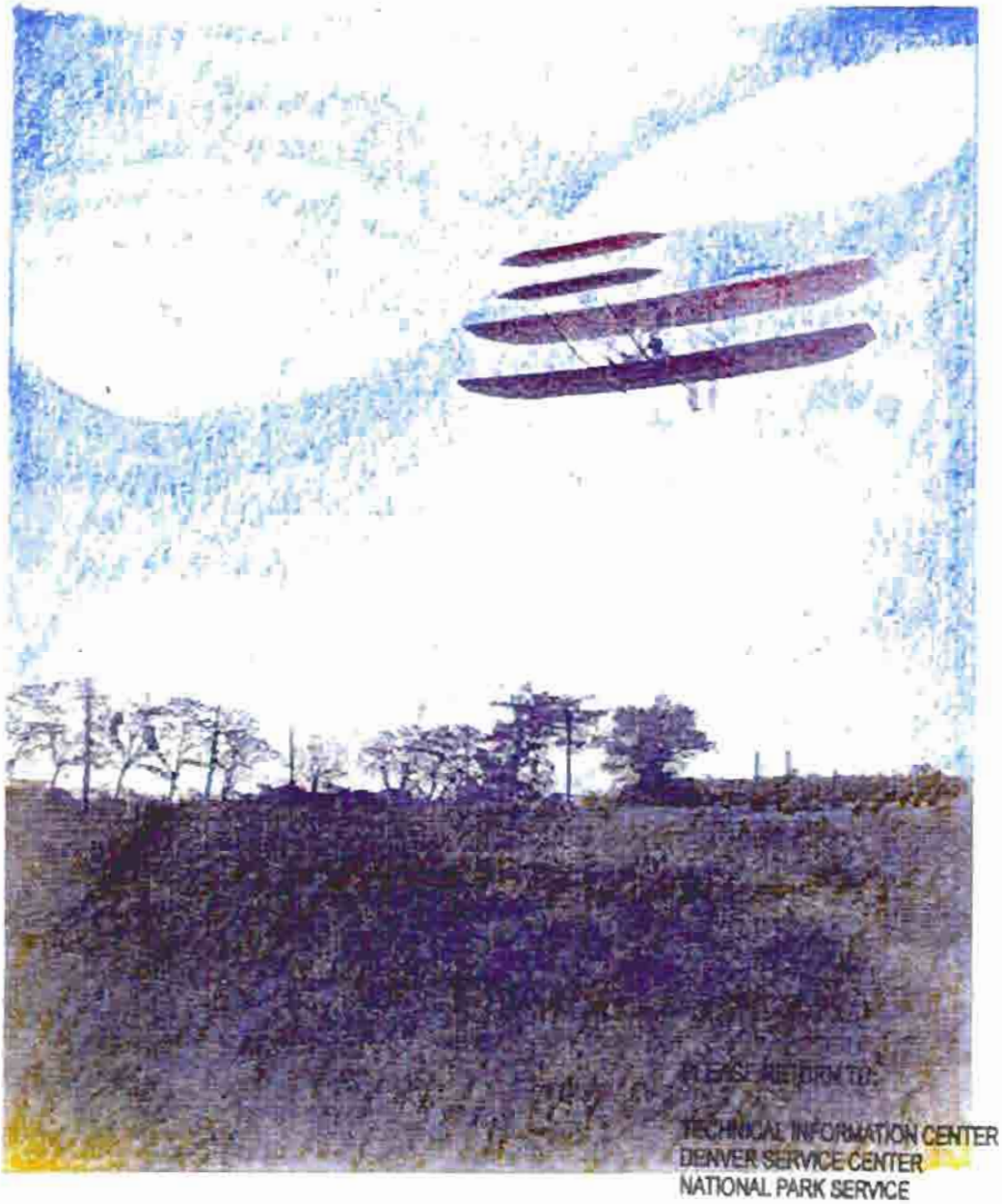
National Park Service
U.S. Department of the Interior

Dayton Aviation Heritage National Historical Park
Dayton, Ohio
2002

From Pasture to Runway: Huffman Prairie Flying Field Wright-Patterson Air Force Base

Cultural Landscape Report
Landscape Implementation Plan
Interpretation Plan



RECOMMENDED: **DATE:** 4 June 02

Chief, Cultural Resources Division, Midwest Regional Office, National Park Service

CONCURRED: **DATE:** 6 June 02

Superintendent, Dayton Aviation Heritage National Historical Park

CONCURRED: **DATE:** 19 Jun 02

Assistant to the Commander, 88 ABW, Wright-Patterson Air Force Base

APPROVED: **DATE:** 6/24/02

Regional Director, Midwest Region, National Park Service

FROM PASTURE TO RUNWAY: HUFFMAN PRAIRIE FLYING FIELD
WRIGHT-PATTERSON AIR FORCE BASE

Cultural Landscape Report
Landscape Implementation Plan
Interpretation Plan

Prepared for Wright-Patterson Air Force Base, Environmental Management by the National Park Service :

Site History: Elizabeth Fraterrigo,
Dayton Aviation Heritage National Historical Park

Landscape Evaluation and Treatment Alternatives: Marla McEnaney
Midwest Regional Office

Landscape Implementation Plan: H. Eliot Foulds
Olmsted Center for Landscape Preservation

Interpretation Plan: Tom Richter
Midwest Regional Office

Editing: Marla McEnaney

PROTECT RESTORE ENHANCE
Environmental Management
Wright-Patterson AFB

NATIONAL PARK SERVICE

CONTENTS

LIST OF FIGURES

PROJECT SUMMARY

Huffman Prairie Flying Field, located within Wright-Patterson Air Force Base, was designated a National Historic Landmark in 1990 and was established as a partnership unit of Dayton Aviation Heritage National Historical Park in 1992. In 1998, following completion of a General Management Plan and Interpretive Plan for Dayton Aviation Heritage, Wright-Patterson and the National Park Service (NPS) initiated planning for developing Huffman Prairie Flying Field. Cultural landscape and interpretation planning were linked to ensure a comprehensive planning approach.

This document, which contains a Cultural Landscape Report (CLR) and Interpretation Plan (IP) for the flying field, is the culmination of this comprehensive planning initiative.

The CLR is the primary research document used by the NPS and other agencies to identify and document features and qualities representing a landscape's historic significance. CLRs provide immediate and long-term guidance for protecting unique features and qualities to ensure their availability for future generations. The CLR consists of four sections: the *Site History*, completed by NPS history technician Elizabeth Fraterrigo, is an exhaustive study of the physical development of the flying field and its immediate surroundings. It also describes how the flying field evolved into Wright-Patterson Air Force Base. The second section, *Historic Landscape Evaluation*, contains an analysis of the flying field's landscape character using criteria established by the National Register of Historic Places. The analysis section sets a framework for defining appropriate treatment activities and management strategies that are described in the third section *Treatment Alternatives*. This section identifies and provides a supporting rationale for the preferred alternative. Marla McEnaney, historical landscape architect for the National Park Service's Midwest Regional Office, prepared the second and third sections for Wright-Patterson. Detailed guidance for implementing the preferred treatment alternative, prepared by H. Eliot Foulds of the Olmsted Center for Landscape Preservation, is provided in the fourth section.

The *Interpretation Plan*, which recommends appropriate themes, defines desired visitor experiences and proposes personal and non-personal services, was completed by Tom Richter, interpretation planner for the NPS's Midwest Regional Office. David Guiney of the NPS' Harpers Ferry Center provided preliminary conceptual planning for the flying field interpretation program.

CHAPTER 1
SITE HISTORY

CHAPTER 1
SITE HISTORY

INTRODUCTION

> Success. Four flights Thursday morning, all against twenty one mile wind. Started from level with engine power alone. Average speed through air thirty one miles. Longest 57 [sic] seconds. Inform press. Home Christmas.[1]

On December 17, 1903, Orville Wright sent this telegram from the Outer Banks of North Carolina to family members in Dayton, Ohio, relating the events that transpired on the beach that day. To someone unfamiliar with the work of Wilbur and Orville Wright over the past five years, the telegram might not have revealed much in an age when most people considered the prospect of human flight to be impossible. The Wright family in Dayton knew better.

A fascination with a childhood toy first sparked Wilbur's and Orville's interest in flight. In later years, a news account of the glider experiments conducted by the German engineer, Otto Lilienthal, rekindled their imaginations. Together, the Wright brothers combined ingenuity, mechanical skill, and a knack for solving problems, and applied their energies toward the mysteries of flight. They spent long hours reading all that had been written on aeronautics and conducted experiments of their own in the workroom of their Dayton bicycle shop. For four years, they traveled to the remote sand dunes of Kitty Hawk where high winds and sandy hills provided a suitable experimental ground. There, they conducted trials with kites and gliders of their own design in order to study the properties of aerodynamics and the mechanics of flight.

On this December morning, the Wright brothers took one step further in their quest to conquer the skies. They made the world's first free, controlled and sustained flight in a power-driven, heavier-than-air machine. The telegram informed the family back in Dayton of the four momentous flights. They had achieved success. Now, the Wright brothers were coming home.

Wilbur and Orville returned to their West Dayton home convinced they were on the right track, yet knowing they had not yet solved *all* the problems of powered flight. At Kitty Hawk, they had guided their machine aloft under the power of its small engine, flying it in a straight line for less than a minute each time. A gust of wind destroyed the machine after its fourth flight, sending it reeling end over end along the beach, putting a halt to their experiments. Now, back in Dayton, they eagerly anticipated continuing their work. They would build and learn to maneuver an even better flying machine.

Wilbur and Orville hoped to transform their invention into a truly useful—and marketable—machine. The brothers needed to find a place closer to home where they

could carry on their work without the time and expense of the lengthy excursions to North Carolina's Outer Banks. They searched for a location suitable for both flying and landing—accessible, yet secluded, so they could keep the details of their invention a secret for the time being. They settled on a patch of farmland eight miles northeast of Dayton. By transforming an eighty-acre cow pasture into the Huffman Prairie Flying Field, they established the world's first airfield. There, in 1904 and 1905, the Wright brothers conducted a series of unique experiments that enabled them to master the principles of controlled, powered flight and develop the world's first practical airplane, forever changing the world and future course of human events.

Though others had attempted to fly, the Wright brothers were the first to understand the need to control an aircraft along the axes of yaw, pitch, and roll, as well as the first to devise a system for achieving such three-dimensional control. Through their work at Huffman Prairie Flying Field in 1904 and 1905, the Wright brothers taught themselves to fly and developed "a machine of practical utility." They spent the following years traveling to promote their invention. In 1910, Orville and Wilbur returned to the flying field, where they opened a flying school and organized an exhibition team under The Wright Company, which they had established the previous year. Although many of their contemporaries were opening flight schools across the country, the Huffman Prairie Flying Field continued to play a central role in the unfolding of a new era of aviation. It served as a test-site for aircraft designed and manufactured by The Wright Company. It also provided a training ground for the civilian aviators who made a sport of flying and military pilots, who earned their wings as part of the government's budding interest in developing air power. The activities at the flying field drew crowds of curious onlookers. In this regard, Huffman Prairie also served as a gathering place where spectators came to watch some of the world's earliest aviators break free from the earth in flying machines of fabric and wood.

In 1917, the United States Army, drawn to the Miami Valley by the flying activities already taking place there and the local community's encouragement, elected to build one of the nation's first military aviation fields on a site that included the flying field at Huffman Prairie. Since its inception that year as Wilbur Wright Field, the military installation has undergone countless expansions, reorganizations, and name changes. But over the years, flight-related activities such as pilot training, aviation research and development, and aircraft- and flight-testing remained a central focus of the installation as it evolved into present day Wright-Patterson Air Force Base. Huffman Prairie Flying Field has stood in the midst of great change: technological advancements have brought increasingly sophisticated aircraft flying overhead, while military expansion has transformed the rural landscape of the Wright brothers' era. Today, the flying field stands at the end of the flight line within the Air Force base, and truly serves to link past and present. Modern jet aircraft soar over the site where the Wright brothers first taught themselves and others to fly. Around the field, the tradition of aviation-related invention and innovation begun by Wilbur and Orville Wright in the early twentieth century has continued to the present day.

The place where the Wright brothers established their experimental flying field has been known throughout the years by several different names. The Wrights referred to their flying field as "Simms" or "Simms Station," after the name of the nearby electric

interurban railway stop. Since the Huffman family owned the field and the surrounding prairie and farmland, others simply called it "Huffman Prairie." When the military established its aviation training facility at the site, the entire installation, including the old flying field, became known as Wilbur Wright Field. The Army changed this name to Wright Field when the base expanded in the 1920s. In 1931, the military renamed the installation once more, designating as Patterson Field the portion of the base that included the site of the flying field. The balance remained Wright Field. In 1947, the U.S. Army Air Force became a separate arm of the military with the establishment of the U.S. Air Force. The following year, the Air Force merged Wright and Patterson Fields to form Wright-Patterson Air Force Base.

Because the field is situated within a military base that was off-limits to the public after 1917, few people had the opportunity to view the place from which the Wright brothers first brought aviation to the world. In 1990, the 84.42-acre site was officially named Huffman Prairie Flying Field and designated a National Historic Landmark. The largest natural tallgrass prairie remnant in the state of Ohio lies adjacent to the flying field. This Ohio Natural Landmark, measuring 109 acres, has been designated "Huffman Prairie." In spring 1991, Huffman Prairie Flying Field was opened to the public for the first time since 1917. The following year, federal legislation established Dayton Aviation Heritage National Historical Park to preserve and interpret to the public the life and works of the Wright Brothers and Paul Laurence Dunbar, their legacy of creativity and invention, and the development of aviation in the Dayton area. Today, Huffman Prairie Flying Field is one of four sites that comprise the National Historical Park. The site is owned and administered by Wright-Patterson Air Force Base in consultation with the National Park Service.

EARLY HISTORY OF BATH TOWNSHIP

When the Wright brothers first established their operations at the Huffman Prairie Flying Field, the cow pasture was part of an ordered system of land division that placed it in the northeastern quarter of Section 1, Range 8, Township 2, of Bath Township, Greene County, Ohio. Paleo-Indians, however, had inhabited the region as early as 11,000 B.C.E. Archaeological evidence also indicates that the Adena Culture, a Woodland Indian tradition that emerged around 1,000 B.C.E, extended into the area now known as Bath Township. The Adena left traces of their existence in the conical burial mounds they built, some of which are located on present-day Wright Brothers Hill within Wright-Patterson Air Force Base. The Adena, along with the Hopewell, another Woodland tradition known for its mound building, declined by 500 C.E. Historic Native American cultures, including the Miami, and later, the Shawnee, moved into the Miami Valley area beginning in the eighteenth century. Following the defeat of Native American tribes by United States troops at the Battle of Fallen Timbers, the U.S. took possession of most of Ohio under the 1795 Treaty of Greenville, which settled the conflict. The treaty officially opened southeastern Ohio for settlement in 1796.[2]

The earliest Euro-American settlers arrived in Bath Township from Kentucky and Virginia in the late 1790s and early 1800s. The commissioners of Greene County, which was formed in 1803, divided Beaver Creek Township in two to establish Bath in 1807,

making it the sixth township in the county.[3] Greene County resided in a physiographic region of Ohio known as the Till Plains, typified by rich glaciated soil and flat or gently rolling terrain.[4] The newly formed township lay in the basin of the Mad River to the west, and the Little Miami River to the east. In 1802, when Israel Ludlow surveyed the area, he found the land crisscrossed by streams and rivulets, and covered by large patches of prairie, with their characteristic wildflowers, tall grasses with extensive root systems, and rich soil. In his records, Ludlow noted that the land adjacent to the future flying field consisted of dry prairie, while the flying field itself, nearer to the river and on slightly lower ground, consisted of "wet, boggy prairie."[5]

The tallgrass prairie that spanned the central United States in the centuries before European contact, covering much of Illinois and Iowa, also extended into southwestern Ohio. In Bath Township, patches of tallgrass prairie spread across hundreds of acres. The largest swatch of prairie, a 4.5-kilometer expanse, occupied the western third of the township.[6] The Wright brothers would establish their flying field within this area. Two types of grasses, both characteristic of North American eastern grasslands, predominated at Huffman Prairie—big bluestem (*Andropogan gerardi*) and Indian grass (*Sorghastrum nutans*). These mesic grasses generally thrived in moderately wet soil, and reached heights of more than six feet. A number of forbs, compass plants, snakeroot and bedstraw typically accompanied them.[7] The soil composition of the flying field consisted of glacial till and alluvium deposits, overlain with a rich layer of humus created by the decomposition of organic materials.[8] This soil was prone to poor drainage. Large deposits of peat, which formed when organic materials decomposed more quickly than their components could be broken down into minerals, were also prevalent in the vicinity. A 1912 statewide-survey identified peat deposits up to seven feet deep at Simm's Bog, located in sections 1 and 2 of the township, immediately west of the flying field.[9]

In the early nineteenth century, amateur naturalists and professional scientists explored and classified the diverse flora found throughout North America. As a recreational pursuit, field of scientific inquiry, and pedagogical tool, botany became widely popular, especially in the half century between the mid-1830s and mid-1880s.[10] During this time, Huffman Prairie served as a significant locale for the collection and identification of prairie specimens. In the 1830s, John Whitten Van Cleve, prominent Dayton citizen, one-time mayor, and an ancestor of the Wright brothers, classified over two hundred plant specimens at Huffman Prairie. Like other amateur naturalists of his day, Van Cleve was a member of an informal network of botany enthusiasts and emerging professionals who corresponded with one another, exchanging knowledge and plant specimens. Van Cleve shared information about his specimens, for instance, with John Torrey, a renowned nineteenth-century scientist. Torrey, together with botanist Asa Gray, co-authored two volumes of a proposed multi-volume study, *Flora of North America* (1838-1843). John Leonard Riddell, another nineteenth-century scientist and botany enthusiast, also collected specimens at Huffman Prairie. There he identified three new species, among them *Solidago riddellii,* a type of goldenrod named for Riddell, its discover. Today, the National Museum of Natural History holds a type specimen of that species, its place of discovery noted as "Hoffman's prairie [sic], 8 miles east from Dayton." Along with such collecting activities, the flora of Huffman Prairie further served as an educational resource. William B. Werthner, Orville Wright's

high school science teacher, brought two generations of students to the prairie for their botany lessons.[11]

Newcomers to Greene County purchased tracts of land in Bath Township and made use of the region's rich soil to grow their crops. A number of mills also sprang up along the waterways that cut through the township. In 1855, a small milling community called Kneisly sat on the western bank of the Mad River, about a mile from the flying field. By this time, Bath Township also contained three small towns, all within a few miles of the future flying field. William Senseman founded the town of Byron, known initially as Tylorsville, in 1841. The smallest of the three towns, Byron consisted of just over seven acres in the southeastern part of the township. In 1816, Joseph Tatman and Samuel Cosad established the town of Fairfield in the central part of the township on a parcel of land known as "Tatman's Prairie." While its population reached about 500 by the 1850s, the town did not develop into a major commercial center since the first railroad line through the township, the Mad River and Lake Erie, was placed a mile west of Fairfield. In 1850, the year the railroad made its first run between Dayton and Springfield, landowners platted the town of Osborne between the two cities. Named for the superintendent of the railroad, E. F. Osborne, it soon became the largest town in Bath Township. By the 1880s, around seven hundred people lived in Osborne. Situated on the rail line, it became a center for grain storage and shipment. With two railroads and six pikes passing through town, Osborne also served as a commercial center.[12]

An 1874 Greene County atlas described the township of Bath as "perhaps the most fertile and best cultivated portion of the County." Residents of Bath primarily grew corn and wheat, along with oats, potatoes, and smaller amounts of rye and barley. They also raised livestock, manufactured dairy products, and tended small fruit orchards. While farmers cultivated the area around it, the flying field itself, perhaps due to its poorly drained soil, was not farmed but instead used for pasture.[13]

Nineteenth-century settlers transformed the landscape by building towns, establishing farms to create a patchwork of cultivated farmland, and developing a transportation system of roads and rails to facilitate travel throughout the area. The Mad River, running through the northeastern portion of Bath Township, provided the earliest settlers with a means of transporting goods downstream, while old Indian trails gave them an established path to follow on land. Greene County commissioners "corduroyed" the Indian trails in the 1840s in an effort to make them more passable. In Bath Township, overland transport also followed crude bridle paths cut by settlers through wooded areas, though one local historian commented that nearly twenty years elapsed before Bath had "any paths which might be dignified with the name of roads." The Dayton-Springfield Pike, however, stood out as the exception. This pike, which later formed the northwestern boundary of the flying field, served as the main thoroughfare between Dayton in Montgomery County and Springfield in Clark County.[14]

In an effort both to improve the transportation network and turn a profit, private companies operated toll roads throughout Greene County by the 1830s, and legislation allowed county commissioners to purchase stock in these companies to facilitate turnpike construction. Tollgates dotted early county maps. An 1874 Greene County atlas, for example, depicted a tollgate where the Dayton-Springfield Pike crossed the Yellow Springs Pike, indicating that it was of the "pay-as-you-go" variety (Figure 1). In

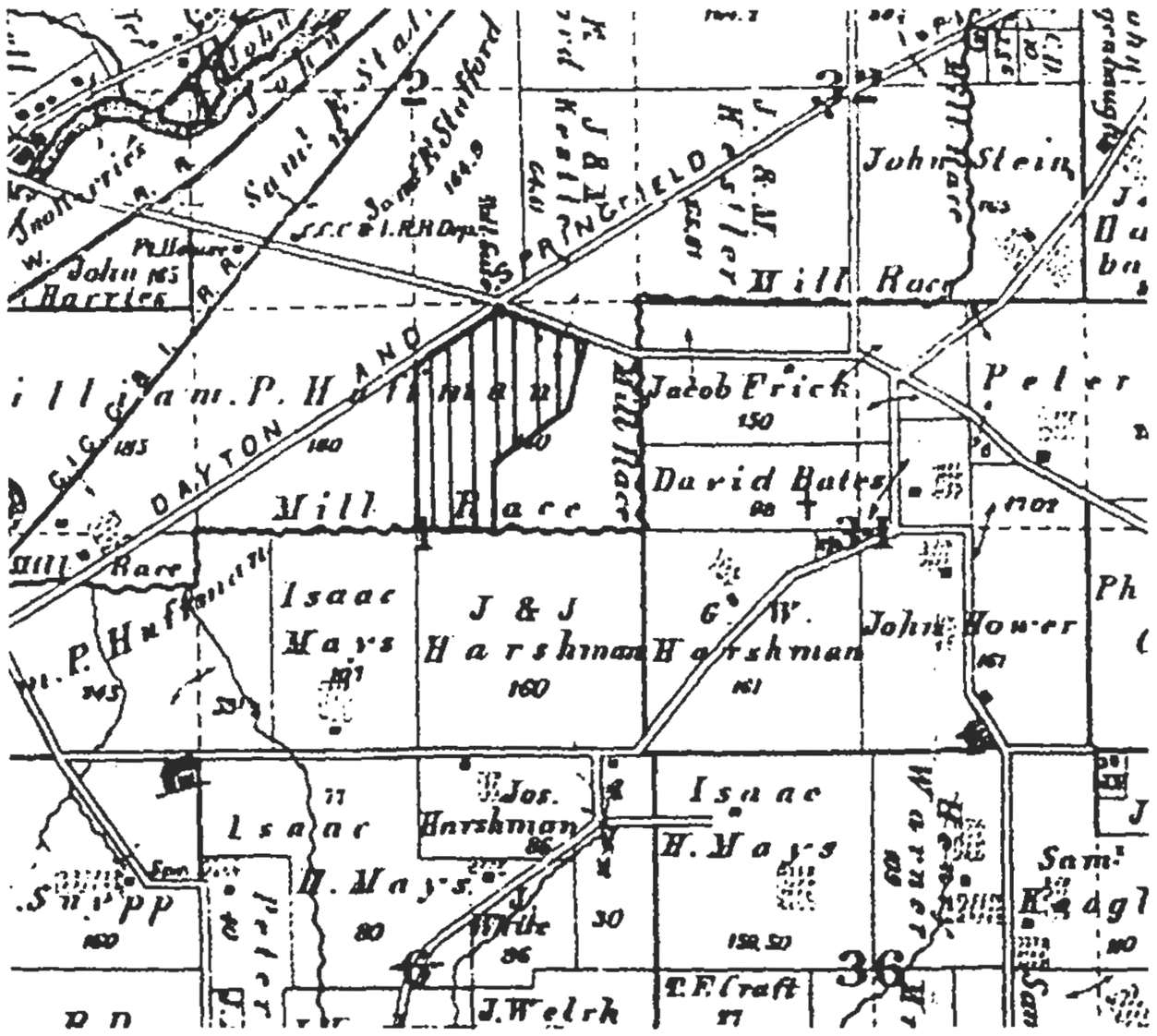


Figure 1. Bath Township, Greene County, Ohio, 1874. The line pattern denotes the flying field boundary.

the 1880s, the Ohio legislature provided for the outright purchase of these privately owned toll roads by the counties, and a later law mandated that local governments acquire the remaining roads still in private hands. No longer a toll road, the Dayton-Springfield Pike continued to serve as one of eight designated inter-county highways.[15]

At the turn of the nineteenth century, Daytonians occasionally referred to the area where the Wright brothers practiced flying as "Huffman Prairie." This land had been in the Huffman family since the early nineteenth century. William P. Huffman, the son of another William Huffman who came to Ohio in 1812, took over a tract of land in Bath Township from his father in 1847. By the 1870s, he owned a large acreage that included the site of the future flying field. William P. Huffman passed his property on to four sons, William, Frank T., George P., and Torrence. As shown in Figure 2, Torrence Huffman became the owner of the tract at which the Wright brothers conducted their flying experiments.[16]

By the late 1890s, two railroads connected residents of Bath to nearby Dayton where additional train lines linked them to the rest of the country (Figure 2). In the last decade of the nineteenth century, however, the development of a new mode of electrified transport provided an alternative to the steam-powered train for local passenger and freight traffic. Within Ohio's cities, horse- and mule-drawn trolleys gave way to the electric trolley. At the same time, the electric traction line linked cities and other locales that were previously without train service. Less costly to build, and able to travel swiftly and operate more frequently, electric interurban lines rapidly became a ubiquitous presence as they connected Ohio's major urban areas and smaller towns.

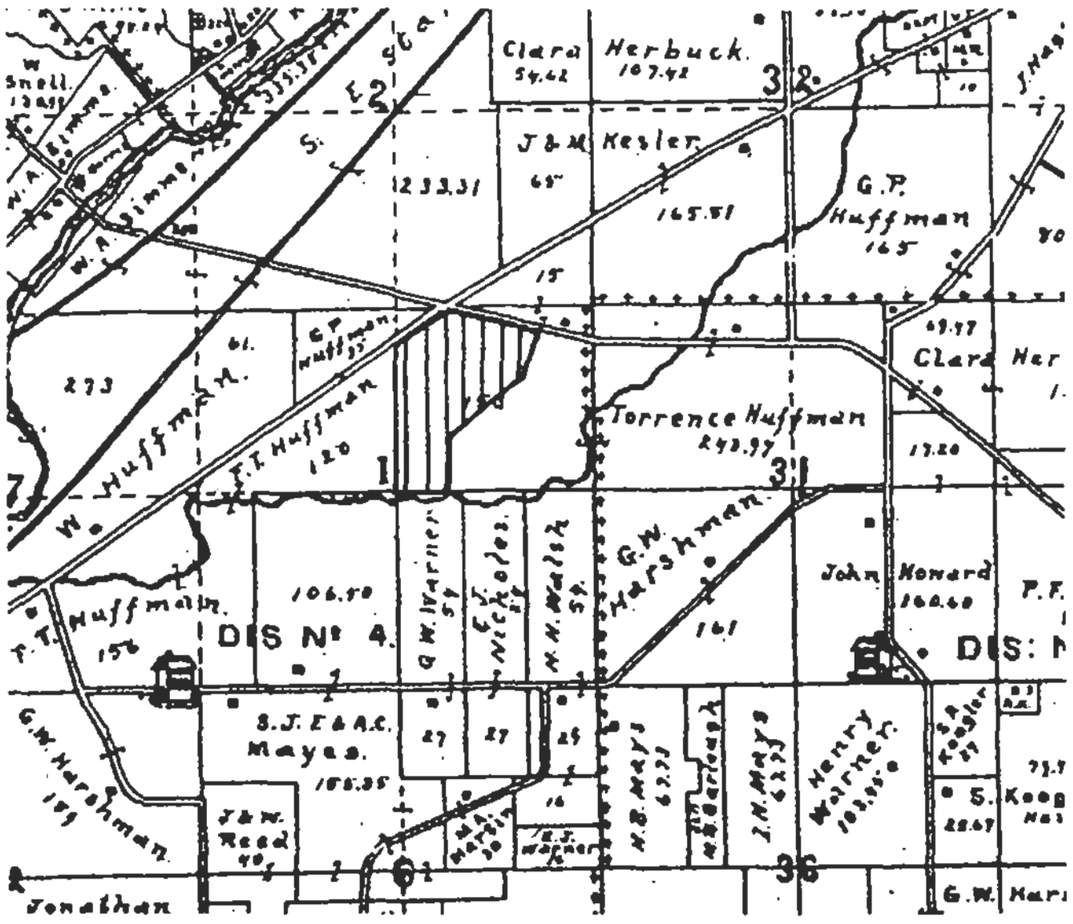


Figure 2. Bath Township, Greene County, Ohio, 1896. The line pattern denotes the flying field boundary.

Entrepreneurs raced to build inter-city traction lines in the "interurban madness" that swept Ohio at the turn of the century.[17]

Local and out-of-state businessmen spurred on by the newest trend in transportation planned to link Dayton to its neighboring smaller cities and towns via an extensive interurban system. One group of investors planned to build a traction line from the city of Urbana southwest toward Springfield. Another consortium intended to construct a line from Dayton northeast to Springfield. In 1895, the two syndicates merged to form the Dayton, Springfield, and Urbana Electric Railway (DS&U). With an infusion of capital from Boston financier Arthur E. Appleyard, the newly formed company began the task of laying forty-one miles of track to connect Urbana and Springfield to Dayton. Workers plowed their way through prairie, built a subgrade of clay and loam, then put down tracks ballasted with gravel. They moved across the gently rolling rural terrain until connecting with an electric trolley-line extension just outside Dayton. A passenger car manufactured by the Dayton-based Barney and Smith Company made the first run between Dayton and Springfield on February 14, 1900.[18]

In 1904, the year the Wright brothers began their work at Huffman Prairie, passengers paid five cents to ride the interurban within the Dayton city-limits. Riders could purchase round-trip tickets between Dayton and Springfield for sixty cents, or buy one-way tickets for a few cents per mile.[19] The inexpensive mode of transportation connected the hinterland to the city, and effectively expanded the Dayton-area marketplace. The interurban allowed passengers to travel with relative ease between cities. It gave farmers a new, faster way to transport their goods into the city, and allowed workers living in nearby Fairfield to commute to jobs in Dayton. The new electric traction line linked once-isolated rural areas to larger towns and to each other. And, most importantly to Wilbur and Orville Wright, the interurban made a stop at Simms Station, close to the Huffman Prairie. To the Wright brothers, the nearby interurban stop made this cow pasture an attractive place to continue their flying

experiments.

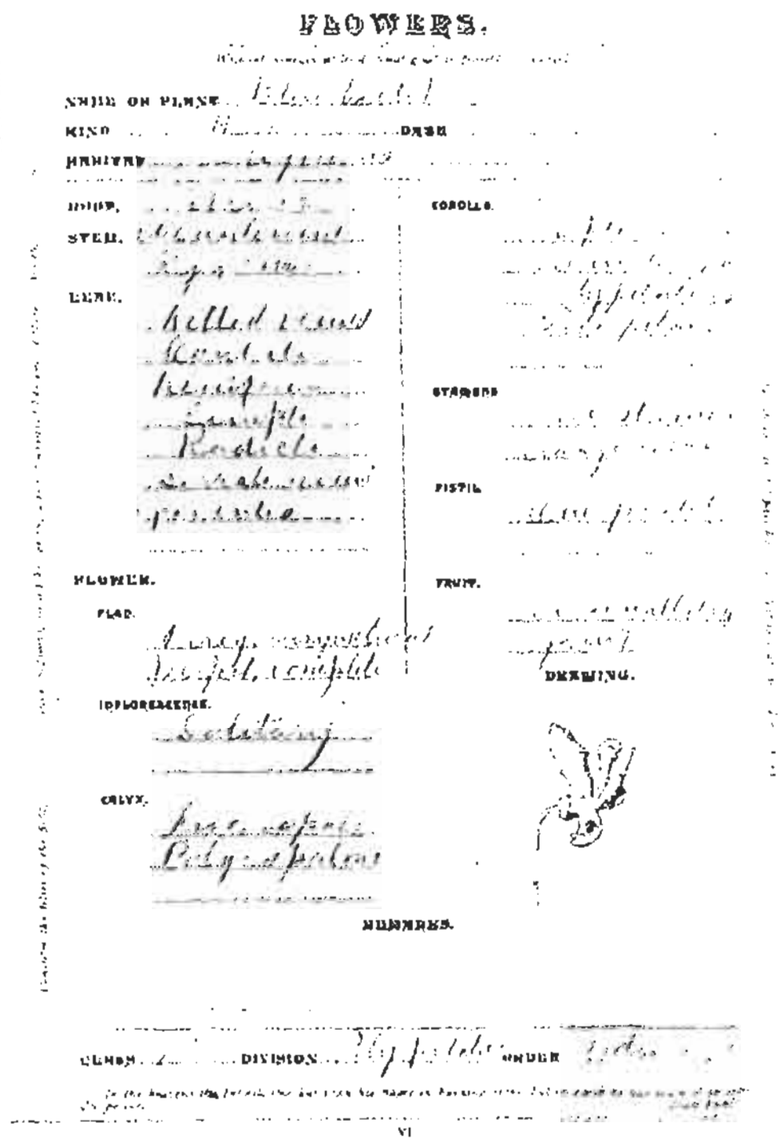
LEARNING TO FLY: HUFFMAN PRAIRIE, 1904-1905

Though Kitty Hawk, North Carolina had provided them with steady winds and sandy hills for their experiments, the Wright brothers found their excursions to the Outer Banks time-consuming, costly, and inconvenient. On one occasion in 1903, for instance, after damaging the flying machine during a trial, Orville had to make the long trip back to Dayton to fabricate replacement parts before he and Wilbur could continue their work.[20] Intent on finding a convenient location closer to home after their success in December 1903, Wilbur and Orville decided to make Huffman Prairie the location for their next experiments with powered flight.

Orville and his sister Katharine had each visited this site at least once, in a high school class taught by W.B. Werthner, who brought his students to the prairie for a botany lesson (Figure 3). The brothers asked its owner, Torrence Huffman, president of Dayton's Fourth National Bank, if they could use the field for their flying experiments. He found the brothers' proposal perplexing, yet harmless. He agreed to let them use the field rent-free, and asked only that they drive the cows and horses pastured there outside the fence before flying their machine.[21]

The Wrights' new experimental site was a flat, open acreage with an irregular, bumpy terrain, covered with prairie vegetation and enclosed by a barbed-wire and post fence. In the center of the field stood a large locust tree, and a few unidentified trees were scattered across its western end. The Dayton-Springfield Pike bounded the field's northwest side. A sparse line of trees lined the road on the north side and the DS&U interurban line ran along its south side. The interurban stop lay within easy walking distance, about one hundred and fifty feet from the field. Arriving at Simms Station, passengers disembarked on a wooden platform at the northeast corner of the intersection of Dayton-Springfield Pike and Yellow-Springs Road. The latter bordered the field on the northeast side. Across the fence to the east lay several farm buildings, a windmill, and a large cornfield. A creek bordered the field on the south and southeast, and drainage ditches ran along its edges. Apart from the one large tree and the cows with which they shared their new workspace, the Wright brothers found the oddly shaped, seven-sided field empty (Figure 4).

In spring 1904, Wilbur and Orville transported tools and building materials, along with the parts for their flying machine, to Simms Station on the interurban. They cut the tall grass on the field with scythes to prepare the terrain for flying.[22] They constructed a wooden shed, in the far southeast corner of the pasture near a bend in the creek, as far as possible from the interurban stop for privacy. Similar to the sheds they constructed at Kitty Hawk, the Wright brothers built this simple, wooden frame structure with a gabled roof and hinged doors that spanned the width of the building. The hangar, which measured approximately twenty-five by forty feet, was roughly oriented north/south. Its doors opened outward to form an awning that could be propped open perpendicular to the entryway (Figures 5 and 6).[23]


FLOWERS.

NAME OF PLANT.

KIND. ... ORDER.

HABITAT.

ROOT.

STEM.

LEAF.

COROLLA.

STAMENS.

PISTIL.

FLOWER.

FRUIT.

PLAN.

DRAWING.

INFLORESCENCE.

CALYX.

NUMBERS.

CLASS. ... DIVISION. ... ORDER.

VI

Figure 3. A page from Orville Wright's botany book showing a plant from Huffman Prairie Flying Field.

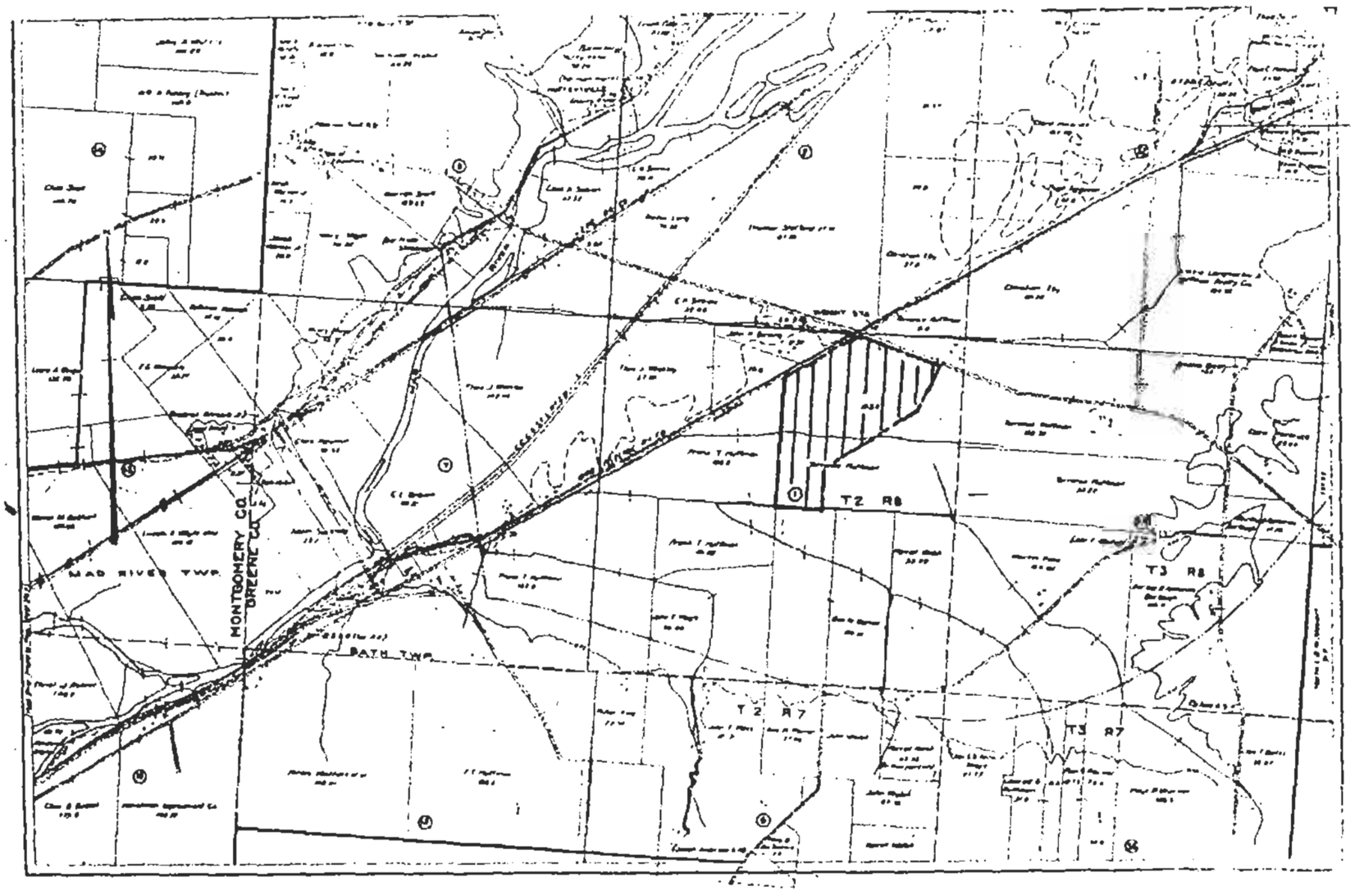


Figure 4. Huffman Prairie Flying Field, between 1900 and ca. 1915. The flying field boundary is denoted by the line pattern.

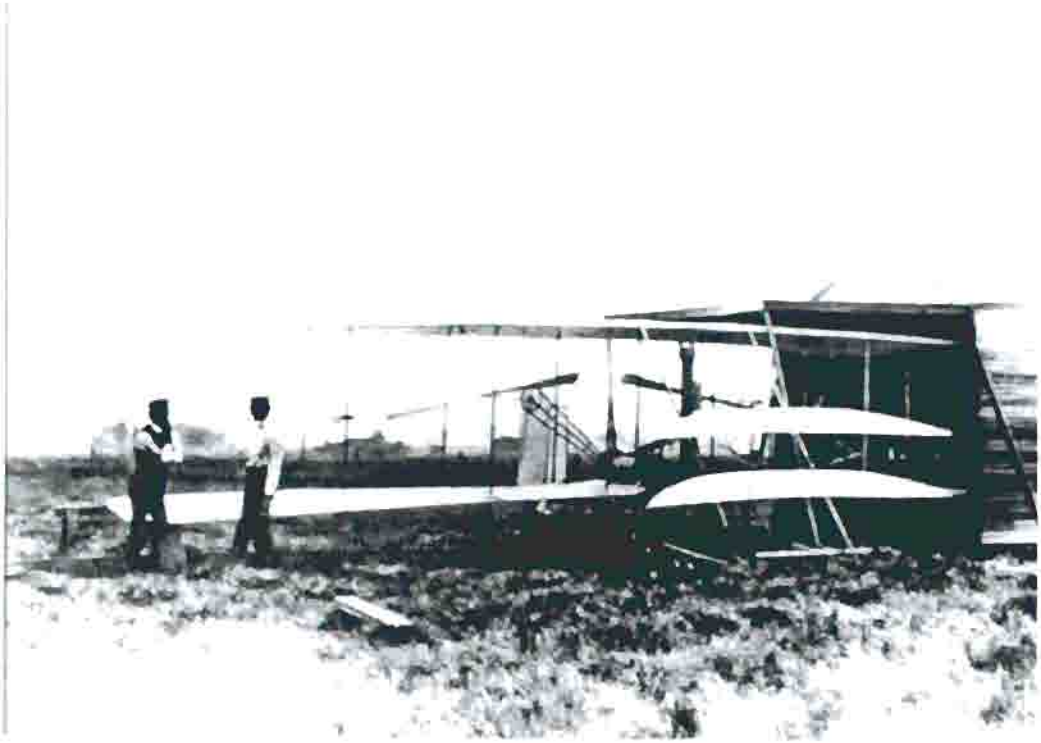


Figure 5. Huffman Prairie Flying Field, 1904.

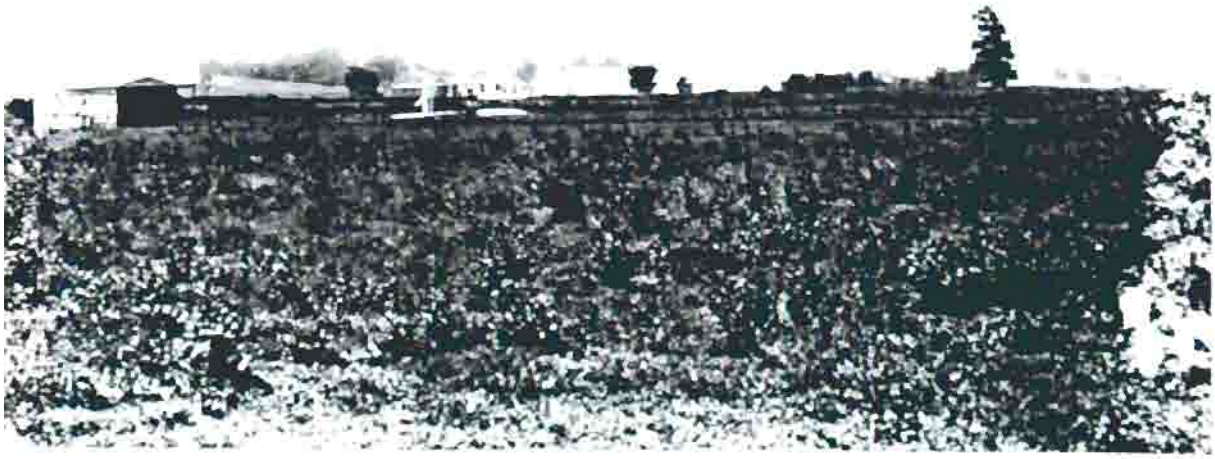


Figure 6. Huffman Prairie Flying Field, 1904.

Wilbur and Orville spent the month of April working inside the hangar. They assembled a new flying machine from parts constructed at their West Dayton bicycle shop to replace the airplane destroyed at Kitty Hawk back in December. Basing the construction of the new machine on the design of their 1903 flyer, the brothers made only a few modifications. They substituted white pine wing spars for the spruce used in the earlier model. In addition, they slightly altered the camber of the new plane, and improved the output of its engine.[24] In order to store the airplane in the hangar, they removed its front elevator apparatus since the shed could not accommodate the fully assembled machine.

Having finished the new flying machine, the Wright Flyer II, the brothers informed newspapers in Dayton and Cincinnati of their plans to try it out during the last week in May. They hoped to refute the ridiculously fabricated reports that had circulated following their flights at Kitty Hawk by inviting members of the press to witness for themselves the brothers' next flight attempt. Although a crowd of spectators and reporters gathered at Huffman Prairie on May 23, 1904, poor weather conditions kept Wilbur and Orville from making any trials. For the sake of the disappointed crowd, however, the brothers tried to give a demonstration of the airplane moving down its starting track. It ran right off the end of the rail without rising into the air at all. Heavy rains kept them grounded for two more days. Finally, on May 26 they succeeded in getting their machine aloft in front of a few lingering reporters. The twenty-five-foot flight failed to excite anyone; their public relations efforts had not gone as planned. Still, they had managed to assure that their experimental work at Huffman Prairie could now proceed without the interruption of nosy reporters who might reveal the details of their invention before they were ready.[25]

Despite its convenient proximity to Dayton and its relative seclusion, the Wright's new location proved far from ideal as an experimental flying field. Octave Chanute, a successful and well-known civil engineer, had conducted gliding experiments of his own. He became a friend and frequent correspondent of the Wright brothers after Wilbur first contacted him in 1900, seeking advice on a suitable location for his and Orville's experiments. Wilbur described their new location to Chanute in a letter:

> We are in a large meadow of about 100 acres. It is skirted on the west and north by trees. This not only shuts off the wind somewhat but also probably gives a slight downtrend. The greater troubles are the facts that in addition to cattle there have been a dozen or more horses in the pasture and as it is surrounded by barbwire fencing we have been at much trouble to get them safely away before making trials. Also the ground is an old swamp and is filled with grassy hummocks some six inches high so that it resembles a prairie-dog town.[26]

Still, the brothers tried to adapt to their new location. Wilbur explained: "We must learn to accommodate ourselves to circumstances. At Kitty Hawk we had unlimited space and wind enough to make starting easy with a short track. If the wind was very light we could utilize the hills if necessary in getting the initial velocity. Here we must depend on a long track, and light winds or even dead calms." In the strong gales at

Kitty Hawk, the airplane lifted into the air after only a forty-foot run down the track. The often still air at Huffman Prairie required the brothers to use upwards of 240 feet of track. Similar to the one they had used at Kitty Hawk, the Wright brothers' starting track consisted of a series of twenty-foot lengths of lumber, aligned and staked in place every few feet by short diagonal wooden supports. The top of each section was grooved to accommodate the small flanges that carried the airplane, resting atop a two-wheeled carriage, down the starting track.

