



An analysis of the Bozeman city park system and suggested developmental plans for four new parks by Alan Chester Epps

A thesis submitted to the Graduate Faculty in partial fulfillment of the requirements for the degree of MASTER OF SCIENCE in HORTICULTURE

Montana State University

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Abstract:

It was the purpose of this study to take a realistic look at Bozeman's city park system and to design developmental plans for those, new park areas which are needed and warrant the expenditure of large sums of capital for development.

In order to do this it was necessary to analyze existing parks and recreational facilities in relation to undeveloped park lands and recreational needs. Selected park sites were then drawn at large scales from which final developmental designs could be prepared. The completed plans were photographed and reduced in size for use in this thesis.

Plant materials utilized in the developmental designs were selected for their hardiness, form, period of display and ease of maintenance.

The suggested construction materials were chosen for design emphasis. In designing developmental plans for the new areas, consideration was given to: overall public use, development at a minimum cost without sacrificing aesthetics and locally available materials.

Each selected undeveloped park area is discussed in relation to the overall park system. If Bozeman is to remain a desirable place to live, the city administrators must develop a more realistic policy for accepting land for park development in order that the needs of the future may be met.

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Date 7/1/69

AN ANALYSIS OF THE BOZEMAN CITY PARK SYSTEM AND SUGGESTED
DEVELOPMENTAL PLANS FOR FOUR NEW PARKS

by

ALAN CHESTER EPPS 441

A thesis submitted to the Graduate Faculty in partial
fulfillment of the requirements for the degree

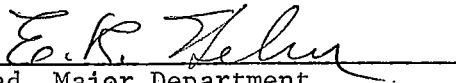
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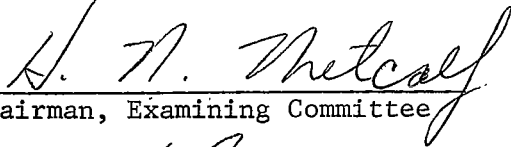
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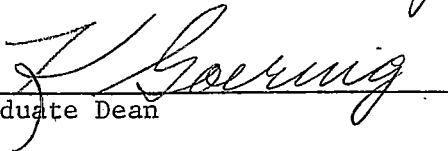
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ABSTRACT

It was the purpose of this study to take a realistic look at Bozeman's city park system and to design developmental plans for those new park areas which are needed and warrant the expenditure of large sums of capital for development.

In order to do this it was necessary to analyze existing parks and recreational facilities in relation to undeveloped park lands and recreational needs. Selected park sites were then drawn at large scales from which final developmental designs could be prepared. The completed plans were photographed and reduced in size for use in this thesis.

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INTRODUCTION

Parks should provide recreation for all age groups and categories of people living in a community. Bozeman's existing park system has lagged in providing adequate facilities, since the city has grown rapidly during the last decade. The present population and expansion of Bozeman indicates a number of specific locations and facilities which would enhance the city's overall beauty and service to both the resident and visitor.

It was not the intention of the author to undertake planning for all undeveloped park lands owned by the city of Bozeman. Instead, each area selected for study was analyzed in relation to existing park facilities and feasibility of development.

Terrain, climate, and needed recreational facilities were molded into a rational and economically possible scheme. Preparation of designs was carried out with aesthetic values, recreational facilities, plant material compatibility and the relationship of the park to surrounding properties as primary guides to development.

LITERATURE REVIEW

Landscaping is a nebulous term with the end result dependent upon the viewer's own likes and dislikes, which have been learned from his sociological background. Litton (18) defines landscaping as that particular art through which man molds nature to his functional, aesthetic and psychological liking. Even though unsupported by scientific data, Ammann (1) indicates further that the character of a landscape, a garden, a tree or a shrub is a thing distinct and apart from its natural physiognomy. Beyond all style and character the physiognomical and physiological harmonization of the architect's "construct" with the organic forms and needs of the surrounding landscape and of the inhabiting life is the greatest accomplishment of all.

Landscaping, according to Wright (31), has been practiced since earliest historic times and perhaps before. Mumford (22) feels gardening developed in the prehistoric period when people congregated and formed communities.

Changes in forms or styles of landscaping have reflected changes in the various cultures from which they originated. In designing landscapes, the designer must exercise taste and discretion in selecting elements suited to the way of life and the existing climate. The designer must rely on his own knowledge and experience and not on the academic symbolism of the styles or the outworn systems of aesthetics, in order to create by experiment and invention new forms which are significant of the age from which they spring (29).

Japanese gardening has long been associated with the Japanese culture.

Harada (15) indicates that the placement of plants and rocks in Japanese gardens has spiritual meaning in reference to their religion. According to Tono (28), Japanese gardens are intended to break the connection with the outside world, so to speak, and to produce a fresh sensation conducive to full enjoyment of the aestheticism of nature. The rest of the world does not ascribe as much symbolism to landscaping as do the Japanese, but as Lees (17) states, alone, plants do not make a landscape.

In recent years, as reported by Eckbo (9), there has been a trend toward designing landscapes for living; and not just for beauty. This has been achieved by relating the scale of the composition to people and striving for harmony with the site. Or, as the editors of Sunset Magazine (11) suggest, landscaping offers a way to take building materials and plant materials, the open sky and the stars at night, and blend them all to create a deeply satisfying space for everyday living.

The site and its physical features, as Lynch (19) points out, are important in developing a good landscape design. Topography, exposure, and soil structure play an important role in analyzing a site so that the physical environment can be utilized for the best land usage. Shephard (27) emphasizes that it is an absolute necessity to have a thorough knowledge of the site and plant materials in order to develop a good landscape. With this knowledge one can then incorporate Baumann's (2) theory of design which states that everything should appear to grow spontaneously, with no part of the landscape isolated. This is achieved by using both native and cultivated plant materials which harmonize with the area and

the site in such a manner as to create unity. Ramsey (24) feels that we must think of beauty, not as it is expressed in the individual things alone, but in relation to all things about it.

Plant forms, in and of themselves, can add to a landscape design, according to Rose (26). The color or variety of plants used in a design is less important than the relationship of one plant or group to other plants or groups. Daniels (6) states that there should be a reason for every plant's presence and every plant's placement. In general, planting arrangements should be simple, effective and dignified. Grant and Grant (13) point out that the most important considerations for proper use of plants relate to their scale, texture, color, accent and uniformity. However, Dawson (7) is of the opinion that, in the long run, shape is more important and more enduring.

