

Prairie Gateway - Community, History and Prairie  
A Design for a Prairie Landscape  
Commerce City, Colorado

by

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## **Abstract**

The City of Commerce City, Colorado intends to develop a 940 acre disturbed prairie grassland site, called Prairie Gateway adjacent to the 27 square mile Rocky Mountain Arsenal Wildlife Refuge. A feasibility study has been conducted to assess economic and community development opportunities for Prairie Gateway that would support Refuge activities and provide a unique amenity for Commerce City residents and visitors. A preliminary site design has been proposed and initial costing and facility needs have been developed for a variety of program options.

This design thesis builds on these previous studies and outlines a site concept for Prairie Gateway based on biophysical, social and historical data. The notion of prairie was explored in terms of art and literature to help better understand and design an appropriate and meaningful prairie experience. A review of several precedents for design on prairie landscapes was conducted to help in creating a site specific design language for Prairie Gateway. A series of design principles - spatial, design detail and program components were developed as building blocks for the proposal, and recur throughout at a variety of scales from planning to detailed design.

Much of the Prairie Gateway design is linked to the concept of reconnection to prairie in terms of community, history and prairie experience. Spatially, at the planning scale, the design references the patterns of settlement based on the surveyed grid of the American West. At the more detailed scale the design incorporates a materials palette of the vernacular prairie farm including rough stone, brick, adobe and corrugated metal.

The Prairie Gateway design includes a concept plan for the mile square portion of the site, a conceptual plan for a public park and visitor's complex, a schematic plan for an educational centre and lodge, a site plan for the lodge and detailed drawings for program areas within the lodge complex. Each portion of the design references the overall design and program principles developed during the analysis phase. Ideally, these principles can be used to guide future work on Prairie Gateway in order to create a holistic and integrated design.

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# **Prairie Gateway: Connection to Community, History and Prairie**

## **Introduction**

The Rocky Mountain Arsenal Wildlife Refuge, designated a National Wildlife Refuge in 1992, is located within 10 miles of downtown Denver, Colorado. A variety of stakeholders including: Commerce City, the U.S. Fish and Wildlife Service, environmental groups, the business community, and Colorado's educational and cultural institutions sought to provide unique environmental education and recreation opportunities for the rapidly growing urban population of Colorado's Front Range. To realise these opportunities, legislation was passed to authorise the conveyance of a tract of land consisting of approximately 940 acres from the US Fish and Wildlife Service to the City of Commerce City. This tract of land is called the Prairie Gateway, the site for this design project.

Between 1990 and 2000 the region was substantially transformed by rapid population growth, large capital investments in clean up operations, and significant economic development (EDAW 2001). The Refuge and Prairie Gateway, together with extensive trail systems, and state, municipal and county parks, represent the largest dedicated Open Space area in Colorado's Front Range.

## **Project Background**

### ***EDAW's Development strategy***

*"The goals for the Prairie Gateway Project make it clear that the City of Commerce City is seeking much more than a traditional economic development project. The focus on environmental education, conservation, restoration, and recreation indicates that the objective of the project is not only economic feasibility, but that it should actively promote an improvement in the natural environment. Moreover, the project should create strong incentives for citizens to protect the natural resource base of the wildlife refuge by allowing them to unlock some of the economic value that can be derived from that resource. Finally, the project should provide an opportunity for residents of Commerce City to advance their personal quality of life through gainful employment, income generation, educational enrichment, and quality recreation," (EDAW 2001).*

To address Commerce City's goals for Prairie Gateway, EDAW Inc., a large planning and landscape architecture firm, has developed an economic development strategy for the site. The strategy outlines a series of potential program opportunities, an economic analysis of these components, a zoning map and a preliminary design strategy. This design thesis builds on the EDAW work, in terms of further uncovering site layers and creating a unified and site specific design for Prairie Gateway.

## **Project Goal**

The primary goal of this design project is to examine how to create an educational and immersive prairie experience while accommodating EDAW's proposed program requirements for Prairie Gateway. The project will explore the



perceived values of the prairie from a variety of perspectives and investigate how to incorporate ecological values into the site design. The key is to mix an analytical investigation of ecological and land use issues with a review of art and literature addressing human interaction with the prairie landscape.

## Objectives

- To develop a series of design principles which can be applied at various scales to create a unified and logical design for Prairie Gateway;  
These design principles should incorporate an understanding of:
  - ecological processes of short-grass prairie landscapes;
  - cultural history of Native American inhabitants of the short grass prairie
  - cultural and geographic history of settlers and farmers of the Colorado Front Range
  - examples of some of the experiential qualities, design and educational opportunities at various interpretive facilities and development projects on other prairie grassland sites;
- To represent the design for Prairie Gateway through a series of drawings at a variety of scales- from a planning scale for the entire site down to the design detail scale for one program component—the Homestead Lodge. This approach will allow for a design language to develop that can be applied to the future development of designs for the remaining program components.
- To demonstrate that a design based on program needs for people with physical disabilities can provide a new and interesting twist to a site experience for all people.

## Methodology

The following sequence outlines the series of steps taken in developing the Prairie Gateway design. It should be noted that the process was iterative and the various steps were revisited at different points as the design progressed.

1. Overlay analysis of regional context information including:
  - land use, climate, bioregional context, cultural history, roadways and greenway connections
2. Review of biophysical site information
  - Rocky Mountain Wildlife Refuge data- vegetation, habitat, topography, soils, wildlife, hydrology, restoration efforts
3. Review of historical/cultural data
  - Rocky Mountain Wildlife Refuge archaeological data
4. Review of economic data
  - EDAW Proposed Development Strategy
5. Review of proposed program options for site
  - Comprehensive Management Plan for the RMANWR, Interpretive Facilities Planning and Design for the RMANWR and EDAW Proposed Development Strategy



6. Exploration of art and literature on the prairie experience in terms of Plains Indians, explorers, settlers, farmers and urbanites.
7. Precedent review of other interpretive facilities and development projects on prairie grassland sites.
8. Development of design principles- spatial, material and programmatic to guide the design process at a variety of scales
9. Design at the planning scale, site scale and detail scale to create a “design language” that can be applied to the future design of other areas of Prairie Gateway

## Regional Analysis

### *Location and Circulation*

Prairie Gateway is the geographic centre of the City of Commerce City and is in the north central region of the Denver Metropolitan Area. The Denver International Airport is located several miles to the east. The site is located along Quebec St. between the intersections of 56<sup>th</sup> Ave. to the south and Colorado Blvd. to the north. These major two lane arterials are experiencing increased traffic volumes and mix of traffic types that will need to be addressed in the development of Prairie Gateway. Interstate 70, 76 and the E-470 also surround the site. (Figure 1)

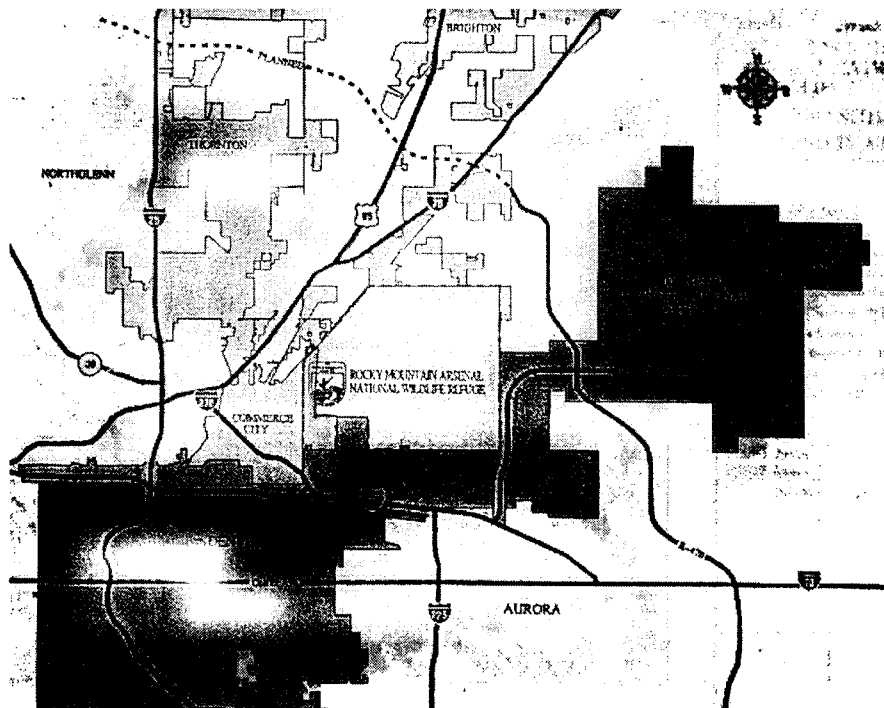
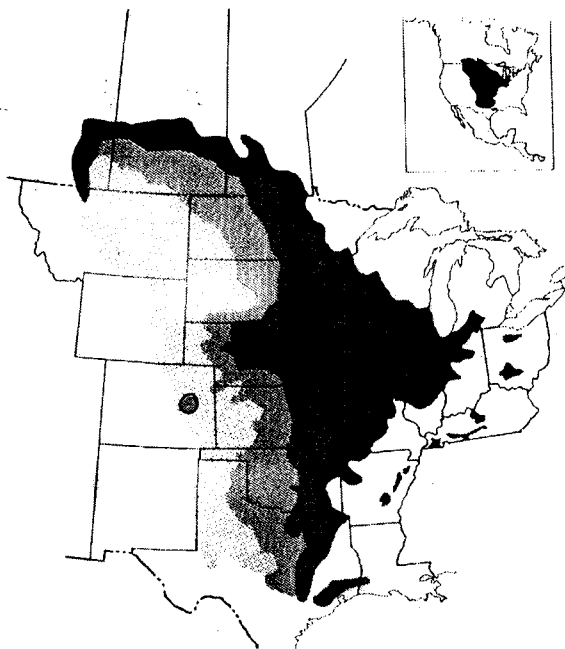


Figure 1 – Regional Context

A substantial amount of rail transport infrastructure is located in the immediate vicinity. Although the rail is used for freight transport, plans are being considered to extend passenger rail service from downtown Denver to the Denver International Airport. The establishment of this type of rail service would allow large numbers of people to access Prairie Gateway. Although roads, transit and rail transport services provide easy access to the site, the open space consisting of Prairie Gateway and the Refuge has become "an island" surrounded by development.

**Bioregion**

Prairie Gateway is situated within the shortgrass prairie zone of the Great Plains of North America (Figure 2). This grassland type is characteristic of low rainfall and is dominated by grass, less than 1 foot tall, including blue grama and buffalo grass (Joern and Keeler 1995 p. 16). Plants in semi-arid zones world-wide have silvery, reflective, thick foliage reducing evaporation and a longer flowering season to aid in reproduction (Woodward 2000).



The semi-arid climate is characterised by low humidity and intense sunshine with average temperatures of 45° F (High) 16° F (Low) in January and 88° F (High) and 59° F (Low) in July. Eighty percent of the 12-16" of precipitation falls between September and April, with January being the driest month. Much of the front range is characterized by northerly day winds and southerly night winds with an average speed of 8.7mph (USFWS 1996).

Figure 2 – Prairie Bioregions

- SHORT-GRASS PRAIRIE
- ▒ MIXED-GRASS PRAIRIE
- ▓ TALL-GRASS PRAIRIE
- PRAIRIE-FOREST TRANSITION

### **Land Division**

The legacy of the land surveys of the late 1800s remains in the division of the 27 square mile Wildlife Refuge into mile sections. Figure 3 shows the numbered sections in the 36 square mile township division defined by a square whose sides measured six miles. This distance was believed to be a “reasonable” distance for horse and wagon to get to market and back. Sections were numbered in what was called “boustrophedonic order” (or as the plow follows the ox) and these numbers remain today (Corner 2000, p. 31). Prairie Gateway consists of section 9 and portions of section 4 and 33. Located within Section 9 are the US Postal Service Bulk Mail facility and the complete rehabilitation of the north portion of the defunct Stapleton Airport runway system (Figure 3).

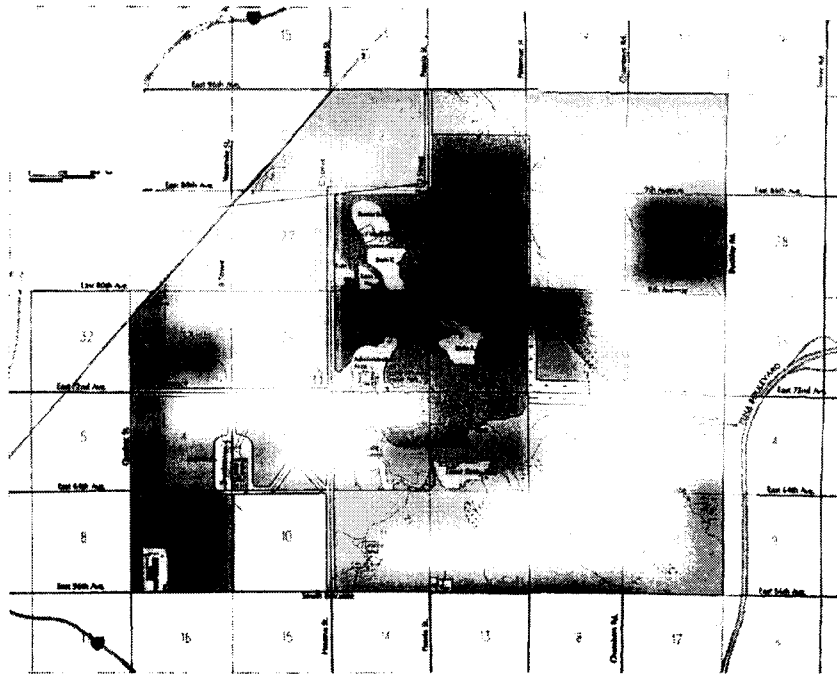


Figure 3 – Land Division

### **Land Use**

Figure 4 shows the extent of land use activity around the site:

- The Denver International Airport is located within five miles of Prairie Gateway (Figure 1).
- Large-scale private development is contributing to a construction boom surrounding Prairie Gateway.
- The extensive annexations of lands by the City of Commerce City now encircle the Rocky Mountain Arsenal Wildlife Refuge.
- Approximately 60 percent of the population of the adjacent Commerce City residential community are of Hispanic origin.



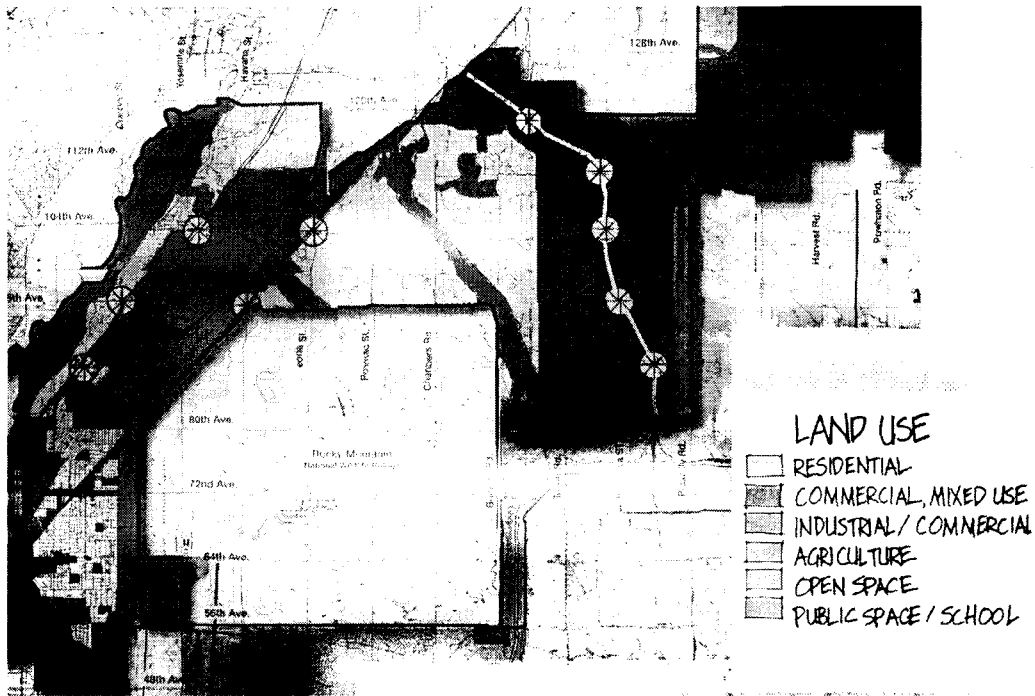
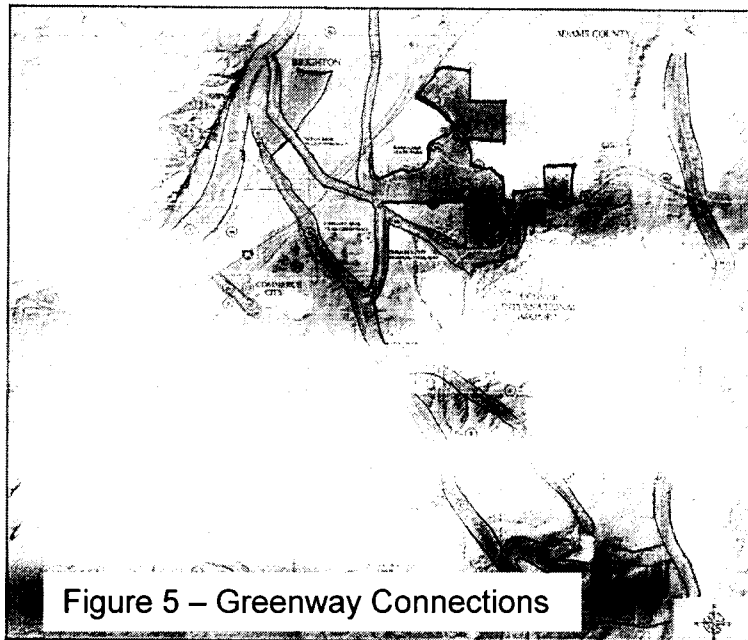


Figure 4 - Regional Land Use

### ***Greenway Connections***

A significant open space acquisition, such as a 17-mile reach of the South Platte River and regional trail development, has occurred in the vicinity of Prairie Gateway. The Refuge master plan proposes to connect the Refuge on-site trail system and perimeter trail to the trails along First Creek, Sand Creek, the Highline Canal and E 470 to the southeast.



On the northern boundary the plan proposes that the refuge connect to open space trails along I-76, Barr Lake, First and Second Creeks, Fulton Ditch and the Brighton lateral (Figure 5). Proposed recreational opportunities would include, hiking, biking, fishing, bird watching and picnicking (Northeast Metro, 2000).

## **Hydrology**

The Refuge (and Prairie Gateway) is within several drainage basins that are tributary to the South Platte River, located 2 miles to the northwest (Figure 6). All surface flows on site are intermittent, with stream-flow occurring as a result of runoff, released or diverted flow or direct precipitation. On Prairie Gateway, due to the sandy soils and sparse development, there is little if any surface runoff from this basin. Groundwater flows to the north and north-west and is found more than 60 ft below ground surface in Prairie Gateway.

