A SENSORY GARDEN FOR THE DALLAS ARBORETUM

by

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for Hunter Kenison Presnall

This project is dedicated to my family:

For Mother and Daddy whose love has helped me persevere;

For Miles and Natalie who have patiently endured my absences, both physical and mental;

For Don who gave me the confidence to begin and the courage to finish.

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CONTENTS

MISCELLANEOUS

INTRODUCTION

HYPOTHESIS

Design is most often carried out as an aesthetic exercise in visual affect and spatial treatment. If more stimulation of other human senses (orienting, auditory, smell/taste, visual,and haptic) were to occur in a place, perhaps the place would become more meaningful and memorable. In an effort to address this hypothesis, a Sensory Garden was designed, and hopefully will be implemented.

RESEARCH

Research for the design thesis was begun before a specific site was analyzed. This was a very time consuming and thought provoking process. Data in the fields of biology, psychology, sociology, medicine, meterology, archeology, landscape architecture, architecture, and anthropology was collected to gain as much knowledge as possible about human senses, memory, and perception.

Differences and similarities of opinion occurred in the data which was collected. The users of a place must derive meaning from the place in order for the place to be successful. " People react to environments

in terms of the meanings the environments have for them." (Rapoport, 1982)

Research by anthropologist Edward T. Hall revealed the multisensory character of mans' existence. Man, like all organisms, must not only respond with each of his senses but must also be able to store and retrieve multisensory information as well." He found that humans store and process information differently. Often one particular sense is more heavily relied upon than another in recollection . For instance, one person, while lying in bed, can ski a certain slope he has been on in the past because his haptic sense is very acute. Another person can recall an experience from the past based on the way it smelled. (Hall, 1981)

In Beyond Culture, Hall speaks of his "shock" when dealing with architects after his being so entrenched in the verbal world of psychiatrists and psychoalalysts for such a long time. To him, they are very visualy oriented (in two dimensions). This thesis design attempts to address this issue.

Like many other authors, Hall believes that "in addition to the talents that people are born with, culture has always exerted a dominant influence on memory and thinking". (Hall, 1981) Perceptions are perceived differently by two different people of two

different cultures. According to Hall (1966):

> Selective screening of sensory data admits some things while filtering out others, so that experience as it is perceived through one set of culturally patterned sensory screens is quite different from experience perceived through another. The architecture and urban environments that people create are expressions of this filtering-screening process. In fact, from these man altered environments, it is possible to learn how different people use their senses. Experience, therefore cannot be counted on as a s t a b l e point of reference, because it occurs in a setting that has been moulded by man.

According to James M. Fitch (1972), humans use their senses equally:

> Most discussion of buildings has been always in primarily visual terms. Consciously or unconsciously, explicitly or implicitly, judgements based on vision have dominated architectural opinion. Actually, of course, there is quite as much justification for measuring buildings on any other sensory bases: Have you heard the new Jones house? . What does the kithen smell like? How do the stairs feel? Do the windows get on your nerves? Though we are trained to think otherwise, we experience buildings through our senses equally; our entire sensory and muscular systems are involved in our use of buildings.

Still , another theory states that in some humans a crossover in the brain occurs in which stimulation of one sense is perceived by another sense. This theory, accepted by the medical community, is called synesthesia, a word derived from the Greek word " syn",

meaning union, and the word " aisthesis" meaning perception; thus, a "joining of the senses". (Britanica,1987) to illustrate this idea, one person having the phenomenon of synesthesis might say that another person's voice sounds yellow and crumbly.

The biologists traditionally have stated that humans have five senses, but this is misleading because some overlap occurs and because some can be sub-divided. In a effort to analyze and synthesize stimulants in the environment and to relate them to specific sense organs, a chart was made and referred to regularly throughout the design process.