The pasture's "prairie-dog town" resemblance made laying the track slow work; many times the flying conditions would change by the time they finished the job. Wilbur recounted their troubles to Chanute: "While we are getting ready the favorable opportunities slip away, and we are usually up against a rainstorm, a dead calm, or a wind blowing at right angles to the track." Often the brothers found themselves doubling their efforts; taking up the long track and moving it according to the shifting winds just after they had finished putting it down.

These conditions prevented them from making as many starts as they hoped. "We are a little rusty," Wilbur admitted to Chanute. He expressed confidence though, that "with a little more track and a little more practice" the brothers would "see what the machine can really do in the way of flying."[27] For months, they succeeded in flying only very

Figure 7. Huffman Prairie Flying Field, flight number 19. This photograph shows the 1905 hangar and flyer and the launching catapult.

short distances—a few hundred feet at best—staying aloft for seconds each time. As one historian has noted, "their notebooks for the period are a litany of broken wings, ... smashed propellers, damaged rudders, and broken supporting members."[28] Besides damaging their flying machine, the brothers on occasion sustained injuries of their own. Wilbur's journal for one such flight noted that the airplane, struck by a gust of wind, had nosed into the ground and overturned, breaking the rudder in the process. Of the pilot, Wilbur reported: "O.W. [Orville] had back of hand scratched & bruised, and sore all over."[29] By August, they had yet to match their longest flight made at Kitty Hawk. They needed more practice flying the machine and studying its capabilities. But weather conditions continued to make it difficult to gather enough ground speed to get the machine into the air. Orville and Wilbur would have to develop a way to transcend their dependence on the wind.

As was their custom, when the Wright brothers could not find an existing solution to a pressing problem, they devised one of their own. Their entire flying machine embodied a series of inventions and improvisations. The brothers had designed their own engine, for instance, when they could not find one that was both lightweight and powerful enough for their aircraft. When existing data concerning the properties of wind over the surface of an airfoil proved suspect, they had designed and constructed their own wind tunnel in order to test various wing shapes and rectify the errant data. Now, at Huffman Prairie, challenged by calm weather that kept them on the ground, Orville and Wilbur devised a way to overcome this problem too. Wilbur told Chanute, "It is evident that we will have to build a starting device that will render us independent of the wind."[30]

The brothers had their "starting apparatus" operational for the first time on September 7, 1904. It consisted of a twenty-foot tower situated at one end of the monorail track (Figure 7). A weight, manually hoisted to the top of the tower, was attached to a rope that ran over a pulley and down to the base of the tower where it went over a second pulley. The rope extended down to the end of the track, where it went over a third pulley, doubled back along the track, and fastened to the front of the airplane. Another rope held the machine in place. The plane sat atop a two-wheeled carriage resting on rollers that allowed it to travel down the track. The readied pilot reached over the wing of the plane and released a clip that held the anchor line, causing the weight to drop. As it fell, the weight pulled the airplane down the track. This measure allowed the craft to pick up enough speed along a relatively short length of rail regardless of the wind. The brothers found that a 1600-pound weight enabled them to take off using only a sixty-foot length of rail.[31]

With their launching device operational, they could now start their plane without a strong wind. Within a week they had made nine flights, and began to try maneuvering their flying machine through the air. On September 15, 1904, Wilbur succeeded in turning the plane for the first time, making a half circle in the air. Five days later, he flew the first circle in a flight that lasted over a minute and a half, traveling a distance of 1,505 meters.[32] With this flight, the Wright brothers were on their way to mastering the fundamentals of controlled, powered flight.

Wilbur and Orville had to take several factors into consideration as they taught themselves to fly. Not only were they learning to operate a new machine, they were constantly and systematically fine-tuning it along the way, so that each flight for both pilot and machine was a new experience. The brothers also tried to keep within the boundaries of their allotted space at Huffman Prairie. Wilbur explained how the practice field impacted their attempts to maneuver their aircraft in a circle: "On the first three trials we found that we had started a circle on too large a radius to keep within the boundaries of the small field in which we were operating. Accordingly, a landing was made each time, without accident, merely to avoid passing beyond the boundaries of the field."[33]

The Wright brothers' journal entries recorded their frequent accommodations to obstacles and space limitations despite the open expanse of Huffman Prairie. Their notations included remarks such as "passed over cattle and soon after touched wing tip. Broke skids and f[ront] rudder." On one occasion, the airplane passed over the fence into a neighboring cornfield, "chased flocks of birds on two rounds and killed one which fell on top of upper surface and after a time fell off when swinging a sharp curve." Of another flight, Wilbur noted, "did not begin to circle in time and landed to avoid going over fence. Landed in west ditch." From time to time they passed by the cows with which they shared the field. Again, Wilbur recorded the flight conditions: "Dead calm, went over two herds of cattle."[34]

The Wrights concluded their remarkable year of experiments with their last flight of December 9, 1904. The brothers had completed a total of 105 flights, for a combined flying time of forty-nine minutes (Figure 8). Wilbur piloted the longest flight— two and ¾ miles—in November, making almost four complete circles of the field.[35] The brothers had made many advances throughout the season, but as the year drew to a close, they worried about continuing their work at Huffman Prairie. Wilbur confided to Chanute, "Up to the present we have been very fortunate in our relations with newspaper reporters, but intelligence of what we are doing is gradually spreading through the neighborhood." The Wrights wanted to keep their activities a secret until they could secure a patent for their machine. Wilbur explained, "we are becoming uneasy about continuing them much longer at our present location. In fact, it is a question whether we are not ready to begin considering what we will do with our baby now that we have it."[36]

That winter Orville and Wilbur, desiring to find a more spacious, yet secluded, flying field, considered moving their experiments elsewhere. Wilbur questioned Chanute in March, 1905, "are you acquainted with any prairie land in Illinois which you would consider suitable for a practice ground? Something neither too accessible nor inaccessible?" When Chanute suggested a deserted place called Dune Park along the Lake Michigan shore in northern Indiana, Wilbur demurred, explaining that their old camp at Kitty Hawk was still preferable over a remote location where they would have to construct another camp. "Our chief objection to the Huffman Prairie grounds," Wilbur wrote, "is not the lack of seclusion but the lack of room. We need a place where we can start at the building and fly in any direction." Because the flying field was bound on one side by trees, surrounded by corn fields, and riddled with bumpy, grassy hummocks that left few places to lay the starting track, Wilbur and Orville could not

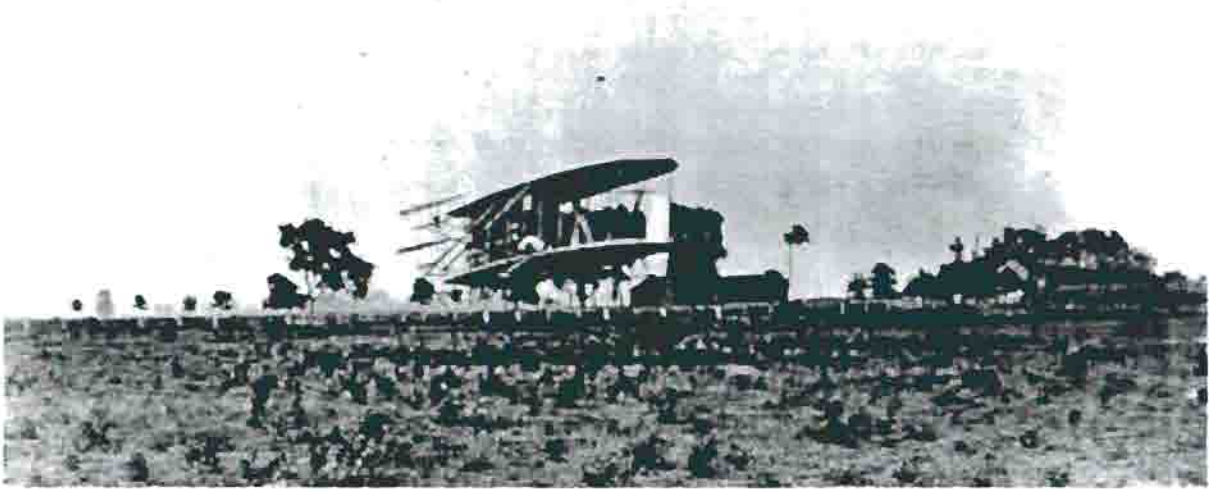


Figure 8. Flight at Huffman Prairie Flying Field, 1904.

take off from just anywhere, nor fly in just any direction. Instead, space limitations and the shape of the field prompted them to follow a counter-clockwise, elliptical flight path, using the large locust tree in the center of the field as their turning point. In the early spring, Wilbur wrote to Chanute again, stating, "We ourselves do not know when or where we will resume flying experiments."[37]

In the end, however, the Wright brothers decided to stay at Huffman Prairie. Traveling there on the interurban once more in the spring of 1905, they constructed a new, slightly larger hangar. Their first shed had been moved to an adjoining farm to house livestock. They built the new hangar closer to Yellow Springs Road, north of the old location. The hangar stood several hundred feet south of Yellow Springs Road and a few hundred feet east of its intersection with Dayton-Springfield Pike.[38]

Wilbur and Orville began work on a third plane in May 1905. A month later they were ready to make their first flight in the new machine, the Wright Flyer III. With this aircraft, the brothers had achieved another crucial step in devising a reliable system of flight control. The 1905 flyer marked the first time the Wrights separated the rudder control from the wing-warping mechanism, thus finally placing full control of the machine in the hands of the pilot. It would still take the rest of the summer, though, to work out the remaining bugs in the system.

As the "flying season" got underway, Orville and Wilbur found their efforts hampered by weather conditions once again, this time by rain. Heavy rains turned the field into a swamp for days on end due to its low elevation and boggy nature. Wilbur described the field after one rainy spell: "It is clear now, but over a large part of the meadow we can get about only by jumping from hummock to hummock, the level ground being under water. It will probably be several days before we can do anything."[39] Even when the ground was not submerged, its soft texture increased the work of toting the plane back to the starting track. Wilbur noted:

> the wet weather of this year has very much interfered with our practice by keeping the ground so wet and soft that we have been entirely prevented from operating many days when the sky was clear. The labor of moving the machine on wheels had been greatly increased, and the overexertion produces quick exhaustion, so that only a few flights can be made at a time. [40]

The brothers used the down time afforded by the wet weather to further adjust their invention. Sometimes they had trouble handling the machine with its new alterations. In August, Orville flew the plane with its newly modified rudder for the first time. Wilbur recorded the flight in his journal: "This was first trial of O.W. with new rudder. A very comical performance."[41]

Over the course of the summer, Orville and Wilbur continued to modify many aspects of their machine's design, fine-tuning the elevator, rudder, and propellers. Despite these improvements, they continued to experience some difficulty in controlling the lateral movement of the plane. The large locust tree in the center of the field, around which the brothers practiced circling, provided the incentive during one flight to solve one of the last remaining problems in operating the aircraft. As Orville attempted to circle the tree, he found the plane instead "tilting up and sliding toward it." Faced with the prospect of crashing into the thorny tree, he lowered the elevator in an attempt to force the plane down on the ground. With the machine tipped down, it promptly responded to the lateral control and finished the flight, landing with several thorns driven into an upright where the wing had struck a branch. For the Wright brothers, the flight was a breakthrough, revealing to them that the problem had not been a flaw in the design of their machine, but merely an error in handling it. With this new understanding of flight control, the Wright brothers felt they were now ready to market their invention.[42]

Orville and Wilbur went on to make several more trials of increasing distance and duration in 1905, at times landing only because they ran out of fuel. On October 5, Wilbur completed the longest and last flight of the season, traveling over twenty-four miles at an average speed of thirty-eight miles an hour. During this flight, which lasted longer than all 105 flights of 1904 combined, Wilbur landed after exhausting the gasoline supply, having circled the flying field twenty-nine times (Figure 9).[43]

As their flights around the cow pasture grew longer, Orville and Wilbur found they could no longer time their experiments to avoid the interurban trolley as it passed by the field and stopped at Simms Station. Farmers working in nearby fields as well had a clear view of the plane as it circled overhead. A small crowd of onlookers saw the flight of October 5. Wilbur recounted to Chanute: "Some friends whom we unwisely permitted to witness some of the flights could not keep silent, and on the evening of the 5th the *Daily News* had an article reporting that we were making sensational flights everyday." The *Cincinnati Post* carried the item the next day. Still concerned about keeping secret the details of the invention until they secured their patent, Orville and Wilbur suspended their flying activities. Though they considered trying to put the record for time in the air above one hour, poor weather kept them grounded. They flew just once

Figure 9. Flight of October 4, 1905. On the following day, Orville completed the longest flight to date.

more, on October 16—their last flight at the flying field in 1905.[44]

Though they did not fly again that year, through their work at Huffman Prairie in 1904 and 1905, they succeeded in developing the world's first practical airplane. Modeled after the 1903 Kitty Hawk machine, the 1905 Wright Flyer III featured a front elevator, operated by a lever to control pitch; a rear rudder, operated by another lever to control the direction of the plane on its vertical axis; and a wing-warping system to control the machine's lateral movement. The pilot, lying prone next to the engine along the lower wing of the biplane, operated the wing-warping mechanism by shifting his weight in a "hip-cradle" device. Twin propellers at the rear of the plane, connected by a crossed bicycle-chain to overcome the effects of torque, pushed the machine through the air, and long skids allowed it to land safely on the ground. The Wright Flyer III was thus both sturdy and maneuverable. It could withstand repeated take-offs and landings, and was able to turn, bank, circle, and fly figure eights.[45]

Despite the confining space, uncooperative winds, and poor weather that characterized the flying field, during 1904 and 1905 the Wrights had taught themselves to fly and developed a machine capable of controlled, sustained and repeated flight. The truly unique and revolutionary experiments that took place there have forever imbued the

site with worldwide importance.

FROM HUFFMAN PRAIRIE TO THE WORLD, 1906-1910

Ready to put their invention to practical use, the brothers ended their flying activities at Huffman Prairie Flying Field. Following the 1905 season, the Wright brothers would not return to Huffman Prairie Flying Field for five years. They turned their full attention toward securing a patent for their invention, for which they had first applied in 1903, and marketing their machine. Much to the brothers' surprise, the United States government at first failed to see the practicality of an airplane, and moreover, did not believe that the Wrights had really developed a machine that could fly. Efforts to market their plane in Europe met with more success. Negotiations with the governments of Great Britain, France and Germany went slowly, and Wilbur and Orville found their search for reliable contractors to build Wright-designed airplanes filled with complications.

The Wright brothers soon found that their attempts to patent and market their invention occupied most of their time and frequently took them away from home. They spent most of 1906 attempting to interest the U.S. government in putting their invention to use in the military. They also met and corresponded with representatives from foreign countries about the possibilities of their purchasing an airplane. At the same time, the brothers tried to convince members of the press and the scientific community at home that their claim to have invented the airplane was indeed true.

By the early part of 1908, Orville and Wilbur had successfully negotiated a deal with a French syndicate to establish a company with the rights to manufacture, sell, or license Wright-designed airplanes in France. They had also contracted to build a plane for the United States Army. Both contracts were contingent upon the success of the brothers' machines in a series of performance evaluations.[46] In order to ready themselves for these trials, Wilbur and Orville traveled once again to their old camp at Kitty Hawk in April 1908. They had modified the controls of the 1905 flyer to enable the pilot to operate them from a seat mounted on the lower wing of the machine. At Kitty Hawk, Orville and Wilbur got acquainted with the airplane's new controls. They also practiced flying with a passenger onboard for the first time, something they would have to do during the performance trials.

With two contracts pending, Wilbur and Orville divided their tasks. Wilbur left from Kitty Hawk for France to prepare for his performance trials, while Orville returned to Dayton to prepare for the U.S. government trials. In France, Wilbur assembled the airplane parts shipped to him by Orville and successfully flew before an astonished crowd in Le Mans in August 1908. Orville began his demonstration flights for the Army at Fort Myer, Virginia the following month. On September 17, Orville piloted the airplane with a passenger on board in accordance with the requirements of the Army contract. During the flight, a propeller broke, striking a guy wire and disconnecting the rudder from a control lever in the process. Out of control, the airplane plummeted to the ground, seriously injuring Orville and killing the passenger, Lieutenant Thomas E. Selfridge, the first American serviceman to die in a plane crash. The Army postponed the trials.

After weeks of recuperation, Orville, with his sister Katharine, joined Wilbur in Europe. The Wrights received widespread acclaim across the continent. The Europeans were impressed by the brothers' triumph over the problem of human flight. They were also quite taken with the unassuming personalities of all three Wright siblings. Photographs, stories, and details of their lives abounded in the European press.

In 1909, Orville and Wilbur returned to Fort Myer to complete the performance trials for the Army contract. Piloted by Orville, the Wright airplane met the Army's requirements for speed, endurance, and distance. The U.S. Army purchased the flying machine for $30,000, and designated it Signal Corps Airplane No. 1.[47] Since the Army contract also stipulated that the Wrights instruct two military men to pilot the machine, Wilbur traveled to College Park, Maryland to train Lieutenants Frank Lahm and Frederick E. Humphreys, both of whom had experience piloting balloons and dirigibles. They became the first two United States military aviators. The third, Lieutenant Benjamin D. Foulois, received a short course in flying before the Army sent him to Fort Sam Houston, Texas with the new flying machine. There, Foulois continued to train on his own. He sent lengthy descriptions of his progress to Orville, who wrote back with advice on how to maneuver the plane under various circumstances. Foulois later quipped that he learned to pilot an airplane via correspondence course.[48]

The U.S. Patent Office had granted the Wright brothers a patent for their invention in 1906. With their flying machine accepted by the public and their patent secure—at least temporarily—Orville and Wilbur next turned to the business of manufacturing and licensing Wright-designed aircraft. The Wright Company was incorporated in the State of New York, where most of its board members were based, on November 22, 1909. Wilbur Wright served as president, Orville as vice president. The Board of Directors included such notable businessmen as August Belmont, Robert J. Collier, Cornelius Vanderbilt, and Russell Alger.[49] The company began to manufacture airplanes in Dayton beginning in February 1910, operating out of temporary rented quarters at the Speedwell Motor Car Company factory at 1420 Wisconsin Boulevard, and later in the brothers' old bicycle shop at 1127 West Third Street. In November of that year, they moved into newly constructed factory buildings at 2701 Home Avenue.

Under the newly formed The Wright Company, Orville and Wilbur also organized an exhibition team and made plans to operate a flying school from their old grounds at Simms Station. Through these two ventures, the Wright brothers intended to promote aviation and market their airplanes. The Wright Company leased the brothers' old flying field from Torrence Huffman. In the meantime, they selected a temporary site in Montgomery, Alabama to begin training pilots for the exhibition team until the spring thaw allowed them to move their operations north to Huffman Prairie Flying Field.

A NEW ERA OF AVIATION: HUFFMAN PRAIRIE FLYING FIELD, 1910-1916

In 1910, the Wright Company prepared the field at Huffman Prairie for flight once more, and constructed a large hangar that could house several airplanes. There is no

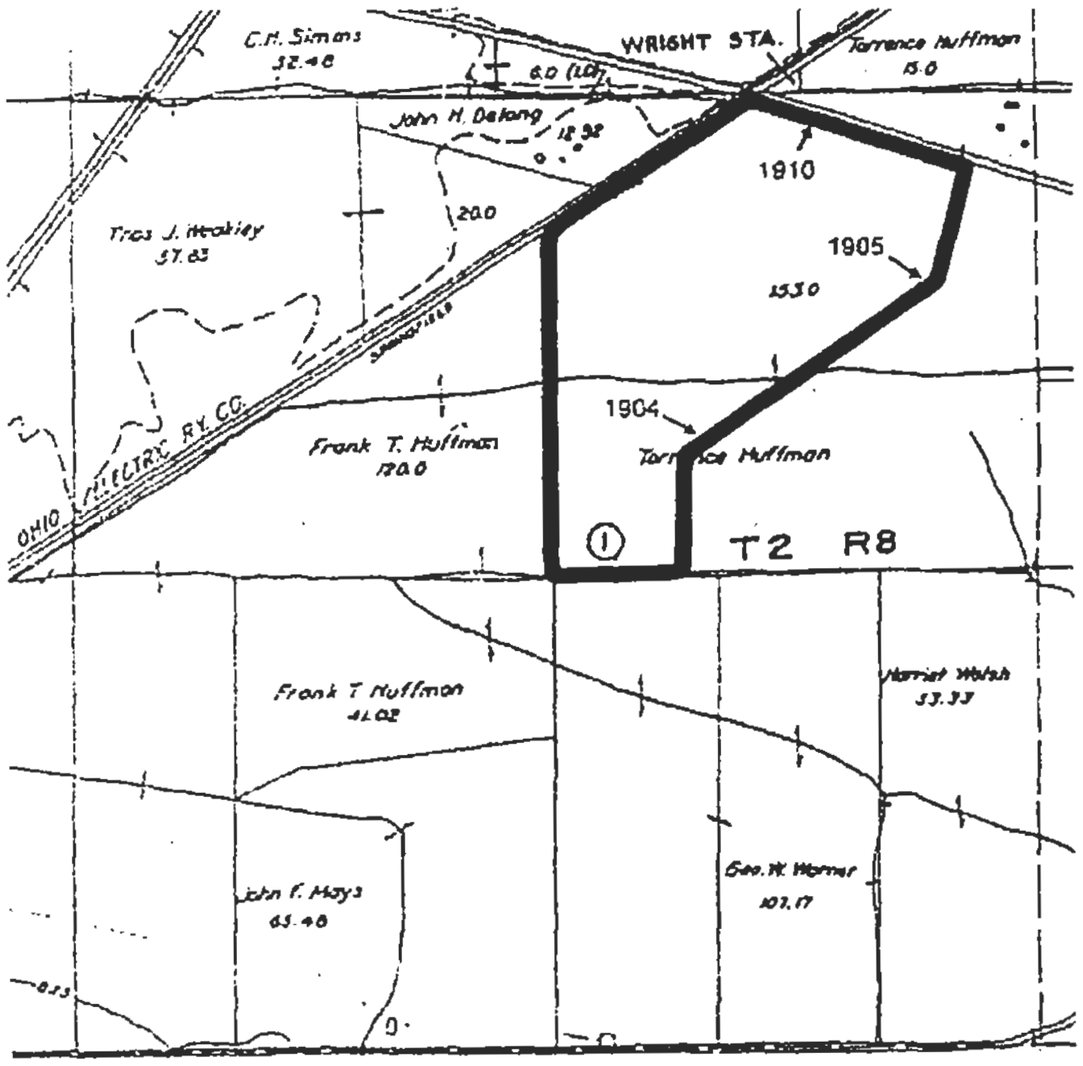


Figure 10. Approximate locations of 1904, 1905, and 1910 hangars.

evidence to suggest that both structures ever occupied the flying field at the same time, and it is not known what became of the 1905 hangar. No longer concerned about keeping their activities on the flying field from the public, the Wright brothers had the new hangar built close to the interurban stop, at the intersection of Dayton-Springfield Pike and Yellow Springs Road (now known as Marl and Symmes Road, respectively) (Figure 10). The new wood-frame shed, with its main entrance facing south, featured a low-pitched gabled roof similar to the hangars built in 1904 and 1905. Instead of the awning-type doors of these earlier models, the new building had large doors in the front (south wall) only, consisting of four wooden panels that slid sideways on an overhead track. Wooden beams helped support the doors in their opened position. Up to three airplanes could be rolled up a short wooden ramp and onto the plank board floor of the hangar, which measured approximately sixty by one hundred feet. The hangar stood about fourteen feet high at the eaves and almost twenty feet at its ridge. The new structure had two small windows with paned glass in the center of the front gable just below the roofline, with two smaller, rectangular windows on either side. Four paned glass windows at the rear of the hangar overlooked the Yellow Springs Road. In the front of the hangar, a small flag flew from a pole at the peak of the roof. Visitors could enter the hangar on the north side from the road through a small door in the back (Figures 11 – 14).[50]

THE WRIGHT EXHIBITION TEAM

By 1910, Americans had begun to develop the same fervor for aviation that prevailed in Europe. Stunt pilots performed daredevil maneuvers at carnivals, county fairs, and other large public gatherings across the country, racing at high speeds, diving, and

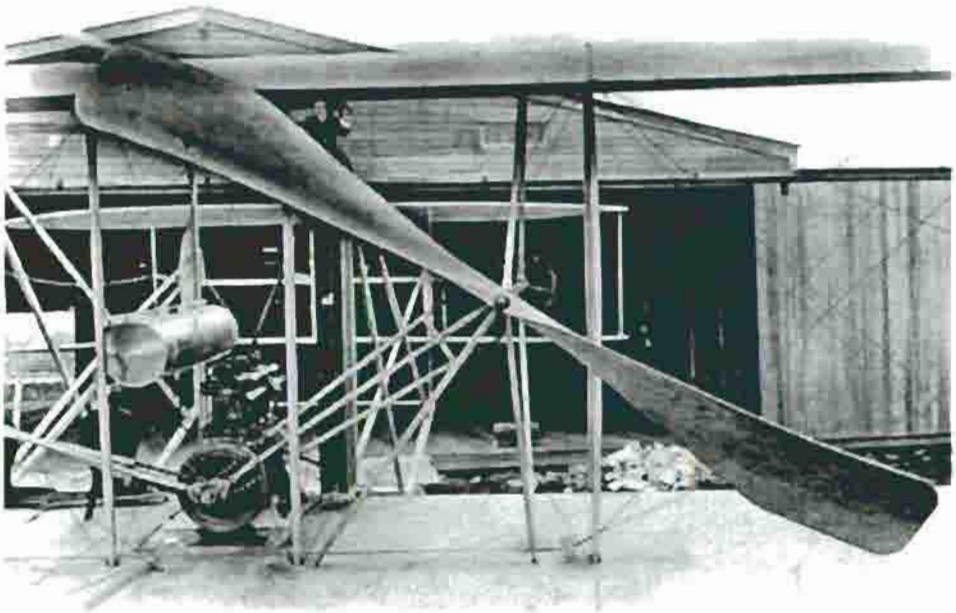


Figure 11. Detail of Wright Flyer and south wall of 1910 hangar.

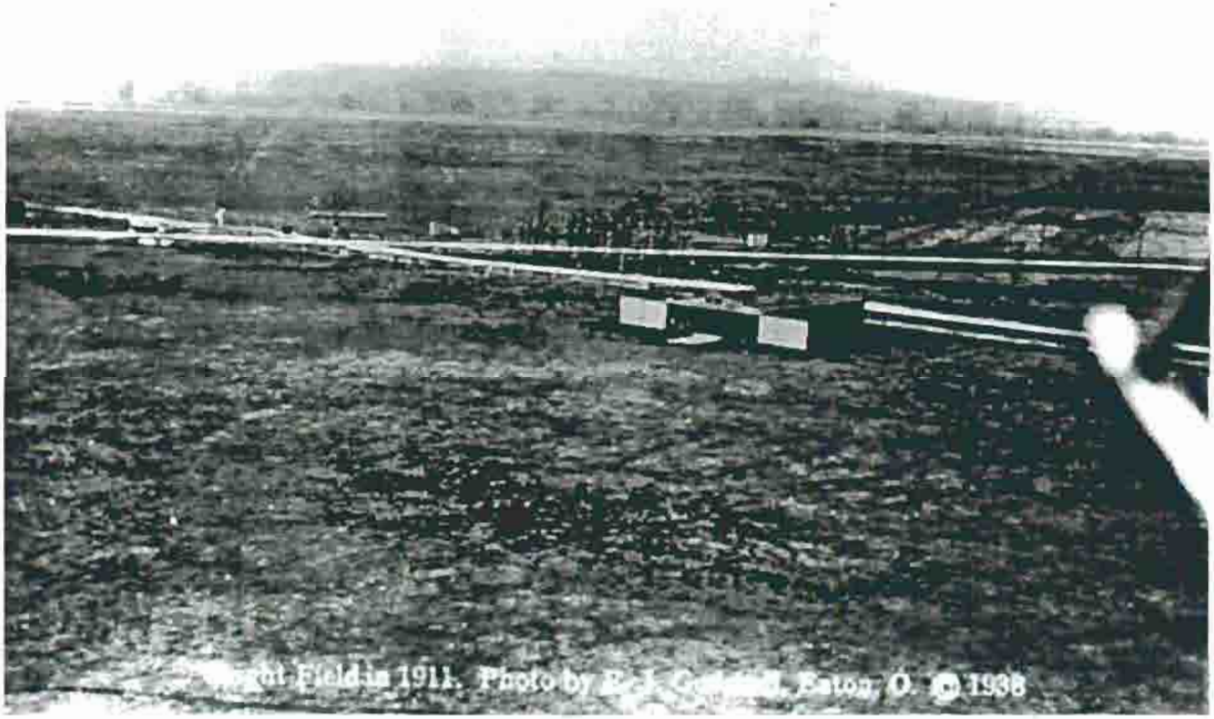


Figure 12. 1910 hangar, view of intersection of Marl and Symmes Roads, 1911.

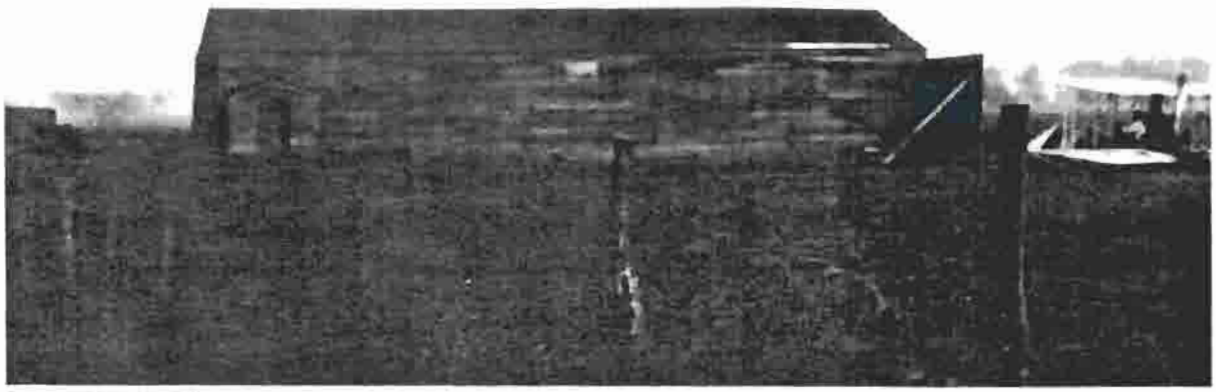


Figure 13. 1910 hangar, view to east. A small gable-roofed shed is visible at the left side of the photograph.

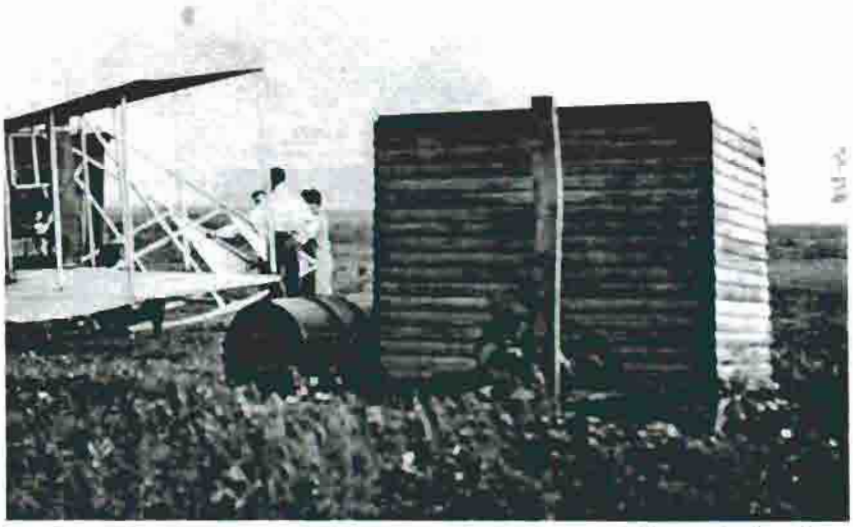


Figure 14. 1910 hangar, showing what appears to be a different shed to the west of the hangar.

looping-the-loop before thrilled onlookers. Appearance fees and prize money attracted many aviators to the business. The Wrights joined in this nationwide sport craze with the establishment of the Wright Exhibition Team. While they saw the exhibition team primarily as a means to promote aviation and create a market for their invention, it proved a profitable venture in its own right. In spring 1910, the training of the exhibition team commenced at Huffman Prairie Flying Field, with Orville handling the flight-instruction of team members. Orville made the first flight in almost five years at the flying field on May 7. Having successfully instructed two pilots in Montgomery for the exhibition team, Walter Brookins and Arch Hoxsey, Orville finished training a third, L. Welsh, at the flying field. The rest of the team included Frank Coffyn, Ralph Johnstone, Phil O. Parmalee, J. Clifford Turpin, Howard Gill, and Leonard Bonney.[51]

Wilbur, in the meantime, traveled extensively in connection with several lawsuits the brothers filed against aviators and airplane manufacturers who were infringing on the Wrights' patents. Orville kept him apprised of the team's activities and progress. Orville noted about one new team member, for example, "Bonney is the most hopeful of our newer men ... he weighs 125 [pounds], and will make a good racer." Orville also described to Wilbur how he and the team simulated a racecourse at the flying field. Using lime, he marked out the boundaries representing a half-mile racetrack so pilots could practice climbing and turning while staying within the limits of the prescribed area. The exhibition pilots had great difficulty staying in-bounds. Orville, however, reported to his brother, "I was blown over the line but once."[52]

Managed by Roy Knabenshue, team members traveled around the country performing and competing with other exhibition troupes. Though The Wright Company assumed no liability for personal injuries sustained by its pilots, it did allow them to use their own discretion in assessing the conditions of the racing venue, the weather, and the aircraft before deciding to make a flight. Pilots received a salary of twenty dollars per week, plus fifty dollars for every day they flew. The Wright Company charged $1,000 for each day that a team member performed, and received any prize money he earned. Orville and Wilbur required their pilots to abide by the standard Wright family rules. Wright Exhibition Team members could not drink, gamble, or fly on Sundays.[53]

Flying for sport proved hazardous, especially as aviators tried to outdo each other for speed and altitude records. Crashes and injuries were the order of the day. Many times both pilot and spectator were at risk. A plane piloted by Arch Hoxsey injured a number of onlookers when it unexpectedly dropped to the ground during a low-level pass near the grandstand at the Wisconsin State Fair in Milwaukee. Team member Ralph Johnstone became the first American pilot to die in a crash when he failed to pull out of a dive during a meet at Overland Park in Denver, Colorado. Hoxsey died in similar fashion on December 31, 1910 at Dominguez Field, Los Angeles, during an attempt to break an altitude record. Five of the original nine team members eventually died in airplane crashes. Appalled at the extreme risks and the loss of life that seemed to go hand in hand with the exhibition circuit, the Wrights dissolved the team in 1911 and got out of the business.[54]

In addition to the flying activities of the Wright Exhibition Team, Huffman Prairie Flying Field served as the staging ground for a number of significant flights in 1910. Wilbur,

becoming increasingly occupied with the brothers' business affairs, made his last flight as a pilot in the United States on May 21, 1910. Four days later, with Orville at the controls, the Wright brothers made their first and only flight together. In September, Orville thrilled crowds as he flew from Simms Station to downtown Dayton, circled the city, and then followed the course of the Mad River back to the flying field as a publicity event for Dayton's Industrial Fair. In November, Orville and his sister, Katharine, went to Huffman Prairie to watch exhibition team pilot Phil Parmalee take off in a Wright airplane carrying a cargo of silk for delivery to the Morehouse-Martens Company in Columbus, Ohio. The flight, which marked the first use of an airplane to carry commercial freight, took just under one hour. As part of its promotional campaign, the Columbus firm paid almost five thousand dollars for the air cargo shipment.[55]

THE WRIGHT SCHOOL OF AVIATION

Though the exhibition team lasted but two years, The Wright School of Aviation, also started in 1910, continued to ensure that the field at Huffman Prairie would remain a center of activity for instructors, student pilots, and spectators (Figures 15 – 18). The Wright Company touted the field's convenient location on an interurban stop just outside Dayton as a selling point to attract students to the flying school. One advertisement described the small field, with the same marshy terrain that had hindered the Wright brothers' efforts during the 1904-05 flying seasons, as "admirably adapted" for flight training:

> In order that all who wish may have the opportunity of learning and practicing this delightful art, The Wright Company has opened a permanent school of aviation at the historic grounds, near Dayton, where the Wright Brothers carried on their early experiments. This field is located only a few miles from Dayton, and is easily accessible by an electric car line, with a station at the door of the hangar. The field is admirably adapted to training purposes, being level ground, free from trees and other obstructions, and surrounded upon all sides by flat country.[56]

One early student of The Wright School of Aviation remembered that a number of other "doubtful" flying schools used planes that could scarcely get off the ground or else made only short, straight "hops." Such schools made their money by charging a breakage fee. The Wright school, on the other hand, provided its students with the use of an airplane free of charge, required no damage deposit, and charged no breakage fee. Marjorie Stinson was one of three women trained by the Wright School. In an effort to get her father to pay for flying lessons at Huffman Prairie, she pointed to the benefits of the Wright program: "They stand any breakage I might bring about and furnish the plane free of charge while I get my license." She stressed this point: "Of course you don't know about that but it is customary for [other] schools to require a deposit of two hundred and fifty dollars for breakage and in case the student does smash anything it is paid for liberally out of the 250."[57] The school initially offered individual instruction for $500. Later, eager students paid only $250 for instruction in small groups of three or four.[58] Pupils who could not learn to fly within the allotted time had the option of paying for additional instruction by the hour.

Figure 15. The Wright School of Aviation.

Figure 16. Crowds along Dayton-Springfield Pike (now Marl Road), 1910.

Figure 17. Flights at Huffman Prairie Flying Field, 1910.

Students who enrolled in The Wright Company's flying school received most of their initial training in a back room of the company factory, learning the mechanics of the aircraft and getting a feel for the controls in an improvised simulator. By 1910, aircraft designed and manufactured by competitors of the Wright brothers offered a variety of control systems. The airplanes designed by Glenn Curtiss, for example, featured a control mechanism that allowed pilots to push or pull the control stick in order to raise and lower the airplane's elevator, and turn it left or right in order to turn the aircraft in either direction. An additional control allowed the pilot to lean in the direction in which he wished to bank.[59]

Wright-model aircraft operated in a less intuitive fashion. In other words, moving a control lever in one direction did not result in a corresponding movement of the airplane in the same direction. Instead, Wright-designed aircraft featured two control

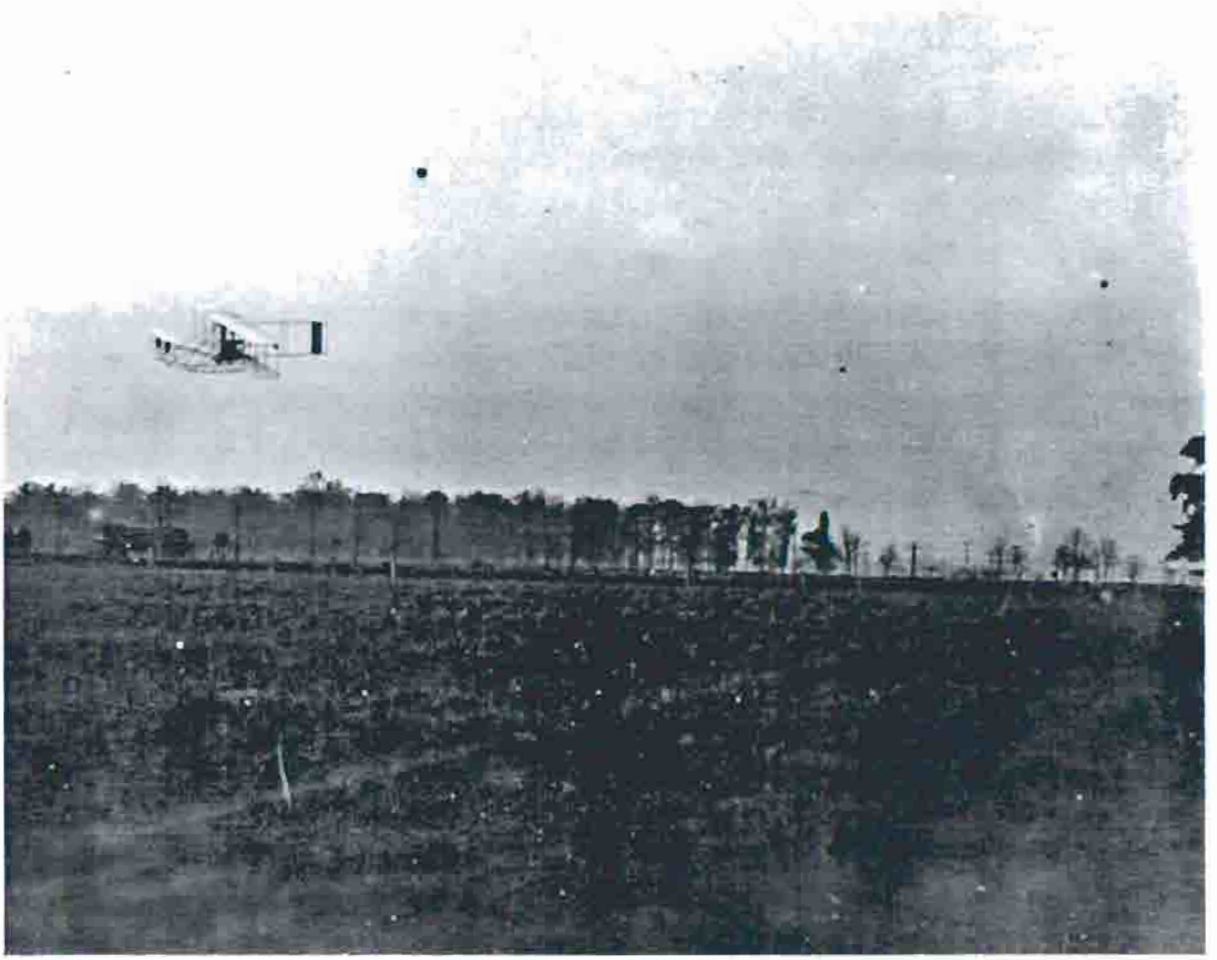


Figure 18. Wright Model A at Huffman Prairie Flying Field, 1910.

levers. One controlled pitch, while the other, replacing the "hip-cradle" device of the earlier Wright flyers, controlled the aircraft's lateral movement. A hinged handle at the top of the lateral-control lever allowed the pilot to operate the rudder by turning his wrist left or right, thus controlling movement of the airplane along its vertical axis. The Wright's school tried to insure that students mastered this somewhat complicated control system by providing them with ample training in a flight simulator where they could learn from their mistakes on the ground. Once students had learned to handle the simulator at The Wright Company factory on West Third Street, they moved on to the Huffman Prairie Flying Field.

The interurban, known as the Ohio Electric Railway by 1910, made the twenty-minute

trip from downtown Dayton to Simms Station every thirty minutes, ferrying students and spectators out to the flying field. Passengers exited at the Simms Station platform and passed over a small wooden bridge that spanned the deep, spring-fed ditches on either side of the road. Walking a short way down the Yellow Springs Road (now Symmes Road), one crossed a footbridge over another ditch, and entered the field through a gate near the rear of the hangar.[60] The flying field remained fenced throughout the Wright brothers' use of it. Sometime after 1910, an additional parking area on the east side of the hangar was enclosed with barbed-wire fencing to accommodate the automobiles that occasionally brought spectators out to the field.[61]

Some students roomed and many of them boarded at the celery farm across the road from the flying field. Often, they did not know if and when flights would be made on a given day. Thus, besides housing a number of airplanes, the hangar also provided a place of rest and recreation for students and instructors as they waited for the right conditions to practice flying. Between making flights in the "smooth" air of early morning and late afternoon, aviators often napped on cots inside the hangar. Outside, the area around the hangar provided an open-air workshop for servicing and repairing aircraft.[62]

Students began their actual flight training by riding next to the instructor in one of the two seats fastened to the lower wing of the biplane. Each aircraft had a lever to control the elevator on the outer edge of both seats, with the lateral and rudder control levers situated between the two seats. The machine could thus be operated from either side. Students whose instructors flew in the left seat, however, automatically learned to fly as "right-seat" pilots, and vice-versa. As novice aviators gained aptitude and confidence, the instructor gradually relinquished control of the aircraft, riding along ready to take over in an emergency. Within a few hours, the instructor allowed the student to fly solo.[63]

The airfield, with its bumpy terrain, and "weeds as stiff and high as young willows," provided only a few areas that were both clear and smooth enough to permit take-offs. Practice flights followed a set course. Pilots headed west as they left the ground, climbing to about twenty-five feet. They banked left to fly south, then left again, and finally headed north back toward the hangar. One early aviator remembered that "part of the flight line was somewhat marshy and covered with hummocks." Since it became known as a spot where wild mushrooms flourished, pilots at Simms Station used the term "mushroom hunting" in reference to flying at very low altitudes (Figures 19 and 20).[64]

Along with learning to operate the airplane, students also had to learn the instrumentation system used on Wright-model aircraft. This consisted of a lone piece of string, about twelve to fourteen inches long, tied to the wire that joined the front skids of the plane. When the airplane flew level, the string blew straight back toward the pilot. As the aircraft slowed, the string began to wave from side to side, and the tail end raised up a bit. A pilot familiar with the movement of the string could also tell when he banked or turned the plane properly. If the aircraft slipped or skidded, the string trailed off toward one side or another.[65]

Figure 19. Wright Model B at Huffman Prairie Flying Field, 1910.

Figure 20. Wright Model F at Huffman Prairie Flying Field, 1914.