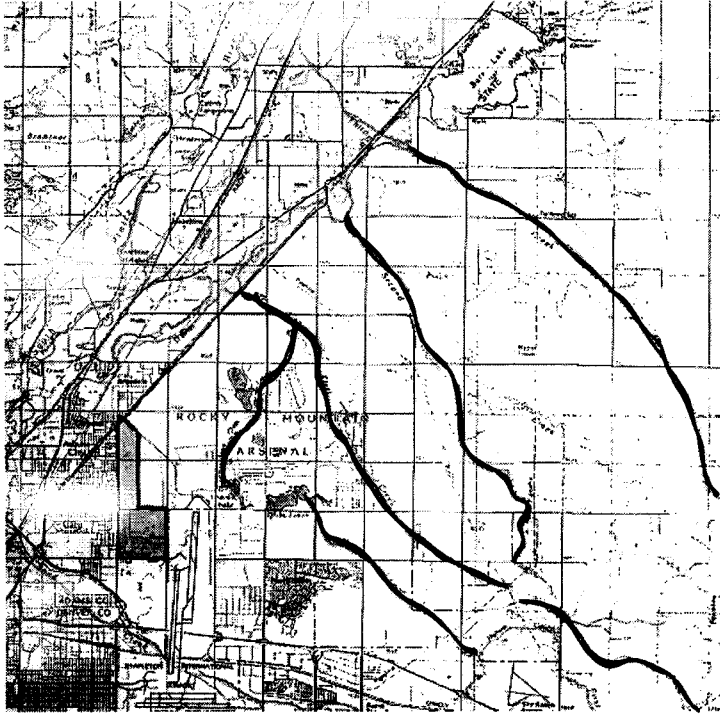


Figure 6 - Hydrology

However, increased run-off from development surrounding the Refuge may impact the drainage regime on Prairie Gateway in the future. Finally, a series of wells in section 4 are used to supplement water levels to Lake Ladora (a small constructed lake within the Refuge) and a permanent easement would be required for their continued use (USFWS 1996).

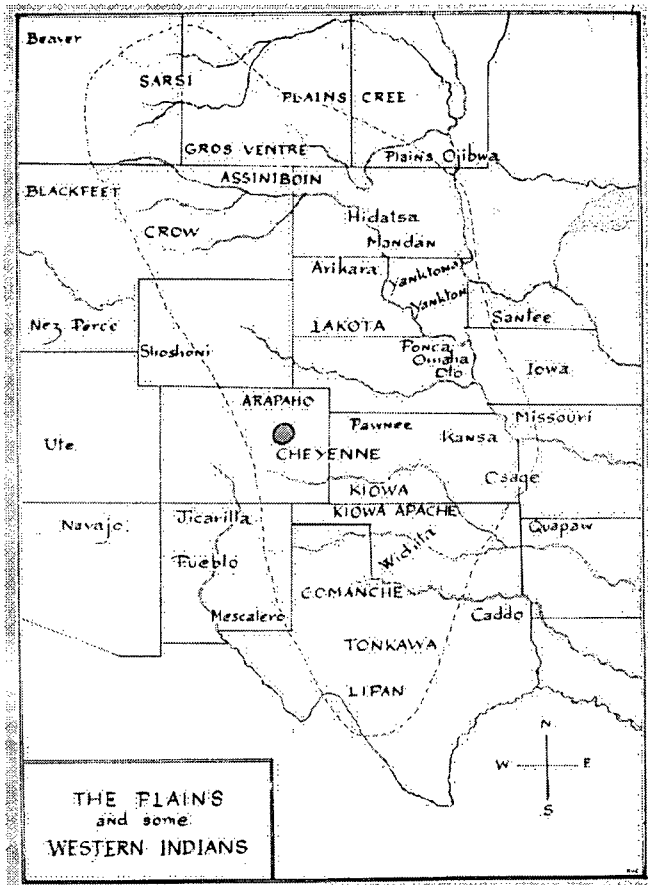
## **Cultural History**

For thousands of years, Prairie Gateway and the Refuge was home to a community of plants and animals which had evolved on the High Plains along Colorado's Front Range. Vast herds of bison roamed freely, while bands of pre-historic people moved from place to place following the availability of wild foods. Plains Indians used fire to drive game out onto the plains and John Fremont (an early explorer) described his inability to see the mountains when approaching from the east, because of the smoke of plains fires (Woodward 2000). The first nomadic people used the Prairie Gateway region from 40,000 to 12,000 B.C. and the earliest indigenous people were followed in succession by the Apache, Comanche, Ute, Arapahoe, and Northern Cheyenne tribal groups (USFWS 1996).

By the early 1800s, the latter two groups roamed along the Front Range, following the bison herds. These tribes were part of the Plains Indians who lived



on the broad expanse of open land stretching from the Saskatchewan River basin in Canada southward to the Rio Grande in Southern Texas (Figure 7)(Carlson 1998 p. 3).



Well-adapted to prairie life, these hunters on horseback made efficient use of bison, their primary game animal, yielding food, clothing and tools. Evidence of native tribes exists on the Refuge including stone flakes from spearheads and knives, fire cracked rocks used for cooking and hammer and grinding stones (USFWS 1996).

Figure 7 – Tribal Territories

By the 1820s the South Platte River, east of the front range, was a well established travel route used by trappers. It took the discovery of workable gold deposits in 1858 to spark large scale migration. The discovery of gold was important to the development of Colorado because the new arrivals created a market for farms, ranches and other consumer goods. As a result of the gold rush, as many as 100 000 individuals came to Colorado between 1858 and 1860 causing the displacement of the Native Americans living in the region (SWCA 1997). Agriculture spread slowly across the Colorado prairie to become the most important industry in the state. By the 1930's the Prairie Gateway region was the residence of approximately 200 agrarian families (USFWS 1996). One of the original homestead settlements, for example, was located within the northeast quadrant of Section 9 of Prairie Gateway (SWCA 1997).

The farm properties on future Refuge land were dotted with a variety of buildings including: houses, barns, garages, a wide variety of sheds to house animals, buildings and structures related to water (windmills, water tanks, towers, pump



houses), schools, gas stations, root cellars, chicken houses, outhouses, silos, milk houses, open water wells, bunk houses and coal sheds (SWCA Inc. 1997 p. 55). The most popular building material was wood and most farms had several frame buildings. Other materials included red fired brick, cinder block, concrete, and ceramic brick. Many of the houses on the Arsenal were constructed from several materials including frame and stone, brick and frame, brick and stone, and brick and adobe (SWCA Inc. 1997 p. 60).

Seventy percent of all properties on the Arsenal were less than 20 acres in area with 40 percent being 5 acres or smaller (SWCA Inc 1997 p. 62). Many of the smaller parcels were the types of operations in which "women's" farm work was the primary endeavour. This included raising chickens growing fruit and making honey and cream (SWCA Inc. 1997 p. 63). Early homesteaders cooked over open fires, coal or wood stoves, using sagebrush for wood. They grew vegetables such as turnips, carrots, cabbage and spinach, which require little water. Children helped out with household chores including cooking, tending garden, taking care of animals, caring for cattle, building fences and digging irrigation ditches (Jones Eddy 1992). Often, men would commute to work in Denver, while women ran the farms (SWCA Inc. 1997 p. 62). Parcels less than 80 acres could not support a family growing wheat or raising cattle but might have provided a living if truck farming or dairying occurred, activities usually engaged by men (SWCA Inc. 1997 p. 63).

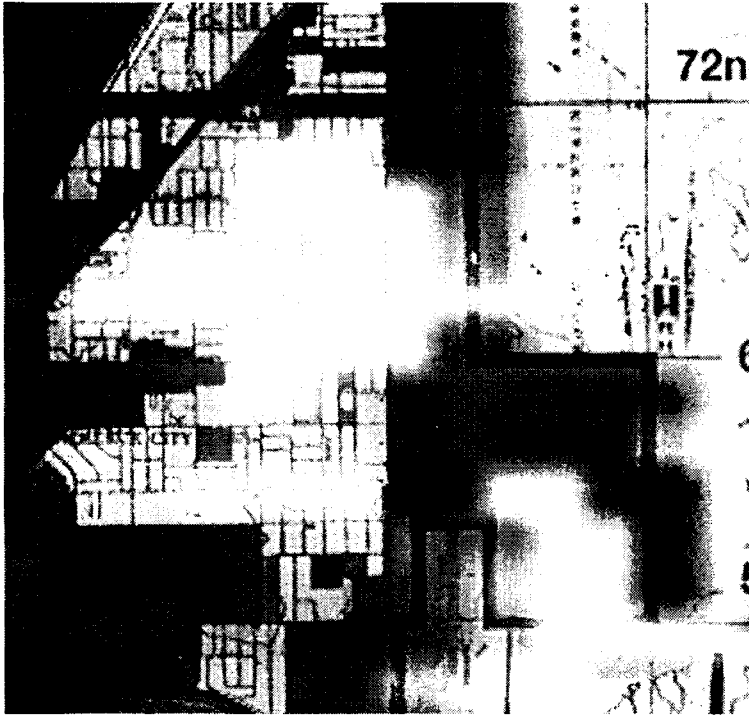
Farming and ranching families prospered until the 1890s when a severe and prolonged drought occurred. The Great Depression of the 1930s also affected agriculture until World War II. In 1942 the families living on the future Refuge property were asked to give up their homes and ranches to the federal government in order to use the site as a federal arsenal to supply armaments for the war. At this time, factories were constructed by the Army to produce chemical weapons, and were then used to produce pesticides after the war. In the 1950's, a second group of factories was built by the Army for the production of nerve gas. The property remained in the exclusive control of the US Army until 1992 when Public Law established the Rocky Mountain Arsenal National Wildlife Refuge (EDAW 2001).

During the period in which the government and chemical companies used the Rocky Mountain Arsenal for munitions manufacture and pesticide production a substantial amount of the interior portion of the Arsenal property and water resources were seriously contaminated. Investigation of the extent of the contamination led to the declaration of the Arsenal as a Super Fund site. Since the 1980's a significant amount of funding has been spent on remediating the entire Arsenal. Although Prairie Gateway was not used for munitions or pesticide production, the site has been thoroughly investigated to insure that no environmental threats exists (EDAW 2001).









# Prairie Gateway Site Analysis

## Adjacent land use



A closer look at adjacent land use in Commerce City reveals the location of several schools along the west boundary of Prairie Gateway. City Hall is located along 60<sup>th</sup> Ave., which currently does not cross into the site (Figure 8).

Figure 8 – Adjacent Land Use

-  RESIDENTIAL
-  COMMERCIAL, MIXED USE
-  INDUSTRIAL / COMMERCIAL
-  AGRICULTURE
-  OPEN SPACE
-  PUBLIC SPACE / SCHOOL

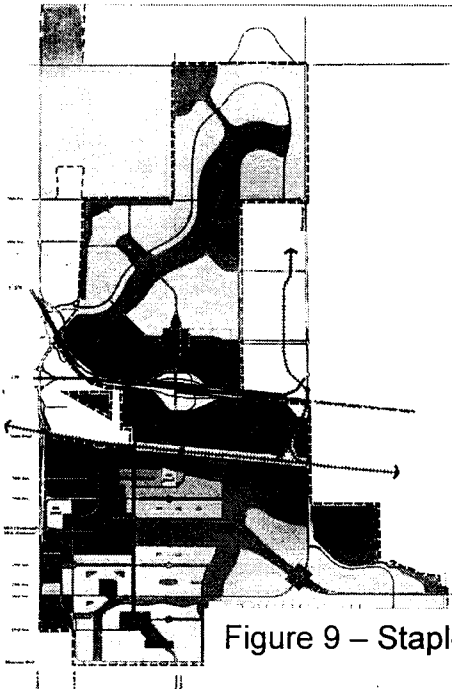


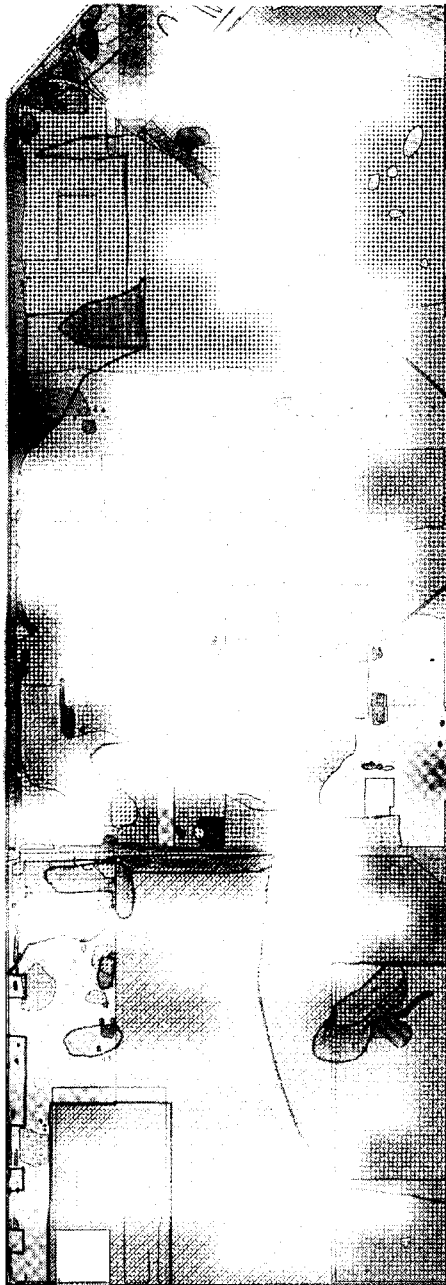
Figure 9 – Stapleton Redevelopment

Plans for the redevelopment of the former Stapleton airport show the creation of a mixed development with a series of connected open spaces and regional connections. The development is intended to accommodate 30 000-35 000 jobs over time and approximately 10 000 households. Average density for the entire site is roughly 12 units per acre, sufficient to support reasonable public transit ([www.stapletoncorp.com](http://www.stapletoncorp.com)). Essentially, Prairie Gateway will become a key recreational feature of the new development (Figure 9).



Finally, a water utility easement of 150 feet in width extends along the western boundary of the Prairie Gateway site from 56<sup>th</sup> Avenue to the South Adams Water Treatment Facility near 74<sup>th</sup> Avenue. Accessibility to this raw water line and prevention of damage will significantly constrain the type of construction that would be permitted within this easement corridor.

### Vegetation



Prairie Gateway is situated within the shortgrass prairie zone of the Great Plains of North America. Prior to intensive agriculture other prairie types also existed within the broad shortgrass prairie zone. Sandy soils were often dominated by sandhill prairie species, some riparian areas had pockets of tallgrass communities, and transition zones of mixed-grass prairie often lay between standard shortgrass prairies and other grassland types (Joern 1995). Most of the Prairie Gateway site is of the sandhills prairie type ecology. Most significantly, the site contains an approximately 40 acre tract of remnant shortgrass prairie in section 4 (Figure 10)(USFWS 1996). Much of the native vegetation was removed once dryland farming was introduced and was followed by the invasion of many non-native plant species.

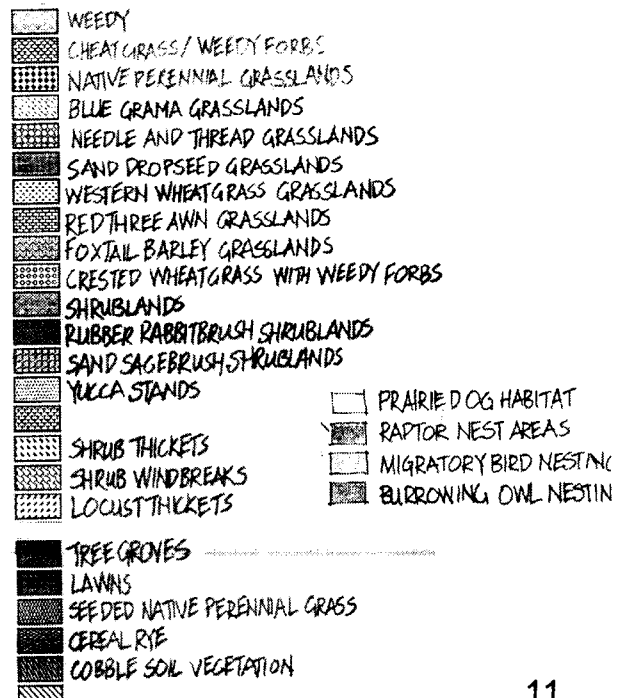


Figure 10 – Vegetation and Summer Habitat Use

## Vegetation Types (Figure 10)

The following list provides a brief explanation of the most common vegetation types found at Prairie Gateway:

### **Blue grama grassland (*Bouteloua gracilis*)**

This grassland type is found in drier plains where loamy soils dominate. Native Blue grama "heals" disturbed sites and is seen as a resilient plant able to recover from extreme overgrazing, plowing and drought (Butala 2000).

### **Cheatgrass (*Bromus tectorum*) and Weedy Forbs**

Cheatgrass is an exotic annual and represents about two thirds of the plant cover in this type. It is a winter annual capable of germinating in the fall. After the snow melts, overgrazed pastures turn green with these annuals, and set seed earlier than competitors. The pasture turns yellow when seeds have matured and plants have died. This drought avoiding opportunist was introduced to stop soil erosion, re-establish fodder, restore vegetation cover in areas that have been ploughed or over-grazed. Principle weedy forbs include field bindweed, musk thistle and prickly lettuce (USFWS 1996 p. 24).

### **Crested wheatgrass (*Agropyron cristatum*)**

This grass of Eurasian in origin is especially widespread throughout the northern half of the High Plains and is highly valued as cattle fodder and as a soil binder. Prone to colonize nearby disturbed places it is rarely superseded by mixed native vegetation once introduced (Bock and Bock cited in Joern 1995 p. 213). This grass also mines soil of nutrients especially nitrogen while native grasses replace nitrogen (Butala 2000, p. 76).

### **Disturbed**

This area likely contains weedy forbs, established following land disturbing activity and may be perpetuated by prairie dogs that selectively graze perennial grasses. Common species include cheatgrass, bindweed, prickly lettuce and tansy mustard among other annual and biennial forbs (USFWS 1996 p. 24).

### **Locust thicket (*Robinia neomexicana*)**

In the RMWR early ranchers likely planted the New Mexico locust around their homes and outbuildings to block harsh snow laden winds. Over the fifty years following the take-over of the farms as part of the arsenal development, the locusts have expanded to from dense thickets and now provide excellent cover for wildlife species (Woodward 2000).

### **Native Perennial Grassland**

This type is a remnant of the original grasslands that have survived or escaped disturbance from farming, grazing and industrial activities.



**Needle and Threat grassland (*Stipa comata*)**

Native grass found on coarser textured soil, including sandy wind deposited soils.

**Red three-awn grassland (*Aristida oligantha*)**

Native grass found on coarser textured soil.

**Rubber rabbitbrush shrublands (*Chrysothamnus nauseosus*)**

This perennial shrub grows 20-40 inches high on dry prairie. It is likely that these areas were established as a result of overgrazing. Rabbitbrush is not a high quality food source for wildlife except its yellow flower tops may be lightly grazed in the late fall (USFWS 1996 p. 25).

**Sand dropseed grassland (*Sporobolus cryptandrus*)**

This grass is native over much of the US, emerging from spring to autumn. It is found on sandy wind deposited soils and its productivity increases with burning (Joern 1995 p. 65).

**Sand sagebrush shrubland (*Artemisia sp.*)**

This plant occurs on sandy upland sites in areas that possibly escaped ploughing due to the unsuitability of the soils for farming (USFWS 1996 p. 25).

**Shrub thicket**

Many of these shrubs were planted as windbreaks. Species include Rocky Mountain Juniper, green ash, and Russian Olive (USFWS 1996 p. 26).