Grosby (14) is of the opinion that a garden of several acres is an independent unit in which the planner wrestles with only natural physical conditions. However, as one looks to the future, one must consider the views of such men as Tunnard (30) who indicates that the garden of tomorrow will not be the hedged, personal, half-acre of today; but a unit of broad green landscape itself, controlled for the benefit of all. Further, the new garden art must submit itself to the demands of society and fulfill with efficiency an active role in the physical and mental development of the individual and the community. Urban development must incorporate the idea of gardens into the scheme for the future.

Doell (8) refers to parks as a piece of land or water set aside for

the recreation of the people. More specifically, Eckbo (9) defines parks as considerable areas of open space, organized primarily by landscape means, for the recreation, both active and passive, of the general public.

The idea of incorporating gardens (parks) as part of towns is not new. Doell (8) states, parks are as old as human history. Ancient parks were, in general, private estates for the pleasure of nobility. He further indicates that the first parks were the hunting parks of the king, the prince, the noble, and constituted the ancestors of today's zoological gardens. The market place, the town plaza, and the agora were also ancestors of today's parks since this is where the common people of the times gathered.

The history of the public park, according to Crowe (5), goes back to ancient Greece, where the city of Athens set aside certain open spaces for the enjoyment of the populace. However, it was not until the 1800's that the public park became the norm. Development of the industrial revolution in northern Europe during the nineteenth century created a pressing need for municipal parks in which the over-crowded townspeople could "get away from it all". Crowe (5) indicates that in 1845, Joseph Paxton, at Birkenhead, England, laid out the first specifically municipal park on an expanse of waste land. The British commons, which were the playgrounds of the common people of England, were introduced into America by early European settlers. According to Doell (8), Boston Common, established in 1640, is often called our first park. It was in 1858, when Olmstead and Vaux were entrusted with the development of Central Park in New York, that

municipal parks in America actually came into existence.

Chadwick (4) suggests that Andrew Jackson Downing extended great influence on early American park design through his beliefs that the floral and arboricultural riches of all climates united in the same scene give a richness and a variety which can never be found in any one portion of nature.

Downing developed the original layout of the Capitol grounds in Washington, D.C., and was a very strong advocate of community planning for park location. Chadwick (4) indicates that one of the most vital contributions to city planning was the complete system of parks in Boston, which was developed by Olmstead and Vaux.

Public responsibility for the active play of the general populace and later for the whole range of recreational activities came over a period of thirty to forty years at the beginning of the twentieth century (8). Burnap (3) and Crowe (5) suggest a two-fold purpose for town parks: visual pleasure and physical recreation. The success of a park system depends upon how far these two ideals can be combined. Litton (18) indicates that the happiness and contentment of people living in an urban area can be maintained if our parks are made functional and beautiful and the programs carried out within their borders made creative and productive.

It is important that parks and the purposes for which they were designed be related to the over-all park system of which they are a part (8). The park must have a relationship by location to the area which it serves and to schools, streets and highways. Further consideration must

be given to present and proposed land use in the area, population analysis, including trends of growth, age groups, ethnic groups, and the age of buildings and structures. Using this information, a park of any given size can be categorized into one of Eckbo's (9) four classifications:

1) small, from one to five acres, 2) medium, from five to fifty acres, 3) large, from fifty to two hundred acres and 4) reserves over two hundred acres. Doell (8) classifies parks in a slightly different way: 1) neighborhood parks of ten acres, more or less, 2) community play fields of twenty acres, more or less, and 3) large city parks of one hundred acres or more.

Neighborhood parks are, in general, our most common form of park. Jacobs (16) expresses the view that, conventionally, neighborhood parks or parklike open spaces are considered boons conferred upon the deprived populations of cities, while in actuality we should consider city parks to be deprived places that need the boon of life and appreciation conferred upon them. He feels that, in reality, people do use parks and make them successes, or they withhold use and doom them to rejection and failure.

Although the author has stated previously that landscape design often reflects the designer's personal likes and dislikes, there are some basic considerations that must be taken into account when developing areas such as public parks. Crowe (5) points out that the scale of parks is that of the crowd, and this breadth of treatment should be carried through the design. As Doell (8) indicates, it should be kept in mind that recreational functioning in both neighborhood and community play fields is para-

mount to topographical and horticultural features, some of which have to be sacrificed to permit good operation. Chadwick (4) reiterates some of the views of two early park designers, Lancelot Brown and Humphrey Rupton. Brown was the first to advocate artificial designs to attain a naturalistic appearance. Rupton suggested one should attempt the happy medium betwixt the wildness of nature and the stiffness of formal art, and further, that in whatever relates to man, propriety and convenience are not less objects of good taste than picturesque effect.

Jacobs (16) expresses the view that good small parks typically have a place somewhere within them commonly understood to be the center--at least a main crossroads and pausing point--a climax. He states further that for neighborhood parks, the finest centers are stage settings for people and that sun is a part of a park's setting for people, shaded, to be sure, in the summer. Doell (8) believes that large auto parking lots ought to be so placed as to serve more than one purpose if at all possible.

Raymore and Ortloff (25) point out that there is no reason why recreation areas should not be attractive as well as useful. They feel childrens' playgrounds need to be more than fenced-in concrete platforms, ball field grandstands need not be ugly, though they usually are, and all sorts of recreation facilities, from the simplest to the most elaborate, can just as easily be made more attractive and add to civic beauty.

Litton (18) points out that more and more leisure time places greater responsibility on the administrators of parks and recreational facilities to provide a dynamic program for the constructive use of people's free

time. Raymore and Ortloff (25) indicate that as communities continue to expand, vacant lots and other open spaces for free play disappear, and parents realize that if children are to develop into well-rounded personalities they must have safe, well-equipped play areas. They emphasize that it has been fairly well established that the delinquency rate increases as the distance from a playground or park increases. They do not say that parks can cure delinquency, but that they can help mightily to reduce it.

Parks are a place for recreational pursuits and can be a form of recreation in themselves. The following analysis of the Bozeman city park system and the development of new park areas takes the theories contained in this literature review into consideration.