For this purpose, the senses were classified as follows:

1. Orienting
2. Auditory
3. Smell/Taste
4. Visual
5. Haptic-cutaneous
6. Haptic-kinesthetic

HUMAN PERCEPTUAL SYSTEMS AND STIMULI

SYSTEM	MODE	RECEPTOR	STRUCTURE	ACTIVITY	TYPE INFO	STIMULI	
ORIENTING	POSTURING & GENERAL ORIENTATION	MECHANO- & GRAVITY RECEPTORS	VESTIBULAR ORGAN OF INNER EAR	EQUILIBRIUM & BALANCE	DIRECTION OF GRAVITY, PUSHED & PULLED	VISTAS → MOVEMENT TILTED WALKS, BENCHES UNDULATING " " BRIDGES	MAZES SWINGS
AUDITORY	LISTENING	MECHANO-RECEPTORS	COCHLEA (INNER EAR)	ORIENTING TO SOUNDS	NATURE & LOCATION OF VIBRATORY SOURCES	BIRDS WIND - RUSTLING PLANTS CHIMES FOOTSTEPS ON DIFF. PAVING	WATER SILENCE FIRE
SMELL-TASTE	SMELLING TASTING	CHEMO-RECEPTORS CHEMO- & MECHANO.	NOSE MOUTH	SNIFFING SAVORING	NATURE & SOURCE OF ODORS - NUTRITIVE	PLANT PRODUCTS FOR MULCH & WALKS IRRIGATION ↑ ESSENTIAL OILS FIRE ASSOCIATION W/ MEMORY	
VISUAL	LOOKING	PHOTO-RECEPTORS	EYES & OCULAR MUSCLES	ACCOMODATION, PUPILLARY ADJUSTMENT, FIXATION SCANNING	SIZE, SHAPE DISTANCE, LOCATION, COLOR, TEXTURE MOVEMENT	ILLUSIONS TREADMILLS WALL ART MORE GROUND " CUBISM SHADOWS FIRE	FIGURE vs. GND. PLANE EXTENTS TEXTURE ↑ AS DIST ↓ BORROWED LANDSCAPE JERRY'S COOL DRIPS - COOLE WIDMA HIDE & REVEAL BORROWED LANDSCAPE
HAPTIC C-TANEOUS	TOUCHING & FEELING	MECHANO & THERMO. EXTEROCEPTIVE (SKIN)	SKIN	EXPLORATION	CONTACT W/ SURFACES, SHAPES, SOLIDITY OR VISCOSITY HEAT, COLD, PAIN	SENSUAL COOLING EFFECTS: • BAY LAVENDER, ROSEMARY & THYME • SWINGS • WIND FUNNELS • WATER • BELLS • COOL COLORS	LEAVES TO BLEED: • REFLECTIVE • AROID • FIRE & WIND TEXTURE: • PLANTS • WALLS • FURNITURE • HANDRAIL • WAX
HAPTIC KINESTHETIC	MOVING	PROPRIO-RECEPTORS	JOINT, MUSCLES, TENDONS & LIGAMENTS	EXPLORATION BY APPENDAGES	AWARENESS OF MOVEMENT OF BODY PARTS	RAMPS TREADMILL CHANGES IN ELEVATION	CHANGES IN ELEVATION TREADMILL

According to Hall (1966):

> There is a general relationship between the evolutionary age of the receptor system and the amount and quality of information it conveys to the central nervous system. The tactile or touch systems are as old as life itself; indeed the ability to respond to stimuli is one of the basic criteria of life. Sight was the last and most specialized sense to be developed in man. Vision became more important and olfaction less essential when man's ancestors left the ground and took to the trees. Stereoscopic vision is essential in aboreal life. Without it jumping from branch to branch became very precarious.

Imaging and memory derived from the senses of hearing and vision have been greatly studied. The other senses have been neglected. The National Geographic Society is performing a massive study at this time, however, on the olfactory sense. This thesis design will utilize their findings at a later date (see letter from The National Geographic Magazine in the appendix).

According to Hall (1966):

> Even in an olfactory underdeveloped species, Americans stand out. Extensive use of deodorants and the supression of odor in public places results in a land of olfactory blandness and sameness that cannot be duplicated anywhere else in the world.
>
> This blandness makes for undifferenrtiated spaces, and deprives Americans of richness and variety in their lives. Our memories also suffer, for smells evoke memories much deeper than either vision or sound.

> Americans have cut themselves off from a powerful communications channel, olfaction.

Similarily, Schiffman (1982) believes that:

> One of the striking aspects of odor memory is that although the initial identification and recognition of odors is not nearly as high as for visual stimuli, the retention of memory for odors is quite long lasting. That is, although there is only moderate recognition for odors compared to say, pictures, the memory of odors show relatively little loss over time.

