ft. chain link or woven wire perimeter fence and concludes that, “the current fence is aesthetically displeasing to the guests and should be demolished and removed completely.” His concerns are based on aesthetic issues connected with the public’s experience when viewing the animals and public and animal safety. Dr. Marks would like to see all three herds moved to new, expanded facilities, near the Lehigh Valley Zoo.

If the county, desires to retain the existing animals but not to invest in meeting AZA standards for public display, they may do so with the current facilities. The current facilities at the Trexler-Lehigh County Game Preserve are adequate based on current standards for animal care and have been used for public display for over a decade. The appearance, quality and maintenance of these existing pastures could be improved by soil testing, amendments, re-seeding and/or reducing animal units. If each herd were to be cut by half, pasture quality and appearance would increase dramatically with no other treatment. The cost for pasture upgrading would be under \$5,000.

Currently there is no quantitative evidence of significant water quality degradation to the Jordan Creek as a result of the existing pastures and no Department of Environmental Protection regulations that would preclude their continued use if the pastures are well maintained. Adult herds of cervids that are neither reproducing, lactating or growing young animals produce dramatically less excrement than production agricultural animals. However, allowing livestock access to streams is generally discouraged according to best management practices due to the potential nutrient and sediment problems that can result.

It should be recognized and considered that while both elk and bison, when satisfied regarding the availability of food and water, are relatively easy to contain, they are extremely powerful animals and can jump and break through barriers. Issues connected to liability should be investigated and clarified by the county through an attorney. Currently, the County of Lehigh appears to own these animals and the land on which they are kept while the Lehigh Valley Zoo, a 501(c)(3), has the permits for the animals displayed from the PGC and USDA under which the zoo appears to be responsible for the animals care and maintenance including their facilities. Who

bears what responsibility should an animal injure a park visitor who enters an unsupervised pasture or through an animal escaping into the park or highway is unclear. The relevance of these issues will increase as the game preserve allows greater public access without supervision.

The cost of maintaining the current animals in the existing facilities would continue at the same level as it is today, adjusted for inflation. Current annual cost runs approximately \$70,000 for personnel, \$26,000 for feed and \$8,600 for veterinary care. No estimate of facility maintenance cost was available. Thus, the total cost of maintaining these herds with no improvement to the facilities, would be in the range of \$105,000/year eventually declining as the herds shrink through attrition. In addition the current facilities take approximately 30 acres of park land that could be used for recreation.

Option 3 Discontinuance of the Elk and Horse Herds but maintain current bison herd at existing facilities using contraception to allowing herd to decline through attrition.- **Not Recommended**

The ability to view bison at the Trexler-Lehigh Game Preserve is a long held tradition of the Lehigh Valley and one many citizens may be reluctant to see come to an abrupt end. One option would be the discontinuance of the Elk and Palomino Horse Herds while retaining the bison and allowing the herd to decline through attrition using contraception to prevent any increase.

This option may be more palatable to those in the community who wish to maintain the herd at least in the short term. It does not however, address concerns regarding the obstacle it presents to the zoo in obtaining AZA accreditation, the current lack of adequate facilities in which to display the animals and the liability to the county of increased public access without upgrading the systems that protect both the bison and public. One possible option that could be explored would be if the zoo could incorporate the bison on their current property.

Option 4 Discontinuance of the Bison, Elk and Palomino Horse Herds - **Recommended**

General Trexler's goal of protecting bison, elk and white-tailed deer from near-certain extinction at the turn of the 20th century has been achieved through their successful restoration to the wild. Their continued maintenance as agricultural animals at the Trexler-Lehigh Game Preserve along with horses obtained over a decade following the General's death has no conservation or ecological significance. Indeed, the only relevance these herds have to the property's ecological health is the negative impacts that result from their over-grazing, nutrient loading and the displacement of native habitats and the species that would normally occupy them.

The display of large herbivores for recreational or educational purposes is a valid goal but remains the focus of zoos and their professional staffs not public parks or game preserves that, due to their success, have outlived the need for captive herds. In addition, the current facilities at the Trexler-Lehigh County Game Preserve are not well suited to the public display of the existing animals and will not be so without a substantial public investment in facilities and personnel.

Given the availability and proximity of the Lehigh Valley Zoo and other high quality zoo facilities as exist in Philadelphia, Hershey and New York, the continued maintenance of the bison, elk and horses by the county at the Trexler-Lehigh County Game Preserve may be difficult to justify. If the county wishes to see a representative sample of these animals retained for education and recreation purposes, the county may wish to facilitate such an effort through negotiations with the zoo. It is noted that the zoo currently includes the bison, elk and horse pens on its wagon ride tours as well as in its adopt an animal program. Otherwise, it is recommended the animals be sold or gifted.

It is difficult to transfer these animals to accredited AZA facilities since they are common and not in demand. However, Pennsylvania has over a 1,000 captive cervid herds in the state and many commercial bison operations. As livestock animals the sale of the current stock would not be difficult and should produce adequate revenue to dismantle and dispose of the existing facilities, while saving the county approximately \$105,000 per year. If the elk, for example, were CWD Qualified (Pennsylvania Department of Agriculture program to monitor Chronic Wasting Disease) they would sell for \$400 to \$900 per animal and may be used by buyers for breeding stock, velvet production, antlers or for meat. Limitations can be placed on their end use but may effect their value and marketability.

Maintaining the current herds in facilities that do not meet AZA accreditation standards while the animals are listed on PGC and United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service permits for public menageries by the Lehigh Valley Zoo does create an obstacle for the Zoo in acquiring AZA accreditation. The sale of the animals would remove this obstacle while reducing costs, opening up land for public recreation and allowing for the restoration of the preserve to native plant and wildlife populations.

OPTION	RECOMMENDATION	ACRES	ESTIMATED COST	
			Initial	Annual
<u>Option 1</u> In cooperation with the Lehigh Valley Zoo, maintain animal herds for public display but relocate to redesigned and expanded facilities that meet AZA requirements for accreditation.	Not Recommended	- 85	\$150,000	\$250,000
Advantage : -Animals are maintained by zoo professionals for public viewing				
Disadvantage: -Increased financial burden to new Lehigh Valley Zoo -Risk that 501(c)(3) defaults and County has responsibility for animals -Loss of 85 acres of park land				
<u>Option 2</u> Maintain current animals with contraception at existing facilities allowing herds to decline through attrition.	Not Recommended	- 30	N/A	\$105,000
Advantage : -Animals are not moved to new location				
Disadvantage: -Burden to Lehigh Valley Zoo -Facilities not well suited for displaying animals -Liability to County -Cost of ~ \$105,00/year to County -Loss of ~ 30 acres of parkland -Obstacle to AZA accreditation				
<u>Option 3</u> Discontinuance of the Elk and Horse Herds but maintain current bison herd with contraception at existing facilities allowing herds to decline through attrition..	Not Recommended	-9	N/A	\$35,000
Advantage : -Bison remain available for public viewing -Immediate cost reduction -No additional annual costs				

Disadvantage: -Loss of local public display of elk and horses
 -Facilities not well suited for displaying animals
 -Liability to County
 -Cost of ~ \$105,00/year to County
 -Loss of ~ 9 acres of parkland
 -Obstacle to AZA accreditation

Option 4 Discontinuance of the Bison, Elk and
 Palomino Horse Herds.

Recommended

0

(\$105,000)

(\$105,000)

Advantage : -County no longer stretching expertise
 -Lehigh County Zoo not overextended
 -Immediate cost reduction
 -No additional annual costs

Disadvantage: -Loss of local public display of animals

Appendix B

PROJECT MANAGEMENT GROUP

- Jan Creedon, Director of General Services, Lehigh County
- Tom Gettings, Director of Special Projects, Wildlands Conservancy
- Phillip Hunsberger, Executive Vice President, Urban Research and Development Corporation
- Michael Kaiser, Executive Director, Lehigh Valley Planning Commission
- Bob Kriebel, Project Manager, Urban Research and Development Corporation
- Debra Lermite, Director of Land Conservation and Planning, Wildlands Conservancy
- Levi Price, Chief of Staff, Lehigh County
- Dale Prinkey, Director, Jacobsburg Environmental Education Center
- Janet Roth, Senior Program Officer, Trexler Trust

former members:

- Robert Korp, (former) Director of Planning, Lehigh County
- Larry Hilliard, (former) Director of Administration, Lehigh County

Appendix C

INTERVIEWEES

- Dexter F. Baker, Trustee, Harry C. Trexler Trust
- Thomas Christman, Executive Director, Trexler Trust
- Don Cunningham, Lehigh County Executive
- Percy Dougherty, Lehigh County Commissioner
- Tom Elias, Finance Manager, Lehigh Valley Zoo
- Jane Ervin, (former) Lehigh County Executive
- Kurt Fenstermacher, (former) Manager/Game Preserve Maintenance, Lehigh County
- Daniel G. Gambet, O.S.F.S., Trustee, Harry C. Trexler Trust
- Malcolm J. Gross, Trustee, Harry C. Trexler Trust
- Kathy Grube, member, Lehigh Valley Horse Council
- Jean Hubler, member, Citizens Task Force on the Trexler Game Preserve
- Shawn Hubler, member, Citizens Task Force on the Trexler Game Preserve
- Jerry Hunsicker, Supervisor, Lowhill Township
- Peter Karch, biology professor, Lehigh Carbon Community College
- James Kelly, Lehigh County Commissioner
- Michael Kilgore, (former) Manager of General Services, Lehigh County
- John Laub, member, Lehigh Valley Horse Council
- Carol Loomis, member, Friends of the Game Preserve
- Dr. Steven Marks, President/CEO, Lehigh Valley Zoo
- Leah Yaw McKernan, Vice President of Strategic Advancement, Kidspace
- David Mitchell, Supervisor/Southeast Region, Pennsylvania Game Commission
- Carl Peck, Manager of Physical Plant, Lehigh Carbon Community College
- Levi Price, Chief of Staff, Lehigh County
- Sterling Raber, Lehigh County Commissioner
- Andy Roman, Lehigh County Commissioner
- Arthur Schmidt, developer
- Donald Snyder, President, Lehigh Carbon Community College
- Ronald Stahley, Director of Public Works, North Whitehall Township
- Kathryn Stephanoff, Trustee, Harry C. Trexler Trust
- Bob Stiffler, Director of Recreation, Lehigh County
- Henry Stoudt, Game Preserve Maintenance, Lehigh County
- Joe Transue, Eastern PA representative, International Mountain Bicycling Association
- Don Wehr, Lehigh Valley Horse Council (son of former TLCPG groundskeepers)
- Robert C. Wood, Trustee, Harry C. Trexler Trust

Appendix D

Recommendations from the report, *Trexler-Lehigh County Game Preserve, Ecological Inventory and Assessment*

The following recommendations are taken from the report, *Trexler-Lehigh County Game Preserve, Ecological Inventory and Assessment*, Wildlands Conservancy, draft, 3-30-05, and are incorporated into the *Trexler-Lehigh County Game Preserve Master Plan* by reference. The recommendations are categorized by subject in the report, with a page reference in the Wildlands document.

Physical Setting (p. 8)

- Consider the expansion of the Game Preserve by including adjacent Lehigh County-owned properties, as well as other properties as they become available.
- Conduct a feasibility study of a Jordan Creek greenway and trail system that would connect the Game Preserve south to the City of Allentown and north to the Appalachian Trail on the Blue Mountain.
- Protect the aesthetic viewsheds.

Management Issues (pp. 14–24)

- Remove the cabin (high point north of zoo). In Phase II planning, integrate vantage point into recreational activities and supporting amenities.
- Clean up farm equipment, small tanks, fuel tanks, fencing, and surrounding debris (North Range). In Phase II planning for recreational activities, determine best possible reuse of the structures.
- The old foundations and springhead on the North Range (remnants of the Hunsicker Valley Homestead) have historical value. Remove the overgrown vegetation, stabilize the stonework, and screen the spring opening to prevent entry so viewers can safely visit the site. Explore destination/educational value in Phase II planning.
- The block springhouse and stone walls (remnants of the Hunsicker Valley Homestead) have historical value. Removal of overgrown vegetation, stabilization of the stonework, and securing the door opening to prevent entry should take place for the safety of visitors to the site. Explore destination/educational value in Phase II planning.
- Remove the collapsed pavilion and other small structure on the South Range, restoring the site to a natural state.