MATERIALS AND METHODS

Outline maps of all new park areas owned by the city of Bozeman, Montana, as of June, 1967, were copied on tracing vellum from city masters in the City Engineer's Office. These maps were redrawn on 36x24 inch drawing paper at scales of 50 or 100 feet to the inch. Designation of scales on the maps was three times that at which they were drawn in order for the proper scale to appear in the thesis plates, since photographing and reduction (by three times) was needed to conform to standard page size.

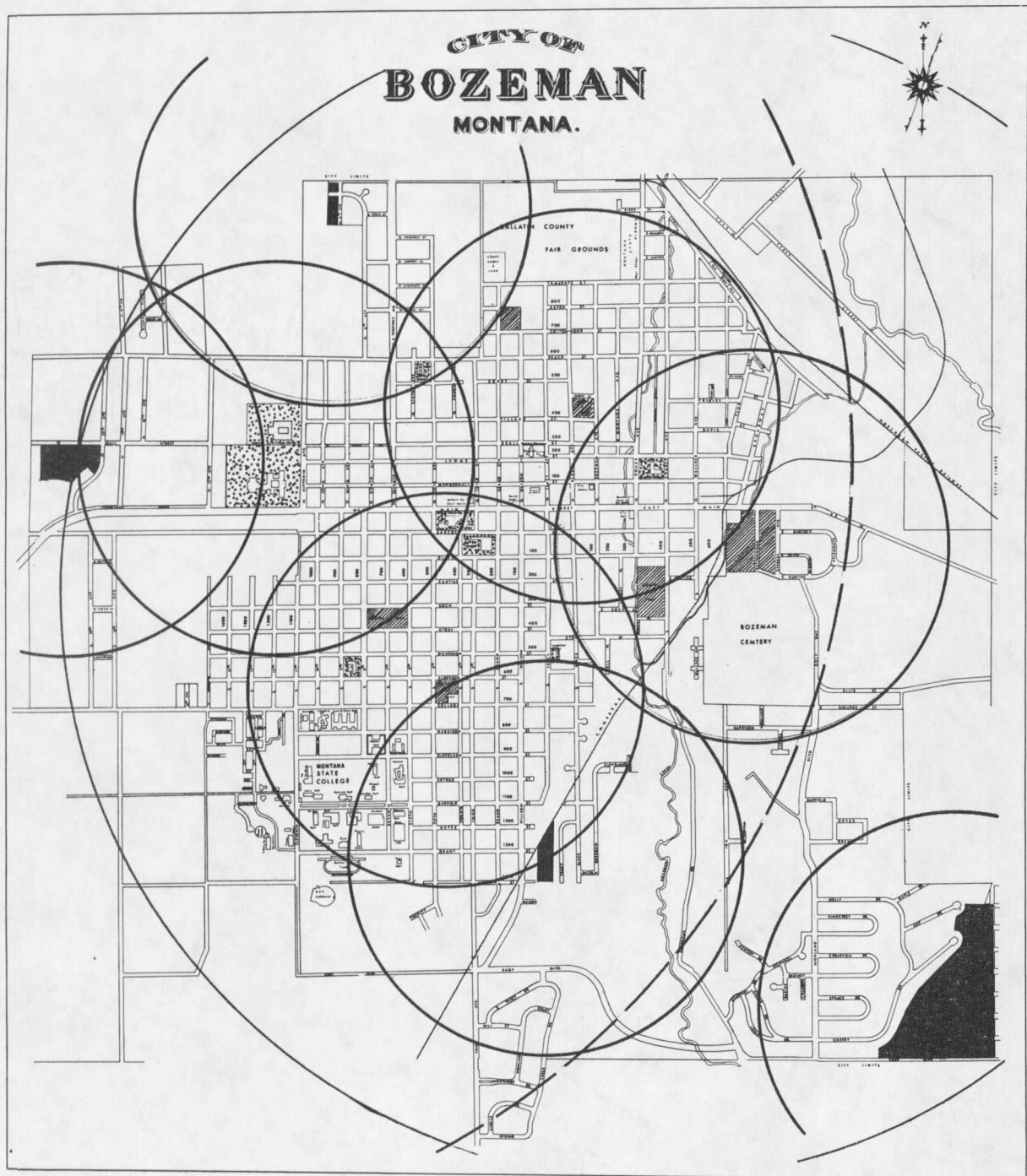
Several city maps of Bozeman were acquired at the City Hall on which relative location of existing and proposed city parks could be plotted and analyzed (Fig. 1) according to standards set forth by George Nez (Table I), Director of the Inter-County Regional Planning Commission of Denver, Colorado, in "The Urban Pattern" (12).

In some places building materials have been suggested for the purpose of complementing plant materials used in the area. Hard surfacing materials have been indicated in several places since they constitute an element of over-all park design.

Designation of plants is by code number corresponding to numbers in the Key of Plant Materials on each map, listing the scientific names of the plants used. Annual and perennial flowers are indicated by the term "flowers" where they have been designed for additional color in the parks.

Plants utilized in the developmental designs (Tables II, III, & IV) were selected with regard to their size, shape, hardiness, drought resistance and season of interest. Plants used are rated hardy in hardiness zones

FIGURE 1



I, II, and III with a few from zone IV when they are known to be hardy in Bozeman (31,32,34,35,36).

Table I. Size And Radii Of Area Served For Ideal Park Distribution (after Nez [12])

Type of Area	Acres Per 1,000 Population	Size Of Site (acres)		Radius Of Area Served (miles)
		Ideal	Minimum	
Playgrounds	1.5	4	2	0.5
Neighborhood Parks	2.0	10	5	0.5
Playfields	1.0	15	10	1.5
Community Parks	3.5	100	40	2.0
District Parks	2.0	500- 1000	varies	10.0

Table II. Trees Used In Developmental Plans For Selected Bozeman Parks

Scientific Name *	Common Name *	Zone	Height
<i>Abies concolor</i>	Concolor Fir	4	120'
<i>Acer platanoides</i>	Norway Maple	3	90'
<i>Acer platanoides</i> 'Schwedleri'	Schwedler Norway Maple	2	90'
<i>Acer platanoides</i> <i>veriegatum</i>	Harlequin Norway Maple	3	90'
<i>Aesculus x carnea</i> 'Briotii'	Ruby Horse Chestnut	3	75'
<i>Alnus tenuifolia</i>	Rocky Mountain Alder	2	30'
<i>Betula papyrifera</i>	Paper Birch	2	90'
<i>Betula verrucosa</i> 'Gracilis'	Cutleaf Weeping European White Birch	2	60'
<i>Caragana arborescens</i> 'Sutherland'	Sutherland Caragana	2	15'
<i>Elaeagnus angustifolia</i>	Russian-olive	2	20'
<i>Gleditsia triacanthos</i> 'Sunburst'	Sunburst Honeylocust	4	135'
<i>Malus</i> sp. **	Crabapple	2-4	20-50'
<i>Picea glauca</i>	White Spruce	2	80'
<i>Picea pungens</i> 'Glauca Koster'	Koster Blue Colorado Spruce	2	100'