CASE STUDIES

As far as can be determined no other Sensory Gardens exist in the United States. That is to say, that no other gardens in the United States exist which were designed explicitly to stimulate all the senses. There is a Fragrance Garden at the Strybing Arboretum at Golden Gate Park in San Francisco California. Several Gardens for the Blind exist. (San Antonio, Texas and Fort Worth, Texas)

GOALS, OBJECTIVES, AND PROGRAM ELEMENTS

I. Goal # 1: Provide a Development Plan for a highly usable Sensory Garden at the Dallas Arboretum which will stimulate the senses of: orientation, listening, touching and feeling, smelling and tasting,moving, and looking,thereby making the place meaningful and memorable.

A. Objectives:
1. Provide pedestrian circulation
2. Provide emergency and tram vehicular circulation
3. Provide stimulation for the senses
4. Provide the Dallas Arboretum with:
   a. Overall design plan showing existing or proposes structures, all hardscape elements, softscape elements, existing grades, and key proposed spot grades
   b. A minimum of three sections
   c. Grading plan showing existing and proposed contours and all pertinent spot grades
   d. Planting plan giving names, quantities and spacing of all plants
   e. Layout plan showing structural materials
   f. Technical information including plant lists and cut-and-fill estimates
   g. Details or elevations of significant elements
   h. Model or 2 three-dimensional drawings
5. Become familiar with the subject
   a. Interview if possible: a wheelchair user, a deaf person, blind person, caretaker from the Dallas Arboretum, member of the Audubon Society, horticulturist from the Arboretum, an entemologist
   b. Tour the Dallas Arboretum via wheelchair
   c. Study other Sensory Gardens and Gardens for the Blind
   d. Read background materials
6. Increase the bioclimatic comfort levels of the site in order to extend the time the Sensory Garden can be used

7. Alleviate obtrusive noises from the pherifery of the site to increase the enjoyability of the Sensory Garden

B. Program elements
   1. Provide handicap access from the adjacent Sunken Garden and Color Garden
   2. Provide access from the stairs west of the DeGolyer home
   3. Provide a 15' min. emergency vehicular access
   4. Provide a heirarchy for pedestrian circulation:
      a. Primary- 10 min. width
      b. Secondary- 6' min. width
      c. Tertiary- 3' min. width
   5. Use noise attenuators to alleviate obtrusive noises if viable:
      a. Buffers:
         (1) Vegetative
         (2) Structural
      b. Masking devices(examples)
         (1) Birds
         (2) Rusltling leaves
         (3) Fountains
   6. Use shelterbelts when necessary to manipulate air flow
   7. Thin understory to increase air circulation when valid
   8. Use evaporative cooling devices to alleviate discomfort from high heat
   9. Provide use areas which are sunny in the winter and shady in the summer
   10. Ideal deciduous vegetation should foliate in April and defoliate in October
   11. Provide stimulation for the senses - see chart of human perceptual systems
   12. Have ample visual stimulation so as not to single out the blind and thereby not have people refer to this garden as a" garden for the blind"

II. Goal #2: Provide educational experiences for those who visit the Sensory Garden

A. Objectives:
   1. Identify the sensory stimulators
   2. Make reccommendations to the Dallas Arboretum for other methods of education

B. Program elements:

1. Have Braille inscriptions to identify features
   a.Have brochures to distribute which shall include:
   b. Larger than normal lettering for the visually impaired
   c. Plans of the garden
   d. Concept and intentions of the garden
   e. Biological data on the sense organs
   f. Other pertinent information and drawings
2. Have guided tours available
3. Have items in the gift shop which reinforce the experiences in the garden
4. Have a sensory festival on the site
5. Have workshops given by
   a. A blind person
   b. An herb expert
   c. A deaf person
   d. A wheelchair user
   e. A biologist
   f. A botanist
   g. A meteorologist
   h. A landscape architect
   i. A psychologist
   j. An architect
   k. A chef

III. Goal #3: Provide a Sensory Garden which will relate to and respect the natural landscape and architecture of the Dallas Arboretum and it environs