**Tree grove**

The majority of trees on site were planted near homesteads as windbreaks. Common species include Siberian and American Elm and Cottonwoods (USFWS 1996 p. 26). Generally native species are found along drainage corridors, while non-native trees are found near homestead sites.

**Western wheatgrass (*Agropyron smithii*)**

Native grass found on finer textured soil.

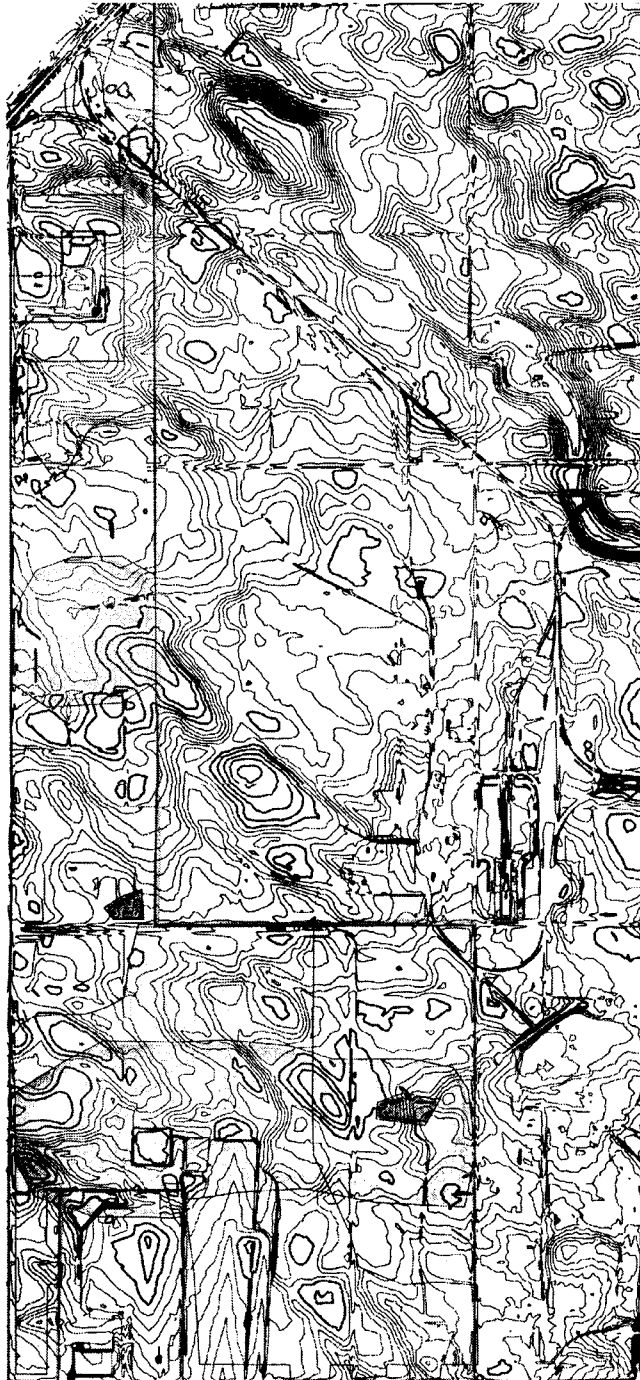
**Yucca stand (*Yucca glauca*)**

Yuccas occur in association with mixed grassland vegetation, usually on south facing slopes in dry conditions. They are usually found in upland prairies, plains, sandy blowouts (Kindscher 1987).



### **Habitat and Wildlife**

The Rocky Mountain National Wildlife Refuge provides important habitat for more than 300 wildlife species. During the Spring, Summer and Fall seasons Prairie Gateway provides habitat for Burrowing Owls, raptors, Black-Tailed Prairie Dogs, and migratory birds including flickers, kingbirds, robins, grackles, orioles and a variety of warblers (Figure 10).



During winter months the Refuge offers critical habitat for Bald Eagles and other threatened raptors. Numerous trees located within Prairie Gateway provide roosting sites for eagles, and Ferruginous Hawks. The Prairie Dog colonies provide critically important prey species for these raptors (Figure 11).

In addition, there are currently about 540 mule deer and 200 white-tailed deer on the Refuge which feed on shrubs, leafy plants and grasses. During the day, they are commonly spotted in wooded areas along streams and irrigation ditches. Historically the Refuge also provided habitat for bison and pronghorn antelope (USFWS 1996).

- PRAIRIE DOG COLONIES
- HAWK ROOSTING SITES
- ▨ EAGLE ROOSTING
- DEPRESSION

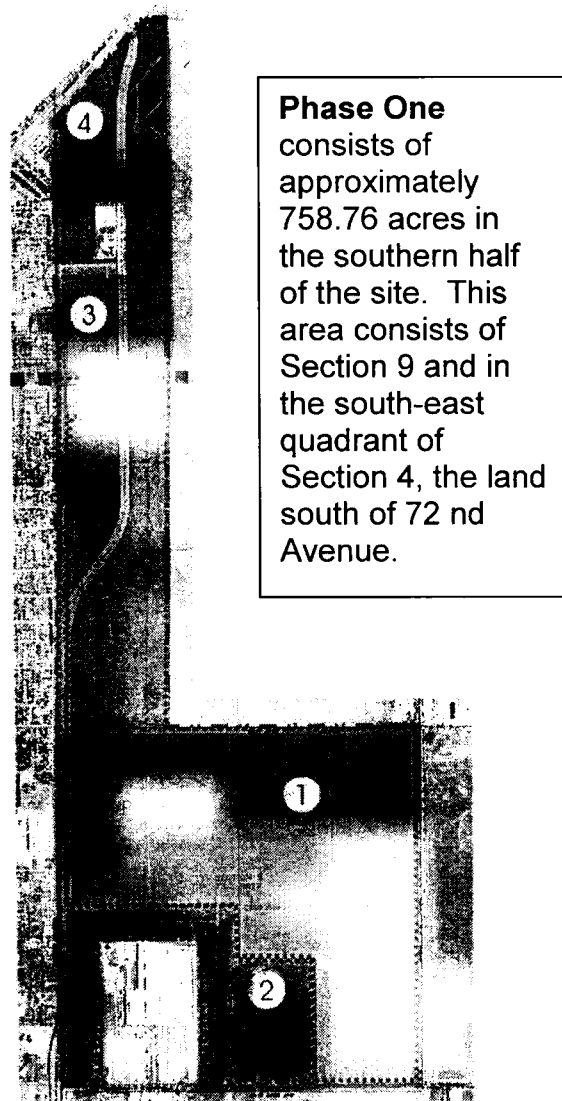
Figure 11 – Topography and Winter Habitat

### **Topography and Soils**

Surface topography on the refuge resulted from river and stream erosion associated with the South Platte River and its tributaries. The land shape varies from almost level to gently rolling with slopes typically less than 3 percent and terrace escarpments with slopes up to 8 percent (Figure 11). Bresser, the most common soil series on site occurs on sandy wind deposited plains. Truckton loamy sand and Ascalon sandy loam are two of the other coarse soils found on site (USFWS 1996).

### **Development Zones**

Two phases and four development zones were outlined for Prairie Gateway in the EDAW report (Figure 12).



**Phase One** consists of approximately 758.76 acres in the southern half of the site. This area consists of Section 9 and in the south-east quadrant of Section 4, the land south of 72 nd Avenue.

**Zone 1** - (593.37 ac.) - Land use consists of the visitor and education centres, compatible business uses and essential support infrastructure. Open space would be preserved to enhance both recreation, ecological and economic value.

**Zone 2** - (165.39 ac.) consists of either disturbed lands or non critical habitat that have excellent frontage for commercial facilities or lands that may serve as a buffer or transitional zone between the commercial development and the wildlife refuge. This area could potentially contain a community park.

**Zone 3** - (92.39) Currently, this zone is dominated by the South Adams County Water Treatment facility. Since this area is in close proximity to residential communities within Commerce City, in the future this location could be used for municipal recreation.

**Zone 4** - (77.06 ac.) is designated for primarily office and retail commercial activities.

Figure 12



## Preliminary Development Strategy

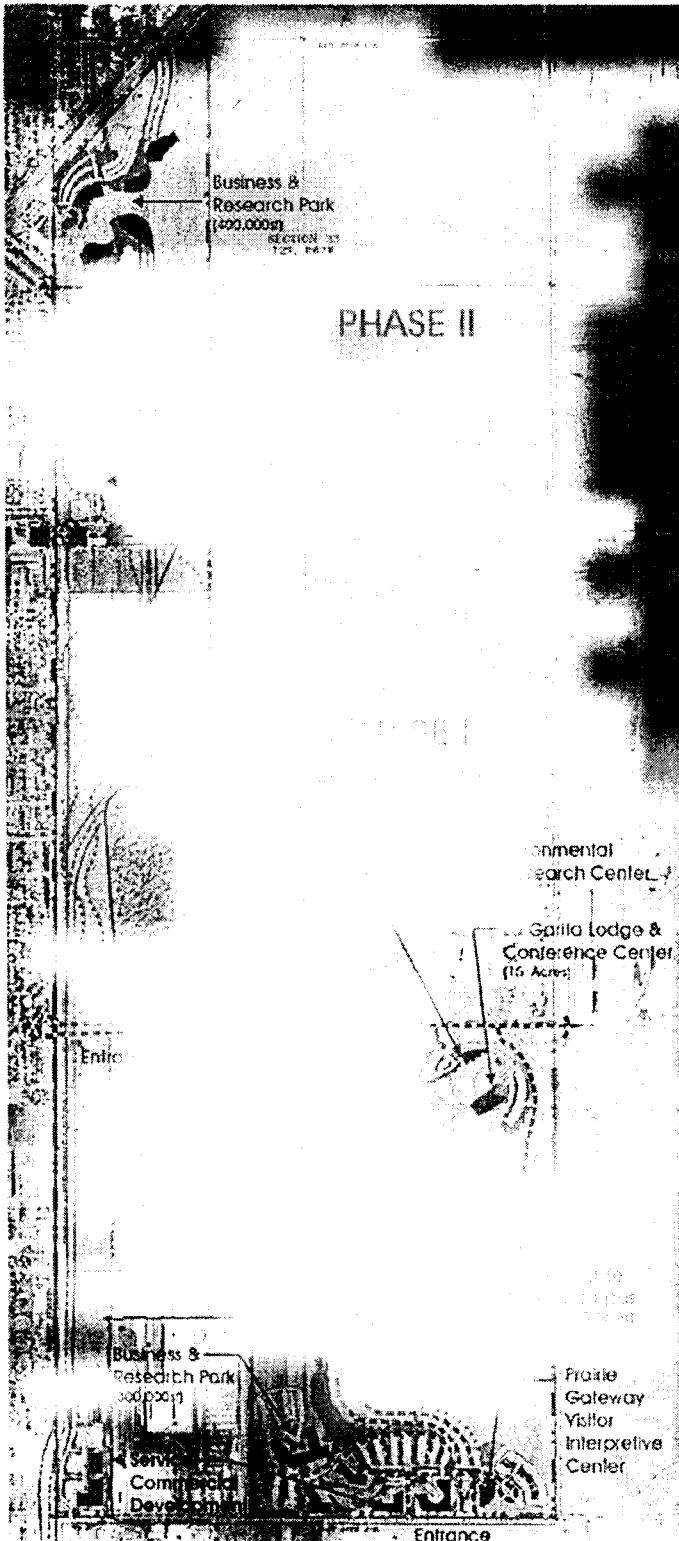


Figure 13

Figure 13 shows a preliminary site plan for Prairie Gateway designed by the EDAW consulting team. Spatially, the site references the notion of the “Bighorn Medicine Wheel”, a recurring Native American symbol. Program components of the plan include: “La Garita Lodge and Conference Centre, High Plains Environmental Education and Research Centre, Prairie Gateway Visitor’s Centre, a business and research park, service and commercial development, and a community park. It should be noted that the main entry to Prairie Gateway is located along the south edge of the site.



## **The Prairie Experience**

The following section outlines human connections with prairie landscapes from a variety of perspectives derived from art, prose and psychology literature. Many of these ideas relate directly to the Prairie Gateway site design in addition to the site analysis information presented in preceding sections.

### ***Perception of Prairie Grasslands***

#### **Stage 1. Native Americans**

Early human inhabitants of the prairies left no physical records of their perceptions of grassland. Their interest was in grasslands not *grasses*. Pre-contact natives had a strong sense of managing the land to enhance the game harvest. They had a profound holistic "circle aesthetic" which encompassed the interrelationship of plants, animals and people and a concern for the management of relationships among the whole (Joern 1995). The tribes divided the sacred powers that construct the grassland into earth and heaven, female and male.

For all Plains Indians, the cardinal points on a compass and the circle were sacred. The circle, often represented by a stone medicine wheel, represents natural harmony, the essence of unity, and wholeness. Life was symbolised by a series of concentric circles- home, extended family, and the infinite. On a more literal level, the prairie provided a circular field of vision since all points appear equally distant on the plains (Rajotte 1998).

#### **Stage 2. Coronado Spanish stage**

The European experience during the 1500s of the prairie landscape can be understood through the renaissance eyes of the Spanish explorers. Castaneda writes about his interest in the tracklessness and durability of the grasslands. He notices that large group of Indians "left no more trace when they go through than if no one had passed over the plains." He reflects on the need to mark the plains with landmarks and also describes the great herds of bison that were so huge that no one could count them. Coronado, another Spaniard developed the love of open ranges and described the grasslands as an ocean. The explorers noted the difficulty in estimating the distance of objects seen on the plains - small animals sometimes appear giant and any object with which the eye is unacquainted usually appears much enlarged. Often the explorers noted how inaccurate ideas were formed in terms of the magnitude and distance of surrounding objects and landforms (Thacker 1989 p. 43).

#### **Stage 3. The Northern Euro-Americans (18<sup>th</sup>/19<sup>th</sup> century)**

After 1803 when the Louisiana Purchase was signed with France, large numbers of Americans, particularly fur trappers and traders began entering the region in



search of furs. Travellers questing for the scenic and the picturesque also ventured out into the prairie landscape. Lewis and Clark were the first Americans to express their perception of grasslands in terms of taxonomy as well as address the myth of the picturesque. "Nature appears to have exerted herself to beautify the scenery by the variety of flowers delicately and highly flavoured raised above the grass which strikes and perfumes the sensation, and amuses the mind..." (Clark in Olson 1995 p. 32). They perceived the plains as an unattended garden, awaiting the appearance of Europeans to cultivate the land, grow timber for building and impose a European based regimen (Olson 1995 p. 32).

Landscape painter Albert Bierstadt (1850s-1870s) painted the plains as picturesque, capturing the "romantic sense of divinity in the landscape." His paintings show the plains reaching out into indefinite space, with the light showing the "presense of divinity." His painting, *The Overland Trail* (1871) shows a covered wagon moving into a 'sublime' sunset, showing the journey to the west as both a physical and religious journey. Divinity is distant, not near at hand like in the Indian belief system (Olson 1995 p. 33).

#### **Stage 4. Settlement**

This era (19<sup>th</sup> and early 20<sup>th</sup> century) is about the grassland turning into a "garden and seascape." The seascape reflects a sense of estrangement, a desire to assimilate the new experience of vastness and emptiness to the actual seascape known in Europe. Settlers and farmers described the natural garden as grassland properly converted to domesticated agriculture. The garden myth implies the promised land because of the area's apparent suitability for domestic agriculture. "The untamed garden of the prairie appears as a fallen Eden, Eden returns when domestic agriculture comes" (Olson 1995 p. 37).

Later writers describe the prairie as a land "notable primarily for its weather which is violent and prolonged, its emptiness which is almost frighteningly total and its wind which blows all the time in a way to stiffen your hair and rattle the eyes in your head...[but]...for over the segmented circle of earth is domed the biggest sky anywhere which sheds down on range and wheat and summer fallow a light to set a painter wild...a light pure, glareless and transparent" (Wallace Stegner in Thacker 1989). Sir Francis Butler writes, "the prairie offers a view so vast that endless space seems for once to find embodiment and at a single glance the eye is satiated with immensity...No ocean of water in the world can vie with its gorgeous sunsets, no solitude can equal the loneliness of the night shadowed prairie; one feels the stillness, and hears the silence, the wail of the prowling wolf makes the voice of solitude audible" (in Thacker 1989 p. 52). Prairie dwellers also talk about the intimacy of the small space, hiding in prairie grasses, as well as exploring hidden ditches and wallows. "In landscape with no topographical shapes and that consists of earth sky, space, light air reduced to simplest elements and baldest features...in this severe austerity, the grasses,



flowers and shrubs claim our attention, attract the eye and assert individual charms" (Thacker 1989).

### **Stage 5. Westering**

"Westering," a late 20<sup>th</sup> century term, is the popular movement of people toward areas where more land, and more sense of home is possible (Woodward 2000). "The image of the west as a new country where one might embark upon a new life has persisted as a powerful attraction...where there is freedom to move the process is practically as automatic as that which inclines a plant toward sunshine," (Davidson and Rees 1991 in Woodward 2000). As an example, 100-000 Californians have moved to the Denver area in the past 10 years and have "left behind an oasis civilisation propped up by Colorado River." Many are searching for access to landscape, trails, parks, nearby nature, accessible views reaching the horizon, early light and cloudless mornings. They long for "authenticity in the plains"- clues of places that have not been sanitized or gentrified, such as old homestead buildings and persistent vegetation surviving long after buildings have been removed (Woodward 2000 p. 6).

### **Connection to Landscape**

"Anything is right when it tends to preserve the integrity, stability and beauty of the biotic community. It is wrong when it tends otherwise" (Leopold 1949 in Woodward 2000). Personal and landscape interactions are the most significant part of an ecological aesthetic and one must experience landscape as an active participant, relating to it as a living entity rather than watching it passively. Consequently, readily available and frequently used urban natural areas probably contribute more psychologically deep, nature based experiences to the lives of citizenry than any other natural area (Bacon in Driver et al 1999). As a result, Prairie Gateway should be designed to provide an accessible, sustainable and ecologically sound nature experience for its urban neighbours.

The colours of the prairie, the browns, reds, umbers, ochres, sepias and warm greys play a key role in the prairie experience and "to appreciate the west means to get over the colour green" (Wallace Stegner in Woodward 2000). To enhance the 'sense of place' of Prairie Gateway, it is important to emphasise the local and natural visual cues of the prairie in the design. In terms of sound, a sense of mystery is created when the acoustical space exceeds the visual space. A sense of remoteness or isolation created by shielding from external sites or sounds can be considered a nature dominant experience (Bacon in Driver et al 1999). With Prairie Gateway's location adjacent to a major urban corridor, it is especially important to shield certain views to help enhance the prairie experience. Essentially the design for Prairie Gateway should integrate these notions of the "senses" to maximise the impact of this small prairie landscape.



## Design Precedents

### ***Big Sky-Texas (Kevin Sloan and Max Levy)***

Big Sky is a plan for a residential development project on 1000 acres of the Texas prairie, near Dallas/Fort Worth. The design was intended to work in concert with the sweeping prairie, the open sky, and the experience of the horizon.

Some of the design concepts in the development include:

- Unbuilt land visually becomes part of the prairie
- Fifty feet between properties ensures that the prairie remains a vivid point of reference in every direction
- Homesites are situated to not block horizon views from neighbours
- Trails are changed to keep beaten down paths from emerging.
- Long driveways function as “moorings” growing out of tradition of likening prairie to ocean.
- Building guidelines include simple <sup>two</sup> elemental building forms set at right angles, with heights not exceeding 2 stories
- Breezeways lighten the imprints of buildings and allow for views through and around farm buildings
- Exterior materials are inspired by the silvery grey colour of sky meeting horizon. Unpainted, corrugated galvanized sheet metal is used for its ability to reflect the changing colour and light of sky.
- Seeing through houses, buildings and fences emphasises the openness of prairie
- Grass “laps” over the edge of gravel entry roads (Germany, 1999).