Table II. Continued

Scientific Name *	Common Name *	Zone	Height
<i>Pinus flexilis</i>	Limber Pine	4	60'
<i>Pinus ponderosa</i>	Ponderosa Pine	4	170'
<i>Pinus sylvestris</i>	Scots Pine	2	75'
<i>Populus tremuloides</i>	Quaking Aspen	1	90'
<i>Rhus typhina</i>	Staghorn Sumac	3	30'
<i>Robinia pseudoacacia</i> 'Pyramidalis'	Fastigate Black Locust	3	60'
<i>Sorbus aucuparia</i>	European Mountain Ash	2	45'
<i>Sorbus scopulina</i>	Greene's Mountain Ash	2	20'
<i>Syringa amurensis</i> var. <i>japonica</i>	Japanese Tree Lilac	3	25'
<i>Tilia cordata</i>	Littleleaf Linden	3	90'
<i>Ulmus pumila</i> 'Dropmore'	Dropmore Siberian Elm	2	120'

* (20)

** Cultivars to be selected by the Gallatin Empire Garden Club.

Table III. Shrubs Used In Developmental Plans For Selected Bozeman Parks

Scientific Name *	Common Name *	Zone	Height
Caragana arborescens 'Sutherland'	Sutherland Caragana	2	25'
Juniperus chinensis 'Pfitzeriana Aurea'	Golden Juniper Pfitzer	3	6'
Juniperus chinensis 'Pfitzeriana Glauca'	Blue Pfitzer Juniper	3	6'
Mahonia repens	Creeping Mahonia	5	10"
Salix sp.	Native Willow	1	15'

* (20)

Table IV. Dwarf Evergreens Used In The South Tracy Avenue Park

Scientific Name *	Common Name *	Zone	Height
Juniperus squamata 'Loberi'	Loberi Juniper	4	4'
Juniperus squamata var. meyeri	Meyeri Juniper	4	6'
Picea abies 'Pumila'	Pumila Dwarf Norway Spruce	2	5'

* (20)

RESULTS AND DISCUSSION

Results of preliminary observations indicated three important factors which should determine present development of the Bozeman city park system.

1) Distribution of existing parks throughout the city is good. 2) South-side, Beall and Bogart parks provide intensive recreational use through ice skating and swimming facilities. 3) In general, many of the undeveloped park lands owned by the city are small, inaccessible to the general public, and would be costly to maintain.

With these three factors in mind, four undeveloped parks were selected which are large enough for possible development, which would fulfill the need for parks in newer areas of Bozeman, and which could provide a number of community services now unavailable to Bozeman residents and visitors. The four parks selected are North Ninth Area (2.2 acres), South Tracy Avenue Area (6.3 acres), West Main Area (11.5 acres) and Hyalite Area (14.3 acres of existing city land, plus 40.0 acres of potentially available land). Specific reasons for the selection of these four parks will be given as each park is discussed in regard to the over-all city park system and in relation to its proposed development.

Three important considerations should be pointed out, however. 1) The two new special purpose parks are in opposite corners of Bozeman. 2) The tourist-oriented parks are situated in a manner which should increase commerce. 3) The development of some of the existing parkland is uneconomical. It is suggested that the city either lease or sell the land back to the housing developments involved and use the increased revenues for development of the more desirable parklands and to purchase additional

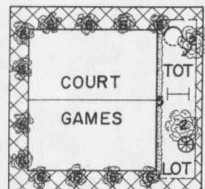
areas.

North Ninth Area

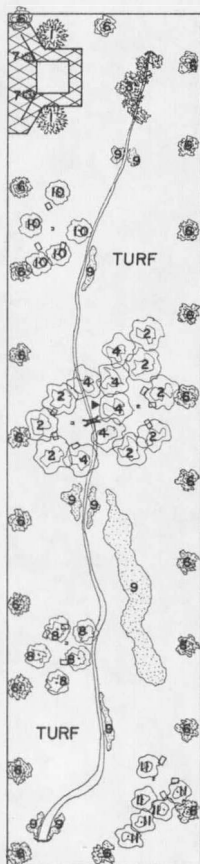
The North Ninth Area (Fig. 2) is situated two blocks west of North Seventh Avenue, within three or four blocks of the U.S. 10 Interstate interchange. Expedient acquisition of access to this area could create a desirable service facility for visitors to Bozeman, while at the same time providing park facilities for residents of the neighborhood.

At the present time the area is being used as horse pasture. The groundcover consists of native grasses intermixed with herbaceous annuals and perennials. A small perennial creek bisects the area from south to north with native willows growing along its banks. Continuation of North Eighth Avenue would separate approximately one-sixth of the area at the north end from the remaining area. Construction of a culvert to carry the creek water and some leveling would allow development of recreational facilities in this area. A hard surface area large enough for two tennis courts in combination with two basketball courts could be developed on the western portion. The eastern part could be utilized as a tot lot, with a planting of 'Sutherland' Caragana providing a screen from the hard surface area. 'Sutherland' Caragana is suggested because of its narrow columnar habit which would require very little, if any, pruning to maintain a good screen. Two Norway Maples in the tot lot would provide shade in the summer and allow insolation in the winter when they loose their leaves. Russian olives were used around the court area and the larger part of the park to create unity between the two sections. Also, because

FIGURE 2



PLANT MATERIALS

VISITOR
CENTER

1. ABIES CONCOLOR
2. ACER PLATANOIDES
3. ALNUS TENUIFOLIA
4. BETULA PAPYRIFERA
5. CARAGANA ARBORESCENS 'SUTHERLAND'
6. ELAEAGNUS ANGUSTIFOLIA
7. JUNIPERUS CHINENSIS 'PFITZERIANA AUREA'
8. POPULUS TREMULOIDES
9. SALIX SP. (EXISTING)
10. SORBUS SCOPULINA
11. TILIA CORDATA

LEGEND

DRINKING WATER ▶

FIRE PLACE ◌

TABLE ◻



NORTH NINTH AREA
SCALE 1"=150'-0"
ALAN C. EPPS

they are extremely hardy and drought resistant, it was felt that they would survive being planted in small beds enclosed with paving materials.