A. Objectives
   1. Respect the guidelines for maintaining the designation as a National Historic Landmark
   2. Design with the natural systems as much as possible
   3. Capitalize on borrowed landscape (White Rock Lake)

B. Program elements
   1. Maintain vista off the Great Terrace of the DeGolyer home
   2. Maintain the lawn-like component in the area west of the Great Terrace
   3. Do not increase storm water run off
   4. Provide erosion control measures:
      a. Maintain or decrease the angle of repose unless methods are used to prevent slipage

b. Use the topography to aide in natural run off

c. Use erosion control where applicable

(1) Vegetative

(2) Structural

(a) Bench terraces

(b) Berms which can intercept water and divert it into swales: 3:1 for grass and 2:1 for other ground cover and shrubbery

(c) Diversion dikes of channels- parallel to the contours above critical slopes

(d) Open paving systems

5. Specify drought tolerant vegetation whenever possible in order to acheive the set goals

6. Preserve wildlife on the site and encourage ones which would naturally live here to move on to the site. If detrimental (to man) species exist, measures should be taken to relocate them.

7. Do not obstruct all views to White Rock Lake and when possible enhance the views

SITE SELECTION

In their Master Plan of 1983,landscape architects Jones and Jones of Seattle, Washington called for a Sensory Garden for The Dallas Arboretum. In 1987, when landscape architects Richard B. Myrick and Luis Santana updated the Master Plan for The Dallas Arboretum, the concept of a Sensory Garden was maintained. Their guidelines for the Sensory Garden are as follows: "a garden designed to appeal to all the senses-smell, sight, touch , and sound, and to those with special handicaps such as the visually impaired. Located west of the Degolyer "Great Lawn" it will be accessible from both Degolyer and adjacent gardens". This site was chosen for the thesis design not only because a Sensory Garden was in the Master Plan but also because it is a public place which attracts many visitors, a fact which would help satiate Goal #2 concerning the education of the public regarding spaces appealing to all the senses. This particular site was also chosen because The Dallas Arboretum has goals corresponding to the thesis Goal #3 concerning mans' impact upon nature.

SITE INVENTORY AND ANALYSIS

The site for the Sensory Garden is at the Dallas Arboretum. The Dallas Arboretum is a beautiful natural resource located in the heart of Dallas. The property is bordered by Garland Road, Lawther Drive East, White Rock Lake and a residential neighborhood. The specific site within the Arboretum for the Sensory Garden is bordered on the north by the Sunken Garden, on the west by Lawther Drive, on the south by the Margaret Elizabeth Jonnson Garden and on the east by the DeGolyer home. The DeGolyer home is a significant feature of the site.

In 1939, on the site of a former dairy farm, Everette DeGolyer, a prominant geologist, scientist and petroleum executive, and his wife built their home. So many native oaks graced the property that they named it Rancho Encinal. Two California architects, Denman Scott and Burton Schutt designed the house in the Spanish Colonial Revival Style. Arthur Berger and his wife Maria, prominent Dallas landscape architects, designed the landscape and gardens of the site. The estate is listed in the National Register of Historic Places Inventory under the category of "1900-present, architecture, landscape architecture and science". A

copy of the nomination form is included in the appendix.

A significant feature of the DeGolyer house is its Great Terrace which overlooks the site of the Sensory Garden. It is a sweeping curved lawn terrace connected to the house. Also of importance in terms of the development of the site is the axis from the DeGolyer library. Given the hitorical designation of the DeGolyer estate, any design on the site should respect the existing conditions and capitalize on them.

White Rock Lake is visible from the site. This natural resource should be utilized. Design should capitalize on the borrowed landscape.

Soil on the site is Ferris Urban Land Complex. It is deep and well drained. Typically, the Ferris soil is moderately alkaline, light yellowish brown clay three inches (3") thick. To a depth of twenty eight inches (28"), the soil is moderately alkaline, olive clay. To a depth of forty one inches (41"), it is moderately alkaline, light brownish gray clay. The layer below that, to a depth of seventy two inches (72"), consists of mottled, light brownish gray, light olive brown, and gray shaly clay.

Permeability of Ferris soil is very slow, and the available water capacity is high. Runoff is rapid and erosion hazard is severe.