The flight training of Henry H. "Hap" Arnold, who went on to become a five-star general and commanded the U.S. Army Air Forces in World War II, was typical of many Wright School pupils. Arnold arrived at Huffman Prairie in April 1911. He spent days at the Wright Company factory, learning what he called the "scarcely instinctive" control system of the Wright Flyers. He practiced on the flight simulator—an "old plane mounted on a sawhorse," the controls of which were connected to a moving belt running over a pulley. After learning to use the controls to keep the wings level, Arnold moved on to flight instruction at the flying field. Al Welsh took him up as a passenger for his first lesson on May 3. Just ten days later, Arnold had completed his training. Like most Wright School students, Arnold learned to fly in a relatively short amount of time: twenty-eight flights, averaging eight minutes each, for a total air-time of just three hours and forty-eight minutes.[66]

Instructors at the Wright School of Aviation encouraged students who had completed their training course to take a licensing test from the Federation Aeronautique Internationale (FAI), organized in 1905 to keep official records of aviation feats and to issue pilots' licenses. A student who hoped to receive a license at Huffman Prairie Flying Field had to demonstrate his or her abilities in front of appointed FAI observers. For these demonstrations, students flew figure-eights around two "pylons," one, the locust tree in the center of the flying field, the other, a pole with an improvised flag.[67]
Not every student managed to master the controls of the Wright aircraft at Huffman Prairie. Orville Wright refused to let one student take possession of the machine he had already purchased. The student, Frank J. Southard, had repeatedly mishandled his practice flights by pulling the elevator control lever in the wrong direction. On May 21, 1912, Southard broke the lock on the hangar door and took the airplane up by himself. Again, he failed to control the plane properly, resulting this time in a fatal crash. Southard was the first aviator to lose his life at the flying field.[68]

Many famous early aviators got their start flying over the cow pasture-turned-

Figure 21. Wright Flyer Model B in Automatic Stabilizer tests at Huffman Prairie Flying Field, 1913.

aerodrome at Huffman Prairie. "Hap" Arnold and Thomas DeWitt Milling, who arrived in Dayton together in April 1911, became the first two military pilots trained there. Lieutenant Frank Lahm and Charles deForest Chandler, who started training at College Park, Maryland, also flew at Huffman Prairie. The first two naval aviators, Lieutenants Kenneth Whiting and John Rodgers, both graduated from the Wright School of Aviation.

In 1915, under the direction of Walter Brookins, whom Orville had trained for the Wright Exhibition Team in 1910, a class of sixty Canadian pilots earned their wings at the Wrights' flying school. Hoping to join the Royal Flying Corps or Royal Naval Air Service in the midst of World War I, they bypassed the over-crowded Canadian flying schools and readied themselves for combat at the flying field. A. Roy Brown, the pilot credited with shooting down Germany's "Red Baron," Captain Manfred von Richthofen, was among the Canadian pilots who learned to fly at the Huffman Prairie Flying Field.

Besides the number of military pilots trained at the prairie, many civilian pilots, who went on to make headlines in flying contests around the country, learned their trade at the flying field. One such pilot was Calbraith Perry Rodgers. In the autumn of 1911, Rodgers completed the first ever coast-to-coast flight across America in the *Vin Fizz,* an airplane named after a new grape beverage manufactured by his sponsor, the Armour Meat-Packing Company.[69]

In addition to the pilot training school, The Wright Company also used the field to test new Wright-model aircraft. The company usually shipped aircraft by wagon or truck from the factory on Coleman Avenue, south of West Third Street in Dayton, to the flying field. This was usually done in the evenings to avoid traffic. Orville tested eleven of thirteen models of The Wright Company-developed aircraft at Huffman Prairie Flying Field, making hundreds of test flights between 1911 and 1915.[70]

On December 31, 1913, Orville demonstrated an automatic stabilizer system before members of the Aero Club of America at Huffman Prairie (Figure 21). The stabilizer was designed to keep a plane balanced in the air without the pilot's intervention. On this day, Orville made seventeen flights over the snow-covered ground. During his final demonstration, he took off and flew seven successive turns around the field with his hands held high in the air. For this achievement, Orville Wright received the prestigious Collier's trophy from the Aero Club of America for 1913 for having made the greatest contribution to aeronautics that year.[71]

THE DEATH OF WILBUR WRIGHT AND PLANS FOR MEMORIALIZATION

While the Wright brothers saw the successes of The Wright Company and the flying school, they still had to contend with competitors who infringed on their patents. Lawsuits filed against Herring-Curtiss and others embroiled the brothers in lengthy battles that required frequent attention. Wilbur especially devoted much time and energy to the patent suits, traveling to Europe and New York in connection with them. The stress of frequent travel, managing overseas business affairs, and giving depositions began to take its toll. On a trip to Boston in May 1912, Wilbur became ill. Returning home to Dayton, he was diagnosed first with malaria, then typhoid fever. For weeks his condition fluctuated, improving slightly, only to worsen again. Finally, on May 30, with Orville at his side, Wilbur died.

The city of Dayton joined the Wright family in mourning its loss. Almost immediately, prominent local citizens began making plans to pay tribute to one of the "fathers of flight." Edward A. Deeds of the Dayton-based National Cash Register Company chaired the committee in charge of making arrangements for the memorial. The committee decided to erect a simple monument on the flying field and construct a larger, more elaborate memorial in Dayton at a later time. Members formed the Wright Memorial Commission in February 1913. A. M. Kittredge, John C. Eberhardt, Frederick H. Rike, Edward E. Burnhart, O. B. Brown, and Frank T. Huffman served as trustees. They proceeded to hire sculptor Gutzon Borglum, of Mount Rushmore fame, along with the Olmsted Brothers, the noted Brookline, Massachusetts landscape architecture firm founded by Frederick Law Olmsted in 1857. The Commission hoped to erect a bronze statue surrounded by a suitable enclosure within the Huffman Prairie Flying Field. Torrence Huffman donated an acre of ground near the intersection of Dayton-Springfield Pike and Yellow Springs Road. In connection with the proposed memorial, Simms Station, the interurban stop near the Fling Field, was renamed Wright Brothers Station. In addition, the Commission's plans called for moving the hangar built by The Wright Company in 1910 to make way for the memorial site.[72]

THE 1913 DAYTON FLOOD

A disastrous flood in March 1913, however, put on hold any plans for memorialization. As spring neared, melting ice and snow combined with light rains to saturate the ground. A heavy downpour began on March 23, inundating the already drenched land. For four days, nearly twelve inches of torrential rains battered the Miami River Valley. The water flowed into the creeks that fed the Miami, Mad, and Stillwater rivers. Floodwaters finally spilled over the banks of the swollen rivers, knocked out bridges, broke through levees, and overwhelmed Dayton and several smaller cities.[73]

Four hundred people lost their lives in the deluge, and property damage totaled 100 million dollars. To prevent such a disaster from recurring, the Ohio legislature enacted the 1914 Conservancy Act. This measure provided for the formation of area conservancy districts to formulate flood control plans. In accordance with this act, ten counties situated along the Miami River and its tributaries petitioned for the formation of the Miami Conservancy District (MCD). Formed in 1915, the MCD had the task of building and maintaining flood control works in the Miami Valley.[74]

The flood control plan that the MCD decided to implement had a major impact on the flying field and the rest of Bath Township. After evaluating an extensive survey of the ten-county area, MCD engineers elected to build five earthen "dry dams," designed to temporarily store excess water in their retarding basins and release it downstream at a controlled rate. One of these proposed dams would cross the Mad River southwest of the flying field. As the Huffman Dam slowed the river's flow toward Dayton in times of flooding, the land lying upstream, northeast of the dam, would be submerged. Though the land behind the dam could still be used for recreation or agriculture for most of the year, it would no longer be fit for permanent habitation. Thus, the flood control measures in effect assured that the flying field would not be developed for future residential or commercial purposes.

In the aftermath of the disaster, members of the Wright Memorial Commission turned their attention to the pressing problem of flood relief and future flood control measures. The Commission postponed plans to build a memorial, and officially dissolved in 1920. Plans for the Huffman Retarding Basin made it clear that the flying field no longer offered a suitable location on which to erect a monument.[75] The issue of establishing a monument to the Wright brothers did remain on the slate of the local citizenry. The Memorial Commission was reestablished in 1922, though construction on a monument would not get underway until 1937.

THE END OF AN ERA

After Wilbur's death, Orville continued the fight to preserve the brothers' patents, and also reluctantly took over as president of The Wright Company. Orville intended to make every effort to protect his and Wilbur's rightful claim as the inventors of the airplane. But he had little interest in managing a business. In spring 1914, he began to purchase most of the stock in The Wright Company. Once in control, he filed another suit on behalf of the company against competitor Glenn Curtiss, who had found

a way to take advantage of a loophole in a court decision that supported the Wright patent. Orville sold the company in October 1915 for a reported 1.5 million dollars. He served as its chief consultant for one year, and would continue to serve on various advisory boards and aeronautics committees for the remainder of his life.[76]
But Orville was most at home when he was tinkering, inventing, and flying. He continued to work on the automatic stabilizer he had demonstrated in 1913, as well as on a new device designed to prevent aircraft from stalling in mid-air. Between 1914 and 1916, Orville made dozens of flights to test the mechanisms at Huffman Prairie Flying Field. In November 1916, he set up a laboratory in his old West Dayton neighborhood at 15 North Broadway, near the Boyd Building, which he and Wilbur, years before, had envisioned using as a permanent space for conducting experiments. The laboratory would serve as Orville's workshop for the rest of his life.[77]

The Wright Company's operations at the flying field drew to a close at the end of 1916. With this, an era of invention and innovation at Huffman Prairie, ushered in when the Wright brothers turned the improbable field into the world's first aerodrome in 1904, also ended. Since that time, the brothers had perfected their invention, taught themselves and others to fly, and thus brought aviation to the world. Huffman Prairie initially gave them a place to conduct their experiments close to home, yet in relative seclusion. Later, the activities undertaken by the Wright Exhibition Team and The Wright School of Aviation transformed the flying field into a training ground for novice aviators. They also made the flying field an exhilarating venue from which spectators watched some of the earliest flying machines circle the air. In all, 116 men and three women learned to fly at the Huffman Prairie Flying Field. As one era ended, however, another began. Huffman Prairie Flying Field would maintain its link to the development of flight as it became the geographic "heart" of one of the earliest military aviation fields.

THE EARLY MILITARY ERA, 1917 – 1931

With the onset of the First World War, the U.S. government began to take a greater interest in developing air power. The tense political climate in Europe had already prompted the governments of Great Britain, France, and Germany to invest in the new technology. Before 1917, the United States had only a small contingent of military aviators. As the possibility of becoming involved in the European conflict loomed on the horizon, however, the U.S. began looking to expand its military commitment to aviation, and to ready itself for war.

Army scouts investigated areas suitable for establishing training grounds. Local civic leaders including E. A. Deeds, H. E. Talbott, Adam Schantz, and others encouraged officials to select property near Dayton, which included the Huffman Prairie Flying Field, as the location for a new aviation school.[78] After the 1913 Dayton flood, the Miami Conservancy District purchased the land residing in the floodplain upstream from the site of the proposed Huffman Dam. In 1917, the U.S. Army leased 2,074 acres of this land from the MCD, and established a Signal Corps Aviation School for pilot training, as well as schools for aviation mechanics and armorers. The Army designated the new installation Wilbur Wright Field. In fall 1917, the Army purchased from the MCD an

additional forty acres adjacent to Wilbur Wright Field. At this site, the Army established the Fairfield Aviation General Supply Depot, organized to provide logistics support for Wilbur Wright Field and the other three Signal Corps Aviation Schools in the Midwest. In December 1917, the Army established a third installation, the 254-acre McCook Field, just north of downtown Dayton. Between 1917 and 1927, McCook Field served as the primary engineering and research facility for the Airplane Engineering Division of the U.S. Army Signal Corps.[79]

In order to prepare men for admission into the flying school at Wilbur Wright Field, the Army Signal Corps established a pre-flight training school at Ohio State University in Columbus, Ohio. The military intended to put aviators to use in battlefield operations as airborne scouts who could observe the position of enemy troops and quickly relay information back to officers on the ground. Military pilots thus needed instruction not just in flying a plane but in other areas as well. At Ohio State, students received classroom instruction in aerodynamics, meteorology, aircraft engines and structures, and navigation. In addition, they studied aerial photography, reconnaissance, communications, and aerial combat tactics. Once they completed their pre-flight instruction, students moved on to Wilbur Wright Field for a six to eight week flight-training program. There, they flew with an instructor before taking the controls themselves in solo and cross-country flights.[80]

To facilitate construction of the new aviation training grounds, workers built a temporary spur connecting the Big Four Railroad with the Ohio Electric Railway track southwest of Simms Station. The interurban line had once transported the Wright brothers, along with their tools, construction materials, and airplane parts out to the flying field. Now, it helped haul shipments of building materials along the last leg of their journey to the new military training ground. Carloads of supplies arriving by train were moved from the railroad to the electric railway and on to the building sites of the emerging Army installation. The Army also ordered the abandonment of a three-mile stretch of the Dayton-Springfield Pike, the long-standing inter-county thoroughfare that bordered the flying field, and renamed it Government Road (now known as Marl Road).[81] The Army continued to maintain and use Government Road, which traversed the base and linked it to nearby Fairfield.

After its first year of operation, Wilbur Wright Field still had a long way to go to become a satisfactory military installation, at least according to one of its earliest commanding officers. Major Wilbourne complained in his annual report that the field had not been properly drained or graded, and consequently flooded when it rained. He found the roads on the base to be in horrible condition—"absolutely inefficient" in the winter months. Furthermore, the post had to depend on the "very inefficient interurban electric railway" for connection to the railroad. (Despite their patronage, riders on the DS&U interurban had disparagingly referred to it as the "Damned, Slow, and Uncertain" for years.) The interurban "refused to transfer [large] shipments to the post, and to make matters worse, its tracks, overhead wires and pole system inside the field" caused fires.[82]

Arthur E. Morgan, Chief Engineer of the Miami Conservancy District, noted in response

to Wilbourne's complaints that the terrain of Wilbur Wright Field was indeed "somewhat swampy." In his opinion, however, the land could be properly drained and graded. In fact, Morgan recounted, "When I went over this territory with Mr. Orville Wright in the early part of 1917, he stated that he found this area to be the most desirable in the vicinity for landing, as the surface yielded somewhat under the airplane and lessened the shock of landing." Morgan acknowledged, though, that aviation had already changed since the Wrights flew at Huffman Prairie. "For the modern, heavier and swifter machines," Morgan suggested, "this softer soil has not sufficient sustaining power, and is wholly unsuited as landing ground."[83] Twenty-five years later, a planning board convened to examine the possibility of expanding the flying area would arrive at a similar conclusion, noting that the grounds at the ends and opposite sides of the main flying field, bounded by the Mad River, were "useless for expansion."[84] Though the military base expanded around it, Huffman Prairie Flying Field would remain at the end of the flight line through the present day (Figure 22).

In addition to the Army's construction of Wilbur Wright Field, the building of flood control works by the Miami Conservancy District also contributed to a transformation in the landscape surrounding Huffman Prairie Flying Field. With the approval of the plan for the massive flood control measures, the District acquired the property behind the site of the proposed Huffman Dam, six miles northeast of Dayton (Figure 23). This acreage included Osborne, which had served as a local commercial center in the nineteenth century. Located within the boundaries of the retarding basin for the completed dam, Osborne would be inundated in times of flooding. Rather than abandon the town, however, residents retained ownership of their property. Between 1922 and 1925, they relocated the entire village one building at a time to a site two miles south, adjacent to Fairfield.[85] In 1950, the village of Osborne merged with Fairfield to form the present city of Fairborn.

The Miami Conservancy District also acquired the farmsteads that lay within the retarding basin. When the Army procured the land for Wilbur Wright Field from the District, it removed some of the farmhouses and associated structures from the property. Others were converted and put to use. The Shade farm, for instance, became a "hostess house," or reception center, during World War I. The Hebble-Hagenbaugh-Beaver and Patton farmhouses, located on the south side of Dayton-Springfield Pike (Government Road), were made into commanding officers' quarters. These nineteenth-century farmhouses remain standing along present Wright Avenue today, known respectively as the Arnold House Heritage Center (Building 8) and Foulois House (Building 88).[86]

Rather than hire private contractors, the District itself undertook the construction and supporting activities for the flood control project with funds raised through a special-assessment bond issue. Work on the five earthen dams began in January 1918 and was completed in April 1923. At Huffman Dam, workers moved over one million cubic yards of sand, gravel, and clay, excavated from "borrow" pits dug nearby, creating a dam standing sixty-five feet along a crest of 3,340 feet. Concrete buttresses supported its spillway and outlet conduits.

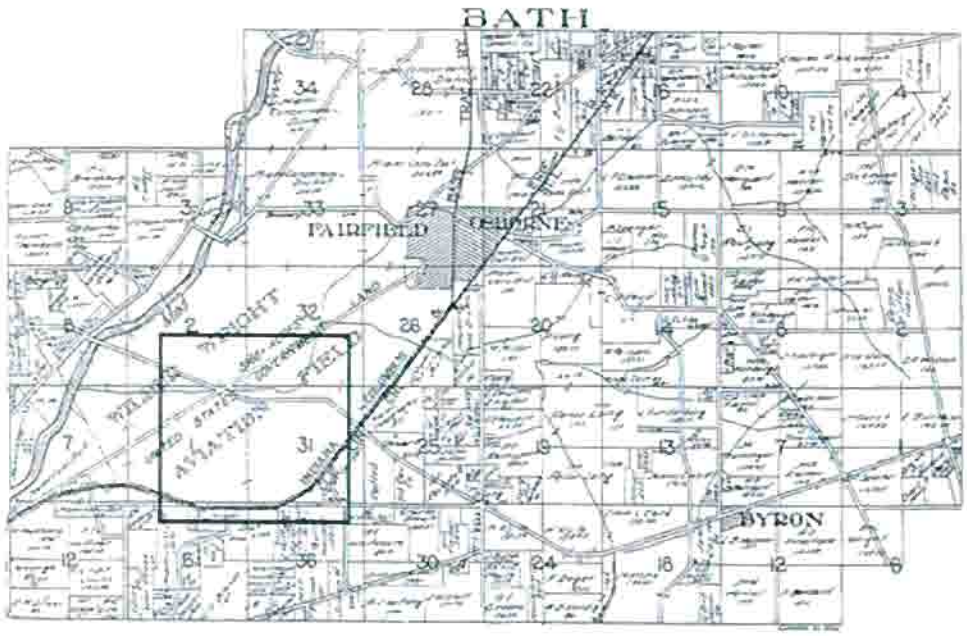


Figure 22. Plat map of Bath Township, ca. 1927. The extent of military development is evident; the general proximity of the flying field is outlined.

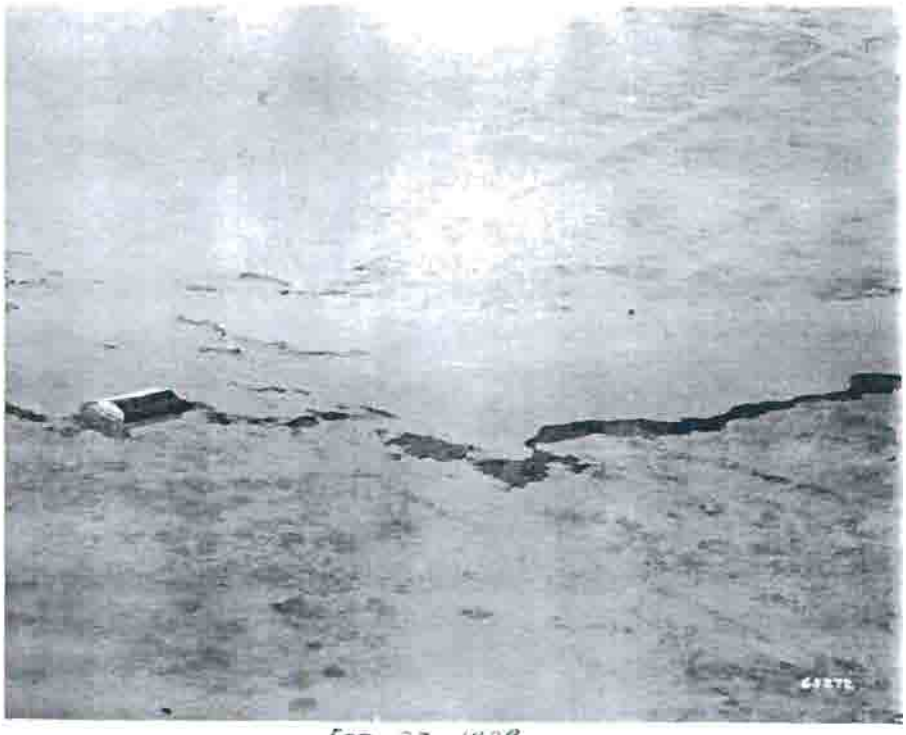


Figure 23. View to northwest showing 1910 hangar underwater, 1929. This photo shows the extent of flooding after the Huffman Dam was built.

Building the dam meant that a vital part of the landscape from the Wright brothers' days at Huffman Prairie would have to be altered. During construction, crews relocated the Ohio Electric Railway from its location within both the military base and the retarding basin for the dam. About two miles southwest of the flying field, the interurban tracks were directed east for almost two miles, then northeast for another two-and-a-half miles toward Fairfield.[87] The Big Four (New York Central) and Erie railroads, both of which traversed the Huffman Retarding Basin, also had to be rerouted for fifteen miles. By 1919, the Miami Conservancy District had moved these railroads southeast to higher ground, making a cut 120 feet deep and 4,800 feet long through solid rock just below Tate Hill (present Wright Brothers Hill).[88] The old lines became the property of the conservancy district, which salvaged the ties and rails for scrap. Today, the MCD continues to maintain Huffman Dam along with four other dry dams and a series of levees and channel improvements constructed in response to the 1913 flood.[89]

After World War I, the Army discontinued the flight training school at Wilbur Wright Field and merged the installation with the Fairfield Aviation General Supply Depot to form Wilbur Wright Air Service Depot. The depot underwent several additional name changes in the next decade, but was commonly referred to as the Fairfield Air Depot (FAD). FAD served as a storage, supply, and aircraft and engine maintenance depot from 1918 until 1946. In the meantime, McCook Field, which had been intended to serve only as a temporary facility, continued its role as a research and development installation. As aircraft grew larger and more complex in the years following World War I, McCook Field eventually outgrew its small size.

During the 1920s, pilots carried out test-flights at Wilbur Wright Field for programs initiated at McCook Field. Thus, though the flight training school had closed, flying continued at the site of Wilbur Wright Field after the war. The facilities for these test missions included a high-altitude bombing range, equipment for the testing of machine guns, and a timed speed course. Just as the Wright brothers had tested new developments for their airplanes by trying them out over Huffman Prairie, test pilots from McCook Field in the 1920s conducted similar experiments through the same airspace. They flew their aircraft along a straight two-mile long course that traversed Wilbur Wright Field, running southwest from one end of the post to the other, skimming the eastern edge of the Wright brothers' flying field.[90]

In addition to these test flights, aviation activities at Wilbur Wright Field continued when the Fairfield Air Depot hosted the International Air Races in October 1924. Spectators enjoyed a carnival-like atmosphere as they watched aviators from around the country and overseas fly exotic aircraft, demonstrate various aerial maneuvers, and vie for prizes in cross-country and high-altitude competitions. Flying exhibitions included events such as the "Foolish Flyers Freak and Fancy Flight," along with a demonstration of aerial bombing as aviators took target practice on a mock-up of New York City (Figures 24 and 25).[91]

The three-day air races also provided an impetus to refurbish the old hangar from The Wright School of Aviation days, which had been abandoned since 1916. Though flying

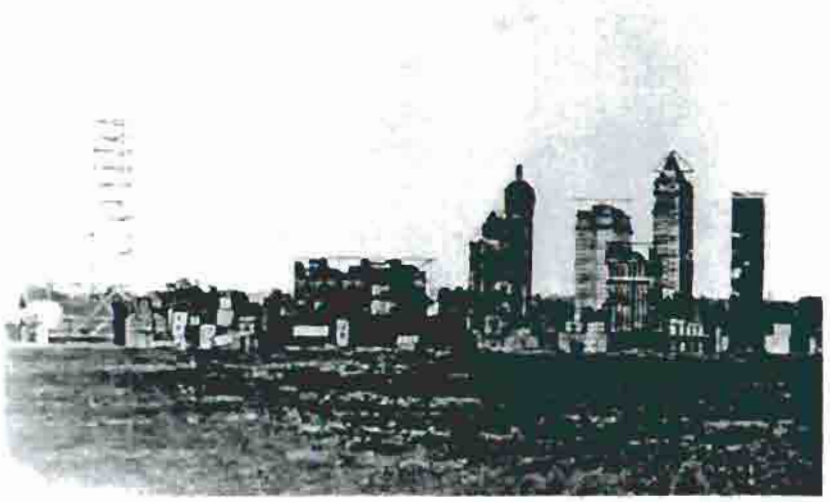


Figure 24. Mock-up setting for International Air Races in Dayton, 1924.

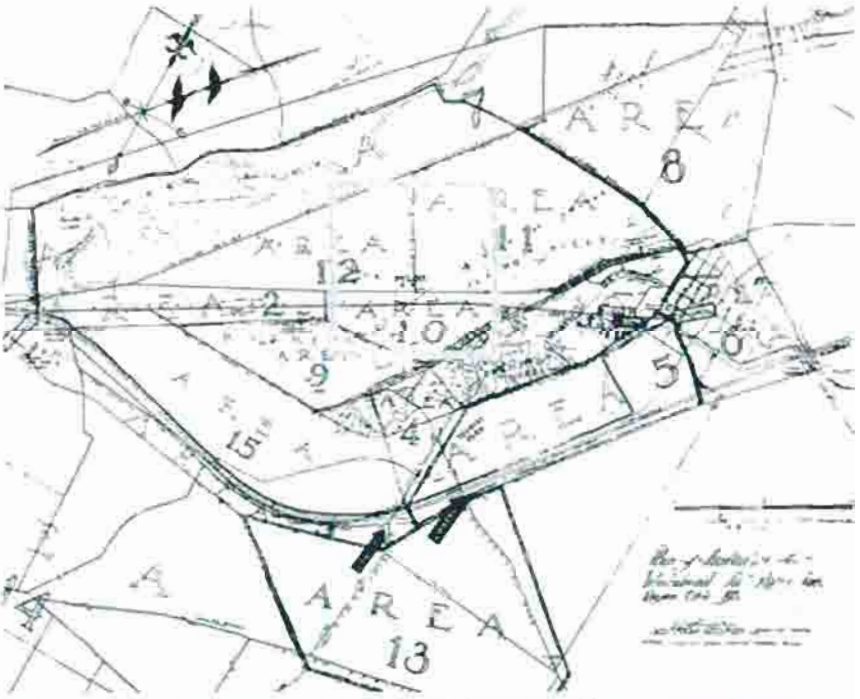


Figure 25. Plan of 1924 International Air Race Aerodrome; general proximity of flying field is outlined.

Figure 26. South wall of 1910 hangar, ca. 1923.

Figure 27. East and north walls of 1910 hangar, ca. 1923.

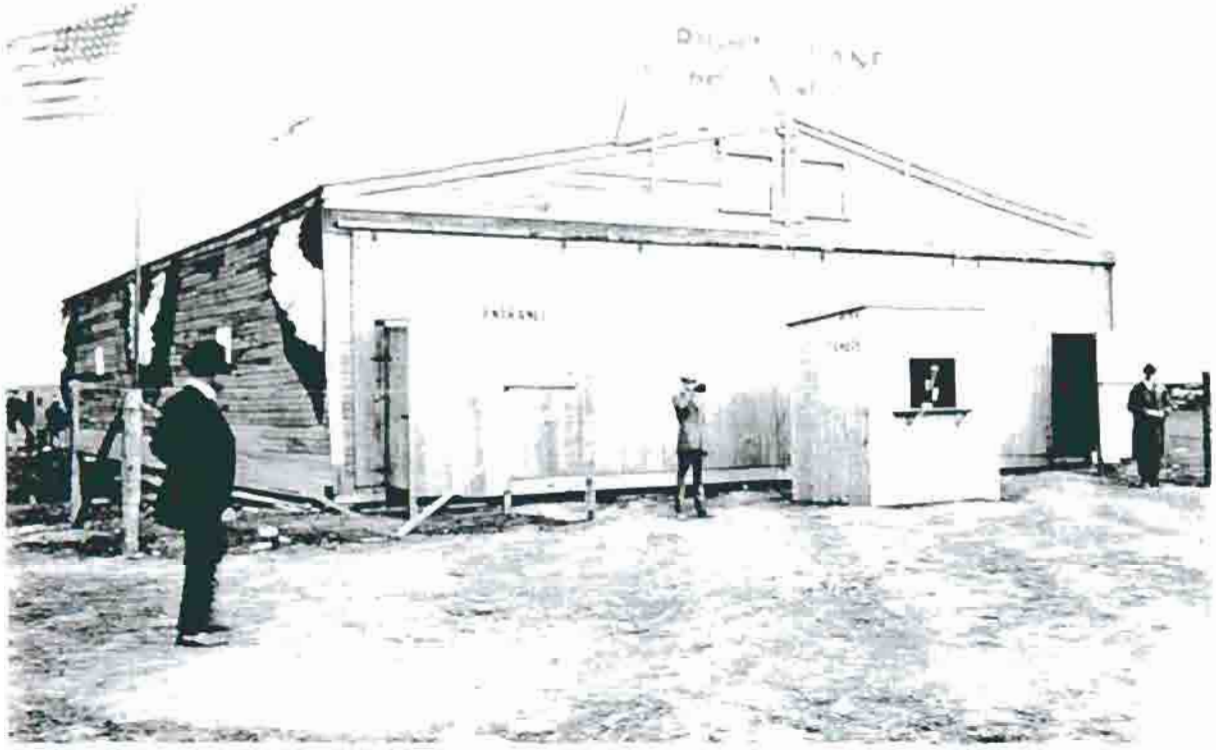


Figure 28. 1910 hangar following 1924 renovation.

activities took place around the Wright brothers' old experiment grounds, the site itself had remained undisturbed. An aviation magazine described the structure in 1923: "The tumbledown Hangar...still stands at Simm's Station eight miles east of Dayton. Numerous steps have been taken to preserve this landmark but nothing as yet has been done and it stands today deserted and half hidden in the tall growth of weeds and brush" (Figures 26 and 27).[92]

In September 1924, the Dayton chapter of the National Aeronautic Association undertook the renovation of the Wright brothers' 1910 hangar, transforming the building into a temporary exhibit hall. The overhead tracks for the large sliding doors were removed, and the doors fixed in a closed position. In the far right and left panels of these doors, two smaller doorways were cut. Workers repaired the sagging roof, replaced siding, and cut down the overgrown vegetation around the building. They decorated the sides with bunting and flew American flags from the front and back gables. A sign atop the roof informed the crowd that this was one of the International Air Races' special exhibits, the "Wright Plane and Hangar." Visitors purchased tickets from a small wooden booth erected outside the front of the hangar before entering to view the original flying machine flown by the Wright brothers at Kitty Hawk in 1903 (Figure 28).

Orville and Wilbur had crated and shipped the damaged machine back to Dayton in 1903 where, packed away in a barn, it had survived the 1913 flood. In 1916, the Massachusetts Institute of Technology requested that Orville display the airplane at the dedication of a new series of MIT buildings. Orville directed Wright Company workers to bring the crates to the factory, where he repaired and restored most of the original machine. Between 1916 and 1924, Orville made the flyer available for several public exhibitions. The National Aeronautic Association sponsored the display of the restored flyer at the International Air Races, the last time it would be shown publicly in the United States during Orville Wright's lifetime (the flyer is now on display at the National Air and Space Museum in Washington, DC).[93]

When the location of McCook Field proved too small to continue its operations there, the Army Air Corps planned to move the installation to a larger space. Concerned that the Army intended to relocate the base, which served as both an economic resource and a point of community pride, local business and civic leaders formed the Dayton Air Services Committee in 1922. They had two goals: to keep the operations at McCook Field from leaving Dayton and to establish a memorial to the Wright brothers. The committee raised funds to purchase land near Dayton to keep McCook Field in the area. It succeeded in raising over $450,000 and purchasing 4,520.47 acres of land northeast of Dayton, including the site of Wilbur Wright Field. The committee then presented the property deeds to the U. S. government for the token sum of two dollars. In honor of both Wilbur and Orville Wright, the entire tract of land was designated Wright Field and dedicated to them on October 12, 1927. The Air Corps relocated the functions of he McCook Field installation to a series of newly constructed buildings southwest of Huffman Dam, known today as "Area B" of Wright-Patterson Air Force Base.

A number of large-scale military aviation events took place at the new Wright Field.

Figure 29. 1924 aerial photograph showing general character of flying field and its proximity to the river.

The Army held the Air Corps Maneuvers there on several occasions. In May 1931, hundreds of airplanes and pilots amassed at Wright Field during what was the largest-ever mobilization of the Army Air Corps at the time. Orville Wright served as the honorary chairman of the Dayton committee for the event, through which the Army intended to evaluate the Air Corps' performance in simulated combat. As spectators watched from the stands, a parade of planes fittingly flew over Huffman Prairie Flying Field before moving on to the East Coast to participate in a mock "aerial war."[94]

In July 1931, the Army installation underwent yet another name change. The War Department dedicated a portion of Wright Field to Lieutenant Frank Stuart Patterson, the nephew of a prominent Dayton businessman, who had been killed while testing a machine-gun synchronizer in a flight at Wilbur Wright Field in 1919. The portion of Wright Field east of Huffman Dam, including the former Wilbur Wright Field, Fairfield Air Depot, and Huffman Prairie Flying Field (present areas A and C of Wright-Patterson Air Force Base), was renamed Patterson Field. The rest of the installation, the area constructed west of Huffman Dam to house the transplanted McCook Field operations,

remained Wright Field.

COMMEMORATING THE WRIGHT BROTHERS, 1922 – 1941

In 1922, the year the Dayton Air Service Committee formed to keep McCook Field in Dayton and raise money for a memorial to the Wright brothers, local citizens also re-organized the Wilbur and Orville Wright Memorial Commission to pursue the goal of erecting a memorial to the two brothers. The individuals who had served as trustees when the group first formed in 1913 occupied the same positions in the new Commission, with Edward A. Deeds serving as president. The Commission worked together with the Dayton Air Service Committee toward the goal of erecting a memorial. In 1927, the Dayton Air Service Committee conveyed a vast tract of land to the military to establish Wright Field. It set aside, however, a 20.8-acre site on a hilltop overlooking the base, along with a site within Huffman Prairie Flying Field for the construction of a suitable memorial to the Wright brothers.

Dayton's plans to memorialize the Wright brothers took many forms but progressed little for a number of years. In North Carolina, on the other hand, a cornerstone for a monument commemorating the Wright Brothers' first flight at Kitty Hawk was placed in the ground in 1928, at the approximate location of the flying machine's 1903 lift-off. The monument was completed in 1932. In 1936, Henry Ford acquired the Wright brothers' Dayton home at 7 Hawthorne Street and their bicycle shop at 1127 West Third Street. Ford moved these buildings to the Henry Ford Museum and Greenfield Village in Dearborn, Michigan, which he had established to preserve the structures associated with notable figures of American history.[95] Both buildings were dedicated at Greenfield Village in 1938.

The Dayton Air Service Committee did attempt to preserve one of the important remaining structures associated with the Wright brothers, the 1910 hangar on Huffman Prairie Flying Field. The committee painted the building and repaired the roof sometime in the late 1920s or early 1930s, but by the mid-thirties, the hangar had again fallen into a state of disrepair. Ford expressed interest in moving this structure, too, to Greenfield Village, but never took possession of the building. It was apparently demolished in error sometime in the late 1930s or early 1940s, possibly in connection with an order that all wooden hangars on the base be taken down (Figure 30).[96]

Despite the loss of three significant structures in Dayton associated with the Wright brothers, those who intended to commemorate Orville and Wilbur remained focused on constructing a suitable memorial to the brothers. Finally, in 1938, the Dayton Air Service Committee deeded the 20.8-acre hilltop site back to the Miami Conservancy District. The transfer meant that federal funds, along with unskilled labor provided by the Civilian Conservation Corp and supervised by the National Park Service, could be used to build the memorial. The Wilbur and Orville Wright Memorial Commission and the Miami Conservancy District pooled funds and began work on the $129,000 park and monument in 1938.

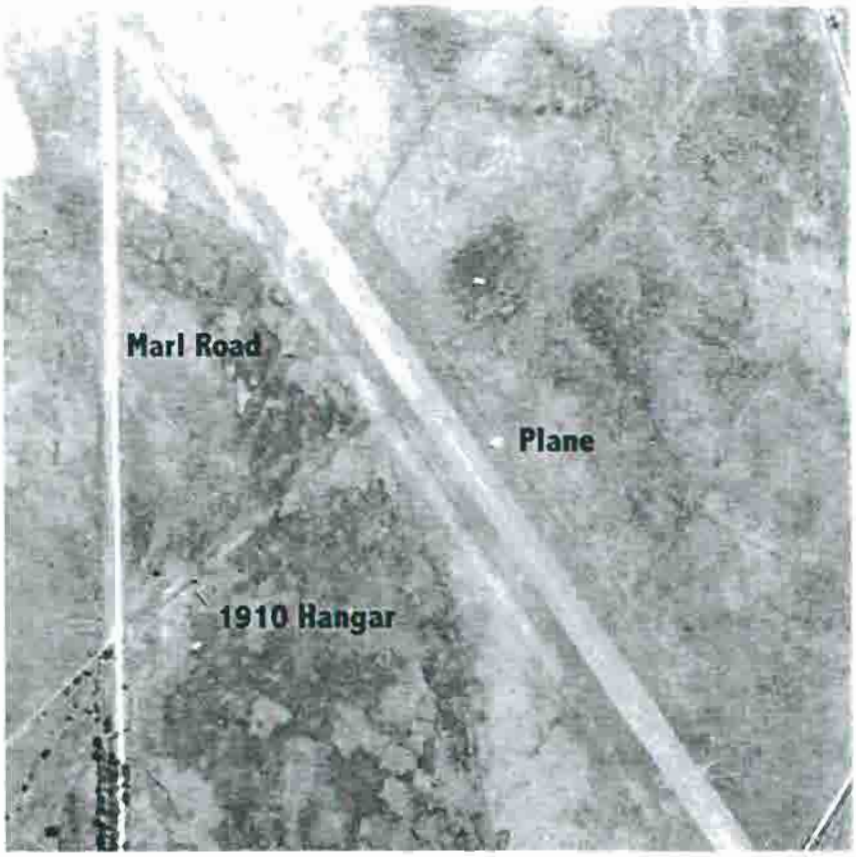


Figure 30. 1935 aerial photograph showing plane landing at the flying field. This photo was taken prior to the removal of all wooden hangars from the air base.

Figure 31. Pylon building.

On August 19, 1940, Orville Wright attended the dedication ceremony of Wright Memorial in honor of his and Wilbur's achievements. Designed by the Olmsted Brothers firm, the memorial featured a thirty-ton shaft of North Carolina pink marble at the center of a landscaped park surrounded by a stone walkway. From atop Wright Brothers Hill, as the site was renamed, visitors could overlook Wright and Patterson Fields, including the former Huffman Prairie Flying Field. Since the Wright's old experiment grounds, located within the military installation, were inaccessible to visitors, the Wilbur and Orville Wright Commission together with the Miami Conservancy District decided to place a marker on the flying field so that it could be seen from Wright Brothers' Hill.[97]

In June 1941, they constructed a shed-shaped building on Huffman Prairie Flying Field (Figure 31). This cement pylon featured a steeply sloped roof, so that it could be seen clearly from the hilltop at Wright Memorial. The structure, situated on the .52 acre piece of land, marked the starting point from which Wilbur flew the first circle on September 20, 1904. Though committee members at least initially intended to identify it correctly as the location of a historic flight, some confusion over the significance of the site seems to have ensued. A metal plaque on the pylon stated erroneously that it marked "the site of the original hangar used by the Wright Brothers."[98] Both the 20.8-acre hilltop site and the .52-acre tract on the flying field remained the property of the Miami Conservancy District until 1978.

HUFFMAN PRAIRIE FLYING FIELD, 1941 – 1992

During the Second World War, Wright Field continued to serve as a center for aeronautical research and engineering, while Patterson Field primarily carried out a logistics mission. Both posts expanded rapidly in wartime. They remained separate installations throughout the war, through by 1945 their functions were greatly linked. In 1948, the Air Force, which had become a separate branch of the armed forces the previous year, merged Wright and Patterson Fields to form Wright-Patterson Air Force Base.

As Patterson Field grew, base planners installed a number of facilities in the vicinity of the flying field, including a well field, an ordnance storage area, and a facility associated with chemical warfare, according to maps from the era. Despite the growth of the military base and the construction of these facilities around it, Huffman Prairie Flying Field remained largely intact (Figure 32). Until the base began to mow the flying field each summer, it also remained thickly covered with vegetation. An Army major described the site in 1944:

> At the present time the Wright Brothers airfield of 1904 and 1905 is overgrown with native vegetation including elderberry, sumacs, dogwood, asters, goldenrod, a host of vigorous weeds and a few scattered elm, locust and sycamore trees.

He further pointed out the remnants of the transportation links that once connected the flying field to Dayton:

Figure 33. 1946 aerial photograph showing military development surrounding flying field.

> Those portions of the Dayton-Springfield Pike and Yellow Spring's Road originally bounding the airfield are still in existence. The Dayton-Springfield Pike along the northern boundary exists in the form of a pleasant country road with a gravel roadbed shaded by rows of trees consisting largely of American elm. The Dayton and Springfield Electric Railroad was abandoned several years ago, however the remaining roadbed is easily recognized. The site of the waiting station can readily be detected by distinguishing marks on the ground and remaining fragments of the building itself.[99]

With the initial establishment of Wilbur Wright Field, the Army had continued to maintain and use a portion of the original Dayton Springfield Pike, renaming it Government Road. East of Government Road, Yellow Springs Road had been abandoned, though its roadbed remained visible for many years. The remaining portion of this road (west of Government Road) was renamed Symmes Road and continued to serve as a light-duty thoroughfare. In the meantime, Dayton-Springfield Pike had been re-routed around the base. After 1924, as one traveled southwest from Fairfield, the pike essentially followed the path of the relocated railroad tracks, skirting the southern edge of the base and continuing west past Huffman Dam toward Dayton.

The present configuration of the main roads surrounding the Wright brothers' flying field has essentially been in place since the mid-1940s. Pylon Road and Hebble Creek

Figure 32. 1952 photo showing Huffman Prairie Flying Field and its proximity to the runways.

Road, which skirts the southern-most end of the flying field, appear to have been installed by 1941. Maps from this time period designate both roads "Patrol Road." In 1942, the installation of the concrete runway system on Patterson Field brought an end to Government Road. Its western third, bordering the flying field, became Marl Road. The central portion was covered-over by the airfield, while the eastern third of the road became Wright Avenue.

Apart from these changes to the spatial organization of the flying field, the soft, marshy ground kept Patterson Field planners from developing Huffman Prairie Flying Field and its immediate surroundings in connection with the runways or flight-line buildings (Figures 33 and 34). Throughout the 1930s and early forties, however, the empty expanse south of the main flying area provided an ideal airspace for calibrating the speed of new planes. Test pilots taking their aircraft along the speed course had to fly at a low altitude and maintain a steady course. Flying about twenty-five feet above the ground, pilots used a stopwatch to time their planes as they passed over fixed markers on the ground. In 1946, the Flight Test Division of Headquarters, Air Materiel

Command, proposed the implementation of an "All Altitude Speed Course" facility, in order to automate and make easier the procedure for this particular kind of test flight.

In 1946, the Patterson Field Planning Board approved the placement of an All Altitude Speed Course facility on the base. A Transmitter Building, a wooden structure measuring approximately fifteen by forty feet, was constructed east of Pylon Road near Hebble Creek Road, adjacent to the southern portion of the flying field. A monitor station was placed just north of the transmitter building and a "VHF house" or antenna tower, was erected across Pylon Road on the flying field. An access road traversed Pylon Road and connected the VHF house to the Transmitter Building (Figure 35). The facilities at Patterson Field served as the third monitoring location for the speed course, which included facilities at nearby Vandalia and Sulphur Grove, Ohio. The stations, constructed parallel to one another at each of these locations, used electronic beams to evaluate the airspeeds of planes as they flew overhead at altitudes between 5,000 and 30,000 feet.[100]

In the mid-1950s—and throughout the 1960s—the flying field's position at the end of the flight line made it a useful site to place facilities used for air navigation and the testing of new instrumentation and navigation systems. In the late 1950s, a structure designated on base maps as Building 916, was erected on the flying field to house navigational aid equipment. A small building with a gabled, checkered roof, it lay at the end of an access road directly across Pylon Road from the Transmitter Building. It served as a support station for the antenna portion of the Ultra High Frequency Direction Finder (UHF/DF), a device that provided heading and bearing information for aircraft, thus aiding in air navigation. In the late 1950s, the Transmitter Building constructed in 1947 as a transmitter station for the All Altitude Speed Course was recycled to house the "Range Calibration Site." The facility calibrated an electronic network of transmitters associated with the "Raydist Tracking System." This system aided in tests of approach and landing systems, navigational systems, and traffic control systems.

A Theodolite Station was also placed on the flying field in the 1950s, east of Building 916. "Theodolite Station J" served as one in a series of facilities used to determine an aircraft's position in space. The data gathered by the phototheodolite tracking network assisted researchers in evaluating approach and landing systems, navigation and guidance systems, parachutes and seat-ejection equipment, along with all-weather flying procedures. These structures were maintained on the flying field until the early 1970s when they were removed, most likely due to technological obsolescence.[101]

Besides accommodating these flight-related facilities, evidence suggests that the Huffman Prairie Flying Field and its surroundings were used for agricultural and recreational purposes. In 1954, the Air Force accepted bids from local farmers to lease base property, including two approximately one-hundred-acre tracts located in Area C, south of the flight line. Cultivation of these areas was intended to provide cover and vegetation for wildlife as well as to produce income for the base. Aerial photographs indicate that the flying field was under cultivation in the mid-1950s, most likely in connection with the lease program. According to one source, farmers grew corn on the base. In addition, they leased land for baling hay adjacent to the flying field, in the

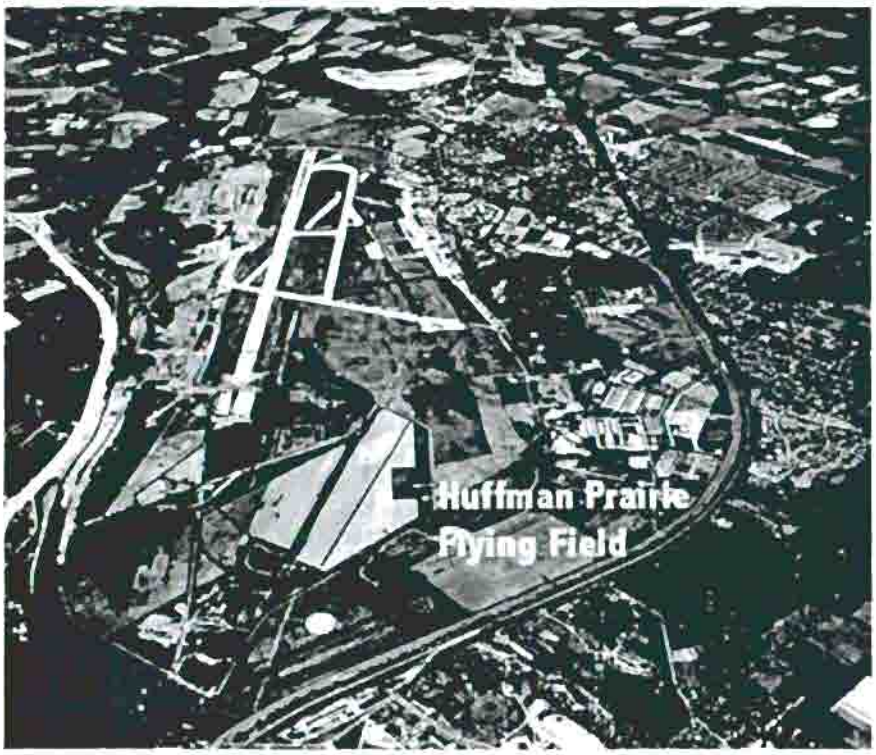


Figure 34. Ca. 1957 photo showing Patterson Field and surrounding base development. The dark square at the middle of the flying field is the location of the Transmitter Building and VHF Station.