Organic groundcovers were not used in this section of the park in order to facilitate maintenance and to reduce mud and water hazards to users of the area. The tot lot was surfaced with pea gravel six to eight inches in depth, which will reduce, to a minimum, injuries to the small children using this section. The outer portion of this area was paved with concrete slabs utilizing 2x4 redwood divider strips in a forty-five degree gridiron pattern, extending to the outer edges, and leaving squares unpaved with a four inch layer of crushed travertine to control weeds, allow for water percolation and provide aeration for tree roots.

The larger section of the park to the south was utilized for an information center and rest area for visitors to Bozeman. The visitors' center consists of a building of stained native building materials in which are housed restrooms and an information booth. On the left and right sides of the building would be large sign boards showing maps of the area and giving location information for various recreational facilities in the Gallatin Valley and the surrounding area. The paving around the building is a variation of that used across the street, with only a change in angle of the redwood strips to sixty degrees from the street. Two planting beds in the front are planted with Golden Pfitzer Juniper for contrast with the building materials. Crushed travertine was again used around these plants. Two Concolor Firs were planted on each side of the building for framing and to give color to this area corresponding with the street planting all

around the park.

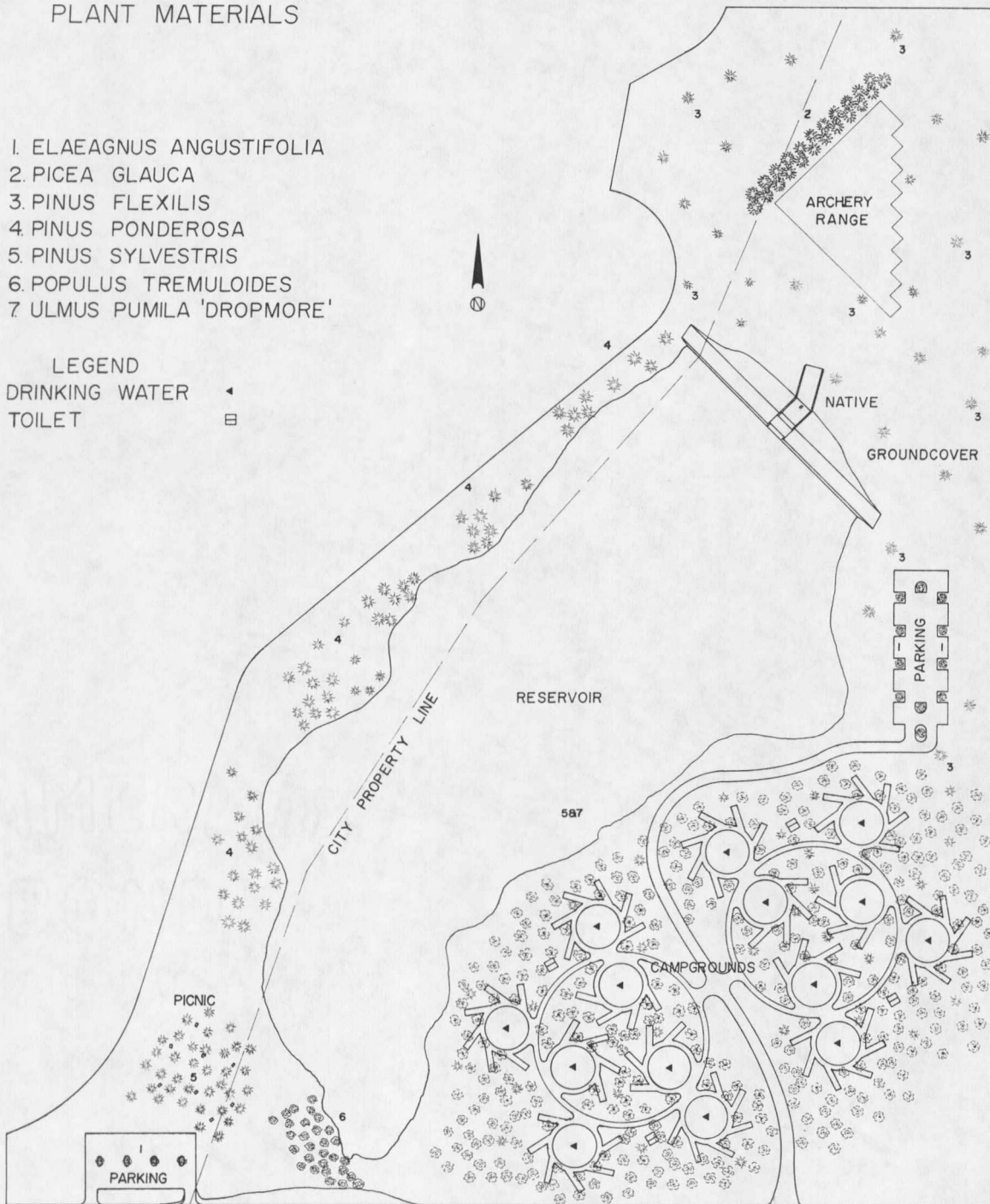
The rest of the park was devoted to open space, and groupings of native and exotic plants intermixed with picnicking facilities. Native plants included Greene's Mountain Ash, Mountain Alder, Quaking Aspen and Willows. Russian Olives, Norway Maples, Paper Birch and European Littleleaf Linden constitute the exotics. The stream banks were smoothed and one channel selected as the primary water carrier. A foot bridge was placed in the center of the park to provide for pedestrian crossing. Drinking water was provided near the bridge, since this is a central location. The entire open area was planted in Kentucky bluegrass turf.

Hyalite Area

The other visitor-oriented park (Fig. 3) lies in the opposite corner of Bozeman, on the southeastern edge, north of Kagy Lane and approximately three blocks east of Highland Boulevard. The city-owned property at this site has questionable developmental potential. It consists of long, narrow irregularly shaped arms, flanked on the west by privately owned building lots. Access to this area for the general public is limited to eight alleyways, ten to twenty feet wide and six alleyways fifty to seventy-five feet wide.