The principal limiting characteristics of the use of this soil are very high shrink-swell potential, low strength, and corosivity of the soil, the unstable slopes, and severe hazard of erosion. The soil will support drought-tolerant and alkaline loving species without soil amendments. Uncoated steel used below grade will corrode. Vegetative or structural methods could be used to help stabilize the slope (curb erosion).

No endangered or unique animal habitat exists on the site. Common on the site are a wide variety of birds, squirrels, racoons, rabbits, chickens and snakes. It is considered advantageous to encourage a number of desirable bird species through habitat enhancement. Plantings should be chosen with this in mind.

Along Lawther Drive there exists a hike and bike trail. It is widely used and therefore is a source of noise on the site. Through the use of noise attenuators this can be mitigated.

The existing site vegetation is not especially unique or of great significance. Lowland woods and grassland, both with disturbed areas, exist on the site. Trees exist primarily along the perimeter of the site. Some vegetation has grown up blocking views to

White Rock Lake. This should be removed to restore the view.

The site is relatively flat. Gradients vary from 0% to over 20%. Close to the house and along the drainage swale the slope is steepest but offers no constraint to development. Refer to the topography map in the appendix.

Hydrology on the site is limited to an intermittant stream, drainage swale and the lake in the background. Storm water runs off the site due to sheet run-off. The lake is significant as a site amenity but not as a source of water for the site. The quality of the lake water is less than that of the city water supply. The intermittant stream provides an opportunity to introduce water into the site on a permanent basis.

Cold north winds in the winter are from the northwest. Cool summer breezes are from the southeast. Plantings should block the winter winds and act as a funnel to direct the cool summer breezes onto the site. See the appendix for a graphic representation of the climatic conditions on the site.

Four conditions existing on the site are:

Shady/windy

Shady/calm

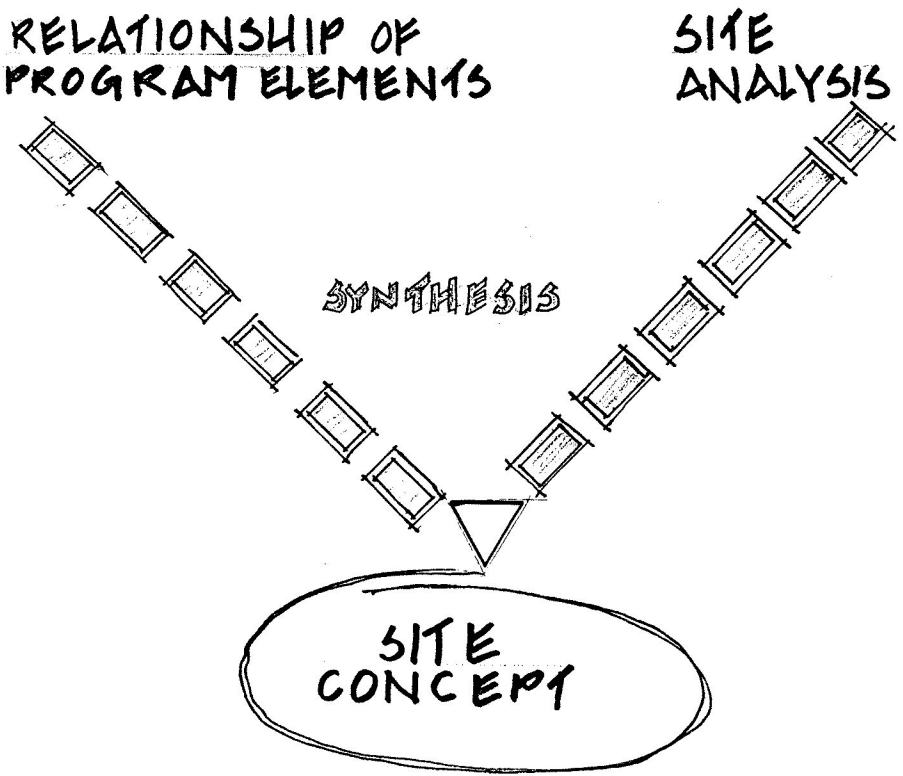
Sunny/windy

Sunny/calm

These conditions can be manipulated by design.

Ideal deciduous vegetation should foliate in April and defoliate in October.