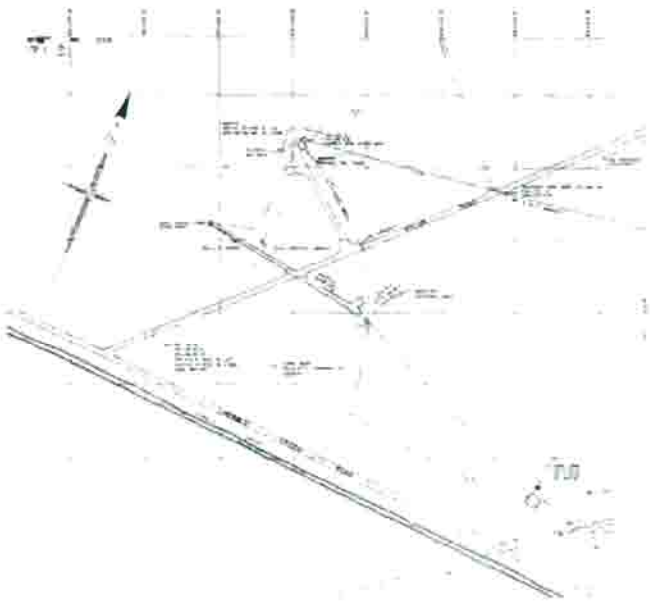


Figure 35. 1950's map showing location of Transmitter Building, VHF Station, and Theolodite building at the southern end of Huffman Prairie Flying Field.

area where the Wright brothers' 1905 hangar once stood.[102]

Huffman Prairie Flying Field and its surroundings were also used for recreational purposes for base personnel. The Air Force constructed a gun range and skeet-shooting facility in the mid-1960s near the southern portion of the flying field. The military also included the flying field in a hunting reserve that spanned several hundred acres, from the 1940s until the early 1990s. In 1951, Wright-Patterson Air Force Base began to actively manage the land for hunting purposes. As part of the land-management strategy, base personnel used a heavy-duty lawn mower to clear hunter "access strips," creating a grid-like pattern across the ground (Figure 36). Evidence suggests that the flying field and adjacent areas were mowed in this fashion. In connection with managing the hunting reserve, the Air Force also brought in farmers under contract to plant "food strips" for wildlife and game. This program occurred from the late 1950s through the early 1970s, and commenced again for a short while in the late seventies. The base also hired a farmer in the late 1970s to plow, plant, and cultivate a variety of grains to support the wildlife on the hunting reserve. The mixture included corn, sorghum, sunflowers, millet, and milo. Food strips were planted in long swaths and sometimes extended into the flying field.[103] In addition to maintaining the flying field for hunting purposes, base managers also mowed the field each year to eliminate woody vegetation, though it is not known for certain when this practice started. Annual mowing ceased in the late 1980s when local ecologists identified the natural prairie remnant adjacent to the flying field and encouraged base officials to foster its restoration.

DAYTON AVIATION HERITAGE NATIONAL HISTORICAL PARK

In recent decades, an interest in historic preservation on the national level, along with a renewed appreciation at the local level for Dayton's aviation heritage and the Wright brothers' legacy, has prompted several steps toward the continued preservation and interpretation of historic Huffman Prairie Flying Field. In 1971, the .52-acre site where the pylon marker stands was listed on the National Register of Historic Places. In 1978, the Miami Conservancy District conveyed the 20.8-acre Wright Memorial property and the associated .52-acre property on the flying field to Wright-Patterson Air Force Base. Also at this time, MCD transferred an additional 7.739 acres to the base, a parcel that the District had obtained from the government shortly after construction of Wright Memorial to accommodate the relocated entry gates and road.

The property transfer coincided with the seventy-fifth anniversary celebration of the Wright brothers' first flight at Kitty Hawk. As part of the effort to commemorate the legacy of the Wright brothers, a group of Youth Conservation Corps volunteers together with the Natural Resources Manager for the base, worked to mark the boundaries and significant sites on the flying field. A survey put the size of the Flying Field at just over seventy-two acres. After the field was surveyed, volunteers installed concrete markers and flags flown from twenty-foot poles at each of the seven corners of the field. They also placed markers at the three hangar sites.[104] These efforts marked a growing interest to interpret the historical use of the flying field. The concrete markers and flagpoles, however, remained only a few years, though the reason for their removal is

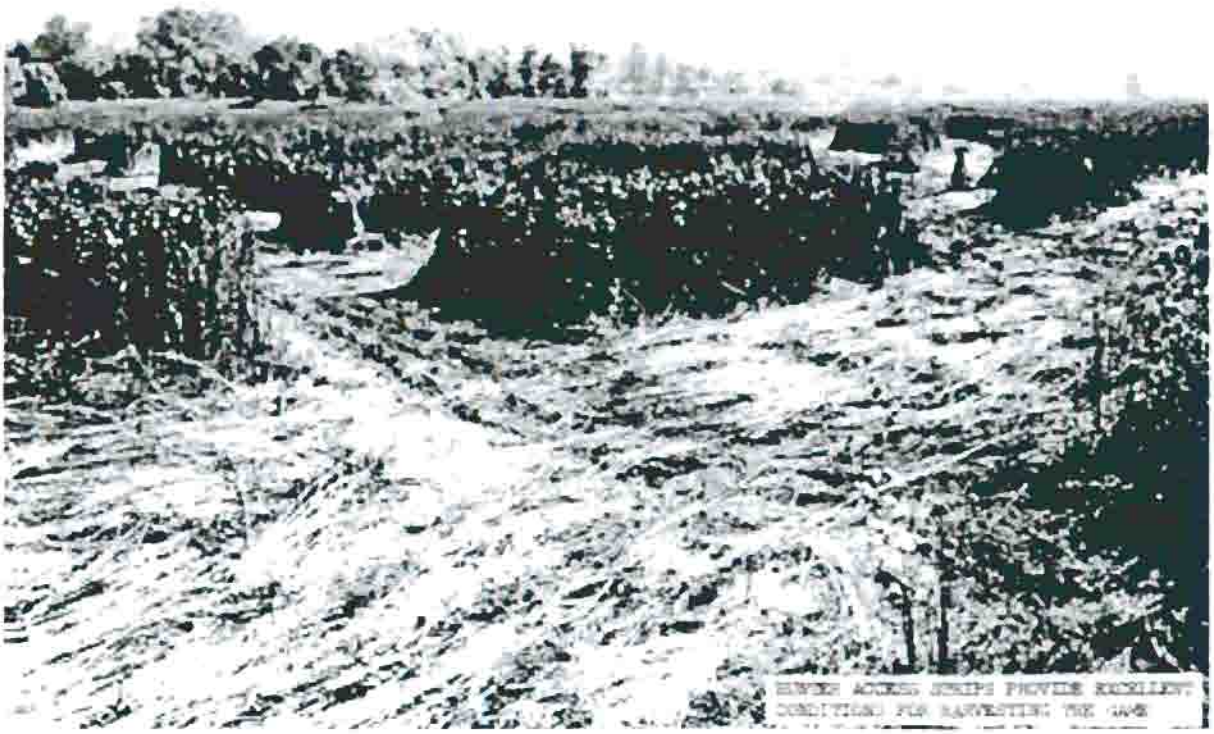


Figure 36. Typical "Access strips" mown into vegetation at Huffman Prairie Flying Field, 1960.

unclear.

In 1990, the flying field was re-surveyed in conjunction with the property's nomination for National Historic Landmark status. The corrected survey set the size of the field at 84.42 acres. In June 1990, Huffman Prairie Flying Field was designated a National Historic Landmark for its association with the Wright brothers and its significance to American history in the areas of invention, transportation, and technology. Under the direction of Wright-Patterson Air Force Base, civil engineers designed a replica of the Wright brothers' 1905 hangar using guidelines gleaned from several sources. These included notations about building materials found in the Wright brothers' papers, photographs of the original 1905 hangar and the sheds built to house the 1903 Wright Flyer at Kitty Hawk, and standard patterns from a 1948 *Southern Pine Lumber Handbook*. Through the combined efforts of base personnel, the U.S. Army Corps of Engineers, and a force of volunteers, workers completed the hangar replica in time for the landmark status dedication ceremony in October 1990. The next year, the flying field was officially opened to visitors for the first time since 1917.[105]

In an effort to better interpret the site to the public, Wright-Patterson Air Force Base made additional enhancements to the flying field. First, a path was mowed through the vegetation so visitors on foot could trace the path followed by Wilbur and Orville Wright during their experimental flights. Attempts were also made to highlight the natural prairie remnant adjacent to the flying field by creating an educational "prairie garden" behind the 1905 hangar replica. This quarter-acre oblong patch of transplanted prairie grasses and wildflowers extended out from the large natural prairie remnant. One could thus walk around its perimeter and view the various species associated with a prairie ecosystem without disturbing the natural prairie.[106] To enable visitors to visualize better the space that comprised the flying field, the base directed the installation of concrete boundary markers and flags at each of the seven corners of the field in June 1992.

On October 16, 1992, Congress enacted legislation that created Dayton Aviation Heritage National Historical Park. Under this law, the National Park Service under the U.S. Department of the Interior serves as a consulting body for the administration of Huffman Prairie Flying Field. Wright-Patterson Air Force Base owns and manages the site in consultation with the national Park Service.

Although the site is open to the public, the boundaries of four military and/or recreational activities for base personnel continue to overlap the Wright brothers' historic flying field. First, the "shotfall danger zone" associated with the nearby Rod and Gun Club extends into the southern part of the field. This affects access to the flying field during scheduled events, when Pylon Road is blocked and visitors must be re-routed to the historic site via Marl Road. These events take place year-round, primarily on weekends during the summer months. Second, the "clear zone" for the Combat Arms Training and Maintenance (CATM) facility stretches across Marl Road at the western boundary of the flying field. Buildings "883" and "886," also associated with the CATM facility, straddle the field's western boundary. Third, the northwest corner of the flying field resides in the "clear zone" for the "hot cargo pad" of the runway system. In times of "maximum explosive weight loading"—that is, when the cargo pads are holding their full capacity of hazardous material—Symmes, Marl, and Pylon Roads must be barricaded to maintain a safe perimeter around the cargo pads. These pads have been loaded to their capacity twice in the past fifteen years. Finally, the northeast corner of the flying field extends into the "parachute drop zone" used by local U.S. Army Reserve units several times a year. The reserve units utilize a large area (2,000 x 3,300 feet) just north of Skeel Avenue to conduct live parachute training drops.[107] While these activities have, in the past, infrequently impeded visitor access, this is likely to change with the rapid increase in visitation accompanying full park development. In particular, the presence of the CATM facility and the Rod and Gun Club range, will have a major impact on how visitors experience the site. These facilities represent a significant visual and auditory intrusion on the historic character of the flying field, a potentially severe impact on site accessibility, and pose a possible environmental issue for the flying field. The structures and/or impact area associated with both facilities lie within the boundaries of the flying field, and it is not unusual for access to the flying field to be limited due to active use of the ranges and visitors to hear gunshots while trying to enjoy and appreciate the flying field.

In 1996, a circular drive surrounding a flowerbed was installed at the bend in Pylon Road in anticipation of plans to remove the southern two-thirds of the road. Visitors would thus approach the flying field by way of Marl Road, following the Wright brothers' historic route via the Dayton-Springfield Pike and the interurban railway from the southwest. The circular drive was to serve as a vehicle turn-around point. However, because it provides primary access to the West Ramp area of the base, and secondary access to the hazardous cargo pads.

Despite significant alterations to the surrounding area, Huffman Prairie Flying Field itself has changed relatively little in the twentieth century. Residing within a cleared floodplain as well as within the military installation that grew around it, this historic site has remained relatively protected from the transforming forces of cultivation and development. As the Army, and later the Air Force, planned the airfield and constructed flight-related facilities nearby, the marshy terrain of the flying field made it more practical to place runways and other structures elsewhere.

Visitors to Huffman Prairie Flying Field still have many visual clues as to what the flying field looked like when the Wright brothers flew their aircraft here. Remnants of its original boundaries exist: Marl Road and the present tree line mark the site of the former Dayton-Springfield Pike and the row of trees that once bordered the field. Symmes Road marks the path of the former Yellow-Springs Road, the northern boundary of the flying field. In the center of the field, where the locust tree around which Wilbur and Orville practiced circling once stood, a small copse of trees stands today. Most significantly, the flying field remains an open expanse of land. Big bluestem and Indian grass grow nearby, along with other native species that have been restored to Huffman Prairie.

Today, the flying field is located inside one of the nation's oldest military aviation fields. Paved runways and recreational facilities have replaced the plowed fields and farmhouses from the Wrights' era. Wright brothers' biographer Tom Crouch has observed, "In the end, Huffman Prairie [Flying Field] is the most appropriate of all monuments to the memory of Wilbur and Orville Wright— the spot where they first flew, preserved inviolate and surrounded by a giant research complex dedicated to the advancement of flight technology."[108] As modern aircraft fly overhead, visitors to this historic site have much to consider, standing on a plot of ground where the Wright brothers taught themselves to fly and developed an invention that changed the world.

LANDSCAPE CHRONOLOGY

1795	Treaty of Greenville placed Ohio under U.S. control.
1802	First land survey by Israel Ludlow.
1803	Greene County established.
1807	Bath Township formed.
ca. 1830	Van Cleve classified over 200 plants at Huffman Prairie.
ca. 1840	Indigenous trail system "corduroyed" by Euro-American settlers.
ca. 1850	First railroad established between Dayton and Springfield.
ca. 1870	Torrence Huffman inherited parcel from father that later became known as "Huffman Prairie."
1874	Plat map listed major Bath Township crops: corn, wheat, oats, potatoes, rye and barley. Farmers were also raising livestock, producing dairy, and cultivating fruit orchards.
ca. 1890	Two railroads provided transportation within Bath Township.
ca. 1900	Interurban line ran between Dayton and Springfield. Later carried supplies to the Army and eventually the Air Force military installations.
1904	In spring, Orville and Wilbur Wright transported materials and tools to the flying field on the interurban to build their hangar. They cut the field's long grasses with a scythe to prepare a take-off and landing area. By September, they had built their launching catapult.
1905	The Wright's built a second hangar at the flying field after moving the first structure to an adjacent farm. In October, Orville completed their longest flight to date.
1906	The flying field was abandoned while the Wrights attempted to patent and market their invention.
1910	Back at the field, the third hangar was built near the interurban to house their new School of Aviation. They leased the field from the Huffman's.
1913	Dayton fell victim to a devastating flood. The impacts of and response to the flood drastically changed the physical appearance of the area surrounding the flying field.

1915 The Miami Conservancy District began building earthen dams along the Mad River in response to the 1913 flood. One of the dams would cross the river near the southwestern corner of the flying field. The Huffman's property was purchased by the District.

1916 The Wright's third hangar was abandoned after the School of Aviation was closed.

1917 Approximately 2100 acres surrounding the flying field—an area known as Wilbur Wright Field—were leased by the Army to establish the Signal Corps Aviation School to train pilots. The Army also founded the Fairfield Aviation General Supply Depot to provide logistical support for Wilbur Wright Field as well as other Midwestern field schools.

1918-23 Huffman Dam under construction.

1919 Miami Conservancy District moved the interurban line to higher ground.

1931 The portion of Wilbur Wright Field east of Huffman dam was redesignated Patterson Field by the War Department.

Ca. late 1930's to early 1940's The 1910 hangar was demolished.

1941 The shed-roofed Pylon building was constructed on the flying field. The building was intended to improve visibility of the flying field from the Wright Brothers Memorial. By this time, Pylon Road and Hebble Creek Road were in place, and the area was closed to the public.

1944 Remnants of the Dayton-Springfield Pike were still evident along the northern boundary of the flying field.

1946 The Transmitter building and VHF House were constructed on the flying field.

1948 Wright and Patterson Fields were merged to form Wright-Patterson Air Force Base.

1951 WPAFB began actively managing the Huffman Prairie area for hunting by mowing "access strips."

ca. 1950 Building 916 and Theolodite Building constructed on the flying field.

1951 Wright-Patterson began an agricultural leasing program.

1954 WPAFB began agricultural leasing program.

ca. 1960 CATM facility and Rod and Gun Club constructed at the southern end of the flying field.

1978	Concrete markers and flagpoles were installed at each corner of the flying field. Markers were also placed at the three hangar sites. All flags and markers were removed after a few years.
ca. 1980	Mowing at the flying field ceased.
1990	The flying field was designated a National Historic Landmark. 1905 hangar replica placed on site.
1991	Huffman Prairie Flying Field opened to the public. The Prairie Garden was created behind the replica hangar.
1992	Concrete boundary markers and flags placed at each corner of the field.
1995	Bluebird boxes installed at the flying field.
1996	Turnaround circle placed in Pylon Road near the 1905 hangar replica.

ENDNOTES

[1] Marvin W. McFarland, ed., *The Papers of Wilbur and Orville Wright* (New York: McGraw-Hill, 1953), plate 71; quoted in Tom Crouch, *The Bishop's Boys: A Life of Wilbur and Orville Wright,* (New York: W.W. Norton & Company, 1989), 270. Punctuation added. The longest flight actually lasted fifty-nine seconds.
[2] George W. Knepper, *Ohio and Its People,* (Kent, Ohio: Kent State University Press, 1989), 9-13; Ann Deines, *What Dreams We Have and How They Fly*, forthcoming, chap. 1: 1-5, 12-13.
[3] M. A. Broadstone, *History of Greene County, Ohio: its People, Industries and Institutions,* (Indianapolis: B. F. Bowen & Company, Inc., 1918), 1: 282, 285 and R. S. Dills, *History of Greene County together with Historic Notes on the Northwest and the State of Ohio,* (Dayton, Ohio: Odell & Mayer, 1881), 709-710.
[4] George Knepper, *Ohio and Its People*, 5.
[5] David B. Nolan and James R. Runkle, "Prairies and Fens of Bath Township, Greene County, Ohio: 1802 and 1984," *Ohio Journal of Science* 85 (1985), 125-126; David Nolan and Dane Mutter, "Huffman Prairie, Dayton, Ca. 1904," *Restoration and Management Notes* 6:1 (Summer 1988), 26-27.
[6] Nolan and Mutter, "Huffman Prairie," 26.
[7] C. Strobbe and D. Bohannon, "Environmental Assessment of the Huffman Field/Wright Memorial Enhancement Plan," (May 1990), Office of Environmental Management, 88th Air Base Wing, Wright-Patterson Air Force Base (cited hereafter as EM, 88th ABW, WPAFB), 20; John Madson, *Where the Sky Began: Land of the Tallgrass Prairie,* rev. ed. (Ames, Iowa: Iowa State University Press, 1995), 64-66 and Richard Manning, *Grassland: the History, Biology, Politics, and Promise of the American Prairie,* (New York: Viking, 1995), 140-43.
[8] Nolan and Runkle, "Prairies and Fens of Bath Township," 128; Madson, *Where the Sky Began*, 113-16. The 1990 Environmental Assessment report notes that the soil at Huffman Prairie Flying Field is a combination of Linwood Muck and Westland soil types. Linwood Muck "consists of level, poorly drained organic soil, 16 to 50 inches thick, grading into a loamy material. " Westland soil is characterized by a surface layer of "silty clay loam about fourteen inches thick and is underlain by sand and gravel." *See* Strobbe and Bohannon, "Environmental Assessment," 19; *see* also U.S. Army Corps of Engineers, Fort Worth District and U.S. Department of the Air Force, Wright Patterson Air Force Base, Ohio, "Phase I Archaeological Investigation of 35 Historical Period Sites, Wright-Patterson Air Force Base, Dayton, Ohio," (September 1996), EM, 88th ABW, WPAFB, 1: 3-9. This report identifies the soil at a test site near the flying field as Westland-Urban land complex.
[9] A. P. Dachnowski, *Peat Deposits of Ohio,* Series 4, Bulletin 16 (Columbus, Ohio: Ohio Geological Survey, 1912), 67-69.
[10] Elizabeth B. Keeney, *The Botanizers: Amateur Scientists in Nineteenth-Century America*, (Chapel Hill: University of North Carolina Press, 1992), 23.
[11] John W. Van Cleve, Scientific Notes and Misc. Folder, Van Cleve-Dover Collection, Dayton Public Library; Crouch, *The Bishop's Boys*, 279 and Strobbe and Bohannon, "Environmental Assessment," 29. On the roles of John Torrey, Asa Gray, and the information networks of amateur botanists, *see* Keeney, *The Botanizers,* 22-37. For biographical information on Torrey and Gray *see* Duane Isely, *One Hundred and One Botanists,* (Ames, Iowa: Iowa State University Press, 1994), 160-62, 191-95.
[12] Dills, *History of Greene County*, 717-20; Broadstone, *History of Greene County*,

Ohio, 1: 263, 287, 291 and Anthony D. Byles, *1855 Atlas from the Map of Greene County, Ohio, Surveyed by A. E. Rogerson & E. J. Murphy,* (Philadelphia: Anthony D. Byles, 1855), reprint (Knightstown, Indiana: The Bookmark Company, 1979), 5.
[13] *Combination Atlas Map of Greene County, Ohio,* (Chicago: L.H. Everts & Company, 1874), reprint, (Knightstown, Indiana: The Bookmark Company, 1974), 18; United States Census Bureau, Schedule 3, "Production of Agriculture in Bath Township, in the County of Greene, in the Post Office, Osborne, Ohio," August 19, 1870, 5-8.
[14] Broadstone, *History of Greene County, Ohio,* 1: 287, 2: 688.
[15] *Ibid.*, 2: 687-91; *Combination Atlas Map of Greene County, Ohio* and Dayton-Springfield Turnpike Road Company Stock Certificate No. 21, purchased by John W. Van Cleve, January 1840, Van Cleve-Dover Collection, Dayton-Montgomery County Public Library.
[16] U.S. Army Corps of Engineers, Fort Worth District and U.S. Department of the Air Force, Wright Patterson Air Force Base, Ohio, "Historic Building Evaluation for Brick Barn (GRE-1066-10) Greene County, Ohio," (September, 1996), EM, 88th ABW, WPAFB, 3-14—3-16; and Levi & W. D. Riddell, *Riddell's Atlas, Greene County, Ohio including United States Maps,* (Xenia, Ohio: 1896), reprint, (Defiance, Ohio: The Hubbard Company, 1981), 17.
[17] Knepper, *Ohio and Its People*, 300. For more on the impact of electric interurban railways on rural and urban America, see David Nye, *Electrifying America: Social Meanings of a New Technology, 1880-1940*, (Cambridge, MA: MIT Press, 1990), 119-22.
[18] Jack Keenan, *The Uncertain Trolley: a History of the Dayton, Springfield and Urbana Electric Railway*, (Fletcher, Ohio: Cam-Tech Publishing, 1992), 10-18, 37; Broadstone, *History of Greene County, Ohio*, 2: 698.
[19] Keenan, *The Uncertain Trolley*, 78; Broadstone, *History of Greene County, Ohio*, 1: 293.
[20] Crouch, *The Bishop's Boys,* 261.
[21] *Ibid.,* 279.
[22] *Ibid.*
[23] Deines, *What Dreams We Have*, chap. 7: 9 and Statement by George W. Warner, 10 December 1964, Box 96, The Papers of Wilbur and Orville Wright, Manuscript Division, Library of Congress (cited hereafter as Wright Papers, LC).
[24] Crouch, *The Bishop's Boys,* 280.
[25] *Ibid.*, 280-82; Arthur G. Renstrom, *Wilbur and Orville Wright: A Chronology Commemorating the Hundredth Anniversary of the Birth of Orville Wright, August 19, 1871*, (Washington: Library of Congress, 1975), 15 and Deines, *What Dreams We Have*, chap. 7: 10-11.
[26] Wilbur Wright to Octave Chanute, June 21, 1904, in Marvin McFarland, ed., *The Papers of Wilbur and Orville Wright,* 1: 441.
[27] *Ibid.*
[28] Crouch, *The Bishop's Boys,* 282.
[29] Wilbur Wright, Diary, August 13, 1904, in McFarland, *Papers*, 1: 452.
[30] Wilbur Wright to Octave Chanute, August 8, 1904, in McFarland, *Papers,* 1: 449.
[31] Crouch, *The Bishop's Boys,* 284 and John Walter Wood, "Wright Field (1904-1905)," *Airports,* (Coward-McCann, Incorporated, 1940), 37-39.
[32] Renstrom, *Chronology,* 143.
[33] Wilbur Wright, Deposition, February-March, 1912, *Wright v. Herring-Curtiss*, in McFarland, *Papers,* 1: 469.
[34] Wilbur Wright, Diary, October 1, 1904; September 7, 1905; September 14, 1905;

October 14, 1904 in McFarland, *Papers*, 1: 459-61, 509-10.
[35] Renstrom, *Chronology*, 15.
[36] Wilbur Wright to Octave Chanute, October 5, 1904 in McFarland, *Papers,* 1: 460.
[37] Wilbur Wright to Octave Chanute, March 11, 1905; Octave Chanute to Wilbur Wright, March 16, 1905; Wilbur Wright to Octave Chanute, March 26, 1905 and April 20, 1905 in McFarland, *Papers*, 1: 481-88.
[38] Statement by George W. Warner.
[39] Wilbur Wright to Octave Chanute, August 16, 1905, in McFarland, *Papers*, 1: 506.
[40] Wilbur Wright to Octave Chanute, October 19, 1905, in McFarland, *Papers,* 1: 517.
[41] Wilbur Wright, Diary, August 30, 1905, in McFarland, *Papers*, 507.
[42] Wilbur Wright, Diary, September 28, 1905, in McFarland, *Papers*, 1: 512 and Deines, *What Dreams We Have*, chap. 7: 22.
[43] Wilbur Wright, Diary, October 5, 1905, in McFarland, *Papers*, 1: 514; Renstrom, *Chronology*, 17 and Crouch, *The Bishop's Boys*, 299.
[44] Renstrom, *Chronology*, 150 and Wilbur Wright to Octave Chanute, October 19, 1905 in McFarland, *Papers*, 1: 515.
[45] Department of the Interior, National Park Service, "Wright Flyer III National Historic Landmark Nomination Form," January 18, 1990; Crouch, *The Bishop's Boys*, 295, and Tom D. Crouch, "The 1905 Wright Flyer: a Machine of Practicality," *Timeline*, (August-September 1985), 24-37.
[46] Renstrom, *Chronology*, 150 and Deines, *What Dreams We Have*, chap. 8: 1-10, 14-16.
[47] Laura Romesburg, "Establishment of Signal Corps Aviation and World War I," *Visions of the Past*, (Wright-Patterson Air Force Base, Ohio: ASC History Office, [1994]), 15.
[48] Crouch, *The Bishop's Boys*, 408 and Benjamin D. Foulois with C. V. Glines, *From the Wright Brothers to the Astronauts: the Memoirs of Major General Benjamin D. Foulois*, (New York: McGraw Hill Book Company, 1968), 79-95.
[49] Crouch, *The Bishop's Boys*, 312, 410.
[50] Janet Bednarek, "The Wright Brothers' 1910 Hangar on Huffman Prairie," (United States Air Force, Wright-Patterson Air Force Base, n.d.), and Stephen P. Brown, Architects, "Alternatives Study for the Development of the Wright Brothers' 1910 Hangar on the Huffman Prairie Flying Field, WPAFB, Ohio," (December 1993), EM, 88th ABW, WPAFB.
[51] Crouch, *The Bishop's Boys*, 427-28.
[52] Orville Wright to Wilbur Wright, May 7, 1911, Box 6, Wright Papers, LC.
[53] The Wright Company to Frank Coffyn, June 4, 1910, in Frank Coffyn, interview by Kenneth Leish, April 1960, 44, transcript, Columbia University Oral History Collection, Part IV, New York Times Oral History Program, Columbia University, New York, New York, appendix; Crouch, *The Bishop's Boys*, 429 and Deines, *What Dreams We Have*, chap. 9: 16.
[54] Crouch, *The Bishop's* Boys, 430-33 and Renstrom, *Chronology,* 53-54.
[55] Renstrom, *Chronology*, 52; Milton Wright, Diary, September 22, 1910 and November 7, 1910 in McFarland, *Papers,* 2: 999, 1001 and Bernard L. Whelan, "Wright Brothers Ran a School for 'Early Birds'" *Dayton Journal Herald,* 22 March 1960.
[56] "The Wright School of Aviation" (1912), Box 102, Wright Papers, LC.
[57] Marjorie Stinson to Edward Stinson, Sr., June 1, 1914, Stinson Collection, Evans Memorial Library, Aberdeen, Mississippi.
[58] "The Wright School of Aviation" (1914), Box 102, Wright Papers, LC; Bernard Whelan, "'Early Birds'," and Deines, *What Dreams We Have*, chap. 9: 17.
[59] Crouch, *The Bishop's Boys*, 436.

[60] Griffith Brewer, "With the Wrights in America," *Flight,* 3 September 1914, 706-08; Brewer, "The First Aerodrome," Library, Royal Aeronautical Society, London, England, and Roderick M. Wright, "With a Piece of String," typescript (n.d.), Wright Brothers Files, History Office, 88th ABW, WPAFB.
[61] Stephen P. Brown, Architects, "Alternatives Study," photo 9.
[62] *Ibid.*; U.S. Army Corps of Engineers, Tri-Services Cultural Resources Research Center, "Archaeological, Geophysical, and Remote Sensing Investigations of the 1910 Wright Brothers' Hangar, Wright-Patterson Air Force Base, Ohio" (September, 1995), EM, 88th ABW, WPAFB; Marjorie Stinson, "Diary of a Country Girl at Flying School," *Aero Digest* (February 1928), 168; Wright, "With a Piece of String," and Whelan, "'Early Birds'."
[63] Brewer, "With the Wrights in America," 706-08; Deines, *What Dreams We Have,* chap. 9: 18-19 and Orville Wright to Frank Coffyn, December 5, 1932 in McFarland, *Papers*, 2: 1159.
[64] Wright, "With a Piece of String," 7 and Whelan, "'Early Birds'."
[65] *Ibid.,* and Stinson, "Diary of a Country Girl," 168.
[66] Henry H. Arnold, *Global Mission*, (New York: Harper & Brothers, 1949), 19.
[67] Whelan, "'Early Birds.'"
[68] Crouch, *The Bishop's Boys*, 437.
[69] Crouch, *The Bishop's Boys*, 435-39 and Lois E. Walker and Shelby E. Wickam, *From Huffman Prairie to the Moon: the History of Wright-Patterson Air Force Base,* (Wright Patterson Air Force Base, Ohio: Office of History, 2750th Air Base Wing, Air Force Logistics Command, 1986), 14.
[70] Crouch, *The Bishop's Boys,* 435.
[71] Renstrom, *Chronology*, 63, 206.
[72] Deines, *What Dreams We Have*, chap. 12: 3-6; Edward A. Deeds to Olmsted Brothers, October 5, 1912, and P. R. Jones, "The Wright Memorial (report)," January 1, 1913, Box 130, Records of the Olmsted Associates, Manuscript Division, Library of Congress.
[73] Carl M. Becker and Patrick B. Nolan, *Keeping the Promise: a Pictorial History of the Miami Conservancy District,* (Dayton, Ohio: Landfall Press, 1988), 23.
[74] Becker and Nolan, *Keeping the Promise,* 109-10 and Miami Conservancy District, *The Story of the Miami Conservancy District,* (Dayton, Ohio: Miami Conservancy District, 1945), 8-11.
[75] Deines, *What Dreams We Have,* chap. 12: 6.
[76] Renstrom, Chronology, 63-67.
[77] *Ibid.*, 66-67; Crouch, *The Bishop's Boys*, 465-66 and Deines, *What Dreams We Have*, chap. 10: 10-11.
[78] "Aviation School to Open July 15 with 216 Planes," *Dayton Journal,* 18 May 1917.
[79] "Historical Development of Wright-Patterson Air Force Base," Typescript, History Office, 88th ABW, WPAFB; *see* also Amy E. Slaton, "Aeronautical Engineering at Wright-Patterson Air Force Base: a Historical Overview, " in *The Engineering of Flight: Aeronautical Engineering Facilities of Area B, Wright-Patterson Air Force Base, Ohio* (Washington: National Park Service, 1993), 1-6.
[80] Walker and Wickam, *Huffman Prairie to the Moon,* 22; "Will Battle Planes Be Able to Rout 'Pirates of the Sea?'" *Dayton News,* 20 May 1917 and "Aviation School," *Dayton News*, 20 May 1917.
[81] "Actual Work on Federal Flying School to start Monday with R. R. Spur," *Dayton News*, 27 May 1917 and "Aviation Ground Named for Wright," *Dayton News*, 27 May

1917.
[82] Major Arthur E. Wilbourne, U.S. Army Signal Corps, "Annual Report, Wilbur Wright Field," May 1918, Wilbur Wright Field Files, 1917-1919, United States Air Force Museum Archives, Wright-Patterson Air Force Base, Ohio (cited hereafter as USAFM, WPAFB).
[83] Arthur E. Morgan to Major General W. L. Kenley, June 22, 1918, Wilbur Wright Field Files, 1917-1919, USAFM, WPAFB.
[84] Air Service Command and Fairfield Air Depot Planning Boards, "Preliminary Report: Master Plan for Patterson Field, Fairfield, Ohio," 2 March 1943, Patterson Field Base Planning Board Minutes, History Office, 88th Air Base Wing, Wright-Patterson Air Force Base, 10.
[85] Walker and Wickam, *Huffman Prairie to the Moon,* 34.
[86] Building 8, Subject Files, History Office, 88th ABW, WPAFB; "The Foulois House, Building 88, Area C," Building 88, Subject Files, History Office, 88th ABW, WPAFB; "Anna Smith is Eyewitness to Early W-P AFB History, " *Skywrighter,* 8 April 1960, 13 and *Dayton Daily News*, 19 December 1971.
[87] Miami Conservancy District, *Miami Conservancy District* and "Simms Station is Topic," *Fairborn Daily Herald*, 15 March 1984.
[88] Becker and Nolan, *Keeping the Promise*, 129.
[89] *Ibid*., 124, 143.
[90] Walker and Wickam, *Huffman Prairie to the Moon,* 47.
[91] "A Brochure on Aviation and the City of Dayton and Official Souvenir Program, International Air Races," October 1924, Dayton, Ohio.
[92] Fred F. Marshall, "A 'Twice Told' Tale of the Wright Brothers," *The Slipstream*, (January 1923), 14.
[93] Renstrom, *Chronology*, 78; Tom Crouch, "Capable of Flight: the Saga of the 1903 Wright Airplane, " in Amy Henderson and Adrienne L. Kaeppler, eds., *Exhibiting Dilemmas: Issues of Representation at the Smithsonian* (Washington, D.C.: The Smithsonian Institution, 1997), 101-02 and Bednarek, "The Wright Brothers' 1910 Hangar."
[94] Ron Davidson, "Orville Wright saw fruits of his labors in 500-plane Air Corps maneuvers of 1931, " *Dayton Leisure,* 17 May 1981, 4 and Walker and Wickam, *Huffman Prairie to the Moon,* 80.
[95] Deines, *What Dreams We Have*, chap. 12: 6-13.
[96] *Ibid*., chap. 12: 13 and Bednarek, "The Wright Brothers' 1910 Hangar."
[97] "Wright Memorial," Wright Brothers Files, History Office, 88th ABW, WPAFB and Department of the Interior, National Park Service, "Huffman Prairie Flying Field National Historic Landmark Nomination Form," January 18, 1990.
[98] Everett Milstead, "'Simms Station' Marks Site of Original Wright Bros. Hangar," *Wingspread* (1957), Wright-Patterson Field Files, USAFM, WPAFB, 5.
[99] Major Arthur C. Sylvester, "The First Airfield," typescript, 25 October 1944, Huffman Prairie Files, USAFM, WPAFB.
[100] Headquarters, Army Air Forces Technical Base, Dayton, Ohio, "Minutes of Planning Board Conference," 23 July 1946, History Office, 88th ABW, WPAFB, 18-19; "Minutes," 20 August 1946, 3-4; "Minutes," 21 January 1947, 20-22; Joseph T. Morrison and Charles A. Horn, *History, Wright-Patterson Air Force Base, Dayton, Ohio,* (January - June 1948), History Office, 88th ABW, WPAFB, 1: 72 and Col. Nathan Rosengarten, former Commander, Air Force Technical Systems Intelligence, personal comm., July 28, 1998.
[101] Untitled typescript, (list of flight-related facilities on Wright-Patterson Air Force

Base, ca.1961), Subject Files-Runways, History Office, 88th ABW, WPAFB and "Minutes of Planning Board Conference," 16 March 1950, History Office, 88th ABW, WPAFB, 5-7.
[102] *History, Wright-Patterson Air Force Base*, (January - June 1954), History Office, 88th ABW, WPAFB, 42-45.
[103] Art Johnson, former Natural Resources Manager, WPAFB, pers. comm., July 15, 1998; Terry Lucas, Natural Resources Manager, WPAFB, personal communication, July 15, 1998 and "Cooperative Agreement for the Protection, Development, and Management of Fish and Wildlife Resources and Fish and Wildlife Management Plan for Wright-Patterson Air Force Base, Ohio," (1980 - 1985), EM, 88th ABW, WPAFB, 5-6.
[104] *Skywrighter*, 28 July 1978; Leon Glaspell to History Office, June 7, 1982, Wright Brothers Files, History Office, 88th ABW, WPAFB and Art Johnson, personal comm., July 15, 1998.
[105] *Skywrighter*, 24 May 1991, 1.
[106] *Skywrighter*, 7 June 1991, 19.
[107] David J. Irwin to Jan Ferguson, November 4, 1992, Rod and Gun Club Shooting Schedule, 29 October 1998; Revised Operational Policy for Huffman Prairie Flying Field, Memorandum; 1 February 1993; Susie Linthicum, Chief, Resource Protection Branch, Office of Environmental Management, to Gary Chandler, (correspondence pertaining to Airfield Parachute Drop Zone), December 4, 1992 and Charles P. Molzon, Director of Safety, to 88 ABW/EM, (memorandum pertaining to Explosive Cargo Pad 3 & 4), November 20, 1998. All of the aforementioned correspondence and memoranda are located in EM, 88th ABW, WPAFB.
[108] Crouch, *The Bishop's Boys*, 511.

CHAPTER 2
LANDSCAPE EVALUATION

CHAPTER 2
LANDSCAPE EVALUATION

Evaluating a historic landscape requires determining the site's significance and assessing its physical condition and integrity. The National Park Service has published *A Guide to Cultural Landscape Reports* to establish standards for CLR content and format; it states that the purpose of the evaluation section is to determine which site features should be protected through an appropriate management program. This determination is based on information from the site history and existing condition documentation.

SIGNIFICANCE

Huffman Prairie Flying Field's significance is described in the 1990 National Historic Landmark (NHL) Nomination:

> Huffman Prairie Flying Field is significant because of its outstanding role in the development and testing of the world's first practical airplane, the Wright Flyer III. Moreover, Huffman Field, touted by some historians as the cradle of aviation and the world's first aerodrome, is the flying field where Wilbur and Orville Wright obtained the necessary practice and experience to master the principles of flight. The Wright brothers themselves always said they really learned to fly on Huffman Field.
>
> Although the initial powered, controlled and sustained flights were made by the Wrights at Kitty Hawk, North Carolina, in 1903, it was at Huffman Field in 1904 and 1905 that the Wrights continued their quest to conquer the air and developed the world's first practical airplane. At Huffman Field, the Wrights perfected the technique of flying and developed a powered airplane completely controllable by the pilot; able to bank, turn, circle, and make figure eights; withstand repeated takeoffs and landings; and remain airborne trouble-free for more than half an hour. Huffman Field is significant as the location of both the Wright Company's School of Aviation and Exhibition Company. Huffman Field was made famous by the Wright brothers' School of Aviation, which operated there from 1910 through 1916 and trained many pilots for World War I. The field also served as the testing grounds for the Wright Company; every model of plane designed and manufactured by the Wright Company was test flown at Huffman Prairie. The world's first air cargo shipment was made from Huffman Field in 1910, thus adding to the site's historical significance. Huffman Prairie Flying Field has made a significant contribution to America's history of aviation.

Although the NHL nomination's significance statement for the flying field encompasses the entire period of aviation activity directly associated with the Wright brothers—1904-1916. This period can be broken down into two distinct eras: from 1904-1905, the Wrights' experiments were unique—they were accomplishing a feat that was taking place at no other location. Through their experiments they mastered the fundamentals of operating a powered, heavier-than-air machine, developed a machine capable of controlled, sustained, and repeated flight, and, as a result, forever changed the world. By 1910, when they returned to the site to begin their commercial endeavors, several other flight schools had been established and the activities taking place at the site were no longer extraordinary. For this reason, relating the internationally significant events of 1904-1905 should be the focus of the landscape treatment at the flying field; interpretive media at the flying field and the Huffman Prairie Flying Field Interpretive Center can be utilized to educate visitors about secondary themes, such as the 1910-1916 period and later military development of the site.

LANDSCAPE ANALYSIS AND EVALUATION OF CONTRIBUTING FEATURES

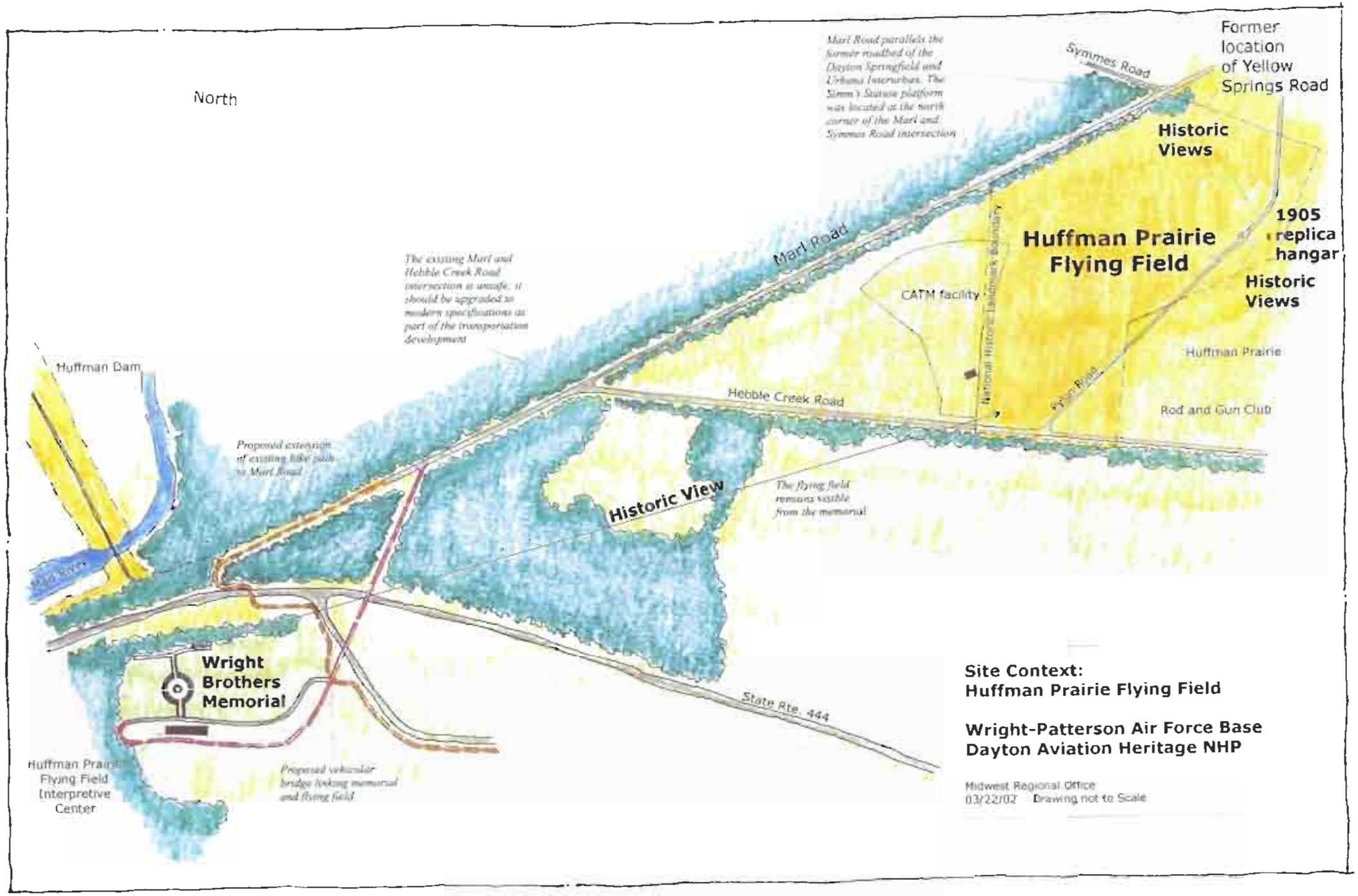
A Guide to Cultural Landscape Reports provides a systematic framework for applying National Register of Historic Places criteria to identify landscape features, determine their physical condition, and assess the level of landscape integrity. The first step, a site survey, allows a researcher to document the existing condition at the landscape and individual feature levels. At the broad scale, it is apparent that the Air Force is able to maintain the field good *physical* condition. Feature level assessments are described in Table I. This more detailed level of scrutiny is useful, as it clarifies areas where preservation treatment can be focused to improve condition and upgrade integrity.

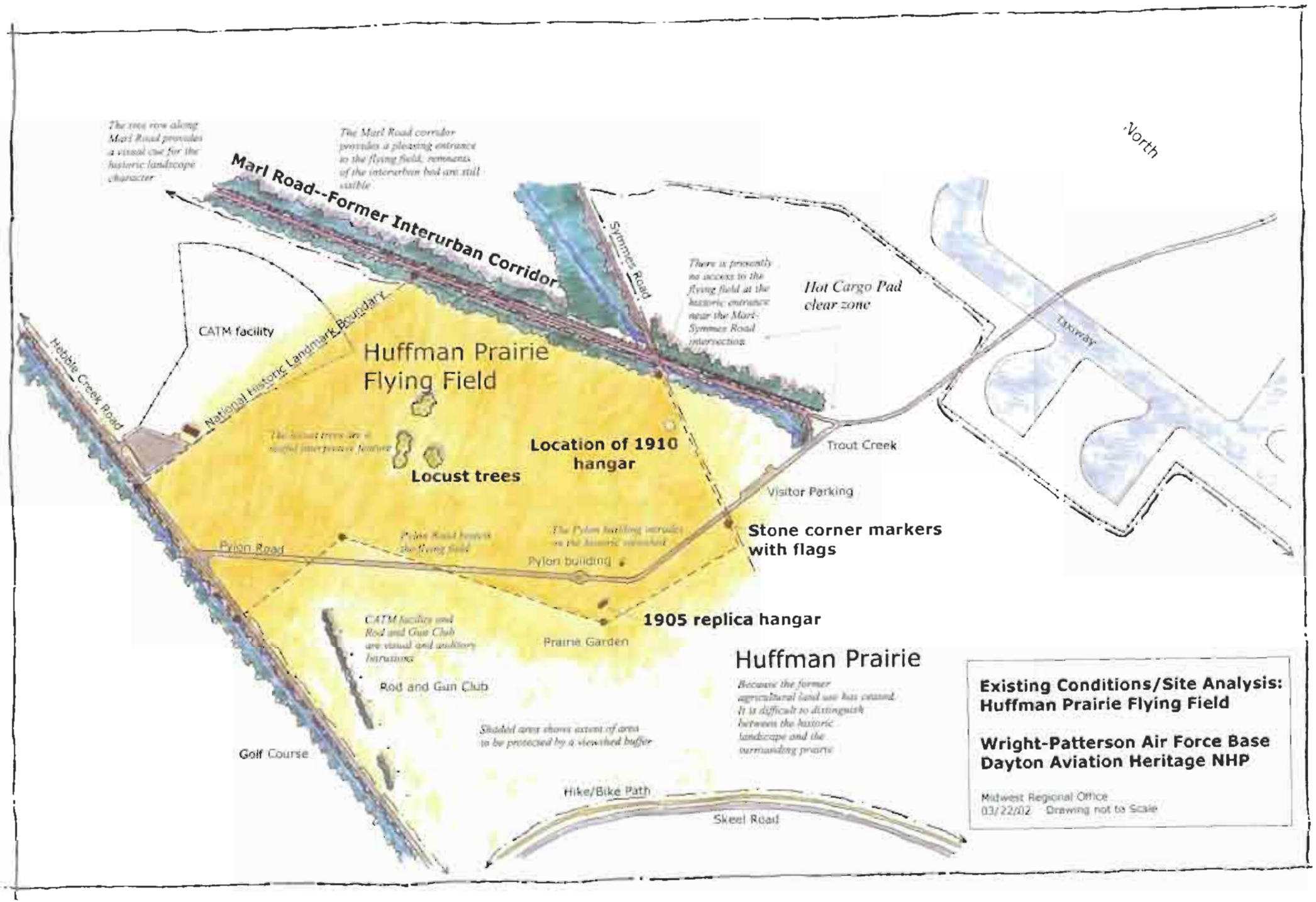
Condition assessments use the *Resource Management Plan Guidelines* to describe the physical condition of landscape features. Condition is depicted as either good, fair, poor or unknown.