Development of interarms would provide pleasing parklands for the homeowners in the housing development, but these are questionable park areas for the remaining residents of Bozeman. Therefore, it seems advisable to utilize only 14.3 acres along the eastern edge and acquire 40.4 additional acres for the development of park facilities which could be used by the

FIGURE 3
PLANT MATERIALS



HYALITE AREA
SCALE 1"=300'-0"
ALAN C. EPPS

general public.

The total proposed park area is characterized by a large coulee in the western half which contains a population of native grasses, forbs and a few shrubs. The remaining eastern part is presently under cultivation as a wheat field. The coulee lends itself to the development of a recreational reservoir by the construction of an earthen fill dam, forty feet high. This dam would back water into the upper two-thirds of the coulee and would create a reservoir of about 17.2 acres in size. According to the Geological Survey Water-Supply Paper 1482 (1960) water is available in the coulee. There is a record of two hand dug wells in the immediate vicinity. One had been abandoned at the time of the USGS report, but water occurred 40.85 feet below the ground surface in the other. The soil strata in the area is apparently capable of holding large volumes of surface water since the city has constructed a number of large sewage settling basins down the coulee from the proposed reservoir. If the reservoir did not hold water, sodium salts could be incorporated into the soil to make it less pervious. Also, the use of plastic liners for recreational water bodies has proven feasible in other areas where water loss was a problem. Bozeman has no ponds or lakes large enough for water-based recreational development near by so the development of such a reservoir would fill a gap which presently exists in the city's recreational facilities.

Since a large part of the total area is presently covered by native grassland vegetation, it appears advisable to return the cultivated portion to native groundcover.

Bozeman presently has no community facilities for overnight campers. The author believes that development of such facilities would be an asset to the community. A seventy-two unit camping development was planned for the southeast corner of this park. Adequate control of camper use could be provided by utilizing two large circles with seven smaller circles coming off the two primary ones. To minimize deterioration from trampling of groundcover plants, numerous combinations of these circles could be opened or closed to camper use. The trees used in and around the campsites were Dropmore Elm and Scots Pine since they have good drought tolerance as does the native Limber Pine around the north end of the reservoir. This will facilitate maintenance since, after establishment, supplementary watering of the entire area should be unnecessary.

In the coulee north of the reservoir an archery range was planned. This is also a facility not provided in Bozeman at the present time. A tight grouping of White Spruce at the northwest end of the range (the target area) will minimize the danger of deflected arrows leaving the range area.

Along the western side of the reservoir groupings of native Ponderosa Pine were used for the purpose of creating a partial screen for the Hyalite Subdivision. On the western shore of the reservoir at the south end, a picnic area was planned among a grouping of Scots Pine. In the bottom of the coulee at the south end of the reservoir a group of Quaking Aspen were suggested since soil moisture would be adequate here to meet the needs of this species.

Two parking lots were proposed; one adjacent to the picnic area having a capacity of sixty cars, and one north of the camping area with a capacity of eighty cars. Russian Olives were used for plantings in these lots since their unique color would aid in distinguishing the lots from the surroundings.

South Tracy Area

The third undeveloped park chosen for development was the South Tracy Area (Fig. 4) in the southern part of Bozeman. This site is presently used as horse pasture. Very little, if any, earth moving would be required in the park except for the small pond, around which an oriental garden has been designed. Three springs flow from the slight slope on the western edge of the property, and Little Spring Creek cuts through the south-east corner and down the eastern edge of the park site.

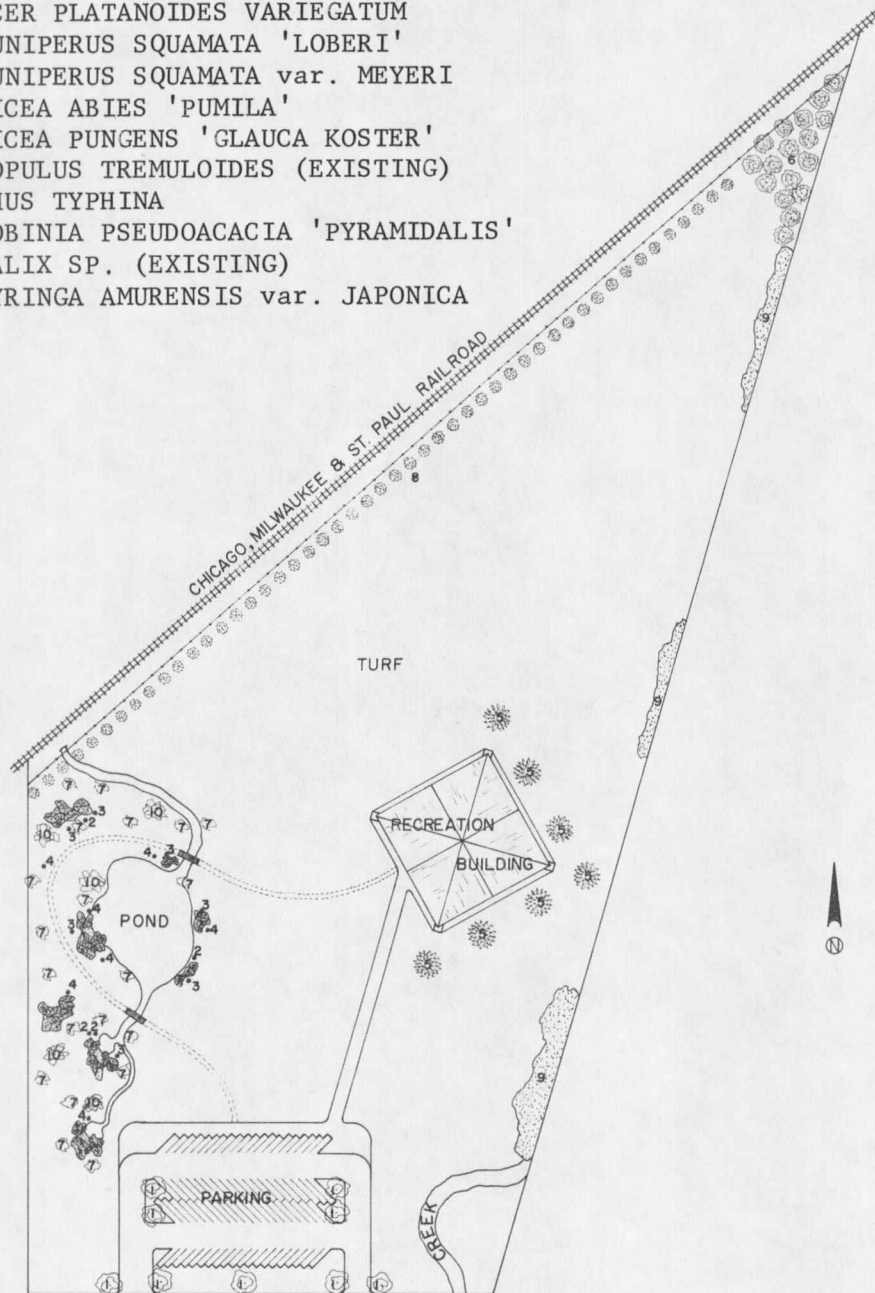
Development of this park would provide recreational facilities for those residents of Bozeman living along Sourdough Road and in the Westridge Subdivision. Playground equipment has not been included in the plan since a new grade school, which will provide these facilities, is proposed just east of the park site along Sourdough Road.