### ***Neal Smith Wildlife Refuge and Prairie Learning Centre-Des Moines Iowa***

This 15 square mile national wildlife refuge is located 20 miles east of Des Moines Iowa and is being designed with the goal of restoring the prairie landscape before European settlement. The emphasis is on research and prairie recovery, and innovative environmental education.

Most of the site was agricultural land used for corn, soybean and cattle.

Some of the relevant design and restoration elements include:

- Three and one half miles of road have been removed, and agricultural drainage tiles have been plugged or broken. Some drainage ditches have been bulldozed and recontoured to look more natural.
- Burns to help grassland recovery are being planned.
- The entry road immerses visitors into the prairie through its siting below hilltops and hugging contours.
- Buildings are located within rolling ridges with an emphasis on horizontality and broad views.
- Floor to ceiling windows show a full view of the tall grass prairie.
- Roof steps blend with landforms.



- Plantings are low and long, and interpretive stations are low and unobtrusive to the visitor's visual experience.
- The visitor's centre includes a constructed wetland for wastewater treatment, geothermal energy, and recycled materials for insulation.
- Educational programs instil an appreciation and understanding of native ecosystems, encourage participation in seed collection and stewardship projects of prairie remnants off site, and finally promote the creation of prairie gardens at home.
- Trails on site include 4 hiking trails, 2 through tallgrass prairie (2 mi) each with exhibits at the beginning and along all trails (White 1999).

## Design Principles

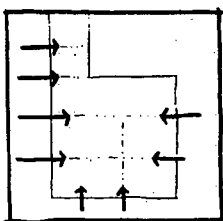
The overlay analysis and review of phenomenological interpretation of prairie has lead to the development of a series of design principles addressing various aspects of the Prairie Gateway design-spatial, design detail, and program components. These principles are the "building blocks" of the design and recur throughout at a variety of scales from the planning level to the detailed design scale.

### *Spatial Design Principles*

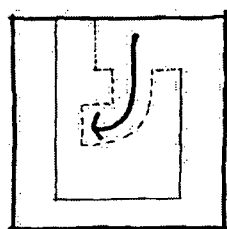
The organisation and "spatial logic" of the design are based on the concept of *connection*- connection to community, connection to history, and connection to prairie experience. Since the site has been fenced off from the community for over 50 years, a key aspect of the design is reintegrating the refuge and Prairie Gateway into the collective consciousness of adjacent communities.

#### Connection to Community

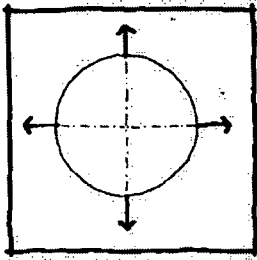
In terms of connection to community, three design principles address this concept.



The first is "knitting together the urban fabric". This principle entails the re-establishment of cross connections across the site. Connections between Commerce City and the new Stapleton development, between local schools and the prairie preserve, between City Hall and Prairie Gateway, and between adjacent Commerce City residents and trails leading out into the 27 square mile prairie preserve (Figure 14).



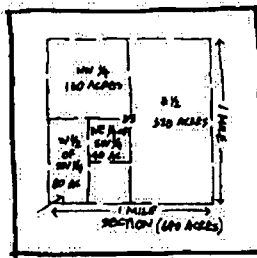
The second principle is about "bringing the prairie in". This entails removing fences and allowing the prairie landscape to physically reconnect with the community. By moving the 7 foot chain link fence that currently surrounds the refuge, visitors will get a better sense of crossing into the prairie and being surrounded by the recovering landscape and abundant wildlife (Figure 15).



The third principle relates to the Native American notion of the sacred or “healing circle.” The circle represents the interconnection of all aspects of nature and humans and is reflected in a variety of symbols in tribal culture. Campsites, ceremonies and festivals of the Arapaho, Cheyenne and Ute Indians were organised around the circle pattern. The recovery and restoration of the Prairie Gateway and wildlife refuge is reflected in this principle of the healing circle (Figure 16).

### Connection to History

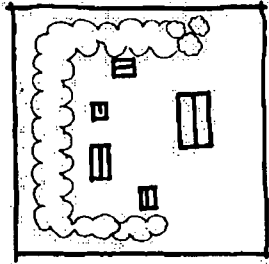
A key aspect of the Prairie Gateway design is the connection to history, especially to the farming history of the prairie over the past 100 years. The homestead history of the Great Plains is important in terms of understanding the present patterns of urbanisation and development surrounding the Prairie Gateway. A series of principles of spatial patterns relating to the homestead experience help to further define a sense of place and unique character in the Prairie Gateway design.



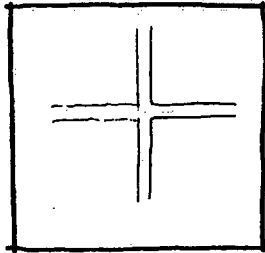
The first principle relates to the “divided and measured landscape” (Figure 17). This concept refers to the superimposition of the grid landscape on the American West by the land surveyors of the National Land Survey in the late 1800s. To regulate the sale of land, a system of division was organised around 36 square mile townships, defined by a square 6 miles by 6 miles. These in turn were divided into 1 square mile sections. To make smaller parcels available to more people, sections were divided; first into half sections, then quarter sections, half quarter and quarter quarters (40 acres)(Corner, p. 31).

Today, tree plantings, fence rows and other clues hint at the homestead patterns that existed on the Prairie Gateway site over 50 years ago. The principle of the divided and measured landscape attempts to explore these land patterns and interpret the idea of the measured landscape to current day site visitors. This principle is intended to enrich the design in terms of helping people understand why their “place” is organised the way it is.

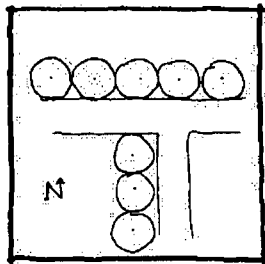




Another key connection to history is through the principle of the “homestead compound” (Figure 18). This principle reflects the pattern of the sheltered yard, the rectilinear organisation of outbuildings, the relationship of house to road and homestead compound to the expansive prairie beyond. The southern exposure of the house was usually shaded by cottonwoods, blue spruce seedlings were planted to buffer winter winds as windscreen on north side, and plants such as lilacs, were settler’s links to their past homes (Woodward 2000).



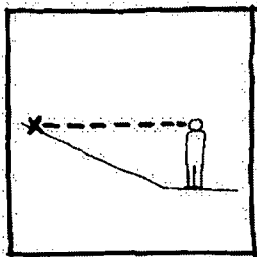
The “rectilinear pattern of roads, fields and edges” reflect the divided and measured landscape of the National Land Survey. This principle is reflected in the Prairie Gateway design in terms of road design along previous trails and roads, as well as in terms of creating edges between the various program components (Figure 19).



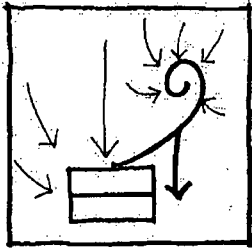
The principle of “protective hedgerows” reflects the spatial and functional aspects of the protective windbreaks that were planted by settlers generally along northern edges to shelter homesteads from the prevailing north winds. This principle is reflected in roadside planting concepts and site specific areas in terms of wind protection and shade on the Prairie Gateway site (Figure 20). Planting of a large tree on the south east corner of the home site was a common practice of settlers to protect and shade the building.

### Connection to Prairie

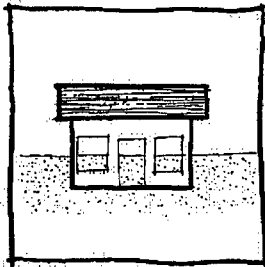
The principles related to connection to prairie attempt to address the experiential or phenomenological characteristics of the prairie grasslands that are key in helping to create a direct experience between people and the landscape. These principles help to emphasise both the grand and small scale details unique to the prairie landscape—from big sky to subtle textures and colours in the grasses and forbs.



The first principle of “blocked views of development” is intended to help immerse the visitor in the prairie experience and buffer the distractions of buildings, industry and traffic. Through the creation of berms and depressions in the landscape, many of the designed outdoor spaces in various areas allow visitors to better focus on the prairie experience, rather than on the urbanising edges of the Prairie Gateway site (Figure 21).

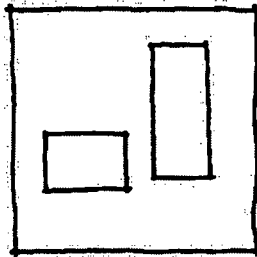


In addition to blocking views of development, the principle of “the prairie surrounds” (Figure 22) emphasises the notion of being immersed in the prairie landscape. Design examples include a depressed grassland bowl, or a prairie patio sunken several feet to allow for a more intimate experience of the immediate prairie.

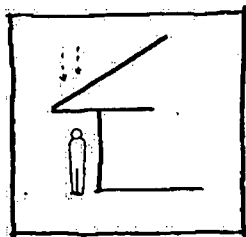


This principle, “transparency to horizon” (Figure 23) describes the notion of maximising for views out to the horizon. Buildings are oriented to allow for views out to the prairie, breezeways and large windows create a sense of transparency, which helps to emphasise the sky/horizon quality of the open prairie. The overall effect of Prairie Gateway is to emphasise the landscape and de-emphasise the built form.

### ***Design Detail Principles***



In addition to spatial design logic, a series of design detail principles help to order the Prairie Gateway design at a more refined scale. “Simple elemental forms,” reflecting the functional and practical aspects of living in the prairie climate are used in structures, fencing and other built components. The key idea is emphasising the texture and colour of materials while minimising ornamentation and superfluous detail. Built forms are intended to highlight the prairie, and should blend together with the prairie palette (Figure 24).



One feature of traditional prairie architecture is the “overhanging roof”. This feature protects from wind, sun and rain. The veranda or porch are typically found in farmhouse/barn architecture and are featured in the Prairie Gateway design (Figure 25).

The use of traditional materials from the homestead era is a key principle in the detailed design of Prairie Gateway. Materials such as corrugated metal, local stone, brick, wooden planks and trusses used in a contemporary design style echo the past, while at the same time reflect the new integration of prairie with the modern city (Figure 26).



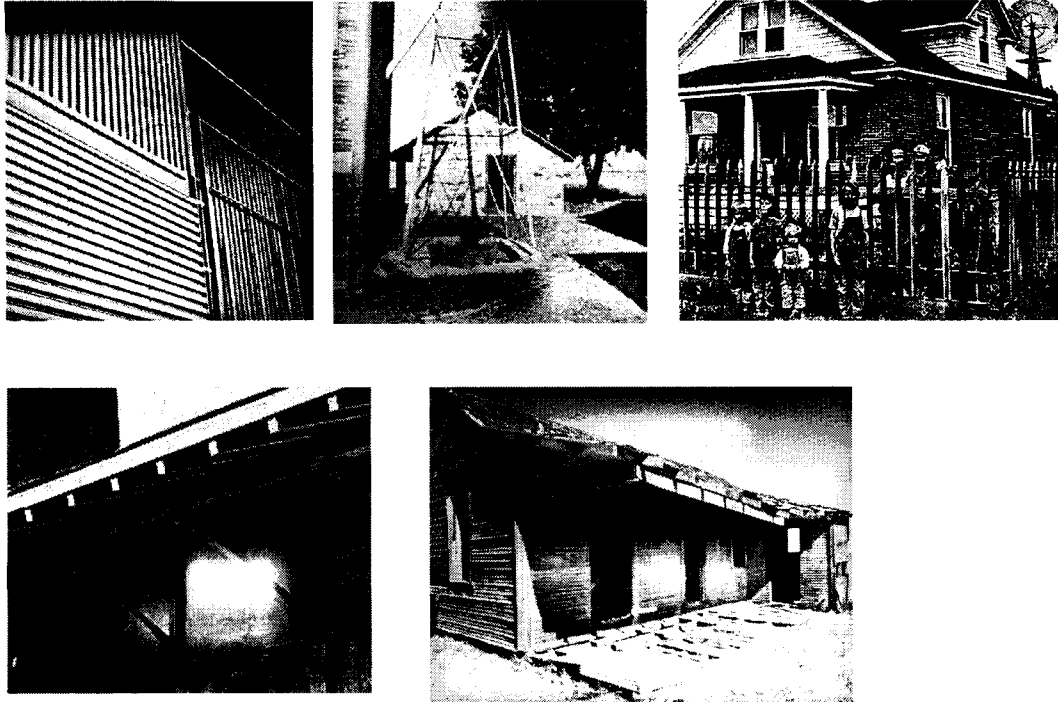


Figure 26 – Material Palette

Plantings of Cottonwoods, rabbitbrush and prairie grasses emphasise the use of native plants and the ornamental qualities of local and site appropriate plant material (Figure 27).

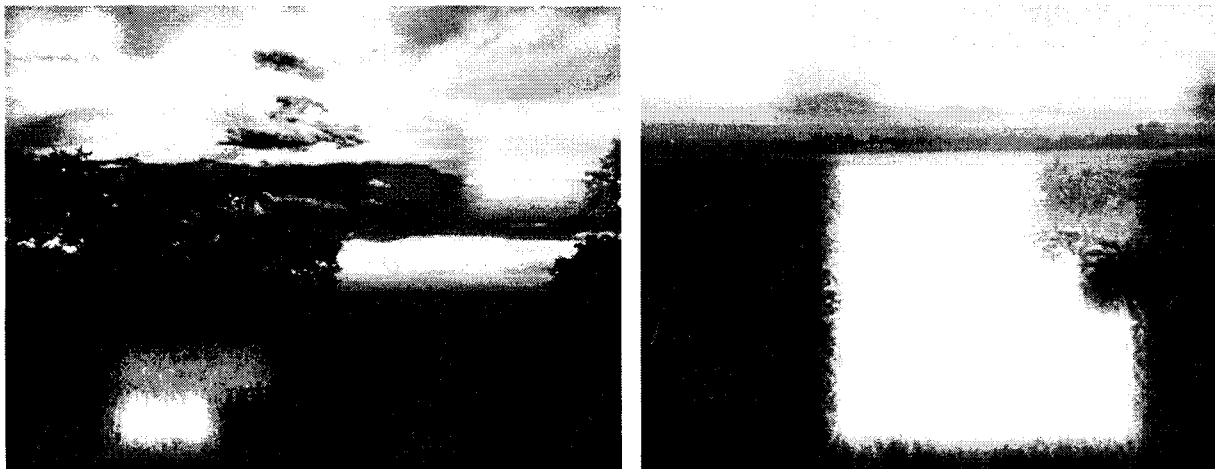


Figure 27 – Vegetation Palette

## Program Principles

The Prairie Gateway design is based on several general program principles.



Figure 28 shows the Crysler's farm, which was taken over by the Army Arsenal in 1942.

The first, "the working landscape" is intended to demonstrate to visitors how the prairie landscape has been used for centuries from the native Americans to the homestead settlers. In the design for the Homestead Lodge, for example, a large vegetable garden provides most of the produce required by the kitchen. The garden also provides visitors with an accessible, hands-on opportunity to participate in working the land and understanding the connections between land and community.

The design for the Prairie Gateway is also based on the concept of sustainable systems- in terms of water, waste and energy. This means that all facilities incorporate solar aquatic systems for treating wastewater. Composting toilets, as well as swales and retention areas handle stormwater. Road surfaces are permeable where possible, minimal paving is used and non-motorised circulation is emphasised. Solar and passive heating/cooling is incorporated into all designs (Figure 29).

The third program principle is that Prairie Gateway is an "interpretive and recreational landscape" (Figure 30). This means that trails provide connections for cyclists, pedestrians to circulate through the site and connect with other local and regional greenways. Essentially, Prairie Gateway is intended to provide people with an opportunity to easily explore the adjacent prairie in terms of wildlife viewing, recreation and understanding both cultural and natural processes of the area.

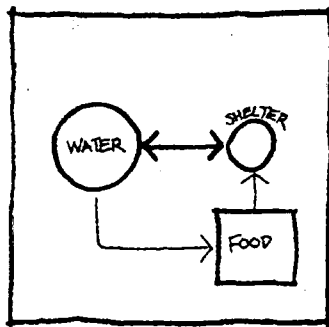


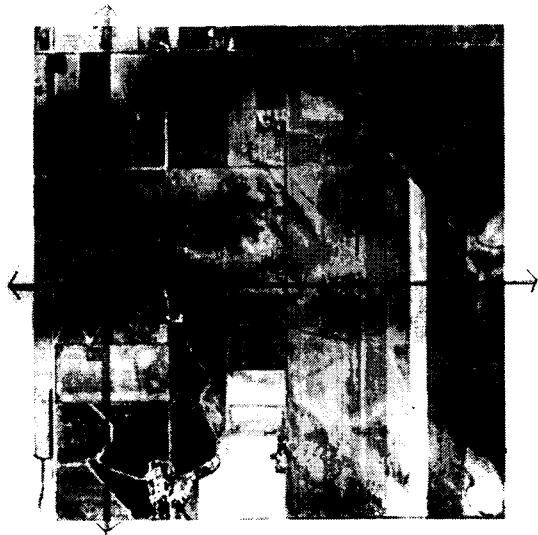
Figure 29 – Sustainable System



Figure 30 - Recreation



## Design Concept



The overall design concept for Prairie Gateway is illustrated in Figure 31 and is based on 3 key spatial principles. “Knitting together the urban fabric”, “bringing the prairie in” and “divided and measured landscape”. The design focuses on section 9- the one square mile of the Prairie Gateway site. The remainder of the site (the north arm) is designated as a prairie preserve to be used for passive recreation and wildlife study.