DESIGN PROCESS



CONCEPTS

Once the non-site specific data and the site specific data had been inventoried and analyzed, it was merged and synthesized, culminating in concepts for a Sensory Garden at The Dallas Arboretum. Several concepts evolved which were overlaid on the site.

The primary concept for the Sensory Garden is not visual and therefore cannot be portrayed graphically like the other secondary concepts. It shall be explained after the other concepts have been laid out.

Overlaying the central nervous system of the human became the major secondary concept because the brain and the spinal cord, the two components of the central nervous system, metaphorically represent two goals which were hoped to be acheived. Overlaying the anatomical cross section of the cerebrum (that part of the brain where memory,learning, and interpretation of senses occur) symbolically reinforces the goal of educating the public (Goal #2) ; education not only of the role of all the senses affecting memory of a place, but also the role of mans' impact upon the land and his role as steward of the land (Goal #3).

The "Brain" area of the Development Plan is a unicursal maze where each sense is treated as simply and as independently as possible within a specific area

which corresponds anatomically to its location of reception in the cerebrum. That is to say, for instance, that the auditory sense is stimulated on both sides of the "Brain" in the garden and anatomically the receptors for auditory stimulus occur on both sides of the cerebrum. Similarily, the other senses are anatomically and geographically correlated.

The thalamus is the part of the brain located centrally and beneath the cerebrum. This is the relay center, the place where all the senses are integrated, and where much synapsing occurs. Fire is the element which stimulates more of the sense organs than any other stimulus studied. Thus, it was placed at the center of the "Brain" where it represents the thalamus.

The spinal cord transmits nerve impulses to and from the brain and this is symbolically represented by our tram route. Along the circulatory routes, both tram and pedestrian, occur changes in the paving material which represents the synapse or nerve cell (see detail B-4). Nerve cells, called neurons, consist of axons, dendrites, and cell bodies which contain the nucleus. They can be sensory, connector, or motor neurons. The sensory neurons pick up nerve impulses from the sense organs. The point at which the axon and dendrite come into close proximity is called the synapse. Here an electro-chemical reaction occurs to

carry the impulse across the space (see reflex arc in the concept drawing on Sheet #2). Thus, the tram and pedestrian circulation routes in the garden represent the circulation of nerve impulses in the spinal cord of the central nervous system.

The next concept addressed was the geometric system used to organize the space. A radial system, the center of which is the fire pit (thalamus) seemed to be an obvious point of beginning. But, there also seemed to be a demand from the important Great Terrace of the Degolyer Estate with it radial edge. Thus, two radial systems were superimposed on the Development Plan; one centered in the fire pit and one centered within the Great Terrace.

Vistas out to White Rock Lake were deemed aesthetically important, and therefore, were maintained. Some views up to the Degolyer Estate from within the garden were also maintained.

Another concept for the garden was derived from Gertrude Jekyll, an English landscape designer and artist who lived from 1843-1933. She believed that color works best in design if it is sequenced in harmonies. "Harmonies are the guiding principle, contrast the occassional exception" (Jekyll, 1908) Harmonious colors lie next to one another on the color wheel and contrasts, often called complementary colors

are in opposition on the color wheel. A flower sequence is to begin with blues and grays and continue through the color wheel until the "strongest scarlets" are reached. She thought that blues really were enhanced by splashes of yellows and whites,(Jekyll, 1908) which should be evidenced in the Sensory Garden's Blue/Gray area. She also said that colors seemed more brilliant when seen right after their complementaries. Thus, climbing, orange-flowering species of plants were chosen for the north entrance from the Degolyer Gardens, to complement the blue flowers and foliage of the Blue/Gray area.

Instead of planting in block shapes, common in Gertrude Jekyll's time, she preferred to plant paramecium-shaped drifts in order to prevent unsightly empty spaces after the blooms receded and the leaves were dying back (Jekyll, 1908). The design for the Sensory Garden adopted her philosophy in its Planting Plans.

The overwhelming, primary concept, the one that is unique to this project, is that to be a sensory garden in the true sense, that is a garden that does not rely on the visual sense for its success, but rather stimulates many senses, the garden must be designed from a non-visual perspective. This approach encourages stimulation of many senses.