- Remove all remnants of the old farm structure on the South Range, and restore the site to a natural state.
- Remove the old farm shed on the Central Range, and restore the site to a natural state.
- Remove the metal (vehicular) bridge crossing a tributary in the South Range, and restore the site to a natural state.
- Regrade trails and install water bars to prevent future erosion.
- Clean up the area (approximately ¼-acre) used for dumping concrete, stone, and ball-and-burlap plant material. Designate an area close to the maintenance building to store material that can be re-used.
- Clean up the area southeast of the ford used for dumping cinder block, stone, logs, metal, and wood. Designate an area close to the maintenance building to store material that can be re-used.
- Remove the concrete, metal, and bricks from the swale above the palomino horse enclosure, regrade the swale to allow for appropriate stormwater dispersal, and establish an herbaceous cover.
- Clean up and dispose of glass bottles, plastic, tires, and wood scattered throughout the preserve.
- Post and monitor Game Preserve boundaries. Although piles of branches often have wildlife benefits, permission should be granted by the Game Preserve staff before such activities take place on the Game Preserve. This will help prevent use as a dumping site for unwanted materials (invasive plants, trash).
- Post and monitor Game Preserve boundaries. Convert and maintain open areas as meadow. Maintain a mowed buffer between the Game Preserve and adjoining residential lots where possible.
- Remove the permanent tree stand with steps in the southwest section of the Game Preserve.
- As part of the Phase II planning process, determine the condition of fencing, need for fencing, and locations where it may be useful.

Natural Communities (p. 47)

- Protect, restore, and maintain natural, healthy, and functioning forest plant communities.
- Assign responsibility to specific staff for plant communities, plant species, as well as special-habitat stewardship, function, and protection.

- Develop strategies to protect each plant community and special habitat area.
- Create a five-year schedule for implementing protection strategies for each plant community and special habitat.
- Utilize Game Preserve staff as well as partners and/or outside experts (e.g., Pennsylvania Bureau of Forestry and Pennsylvania Game Commission) to implement this protection and monitoring program.
- Coordinate monitoring efforts with other entities so Game Preserve data are comparable and consistent among agencies and conservation organizations to enable better indications of forest function and health across the entire Commonwealth.
- Observe and assess the impact of humans on plant communities and special habitat areas over time. Quickly respond appropriately (e.g., moving trails, limiting access, reducing activities) with measurements (sic) that are necessary for long-term protection.
- Monitor the hemlocks in the hemlock-white pine forest and hemlock-white pine-red oak-mixed hardwood forest for wooly adelgid.
- Monitor and protect the rare plant located on the calcareous cliffs. Investigate for additional rare, threatened, and/or endangered species on the cliffs.
- Protect any trees planted in canopy gaps with wire cages or choose to plant larger trees whose crown are above the browsing height of deer, and protect the stems from antler ribbing with the use of tree-wrapping tape.

Invasive Plant Species (p. 53)

- Work with Lehigh County's Penn State Cooperative Extension office as it fulfills the last two years of its three-year contract with Wildlands Conservancy to test methods of controlling autumn olive.
- Develop strategies and priorities to monitor and eradicate and/or control exotic, invasive plant species found on the property.
- Develop a five-year strategy to monitor and eradicate/control each exotic, invasive plant species in the Game Preserve, focusing particularly on autumn olive.
- Assign responsibility to specific staff for invasive-plant species management.
- Utilize Game Preserve staff as well as partners and/or outside experts (e.g., Pennsylvania Bureau of Forestry and Pennsylvania Game Commission) to implement this monitoring and eradication/control program.

- Retard the spread of existing masses of autumn olive by monitoring the perimeter and removing (chemically or mechanically) newly sprouted shrubs. Mow meadows under siege twice annually.
- Consult with a local farm supply or gardening store (e.g., Agway) for more information on appropriate herbicides and application measures for specific species.
- Where appropriate, minimize human disturbance to curtail the spread of invasive plant species.
- Take caution to use uncontaminated construction materials. Materials such as soil and mulch can contain seeds, roots, and plants of invasive species. All areas that receive imported material must be monitored to quickly identify and address the new establishment of any invasive species.
- Utilize Integrated Pest Management (IPM) practices where appropriate.
- Develop a hazard-tree policy and program in an effort to protect visitors and staff from falling trees and limbs, particularly in high-risk areas. Include training of the staff in the identification and safe removal of hazard trees.

Deer (p. 60)

- Conduct an official deer count (i.e., “deer pellet” and/or “infrared” method) coupled with systematic observations to help determine the size, age, gender, and health of the deer herd.
- Work with the Pennsylvania Game Commission to determine the best deer-herd management techniques based on the difference between actual and target deer-herd size and composition.
- Reduce deer herd to a density of 5 to 10 per forested square mile and then maintain it at an ecologically sustainable level to allow the recovery of the plant communities, especially forest regeneration.
- Monitor the effects of deer population on the forest plant communities.

Bison, Elk, Palomino Horses (p. 63)¹

- Manage pasture space at least 1–2 acre (sic) of good quality pasture per large animal.
- Move current animal enclosures onto pastures between the Game Preserve entrance and the zoo parking lot to:

¹ The wildlife herds are the only areas where the *Trexler-Lehigh County Game Preserve Master Plan* differs in recommendation from the ecological inventory/assessment. The master plan, through the NRC report that appears in Appendix A, assesses the biological/ecological significance of the herds, and concludes that the herds should be removed. If the herds are maintained, the recommendations of the Wildlands study should be followed.

- provide better pasture and easier access for management by the zoo staff,
 - expand viewing opportunities, and
 - protect water resources.
- Rotate pasture space on a predetermined, regular basis to provide better pasture management and to reduce feeding costs.
- Utilize partners and/or outside experts (e.g., Penn State Cooperative Extension) for pasture and animal management.
- Explore options (i.e., solar panels) for providing electricity to new animal enclosures for electric fencing and water de-icer.
- Explore using solar wells to provide water.

Amphibians, Reptiles, Birds, Mammals, Other Wildlife (pp. 79–80)

- Maintain plant communities as habitats and for food sources for birds (migrating and resident), amphibians, reptiles, mammals, fish, macro-invertebrates, insects, and other wildlife, especially rare, threatening (sic), endangered, and special concern species.
- Develop a five-year strategy to monitor and manage amphibians, reptiles, birds, mammals, and other wildlife.
- Assign responsibility to specific staff for management of amphibians, reptiles, birds, mammals, and other wildlife.
- Utilize Game Preserve staff as well as partners and/or outside experts (e.g. Pennsylvania Bureau of Forestry, Pennsylvania Game Commission, and Pennsylvania Fish and Boat Commission) to implement this monitoring and management program.
- Work with neighbors, municipalities, and conservation organizations to promote wildlife corridors along the Jordan Creek, south to the City of Allentown and north to the Blue Mountain (part of the larger Kittatinny Ridge).
- Work with neighbors, municipalities, the Pennsylvania Game Commission, and conservation organizations to promote wildlife corridors between the Game Preserve and State Game Lands (SGL) #205.
- Preserve and protect continuous, unfragmented forest cover on the North Range in conjunction with SGL #205.
- Conserve forest cover along streams to improve and expand habitat protection along the Jordan Creek, thus enhancing water quality and habitat for wildlife, including fish.

- Improve riparian habitat along the Jordan Creek, especially in the Central Range.
- Designate the Game Preserve as a national and Pennsylvania *Important Mammal Area*.
- Observe and document migratory birds annually as baseline information (using volunteers).
- Conduct turkey census and develop management strategies based on this census information.
- Designate the Game Preserve as a national and Pennsylvania *Important Bird Area (IBA)*.
- Limit pesticide and herbicide applications, except when deemed necessary, (i.e., autumn olive control) to provide resource protection.
- Utilize native shrubs that provide food for migrating birds and other wildlife around existing and new facilities, openings, and access routes.
- Utilize native grasses as a seed source for seed-eating birds and other wildlife in existing and new parking areas and other necessary open areas.

Deer Exclosures (p. 82)

- Monitor the three existing deer exclosures monthly during the growing season (April through October) and record all pertinent information on appropriate forms.
- Consider installing additional, larger deer exclosures in the remaining eight plant communities to use as research and educational tools, and to document the level of deer impact.

Jordan Creek (pp. 90–91)

- Minimize impacts to soils, native plant communities, and water resources, especially within areas identified as “Environmentally Sensitive Lands”.
- Incorporate Structural and Non-Structural Best Management Practices (BMPs) into proposed future site development and/or improvements to achieve comprehensive storm water management and minimize runoff and impacts to soils and native plant communities.
- Establish a series of designated stream-access locations to the Jordan Creek at various locations. Designated stream-access locations should be designed to accommodate water-based recreational activity needs in such a way that minimizes runoff and impacts to soils, native plant communities, and water resources, especially within areas identified as “Environmentally Sensitive Lands”.
- Investigate ways to reduce the negative environmental impacts and safety hazards associated with the automobile ford across the Jordan Creek to:

- Create a safer environment for the general public by limiting the potential for people and vehicles to be swept downstream as a result of crossing the ford during high-water conditions.
- Minimize water pollution resulting from leaking vehicle fluids (fuel and oil) to the Jordan Creek.
- Minimize aquatic-habitat impacts to the Jordan Creek, including sedimentation, thermal pollution, and fish-passage obstruction.
- Work with the Pennsylvania Fish and Boat Commission to determine if the existing water quality and physical habitat characteristics of the Jordan Creek are conducive to supporting trout stockings, and if so, what species and biomass that (sic) would be most appropriate to stock.
- Conserve forest cover along the Jordan Creek to maintain cooler water temperatures and enhance water quality.
- Develop a working relationship with the Pennsylvania Game Commission to coordinate management strategies of water quality of Mill Creek.

Educational Programs (p. 92)

- Develop and utilize an effective educational program that establishes the Game Preserve as an educational resource for the Lehigh Valley community.
- Include recreational activities in the educational programming, such as guided hikes, bird watching, fishing, wading in the Jordan Creek, night observation, and forest management.
- Collaborate with local universities, educational institutes, and local conservation groups to manage the property and to provide educational opportunities (i.e., Lehigh County Zoo, Lehigh Carbon Community College, the National Trails Training Partnership, Pennsylvania Recreation and Park Society, Lehigh County Conservation District, the local chapter of the Sierra Club, and others).
- Monitor recommended educational and recreational activities on an on-going basis to identify unexpected impacts or conditions.
- Develop educational/interpretive signage and other educational tools to educate the public about the various natural features of the Game Preserve.

Recreation (p. 103)

- Consider providing appropriate programming and facilities for the following recreational activities (in alphabetical order):

- biking/mountain biking
 - camping
 - cross-country skiing
 - fishing
 - hiking
 - horseback riding
 - nature watching, including viewing the bison, elk, and palomino horses
 - picnicking
 - wading in the Jordan Creek
 - walking
- Monitor recommended educational and recreational activities on an on-going basis to identify unexpected impacts or conditions.
- Consider reusing and improving the existing roadway/trail remnants for recreational activities.
- Work with federal, state, and local organizations to provide specific funding for recreational opportunities and appropriate facilities.
- Work with the International Mountain Biking Association (IMBA) guidelines and procedures to design single-track, trails, and multi-use trails that include biking and mountain biking.
- Work with local mountain biking associations to determine the best trail solutions for protecting the environment and providing biking opportunities.
- Work with partners, such as the Lehigh Valley Convention & Visitors Bureau, to develop recreation programming that will attract visitors to the Lehigh Valley.
- Work with the Pennsylvania Fish and Boat Commission to determine best fishing areas along the Jordan Creek, explore stocking the stream, and develop specific policies for the Game Preserve.
- Work with [the] Lehigh Valley Horse Council to determine best trail locations and solutions for protecting the environment and providing horseback riding opportunities.

Red oak–mixed hardwood forest and hemlock (white pine) forest (p. 107)

- Concentrate disturbance (buildings, roads, campgrounds) along edges and not within the forest interior.
- Allow for some breaks in the canopy to permit sunlight to reach the forest floor to support the growth of understory plant species.
- Plant appropriate native plants in wooded plant communities (understory trees, shrubs, perennials, and ferns) to provide wildlife food and shelter. (Provide deer fencing for newly planted vegetation.)