Figure 31- Design Concept on 1937 air photo

- |  |                    |  |                 |
|--|--------------------|--|-----------------|
|  | COMMERCIAL         |  | CIVIC PARK      |
|  | EDUCATIONAL CENTRE |  | HOMESTEAD LODGE |
|  | VISITOR CENTRE     |  | BUSINESS        |
|  | GREENWAY TRAIL     |  | OLD HOMESTEAD   |

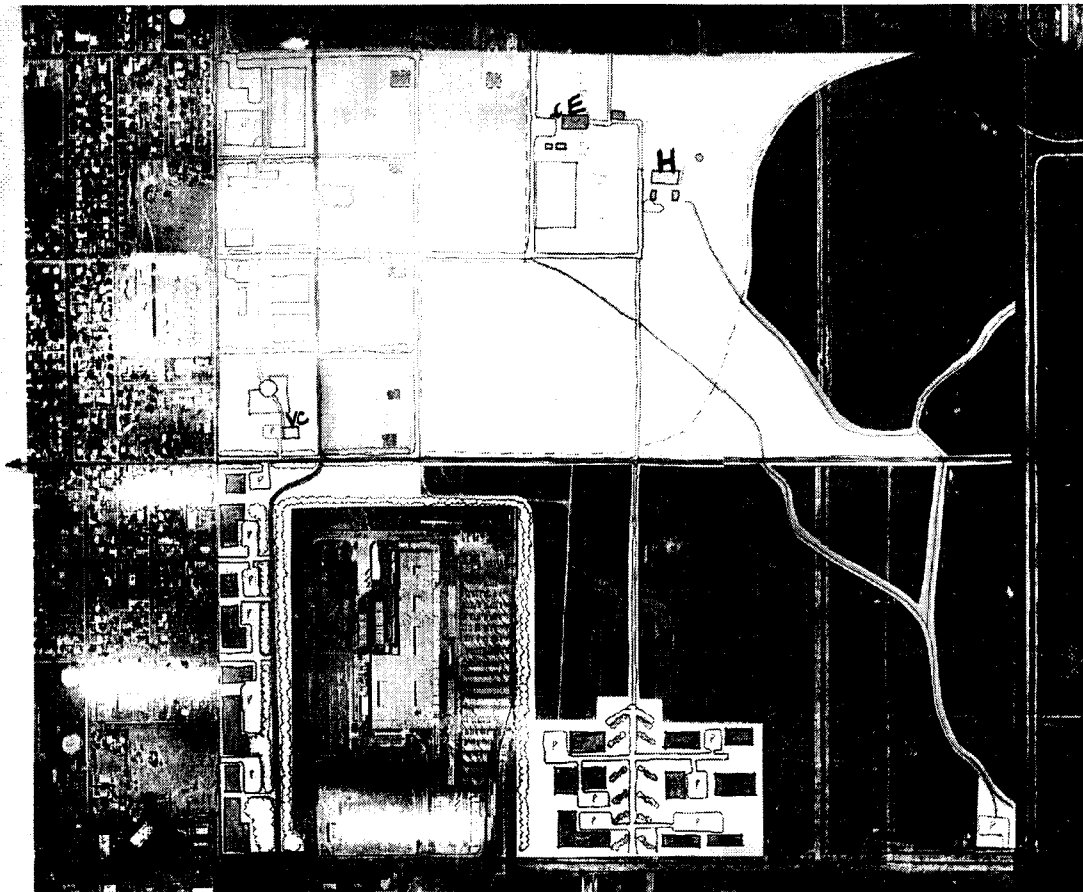
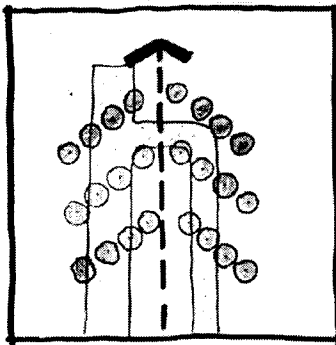


Figure 32 – Zoning and Concept Site Plan

### ***Circulation and Edges***

In terms of “knitting together the urban fabric”, major access points are located at central nodes along each edge of the site through greenways, trailheads, or road access. A key feature of the site design is the entrance to Prairie Gateway. The main entry is accessed at the terminus of East 60<sup>th</sup> Avenue which creates a physical and cognitive connection between the Commerce City - City Hall and the Prairie Gateway property. Since Commerce City intends for Prairie Gateway to be a key feature of the community, it is important for the entry to connect the two areas. This entry axis also lies along the quarter section division line of the square mile and provides a pedestrian linkage between Commerce City and the future Stapleton development east of Prairie Gateway (Figure 31). The north south greenway trail forms part of the regional network of trails and is part of the perimeter trail of the wildlife refuge.

Other features include the dike trails connecting the south east corner of the site to the regional trail system. The south east corner is the “highest point” topographically on the site and functions as an orientation point for visitors arriving from the airport. A trail head with introductory signage and a parking area welcome visitors to Prairie Gateway. Signage indicates the location of the visitor’s centre and entry points to the wildlife refuge. The dike trails are aligned adjacent to historic drainage ditches and signage explains the importance of water in the dry prairie landscape.



The runway concept (Figure 33) references a former runway from the old Stapleton airport. This road with plantings suggesting a chevron pattern leads the eye beyond the paved portion out into the prairie landscape. A parking area and interpretive signage functions as a trailhead connecting the business park, Stapleton and Prairie Gateway to the wildlife refuge beyond.

### ***Site Structure***

The principle of “bringing the prairie in” is illustrated in Figure 15. Fencing between the refuge and Prairie Gateway is oriented to allow for free access of wildlife into the heart of the site. Visitors also pass out into the refuge landscape from the educational centre or homestead lodge without crossing through a physical barrier. By “bringing the prairie in” the physical and cognitive connection between Commerce City and the wildlife refuge is further strengthened.

Figure 31 is an historic air photo from 1937. The pattern of “divided and measured landscape” is clearly visible in terms of the homestead sites. This

pattern is referenced in the proposed site design in terms of spatial layout, road siting and planting design.

### ***Zoning and Program***

Figure 32 illustrates the different program areas of the site. The following acreages are based on program options suggested in the EDAW feasibility report: 120 acres for a civic park and sports complex, 20 acres for an environmental education centre, 15 acres for a lodge retreat, 60 acres for a business park showcasing green technologies and 20 acres for retail development including nature based and outdoor equipment types of stores related to the Wildlife Refuge.

### **City Park**

Based on the local demand for a variety of both passive and active recreational services a demand exists for a community park (EDAW 2001).

### ***Program***

The civic park (Figure 34) is intended to function as the main open space and recreational facility for Commerce City residents. A football field, two baseball fields, two soccer fields, five outdoor basketball courts and 6 outdoor tennis courts provide a mix of recreational opportunities for adjacent communities. An aquatic centre with a fitness gym are located as a central feature of the park. Viewing stands surrounding the basketball courts provide a venue for both players and spectators. Parking is provided on site in lots as well as along gravel areas flanking several of the playing fields. Parking along the field was a common practice in many prairie towns and creates a sense of "rally" in Prairie Gateway. In addition, gravel parking areas function well in terms of infiltration of storm water.

The Prairie Gateway main entry is located at the south edge of the park at 60<sup>th</sup> and Quebec St. A public market flanks the south side while the Visitor's Centre flanks the north side of 60<sup>th</sup>. It has been determined that the visitor's centre can expect approximately 100,000 visitors per annum, requiring an 11,148 square foot facility. Year round visitation to the Prairie Gateway Visitor Centre should benefit from many market factors. These include: diversity of year round, high quality wildlife attractions; proximity to a population of more than 3 million people who reside within a one hour or less travel distance to the site; and a school population of more than a half a million people which can combine recreational and educational pursuits at the site; (EDAW 2001).

The Visitor's Centre acts as a key indoor community gathering space, while the adjacent amphitheatre provides an excellent outdoor venue for cultural events. The Centre provides visitors with an orientation to the wildlife refuge, as well as to the recreational opportunities in the refuge and Prairie Gateway. Exhibit spaces presenting the cultural and natural history of the refuge and Prairie



Gateway provide hands on opportunities for exploring the site indoors. Refuge staff are on site to answer questions as well as to conduct live demonstrations and screen films in a 175 seat theatre. The Centre also provides an opportunity to showcase both the past and present Native Indian cultures connected to Prairie Gateway and the Refuge. Storytelling, evening star gazing programs, dance and drum ceremonies, and native art exhibitions are integral aspects of programming at the Centre.

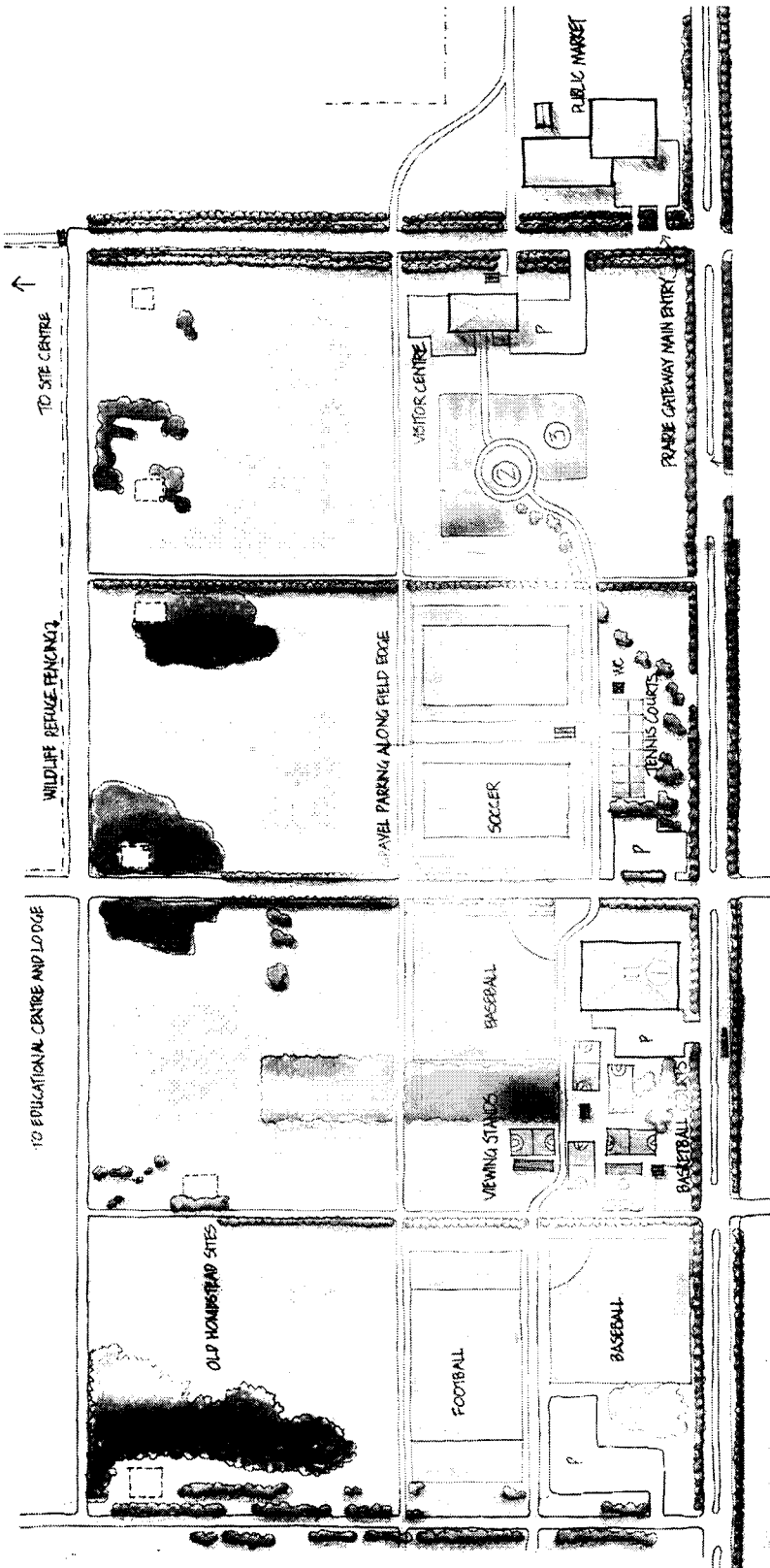
The grounds surrounding the Visitor's Centre contain several large picnic areas, an outdoor children's play area, an exhibit on prairie grassland plants and an outdoor café. A large amphitheatre is a short walk through a sculpted landscape (Figure XX) which interprets the concept of how exposure and aspect influence grassland species. Various patterns of grasses result in the dips and high points of the bermed areas surrounding the amphitheatre.

The Visitors' Centre is intended to introduce people to the cultural and natural history of the region and encourage people to further explore the areas on site by foot, by bicycle or by tram. Guided tours and bike rentals are also available at the Centre. A wheelchair accessible tram stops outside the Centre and shuttles visitors to key stops of interest inside the refuge. The tram runs every 15 minutes during peak season allowing for visitors to plan their stay according to their level of interest and time available. Visitors are able to explore refuge trails and interpretive elements at their leisure.

### ***Site Structure***

Spatially the park references the design principle of "divided and measured landscape". The playing fields, roads and trails are oriented to emphasise the spatial division of land down to the 10 acre scale. The Refuge perimeter greenway trail, for example divides the park into 10 acre sections with the more formal playing fields along the west side and the old homestead sites "returning to prairie" along the east side. The homestead sites offer visitors an opportunity to look for traces of the agricultural past of Prairie Gateway including plantings, old building foundations, fence posts etc. This section of the park functions as a transition zone between the sports field complex and the wildlife refuge in terms of program- moving from active to passive recreation. Signage and hands-on exhibits animate several of the interpretive stations in this zone.





3

2

1

Figure 34 – Park Plan and Program

### **Park Planting and Circulation Concept**

The planting and circulation concept for the park reference the design principle of "divided and measured landscape," ( Figure 35). The main entry road (60<sup>th</sup> Avenue) to Prairie Gateway is flanked by a double row of Cottonwoods on each side of the 2-lane road. The double row delineates the central division of the site into four 160 acre quarter sections. Bike lanes (4' wide) are provided along each side of the street and the crowned road drains to swales along each side of the road, separating the pedestrian corridor and roadway (Figure 35).

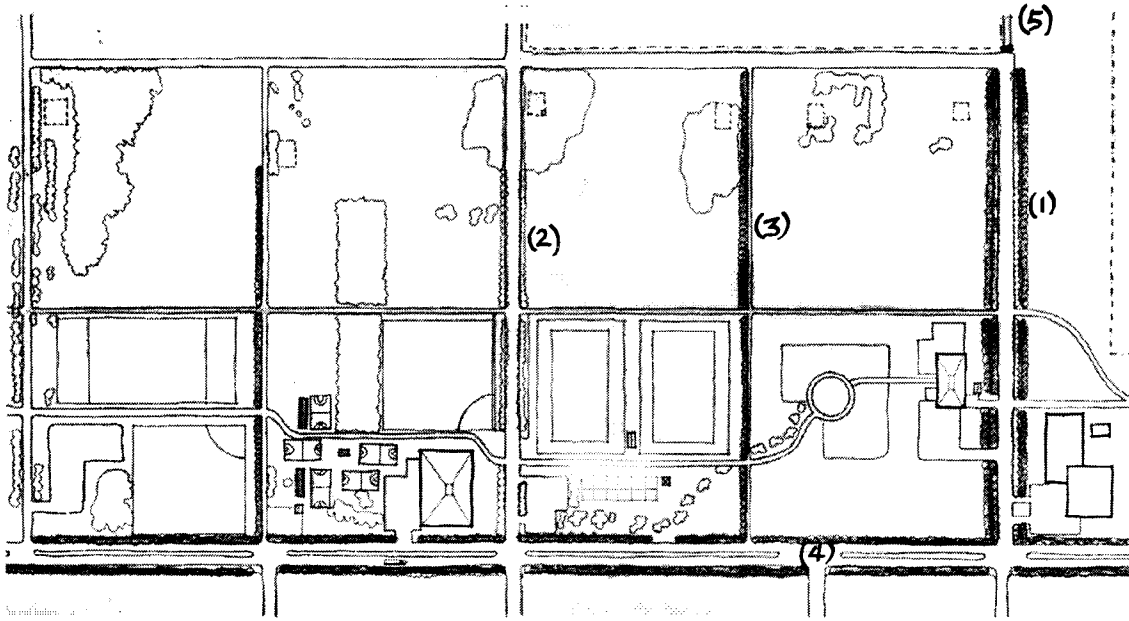


Figure 35 – Planting Concept Schematic

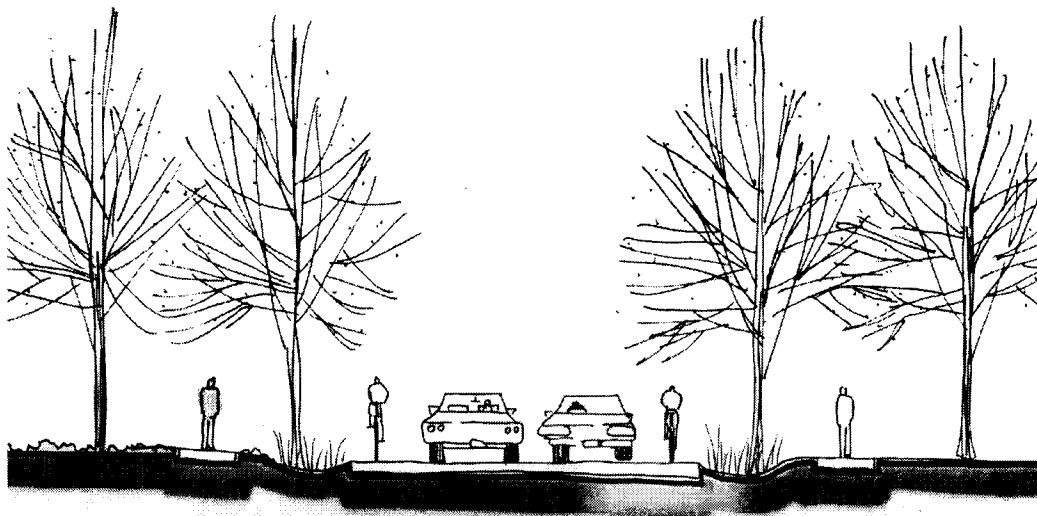


Figure 36 – Main entry (I)





The 1/16<sup>th</sup> section road is flanked by a single row of Cottonwoods on each side of the street, again with two lanes and two bike lanes. The single rows reference the next level down in terms of land division into 40 acre parcels (Figure 37).

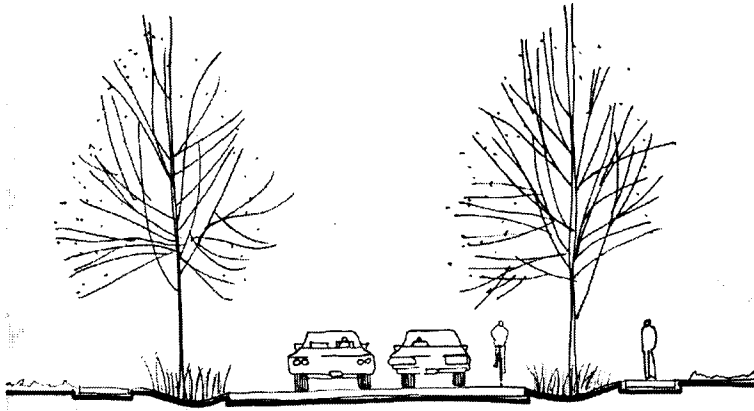


Figure 37 – 1/16<sup>th</sup> section road (2)

A cycling/pedestrian trail marks the next division into 20 acre parcels (Figure 38). A single row of Cottonwoods line the north side of the paved trail acting as a windbreak. These trails provide access to the old homestead sites and interpretive stations.

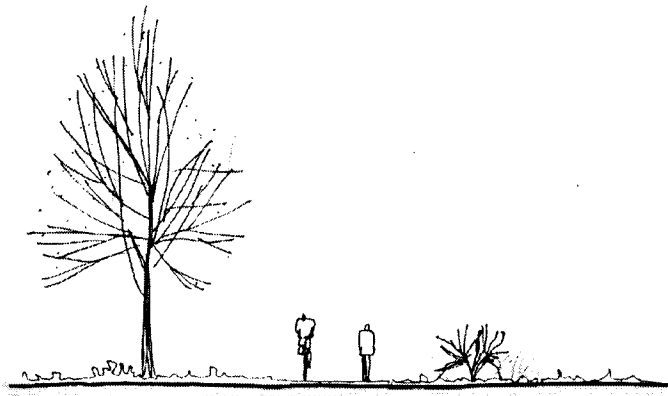


Figure 38 – 20 acre division (3)

The section across Quebec Street (Figure 39) shows a new road alignment with four lanes instead of two. A prairie grass swale in the centre separates the lanes, “brings the prairie in” to the urban landscape and provides sewer-free road drainage. Bike lanes along each side of the road and separated sidewalks help to create a more “people friendly” street. The additional 50’ needed for the new road alignment can be accommodated on Prairie Gateway land and the South

Adams County Water line right of way. A 20' buffer would remain between the sidewalk and the water main if 50' of the 90' ROW were used..