The park was designed as a visual beauty area with a recreation building for group activities. Parking facilities with accommodations for eighty cars were designed at the south end. The existing groups of willows along the creek on the eastern edge of the property have been preserved, as have the Quaking Aspen in the northern corner. A row of Fastigiata Black Locust was proposed along the northwest boundary. Their

FIGURE 4

PLANT MATERIALS

1. ACER PLATANOIDES VARIEGATUM
2. JUNIPERUS SQUAMATA 'LOBERI'
3. JUNIPERUS SQUAMATA var. MEYERI
4. PICEA ABIES 'PUMILA'
5. PICEA PUNGENS 'GLAUCA KOSTER'
6. POPULUS TREMULOIDES (EXISTING)
7. RHUS TYPHINA
8. ROBINIA PSEUDOACACIA 'PYRAMIDALIS'
9. SALIX SP. (EXISTING)
10. SYRINGA AMURENSIS var. JAPONICA



SOUTH TRACY AVENUE AREA
 SCALE 1"=150'-0"
 ALAN C. EPPS

tall, narrow habit and fine foliage characteristics would add an interesting contrast to the park while functioning to screen from view the spur line of the C.M. & St. P. Railroad.

An Oriental Garden has been suggested for the area around the three existing springs. Large rocks placed around these springs would create an interesting effect, as well as creating three small water falls. Two springs will act as a source for a small creek and the third would tumble into the small pond fed by the creek. Other large rocks, placed around the pond and in the garden would create additional interest. Spring bulbs should be planted around these rocks as a source of spring color in the garden. Staghorn Sumac and Japanese Tree Lilac were used as deciduous specimen trees because of their interesting oriental-like growth habits and their good summer, fall and winter color.

Three species of dwarf conifers were used around the rocks in the garden area. They are the Meyer Juniper (loose, open fan shape), the Loberi Juniper (dense, columnar form), and the Pumila Dwarf Norway Spruce (low, spreading bush with a more or less irregular outline). A path, surfaced with crushed travertine, leads from the parking lot across the creek on rustic arching bridges, through the Oriental Garden, back across the creek and to the recreation building.

The recreation building, of A-frame construction, is framed and screened on the northeast and southeast by Koster Colorado Blue Spruce. The parking lot was designed with Harlequin Norway Maple which is a variegated variety and should add some interest to the park. In all

unpaved areas Kentucky bluegrass was suggested as a groundcover.