- Plant appropriate native trees to expand narrow wooded areas as circular wooded plots offer more forest interior habitat and less access to the interior for predators and nest parasites, therefore maximizing habitat for forest-interior-area-sensitive species.
- Consider minimizing isolation of forest patches by promoting reforestation of successional fields that will provide wildlife corridors between forest tracts.
- In forested areas, leave:
 - All snag, cavity, and den trees for wildlife.
 - On average, one large and three small cavities per acre (different species prefer different types and sizes).
 - Four to six trees in the form of culls or dying trees as potential cavity trees.
 - Dead and downed woody debris.

Floodplain meadow and swamp rose palustrine shrubland and wet meadow and sycamore (river birch)—box-elder floodplain forest and general riparian habitat (pp. 109–110)

- Manage the woody vegetation (e.g., red maple) so this species does not take over the meadow, as it will close the canopy and greatly alter the hydrology.
- Leave woody debris and brush piles in the wet meadow.
- Erect nest boxes for bats, wood ducks, and prothonotary warblers.
- Plant native trees and shrubs in degraded riparian buffer zones.
- Maintain existing and newly planted native trees and shrubs in these areas.
- Leave large trees overhanging the water, fallen trees, branches, snags, and leaves unless considered a safety hazard.
- Protect sandy soils with good sun exposure used by turtles as nesting areas.

Skunk cabbage seep (p. 110)

- Favor native, mast trees, shrubs, and vines (i.e., pin oak (*Quercus palustris*), swamp white oak (*Quercus bicolor*), hawthorn (*Crataegus spp.*), winterberry (*Ilex spp.*), viburnums (*Viburnum spp.*), serviceberries (*Amelanchier spp.*), and American bittersweet (*Celastrus scandens*)) for the food they provide well into the winter.
- Encourage herbaceous vegetation around all spring seep perimeters.
- Protect these valuable wetlands from any disturbance that could degrade the seep, especially timbering operations and agricultural pollution.

Vernal pool (p. 111)

- Protect the critical terrestrial habitat by limiting disturbances or development to happen in less than 25% of this critical habitat.
- Protect by limiting disturbance, especially in the vernal pool depression. Protect the vernal pool “envelope” by:
 - Leaving the forested habitat intact.
 - Avoiding barriers to amphibian movement.
 - [P]Reverting alteration of the hydrology and water quality.
 - [P]Reverting or limiting disturbance or development.
- Protect the critical terrestrial habitat by limiting disturbance or development to happen in less than 25% of this critical habitat.
- Avoid disturbance of wet areas (wetlands, springs, and vernal pools) even when they appear to be dry.

Calcareous opening/cliff (p. 112)

- Ensure that rocky outcrops can be used by salamanders by maintaining adequate shade to retain moisture in the outcrops.
- Daylight a few areas of the rocks by felling or girdling trees to enhance their use as thermal habitat by garter snakes, black rat snakes, eastern hognose snakes, eastern fence lizard, and other reptiles.

Young miscellaneous forest/woodland and successional field (p. 113)

- Create a soft transition from successional fields to forested habitat by cutting down trees along the border until the maximum forest tree height (in feet) is equal to the distance within the forest (in feet). For example, three feet into a forest, a properly created soft edge will have no vegetation or trees higher than three feet tall.
- Provide additional food sources by planting native shrubs and small trees, including American crabapple (*Malus coronaria*), blackberry/rasp[berry (*Rubus spp.*), serviceberry (*Amelanchier spp.*), blueberry (*Vaccinium spp.*), elderberry (*Sambucus canadensis*), hawthorn (*Crataegus spp.*), black huckleberry (*Gaylussacia baccata*), and witch hazel (*Hamamelis virginiana*). Protect these plants from deer browsing by caging or using tree tubes.
- Establish a population of American woodcock by first stocking and then managing the habitat areas found on the South Range (i.e., meadow, shrubland, early successional habitat forest, riparian zone) for the American woodcock (a species in decline).

- Manage for the American woodcock by planting a dense thicket of hawthorn, alder, birch, and/or aspen in this area, as woodcock are often associated with young thickets of these tree species.
- Inventory successional fields and document areas and stages of succession.
- Compare inventory of the successional fields with that of the forested plant communities to determine if, and which, successional fields should [be] allowed to revert to forest in order to provide interior habitat and less access to the interior for predators and nest parasites (e.g., brown-headed cowbirds).
- Promote reforestation of successional fields that will provide wildlife corridors between wooded tracts.

Upland meadow (p. 115)

- Convert some of the upland meadows to native warm season grass meadows, and convert some smaller areas to cool season grasses.

Environmental impact of educational and recreational activities (p. 120)

- Limit public use in the following areas to scheduled guided tours and educational and other appropriate activities to prevent undue disturbance of these critical resources:
 - South Range.
 - Shale cliffs/outcroppings in various areas of the Game Preserve.

Management Models (p. 121)

- Conduct a phase II master site planning process to develop a comprehensive plan for integrating the environmental, ecological, and physical features of the Game Preserve with appropriate educational and recreational activities.
- Provide a full-time, on-site Game Preserve manager with appropriate supporting staff.
- Develop outreach activities that include identifying, contacting, and enrolling community and volunteer organizations as key partners for assistance in land management and maintenance, wildlife research and protection, education, and recreation.

APPENDIX E

DETAILS

Gravel Pave Section for Handicapped Trail

Pathway Cross Section

Pathway on Slope Area

Road Crossing (1)

Road Crossing (2)

Road Entrance (3)

Road Entrance (4)

Post (for Guide Rail)