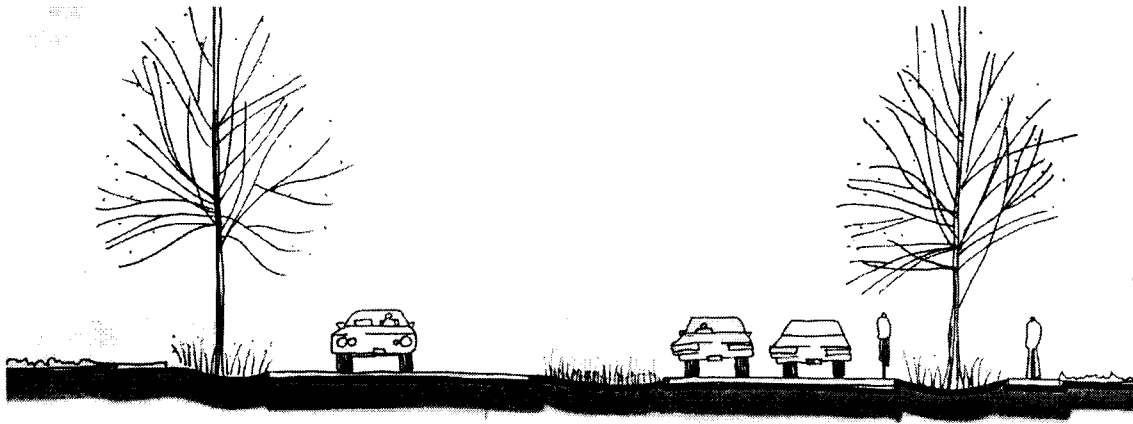


Figure 39 – Section of Quebec Street (4)

Figure 40 shows a section across the trail leading to the centre of the mile section. This trail connects the main entry to Prairie Gateway with the Stapleton redevelopment project. A 78" fence is intended to keep deer within the refuge and discourage off-road motorised vehicle use. Trees are absent here in order to accentuate the feeling of the open prairie beyond.

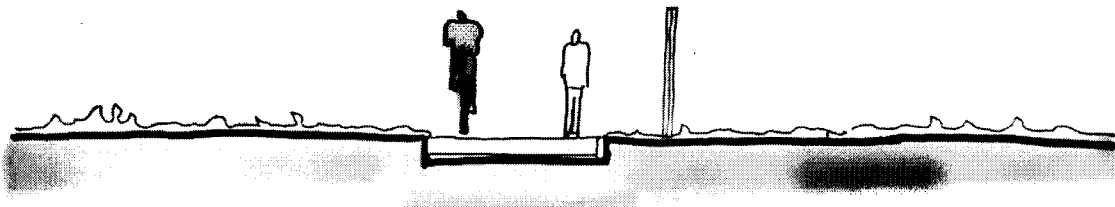


Figure 40 – Trail to Site Centre (5)

## Prairie Edge - Program and Concept

### *Program*

#### Educational Centre and Eagle Repository

Since 1993 the Rocky Mountain Arsenal Wildlife Refuge has offered a variety of environmental education opportunities to diverse population groups. These groups have included public school children, college and university students, and a large variety of special interest organisations. The Refuge has also played an



important role in nationally significant environmental research including studies of raptors, environmental restoration techniques, and wildlife and range management practices. To further develop the research and educational profile of the Refuge, it has been proposed that a new educational facility (16, 893 square feet) be constructed immediately adjacent to the refuge on Prairie Gateway land to service the diverse spectrum of user groups (EDAW 2001). In contrast with many other refuges and outdoor education venues, environmental education activities at Prairie Gateway will enjoy year round use.

The Educational Centre contains lab facilities, classrooms, small theatre, exhibits related to the ecology and cultural history of the Refuge, research outbuildings, a library, and cafeteria. Outdoor learning areas, interpretive exhibits and research plots are situated around the Centre. An injured bird centre and eagle repository are located adjacent to the educational centre. This facility provides care to injured birds found both in the city as well as on Refuge land. Visitors are encouraged to view the birds and learn about the hazards of development on these species. In addition, this facility contains the National Eagle Repository, an existing feature of the Refuge. The repository was established to provide Native Americans with the feathers of golden and bald eagles to use for religious purposes and cultural purposes, including healing, marriage, and naming ceremonies (U.S Fish & Wildlife Service). Historically, bald and golden eagles typified courage needed for success at war. Eagles were considered as sacred representatives of the spirit beings. Tribes prayed to eagles and used their feathers and bodies in ceremonies, in decorations and in symbolic reference to successful raids, hunts, wars (Carlson, 1998).

#### Homestead Lodge

The Homestead Lodge is designed to appeal to guests who are looking for a different hospitality experience. The facility will compete with boutique hotels and nature lodges located outside urban areas. The target market includes business people looking for a special place to stay, nature-oriented tourists passing through the area, and families who come to the Rocky Mountain Arsenal Wildlife Refuge as a destination in itself. The Homestead Lodge serves a meeting and conferencing clientele interested in a natural, rural setting close to the airport and the metropolitan region. The Lodge provides easy access and compatible meeting needs associated with the business, research, educational, and recreation facilities located in Prairie Gateway.

#### **Site Structure**

This zone references four spatial design principles, "rectilinear pattern of roads, fields and edges", "bringing the prairie in", "divided and measured landscape" and the "healing circle". The access roads and entries reference the former fence lines and property lines of the old farms and homesteads. The north/south orientation of the entry roads emphasise views out to the Refuge, reinforcing the concept of "bringing the prairie in" and the directionality of the "healing circle". This program zone is located *within* the Refuge fence allowing for deer and other



wildlife to roam through these areas providing visitors with potential wildlife viewing opportunities (Figure 41).

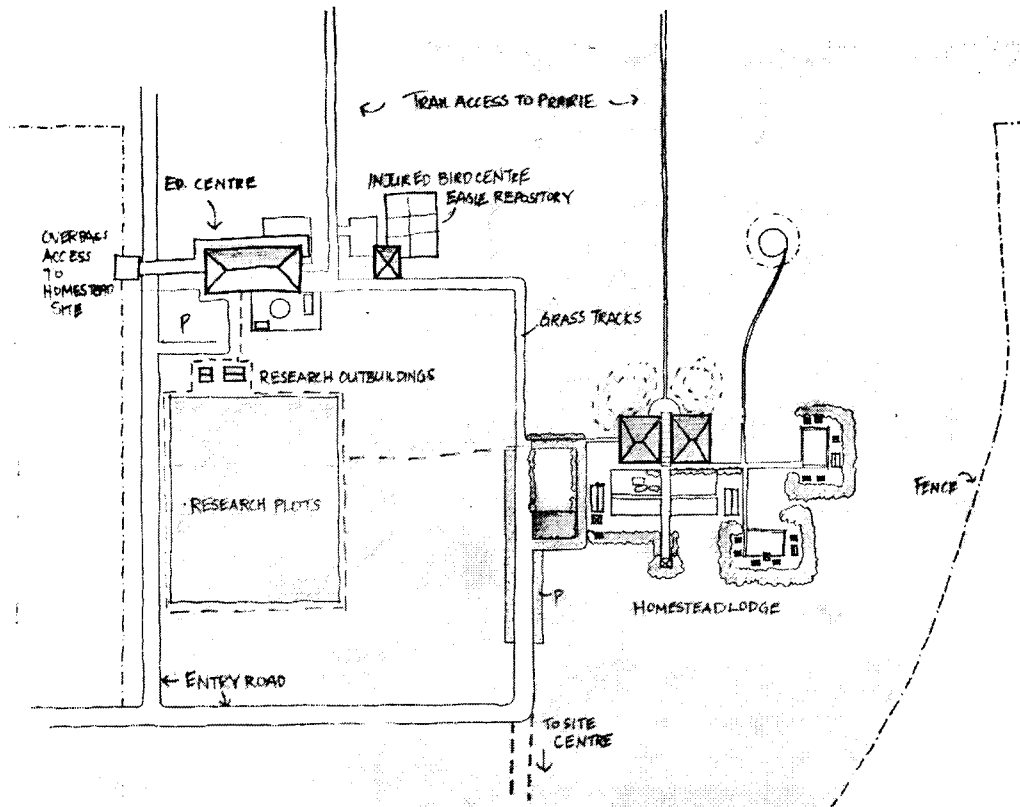


Figure 41 – Educational Centre and Lodge Site Plan

The entry road to the Homestead Lodge provides access to the trail running across the site to the site centre and out to the business park. The site centre (Figure 42) is a crossroads for the north/south and east west trails crossing Prairie Gateway.

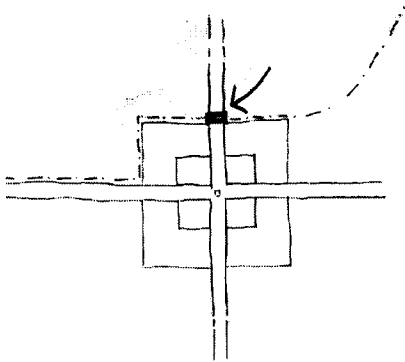


Figure 42 – Centre of Square Mile  
Note cattle grate crossing at north edge of crossroad.

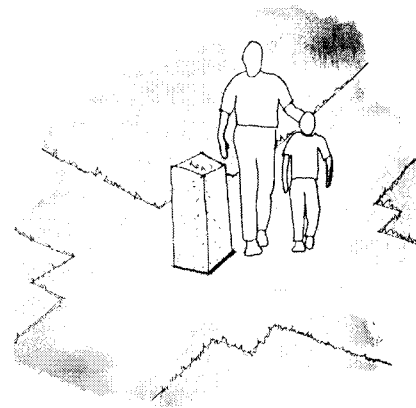


Figure 43 – Stone Marker at Site Centre

At the centre, is a stone marker engraved with the number “640” referencing the 640 acres which compose the 1 mile section of Prairie Gateway (Figure 43). The idea here is to reintroduce people to the “measured landscape” of the American West—a key concept that has influenced the development of urban landscapes across the United States.

Finally, Figure 44 shows the relationship between the Refuge fence and the site centre. Pedestrians are able to access the refuge by crossing the cattle grate opening in the deer fence. The grate prevents wildlife from entering urban areas, while allowing people to access the Refuge perimeter trail (Figure 45).

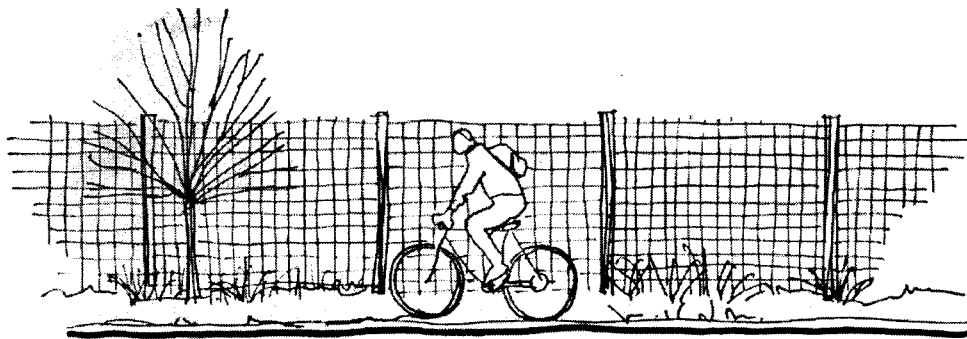


Figure 44 – Refuge Perimeter Fence

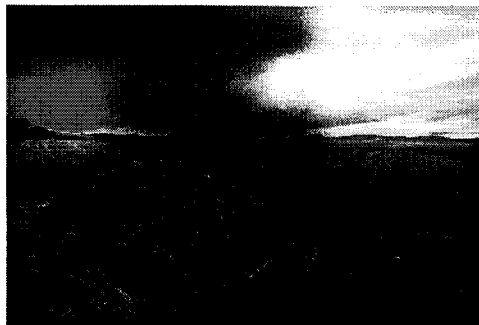


Figure 45 – Cattle Grate Crossing

Fence crossings can be closed at night to prevent vandalism inside the Refuge. All vehicle access into the Refuge is controlled through the entry gate at the Educational Centre and pedestrian trail access can be visually monitored from the centre.

## Homestead Lodge - Program and Site plan

### *Program*

The Homestead Lodge is intended to provide up to 150 guests with sense of getting back to the prairie. The site is a working landscape and is designed to be as sustainable as possible (design principle -“self contained system”). Produce used in the kitchen is produced on-site in a large vegetable garden. A chicken coop, small orchard and crop field also provide additional food. All wastewater is purified and recycled in a solar aquatic treatment facility and solar panels are used to heat water. Buildings are oriented to maximise solar gain for heating and



lighting purposes. Roads and pathways are surfaced with permeable materials to maximise drainage on site, while all rooftop water is collected and used for irrigation in the garden. Overflow parking occurs along gravel road edges, allowing for water infiltration and the main parking lot is designed to drain into adjacent swales.

Guests are encouraged to assist staff in tending the garden, helping in the kitchen, greenhouse etc. The concept of 'transparency' of systems (both manual and technical) is key in terms of encouraging people to participate in the prairie experience as well as in living sustainably. Part of the uniqueness of staying at the Homestead Lodge is its participatory nature. In addition to attending meetings and conferences, guests can take part in numerous programs offered by Lodge staff including gardening, horticulture, craft seminars, cooking demonstrations, and green design lectures. Guided walks through the Refuge, bike tours and other types of programs can provide seasonal variation in Lodge programming.

A sauna retreat, cabins and bunkhouses, outdoor amphitheatre, greenhouse patio, swimming pool, and prairie bar are some of the key program features explored in design drawings in this project (Figure 46).

### ***Site Structure***

The design principle "bringing the prairie in" is one of the key spatial patterns in the Homestead Lodge design. The front of the Lodge faces the open prairie and the Native American notion of the 'round prairie' is emphasised through the patio interface between the Lodge and prairie. The open prairie flows in past the lodge into the cabin and bunkhouse area. Spatially, the organisation of the site reflects "the homestead compound" with outbuildings situated around a central work space/garden. The edges of the Lodge are planted with "protective hedgerows", another key design principle for Prairie Gateway. Rectilinear roads and pathways reflect the typical siting patterns found in farmed prairie landscapes. A trail from the Lodge leads out through a 4' berm and into the Refuge and the main entry road becomes a double track in the grass as it moves out into the prairie.



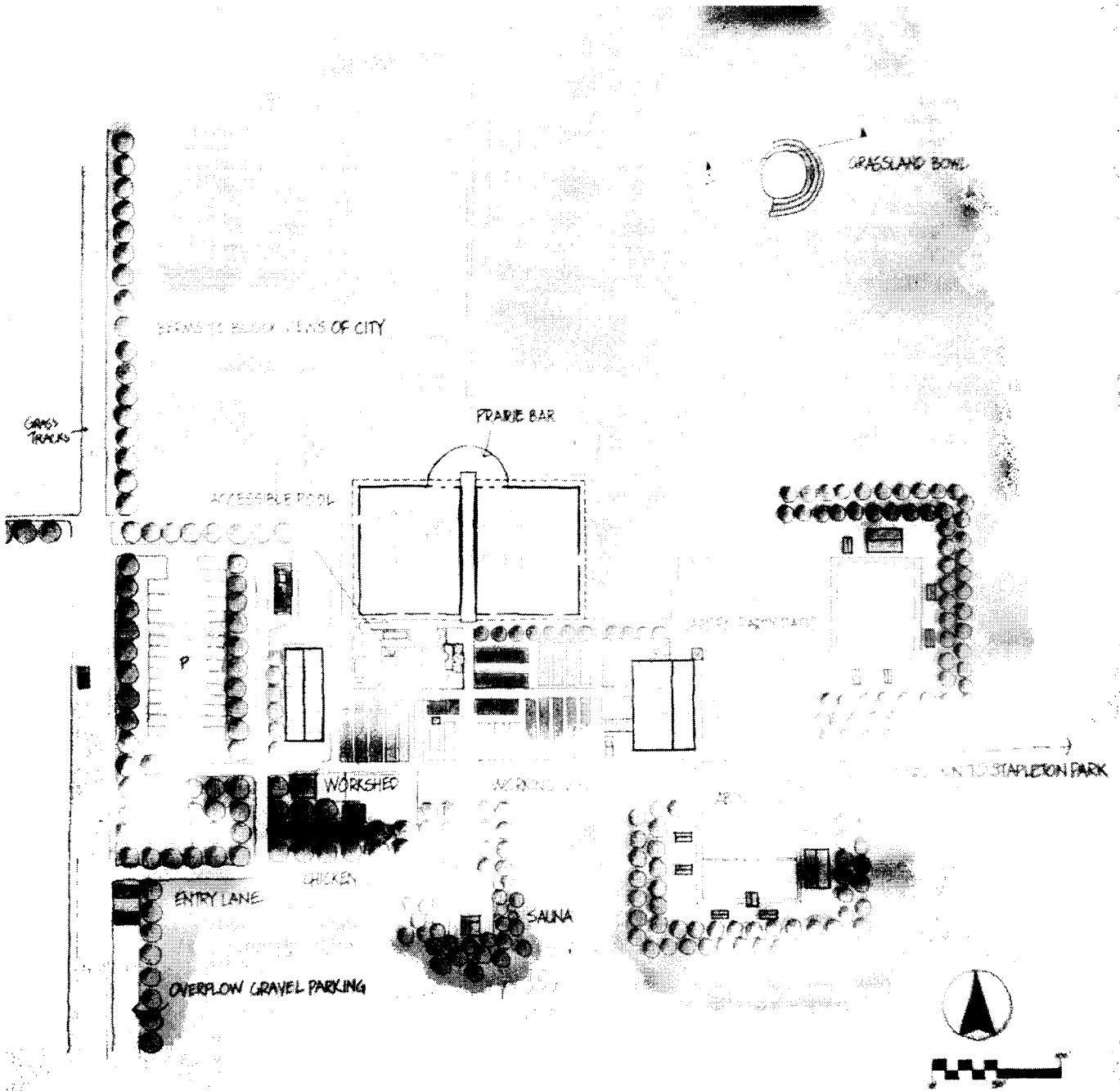


Figure 46 – The Homestead Lodge Site Plan  
 Program areas include: The Prairie Bar, Working Garden, Sauna Retreat, Cabins and Bunkhouses, Grassland Bowl, Greenhouse Patio, Swimming Pool, work areas and a chicken coop.

The following sections describe in more detail the key program elements at the Homestead Lodge.

**Prairie bar**

**Program**

The prairie bar is a sunken outdoor patio located on the north side of the Lodge (Figure 47). The bar, opening out from a meeting room and dining area, is used for outdoor dining, as well as for coffee breaks during meetings. Seating for approximately 90 people is provided- including 22 bar stools. Pathways lead out into the Refuge as well as to the Grassland Bowl.