> Good: indicates the cultural landscape shows no clear evidence of major negative disturbances and deterioration by natural and/or human forces. The cultural landscape's historical and natural values are as well preserved as can be expected under the given environmental conditions. No immediate corrective action is required to maintain its current condition.

> Fair: indicates the cultural landscape shows clear evidence of minor disturbances and deterioration by natural and/or human forces, and some degree of corrective action is needed within three to five years to prevent further harm to its historical and/or natural values. The cumulative effect of the deterioration of many of the significant characteristics and features of the cultural landscape, if left to continue without the appropriate corrective action, will cause the landscape to degrade to a poor condition.

> Poor: indicates the cultural landscape shows clear evidence of


North
Marl Road parallels the former roadbed of the Dayton Springfield and Urbana Interurban. The Simm's Station platform was located at the north corner of the Marl and Symmes Road intersection
Symmes Road
Former location of Yellow Springs Road
Historic Views
1905 replica hangar
Huffman Prairie Flying Field
Historic Views
Marl Road
The existing Marl and Hebble Creek Road intersection is unsafe. It should be upgraded to modern specifications as part of the transportation development
CATM facility
National Historic Landmark Boundary
Huffman Prairie
Hebble Creek Road
Sykes Road
Rod and Gun Club
Huffman Dam
Proposed extension of existing bike path to Marl Road
Historic View
The flying field remains visible from the memorial
Wright Brothers Memorial
State Rte. 444
Huffman Prairie Flying Field Interpretive Center
Proposed vehicular bridge linking memorial and flying field
Site Context:
Huffman Prairie Flying Field
Wright-Patterson Air Force Base
Dayton Aviation Heritage NHP
Midwest Regional Office
03/22/02 Drawing not to Scale


The trees row along Marl Road provides a visual cue for the historic landscape character
The Marl Road corridor provides a pleasing entrance to the flying field; remnants of the interurban bed are still visible
Marl Road--Former Interurban Corridor
Symmes Road
There is presently no access to the flying field at the historic entrance near the Marl-Symmes Road intersection
Hot Cargo Pad clear zone
North
Taxiway
CATM facility
Hebble Creek Road
National Historic Landmark Boundary
Huffman Prairie Flying Field
Location of 1910 hangar
Locust trees
Trout Creek
Visitor Parking
Stone corner markers with flags
Pylon Road
Pylon building
1905 replica hangar
Prairie Garden
CATM facility and Rod and Gun Club are visual and auditory intrusions
Rod and Gun Club
Golf Course
Shaded area shows extent of area to be protected by a viewshed buffer
Huffman Prairie
Because the former agricultural land use has ceased, it is difficult to distinguish between the historic landscape and the surrounding prairie
Hike/Bike Path
Skeel Road
Existing Conditions/Site Analysis:
Huffman Prairie Flying Field
Wright-Patterson Air Force Base
Dayton Aviation Heritage NHP
Midwest Regional Office
03/22/02 Drawing not to Scale

major disturbance and rapid deterioration by natural and/or human forces. Immediate corrective action is required to protect and preserve the remaining historical and natural areas.

Unknown: indicates that not enough information is available to make an evaluation.

As stated above, a systematic approach has been established for understanding, documenting and describing historic resources. In addition to *A Guide to Cultural Landscape Reports*, a series of bulletins have been created that specifically address landscape resources. Over the last two decades, scholars in the National Register program and academic circles have established a fairly consistent set of thirteen landscape characteristics to be considered as part of the analysis and evaluation process. The characteristics articulate the physical relationships between features; the evaluation process permits a researcher to set physical boundaries and define those features that contribute to the landscape's historic significance.

Landscape characteristics include tangible and intangible aspects of a landscape from the historic period(s); these aspects individually and collectively give a landscape its historic character and aid in the understanding of its cultural importance. The landscape characteristics range from large-scale patterns and relationships to site details and materials.

The landscape characteristics addressed for this site include *Natural Systems and Features*, *Spatial Organization*, *Land Use*, *Cultural Traditions*, *Circulation*, *Topography*, *Vegetation*, *Buildings and Structures/Cluster Arrangement*, and *Views and Vistas*.

Natural Systems and Features
According to 1802 survey notes, the area that is now Huffman Prairie Flying Field was a wet, boggy prairie located near the Mad River. The flying field's location within the floodplain led to infrequent cultivation; the Huffman family used it for grazing their cows while the Wrights carried out their early experiments. Wilbur Wright described it as "an old swamp . . . filled with grassy hummocks." In the aftermath of the 1913 flood the river was dammed. Because the Huffman property was within the defined retention area created by the dam, the threat that the field could be submerged increased, limiting future development of the site (Figure 37). It is primarily for this reason that the flying field is intact today.

The field remains fairly low-lying and can become quite wet according to the season. The soil is a combination of Linwood Muck and Westland soils. Linwood Muck "consists of level, poorly drained organic soil, 16 to 50 inches thick, grading into a loamy material." Westland is characterized by a surface layer of "silty clay loam about fourteen inches thick and is underlain by sand and gravel." Neither series is well suited to agriculture, though conditions can be improved through artificial drainage. Limited documentation exists that drainage tiles were installed at the flying field, although there is no evidence of their specific location.

Huffman Prairie, which lies to the north and east of the flying field, is a 109-acre parcel

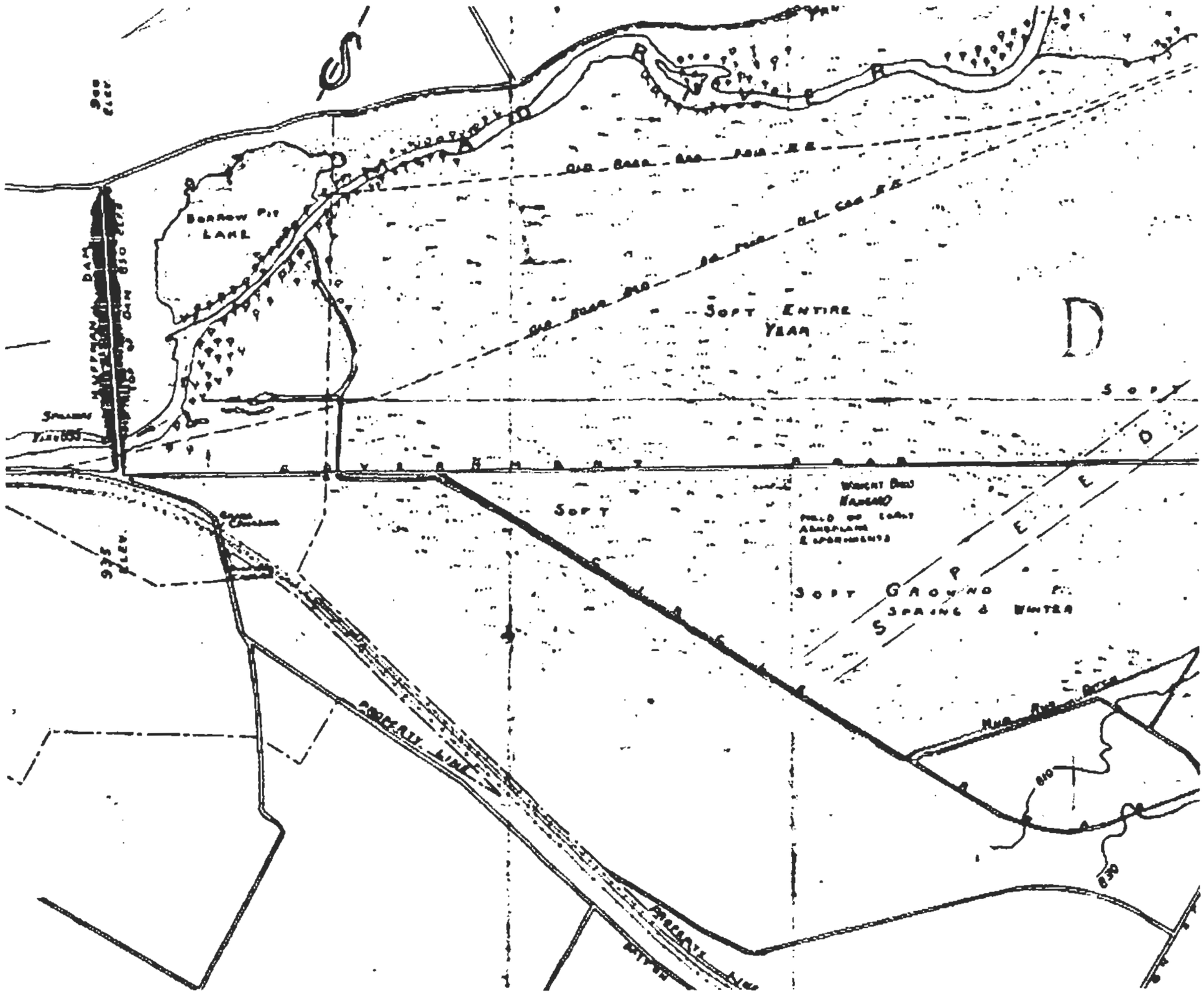


Figure 37. 1927 map of Wright Field with notes on the wet condition of the flying field after the Huffman Dam construction.

recognized as Ohio's largest remnant tallgrass prairie. The broad, open prairie provides the overall setting for the historic landscape of the flying field, though at times, the distinction between the two areas is blurred. The prairie had been drained and cultivated for hay or mowed until 1984. When left fallow, the remnant native grasses became apparent. Since 1990, The Nature Conservancy has been restoring and managing the Prairie in conjunction with Wright-Patterson Air Force Base. A number of vegetation surveys have yielded information on remnant species. "The site [Huffman Prairie Flying Field] has at least three dozen prairie indicator species including the prairie grasses big bluestem (*Andropogon gerardi*), Indian grass *(Sorghastrum nutans*), prairie cordgrass (*Spartina pectinata*) and little bluestem (*Schizachyrium scoparium*); and prairie forbs such as ox-eye (*Heliopsis helianthoides*), black-eyed Susan (*Rudbeckia hirta*), and gray-headed coneflower (*Ratibida pinnata*)." Upon close inspection, one can see that the flying field's vegetation is less diverse than the prairie. The prairie has more vividly flowering species, while the flying field is mostly grasses that are frequently seen in abandoned fields. At present, the flying field is mown as

needed and the vegetation can get quite high, which directly contradicts its historic appearance. Historic period photographs show a landscape of closely grazed pasture with a shaggy, bumpy surface, and large trees scattered across the site. Because the photographer's location is not documented, it is not possible to pinpoint where the trees were on the site. Today, there are trees scattered across the southern portion of the flying field (see *Vegetation*).

Spatial Organization

The flying field sits in a broad open meadow that is bounded on the west and south sides by historic tree rows. At the northern and eastern edges the boundary of the field is less distinct as it blends into Huffman Prairie. Historically, a post and wire fence defined the perimeter of the flying field. Today, flags mark the seven corners of the flying field. Because the field is no longer grazed or frequently mown, the historic juxtaposition between the bumpy, closely grazed ground plane and surrounding meadow is not evident.

Today, most activity at the field is concentrated at its approximate center. Pylon Road provides access to the commemorative features that dot this area, such as the 1905 hangar replica, catapult replica, pylon building, and markers (Figures 38 and 39). The vertical orientation of the hangar, catapult, and flags punctuate the horizontal plane of the flying field. The skeet and firing ranges are clustered at the southern end of the field, and intrude upon an area that appears open in the historic photographs.

Over time, the spatial organization of the flying field has changed to a relatively minor degree. Although, the Huffman property was probably just one in a series of pastured or cultivated open areas, the relationship between the pasture and the surrounding meadows was defined by tree rows and a post and wire fence. Historic photographs do not yield detailed information regarding the type of crops that could have grown in adjacent plots, or whether grazing patterns differed from the Huffman property.

Figure 38. View of flying field from Wright Memorial. The runways are visible to the center of the photo.

Figure 39. The Pylon building was added in 1941 to improve the visibility of the flying field from the Memorial.

Land Use

The proximity of the flying field to both the Huffman Dam and runways has provided protection from extensive development. The historic agricultural use of the former Huffman property ended in 1917 when the Army leased the area upstream from the dam. Although the presence of the Army and later, the Air Force, continued to expand around Huffman Prairie Flying Field, limited agricultural activities persisted into the 1980's under a leasing program. Since the early 1990's, the Air Force, in partnership with the National Park Service and The Nature Conservancy, respectively, has been managing the flying field as a historic landscape, and the prairie as a naturalistic landscape (Figure 40).

The open character of the historic landscape and surrounding prairie still allows for diverse views of the flying field, and, in return, most of the adjacent land uses are visible from the field. The level topography, absence of shrub and tree vegetation, and limited development creates a broad viewshed that should be protected into the future. The viewshed should be maintained as a buffer zone within which no new construction should take place. The flying field and prairie have been protected for almost one hundred years, this legacy of preservation should be continued into the future.

Existing buildings and structures linked to the military operations that surround the flying field include the runways and hazardous cargo loading pads to the north, and the Rod and Gun Club and CATM facility to the south (Figure 41). The runways and pads are outside the buffer zone and do not detract from the historic views. Views to the western and eastern edges of the flying field currently reflect the historic character of the landscape as they feature a compatible recreational use including, respectively, bicycling/hiking trails along Marl Road and golf courses along Skeel Avenue and Hebble Creek Road.

The ranges are more problematic, for a number of reasons. Full development of the National Historical Park will bring increased visitation, and these facilities will have a major impact on how visitors experience the site. They represent a significant visual and auditory intrusion on the historic character of the flying field, a potentially severe

Figure 40. View of mown area around replica hangar, meadow, and tree row, 1996.

Figure 41. View of the Rod and Gun Club at southern end of flying field.

impact on site accessibility, and pose a possible environmental issue for the flying field. The impact area extends beyond the structures and encompasses Marl Road, one of the primary access routes to the site. At present, it is not unusual for access to be limited while the CATM facility is in use, and visitors often hear gunshots while trying to enjoy and appreciate the flying field.

Cultural Traditions

The significance of the connection between the flying field and Wright-Patterson Air Force Base cannot be understated. The legacy that is evident whenever an aircraft departs or arrives at Wright-Patterson is a wonderful opportunity for interpreting the Wright brothers' contribution to aviation history. Huffman Prairie Flying Field's significance lies primarily in the early 1904-05 experiments, but it is also the place where aviation technology was born. It is the birthplace of the Air Force and the starting point of an aviation continuum that is evident with every take-off and landing that passes over the flying field.

The flying field possesses commemorative value for aviation enthusiasts and Dayton residents. When the Wright Brothers Memorial was constructed in the late 1930s through the efforts of Colonel Deeds and other community leaders, a physical link was established between the Memorial and the flying field. The Pylon building was added to improve the visibility of the field from the Memorial overlook. The 1905 hangar replica and the three markers installed for the 1990 National Historic Landmark dedication ceremony have also left a contemporary layer of commemoration.

Circulation

The Wright brothers accessed the flying field using the interurban line that ran from Dayton. Once they left the interurban platform, it is not known how they accessed the 1904-1905 hangars, but it is likely that during the 1910-1916 period they followed Yellow Springs Road to an opening in the fence that was near the hangar. Visitors that coming to the field to watch the Wrights' experiments probably rode the interurban or came via car on the Dayton-Springfield Pike, the primary vehicular route that ran parallel to the interurban along the northwest edge of the flying field. The Dayton-Springfield Pike is now known as Marl Road. The interurban corridor is extant, though the tracks and the Simm's Station platform have been gone for some time.

Contemporary access roads include Hebble Creek, Marl, and Pylon Roads. All vehicular traffic arrives on Hebble Creek; drivers can choose either Marl or Pylon Road to enter the field. The shaded hiking/biking trail along Marl Road provides enjoyable access to the flying field and prairie. Pylon Road, constructed in 1941, provides direct access to the cluster of buildings and structures near the center of the field. Visitors to this area use a small pull-off parking lot just north of the flying field boundary. Both Hebble Creek and Pylon Roads adversely impact landscape integrity as they traverse the historic field. Pylon Road is more intrusive, as its raised roadbed interrupts views across the field and cuts the field into two segments, making it hard for pedestrian to move freely throughout the field (Figures 42 and 43).

From 1991-2002, Wright-Patterson maintenance crews mowed a walking trail to

Figure 42. Pylon Road bisects the flying field, negatively impacting the visitor experience and posing a safety hazard.

Figure 43. The traffic circle is near the 1905 hangar replica. The catapult replica is visible at the right side of the photo.

represent the historic oval flight path used by the Wrights. A brochure available at the field is keyed to specific stopping points along the trail. The trail moves visitors through the site, and symbolizes the early notion that historically property rights extended vertically—the Wrights had to stay within the perimeter of the field while in flight.

Planning efforts are currently underway to improve visitor access to the flying field. The goal is to establish a stronger physical link between the flying field and other aviation sites. The new route will follow the historic access route along the interurban corridor and will accommodate vehicular, pedestrian, and bicycle traffic; bringing visitors to the site in this manner will afford a fuller understanding of how the Wright brothers used and experienced the site. A new parking lot will have to be constructed along Marl Road to serve the increased visitation that is anticipated once the park is fully developed.

Topography

The topographic character of the flying field has remained intact since the historic period, with the exception of the Pylon Road corridor. When the roadbed was constructed, the earth was built up approximately five feet in an attempt to avoid the low-lying spots near the field's center. Photographs taken to document the early flights show an uneven, closely grazed surface that posed many challenges to safe takeoffs and landings. The field remains flat and open; because the grass is currently maintained at a longer height, the bumpy quality is not as visible (Figure 44).

Vegetation

Historically, extensive pasture and taller meadows surrounded the closely grazed Huffman property. The flying field was dotted with large trees and possessed a rather scruffy appearance. Biotic elements, including the tree row along Marl Road and remnants from the locust tree survive from the 1904-05 period. The tree row, though essentially intact, has a much fuller character than during the historic period, when it

Figure 44. View of flat open topography at northeastern portion of the flying field. The grass along Pylon Road is regularly mowed.

Figure 45. The existing character of the Marl Road tree row and the meadow vegetation.

had a rather sparse, and somewhat open appearance. This change most likely results from the cessation of grazing and transition from interurban to secondary road (Figure 45).

Today, the flying field consists of mixed native and exotic grassland species with scattered large trees; while of the Prairie features a richer display of flowering species. The Prairie Garden planted by the Air Force as an interpretive tool intersects with the historic flying field near the 1905 replica hangar. At this time, it is difficult to distinguish the Prairie Garden from the prairie itself. The Prairie Garden is considered non-historic, as are the barberry, yew and cotoneaster shrubs at the 1905 hangar and NHL markers and Pylon building.

Buildings and Structures/Cluster Arrangement

During the flying field's period of significance, the site featured several buildings and structures used by the Wright brothers. During the 1904-05 experimental period, the Wrights built two consecutive hangars, and a launching catapult. They built a third hangar and at least one small shed during the 1910-16 flight school era. None of these structural features survived past the 1940s. Adjacent structures associated with the Wrights' activities included the interurban line and the Simm's Station platform. Neither of these features is evident today, though Marl Road has reflects the linear quality of the historic interurban corridor. A portion of the interurban railbed remains adjacent to Marl Road.

The contemporary structures at the flying field are intended to facilitate interpretation of the historic period. Although they should not be considered historic, they do contribute to understanding the significance of the field and represent the added commemorative nature of the site. The replica 1905 hangar is the sole building; the structures include the Pylon building, replica catapult, the 1905 and 1910 hangar markers and the NHL marker, and the seven flags set in low stone walls marking the corners of the field. The buildings and structures (except the corner markers) are clustered near the center of the field, where most of the Wright brothers' activities were focused. Except for the replica hangar, the structures do not represent historic

Figure 46. 1905 replica hangar.

Figure 47. Concrete marker added to the site for the 1990 National Historic Landmark dedication ceremony.

features and add contemporary character to what could be an essentially accurate scene. The stone markers, however, are useful in that they define the historic boundary of the field. Although the replica catapult represents a historic structure, the replica is not full-scale and is therefore somewhat misleading (Figures 46 and 47).

Views and Vistas

Photographs of the field taken during the historic period focus on the flying experiments; visual clues of the historic landscape are limited and usually quite blurry. Features that figure prominently in the historic views include the hangars, tree row, locust tree, grassy hummocks, and boundary fence. (See *Land Use* for discussion of contemporary impacts on the viewshed.)

The flying field is visible today from Skeel Avenue and Hebble Creek Road, with the help of the flags that have been placed at each of the seven corners. Because it is not grazed or regularly mown, the eastern boundary cannot be easily distinguished from the surrounding prairie. Modern utilities related to base operations are primarily limited to the Marl Road corridor, where they are hidden in the tree row. Overhead lines run along Hebble Creek, and a small utility-related structure near the middle of the field is hidden by shrub growth.

While the flying field retains the open character and one major physical element from the historic period, it has accumulated a number of features associated with commemorative activities or Air Force operations (Figures 58-51). Table I provides an itemized list of the historic features, features that are not historic but are not necessarily detrimental to the integrity of the flying field, and those features that are intrusive and or damaging to the field's condition or integrity. The condition assessment for each of these features is also presented in the table

TABLE I—LANDSCAPE EVALUATION

HISTORIC FEATURE	DESCRIPTION	CONDITION
Meadow	Broad, unobstructed views of relatively flat topography with a bumpy, scruffy-textured ground, open sky, and an irregularly shaped perimeter.	Fair
Locust Tree	Visible in the most early flight photographs, the original tree was the Wright's landmark for navigating their circular flight path. A clump of possible descendents of the tree is located in the approximate center of the field	Good
Former Interurban Corridor	The linear corridor, lined by the tree row, defines the route of the former Dayton-Springfield Pike, the historic western boundary of the flying field. The track bed, still evident under the forest growth, represents the historic circulation system that the Wrights and other Dayton residents used to access the field. Although the tracks have been removed, the physical connection between the corridor and the field is intact. The tree row, which also retains its physical relationship with the field, is denser than during the historic period.	Fair
COMMEMORATIVE FEATURE	**DESCRIPTION**	**CONDITION**
1905 Hangar Replica	An interpretive feature constructed for the 1990 NHL dedication ceremony. It provides a sense of scale in the historic landscape and represents the austerity of the Wright's early flight experiments.	Good
1905 and 1910 Hangar and NHL Markers	Interpretive features constructed for the 1990 NHL dedication ceremony. They facilitate understanding of the historic landscape.	Good
Launching Catapult	An interpretive exhibit built as an Eagle Scout project in 1993. This exhibit is a two-thirds scale replica model of the historic structure.	Good
Stone Walls with Flags	Installed in 1991, they reflect the historic materials and construction methods of the Wright Brothers Memorial. The walls and flags serve to define the historic landscape boundary.	Good
Pylon Building	Installed in 1941 to improve visibility of the flying field from the Wright Brothers Memorial. Because the flying field was not open to the public at that time, the pylon served as a tool for interpreting the site from the Memorial.	Good
Concrete Sidewalks	Installed incrementally between 1941 and 1990, the walks provide access to the Pylon building and various commemorative markers. Some of the slabs are worn and cracked.	Good to fair
INTRUSIVE FEATURES	**DESCRIPTION**	**CONDITION**
CATM facility and Rod and Gun Club	Although the ranges are part of adjacent base operations and recreational land use, they present a visual and auditory intrusion.	Good
Pylon Road	The road divides the historic property and interrupts historic views.	Good
Guest Register Mailbox	A contemporary residential feature that appears incongruous in the historic landscape	Good
Shrub Plantings	The contoneaster and barberry shrubs are incompatible with the meadow character of the flying field and surrounding prairie.	Good
NON-EXTANT FEATURES		
1904 hangar, 1910 hangar, boundary fence, interurban tracks and platform, catapult, Yellow Springs Road, bridge across Trout Creek.		

Figure 48. View to southwest showing catapult replica and meadow vegetation, 1996.

Figure 49. View to northwest showing tree row, Pylon Road, and the Pylon building with associated markers and vegetation, 1996.

Figure 50. View to northeast showing flag at corner of flying field.

Figure 51. Corner wall and flagpole near 1905 hangar replica.

INTEGRITY ASSESSMENT

Integrity is the ability of a landscape to convey its historic significance. While the condition assessment refers directly to the physical state of historic features, integrity is less straightforward. While it literally refers to a landscape's ability to convey its historic appearance, an assessment has to take into account the reality that the elements that make up a landscape are often living and constantly changing. It also has to define the degree to which changes to the historic landscape can be reversed—if changes are irreversible, applying a treatment approach will not return a landscape to a high level of integrity. It may be possible to better convey the historic appearance, but original features and materials are gone.

National Register criteria for evaluating landscape integrity uses the seven aspects of *location*, *design*, *setting*, *materials*, *workmanship*, *feeling* and *association*. Due to the loss of original historic structures such as the hangars and fences, and the subsequent accumulation of incompatible contemporary features, the overall integrity of the flying field is medium. The breakdown of the integrity assessment is located in Table II.

EVALUATION SUMMARY

Overall, Huffman Prairie Flying Field has good physical condition and a high to medium level of integrity. This assessment has strong implications for future management, as it is critical that the intrinsic significance of the flying field be respected: the parcel of land with its historic open meadow character is the cultural resource to be protected. The treatment objective is, first, to minimize or remove intrusions and, second, avoid further intrusion on historic views by maintaining a visual buffer outside of the historic boundaries that prohibits future construction. Prohibiting any further buildings or structures within or near its boundaries can protect the broad views and open character of the field.

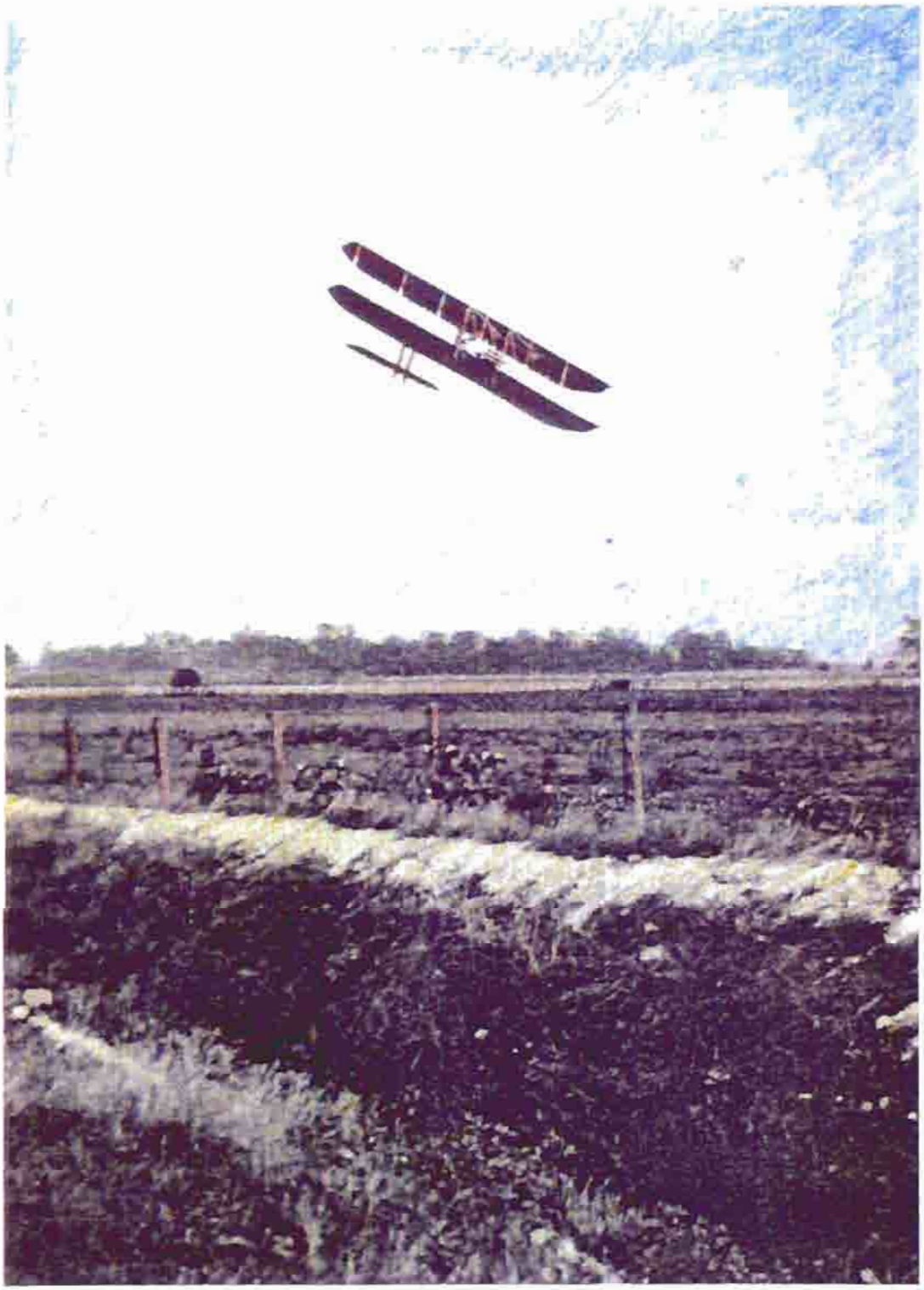
In addition to maintaining the open field, treatment guidelines will strive to protect landscape character by preserving all remaining historic features that contribute to the field's significance and removing intrusive features. It is essential that any new features, such as interpretive media, are unobtrusive; this can be accomplished by respecting the historic scale and utilizing appropriate construction methods and materials.

It must be noted that the Pylon building is over fifty years old, and should be evaluated for potential National Register of Historic Places eligibility. It was built in 1941 to improve visibility of the field from the Wright Memorial. At that time, the building was the only means that non-military personnel could view the field, as the base was not accessible. The NHL nomination lists the building as non-contributing, however, its historic function should be acknowledged. This function is still relevant, as the field would be inaccessible if the base is closed. Visibility of the field from the Wright Memorial should be considered when determining treatment alternatives in the following chapter.

TABLE II—INTEGRITY ASSESSMENT

ASPECT	RATING	ANALYSIS
LOCATION The place where the cultural landscape was constructed or the landscape where the historic event occurred.	High	The flying field has not been relocated from its historic boundaries and can be distinguished from its contemporary surroundings.
DESIGN The combination of elements that create the form, plan, space, structure, and style of a cultural landscape	Medium	Because historic features have been lost and contemporary amenities such as the CATM facility, Rod and Gun Club and Pylon Road have been added, the vernacular character of the flying field has been altered. It retains the open meadow character, but it is no longer evident that the site was once used as a pasture.
SETTING The physical environment of the cultural landscape.	Medium-High	The physical environment of the flying field has been altered by both internal and external developments, such as the CATM facility, Rod and Gun Club and Pylon Road. While these developments have specifically intruded into the historic views and altered historic circulation patterns, the open meadow character remains.
MATERIALS The physical elements that were combined or deposited during the particular period(s) of time and in a particular pattern or configuration to form the cultural landscape.	Medium	Although the general vegetative character of the flying field remains, a number of contemporary materials and construction methods not associated with the period of significance have been added to the site. This includes the commemorative markers, the Pylon building, and the corner walls.
WORKMANSHIP The physical evidence of the crafts of a particular culture or people during any given period in history or prehistory.	Low	Physical evidence from the historic period is limited. The site is dominated by reconstructed features which are non-historic, and therefore more interpretive in nature.
FEELING A cultural landscape's expression of the aesthetic or historic sense of a particular period of time.	Medium-High	Despite the loss of historic buildings and structures, such as the hangars and boundary fence and the addition of contemporary intrusions, the landscape expresses the aesthetic or historic sense of the period of significance. This is mostly due to the enduring historic views of the remaining open meadow character, and the texture created by grassy vegetation.
ASSOCIATION The direct link between the important historic event or person and a cultural landscape.	High	There is a direct link between the historic events and persons with which the flying field is associated, especially between the Wrights' experiments and the aviation technology evident at Wright-Patterson Air Force Base.

CHAPTER 3
TREATMENT ALTERNATIVES



CHAPTER 3
TREATMENT ALTERNATIVES

TREATMENT ALTERNATIVES

Treatment

Based on historical research and landscape evaluation at Huffman Prairie Flying Field, the final step in the Cultural Landscape Report process is articulating a long-term strategy for protecting the property. The *Secretary of the Interior's Standards for the Treatment of Historic Properties*, the professional standards to which federal agencies, including the Air Force and National Park Service, subscribe when treating a historic resource, were revised in 1995 to include guidelines for treating historic landscapes. "A treatment is a physical intervention carried out to achieve a historic preservation goal." To determine the appropriate approach, researchers should consider management goals, such as levels of public access, preservation of natural resources, contemporary use, and interpretation. Treatment decisions are based on many factors including:

LEGISLATIVE AND MANAGEMENT FACTORS
- ✓ Federal law
- ✓ Park unit's enabling legislation
- ✓ Policy, guidelines, and standards of Air Force and National Park Service
- ✓ Management objectives
- ✓ Proposed use (as defined in planning documents)

RESOURCE-BASED FACTORS
- ✓ Historical integrity and significance
- ✓ Level of historical documentation
- ✓ Existing conditions
- ✓ Threats and resource conflicts

OPERATIONAL FACTORS
- ✓ Health and safety
- ✓ Maintenance requirements
- ✓ Projected Costs
- ✓ Public Access

The Secretary of Interior's Standards defines four general approaches to treating a historic landscape. The Standards acknowledge that for complex sites, "the primary treatment often serves as a general treatment for the historic landscape." It is acceptable, practice, then, to apply different approaches to treat specific areas within the landscape. The four approaches are defined as follows:

Preservation: the act or process of applying measures necessary to sustain the

existing form, integrity, and material of a historic property. Includes initial stabilization work, where necessary, as well as ongoing preservation maintenance and repair of historic materials and features.

Rehabilitation: the act or process of making possible a compatible use for a property through repair, alterations, and additions while preserving those portions or features which convey its historical, cultural or architectural values.

Restoration: the act or process of accurately depicting the form, features, and character of a property as it appeared at a particular period of time by removing features from other periods in its history and reconstructing missing features from the restoration period.

Reconstruction: the act or process of depicting, by means of new construction, the form, features, and detailing of a non-surviving site, landscape, building, structure, or object for the purpose of replicating its appearance at a specific period of time and in its historic location.

HUFFMAN PRAIRIE FLYING FIELD TREATMENT ALTERNATIVES

Like any planning document, cultural landscape reports typically consider a range of alternatives to determine how to best manage a cultural landscape. First, a general treatment approach is defined as an overall guiding principle, and alternatives that provide varied means for achieving the accepted treatment approach are then laid out. Based on the flying field's significance, physical condition, integrity, as well as more mundane factors such as available funding and staff, the most desirable and feasible alternative is rehabilitation.

Because several critical features survive from the flying field's historic period, and to facilitate interpretation of the field's significance for visitors more recent additions have also been made, the preferred treatment should protect historic features and determine whether the contemporary features are compatible and worthy of retention. The subtle nature of the flying field may also require that additional interpretive or representational development be installed at the site. Fortunately, rehabilitation allows for the most flexibility for protecting the historic landscape while simultaneously accommodating appropriate contemporary use.

One of the most critical issues facing the development of Huffman Prairie Flying Field as a cooperating unit of the National Historical Park is providing multi-modal public access. Increased public visitation to Huffman Prairie Flying Field will require accommodating more traffic, including private automobiles, tour buses, pedestrians and bicyclists. Access routes will have to link the flying field to both the greater Dayton transportation network, and other aviation history sites. A successful strategy will establish a single multi-modal corridor that addresses the needs of visitors, corresponds to base operations, and allows for the potential future development of an electric trolley that would link the City of Riverside, the U. S. Air Force Museum, Wright Brothers Memorial, and the flying field. A straightforward system of roads and trails will provide a gateway

from public roads to the flying field, using signs and vegetation to heighten visitor's sense of entry to the historic landscape.

The primary goal of the rehabilitation approach is to improve condition, protect integrity, and provide public access and understanding of significant historic resources. A delicate touch is needed when designing new site elements so that the historic qualities and features are not obscured. At the flying field, the sense of place is dependent on open, unobstructed views, a predominantly horizontal orientation, and the irregular texture of the ground plane and surrounding prairie. It is critical that these rather intangible qualities, as well as the locust trees and the tree row, are protected. It is also important that active public use and enjoyment, as well as visitor access, be promoted as part of the treatment plan. By incorporating interpretive concerns, the plan can integrate the twin missions of resource management and visitor education. To effectively address the complex requirements associated with the primary goal of rehabilitation, treatment alternatives for landscape management and treatment alternatives for public access were considered separately with two preferred alternatives merged to provide a single comprehensive preferred alternative. The specific actions that will be implemented under the preferred alternative are organized into general categories of **Visitor Access, Interpretation, Vegetation Management, and Mitigating Intrusions**.

Description of the Comprehensive Preferred Alternative – Landscape Alternative B: "1904-1916 Symbolic Landscape" and Transportation Alternative C: Marl Road Loop Circulation

Landscape Alternative B: "1904-1916 Symbolic Landscape" merged with Transportation Alternative C: Marl Road Loop Circulation, is the comprehensive preferred alternative because it protects historic views and spatial relationships, allows interpretation of the full range of historic activities at the site, and provides for a variety of visitor experiences and the highest levels of public access (Figures 52 and Alternative B Concept Site Plan).

The objective of this alternative is to convey both historic periods without adding literal reconstructions in such a way that archeology and historic views are minimally impacted. Simple design elements will be added to allude to the flying field's historic agricultural character, symbolize where the Wrights' hangars were located, and indicate how they used the site.

VISITOR ACCESS

Improve Access to the Flying Field from Major Transportation Routes
Visitors currently have to travel through a circuitous route to reach the flying field. Establishing a more direct route that will accommodate the anticipated increase in visitation will serve to enhance the visitor experience. Marl Road, once known as the Dayton-Springfield Pike, paralleled the interurban rail line used by the Wright brothers and other residents to reach the experimental airfield. This is the preferred route for bringing visitors to the site. However, the paved surface of Marl Road is currently about fourteen feet wide and inadequate for two-way traffic. The projected increase in

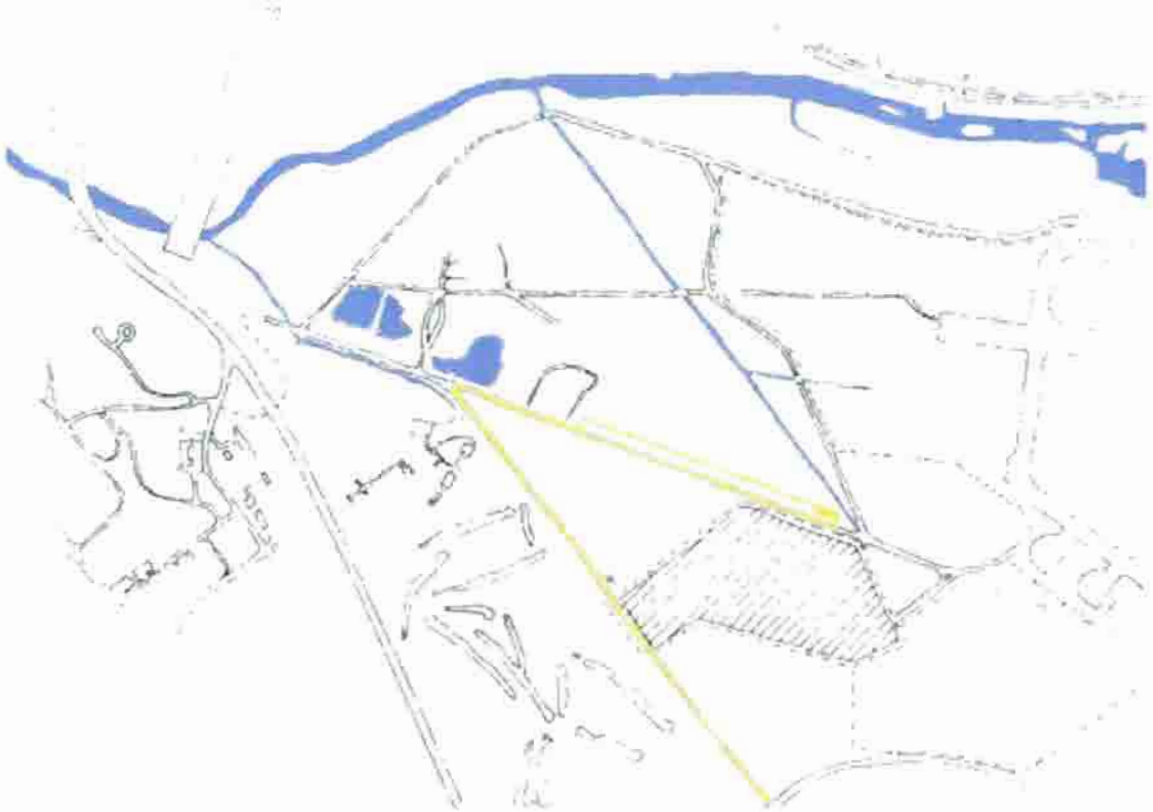


Figure 52. Preferred Transportation Alternative, showing development of Marl Road into a one-way loop with a boulevard. This schematic shows how traffic will be routed following removal of Pylon Road but before the vehicular "gateway" to the Wright Memorial is completed.

visitation will require modification of the existing road.

A number of schematic designs were explored for implementing the access and visitor circulation changes proposed in Landscape Management Alternative "B." The goal is to incorporate multi-modal transportation without damaging the character of the tree row and the interurban remnants. Additionally, providing access to the Wright Brothers Memorial and the U.S. Air Force Museum will create a physical and conceptual connection between the flying field and other aviation history sites. Using the narrow shaded Marl Road corridor as a "gateway" to transport visitors back in time will convey the site's importance to the success of the Wrights' experiments and help visitors appreciate the transportation challenges they faced as they traveled and moved to the flying field. To accomplish this goal new routes will be created that will provide for multi-modal access, e.g., cars, buses, bicycles, and pedestrians. The complexity of this effort will require that the changes in routes happen in phases. Phase I, development of a new entrance (Gate 16A) off of State Route 444 to Hebble Creek Road and the flying field has been completed and is ready to be opened pending the addition of turn lanes on SR444 by the Ohio Department of Transportation. In Phase II Marl Road

would be widened to allow vehicles and bicycles. The intersection of Hebble Creek Road and Marl Road would be reworked, and an additional roadway and bike lane would be constructed parallel to the northwest side of Marl Road to create a counterclockwise return loop. The return loop would rejoin Marl Road just east of Gravel Lake, and a relatively short segment of Marl Road would be widened south and west of Gravel Lake to accommodate two-way traffic. The bike lane would connect to the Mad River Bikeway to provide direct bicycle and pedestrian access from the Huffman Prairie Flying Field Interpretive Center and Wright Memorial. This transportation alternative protects the character of the historic approach to flying field along Marl Road by keeping road construction north of Marl Road. It also avoids disturbing Burial Site #4 and retains the interurban rail bed.

Following the completion of the Marl Road corridor, Pylon Road's bituminous surface would be removed. Between the northern flying field edge and the traffic circle the sub-base will be retained to provide a stable surface for visitors and service vehicles.

Proposals have also been made for a direct vehicular connection from the Wright Memorial to the western terminus of Marl Road and an electric trolley along the interurban rail bed to connect the U.S. Air Force Museum, Riverside, the Wright Memorial, and the Huffman Prairie Flying Field. Funding is not currently available to implement these proposals.

Construct New Pedestrian Bridges
Two new pedestrian bridges will be constructed near the Marl and Symmes Road intersection to move visitors from the parking area to the flying field. Although there is no documentation of the previous bridges, an appropriate design will be adapted from examples of period bridges from the Dayton area.

INTERPRETATION

Mark the 1910 Hangar Site
Medium to large native stones will be set on the ground to mark the footprint of the 1910 hangar. The corner stone walls and flags will be retained. The concrete bases of the 1990 NHL dedication ceremony markers will be removed, and the bronze plaques attached to the outer wall of the 1905 replica hangar.

Install Post and Wire Fence
Restoring the historic fence will recapture the historic agricultural character of the flying field, more clearly define the historic property and improve visibility from Wright Memorial. It will also establish a strong sense of entry into the site, highlight the contrast between the surrounding prairie and base development and allow for more efficient site management. The fence will be restored around the entire field. The existing corner markers will be retained, with the fence stopping and starting several feet from the marker. Larger flagpoles (40 feet) will be used to illustrate the average height of the Wrights' experimental flights and make the field more visible.

Install Interurban Exhibit and Access Trail
In conjunction with the improved Marl Road access, the intersection of Marl and Symmes Roads will be developed as the main entry point to the historic landscape. Visitors will arrive, park their cars or bikes if necessary, and be greeted by entry signs and an exhibit describing the significance and location of the historic interurban platform. They will then cross the road and bridge, and walk along the former Yellow Springs Road on a universally accessible trail. The trail will parallel the post and wire fence until it meets Pylon Road. Visitors will then enter the field through a fence opening and walk along another accessible trail until they reach the 1905 hangar area.

Develop 1905 Replica Hangar and construct Replica Catapult
The 1905 replica hangar will be the focus of activity once visitors enter the flying field. Interpretive exhibits will be constructed inside the hangar, with the door secured in an open position to allow visitor access. Eventually, the "traffic circle" area will be developed as a visitor gathering space; the existing catapult will be replaced with a full-scale replica. The replica will set in this general location for use in interpretive programs.