Wood Guide Rail

Identification Sign Detail

Stop Sign

Vehicles Excluded

Warning Sign

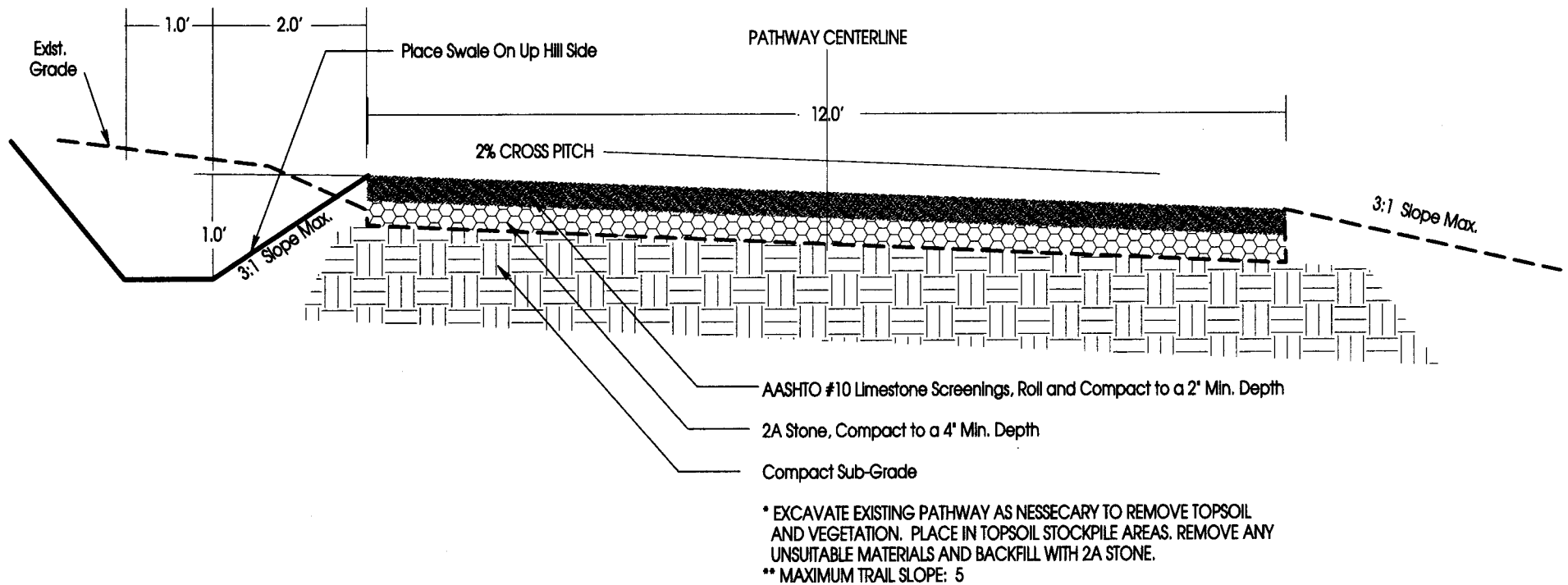
Pedestrian Crossing Sign

Sign Post

Metal Gate

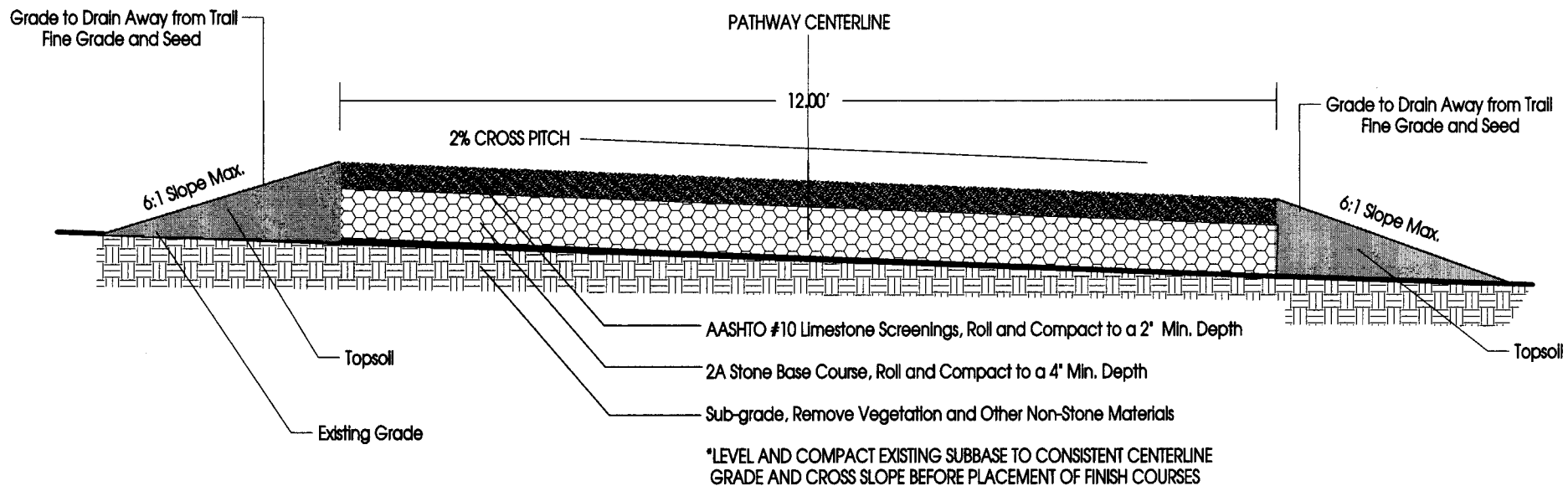
Post and 3-Rail Fence

Kiosk



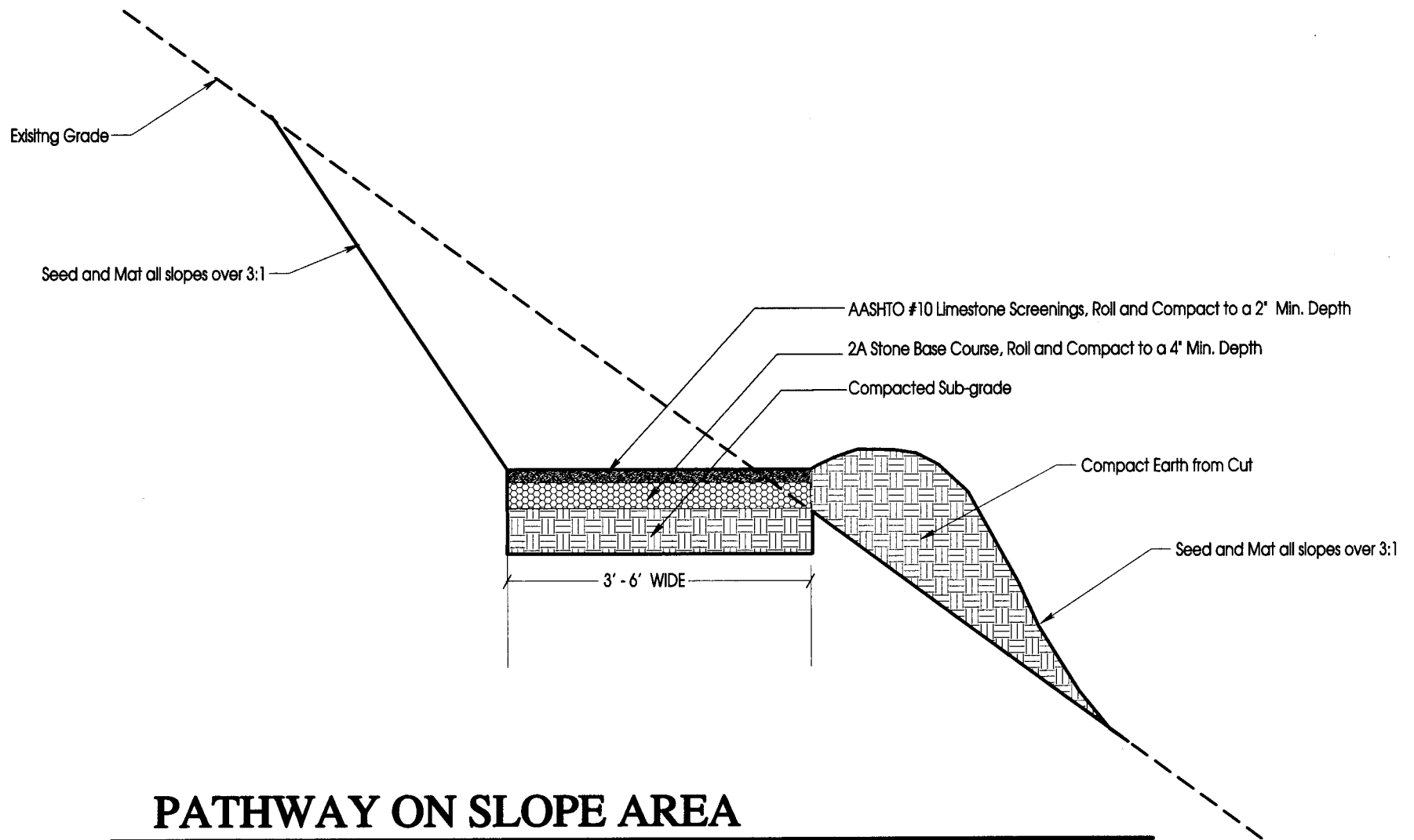
Gravel Pave Section for Handicapped Trail

NOT TO SCALE

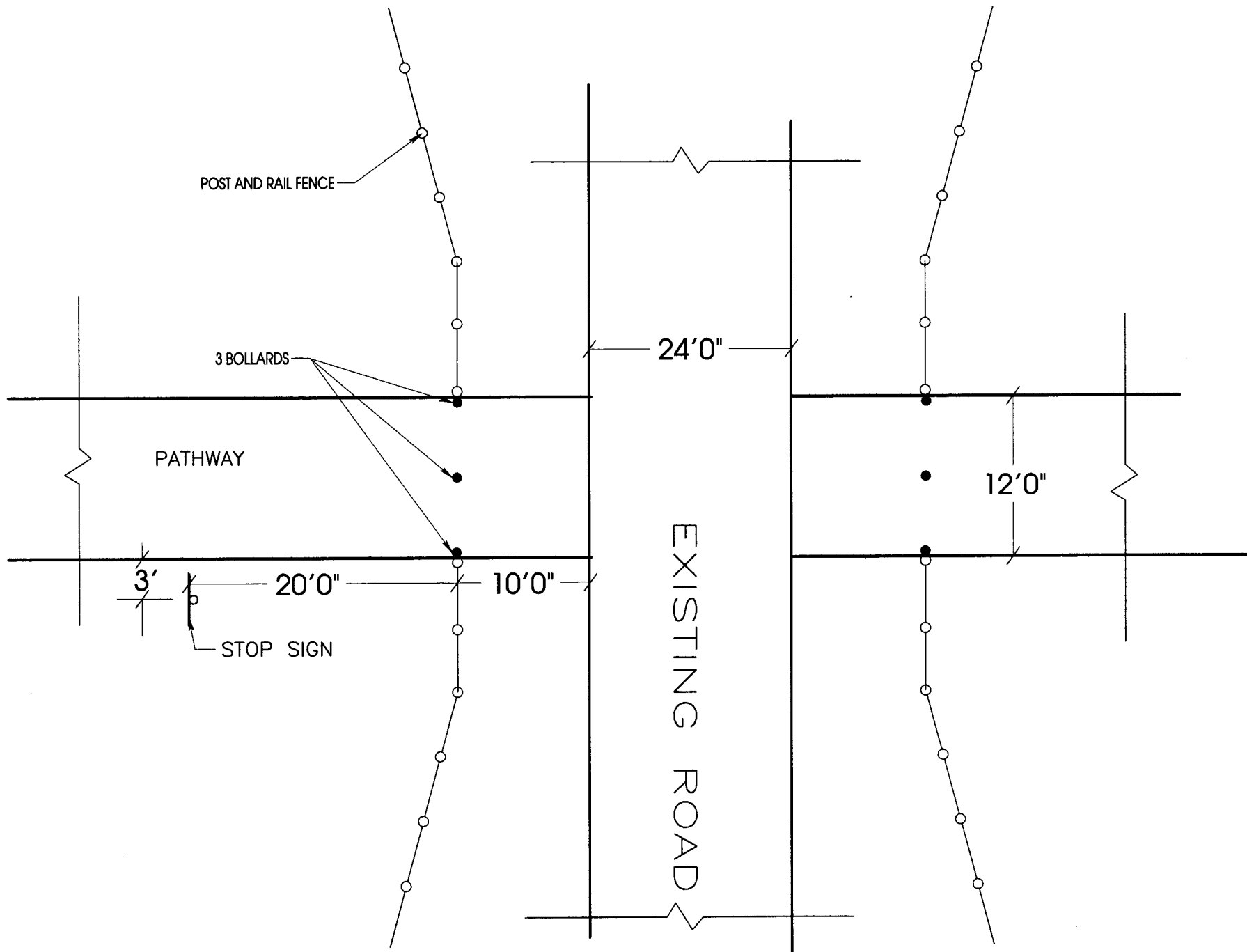


PATHWAY CROSS SECTION

NOT TO SCALE

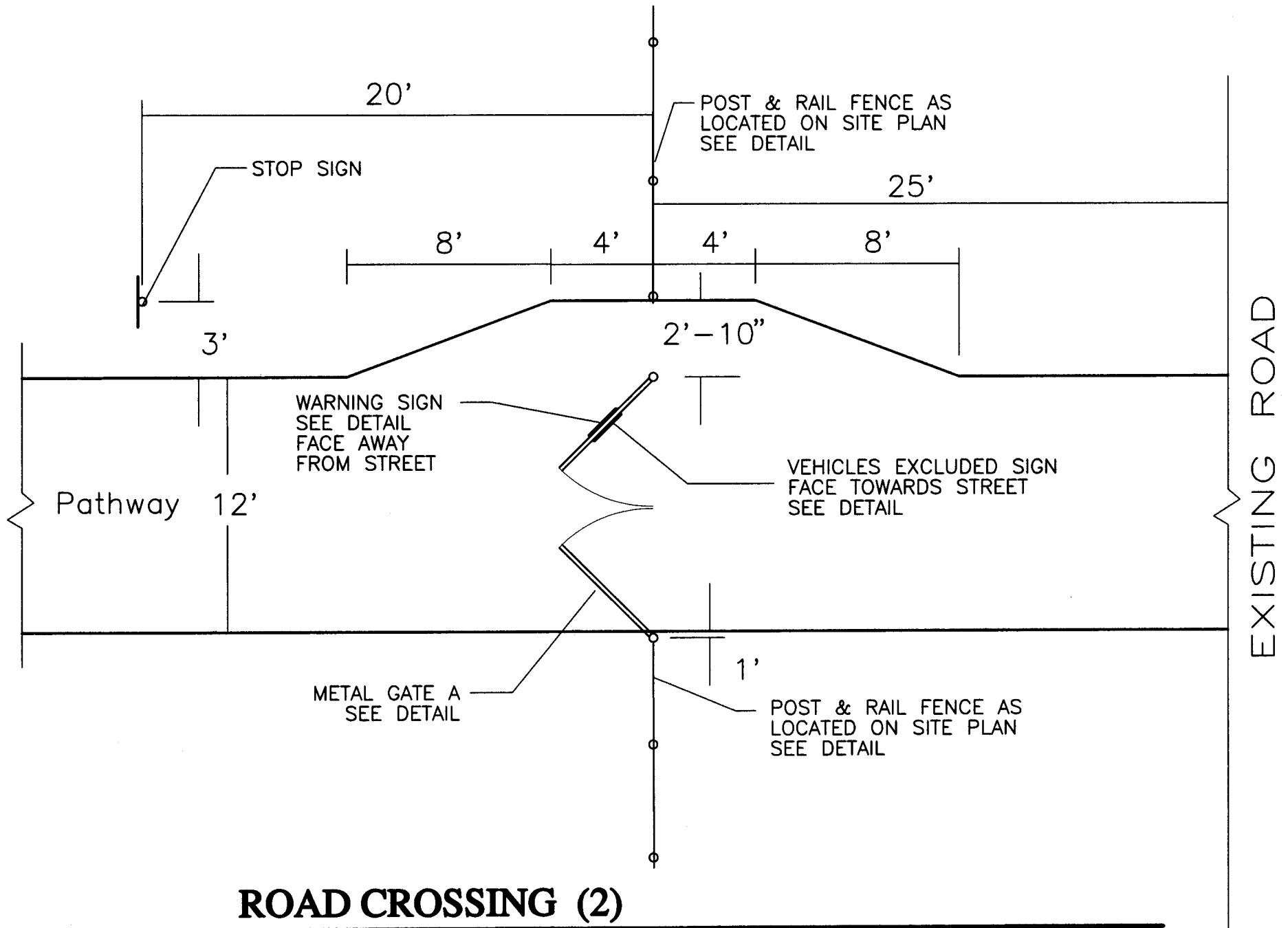


NOT TO SCALE



ROAD CROSSING (1)

NOT TO SCALE



ROAD CROSSING (2)

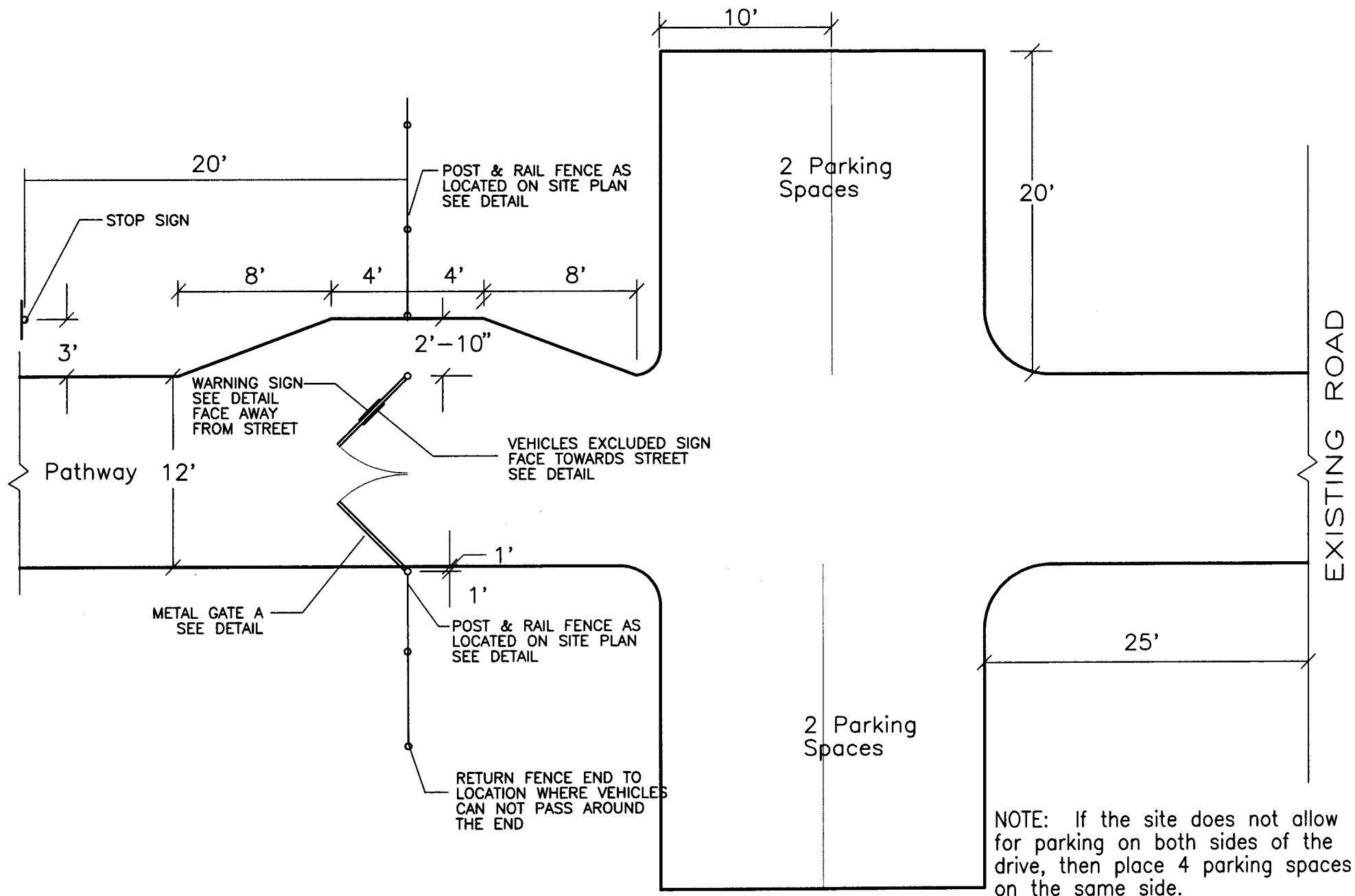
NOT TO SCALE



Road Crossing (1)