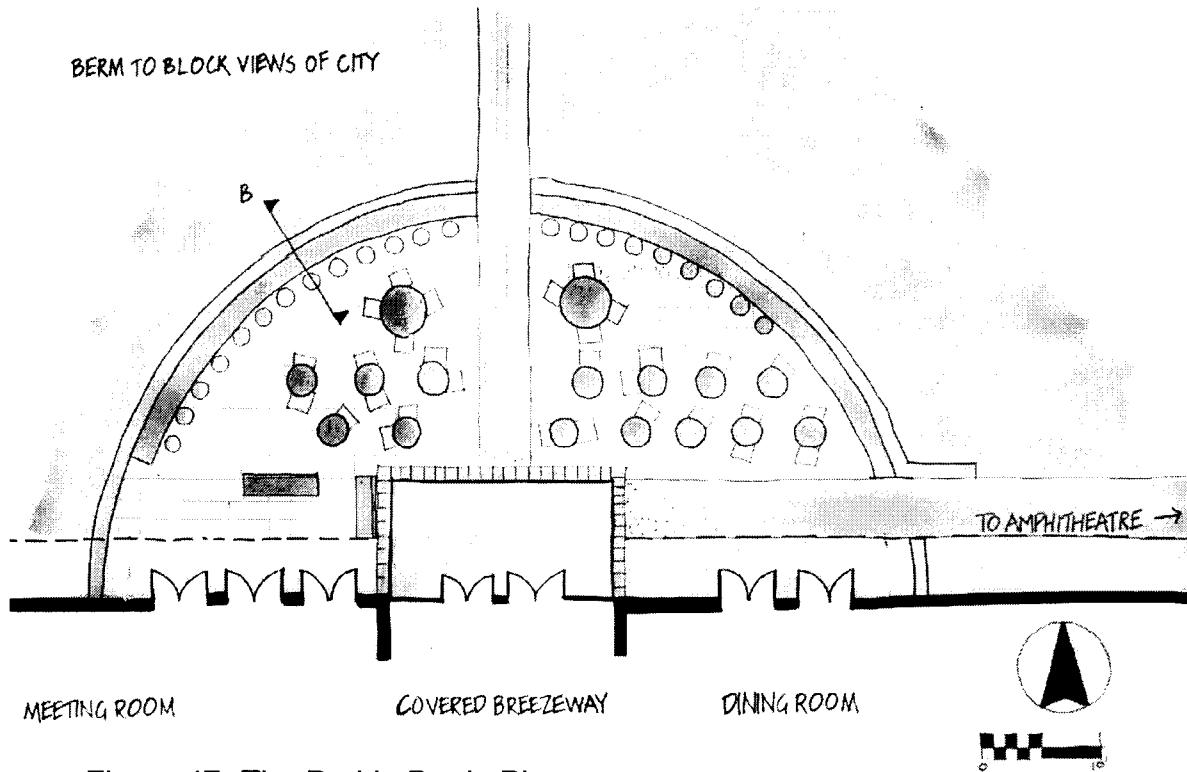


Figure 47- The Prairie Bar in Plan

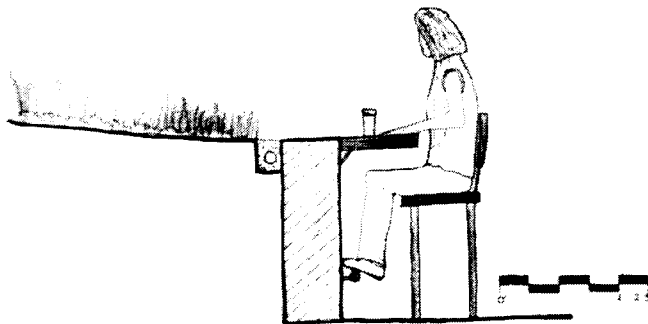


Figure 48 – Prairie Bar Section

Figure 48 is a section through the bar. The prairie slopes down to the bar, providing visitors with a 'prairie dog' eye level view of the delicate patterns of prairie grasses. The slope is intended to block out views of Commerce City while visitors gaze out into the Refuge from the Prairie Bar. A small infiltration trench is embedded at the bar's edge to prevent runoff from flooding the patio.



## Design Principles

The design principles of “the prairie flowing in” as well as “blocked views of development” are evident in this design detail. The prairie essentially surrounds and immerses the north side of the Lodge providing visitors with a more focused view of the prairie landscape. A 6’ high berm is gradually sloped over 80’ to provide a subtle screen of distant development.

## Grassland Bowl

### Program

The Grassland Bowl is located several minute’s walk from the Lodge. It is intended as campfire/stargazing venue immersed in the prairie. The bowl is accessed through a spiralling ramp (5% grade) with seating on stone walls with wooden planks. Accessible seating is located on the end of each of the three step levels (Figure 49). A stone campfire ring is centrally located and is surrounded by moveable wooden benches to accommodate for various group sizes.



Figure 49 – Section of Grassland Bowl

Backrests can be inserted into the stepped seating and can be adjusted to recline for night time star gazing programs (Figure 50).

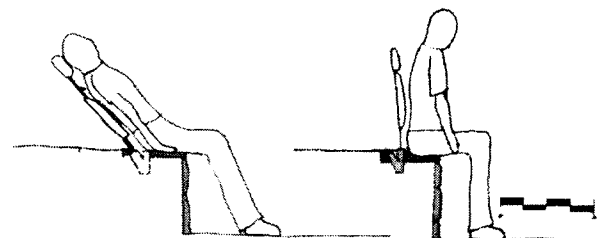


Figure 50 – Backrests for Stargazing

## Design Principles

The grassland bowl is surrounded by a 6’ high berm to create a sense of “the prairie surrounds.” Visitors are immersed in the prairie, and views of Commerce City development are blocked. The campfire circle is intended to evoke the notion of the “healing circle” of Native American culture. From the Lodge, the night time view out to the campfire in the grassland bowl looks as if the prairie is

aglow. This is intended to reference the Indian campsites that were once found across the American prairie in prime bison hunting grounds.

### ***Cabins and Bunkhouse***

#### **Program**

The cabins and bunkhouse offer an alternative to staying in one of the 30 rooms within the Lodge. 10 cabins (5 in each of the two areas) offer a rustic option for up to four people per cabin. Two bunkhouses, (20' by 30' building) provide bunk bed accommodations for groups of up to 15 people. Scout or school groups, associations or clubs can use these facilities for more private gatherings or retreats. A central "sundial and seating" space is designed to demonstrate the changing shadow pattern of the sun, in addition to providing a central gathering space for groups. Seating rocks, arranged in a circle are organised to define the sundial clock. Other features include a "two holer" composting outhouse (a key characteristic of old prairie farms) and a shady gazebo with a bench swing (Figure 51).

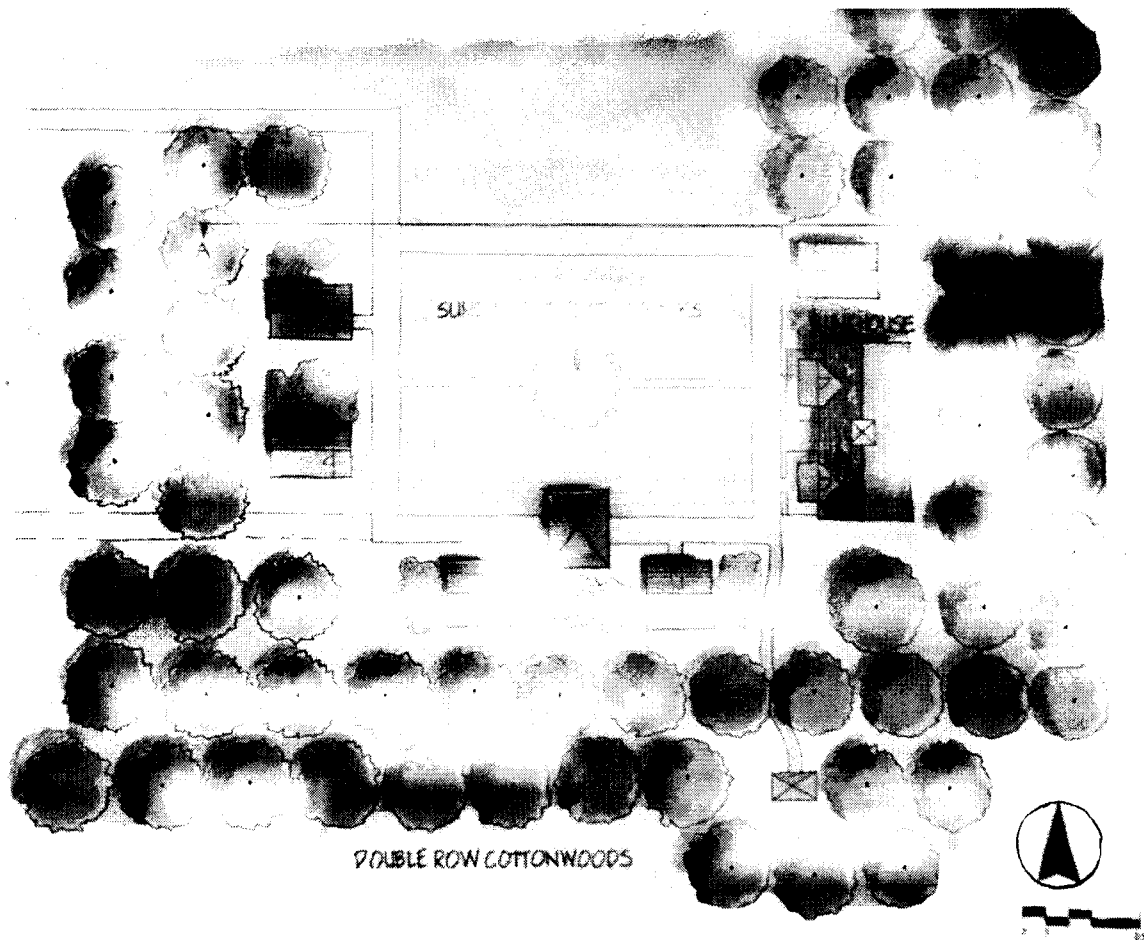


Figure 51 – Plan of Cabins and Bunkhouse Area

## Design Principles

The cabins are sited to reference the design principle of the “homestead compound” with buildings oriented around a central space. A double row of cottonwoods surrounds the cabins providing wind protection and shade. The historic pattern of planting a tree along the south east corner of the house to provide shade is used in the design. In terms of architecture, the cabins are designed with “overhanging roofs” and porches, typical features of prairie buildings. The cabins (12' X 14') were sized to reference the 1862 Homestead Act that required settlers to erect a house of at least twelve by fourteen in order to legally claim their homestead land (Michener 1974, pg. 750). Wood, stone and sod were used to construct these cabins and these materials are used in the construction of the cabins at the Homestead Lodge. Corrugated metal, wooden shingles, wooden doors, and muted colours are typical features of these buildings (Figure 52).

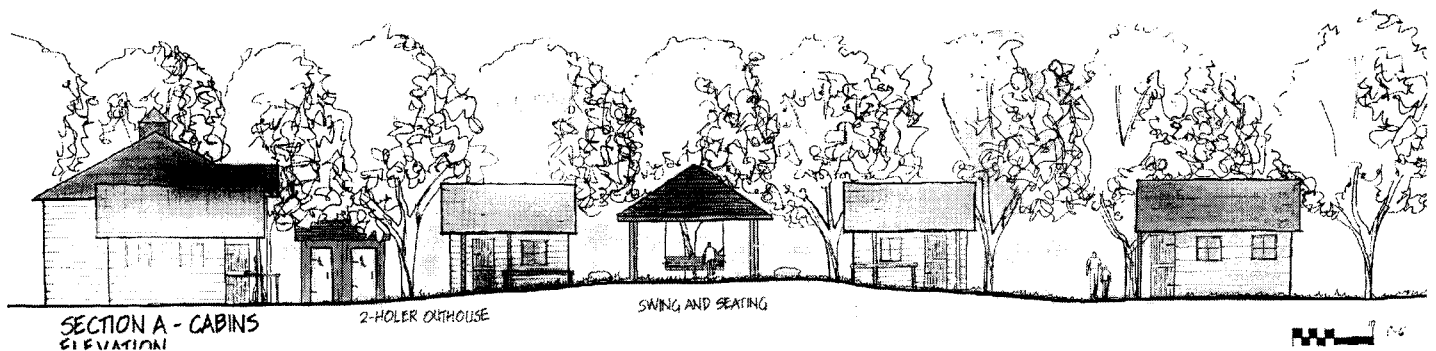


Figure 52 – Section of Cabin and Bunkhouse Area



## *Working garden*

### Program

Figure 53 is a plan of the program areas behind the Homestead Lodge. Most activities occur behind (south of) the Lodge, sheltered from the north prairie winds, while receiving direct sunshine. The garden area is bounded by 2 greenhouses- the solar aquatic water treatment facility and the working



greenhouse and garden patio. A service vehicle gravel roadway borders the south edge. The floor plan and internal program of the Lodge was designed to address the outdoor program of the garden area. For example, the kitchen is located adjacent to the vegetable garden plots, and the spa and gym opens directly out to the lower pool patio area. A seating wall facing the meeting room provides an outdoor space for guests to spend a quick break between conference or lectures proceedings. The central breezeway of the Lodge opens out to the main axis through the garden and out to the sauna retreat. The numbered photos provide examples of the character of the different program areas.

### Design Principles

The organisation of the garden references the design principles of “rectilinear roads and edges” as well as the “homestead compound”. The location of the outbuildings and greenhouses creates an enclosed, bordered garden space, while the rectilinear paths and edges create an ordered, soothing landscape, representing traditional agricultural prairie landscapes.

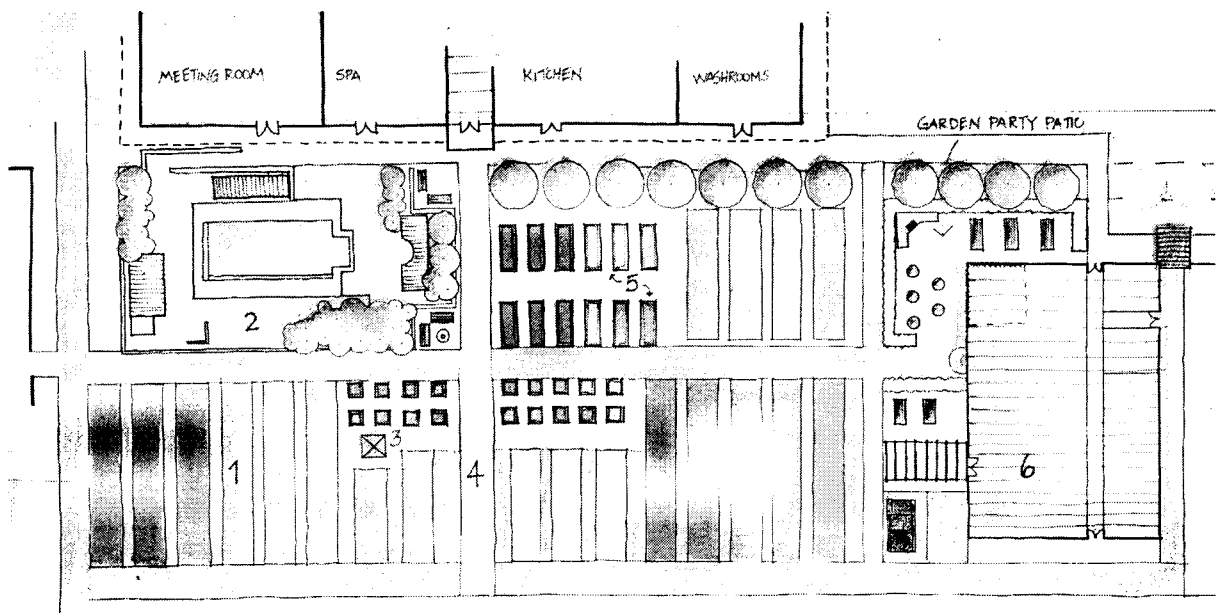
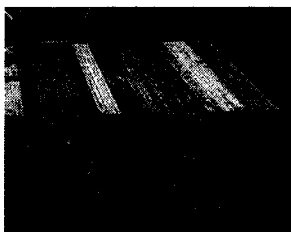
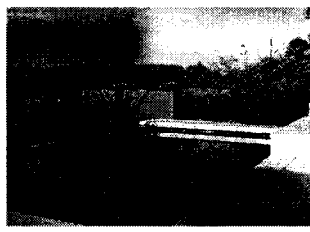


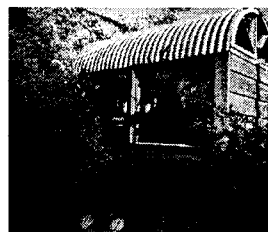
Figure 53 – Garden Plan



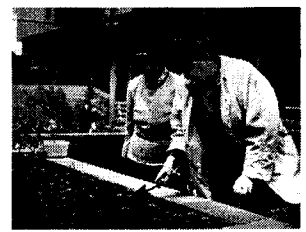
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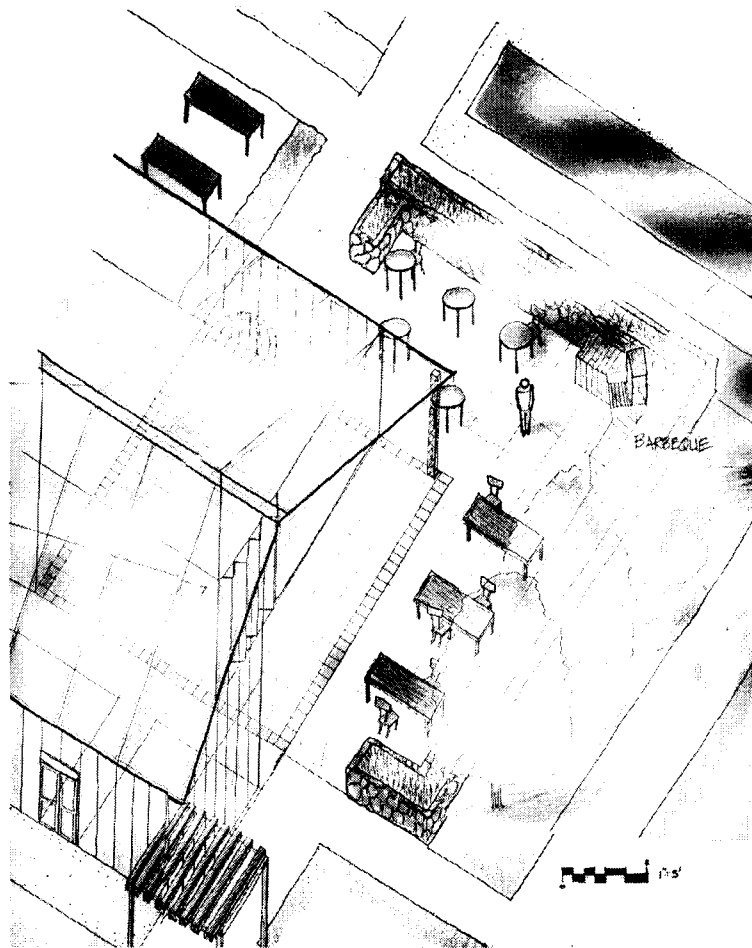


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## Garden patio

### Program

The Garden Patio provides a semi-sheltered space for about 40 people. A stone barbeque creates the main focal point of the space, a common feature of many farms on the prairie. Sliding glass doors on two sides of the greenhouse can be opened connecting a small dance floor to the seating areas. Grey slate tiles, accented with pale ochre accent tiles delineate the space. A 3' stone wall spatially separates the patio from the garden, while filtered views out to the prairie are maintained (Figure 54). The square configuration of the patio again reflects the notion of "rectilinear roads and edges".



Washrooms are located in the greenhouse for patio users as well as for guests staying in the cabins and bunkhouses. Figure 54 also shows the gateway gazebo which marks the paths leading to the cabin areas.