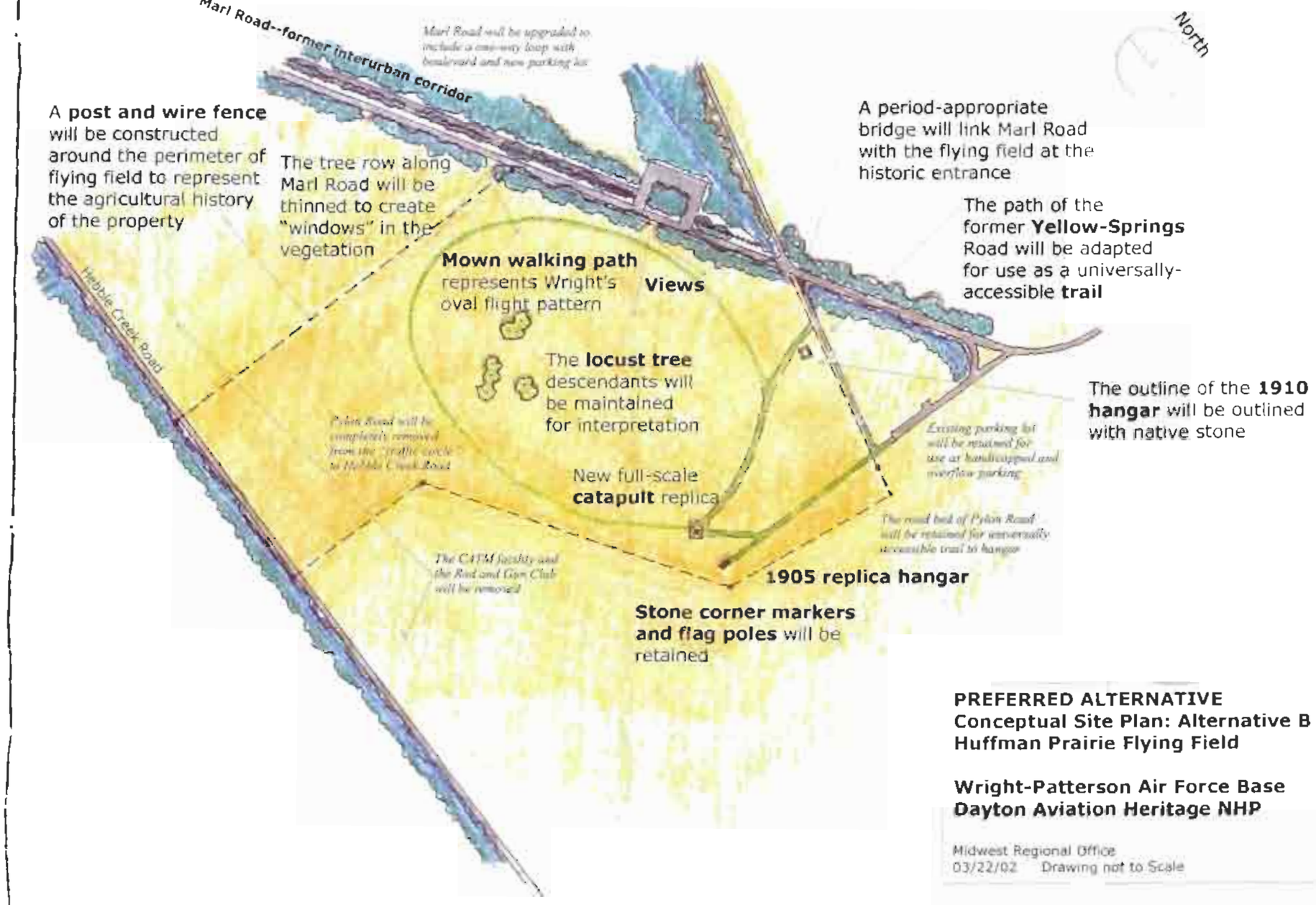
Interpretive Trail System
Once visitors enter the flying field from the Yellow Springs Road access trail, they will use another universally accessible trail to reach the 1905 replica hangar. This trail will connect to the 1910 hangar site and lead back to the exit at the northwest corner of the flying field. Beginning at the 1910 hangar site, a loop trail will be mown to represent the Wrights' oval flight path. Waysides will be sited along both trails at appropriate points.

VEGETATION MANAGEMENT

Rehabilitate Tree Row
The tree row along the western boundary of the flying field provided significant visual and spatial character during the historic period. It also acts an orientation device in many historic photographs. By thinning or pruning to more closely resemble its original appearance, views into the field will reinforce a strong sense of entry, and facilitate interpretation of the Wrights' activities and the historic landscape character.

Establish Mowing Program
Returning the relationship between low, scruffy pasture surrounded by taller meadow or crop vegetation will restore a sense of the site's historic appearance and improve understanding of the extent of its historic boundaries. The entire field should be mown six to eight times a year. The oval loop trail will be distinguished from the remainder of the mown flying field by a closer and more frequent mowing schedule.

Enhance the Prairie Management Program
There is no inherent conflict between the current restoration and management of Huffman Prairie and the preferred flying field treatment. Although the small area where the flying field and prairie overlap should be mowed with the rest of the field, in recognition of the time and effort invested in the Prairie Garden—an area planted to



PREFERRED ALTERNATIVE
Conceptual Site Plan: Alternative B
Huffman Prairie Flying Field

Wright-Patterson Air Force Base
Dayton Aviation Heritage NHP

Midwest Regional Office
03/22/02 Drawing not to Scale

highlight and interpret the species found in the surrounding restored prairie—the portion within the historic boundaries may be left intact at this time. In the future, if a decision is made to stop maintaining this area as part of the garden, it should be added to the mowing program. It is recommended that the prairie management program be extended to all areas that are outside the field and within the viewshed buffer zone.

MINIMIZING OR REMOVING INTRUSIVE SITE ELEMENTS

Remove Pylon Road

Pylon Road intrudes upon the historic landscape's spatial and visual character. By dividing the property into sections, it prevents visitors from experiencing the feeling of open space and may discourage them from walking from one part of the field to another. The raised roadbed interrupts the relatively flat, low-lying topography. The road, which was not present during the historic period, will be removed to return the open expanse of meadow. The asphalt surface will be removed along the road's entirety; the roadbed will be reused from the northern boundary of the flying field south to the "traffic circle." From this area to Hebble Creek, the roadbed will be regraded to reduce its height.

Remove Rod and Gun Club and Combat Arms Training Maintenance (CATM) facility

Removing these contemporary intrusions from the southern portion of the historic property will reestablish the pastoral character and allow for a more reflective atmosphere for visitors. Because the ranges play an important role in the base's mission and quality of life, base officials have agreed to actively investigate a variety of options, including preparation and submittal of a military construction project to remove and relocate the CATM facility.

Remove Pylon Building and Associated Features

The Pylon building was constructed in the 1940s to enhance the flying field's visibility from the Wright Memorial because the site was closed to the public. Today, the flying field is open to the public and it is less crucial that it be visible from the Wright Memorial. The building, surrounding sidewalks and shrubs contradict the field's historic character and will be removed. The views between the two sites remain important for interpretation and will be enhanced through improved vegetation management and construction of less intrusive elements, such as the fence.

Establish Viewshed Buffer Zone

One of the treatment goals defined for the flying field is to insure that future activities do not adversely impact historic views of and from the site. Although there is already a construction ban due to floodplain restrictions, further prohibiting any new buildings or structures within or near its boundaries will protect the broad, open character of the field.

The viewshed extends from the tree row along Marl Road east to Skeel Avenue, the intersection of Marl and Symmes Road north to the Patterson Field runways, and south to Hebble Creek Road, including its intersection with Skeel Avenue. A second viewshed

that should be protected and maintained is the view from the Wright Brothers Memorial. While an additional buffer zone may not be necessary to protect this significant element from intrusion, selected clearing of large trees between the Memorial and the flying field may be needed to improve the visibility.

LANDSCAPE MANAGEMENT ALTERNATIVES CONSIDERED BUT REJECTED

No Action Alternative: This alternative would call for continuing the current maintenance and interpretive approach at the flying field. Compliance with existing federal law would still apply. Visitors would still have access to the field, and the Air Force and National Park Service could continue to provide the existing level of interpretation. The result would be that the full historic significance of the site would not be evident because the landscape would still feature modern intrusions, presenting an inaccurate view of the flying field's historic appearance. The condition would not suffer if the current levels of maintenance were continued, but the integrity would remain compromised and the full interpretive potential of the site would not be realized. Goals for visitor satisfaction would not be fulfilled.

Landscape Alternative A: This alternative places the highest priority on protecting the NHL significance by managing the site as a combination of historic and reconstructed features with an emphasis on the 1904-1905 experimental period (Alternative B Concept Site Plan). The existing 1905 replica hangar would be removed, and the existing replica catapult would be replaced with an accurately scaled model. The flying field will be mowed frequently to approximate the historic meadow character. Interpretation would rely on organized tours, as minimal interpretive media would be added to the site. Features that did not exist during this period would be removed. This includes all commemorative features such as the Pylon building, 1990 NHL dedication ceremony markers, and corner markers and flags. The concrete markers could be moved to a location outside the historic boundaries of the flying field, such as the parking lot. Alternative "A" was eliminated because it does not offer sufficient interpretive opportunities for visitors.

Landscape Alternatives C and D: Rejected earlier in the planning process, these alternatives proposed "ghost" frames and reconstructed frames, respectively, which would have been detrimental to the field's historic landscape and would have contradicted reconstruction policy (Alternatives C and D Concept Site Plan). The preferred alternative retains the replica hangar and proposes an accurately scaled reconstruction of the catapult; both structures will be useful interpretive tools and provide shelter and a sense of scale for visitors. No further reconstructions are recommended. National Park Service policy, and historic preservation practice in general, actively discourages reconstructing buildings, structures, or features within a historic landscape. Because the Wrights' hangars never occupied the site together during the period of significance, literal reconstruction would not be permitted. From a resource management and interpretive perspective, reconstructions are undesirable for several reasons:

- They may confuse visitors who think they are viewing a historic feature,
- They often require conjecture during construction because historic

documentation is unavailable and thus they are less than accurate (this is especially true of the 1904 hangar), and

- They divert maintenance funds from authentic historic features.

NPS policy, as stated in *Director's Order 28, Cultural Resource Management Guidelines* state that "reconstruction . . . is always a last-resort measure for addressing a management objective and will be undertaken only upon a specific written approval of the director after policy review in the Washington office."

The *Secretary of the Interior's Standards* provide more specific guidance related to reconstruction:

> justifying a reconstruction requires detailed physical and documentary evidence to minimize or eliminate conjecture and ensure that the reconstruction is as accurate as possible. Only one period of significance is generally identified; a landscape, as evolved, is rarely re-created.

TRANSPORTATION ALTERNATIVES CONSIDERED BUT REJECTED

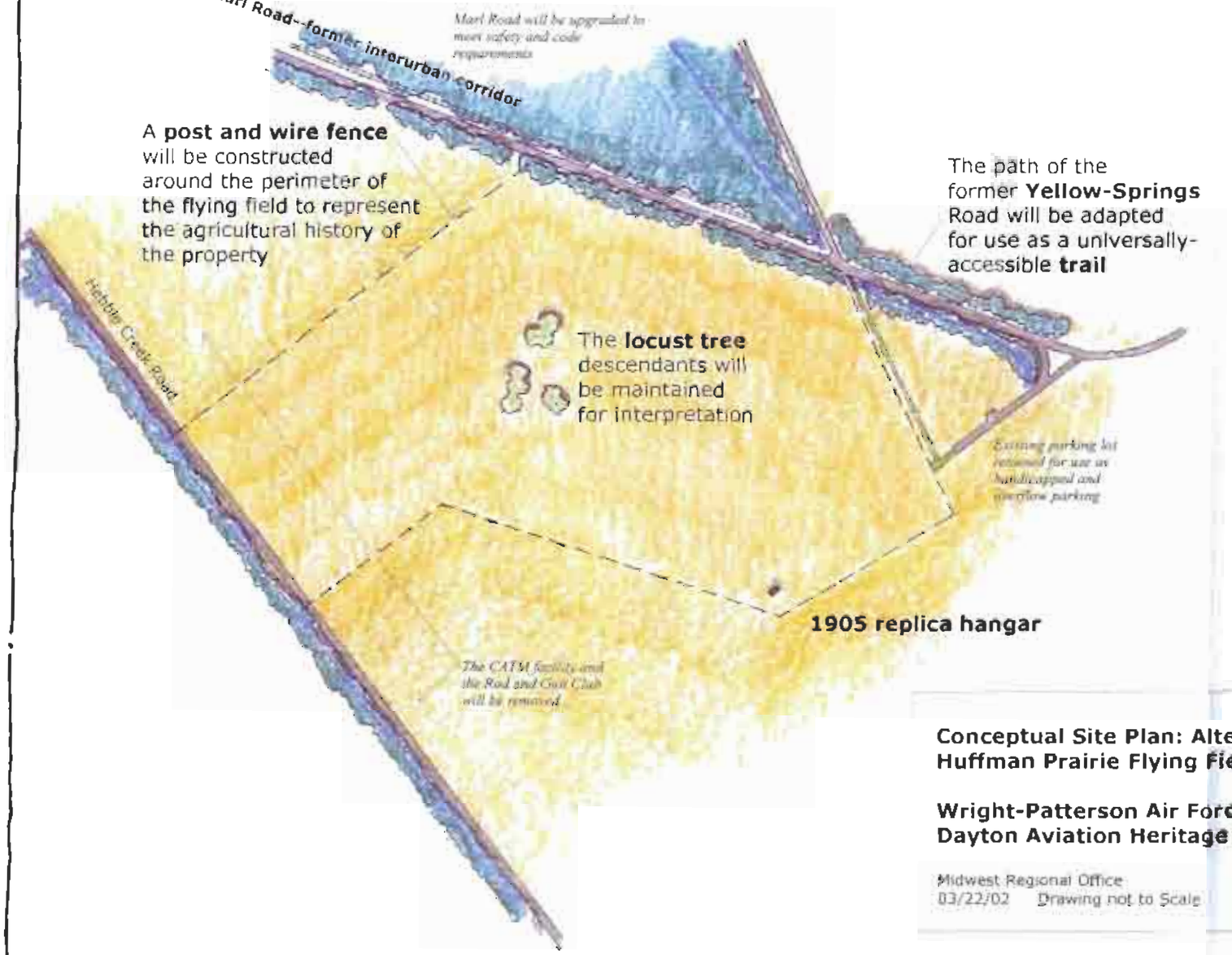
Transportation Alternative A – No Action: Under the No Action alternative, the current traffic route at the flying field would be continued . Compliance with existing federal law would still apply. Existing roadways would not be altered and traffic patterns on existing roads would remain unchanged. Visitors to the flying field could still enter and exit the site via Pylon Road or Marl Road. The result would be that public access would be inadequate, if not dangerous. Goals for visitor satisfaction would not be fulfilled.

Transportation Alternative B – One-Way Traffic Circulation – Pylon Road: Under Alternative II, Pylon Road would remain in its current physical condition, but would be designated as a one-way route. Traffic would be routed from Hebble Creek Road to Marl Road and down Pylon Road in a clockwise configuration. No right turns on Pylon Road from Hebble Creek Road would be permitted. Signage would be erected to direct traffic in this new configuration. This alternative would perpetuate the existing, though historically inaccurate, visitor access route. Pylon Road would still bisect the flying field.

Transportation Alternative D – Widen Marl Road for Two-Way Circulation: Transportation Alternative D would be similar to the preferred alternative (Transportation Alternative C), except for the Marl Road alterations. Under this alternative, Marl Road would be widened from the Hebble Creek Road intersection to the parking lot. The road would be improved to strengthen its structural base and the paved surface widened to accommodate two-way traffic and a bike lane. The Hebble Creek Road/Marl Road intersection would be reworked to meet contemporary road standards. Widening Marl Road would eliminate many of the larger trees lining one or both sides. A wider road could also cause disturbance to Burial Site #4, as well as the interurban rail bed.

Transportation Alternatives E and F: Alternatives E and F were eliminated from further

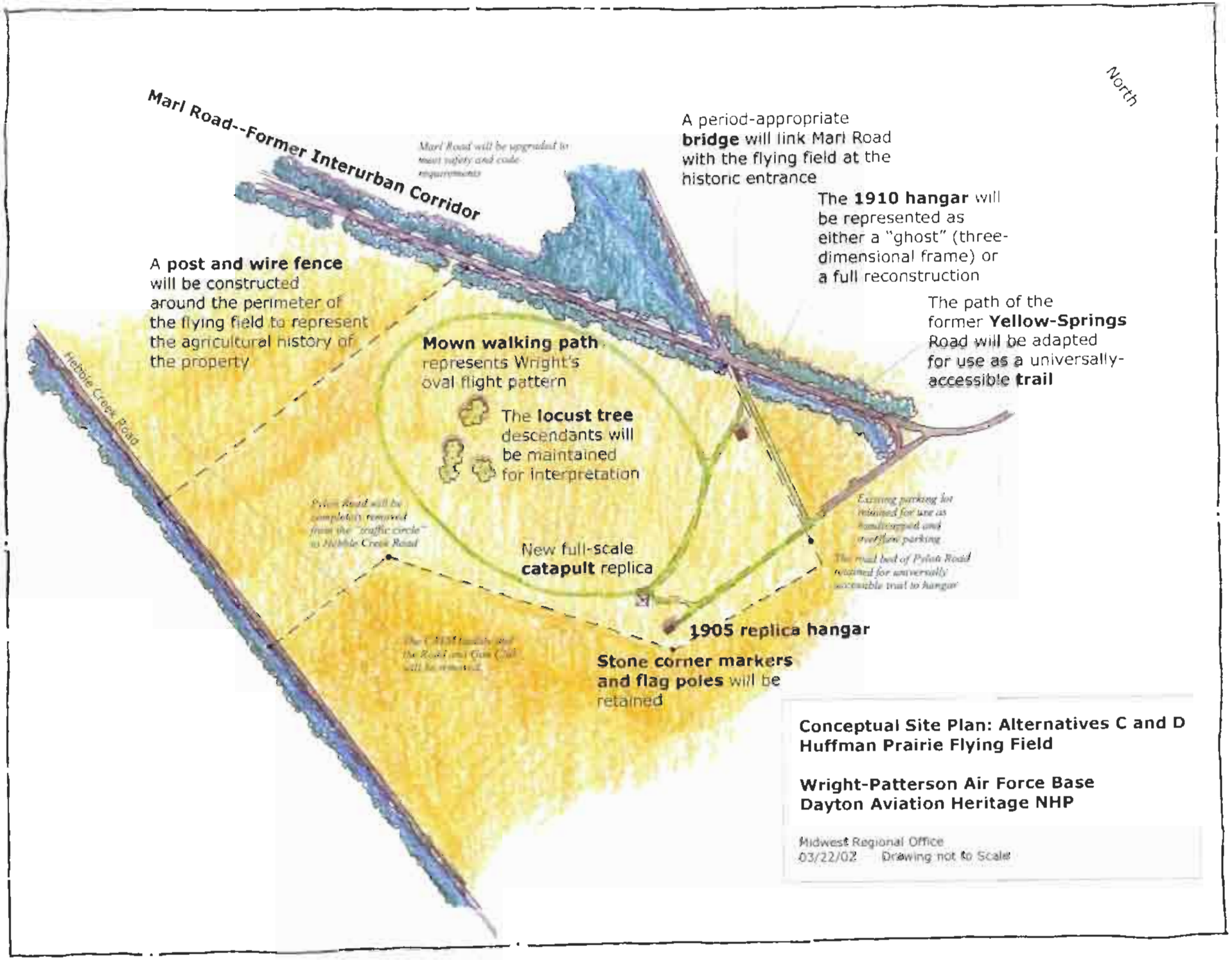
consideration due to base security concerns. Both of these alternatives would route traffic flow north and west of the flying field via existing roadways. Security forces want to limit the amount of base property that can be accessed by the public; these two alternatives would allow visitors to access a large amount of base property as they exit the flying field. They would also involve a longer, more complex exit route for visitors, contradicting the park's desired visitor experience goals.



Conceptual Site Plan: Alternative A
Huffman Prairie Flying Field

Wright-Patterson Air Force Base
Dayton Aviation Heritage NHP

Midwest Regional Office
03/22/02 Drawing not to Scale

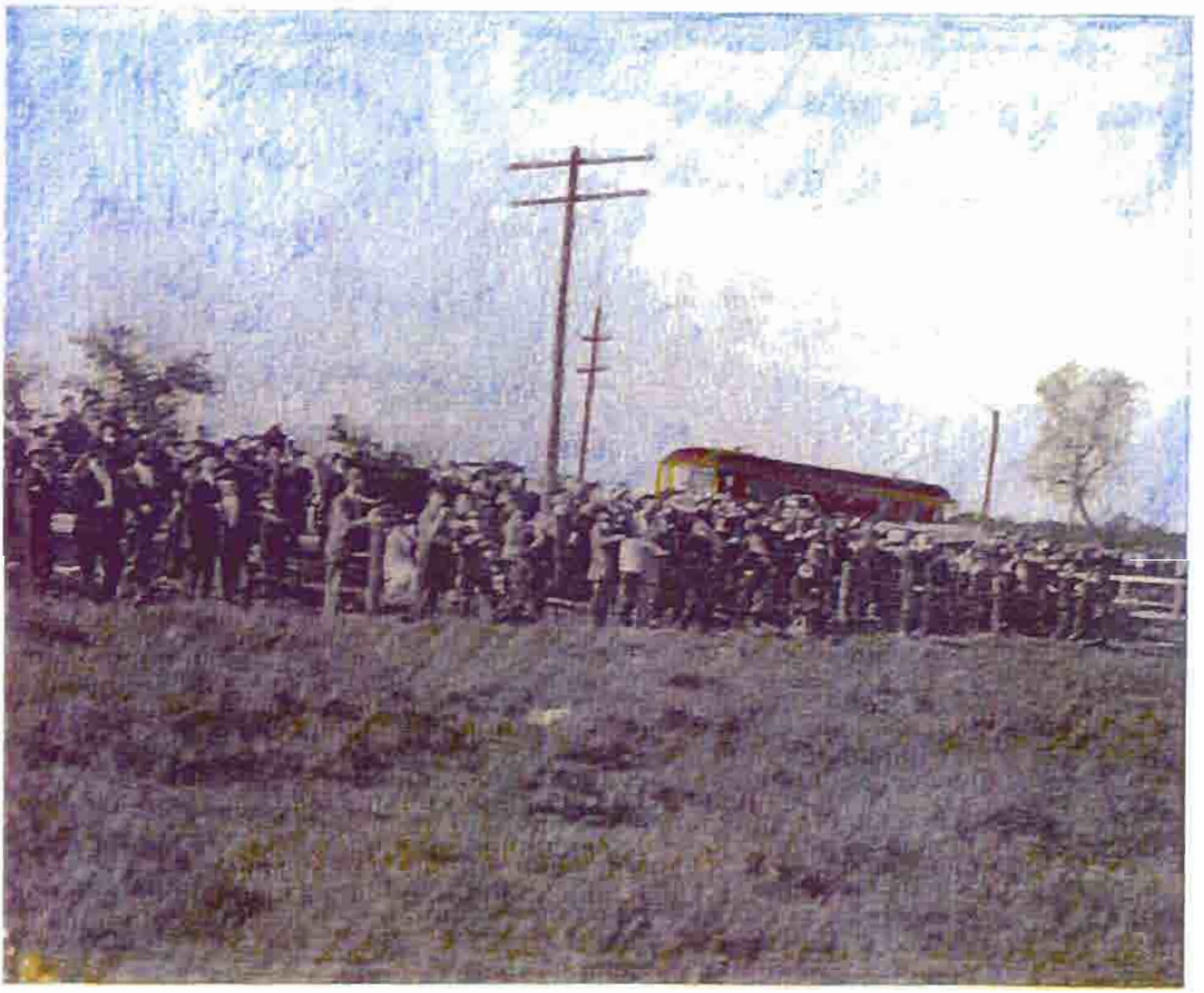


Conceptual Site Plan: Alternatives C and D
Huffman Prairie Flying Field

Wright-Patterson Air Force Base
Dayton Aviation Heritage NHP

Midwest Regional Office
03/22/02 Drawing not to Scale

CHAPTER 4
LANDSCAPE IMPLEMENTATION PLAN



CHAPTER 4
LANDSCAPE IMPLEMENTATION PLAN

INTRODUCTION

This chapter provides information on formalizing the conceptual recommendations proposed in the previous chapter—the foldout concept plan on page 105 illustrates the treatment. Materials and methods for implementing the preferred comprehensive alternative are again organized in the following categories: *Visitor Access*, which includes information on constructing the road and trail alignment and moving visitors through the site, *Interpretation,* which proposes how visitors can understand the significance of the flying field and imagine features that are no longer extant, *Vegetation Management*, which provides guidelines for replanting disturbed areas and improving historic biotic features, and *Removing Intrusive Site Elements*, which proposes methods for improving the visual qualities of the site.

Visitor Access

In making plans to help visitors to appreciate a landscape as subtle and poetic as Huffman Prairie Flying Field, extra care and thought has been put into choosing the appropriate approach and entry into the field. Extending the preservation treatment to areas immediately beyond the site's national historic landmark boundaries will establish a sensitive and appropriate experience. This will insure that critical interpretive messages are well introduced and clearly explained.

The preferred circulation alternative, which calls for a simple, one-way loop road, plays a significant role in introducing visitors to the site. By the time they have reached the intersection of Marl and Symmes Roads, they have traveled slowly down a narrow, shaded corridor with occasional glimpses through the tree row to the broad open expanse of meadow. The grassy vegetation, post and wire fence, and wooden hangar establish an informal pastoral setting. After parking their cars or securing their bicycles, they will approach the Simm's Station platform interpretive exhibit (Figures 53 and 55). The exhibit will provide general orienting information and explain the significant role the interurban played in the Wrights' experience at the flying field.

A small pedestrian bridge across Trout Creek, parallel with the north side of Marl Road, will be in the same site as the bridge that once carried the Dayton-Springfield and Urbana interurban line. This bridge will keep people and vehicles separated until they reach the intersection. Although not a replica of an earlier structure, this new bridge should reflect the scale and massing of the original. It should be approximately nine feet across, wide enough to accommodate a trolley. Pedestrians will then be led to a walkway across Marl Road to a second new bridge leading to the flying field. The wooden bridge that provided the Wrights with access at this location has long since disappeared; the remaining concrete abutment could be used as part of the new concrete bridge (Figure 56). This bridge will act as a critical symbolic threshold, and

Figure 53. Preferred schematic parking alternative showing relationship to Marl and Symmes Road intersection as well as the interurban platform exhibit, pedestrian bridges and the Yellow Springs Road trail.

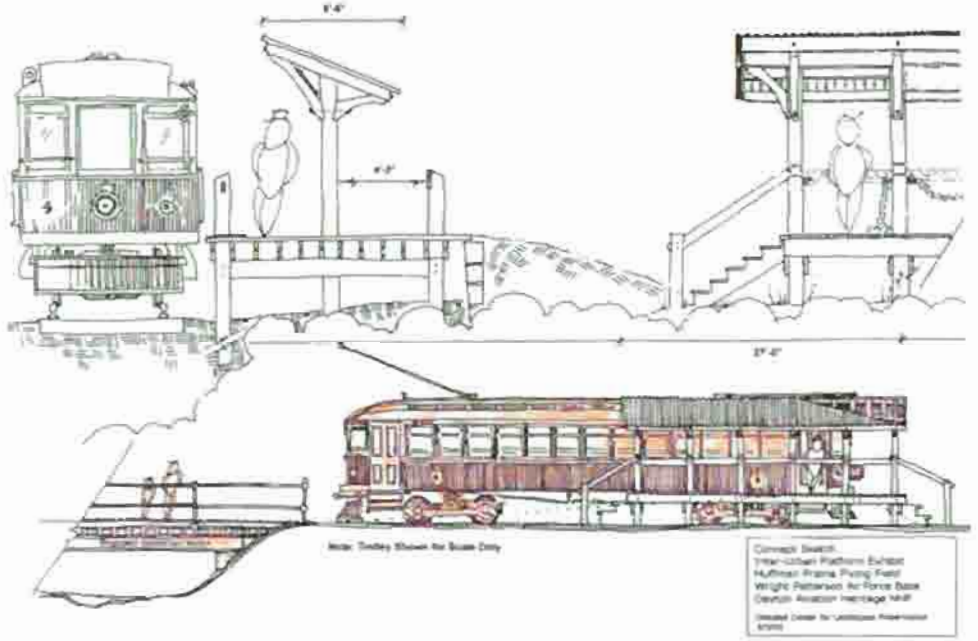


Figure 54. Concept sketch showing proposed interurban exhibit and the first of two proposed pedestrian bridges (for location, see figure 53). The interurban exhibit will serve as the first opportunity for visitor orientation and the departure for self-guided tours. The trolley shown for scale purposes only.

Typical passenger platform on the DS&U trolley line
Platform at Simms Station was known to have a canopy c. 1910

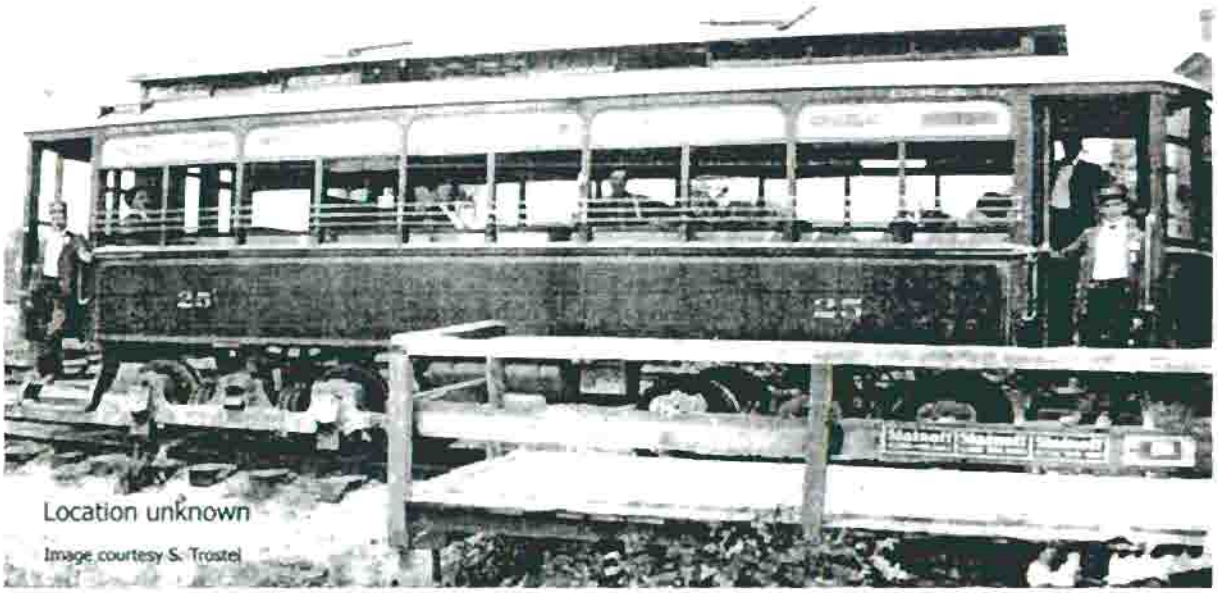


Figure 55. Rural platforms on the DS&U line were rustic. Although this is not the Simms Station platform, the Wrights most likely used one that was very similar. Image courtesy of Scott Trostel.

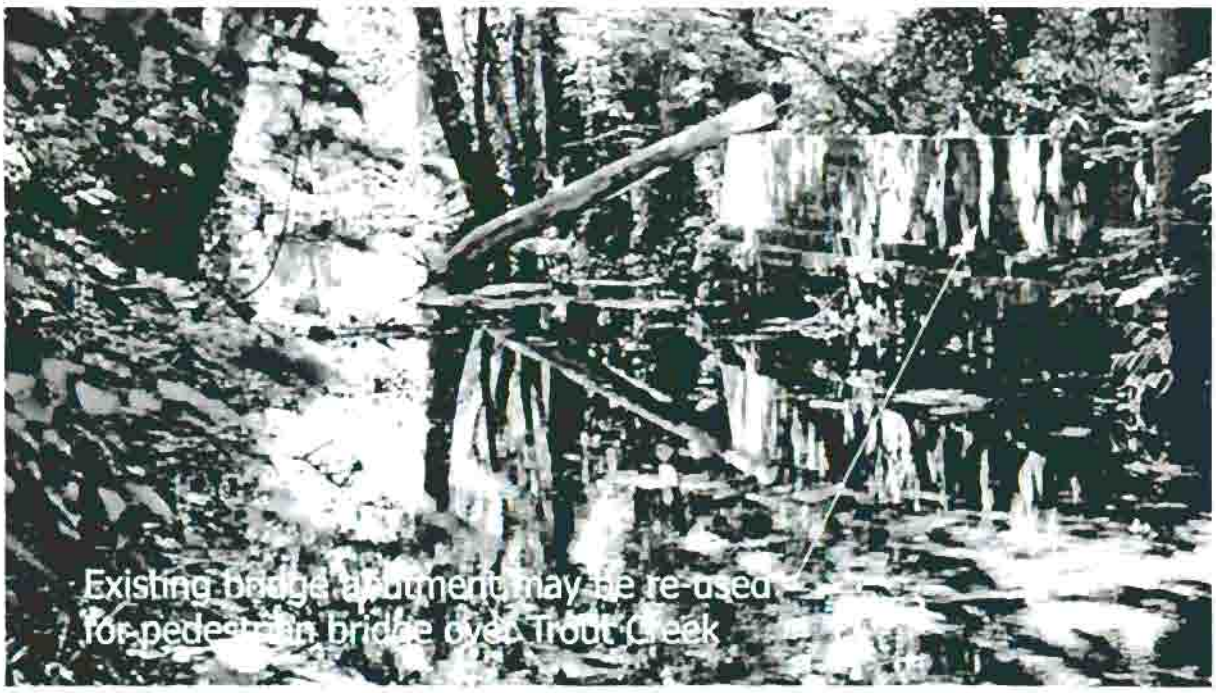


Figure 56. The existing concrete bridge abutment survives from the former Trout Creek bridge. This existing structure could be incorporated into plans for a new pedestrian bridge. Photo by E. Foulds, Olmsted Center for Landscape Preservation, 2000.

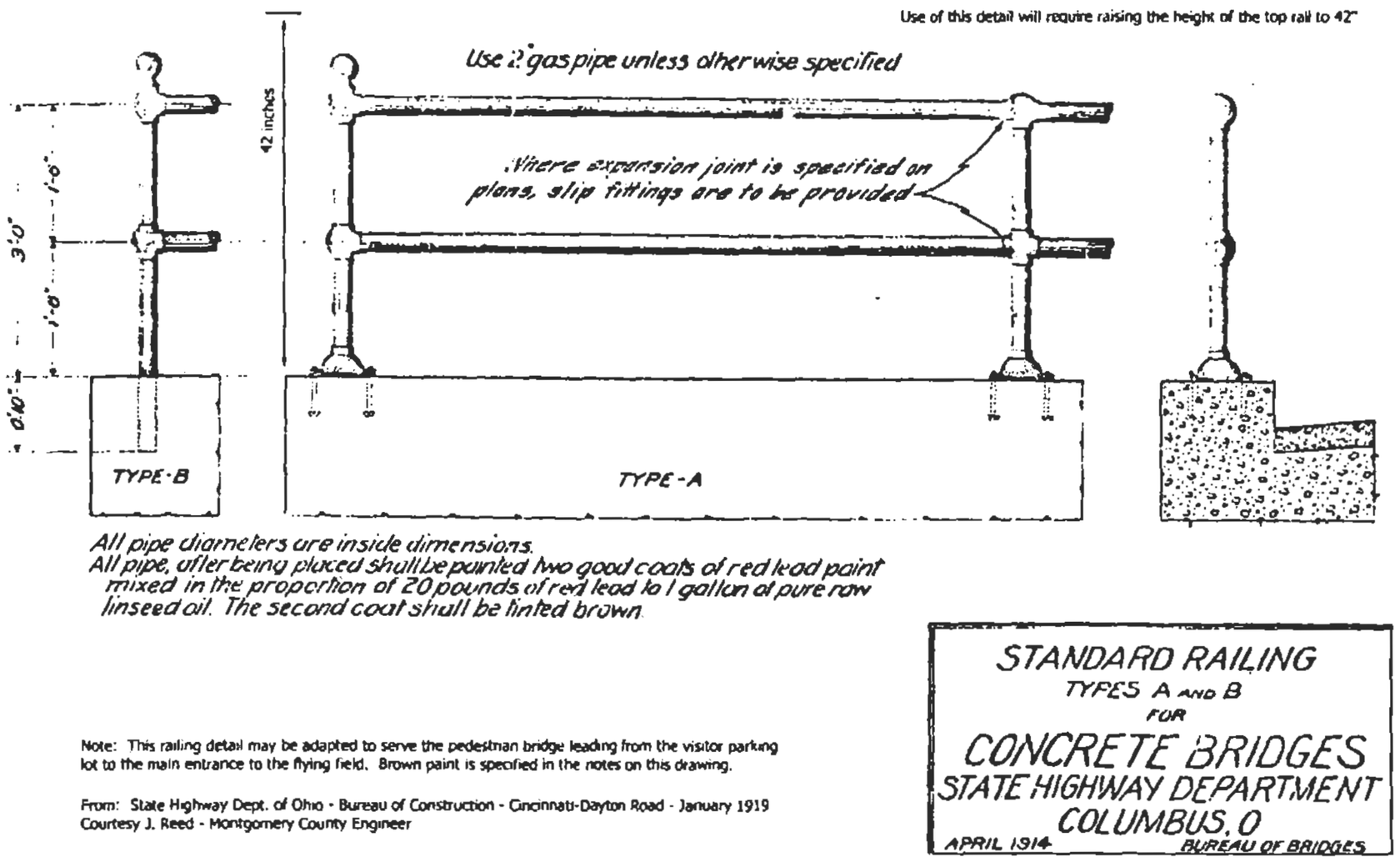


Figure 57. Railing proposed for use on the first of two pedestrian bridges. If building codes require barrier-wall protection, this simple design will easily accommodate an infill of black vinyl-coated chain link.

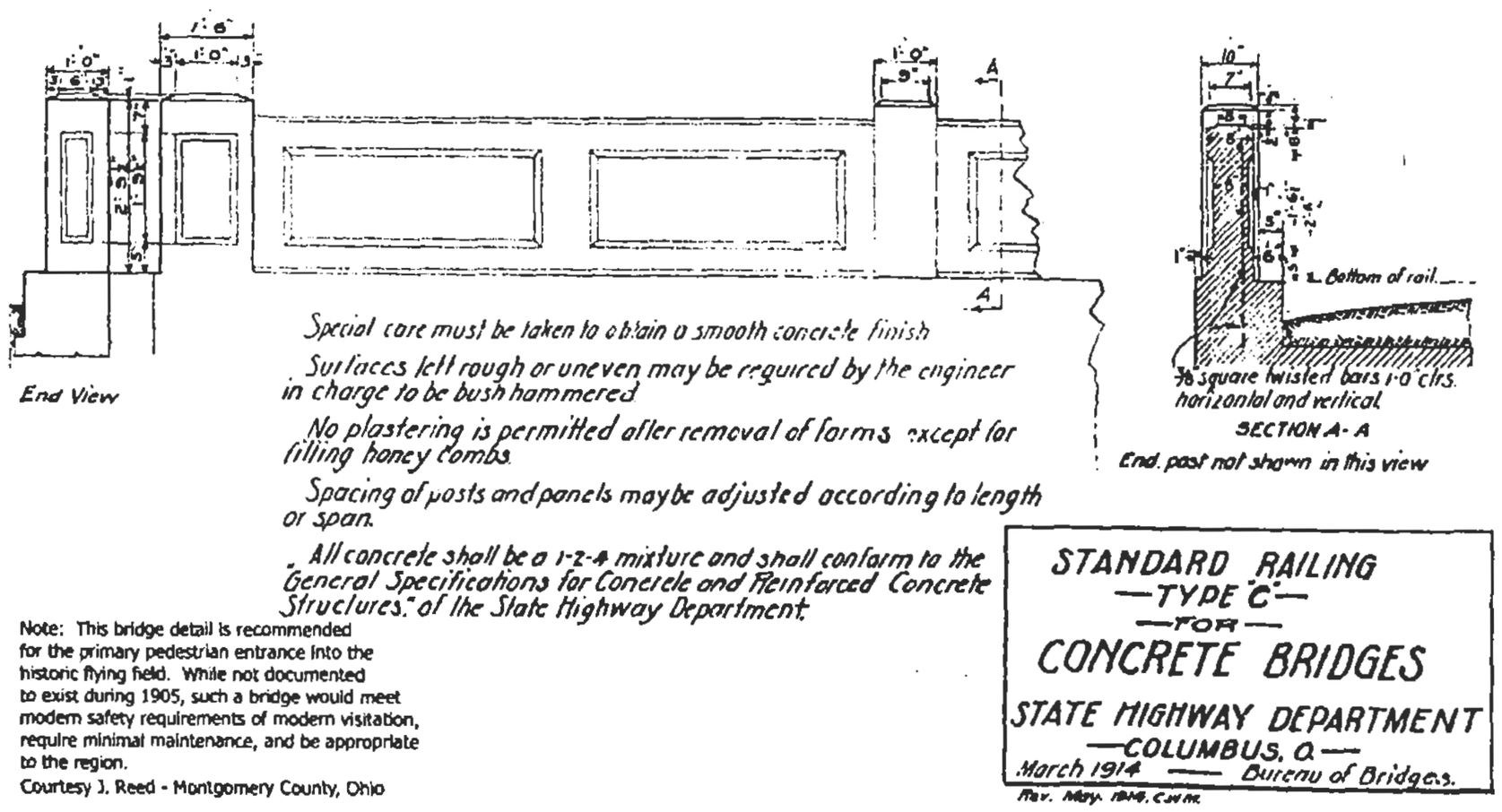


Figure 58. Concrete bridge railing proposed for the second of two pedestrian bridges. This design, while not historic to the site, meets modern safety code requirements. Parapet height would be modified to 42 inches. This railing design is also recommended for replacing the "Jersey-barrier" sidewalls on the current Marl Road bridge.

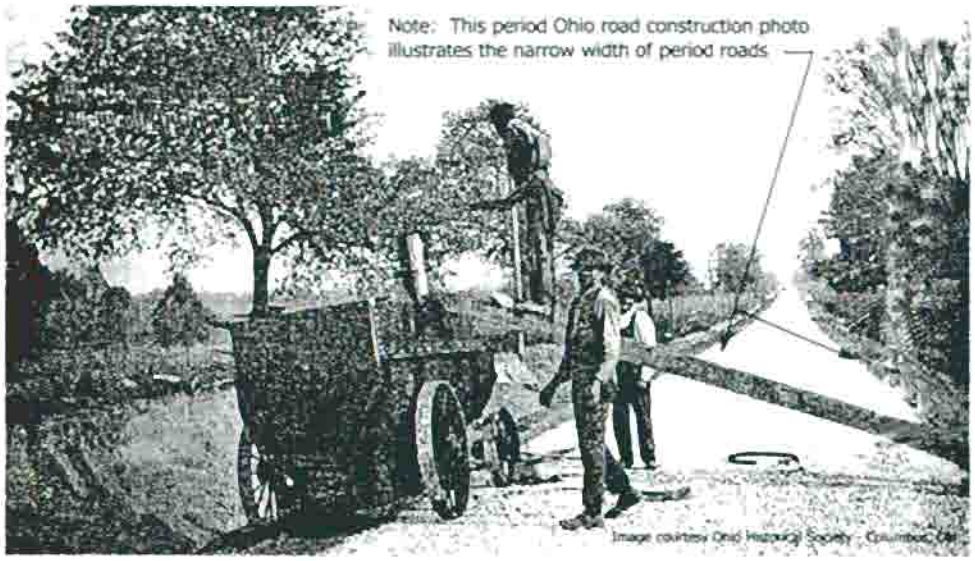


Figure 59. Asphalt and bituminous pavements were in limited use at the turn of the 19th century, with a standard road width of 12 to 14 feet. This photograph of road construction in Ohio during the historic period provides a sense of scale intended for the proposed Yellow Springs Road trail.

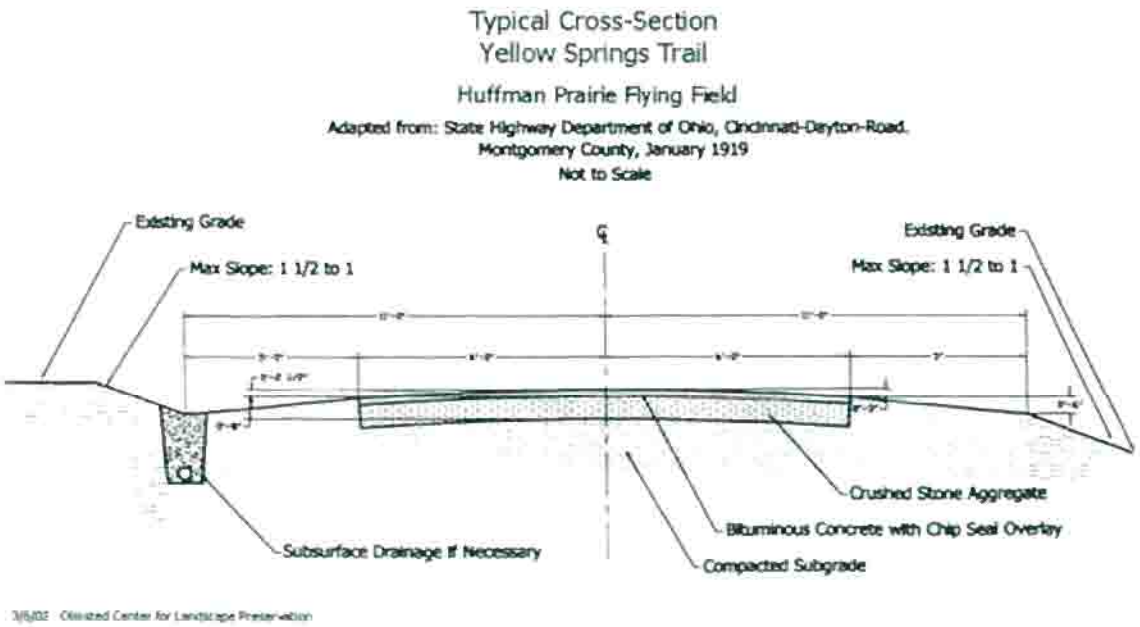


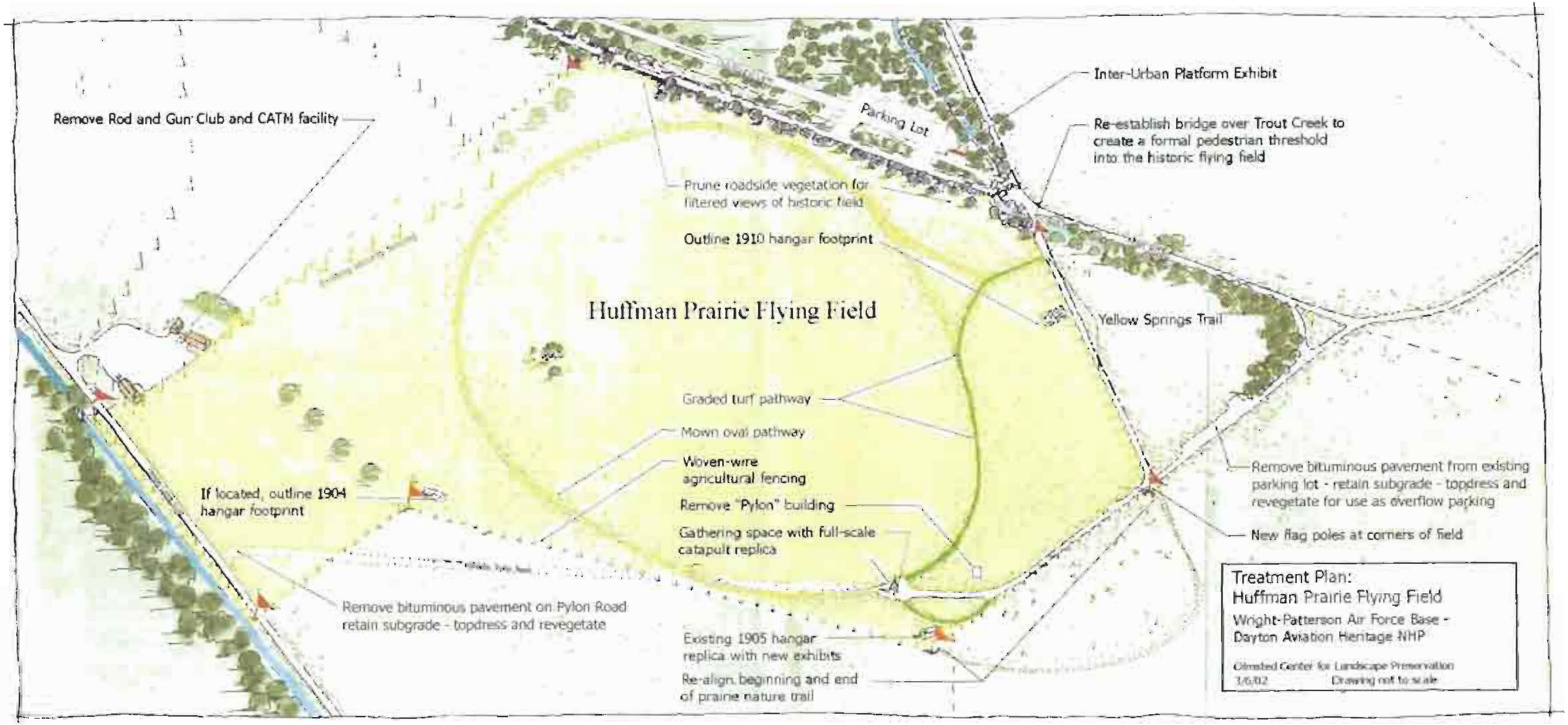
Figure 60. Typical cross-section for constructing the Yellow Springs Road trail. The cross-section features an exaggerated crown and final chip-seal to represent early 20th century methods.

should be between twelve to fourteen feet wide. The bridge railing and parapets are the most important design consideration. Because there is no existing documentation of the original bridge, they should be simple. Two period examples from the Dayton region are provided in Figures 57 and 58. One features a brown pipe railing, which could be adapted with a wire mesh infill to meet contemporary safety codes, the other is a cast concrete design which would most likely meet safety codes. As part of the bridge construction, it is recommended that the existing "Jersey Barrier" parapets on Marl Road be replaced to match the final design of the second bridge.