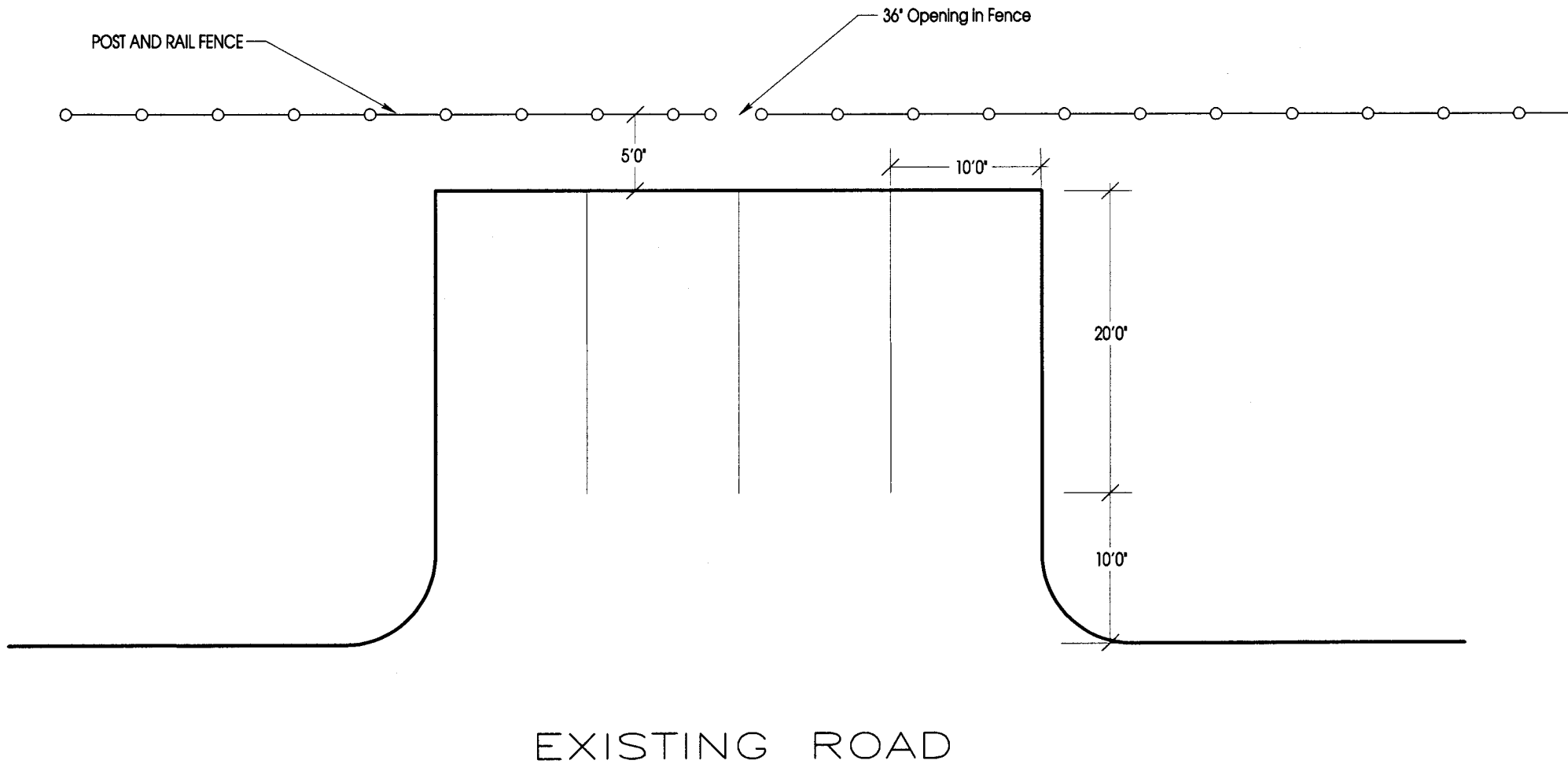


Road Crossing (1)



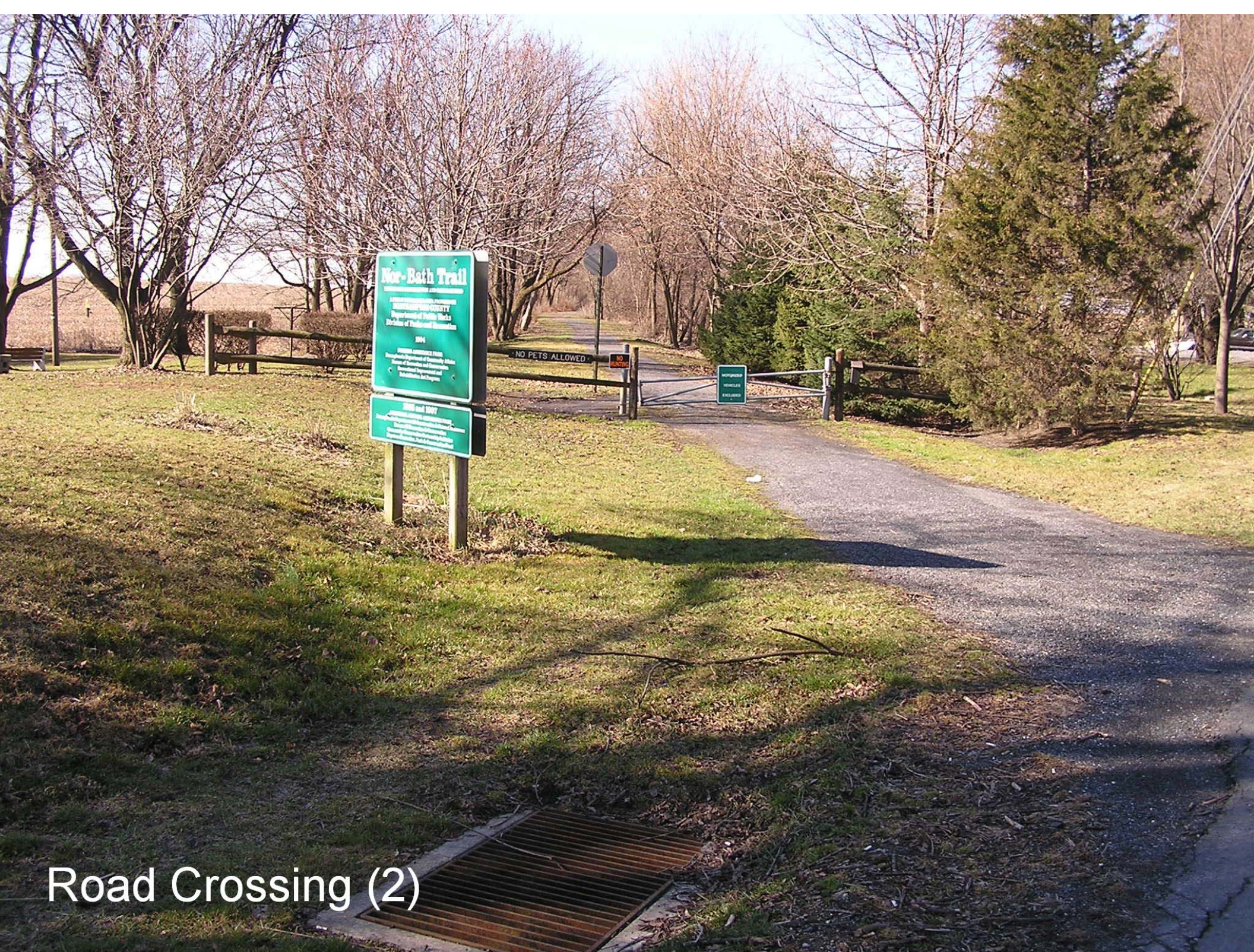
ROAD ENTRANCE (3)

NOT TO SCALE



ROAD ENTRANCE (4)

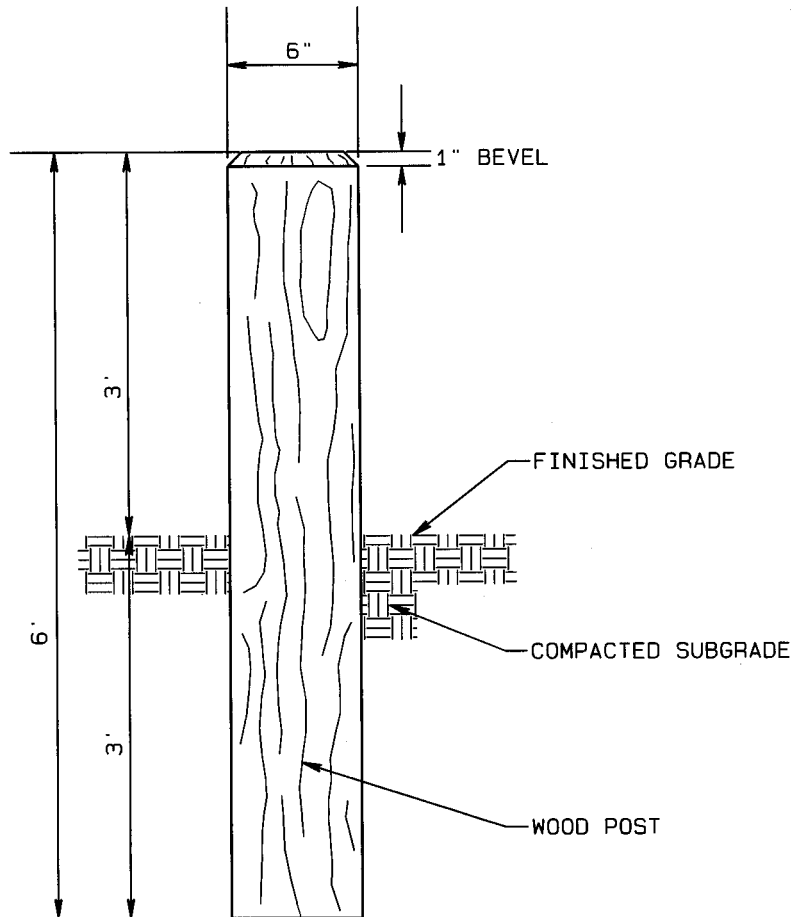
NOT TO SCALE



Road Crossing (2)