Figure 54 – Garden Patio

## Sauna Retreat

### Program

The sauna design provides a quiet retreat from the activities around the Lodge. The sunny patio creates a quiet space for several people to play cards, read or enjoy a cool drink. A trellis creates a shady patio, with tables, chairs and recliners for reading and relaxing (Figure 55).

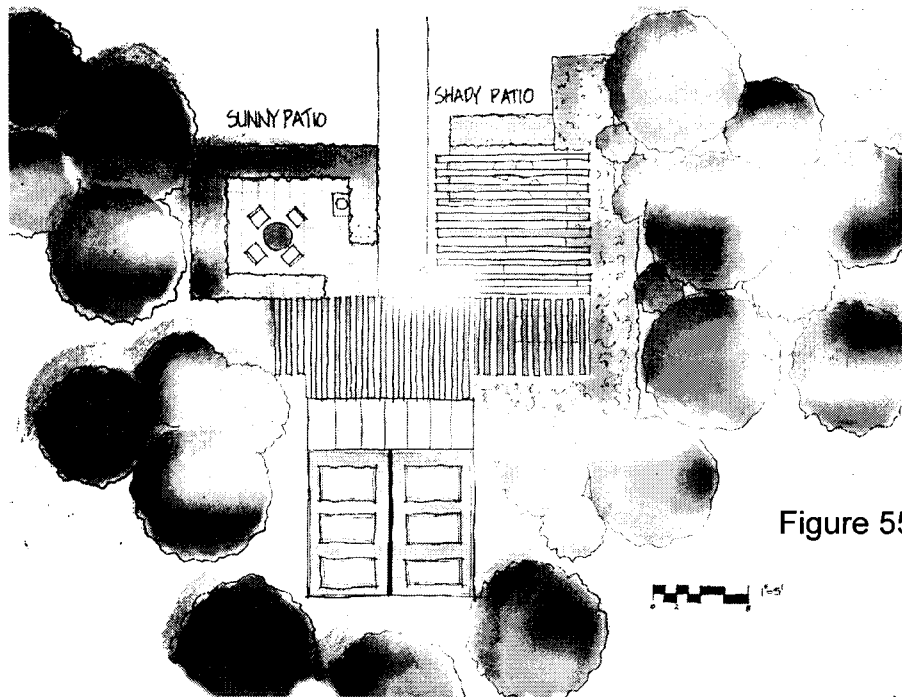


Figure 55 – Plan of Sauna Retreat

The floor plan of the dry sauna (Figure 56) shows two change rooms, wooden benches, stone tile and the electrically heated stone rocks. The sauna would most likely be used in the fall and winter, while the outdoor seating areas would be used in spring and summer months.

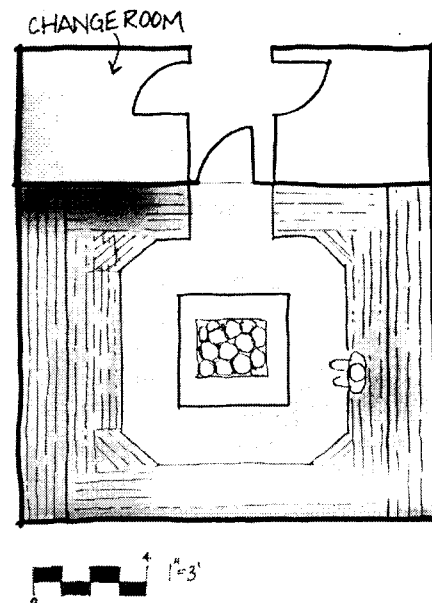


Figure 56 – Sauna Interior

## Pool

### Program

The garden pool is a two level pool with a lower patio and upper patio connected by a ramp. Figure 57 shows the spatial relationship between the raised garden beds, the plots and seating areas. A water pump drinking fountain acts as a focal point in the garden providing both a functional as well as aesthetic feature in the central seating areas. This drawing also illustrates the incoming and outgoing water systems connected to the solar aquatic facility. All water on site- is either infiltrated or collected and recycled for irrigation or other uses.

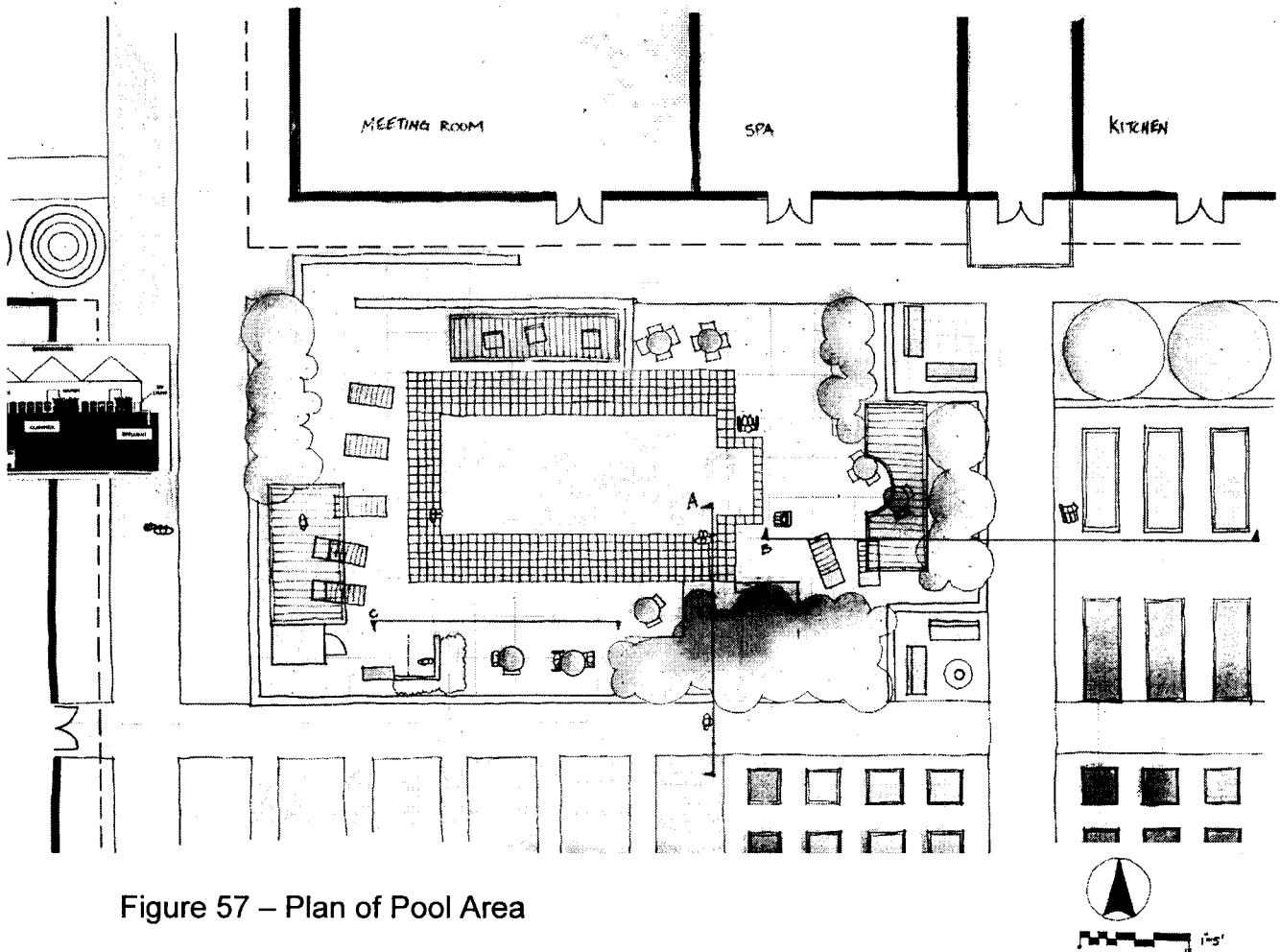


Figure 57 – Plan of Pool Area

The solar aquatic facility is a 30' by 80' building based on calculations for wastewater generation for 150 people for 1 year (Figure 58). The greenhouse can process up to 4800 gallons per day of raw septage or 32 gallons per person per day (Spencer 1990). This figure is low because of the water saving appliances, composting toilets and other features incorporated in the design. Separate storage tanks are used to store processed water as well as incoming water when facility capacity is reached.

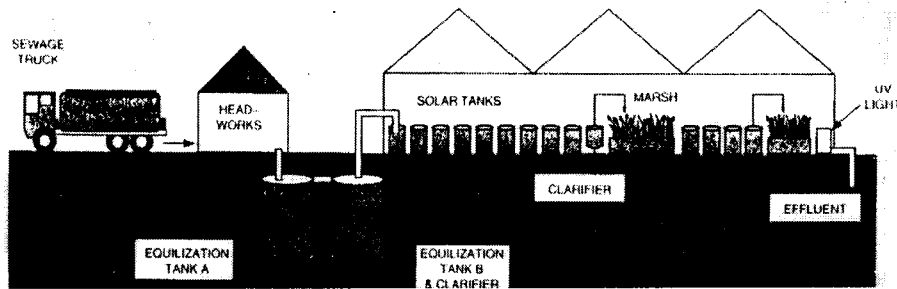


Figure 58 – Diagram of Solar Aquatic Treatment System

### Waterfall and seating bench

#### Program

Figure 59 shows the lower patio level by the pool and the shaded seating area. The pool with a 17" water wall has been designed to maximise wheelchair accessibility as well as add an interesting feature to the patio. As shown in the drawing, a wheelchair user simply transfers onto the cushion on the pool deck, pivots and enters the pool. The corner of the pool also allows users to easily push themselves up and out of the pool back onto the deck. Several tables and chairs, as well as recliners provide flexible seating. The shade pavilion has adjustable louvers which can be manipulated by a crank to maximise shade on hot sunny days. The drawing also shows the drinking fountain in more detail as a key design feature of the central seating area.

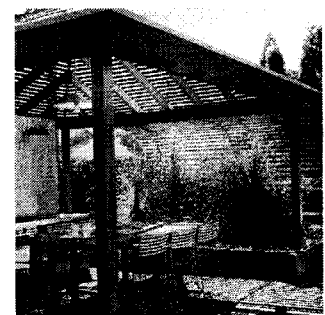
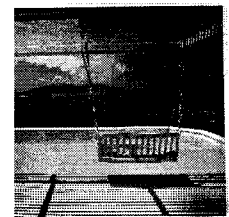
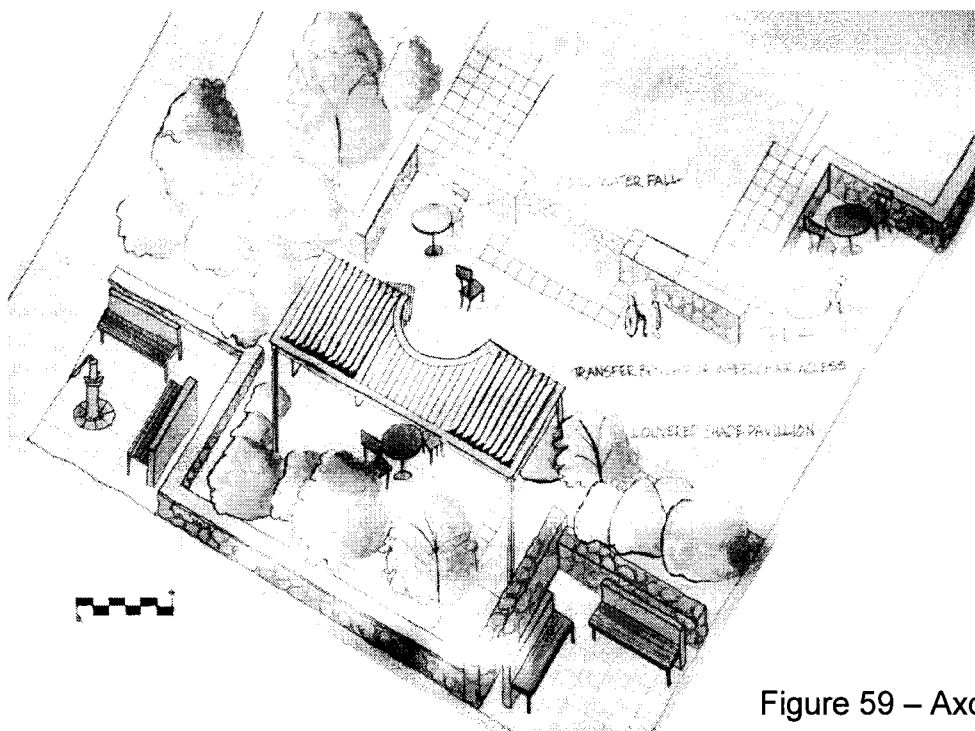


Figure 59 – Axon of Pool Patio



Figure 60 (Section A on Figure 57) shows the relationship between the pool and the vegetable garden. The seating wall, which separates the upper pool deck and the garden, provides a sunny spot to take a quick break while working in the garden.

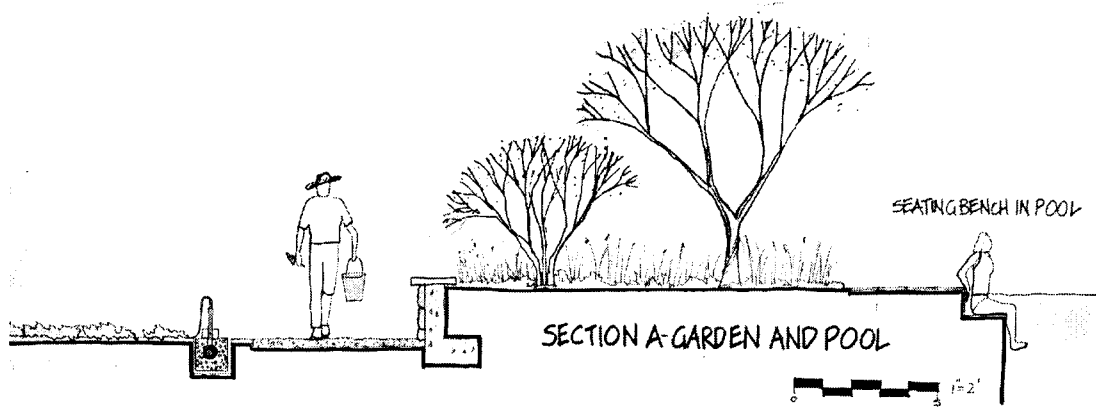


Figure 60 – Pool and Garden Spatial Relationship

The stone retaining walls, wood and metal shade structures, exposed aggregate pavers, slate tiles, wood furniture and wood and stone benches reflect the materials traditionally used on the prairie landscape. The warm greys, muted yellows and browns emphasise the natural colours of the prairie landscape. The plantings around the pool include Rubber rabbitbrush (*Chrysothamnus nauseosus*), Sand cherry (*Prunus besseyi*), New Mexico Locust (*Robinia neomexicana*) and Fringed sage (*Artemisia frigida*).

### Elevation from Garden

Figure 61 (Section/Elevation B, Figure 57) shows the view from the garden looking back towards the Lodge. The section/elevation shows the accessible raised beds in the garden and a work table which can be folded up to allow for easy access around the edge beds. The main entry, spa and gym access are also visible in this drawing.

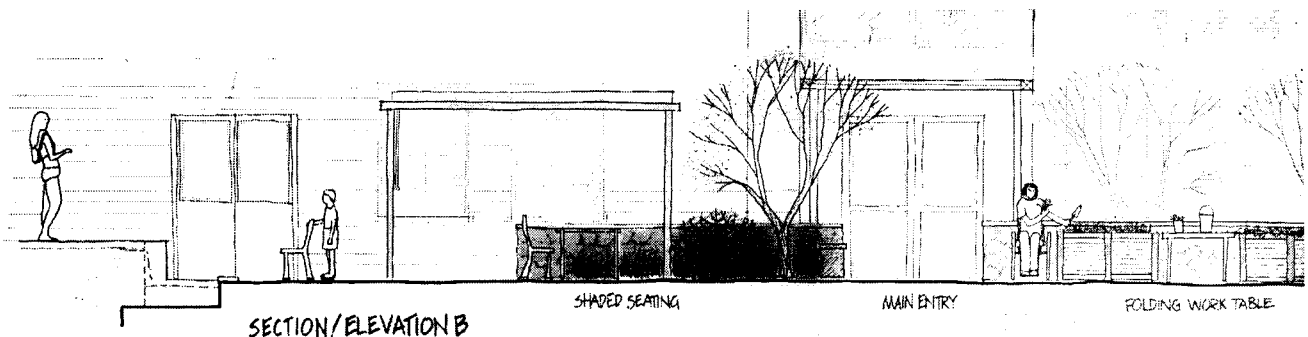


Figure 61 – Section/Elevation of the Lodge, Pool and Garden

The photos in figure 62 show the character of what the Lodge might look like, in terms of materials and structure.



### Pool Deck

Figure 63 (Section C, Figure 57) shows the outdoor shower with grey water infiltration trench, transfer bench and shower curtain. The transfer bench allows a wheelchair user to sit in the shower while leaving his or her wheelchair behind the shower curtain.

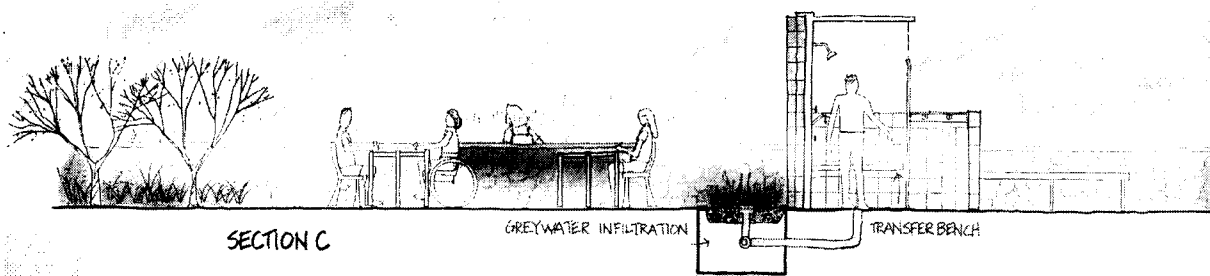


Figure 63 – Section of Pool Deck and Shower

Figure 64 (Section D, Figure 57) shows the pathway between the solar aquatic facility and the pool. Signage is located along side the treatment facility to interpret the purification process for Lodge guests. The gravel pathway extends from the front entrance of the Lodge to the workshed and chicken coop. The drawing also shows the storage building and louvered shade pavilion on the pool deck.

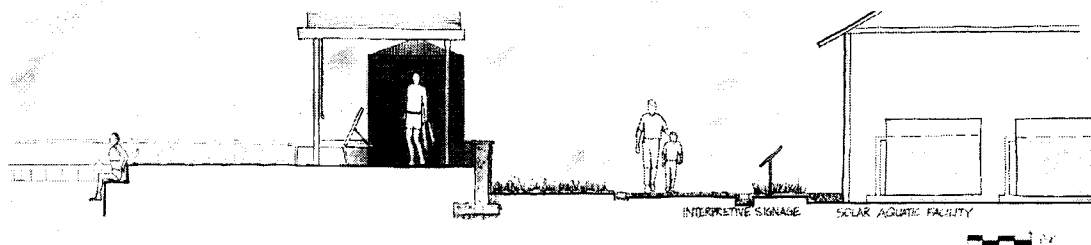


Figure 64 – Section of Pool and Solar Aquatic Facility

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