By crossing the creek through the shade of the tree row, visitors will step from the present back into the past, mentally prepared to enjoy the flying field. As they step off the bridge, they will then pass into the open meadow and be presented with broad views of the entire site. The stone corner marker, well-defined trail, and interpretive panels will visually proclaim to visitors that they have reached their destination.

Once across the bridge, visitors will follow the eastern boundary of the flying field using the universally accessible trail. The trail is aligned with the bed of the former Yellow Springs Road, which road served the area before 1924. During the late 19th and early 20th century, improved roadways were much narrow than contemporary roads, yet pavements had become available on a limited basis (Figure 59). The access trail will be constructed with a conventional crushed aggregate sub-base, paved with bituminous concrete and finished with a final chip-seal to simulate early 20th century bituminous pavements (Figure 60). The trail crown will be slightly exaggerated to mimic period building techniques. This construction will require little subsurface excavation and grading, minimizing the need for archeological disturbance. Most importantly, the trail will provide an interpretive opportunity by recapturing some of the physical context and rural character for the historic landscape.

The Yellow Springs Trail runs parallel to the restored post and wire boundary fence until it intersects with Pylon Road, where visitors will turn south toward the 1905 hangar. Due to funding and logistic constraints, it is proposed that Pylon Road remain intact during the 2003 celebration; a gravel trail will run parallel to the road to provide safe access to the hangar. As part of the preferred treatment plan, the bituminous surface of the road will be removed and roadbed areas with substantial fill will be regraded to be less conspicuous. The remaining subsurface will be covered with filter fabric and topped with a layer of 60 percent soil/40 percent stone aggregate mix to allow revegetation. The stone aggregate should consist of stones up to ¾" diameter. The stones should be mixed, rather than uniformly sized. The grass in the paths should be regularly mowed to a short height to provide a stable surface for pedestrians, wheelchairs, bicycles, and service vehicles. This surface treatment will extend to the "traffic circle" near the hangar to create an interpretive area (see Concept Treatment Plan and Figure 61). This central "node" and the adjacent 1905 replica hangar will serve as the primary visitor destination and gathering space. A second trail utilizing the 60/40 mix will connect this "node" to the 1910 hangar location and then exit the field through a gate and join the Yellow Springs trail to return to the parking lot (Figure 62). Most interpretive media will be concentrated along this path. Visitors seeking a longer, more in-depth experience can enjoy the third trail that allows them to traverse most of the flying field. It connects with the 1910 hangar site, forming a large oval symbolizing


Remove Rod and Gun Club and CATM facility
Parking Lot
Inter-Urban Platform Exhibit
Re-establish bridge over Trout Creek to create a formal pedestrian threshold into the historic flying field
Prune roadside vegetation for filtered views of historic field
Outline 1910 hangar footprint
Huffman Prairie Flying Field
Yellow Springs Trail
Graded turf pathway
Mown oval pathway
Woven-wire agricultural fencing
Remove "Pylon" building
Gathering space with full-scale catapult replica
Remove bituminous pavement from existing parking lot - retain subgrade - topdress and revegetate for use as overflow parking
New flag poles at corners of field
If located, outline 1904 hangar footprint
Remove bituminous pavement on Pylon Road retain subgrade - topdress and revegetate
Existing 1905 hangar replica with new exhibits
Re-align beginning and end of prairie nature trail
Treatment Plan:
Huffman Prairie Flying Field
Wright-Patterson Air Force Base - Dayton Aviation Heritage NHP
Olmsted Center for Landscape Preservation
1/6/02
Drawing not to scale

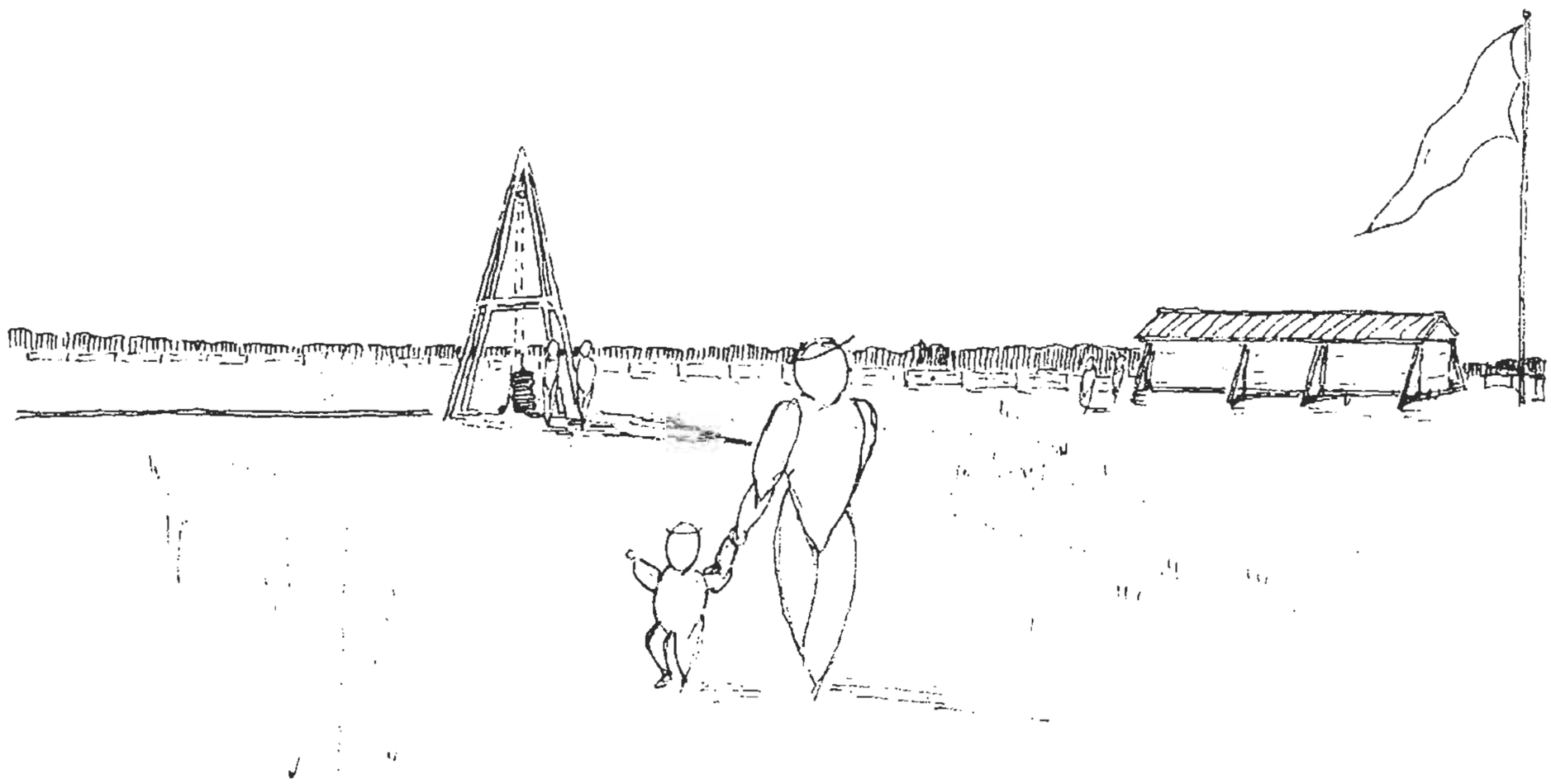


Figure 61. Sketch showing development of "traffic circle" area into an interpretive gathering space for visitors. Personal services will be focused in this area of the flying field, which includes a universally-accessible trail, the 1905 replica hangar with wayside exhibits in the interior, a full-scale replica catapult with track, and exterior wayside exhibits.

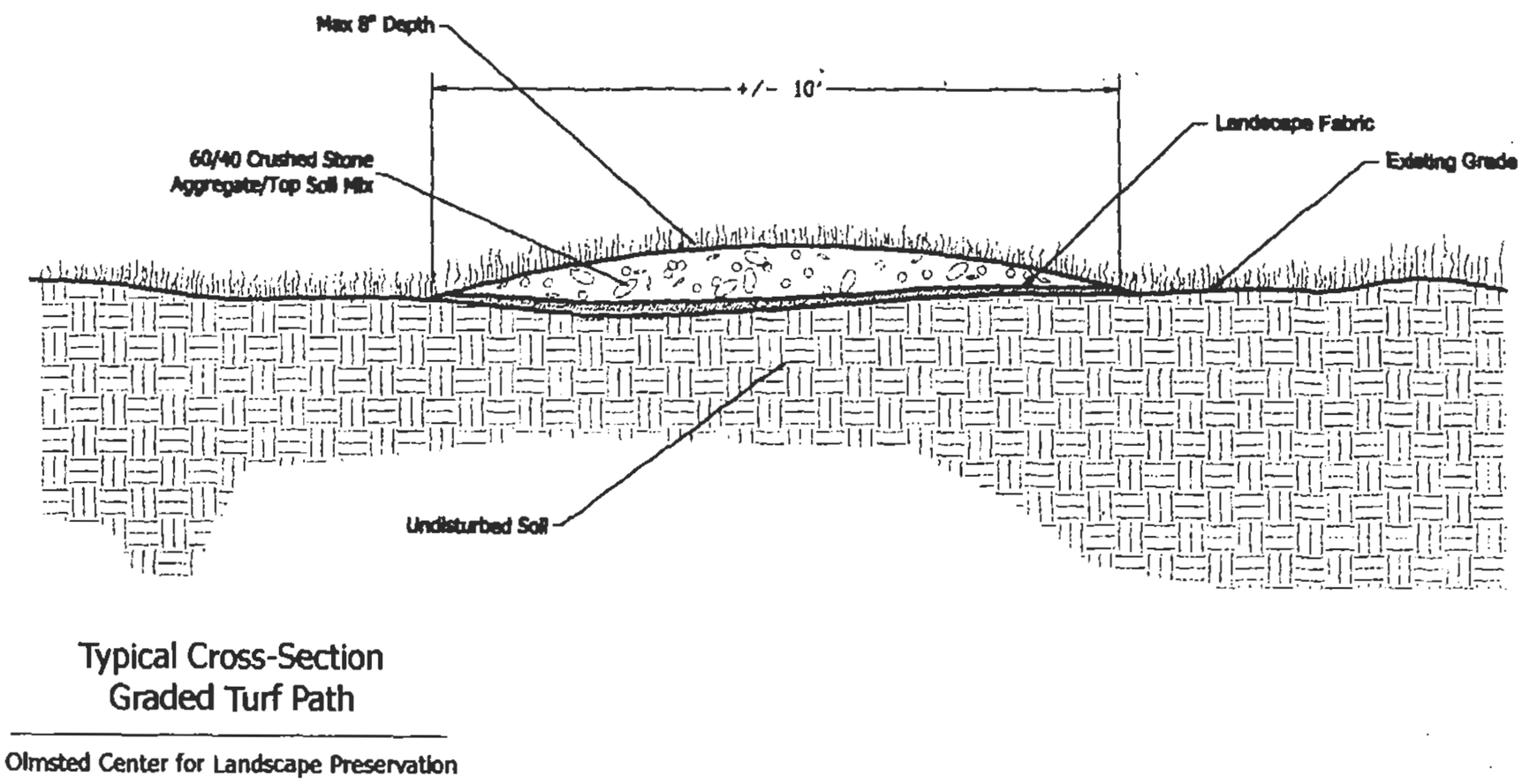


Figure 62. Typical cross-section for universally-accessible trails to be installed within the flying field.

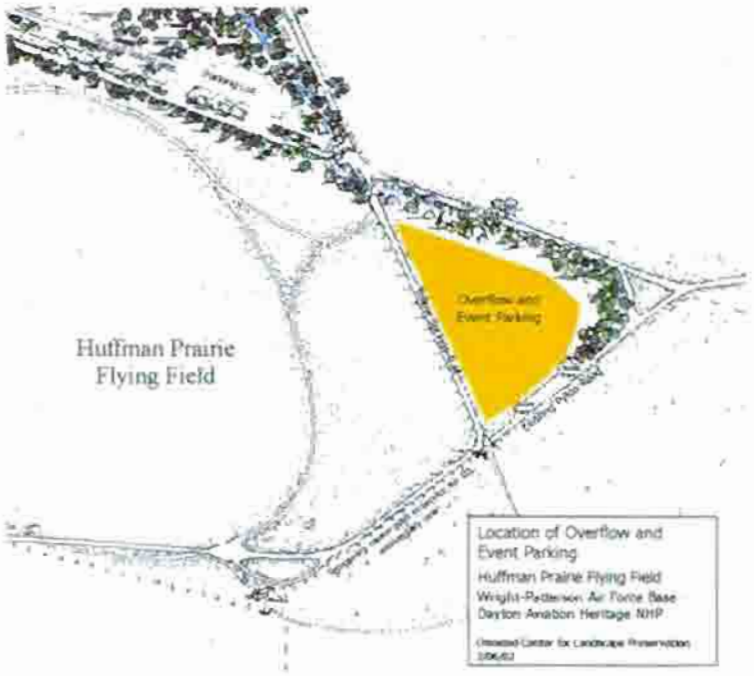


Figure 63. This plan shows areas proposed for use as overflow and event parking. It also provides a temporary solution for pedestrian circulation while Pylon Road is still in place during the 2003 celebrations.

Overall Dimensions: 13'-5" long x 5'2" tall
Sign Panel Dimensions: 11' long x 3'2" tall
Site name letter height: 4"
Dayton Aviation Heritage and
Wright-Patterson letter height: 2-1/2"
Note: Overall dimensions are approximate.
Exact height to be determined by
using full courses of stone.
Stone to be selected by owner.

Figure 64 Design for Huffman Prairie Flying Field entrance sign. The sign will be sited along Marl Road near the new visitor parking lot.

the Wrights' historic flight path.

The "bump-out" parking lot along Pylon Road and the grassy area between Yellow Springs Trail and the intersection of Marl and Symmes Roads will be used as overflow parking during special events and peak visitation days (Figure 63). An orientation sign will be sited near the lot to help visitors access Yellow Springs Trail to gain entry into the flying field. When possible, the grassy area can be mown to provide a better surface for parking and walking. It is anticipated that circulation from this area will be unstructured, it may be possible to encourage visitors to use the former Pylon Road.

Interpretation

A formal entry sign will greet visitors to the site as they approach the parking lot on Marl Road (Figure 64). The sign was designed as part of a comprehensive entry sign program that has been completed for all Dayton Aviation Heritage National Historical Park units. The Huffman Prairie Flying Field entry sign will be constructed of stone to match the walls at the Wright Memorial, with a brown aluminum sign panel with white raised letters. The sign dimensions are approximately 13'-5" long by 5'-2" tall. The sign will be sited near the parking lot, with a small directional sign at the intersection of Marl and Hebble Creek Roads. As the "Gateway" program is implemented, signs directing people from the Wright Memorial and the surrounding area will have to be developed.

Once visitors have parked their cars and are approaching the flying field, they will be guided along a trail to the Interurban platform exhibit. The exhibit will reflect the general design of the former Simm's Station platform, with signs that provide orienting information and a general history of the flying field. The trails will then guide visitors across Trout Creek, across Marl Road, and then back across Trout Creek to connect

Figure 65. Sketch showing the character of the Marl and Symmes Road intersection following installation of new pedestrian bridges, interurban platform exhibit, and wayfinding signage. Due to safety restrictions related to the "Hot Cargo" loading pads, the platform exhibit will not be sited on the historic location of the Simm's Station platform. Instead, the exhibit will be on the south side of Symmes Road, and will function as an initial orienting and informational device for visitors.

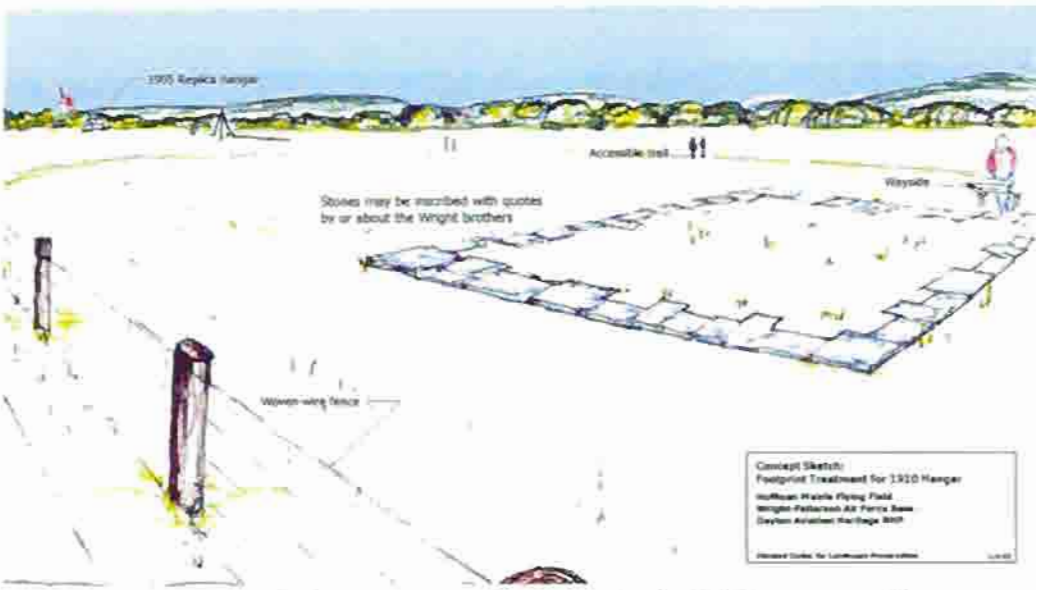


Figure 66. Concept sketch showing proposed treatment for the 1910 hangar site. The stone footprint could be accompanied with appropriate interpretive wayside panels featuring information for visitors.

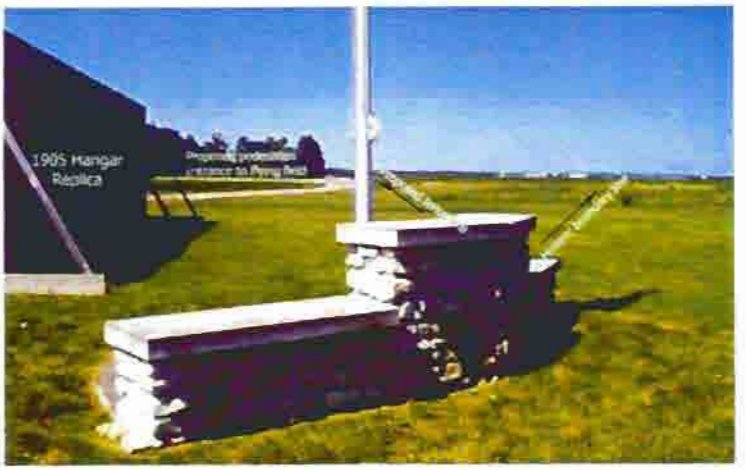


Figure 67. Photograph showing relationship of existing corner markers to proposed post and wire fence.

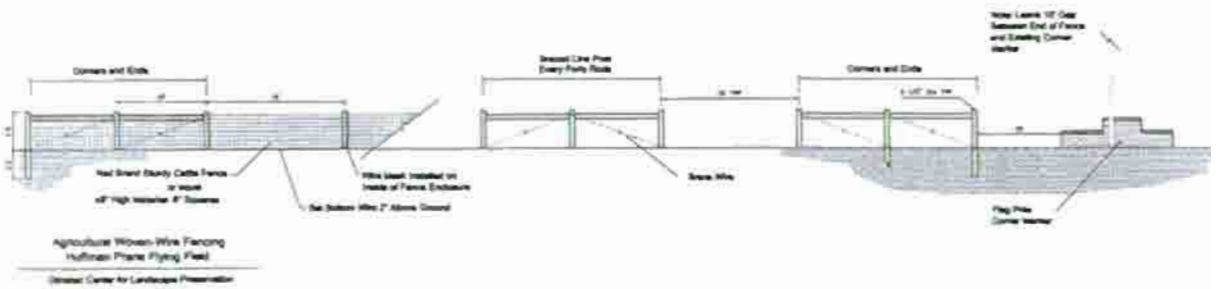


Figure 68. Recommended design for post and wire fence to be installed around perimeter of the flying field.

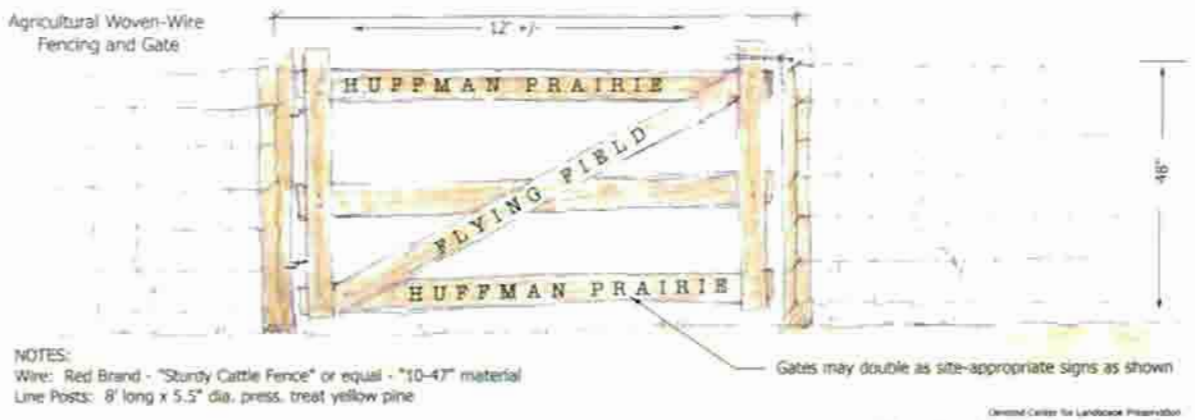


Figure 69. Concept sketch showing wire fencing and gate. Fence ends at gates will be fitted with horizontal bracing

with the Yellow Springs Road trail (Figure 65).

A primary focus of the interpretation program will be helping visitors imagine the flying field during the historic period. Visual cues will help interpreters describe features that have changed or been lost over time. The location and footprint of the missing 1910 hangar will be marked with an outline of limestone blocks as shown in Figure 65. The larger blocks could be inscribed with quotations evoking the Wrights achievements at the historic field. The exact 1904 hangar location is unknown at this time. It will be marked with a wayside exhibit.

Figure 70. Wire fence advertisement from "The Ohio Farmer," 20 August 1892. Image courtesy of the OSU Agricultural Research Center.

Another characteristic of the historic flying field that has changed is its relationship to its surroundings. It once part of larger pattern of agricultural fields, surrounded by a fence to keep in livestock. Because it is now surrounded by base development, one way to define its historic significance is to distinguish it by an installing an agricultural woven-wire fence around its perimeter (Figure 68). Woven-wire fencing had become popular in the Midwest during the 1890's and is documented at Huffman Prairie in historic photographs. This fencing was used to contain the cattle that the Wrights occasionally referred to in their notes and logbooks. Happily, virtually the same material seen in the photographs is still commercially available.

The fence will be used in concert with the existing stone corner markers. The stone corners and the proposed fence are two different heights and two strikingly different materials. Rather than designing an awkward connection between these two elements, there will be a ten-foot gap between the end of the fence and the corner markers. The

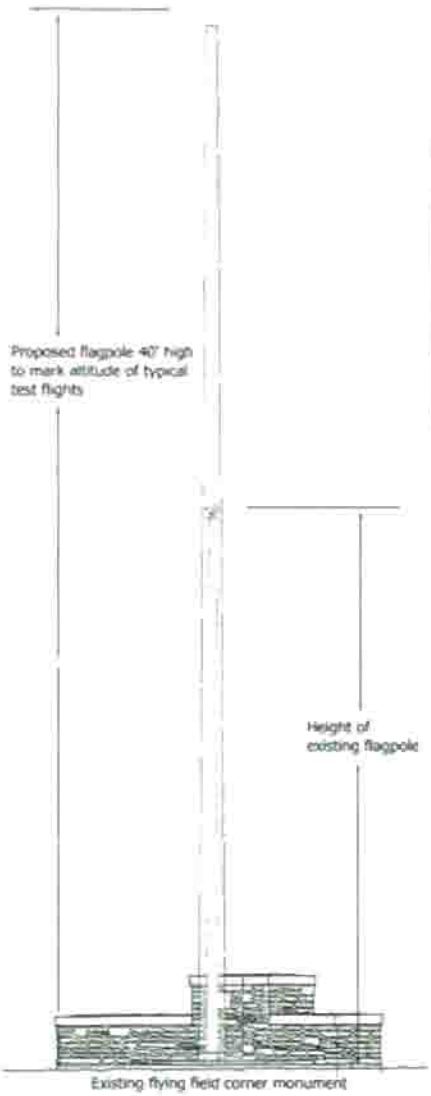


Figure 71. New proposed height of flagpoles at corner markers. It is hoped that the higher poles will improve visibility from the Wright Memorial.

Figure 72. Historic photo showing 1905 hangar and launching catapult. Siting the new replica catapult at the "traffic circle" once Pylon Road is removed is intended to reflect the historic spatial relationship of these two significant features.

fence will align with the markers' centerline (Figure 67). This will allow the fence to perform its visual and interpretive function. The length of the fence and its capacity to expand and contract with temperature changes will require a brace at the end of all fence runs, whether at a gate or at the stone corners (Figure 68). Brace sections are to be narrow—ten feet between posts—while the other posts will be spaced at sixteen feet. In long, straight fence runs, braces should be installed every forty sections. While contemporary installations of woven-wire fence typically specify the use of narrow four-inch diameter line posts, in order to evoke the historic fence character, both 5½ inch diameter line posts and end posts should be installed. In the future, the fence could be fitted with appropriate gates to help interpret its historic function of containing livestock. The gates along pedestrian walkways could be left open to serve as a backdrop for subtle signage to further identify the site to visitors (Figures 68 and 69).

The existing twenty-foot flagpoles will be replaced with forty-foot poles and fitted with larger pennant shaped banners (Figure 70). The forty-foot height will serve to interpretive the average altitude of the Wrights' experimental flights. The new banners would be constructed of lightweight "rip-stop" nylon reminiscent of the silk scarves favored by early aviators. The gentlest breeze will animate the banners, which will be most visually effective if made of bright white material. This would differentiate them from orange windsocks and other visual markers related to flight operations. The banners would measure twelve feet along the short side with a length of twenty-four

feet. An appropriate logo could be added using a lightweight ink screen-print appliqué. The banners should be ordered in large quantities for convenient and inexpensive replacement as they become soiled or worn.

The area now encompassed by the "traffic circle" will be developed as a gathering space, where rangers will be able to present their programs to small groups of visitors in favorable weather (Figure 61, page 107). A universally accessible trail will connect the hangar and the traffic circle, where a full-scale replica catapult will be built to replace the 2/3rd-scale model currently on display. The catapult helped launch the Wrights' aircraft independent of the availability of wind (Figure 71). It employed rope, pulleys, a wooden rail and a 1,600-pound weight to get the plane moving. The concept is essentially the same as that behind steam catapults used on modern aircraft carriers and ended the brothers' frustration with the conditions at the flying field. It provided the opportunity to use the field to master their invention, and is thus a very important interpretive element of the Wright's Dayton story. The original catapult had four legs joined twenty feet in the air, with bracing installed at a midway point.

Eventually, the interior of the hangar will feature exhibits and provide shelter from sun or rain. These exhibits will be developed in detail in another study, but are described generally in Chapter 5.

Vegetation Management

Vegetation management issues at the flying field can be divided into two general categories: pruning and turf management. Managing the Marl Road tree row to the desired condition will be the most labor intensive pruning effort. Traveling along Marl Road is currently much like moving through a woodland tunnel. This provides a useful

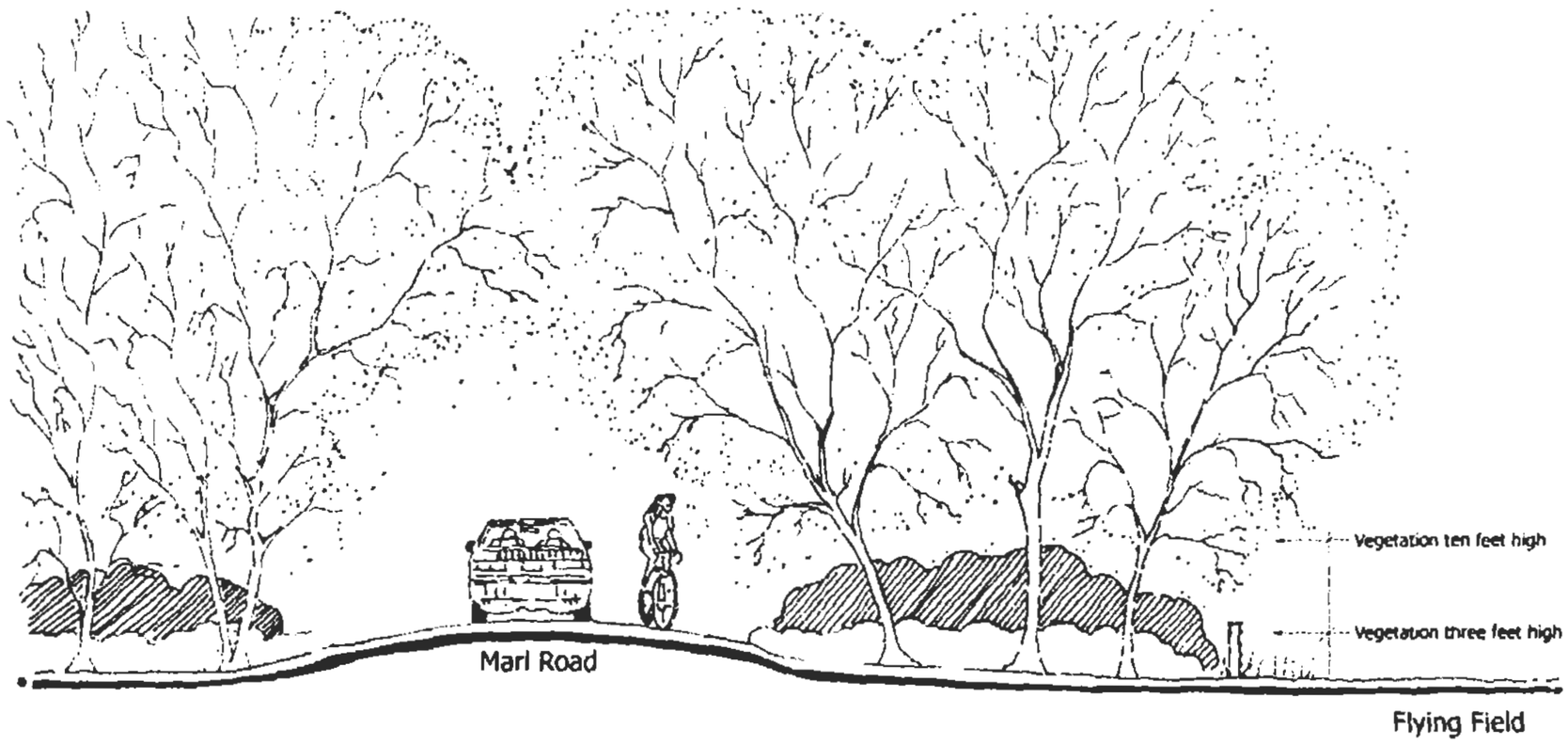


Figure 73. Cross-section showing general guidelines for managing vegetation along Marl Road.

Figure 74. Sketch illustrating strategy for removing select understory trees to create "windows" into the flying field. When removed, all stems should be cut flush with the soil.

mental transition for visitors by temporarily buffering views and sounds of the surrounding air base. To retain the positive aspects of this experience and heighten the sense of arrival for approaching visitors, thinning the understory to create "windows" will open views through the tree row (Figures 73 and 74). The windows should be spaced along the southern portion of the road. Figure 74 provides a guideline for opening views into the flying field. All dead and diseased large trees and dead limbs on otherwise healthy trees will be removed according to the methods described below. Vegetation should be cleared every five years; to protect potential habitat for Indiana bats, no cutting should take place between April 15 and September 15.

The pruning program will also include the possible descendents of the historic locust tree used by the Wrights' for navigation. After thinning to remove smaller specimens, two or three larger remnants will be managed for interpretive purposes. As these trees mature, a maintenance regime similar to that described below should be undertaken to ensure their longevity and, from time to time, encourage them to send out shoots to perpetuate themselves.

Routine pruning to remove weak, diseased or dead limbs can be accomplished at any time during the year with little effect on the tree. As a rule, growth is maximized and wound culture is fastest if pruning takes place before the spring growth flush. Some trees, such as maples and birches, tend to 'bleed' if pruned early in the spring. This may be unsightly, but is of little consequence to the tree. Heavy pruning just after the spring growth flush should be avoided. This is when trees have just expended a great

deal of energy to produce foliage and early shoot growth. Removal of a large percentage of foliage at this time can stress the tree.

Proper pruning cuts should be made just outside the branch collar. The branch collar contains trunk or parent branch tissue and should not be damaged or removed. If the trunk collar has grown out on a dead limb to be removed, make the cut just beyond the collar. Do not cut the collar. If a large limb is to be removed, its weight should be reduced to lessen the chance of cracking or breaking. An undercut about 12-18 inches from the limb's point of attachment is followed by a second cut made from the top. As with the tree row, no cutting should be done between April 15 and September 15.

Road and building removal from the flying field will require replanting of turf grass. The bituminous surface of Pylon Road will be removed from its intersection with Marl Road south to Hebble Creek Road. Between the Marl Road intersection to the 1905 replica hangar (the "traffic circle"), the road foundation will be left in place to accommodate pedestrian and service vehicle access. The subsurface will be topped with a layer of mixed crushed stone and topsoil. From the 1905 hangar site to Hebble Creek Road, Pylon Road will be entirely removed. The entire length of the road will have to be replanted with a red fescue (*Festuca rubra*) and orchardgrass (*Dactylis glomerata*) mix.

After the Pylon building is demolished to one-foot below existing grade, the building and sidewalk debris should be removed and the soil raked smooth. If ground depressions remain, clean certified weed-free soil, pre-tested for contaminants and toxic substances will be added and tamped to bring the surface up to grade. As with the roadbed, these disturbed areas will be planted with the red fescue/orchardgrass mix. If possible, these areas should be lightly mulched after seeding and raking. The grass mix, appropriate to the historic agricultural use, will establish more rapid ground cover than native species, quickly blending the disturbed areas with the surrounding terrain. The disturbed areas may be mulched with blown straw or seed and mulch may be applied simultaneously with a hydroseeder.

Figure 75. Pylon building, surrounding vegetation and sidewalks, and NHL markers are intrusive and should be removed.

Figure 76. The Rod and Gun Club is aurally and visually intrusive. To protect the historic viewshed and promote an enjoyable visitor experience, this facility should be relocated.

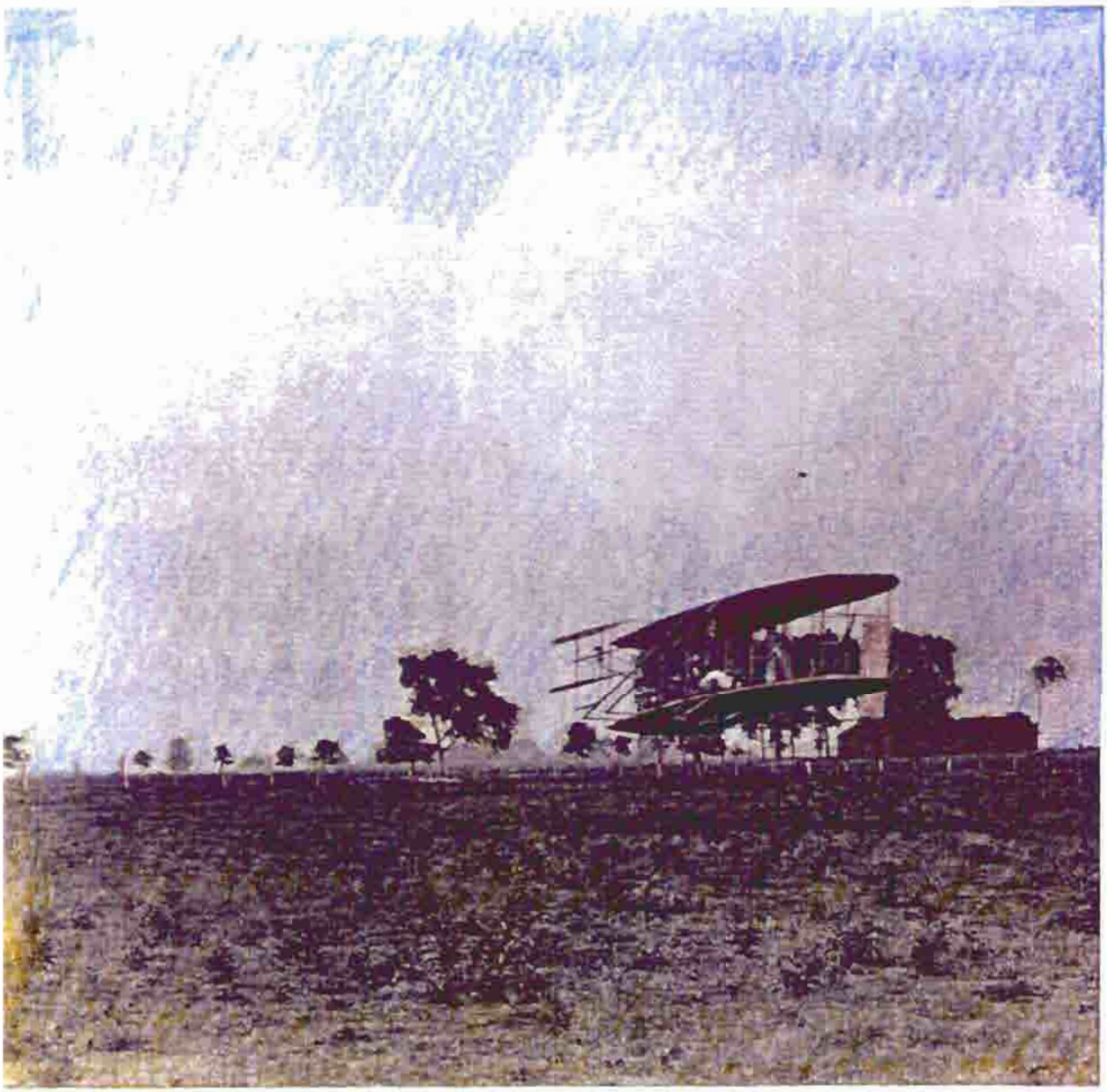
During the growing season, the overall field should be rough mown six to eight times a year to a height of three inches. The pathways within the field should be mown to two inches every other week. The paths and other areas with heavy pedestrian activity should be overseeded in mid to late fall with red fescue turf grass to gradually establish a finer turf stand compared to that of the surrounding field. Following periodic soil tests, lime and fertilizer should be applied to subtly yet clearly mark the pedestrian path with greener, more vigorous turf that is able to better withstand foot traffic.

Removing Intrusive Site Elements

The viewshed buffer will limit further development adjacent to the flying field that could potentially intrude on the historic views. The most critical historic view extending beyond the flying field boundaries is the visual connection from the Wright Memorial, located to the southwest in Area B of the air base. The viewshed between the two sites should be preserved to effectively inform and serve visitors. While some vegetation has been cleared, more should be removed to reinforce their historic, spatial, and conceptual relationship. In addition to more vegetation clearing, visual cues at the flying field will increase its visibility once the Pylon building is removed. These visual cues include the more frequent mowing regimen, the post and wire fence, and larger corner flagpoles and flags.

The most intrusive contemporary elements at the flying field are Pylon Road, the Pylon building and surrounding landscape elements, and the buildings and features associated with the Road and Gun Club and the CATM facility (Figures 75 and 76). As discussed previously, Pylon Road contradicts the historic rural character of the flying field and is problematic from a visitor use standpoint. Its removal has been previously discussed. Pylon Road, Marl Road, and the oval loop trail all intersect the shotfall danger zones of the Rod and Gun Club and the CATM facility. While the chance of actual physical harm to visitors is minimal, these adjacent uses are incompatible from the standpoint of quality of visitor experience, visitor access and safety, and potential for environmental contamination. A number of alternatives for resolving this conflict are being cooperatively explored by the NPS and the Air Force and a strategic plan for resolving the conflict is being developed.

CHAPTER 5
INTERPRETATION PLAN



CHAPTER 5
INTERPRETATION PLAN

PREFACE

This *Interpretation Plan* provides an interpretive vision for the next ten to fifteen years in response to Dayton Aviation Heritage's *General Management Plan* and *Strategic Plan*. It addresses the role of both personal and non-personal services in providing the public with a variety of opportunities to make personal intellectual and emotional connections with the meaning and significance of the resources. A desired visitor experience statement reflects an area's purpose, significance, interpretive themes, and visitor experience goals. This statement defines how the interpretive process will facilitate a physical, intellectual, and emotional experience for the public. The future interpretive program describes the mix of facilities, personal services, and media necessary to fulfill the area's mission goals and interpretive vision. This description includes partnership opportunities, research needs, library and collection needs, staffing needs, and an implementation plan. It set the course for the preparation of an *Annual Interpretation Plan*—which will consist of a brief analysis of current programs, management issues related to interpretation, and an annual work plan.

INTRODUCTION

A close connection will exist in visitor experiences between the Huffman Prairie Flying Field Interpretive Center, the Wright Memorial, and Huffman Prairie Flying Field. Together they will provide a comprehensive interpretive experience that provides opportunities for individuals to make intellectual and emotional connections to the meanings of the flying field. The Huffman Prairie Flying Field Interpretive Center will provide orientation and historical context to the story of the Wright brothers at the flying field. A variety of media and formal programs will provide a comprehensive interpretation of the significance and legacy of their accomplishments. The flying field will provide a sense of place and a tangible connection to that legacy. While a modest amount of interpretation will provoke further intellectual connections to the significance of the site, the visitor experience primarily will evoke emotional feelings related to a sense of presence at a significant historical site. The Wright Memorial will complete the experience by providing a formal setting for individuals to seek personal meaning in the Wrights' achievements at the flying field that will continue to impact the world far into the future.

INTERPRETIVE THEMES

Interpretive themes create opportunities for the public to make their own intellectual and emotional connections to the meaning and significance of the park. Themes provide the foundation for the park's interpretive program, both personal and non-

personal services. All interpretive efforts will relate to one or more of the themes. The overall interpretive program will provide the public with access to all of the themes. Park wide interpretive themes can be found in the *General Management Plan*. The following specific interpretive themes relate to Huffman Prairie Flying Field:

The Wright brothers' invention of powered flight fundamentally affected the evolution of world civilization.

Wilbur and Orville Wright's willingness to question accepted scientific data and their confidence to act upon their own data enabled them to succeed.

The brothers applied a rigorous scientific method to the problem of creating a practical, powered airplane.

Their pioneering wind tunnel research corrected errors in aeronautical engineering concepts and data that previously were accepted as the conventional wisdom in aviation design.

Their mastery of engineering, mechanics, mathematics, and writing qualified them to deal with every facet of aircraft development, design, and construction.

The Wright brothers' achievements established Dayton as the birthplace of aviation.

The Wright Flyer III was built, tested, and modified in Dayton, Ohio, becoming the world's first fully controllable, practical airplane.

Huffman Prairie Flying Field, where humans learned to fly, was the test site for the Wright Flyer III and home of the Wright Company's flying school.

Wilbur and Orville Wright built the United States' first aircraft factory and the world's first mass-produced airplane—the Wright "B" Flyer—in Dayton.

VISITOR EXPERIENCE GOALS

Visitor experience goals describe the physical, intellectual, and emotional experiences available to park visitors. All visitors will have access to these experiences, including visitors with visual, auditory, mobility, or cognitive disabilities. The following park visitor experience goals relate to Huffman Prairie Flying Field.

Orientation to Site and Story

Visitors will be able to make informed choices about their visit to the flying field and cooperating park sites, and will be provided with comprehensive, visitor-friendly devices for site orientation. The flying field will have a strong, yet appropriate, sense of

entry and arrival with logical sequencing of the visitor experience.

Sense of Time and Place
The site treatment will create an environment and employ media that will allow visitors to mentally go back in time and experience, through multiple senses, what it would have been like to witness or participate in the Wright brothers' experiences.

International Significance
High quality interpretive displays will convey the international significance of the Wright brothers' accomplishments. All media will be coordinated between the park's cooperating sites to ensure consistency in message and materials.

Transportation
Access to the flying field will accommodate a variety of transportation methods including private vehicles, tour buses, bicycles, and foot traffic. To the highest practical degree, visitors will encounter separate means and routes for this multi-modal transportation network.

Parking
The flying field will have safe, convenient, and unobtrusive parking for normal and overflow use. Parking will stay outside the 2,115 foot "explosive clearance arc" from Hot Pad #4.

Accessibility
Pedestrian access to the flying field will appear straightforward and stable with a minimal impact on subsurface resources. The site treatment will provide visitors with a high degree of accessibility; primary walkway and trail surfaces will accommodate wheelchairs, strollers, and walkers; and developments will support a safe visitor environment without marring the historic character of the flying field.