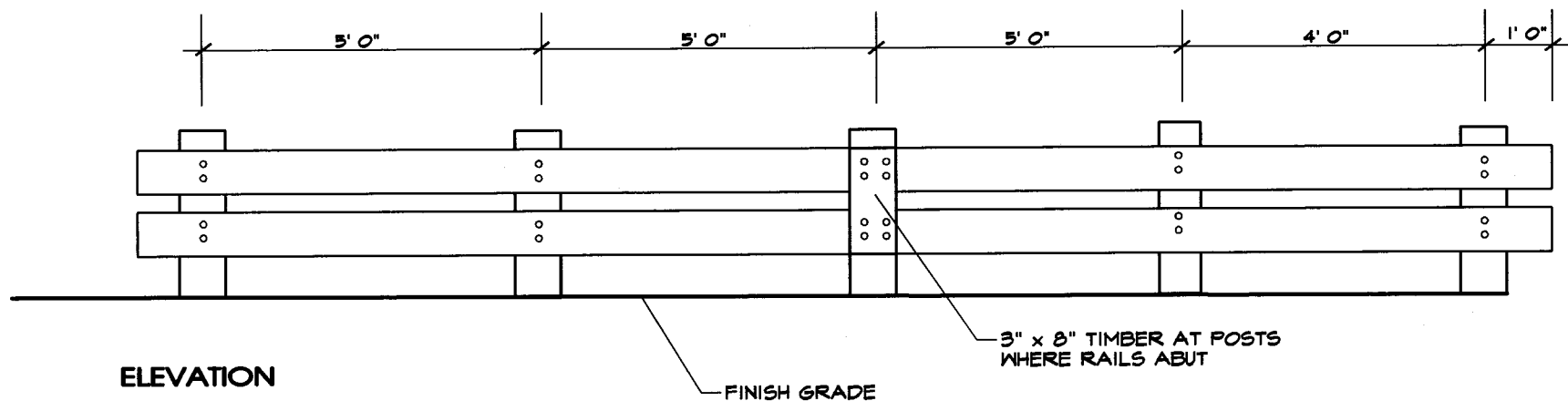


Road Entrance (4)



POST

NOT TO SCALE



WOOD GUIDE RAIL

Scale: 3/8" = 1' 0"

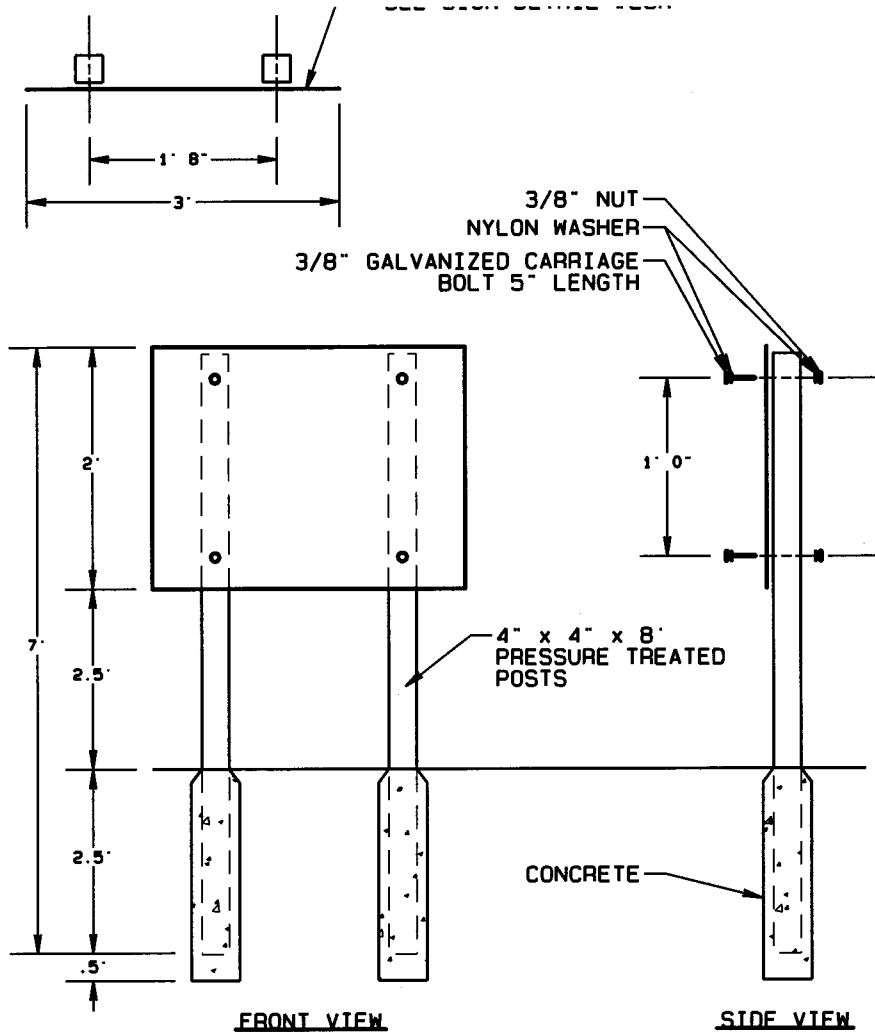
NOTE: ALL METAL FASTENERS TO BE HOT
DIPPED GALVENIZED



Post Guide Rail



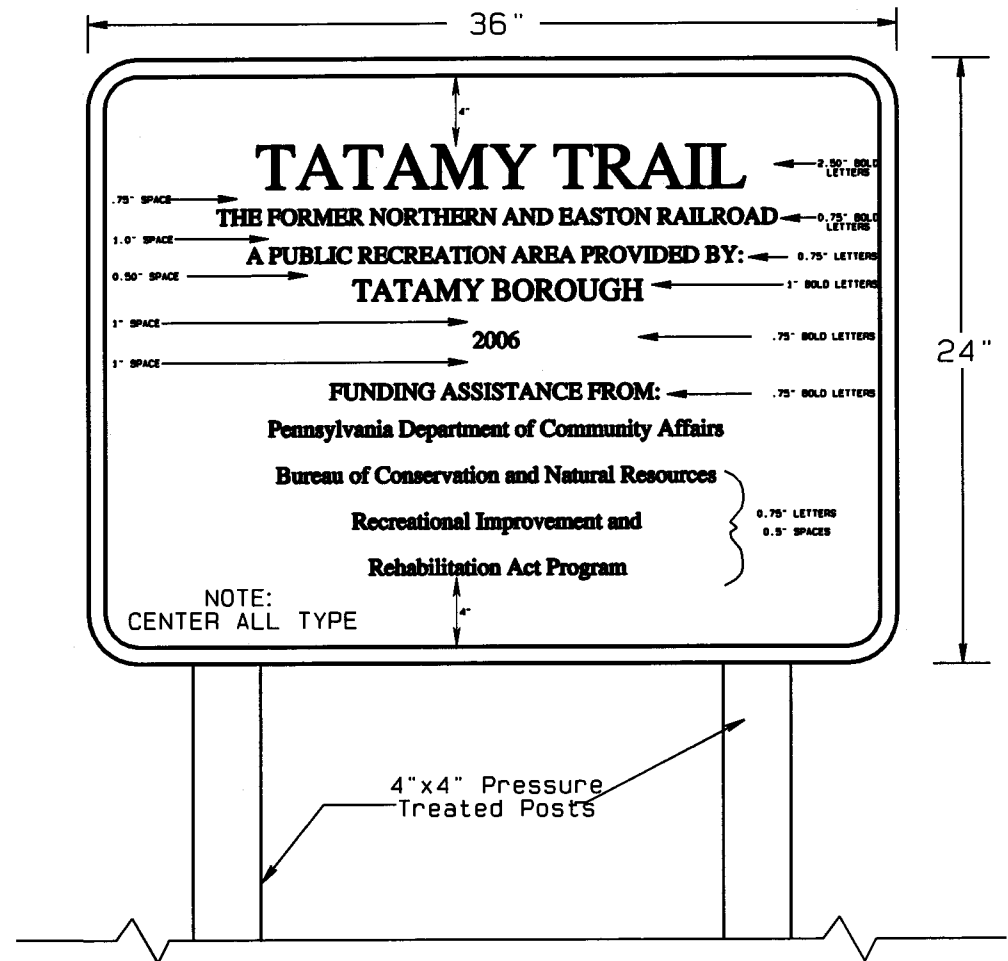
Wood Guide Rail



NOTE:
1. TIGHTEN NUT, CUT BOLT OFF FLUSH STRIP NUT.

XX IDENTIFICATION SIGN POST AND MOUNTING

NOT TO SCALE



NOTES:

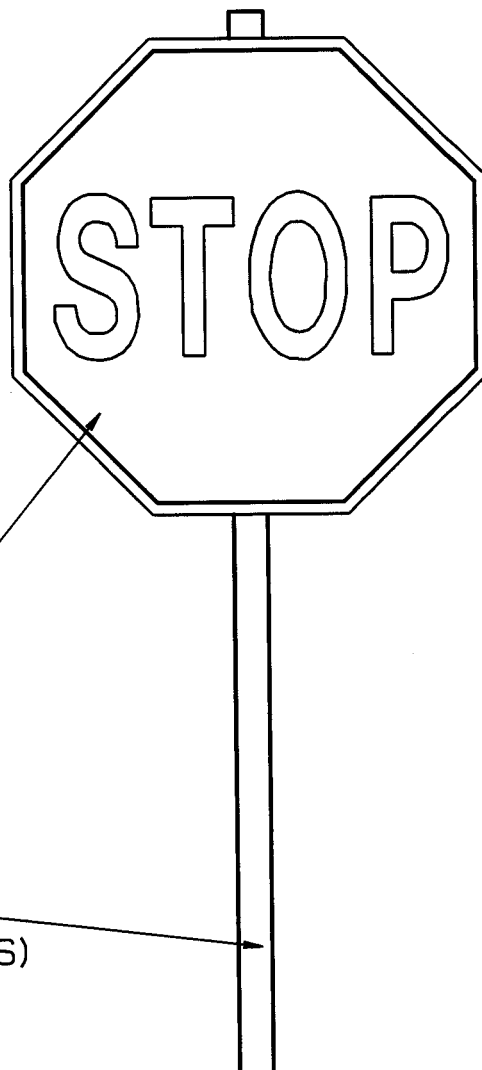
1. 0.08 GAGE ALUMINUM SIGN
2. WHITE LETTERING ON GREEN BACKGROUND WITH WHITE BORDER
3. LETTERING STYLE -- TIMES ROMAN
4. SHOP DRAWING REQUIRED / TO MATCH EXISTING SIGN

XX IDENTIFICATION SIGN DETAIL

NOT TO SCALE

STANDARD ALUMINUM
STOP SIGN
R1-1 24' x 24"

MOUNT ON SIGN
POST AT LOCATION (S)
SHOWN ON PLAN
(SEE SIGN POST
DETAILS 30 & 31)