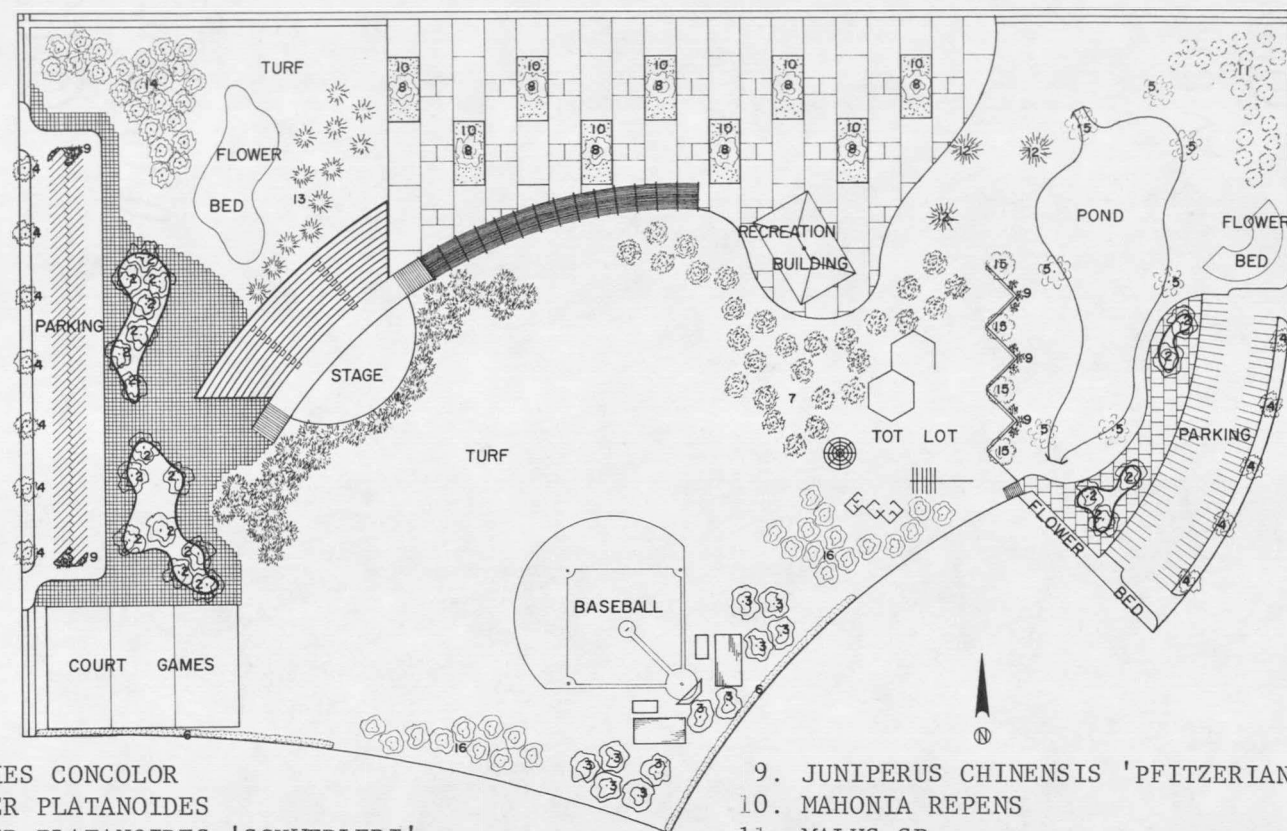
West Main Street Area

The fourth park chosen for development was the West Main Street Area (Fig. 5) in the western part of Bozeman. It is bordered, in part, on the east side by North Twentieth Avenue and on the north by West Beall Street. When this project was started (since then the development of the park has begun, utilizing development designs by Theodore Wirth & Associates) the area was relatively level, with a creek traversing it from south to north about one-third of the way in from the eastern side. An abandoned earthen stock tank lay just east of this creek in the northeast corner. Half a dozen very poor specimens of Green Ash, Fraxinus pennsylvanica are presently in this area also. The western portion of the park from the creek westward was in cultivation as an alfalfa field.

With considerable study, it was decided that this area could best be developed as a large multi-purpose community park for the entire city. This park is easily accessible from all areas of Bozeman and would provide many now nonexistent community services, such as an outdoor theater area for orchestral and theatrical presentations. The topography and size of this area lends itself to the development of a multifacility park. This fact was used as a guide in preparing a design.

Two large off-street parking lots were planned on opposite sides of the park; the west lot accommodating one hundred cars and the east lot having a capacity of seventy-two cars. Street plantings chosen for these lots were the Ruby Horse Chestnut, which has distinctive foliage and bark,

FIGURE 5



1. ABIES CONCOLOR
2. ACER PLATANOIDES
3. ACER PLATANOIDES 'SCHWEDLERI'
4. AESCULUS x CARNEA 'BRIOTII'
5. BETULA VERRUCOSA 'GRACILIS'
6. CARAGANA ARBORESCENS 'SUTHERLAND'
7. ELAEAGNUS ANGUSTIFOLIA
8. GLEDITSIA TRIACANTHOS 'SUNBURST'

PLANT
MATERIALS

9. JUNIPERUS CHINENSIS 'PFITZERIANA GLAUCA'
10. MAHONIA REPENS
11. MALUS SP.
12. PINUS PONDEROSA
13. PINUS SYLVESTRIS
14. POPULUS TREMULOIDES
15. SORBUS AUCUPARIA
16. TILIA CORDATA

WEST MAIN STREET AREA
SCALE 1"=150'-0"
ALAN C. EPPS

plus the special characteristic of red flowers.

The eastern part of the park was designed as a quiet, restful beauty spot. Two large flower beds were designed for this area. It is suggested that these, and the one in the northwest corner, could be planted and cared for by local garden clubs. Adjacent to the east parking lot is an area of pavement utilizing staggered square paving pieces. Within this paved area are two raised planters with benches at their outer edges. The Norway maples planted within these planters are underlain with shingletow as a groundcover material. Enlargement of the stock tank would create a quiet pond with Cut-leaf Weeping Birches designed to be planted along the banks. The extreme northeast corner is devoted to a crabapple collection for which there has been interest expressed in the past by the local garden club. The selection of crabapple cultivars has been left to this organization's discretion.

To separate this area from the more actively used central portion of the park, a change of grade was designed utilizing a sawtoothed native rock wall. The points of the wall were planted with Blue Pfitzer Junipers while European Mountain Ash was used in the pockets. Three specimens of the State tree, the Ponderosa Pine, were utilized north of the wall as a partial visual break.

A tot lot was designed immediately west of the change in grade, with the top of the rock wall acting as a seating facility for those watching their children. This lot is screened off to the south by a grouping of Littleleaf Lindens and to the north by a grouping of Russian Olives.

The south central portion of the park was devoted to a baseball field. Enclosed painted bleachers are used with Schwedler Maples grouped around them for shade. Another group of Littleleaf Lindens was used along the southern edge of the playing field to maintain symmetry with the ball field.

A large hard surface area was designed for the southwest corner, incorporating three basketball and tennis courts. Sutherland Caragana hedges were used as sound barriers along the southern edge of the park at points where noise would be of high intensity.

North of the courts a large area was designed of geometric paving in which two large raised planters act as islands. These planters are designed like those in the eastern part of the park. This large area provides access to the outdoor theater, which should be constructed so that half of the seats would be below ground level (as would the stage) and half would be above the ground. Concolor firs were proposed as an attractive back drop to the stage because of their pleasing light blue color and very dense growth habit.

A lattice covered walk way would lead from the east stairway of the theater toward the recreation building along the edge of a geometrically paved area. Nine rectangular unpaved areas are planted with Sunburst Thornless Honeylocust and native Creeping Mahonia as a groundcover, for space division. A large group of native Quaking Aspen were in the northwest corner on the west side of a large flower bed with a group of Scots Pine on the east, acting as a partial screen for the outdoor theater. All

open areas should be seeded with Kentucky bluegrass, with the exception of those areas which are paved or have designated groundcovers.

SUMMARY

It was the purpose of this study to take a realistic look at Bozeman's city park system and to design developmental plans for those new park areas which were needed and which warrant the expenditure of large sums of capital for development.

In order to do this it was necessary to analyze existing parks and recreational facilities in relation to undeveloped park lands and recreational needs. Selected sites were then drawn at large scales from which final developmental designs could be prepared. The completed plans were photographed and reduced in size and scale for use in this thesis.

Plant materials utilized in the developmental designs were selected for their hardiness, form, period of display and ease of maintenance. The suggested construction materials were chosen for design emphasis.

Each selected undeveloped park area has been discussed in relation to the over-all park system, including suggestions concerning why certain recreational facilities were included in the designs. If Bozeman is to remain a desirable place to live, the city administrators must develop a more realistic policy for accepting land for park development in order that needs of the future can be met.

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