Viewshed
The historic visual connection between the Wright Memorial and the flying field must remain preserved in its spatial, historic, and conceptual aspects. Visitors at the memorial will see visual cues or landmarks at the flying field.

Motivation for Return Visits
Visitors will leave the park with enough motivation and stimulation to want to return in the future.

ISSUES AND INFLUENCES AFFECTING INTERPRETATION

The location of Huffman Prairie Flying Field within an active military base (Wright-Patterson Air Force Base) poses access issues that impact both the visitor experience and base mission. Access to the flying field should afford the highest quality visitor experience while minimizing public access to the remainder of the base. Attempts are

currently being made

The proximity and use of "Hot Pad #4" has, under certain conditions, the potential to impact visitor access to areas of the flying field. At present, the base's hunting program closes the flying field.

The adjacent CATM facility and the Rod and Gun Club Trap and Skeet Range have the potential to severely impact both access to the flying field and the overall quality of the visitor experience.

Development and operation of the flying field and its associated interpretive program must reflect the partnership principles upon which the park is based. Operating funds for the flying field from both Wright-Patterson Air Force Base and Dayton Aviation Heritage National Historical Park will be limited. The design of the cultural landscape features and the interpretive media at the flying field will anticipate restrictions in the levels of available funding. Wright-Patterson Air Force Base and Dayton Aviation Heritage National Historical Park will develop an agreement defining management and operational responsibilities for the landscape features and interpretive media associated with the flying field. In general, the agreement would assign responsibility for the operation and maintenance of the landscape features including both vegetation and constructed components to Wright-Patterson and responsibility for the operation and maintenance of the interpretive program and media to Dayton Aviation Heritage.

The relatively isolated location of Huffman Prairie Flying Field on Wright-Patterson Air Force Base will require that interpretive media elements remain simple and resistant to vandalism.

Design and implementation of the interpretation program must be coordinated with the design and implementation of the landscape treatment.

To preserve the simple, pastoral setting of the flying field, utility services proposed for either interpretive media or visitor services must be limited to solar placed remotely and with wiring placed underground. Visitors to the flying field will have access to visitor convenience facilities at the Huffman Prairie Flying Field Interpretive Center.

Media at the flying field will supplement, but not duplicate, the visitor experiences at the Huffman Prairie Flying Field Interpretive Center. Completion of the Gateway Project, a proposed transportation system linking the Huffman Prairie Flying Field Interpretive Center to the flying field, will ensure that most visitors initiate their experience the Huffman Prairie Flying Field Interpretive Center.

The limited availability of park staff at the flying field will limit the feasibility of an extensive personal services interpretive program. Staff will operate from the Huffman Prairie Flying Field Interpretive Center.

For the immediate future, CATM facility, the Rod and Gun Club range, and Pylon Road

will remain in place requiring a high level of coordination between Wright-Patterson Air Force Base and Dayton Aviation Heritage National Historical Park to minimize conflicts.

The entry and directional sign system to the flying field will conform to appropriate Ohio Department of Transportation, National Park Service and Air Force standards and guidelines. The entry sign is described in Chapter 4.

VISITOR PROFILES

An assessment of potential visitors to the Huffman Prairie Flying Field because the flying field and its associated interpretive facility are still being developed. Currently about 2,000 visitors come to the site each year. The park anticipates up to 100,000 people will visit the flying field during 2003, the Centennial of Flight. A reduction in visitor numbers is expected after the centennial year.

Most visitors will arrive at the flying field because of interest generated from visits to the other park units and the United States Air Force Museum. Bus tours and military reunions will bring visitors to the flying field. School children will arrive in organized groups primarily in April, May and October. There are also many international visitors to Wright-Patterson Air Force Base each year. Convention and visitor organizations will generate additional visitation through their active marketing of heritage tourism in the Miami Valley. People seeking an experience with the natural resources of the Huffman Prairie or pursuing recreational activities (hiking or biking) on the base sometimes will make an accidental discovery of the flying field. The Multi-Modal Transportation Study, currently underway, is exploring opportunities for how to provide the best vehicular, bicycle, and pedestrian access to the flying field.

In November 2000, the Center for Business and Economic Research prepared an *Economic Impact Study of the Dayton Aviation Heritage National Park*. Based on the existing visitation to the United States Air Force Museum, the study concluded that 65,194 people would visit all the park sites if the sites complete their proposed site improvements and conduct an ongoing marketing effort. Huffman Prairie Flying Field's adjacency to the United States Air Force Museum could help the flying field exceed that estimate.

The following visitation statistics from the United States Air Force Museum provide additional insight into potential visitation at the Huffman Prairie Flying Field. While these visitor numbers are not expected at the flying field, there is a strong likelihood that a good portion will also visit the flying field once the developments are in place.

Annual Visitation:	2000	1,198,059
	1999	1,107,516
	1998	1,210,976
	1997	1,081,053
	1996	880,962
Monthly Visitation in 2000:	January	52,556
	February	67,628
	March	74,892
	April	99,349
	May	101,781
	June	116,247
	July	160,067
	August	125,400
	September	176,631
	October	97,292
	November	73,553
	December	52,663

Visitors by Age Group (March-June 1998 Survey):

The adult male/female ratio was 60/40.
The male child/female child ratio was 63/36.
The adult average age was 46.5 years.
The child average age was 8 years.
The average number of people in a party was 3.8 (average number of adults in group = 2.6; average number of children = 1.1).

First Time Visitors versus Repeat Visitors:
The average percentage of first time visitors = 40.3%
The average percentage of repeat visitors = 59.7%

Information pertaining to geographic origin of visitors and length of stay in the area (March-June 1998 Survey):

The average percentage of non-local visitors = 72%
Non-local visitors staying in hotels/motels = 39%

Length of stay in local area: One day (or less) = 44%
Two days = 23%
Three to five days = 18%
Six to seven days = 6%
Seven or more days = 7%
Seasonal resident = 1%

School Groups:

From January-December, 1998, 260 school groups visited the museum.
The average number of students per group = 81.5

Purpose of Visit (March-June 1998 Survey)
(Participants could indicate more than one reason for visiting the museum.)

Aviation	65%
Military History	54%
Sightseeing	52.5%
Entertainment	37%
Education	40%
Other	12.6%

Existing Conditions of Interpretation
Since May 1991, visitors have had access to the site during daylight hours via the main gate to the base, using local base roads (Hebble Creek Road to Pylon Road, or to Marl Road as an alternative). Visitors often have difficulty gaining access to the base, with the added obstacle of having to navigate the base's complex road systems. Military operations and Force Security Conditions sometimes require closing the site.

Visitor amenities remain limited to a self-guided discovery trail, established in 1991 as an Eagle Scout project to provide visitors with on-site interpretation. A separate trail extends into the 109-acre Huffman Prairie. Although a pamphlet available at the site provides information on the history of the flying field and the significance of the surrounding prairie, the trail lacks an orientation sign to help visitors locate and enjoy the trail.

Since the flying field lacks an architecturally defined entrance, many first-time visitors become confused about their experience. Some come to the flying field via the non-historic Pylon Road, while others arrive via Marl Road. The informal parking situation provided by a simple parking lot on Pylon Road adds to visitor confusion. Most people gravitate to the reconstructed 1905 hangar, replica catapult and launching track, and the Pylon building. Some take the self-guided trail if they find a trail pamphlet.

Desired Visitor Experience
The integrity of Huffman Prairie Flying Field's open, pastoral landscape with minimal distractions from modern developments will provide the key to meaningful visitor

experiences. If design features and interpretive media do not overpower the landscape, the public will have opportunities to ponder the far-ranging consequences of the work of the Wright brothers at the flying field. The presence of modern flight operations will provide a tangible reminder of the flying field's legacy of a century of evolving aeronautical technology. Visitors will have an emotional feeling of encountering authentic "sacred ground," where human beings truly mastered powered, controlled flight. If visitors previously have experienced the Wright Memorial, they will note the contrast between the simple, humble character of the flying field and the formal nature of the memorial.

Interpretive media will help visitors understand and appreciate that practical aeronautics began at the flying field. They will have a picture of the evolution of the process from the Wrights' private, secret, and internal period of invention and experimentation in 1904-1905 to their public period of testing, training, and exhibiting from 1910 into the future. The flying field, therefore, will symbolize the transition point of the Wrights' career from a process of invention to the development of a commercially viable industry.

Visitors will understand that fight testing dominated activity at the flying field—both the testing of aircraft and the training of pilots (including the Wrights). Flights became higher, faster, and farther than ever before. At the flying field, the Wrights learned how to control flight to avoid such hazards as cows and locust trees. As they overcame a particular problem, they proceeded to the next challenge in a systematic manner that remains a practical recipe for successful endeavors.

Through personal and non-personal services (park ranger programs, 1905 replica hangar exhibits, wayside exhibits, publications, or inscribed stones), visitors will encounter direct quotations from the Wright brothers about their experiences at the flying field. As much as possible, interpretive services will allow the Wrights to speak for themselves about the site.

The flying field will provide a variety of experiences for visitors to meet different levels of interest, learning styles, and knowledge about the Wright brothers. Experiences will vary from highly social and group-oriented activities to opportunities for personal contemplation apart from most visitors.

Most important of all, visitor experiences will permit individuals to find their own personal meaning in the flying field. Interpretation will support that search for meaning, but never impose a particular point of view. Freedom to explore one's own insights and emotions will remain the hallmark of the flying field experience.

FUTURE INTERPRETATION PROGRAM

Wayfinding, Information, and Orientation

Previsit information will provide a vital prelude to a meaningful visit to the flying field. The site's location within the Wright-Patterson Air Force Base does not provide

opportunities for casual visitors to the area to make spontaneous decisions to come to the flying field. Orientation services at the other units of the park will direct visitors to the Huffman Prairie Flying Field Interpretive Center before coming to the flying field. Since many visitors to the United States Air Force Museum will have an interest in the flying field, the park will work with the museum and the other units of the park to develop a small interactive kiosk with information about each of the park units to be placed in the lobby or entrance area. The park's Worldwide Web site and folder will provide clear directions to the flying field. The park will develop a rack card with basic visitor information for distribution at tourist/convention bureaus; local, regional, and state information centers; and commercial businesses catering to visitors. The park will ensure that visitors receive a prompt and informative response to inquiries about the flying field by mail, telephone, or e-mail.

Directional signs to the flying field and its parking lot from the Huffman Prairie Flying Field Interpretive Center will represent a key wayfinding service. Directional signs from the United States Air Force Museum to the Huffman Prairie Flying Field Interpretive Center will add further guidance for visitors to the flying field. These signs will conform, the extent feasible, with the park's overall design program for directional signs, as well as the National Park Service Messaging Project and Ohio Department of Transportation and base signage standards. The directional signs will vary in size and complexity from major informational signs at significant intersections down to small "confidence builder" signs along the way.

A Traveler's Information Station (TIS) will provide additional assistance for visitors finding their way to the flying field. The TIS will broadcast information over a low-watt radio system with a range of a few miles. Signs will direct visitors to tune to a specific radio frequency on their car radios to hear a repeating message, setting the scene for the flying field experience. The broadcast will include practical information on directions, hours of operation, visitor experiences, and regulations. A brief interpretive message will establish the significance of the flying field. The TIS will prove especially helpful in directing visitors to the flying field from the Huffman Prairie Flying Field Interpretive Center and the United States Air Force Museum. The park will work with Wright-Patterson Air Force Base to ensure that the TIS broadcasts will not interfere with any base operations.

The "Gateway" concept being developed as part of the Multi-Modal Transportation Study would provide a direct connection between the Huffman Prairie Flying Field Interpretive Center and the flying field. This would eliminate much potential confusion for drivers and provide separate access for pedestrians and bicyclists.

A directional sign at the intersection of Hebble Creek and Marl Roads and a visually striking entrance sign across from the flying field entrance will establish a sense of arrival for visitors.

When visitors arrive at the new parking lot they will encounter two upright orientation wayside exhibits that will provide general orientation to the park and specific orientation for visiting the flying field. Orientation to the park will introduce visitors to

the other units: Wright Memorial and Huffman Prairie Flying Field Interpretive Center, Wright-Dunbar Interpretive Center and Aviation Trail Visitor Center, The Wright Cycle Company Building, Wright Brothers Aviation Center at Carillon Historical Park, and the Paul Laurence Dunbar State Memorial. The exhibit also will explain the interpretive relationship between the various units. Orientation to the flying field will include appropriate information for those visitors who did not visit the Huffman Prairie Flying Field Interpretive Center. The exhibit could include an overview of the flying field's significance: the early test flights, the development of a practical, commercially viable aircraft, and the operation of the flying school. An orientation map of the flying field will highlight significant sites and facilities including the reconstructed 1905 hangar, the replica of the catapult and launch track, site of the 1910 hangar, and the Wright Company School of Aviation. The map will locate the walking route for visiting the flying field including accessibility considerations. The map also will point out the differences in experiences between the principal pedestrian paths and the mown oval pathway. The latter route will offer a more personal, contemplative experience than the areas with formal interpretive services. The exhibit will explain the significance of the 40-foot flagpoles marking the flying field boundaries. It also will point out that the mown oval pathway on the flying field mimics the flight path. The orientation exhibit will conclude by encouraging a sense of excitement and anticipation for a unique encounter with a special place.

The landscape treatment plan focuses on providing a straightforward, sequenced visitor experience. The sequence begins with the gateway—a system of roads and trails that make it easy for people to access the site from major roads. After arriving at the parking lot, the interurban wayside exhibit will explain the flying field's pedestrian circulation, which is further reinforced by various landscape features. Following the path from the interurban exhibit, visitors will cross a small wooden bridge across Trout Creek, traverse Marl Road and reach a second concrete bridge across Trout Creek. The bridges will evoke the period the Wrights' used the flying field. The second bridge will provide a formal gateway into the flying field. After walking through a row of trees, visitors will encounter a dramatic view of the flying field. The 40-foot flagpoles will enable visitors to locate the boundaries of the flying field and the air space available to the Wrights. While walking along a reconstructed portion of Yellow Springs Road next to a reconstructed fence, visitors will enjoy views of the flying field as well as several wayside exhibits placed along the right side of the trail. The fence will lend an agricultural ambiance to the flying field, delineate its boundaries, and once Pylon Road is removed, lead visitors through an entrance gate. The gate will establish a sense of arrival and anticipation. Once inside the field, the replica 1905 hangar, catapult and launching track will draw visitors to the primary interpretive area, where several wayside exhibits will offer more detailed information about the site's historic significance; visitors then will have a choice. Mown paths will direct visitors toward the 1910 hangar area, where they can leave the site or explore the mown oval path for a more personal, contemplative experience that passes the vicinity of 1904 hangar. The oval path will offer no interpretive services except a couple of wayside exhibits or low, rough textured stones inscribed with quotations. Either route will exit the flying field via an exit gate on Yellow Springs Road adjacent to the 1910 hangar area. The difference in surfaces between the two routes will provide a subtle cue about the choice of experiences.

Overflow Parking Lot on Pylon Road
An upright orientation wayside exhibit will explain how to access the flying field from the overflow parking area. It will highlight interpretive experiences in the 1910 hangar area that visitors might overlook in their natural inclination to retrace their steps from the 1905 hangar area. During the 2003 celebrations, visitors from this parking lot will enter the flying field via the trail running parallel to Pylon Road. Once Pylon Road is adapted for use as a universally accessible trail, visitors will gain entrance through an opening in the fence.

Interpretation Facilities
Huffman Prairie Flying Field Interpretive Center
The Huffman Prairie Flying Field Interpretive Center will serve as the principal interpretive facility for visitors to the flying field. It will provide an array of media and programs to interpret the research, development, and training functions of the flying field. Visitors will recognize the continuity of those functions in the history and present mission of Wright-Patterson Air Force Base. Visitors will understand that the basic aeronautical technologies developed by the Wrights still remain valid today. They will encounter examples of how the Wrights used their process of education, inspiration, and trial/error experiences not only to invent a powered aircraft, but also to learn to fly. In addition, the Huffman Prairie Flying Field Interpretive Center will demonstrate the essential principles of flight, as well as documentary exhibits about how aeronautical innovations made at Wright-Patterson Air Force Base over the years have continued the legacy of the Wright brothers. To provide historical context for the flying field, the Center will provide a comprehensive list of other area aviation heritage sites that are a part of the Aviation Trail.

Wright Memorial
The Wright Memorial will provide visitors with an opportunity to have a commemorative experience related to the significance and meaning of the flying field. The proximity of the Huffman Prairie Flying Field Interpretive Center will encourage a higher level of visitation to the memorial than at present. After the removal of the Pylon building, flags on the 40-foot flagpoles at the flying field will serve as landmarks for visitors to locate the flying field. To support the commemorative experience, it will remain essential to maintain the viewshed from the memorial to the flying field.

Simm's Station Interurban Platform
A platform evoking the character of Simm's Station on the interurban line will provide visitors with their first sense of place and recognition of arrival. This entry experience will serve as a transition from the contemporary nature of the parking lot to the historical character of the flying field. Although not a specific reproduction of the interurban station, the platform will provide a visual demonstration of the convenience of Huffman Prairie to downtown Dayton via the interurban system.

The interurban station will feature a simple wood platform with a roof supported by posts. In addition to its interpretive function, the platform will provide visitors with a shady refuge from the sun and shelter during storms. Since the platform will not represent a historical replica, it will accommodate people using wheelchairs. This

accessibility feature will enable all visitors to experience the interurban platform as well as any formal interpretive programs presented on the platform.

1905 replica hangar

The reconstructed 1905 hangar will provide a tangible reminder of the Wright brothers at the flying field. It will represent the test-flight phase of their use of the site, as well as their practical adaptation to the challenges inherent in their occupation. The hangar will contribute to a sense of place and historic identity for visitors. The overhead door and the lack of wheelchair accessibility and electrical power will require resolution to fully implement use of the hangar.

Interpretive exhibits are planned for the interior of the hangar. They will be displayed along the walls to preserve the interior space for special exhibits and events. Although additional planning and design is needed, the exhibits could incorporate historic photos, direct quotations from the Wrights and other primary sources, historic furnishings, models, and illustrations to add interest to the interpretive text. Proposed themes for the exhibits might include: explaining the Wrights' development and use of the 1905 hangar and other hangars to illustrate the practical and problem-solving nature of the Wrights in their quest to develop flight; tracing the evolution of hangar design to connect the historic era of the flying field to contemporary aviation; displays illustrating the evolution of the Wrights' aircraft; and use of reproduction items to recreate the hangar's workshop character. A Plexiglas barrier could be placed to protect the exhibit from potential harm from vandals or severe weather. A scrim exhibit across the front of the hangar could also be used to provide a view looking in on the hangar activity of the Wrights. When visitors looked out from inside the hangar, they could see a view of flight operations during the Wright brothers' era.

In the future Another interpretive opportunity is the Virtual Time Traveler Station (VTT), an electronic device developed by AniVision, Inc. The VTT looks like the post-mounted binoculars often seen at viewing decks and park overlooks. Instead of looking through regular glass optics, visitors look into a small, high-resolution video screen connected to a video camera on the front of the housing. The camera takes a live picture of the landscape in front of the visitor. A computer modifies the image through an interactive interface. As visitors scan the device across the flying field, they can zoom in and out to study details. If they click a crosshair on selected features, additional information appears on the screen in the form of text, graphics, video, or animations. The VTT would have the capability of superimposing a flying Wright brothers aircraft onto the actual, real-time picture of the flying field. Visitors could pan across the field to discover the airplane flying above the field. This could demonstrate the flight path, plane motion, and height of various test flights conducted by the Wrights. Visitors could watch the Wrights laying out the catapult track across the flying field. The computer would superimpose the scene over the present view of the flying field.

The VTT would offer a highly interactive, memorable experience of events long ago. Because the VTT works best for a single individual, it could accommodate the moderate pace of visitation at the flying field. The VTT represents an excellent opportunity to

provide engaging interpretation of historic landscape character with minimal intrusion. Placing the VTT in the primary interpretive area of the replica 1905 hangar, catapult, and launching track would minimize its impact on the landscape of the flying field. Electrical service would be needed to use the VTT; this could be obtained by solar panels or expanding utilities into the flying field.

Reconstructed Catapult and Launching Track
The park will construct an accurate full-scale model of the catapult and launching track system in the vicinity of the 1905 hangar to illustrate how the Wrights adapted the pasture for use as a test facility. The catapult and launching track will provide a tangible reminder of the Wrights' ingenuity and problem-solving ability in the face of environmental and technological challenges. This interpretive area will become a useful background for park rangers to present programs on the flight test period of the flying field.

1910 Hangar Outline
A simple stone outline of the building footprint will mark the former location of the 1910 hangar. Nearby wayside exhibits will interpret the Wright Exhibition Company and the Wright Company School of Aviation, both related to that portion of the flying field. This will emphasize the flying field's commercial phase of operations.

Wayside Exhibits
Wayside exhibits comprise the primary interpretive medium at the flying field since staff will be provided only in high visitation periods. Wayside exhibits will provide site-specific, consistent, high-quality interpretation available for visitors at all times. The importance of the wayside exhibits in the overall visitor experience will require them to become as accessible as possible. Because the visitor experience is organic, rather than tightly controlled, the exhibits will not be sequenced.

Wayside exhibits will be carefully located and sited to minimize ground disturbance and reduce their cumulative visual impact on significant views. To encourage visitors to make personal connections with the meaning of the flying field, the wayside exhibits will focus on the meaning and significance of those resources. This will enable visitors to understand the evolution of the flying field's form and function over time.

The flying field *Wayside Exhibit Proposal* provides additional detail on the scope and intent of each wayside exhibit. Topics defined for the wayside exhibits include "High School Field Trips," "Simm's Station," "Prairie and Pasture," "Learning to Fly—1904," "The Flight Path," "More Air Time—1905," "Learning to Bank and Turn," "Catapult Launches," "School for Flyers—1910," "The Wright Exhibition Team," "Orville's Later Test Flights," and "The Evolution of Wright-Patterson Air Force Base." An additional wayside exhibit and trail brochure box might be placed at the beginning of the Huffman Prairie trail.

Personal Services
The wayside exhibits and 1905 replica hangar exhibits will help visitors make intellectual connections with the flying field. Visitors will understand its significance and the meaning of

specific locations and features. In contrast, personal services will focus on conveying intangible and emotional aspects of the flying field story through formal and informal interactions between visitors and park rangers. Visitors will have the opportunity to ponder the wonders of the Wrights' creative process and their successes and setbacks. They can consider the universal appeal of the creative process. Most importantly, programs will convey the emotional aspects of the flying field story and the sense of exhilaration and wonder that Wrights felt for their work.

Fixed-point programs will be presented to supplement the information presented on the exhibits. Programs will consider intangible and conceptual topics that require feedback and questions between the park ranger and the audience. Potential topics will include:

1) the process of trial and error;
2) how the brothers learned from their mistakes,
3) how analysis figured prominently in the Wrights' experiments,
4) how the they eventually coped with success and fame,
5) the significance and characteristics of genius,
6) how the Wrights faced the many dangers of early test flights,
7) the character traits of a pilot, then and now; and, most importantly,
8) the intrinsic attraction of flight felt by the Wrights and so many other human beings.

Programs will convey pilots' and scientists' point of view to focus on the flying field's history of flight-testing. The park's volunteer program could recruit retired pilots to focus on the practical challenges of flight faced by the Wrights and other pioneer pilots.

Although many visitors will expect staff at the flying field, it will remain critical that the park refrain from overwhelming the flying field experience with formal programs. Visitors should encounter opportunities for direct, personal experiences at the flying field with few distractions. Programs will serve as supplementary experiences rather than the principle attraction.

Staff will operate from the Huffman Prairie Flying Field Interpretive Center. Formal programs will take place only during hours of the highest visitation. The Center will provide visitors with the daily program schedule. Flying field programs will take no more than thirty minutes in order to accommodate the projected average visit of forty-five minutes. Since the park anticipates a moderate level of visitation except on special occasions, on site staff will remain to accommodate visitors needs.

A park van will be purchased to serve as a portable base for flying field operations. This eliminates the need for a permanent support facility at the site. The van will store park radios, first-aid kits, park folders and site bulletins, reference sources, and other items necessary to support visitor services at a remote location. The van will enable park rangers to bring along props to support their programs. Examples could include models to demonstrate particular flight challenges encountered by the Wrights, copies of historic photographs, or reproductions of notebooks used by the Wrights to record the results of their flights.

Publications
Publications associated with the flying field will follow publication design standards developed by the park in keeping with NPS standards and the Messaging Program.

Park Folder
The park folder will include orientation, driving directions, and a description of the flying field. By interpreting the significance and meaning of the flying field, the folder will enhance the experience of the flying field before, during, and after a site visit.

Park Handbook
The handbook prepared for both Dayton Aviation Heritage National Historical Park and Wright Brothers National Memorial in North Carolina will enhance and supplement the interpretation of the flying field available in the park folder. The handbook will place the flying field in the context of the birth and development of aviation. Maps, diagrams, and historical images will provide an engaging experience for visitors wishing to learn more about events and personalities associated with the flying field.

Site Bulletins
To supplement the flying field's wayside exhibits, the Huffman Prairie Flying Field Interpretive Center will offer a series of site bulletins providing information and interpretation about specific topics and personalities associated with the flying field. Topics will include the 1910 era, the flight school, and the connection of Wright-Patterson Air Force Base to the flying field. Site bulletins for special events will enhance visitor understanding and participation in those events.

Information Sheets
A portfolio of information sheets about the flying field will enable the park to respond in a systematic manner to the inquiries of schoolchildren seeking help with school reports. The information sheets will follow the site bulletin design.

Monographs
To help people obtain in-depth information about the flying field, the park's Worldwide Web Site could include a list of appropriate science and history texts. Short annotations of the monographs, including purchasing information, will provide additional guidance to topics of particular interest. The cooperating association will sell a range of publications associated with the flying field to appeal to a variety of levels of interest and knowledge.

Rack Card
As described in the orientation section, a rack card describing the flying field and its visitor experiences will prove useful for encouraging visits to the flying field.

Audiovisual Programs
Orientation Film
The park's orientation film will include an overview of available visitor experiences. Visitors will receive encouragement to come to the flying field to experience the "real

place" where practical aviation developed.

Feature Film
The proposed *Inventing Flight* film will emphasize the inventive process and the interrelationship of the Wrights that contributed to their achievements. The film will best serve visitors to the flying field by encouraging them to ponder the collaboration that resulted in the remarkable accomplishments at the flying field—the actual site where human beings mastered the challenges of powered, controlled flight. By generating a high degree of excitement and anticipation, the film will serve as a vital prelude to a visit to the flying field.

Audio Tour
A compact disc audio tour could be made available to supplement the wayside exhibits at the flying field. The cooperating association would rent the players at Huffman Prairie Flying Field Interpretive Center. The audio tour will respect the privacy of other visitors seeking a peaceful, contemplative experience at the flying field, while at the same time providing additional information, interpretation, and inspiration through an auditory medium. The audio tour will enable the park to serve international visitors by including separate tracks in a variety of languages. Another track will provide a tour for children. The park can also address the needs of visitors with vision problems by including a track with a special audio description.

Special Events
Special events are important tool for encouraging ongoing community support for preserving the flying field. The events will be designed to respect the integrity, ambiance, and simplicity of the flying field, be designed to reflect the primary interpretive themes, and vary in scope, size, topic, and audience. In particular, special events will feature aircraft displays and flight demonstrations including the replica Wright "B" Flyer. The park will enter into an Agreement with the Wright "B" Flyer, Inc. to display the replica Wright "B." The replica flyer will be displayed from mid-May to mid-October, between the boundary fence along the Yellow Springs Trail and the path between the 1905 hangar and the 1910 hangar site. This display will feature the flyer, a temporary shelter, such as a tent or awning, and a temporary wayside.

Anniversaries of significant events or milestones at the flying field will provide opportunities for special commemorative events. The 1905 replica hangar area can be used for displays and booths related to special events. The scope of the special event program will reflect the amount of staff and volunteers available to manage the events. The existing parking lot on Pylon Road and the triangle of land bounded by Pylon, Marl, and Symmes Road will serve as overflow parking during special events.

Worldwide Web Site
The park's Worldwide Web site will help provide information to the visiting and non-visiting public. Not only will it prepare people for their visit through orientation and information, but it also will provide a vicarious experience for people who might never have an opportunity to visit the park.

Orientation and trip planning will become a vital function of the Worldwide Web site. The web site will provide orientation maps of the Greater Dayton/Miami Valley region, locating the units of the park and other aviation heritage sites. Each park unit will have its own map with driving directions. The section of the web site on the flying field will emphasize that a successful visit will begin at the Huffman Prairie Flying Field Interpretive Center.

Over time, the park can provide an extensive array of interpretive and historic information about the flying field on the web site, including historic and contemporary photos, primary written sources, and oral interview transcripts. Creating links to other related web sites, such as the United States Air Force Museum, the National Air and Space Museum, Carillon Historical Park, and the Wright Brothers National Memorial, will provide further enriched experiences.

To assist researchers, the web site will list and annotate science and history texts related to the flying field. Annotations will include purchase information for items offered by the cooperating association or the United States Air Force Museum sales shop.

Education Program

The flying field will offer education programs for schoolchildren that focus on evoking a sense of wonder at being at a site that changed world civilization. Explaining the flying field's relationship to science, history, invention, and creativity will stimulate educational processes. On-site activities will help schoolchildren establish a tangible connection to the intangible meaning of the flying field.

Education program activities might emphasize the rigorous scientific method that the Wrights employed in their work and demonstrate their mastery of engineering, mechanics, mathematics, and writing. These innovative, inter-disciplinary programs will challenge the audience's creativity. The tacit goal is for children to consider the Wrights' experiences and as a recipe for success in any endeavor. Both their successes and failures represent a significant part of their creative and inventive process. While most education programs will focus on the Wrights' scientific accomplishments, others will emphasize their enormous and long-lasting impact on the lives of people around the world. As part of the programs, schoolchildren will be encouraged to express their personal feelings through writing and other artistic endeavors. The Huffman Prairie Flying Field Interpretive Center can be used for classroom exercises that supplement the flying field programs.

The education program will fulfill the "Parks as Classrooms" program standards established by the National Park Service. This includes developing curriculum guides and pre-visit/post-visit materials, presenting curriculum-based programs that meet the specific needs of various grades, and providing additional educational resources, such as traveling trunks, traveling exhibits, and Worldwide Web-based resources for use off-site by schools. Education programs will be designed in collaboration with local school districts and teachers to ensure that individual programs meet their curriculum needs. This dynamic relationship will ensure that the programs promote creativity and have ongoing relevance. Feedback from both teachers and schoolchildren will keep education programs fresh and meaningful. The education program for the flying field will

complement similar education programs at the other units of the park, as well as such related institutions as the United States Air Force Museum. In this way, schools will encounter a comprehensive, coordinated, and mutually supportive education program among the partners and units of the park.

Distance learning opportunities could be developed to serve schools far away from Dayton. The proximity of satellite technology at Wright-Patterson Air Force Base would enable the park to present real-time programs. Such technology could provide a connection between schoolchildren in local schools and those in other parts of the United States or other countries.

Organized Groups
The park will work with its partners to develop a reservation system for groups requesting formal flying field programs. This will help ensure that programs meet the needs and expectations of each particular group. A park ranger will join the organized group at the Huffman Prairie Flying Field Interpretive Center to provide appropriate narration, and then move to the flying field to present a guided tour or a fixed-point program.

Staffing Needs
As funding becomes available, a single park ranger will be stationed at the flying field during high visitation periods and at other times be available to enhance security and provide visitor services. During special occasions staff numbers may be increased. Two park rangers will ensure seven-day coverage at the flying field, and allow the presentation of education programs during the week. When not serving at the flying field, the park rangers will support operations at the Huffman Prairie Flying Field Interpretive Center. Volunteers will supplement the services provided by paid staff. Not only will the volunteers bring additional perspectives and enthusiasm to the program, but they also will significantly expand the number and variety of formal programs presented at the flying field.

At a minimum, the park will include an education specialist on its staff to direct the development of a comprehensive education program. Ideally, the Huffman Prairie Flying Field Interpretive Center and flying field will share an education specialist to develop education programs, pre-visit and post-visit material, and other educational resources specifically for the flying field. The education specialist also will serve as a coach to ensure the quality of individual educational programs presented by the park rangers.

Partnerships
The collaborative partnership between the various units of Dayton Aviation Heritage National Historical Park represents the very essence of the park. The National Park Service, Wright-Patterson Air Force Base, Carillon Historical Park, Ohio Historical Society, and Aviation Trail, Inc. work together to create coordinated visitor experiences. Although each unit has maintained its organizational and operational autonomy, all the units have joined together with the Dayton Aviation Heritage Commission to create an umbrella organization of stakeholders to promote the interpretation of aviation heritage in Dayton and the Miami Valley. Congress mandated the commission to "assist federal, state, and local authorities

and the private sector in preserving and managing the historic resources in the Miami Valley, Ohio, associated with the Wright brothers, aviation, and Paul Laurence Dunbar." The Wright family continues to provide invaluable support and guidance to the park. The Dayton Aviation Heritage Commission provides important leadership in bringing together all of the park and community partners to focus on both park specific issues and the broader issues of residential and commercial revitalization and transportation. The City of Dayton, Montgomery County, Greene County, a well as many civic organizations provide enthusiastic support and participation in park planning activities. Aviation Trail, Inc. provides comprehensive interpretation of the aviation heritage of the Miami Valley through the Aviation Trail Visitor Center and its publications. Inventing Flight has served as the umbrella organization coordinating the extensive regional plans for the Centennial of Flight.

Eastern National will offer interpretive items for sale in the interpretive center to allow visitors to enrich their flying field experience after their visit. A *Scope of Sales* statement defines appropriate topics for the sales items. Sales items should include a comprehensive selection of scholarly books related to the Wrights, the flying field, and other park related themes. The association will make substantial donations to the park to operate and expand its interpretation program.

The success of the flying field will rely upon the joint management of the property between Wright-Patterson Air Force Base and the park. The mutual interest in the preservation and interpretation of aviation heritage will ensure success in the partnership. The base's historian and historic preservation officer will provide invaluable support for the interpretation of the flying field. Aviation enthusiasts will provide the backbone of the flying field's volunteer program. Such volunteers will enable the flying field to expand its personal services program far beyond the capabilities of its paid staff. Volunteers also will enable the flying field to develop a program of special events.

Library and Collection Needs

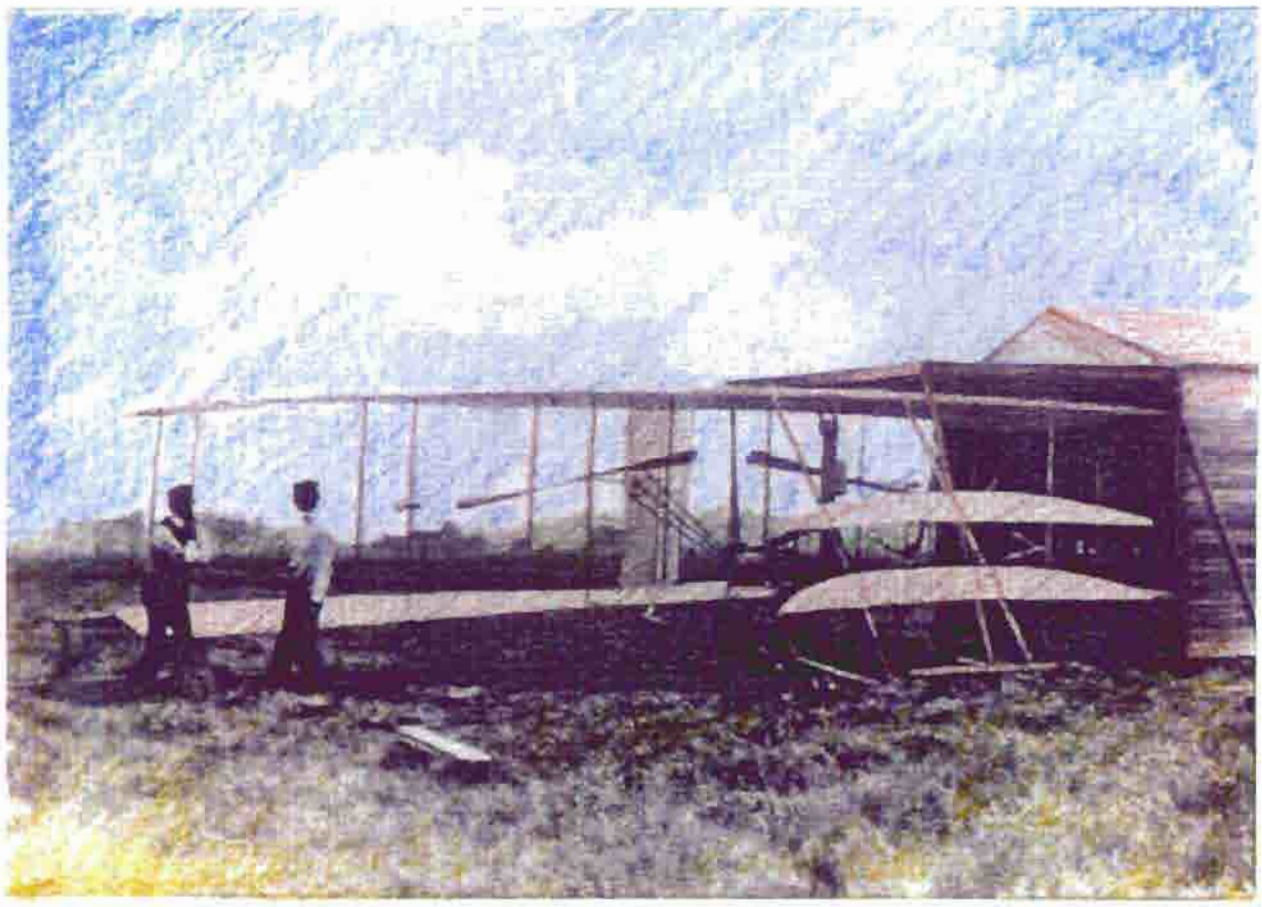
As a new park unit, staff will continue to build a research library necessary to support research interpretation. These sources will be housed either at park administrative offices or at the Huffman Prairie Flying Field Interpretive Center.

The park does not plan to acquire or manage significant collections of museum objects, documents, or photographs. Researchers will be guided to relevant local and national collections. Archeological objects recovered from the flying field are curated at the Ohio Historical Society in Columbus, Ohio.

Research Needs

An remaining research gaps should be filled through ongoing collaborative research program with associated facilities, such as the National Air and Space Museum, Wright-Patterson Air Force Base, and Wright State University Special Collections and Archives.

BIBLIOGRAPHY



BIBLIOGRAPHY

PRIMARY SOURCES

Arnold, H. H. *Global Mission*. New York: Harper & Brothers, 1949.

Brewer, Griffith. "The First Aerodrome." Library. Royal Aeronautical Society. London, England.

"A Brochure on Aviation and the City of Dayton and Official Souvenir Program: International Air Races." International Air Races, Inc., 1924.

Coffyn, Frank. Interview by Kenneth Leish. April, 1960. Columbia University Oral History Collection. Part IV. New York Times Oral History Program. Columbia University. New York, New York.

Foulois, Benjamin D. with Colonel C. V. Glines, USAF. *From the Wright Brothers to the Astronauts: the Memoirs of Major General Benjamin D. Foulois.* New York: McGraw Hill Book Company, 1968.

Huffman, William P. Interview by Shelby E. Wickam and Virginia L. Julian. 2 December 1977. 88th Air Base Wing History Office, Wright Patterson Air Force Base, Dayton, Ohio.

McFarland, Marvin W., ed. *The Papers of Wilbur and Orville Wright including the Chanute-Wright Letters and Other Papers of Octave Chanute.* 2 vols. 1953. Reprint, Salem, New Hampshire: Ayer Company Publishers, Inc., 1990.

Miller, Ivonette Wright. *Wright Reminiscences*. Dayton, Ohio: The Air Force Museum Foundation, 1978.

Stinson Collection. Evans Memorial Library. Aberdeen, Mississippi.

Van Cleve-Dover Collection, Dayton Public Library.

Wright Brothers Historic Aeronautical Photographs. Special Collections and Archives. Paul Laurence Dunbar Library, Wright State University.

Wright, Orville. *How We Invented the Airplane: An Illustrated History*. New York: Dover Publications, 1988. (Originally published by David McKay Company, New York, 1953).

United States Census Bureau. "Products of Agriculture in Bath Township, in the County of Greene, in the Post Office: Osborne, Ohio." Washington D.C.: 1870.

SECONDARY SOURCES

Aldridge, James F. "Wright from the Start: the Contributions of Dayton's Science and Engineering Community to American Air Power in the Twentieth Century." Wright-Patterson Air Force Base, Ohio: History Office, Aeronautical Systems Center, Air Force Materiel Command, 1997.

Becker, Carl M. and Nolan, Patrick B. *Keeping the Promise: a Pictorial History of the Miami Conservancy District.* Dayton, Ohio: Landfall Press, 1988.

Broadstone, Hon. M. A. *History of Greene County, Ohio: its People, Industries and Institutions.* vols. I and II. Indianapolis: B. F. Bowen & Company, Inc., 1918.

Brown, Stephen P., Architects. "Alternatives Study for the Development of the Wright Brothers' 1910 Hangar on the Huffman Prairie Flying Field, WPAFB, Ohio." December 1993. Office of Environmental Management, 88th Air Base Wing, WPAFB.

"Cooperative Agreement for the Protection, Development, and Management of Fish and Wildlife Resources and Fish and Wildlife Management Plan for Wright-Patterson Air Force Base, Ohio, Air Force Logistics Command for Plan Period: Jan 1980 – Jan 1985." Office of Environmental Management, 88th Air Base Wing, WPAFB.

Cornelisse, Diana G. *An Historic Tour of Wright Patterson Air Force Base.* History Office, Aeronautical Systems Center, Air Force Materiel Command. March 1995.

Crouch, Tom D. *The Bishop's Boys: A Life of Wilbur and Orville Wright.* New York: W.W. Norton & Company, 1989.

_____. The Giant Leap: A Chronology of Ohio Aerospace Events, Personalities 1815-1969 (Columbus: The Ohio Historical Society, 1971).

_____. "Capable of Flight: the Saga of the 1903 Wright Airplane." Amy Henderson and Adrienne Kaeppler, eds., *Exhibiting Dilemmas: Issues of Representation at the Smithsonian.* Washington D. C.: The Smithsonian Institution, 1997.

Dachnowski, A. P. *Peat Deposits of Ohio.* Series 4, Bulletin 16. Columbus, Ohio: Ohio Geological Survey, 1912.

Deines, Ann. *What Dreams We Have and How They Fly,* forthcoming.

Dills, R. S. *History of Greene County together with Historic Notes on the Northwest and the State of Ohio.* Dayton, Ohio: Odell & Mayer, Publishers, 1881.

East, Omega G. "Wright Brothers National Memorial." Washington D.C.: U.S. Department of the Interior, 1961. Reprint, 1991.

Historic American Buildings Survey/Historic American Engineering Record. "The Engineering of Flight: Aeronautical Engineering Facilities of Area B, Wright-

Patterson Air Force Base, Ohio." Washington, D.C.: National Park Service, U. S. Department of the Interior, 1993.

Isely, Duane. *One Hundred and One Botanists.* Ames, Iowa: Iowa State University Press, 1994.

Keenan, Jack. *The Uncertain Trolley: a History of the Dayton, Springfield and Urbana Electric Railway*. Fletcher, Ohio: Cam-Tech Publishing, 1992.

Keeney, Elizabeth B. *The Botanizers: Amateur Scientists in Nineteenth Century America.* Chapel Hill: University of North Carolina Press, 1992.

Kelly, Fred C. *The Wright Brothers*. New York: Ballantine Books, 1943. Reprint, 1950.

Knepper, George W. *Ohio and Its People.* Kent, Ohio: Kent State University Press, 1989.

Madson, John. *Where the Sky Began: Land of the Tallgrass Prairie*. Revised edition, Ames, Iowa: Iowa State University Press, 1995.

Manning, Richard. *Grassland: the History, Biology, Politics, and Promise of the American Prairie*. New York: Viking, 1995.

Misenko, Albert E. and Pollock, Philip H. *Engineering History, 1917-1978: McCook Field to the Aeronautical Systems Division*. Wright-Patterson Air Force Base, Ohio: History Office, Aeronautical Systems Center, Air Force Systems Command, 1978.

National Park Service. *Director's Order 28: Cultural Resource Management Guidelines, Release No. 5*, Washington, D.C.: U.S. Department of the Interior, National Park Service, 1997.

_____. *Resource Management Plan Guidelines*, Washington, D.C.: U.S. Department of the Interior, National Park Service, 1994.

_____. *The Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes.* Washington, D.C.: U.S. Department of the Interior, Nati0nal Park Service, 1996.

Nye, David. *Electrifying America: Social Meanings of a New Technology, 1880-1940.* Cambridge, MA: MIT Press, 1990.

Page, Robert R., Cathy A. Gilbert, and Susan A. Dolan. *A Guide to Cultural Landscape Reports: Contents, Process, and Techniques*. Washington, D.C.: U.S. Department of the Interior, Nati0nal Park Service, 1998.

Renstrom, Arthur G. *Wilbur and Orville Wright: A Chronology Commemorating the Hundredth Anniversary of the Birth of Orville Wright, August 19, 1871.* Washington D. C.: Library of Congress, 1975.

Robinson, George F. *History of Greene County, Ohio*. Chicago: The S.J. Clarke Publishing Company, 1902.

Romesburg, Laura. "Establishment of Signal Corps Aviation and World War I." *Visions of the Past.* Wright-Patterson Air Force Base, Ohio: ASC History Office [1994].

Strobbe, C. and Bohannon, D. "Environmental Assessment of the Huffman Field/Wright Memorial Enhancement Plan." May 1990. Office of Environmental Management, 88th Air Base Wing, WPAFB.

U.S. Army Corps of Engineers, Tri-Services Cultural Resources Research Center. "Archaeological, Geophysical, and Remote Sensing Investigations of the 1910 Wrigth Brothers' Hangar, Wright-Patterson Air Force Base, Ohio." July 1998. Office of Environmental Management, 88th Air Base Wing, WPAFB.

U.S. Army Construction Engineering Research Laboratory, Tri-Services Cultural Resources Management Center. "Historic Resources Management Plan for Wright-Patterson Air Force Base, Ohio, Fiscal Years 1993 through 1997." December 1993. Office of Environmental Management, 88th Air Base Wing, WPAFB.

U.S. Army Corps of Engineers, Fort Worth District and U.S. Department of the Air Force, Wright Patterson Air Force Base, Ohio. "Phase I Archaeological Investigation of 35 Historical Period Sites, Wright-Patterson Air Force Base, Dayton, Ohio." September 1996. Office of Environmental Management, 88th Air Base Wing, WPAFB.

U.S. Army Corps of Engineers, Fort Worth District and U.S. Department of the Air Force, Wright Patterson Air Force Base, Ohio. "Historic Building Evaluation for Brick Barn (GRE-1066-10) Greene County, Ohio." September 1996. Office of Environmental Management, 88th Air Base Wing, WPAFB.

Walker, Lois E., and Shelby E. Wickam. *From Huffman Prairie to the Moon: the History of Wright-Patterson Air Force Base.* Wright Patterson Air Force Base, Ohio: Office of History, 2750th Air Base Wing, Air Force Logistics Command, 1986.

Wood, John Walter. *Airports*. Coward-McCann, Incorporated, 1940.