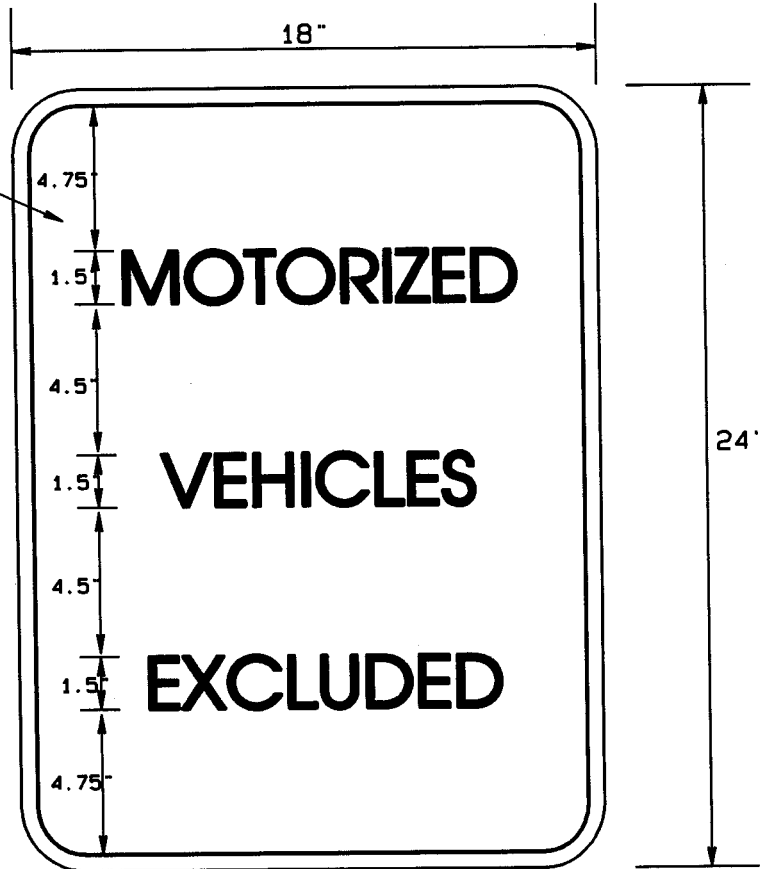
STOP SIGN

NOT TO SCALE

CUSTOM ALUMINUM SIGN
R7-114 18"-24"
WHITE LETTERS ON
GREEN BACKGROUND

ATTACH TO GATE(S)
FACING STREET AT
LOCATIONS SHOWN
ON PLAN

NOTE: CENTER ALL TEXT
TEXT STYLE-HELVETICA

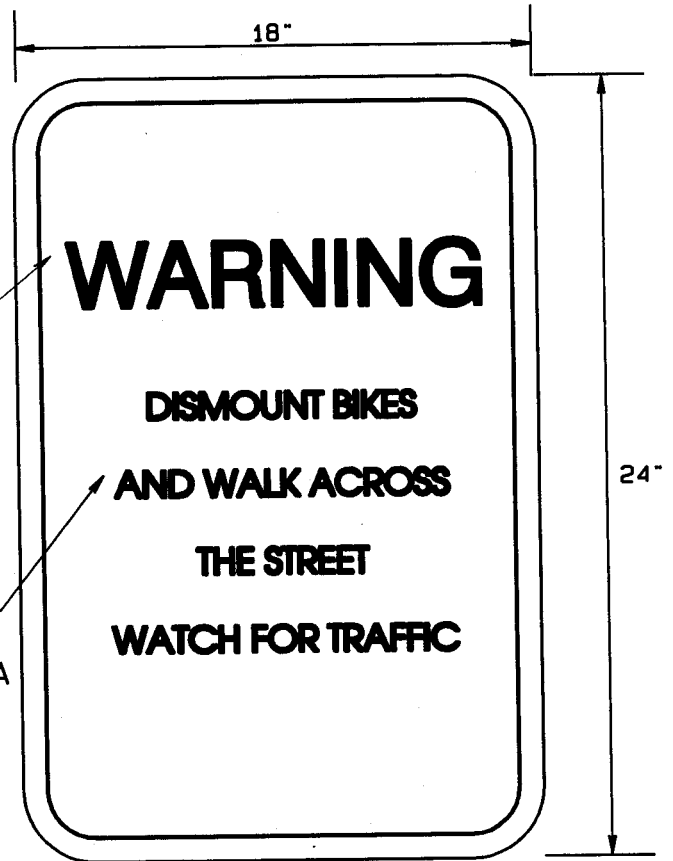


XX **VEHICLES EXCLUDED**
SIGN NOT TO SCALE

CUSTOM ALUMINUM SIGN
R7-114 18" x 24"

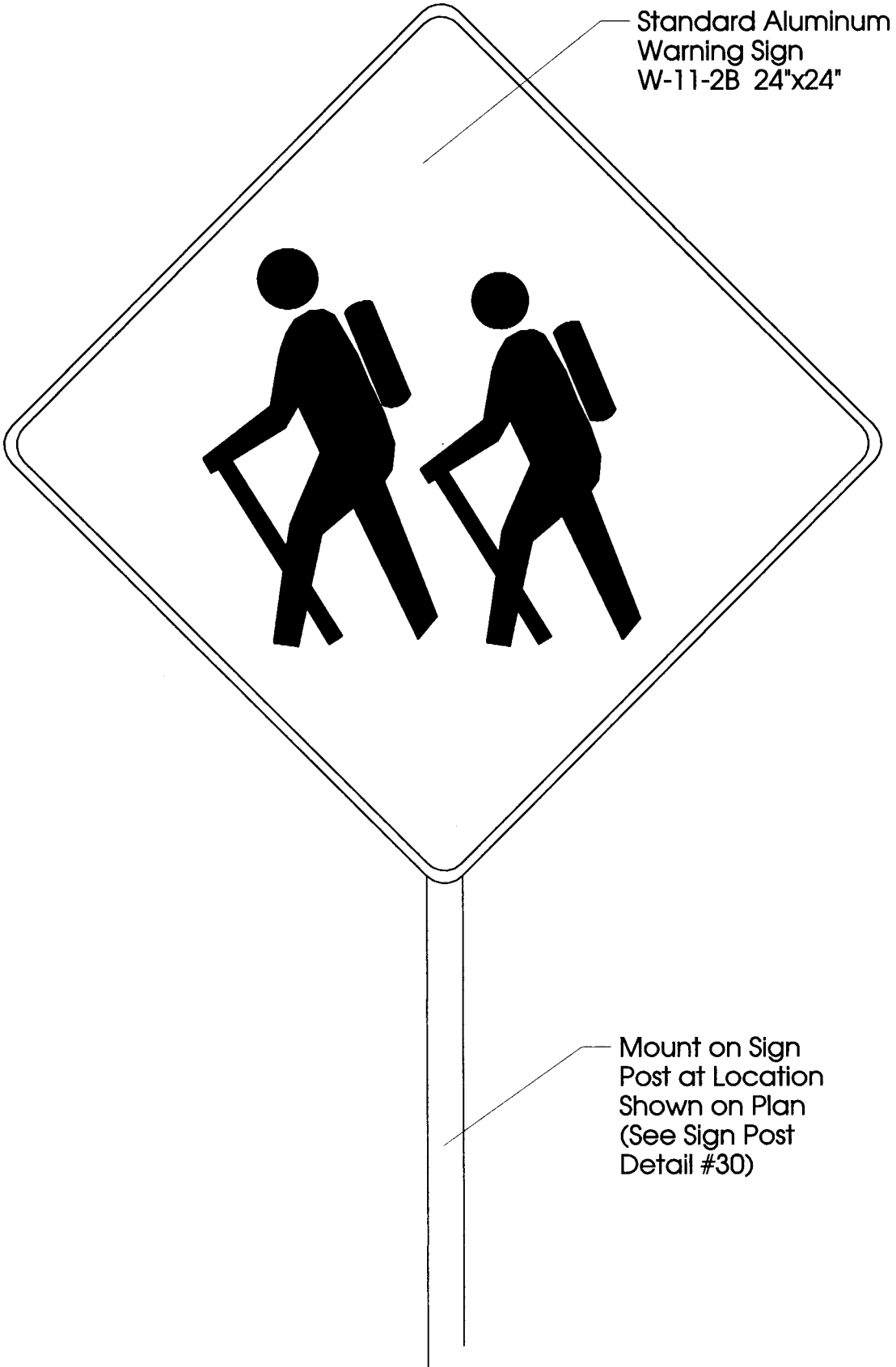
RED LETTERS CENTERED
ON WHITE BACKGROUND
TEXT STYLE - HELVETICA

NOTE:
MOUNT ON GATE (S)
AT LOCATIONS SHOWN
ON PLAN



WARNING SIGN

NOT TO SCALE

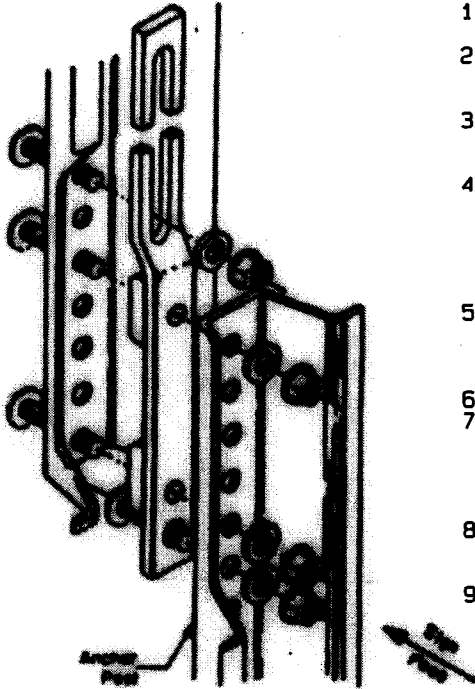


Standard Aluminum
Warning Sign
W-11-2B 24"x24"

Mount on Sign
Post at Location
Shown on Plan
(See Sign Post
Detail #30)

PEDESTRIAN CROSSING SIGN

Not to Scale



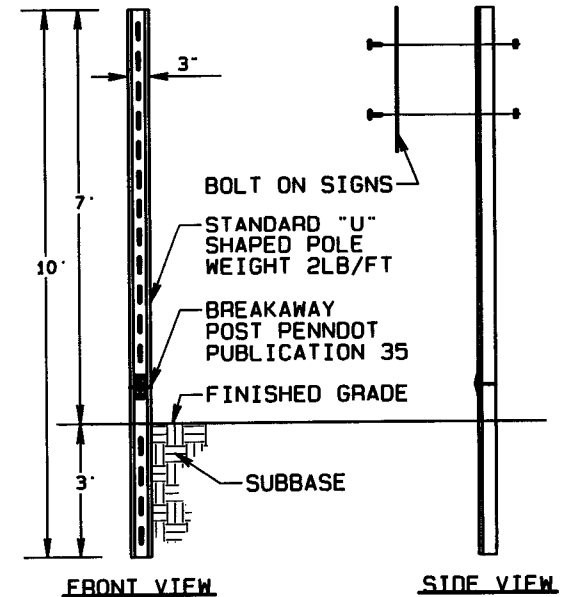
NOTES:

1. Determine the proper size signpost and anchor from the appropriate graph.
2. Remove a shovel of dirt at the post location to allow for final attachment to post anchor.
3. Drive the anchor into the ground with a drive cap until only 10" of the anchor is above ground.
4. Align the hole closest to the long slot in the retainer space strap with the top hole in the anchor. Attach strap by making a bolted connection through the bottom hole in the strap and the hole it aligns with in the anchor.
5. Rotate the strap 90 degrees to the left or right and drive the anchor into the ground until only 4" remain above ground level to enhance the breakaway features of the sign.
6. Rotate the strap back to vertical position.
7. Place the sign post against the anchor and the strap. Align the bottom hole in the signpost with the lowest open hole in the strap. Insert two anchor bolts through the common holes in the signpost, strap and anchor.
8. Complete the construction by attaching the strap to the signpost with a bolt and nut at the bottom of the long slot in the strap.
9. Tighten the bolts and nuts by the turn-of-the-nut method, i.e., bring nut to a snug tight condition to insure that all parts are brought together into full contact with each other, then tighten an additional 1/2 turn.
10. Restore the dirt around the anchor.



BREAKAWAY SIGN POST

NOT TO SCALE



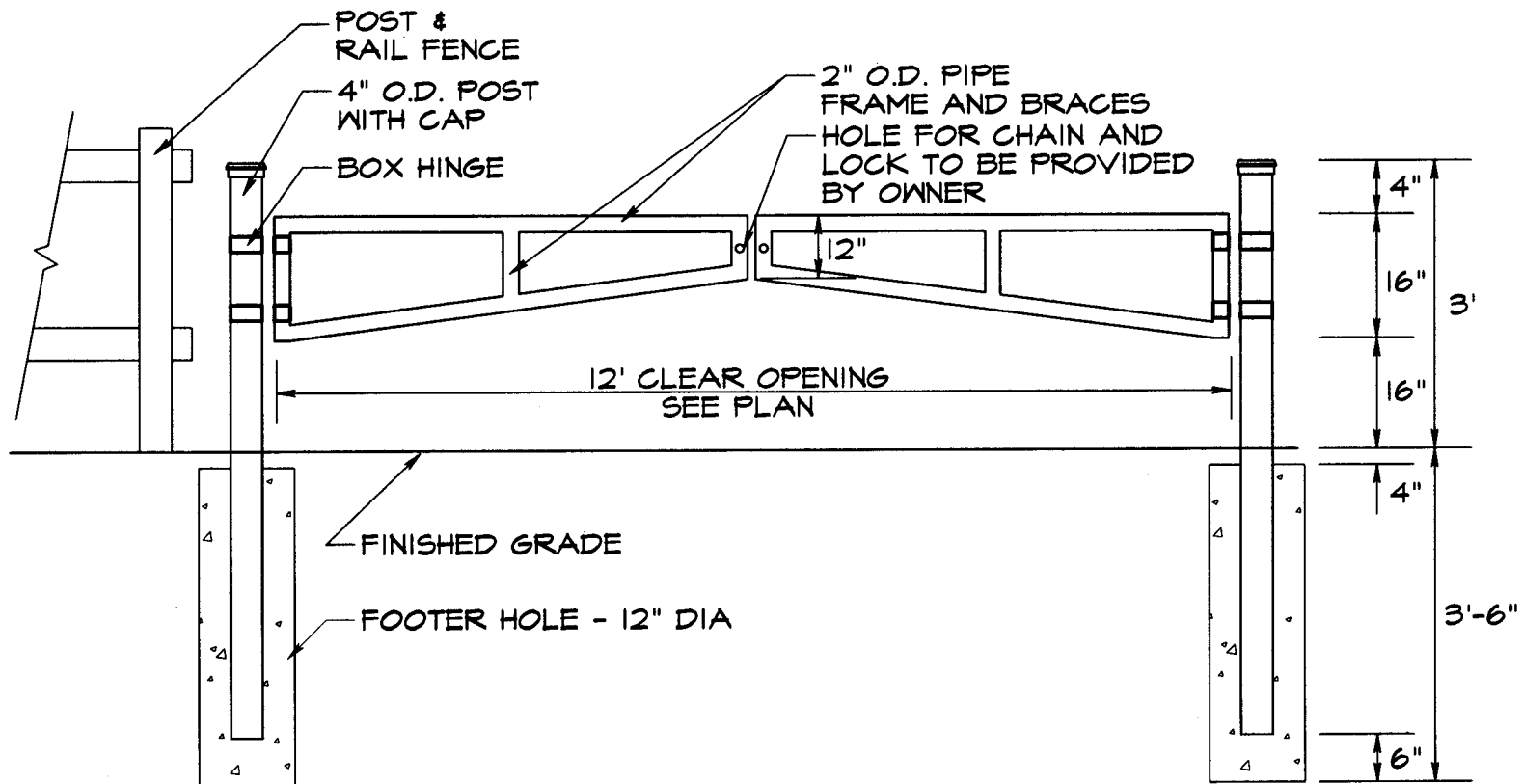
NOTE:

1. THIS POST IS TO BE USED ON ALL SIGNS EXCEPT HANDICAPPED PARKING SIGNS WHICH SHALL BE MOUNTED ON A 7' POST WEIGHT OF 1.12 LB/FT
2. INSTALL AS PER PENNDOT SPECIFICATIONS.



SIGN POST

NOT TO SCALE



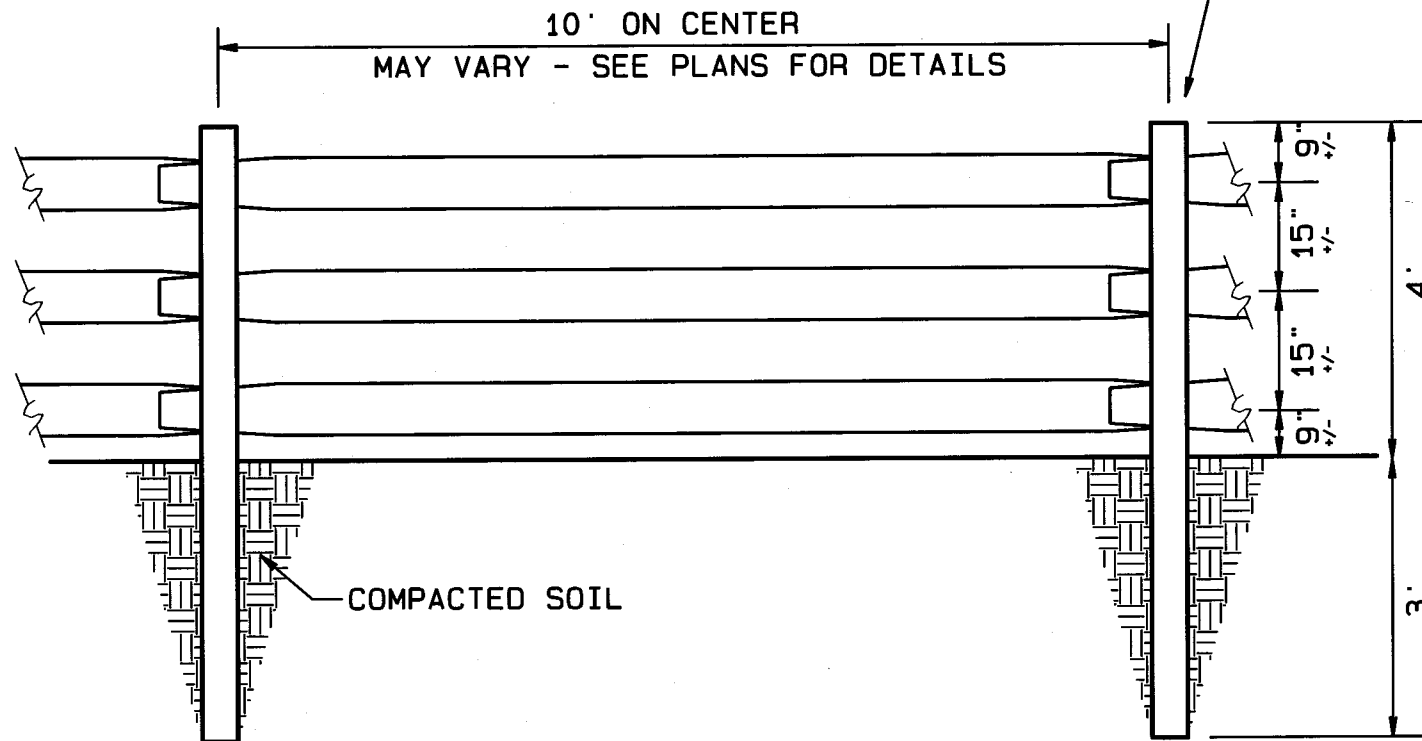
NOTES:

1. WELD PIPE AND GRIND ALL WELDS SMOOTH.
2. ALL GATE MATERIALS, WELDS AND CONNECTIONS TO BE GALVANIZED STEEL.
3. SEE SITE PLAN FOR HINGE AND SWING SIDE OF GATE.
4. SEE SITE PLAN FOR ABUTTING WOOD POST AND RAIL FENCE.
5. PROVIDE CLOSING HASP & PROVISION PADLOCK USE.
6. PROVIDE SHOP DRAWINGS OF GATE FOR REVIEW AND APPROVAL BY OWNER.

METAL GATE

NOT TO SCALE

ALL TURNS IN FENCE LINE SHALL
BE IN 45 OR 90 INCREMENTS



NOTES:

1. WHITE CEDAR 6" THREE (3) RAIL FENCE
(PADDLED OVERLAP)

POST & 3 RAIL FENCE

NOT TO SCALE



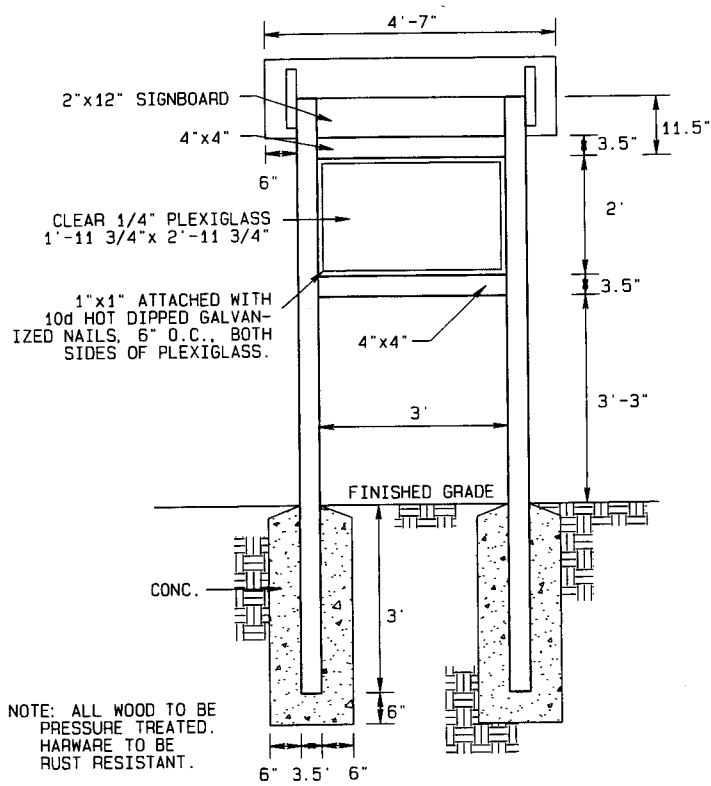
MOTORIZED
VEHICLES
EXCLUDED

Metal Gate

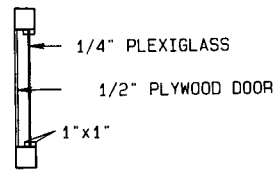


Post and Rail Fence

Gravel Pave Pathway- 12'

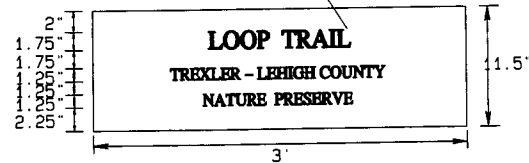


SIGN FRAME

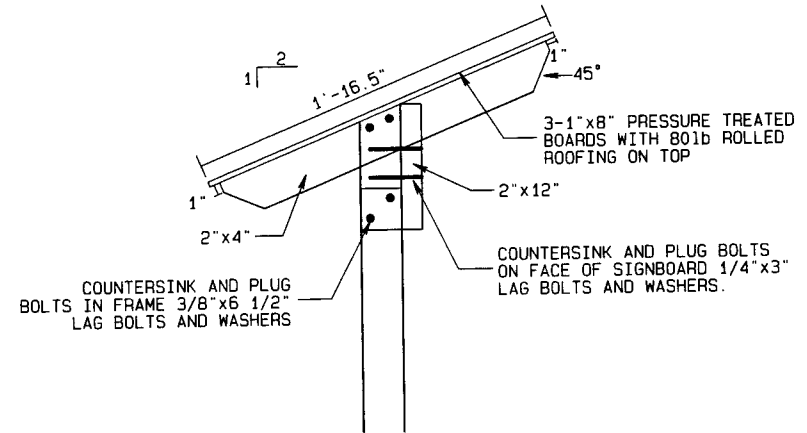


SECTION

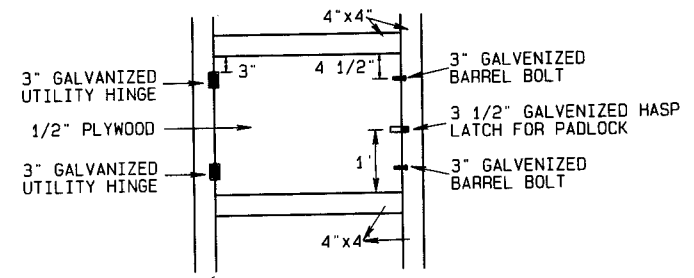
TEXT TO BE DONE IN
TIMES ROMAN FONT AND
SHALL BE CENTERED.



SIGN BOARD



SIGN ROOF



SIGN DOOR
(Rear of Sign)

Kiosk

NOT TO SCALE



Kiosk

NOR-BATH TRAIL
COUNTY OF NORTHAMPTON
DIVISION OF PARKS AND RECREATION

\$500 Reward

To the person or persons providing information leading to the arrest and conviction of the person or persons defacing County-owned property.

Glenn F. Reilman
Northampton County Executive

\$500 Reward

NOTICE

THE NOR-BATH TRAIL WILL BE
CLOSED TO EQUESTRIANS
EFFECTIVE MARCH 15, 1999.
THIS IS DUE TO REOCCURRING
TRAIL SURFACE DAMAGE.

FOR PARK & PERMIT INFORMATION
PLEASE CALL 610-766-1978

NOTICE

PEDESTRIANS
BICYCLES
&
EQUESTRIANS
ONLY

**THIS IS A
NON-MOTORIZED
TRAIL SYSTEM**

NO ATVs ALLOWED
NO MOTOR BIKES ALLOWED
NO SNOWMOBILES ALLOWED
NO SPORT UTILITY VEHICLES ALLOWED
Violators Will Be Prosecuted

**ALCOHOLIC
BEVERAGES
PROHIBITED**

NOTICE

THE NOR-BATH TRAIL WILL BE
CLOSED TO EQUESTRIANS
EFFECTIVE MARCH 15, 1999.
THIS IS DUE TO REOCCURRING
TRAIL SURFACE DAMAGE.

FOR PARK & PERMIT INFORMATION
PLEASE CALL 610-766-1978

Kiosk