Designers depend largely on the visual sense, hence designs tend to appeal primarily to that sense. If other senses are interjected into the design they seem to be an after thought or just decoration, not an intergral part of the design on which its effectiveness relies.

By incorporating a variety of senses in the design and using the stimulation of those senses as a design element, a memorable and meaningful mixture of sensory experiences becomes integral to the garden design. The senses are no longer adornment. They have become the meat of the design. It is this concept that creates a rich sensory experience.

The most effective means of communicating how this concept is applied to the design is to verbally tour the garden.

The description of the garden begins at the north end of the site. It will proceed through the curvilinear Blue/Gray Garden, the Prairie, the central node, or the Brain, then past the Jekyll garden.

Having just left the Formal DeGolyer Gardens, entrance into the Sensory Garden is marked by a limetone arch planted with brightly colored, fragrant orange vines. The orange color serves to enhance the awareness of the plantings in the Blue/Gray Garden. This is the first occurance of the theme of contrast

that will be evident throughout the garden. Research indicates that all senses become acclimated quite quickly. For the optimum awareness and appreciation of sensory stimulation, contrasts must be frequent.

Passing trough the stone archway, the gracious sweep of the main circulation spine is apparent. The paving of this circulation system, edged with 8" x 4" limestone 'bricks,' and the adjacent retaining wall provide continuity through the garden, as do the synapses in the circulation system. The battered limestone wall and the limestone edged walkway (10 ' wide) are strong elements and serve to provide the visitor with the assurance that although there are a variety of experiences within the Sensory Garden, it is all part of a whole.

The wall is made of large blocks of Texas limestone. Along the wall are seating niches and frequent plant pockets from which grow plantings that pick up the colors of the plantings on the opposite side of the walk. The colors of the plantings adhere to the Gertrude Jekyll color theory,and are planted in drifts rather than in blocks. This system of planting was used successfully by Jekyll to eliminate the unsightly occurance of dead spots when a particular planting has completed its blooming.

Imagine sitting on the cool, irregular blocks of limestone that are the deepset benches. Stretching out across the walk is the undulating, winding, shady Blue/Gray Garden. It is abutted by the arid Prairie whose beauty is derived from its simplicity. True to the heritage of the DeGolyer Gardens, the expanse is kept free of complex elements. Historically, the sweep of land from the Great Terrace to White Rock Lake in the background, was lawn. While some liberty has been taken, the feeling of a lawn has been retained. Continuing along the curved limestone path, the sweep would eventually lead to the central node, on axis with the DeGolyer library. The radial grid system that defines the circulation has its beginning in the Blue/Gray Garden. The grid system is more discrete in this area but does exist, albiet is its most elemental state. At this point the grid breaks down, providing a gentle transition into the more rigid system to come. This looser form of the grid carefully maintains the organization of the circulation. It positions the walks and allows the placement of the bridge and bird bath to seem so comfortable. Without the grid system, these elements would be arbitrarily placed, thus diminishing the overall effect of continuity. It is this type of discipline in design that produces effective results.

The overall feeling of the Blue/Gray Garden is intimate, comfortable, leisurely, meandering. The path undulates slightly causing a slower pace through the space and stimulates the kinesthetic sense.

As the path undulates it also meanders. A stream follows the path first on one side then it disappears beneath the limestone slab that is the bridge and emerges on the other side. The water moves, slowly at first making little noise but contributing to the humidity in the area. The humidity is held down by the tree canopy above. The humidity changes the thermal experience, adding a sense of coolness and enhancing the aroma of the fragrant plantings. At the juncture of the grid path and the meandering path is the limestone bridge. The sculptural bird bath, which sits atop a synapse, and its adjacent dust bath are placed at the terminus of this path thus reinforcing the grid and serving as a focal point from the bridge. The bird bath adds to the visual and auditory enjoyment of this part of the garden.

Also adding to the auditory pleasure is the sound of the water rushing beneath the slab to reappear on the opposite side. The sound contributes a refreshing dimension to the experience of the garden. Studies indicate that from elements generally associated with coolness; cool blue and gray colors, water, fresh

smells (specifically mint) one derives a sense of coolness. Here there is also the movement of air, heightening the illusion, if not the reality, of coolness. Gliders are placed here to allow even fuller appreciation of the movement of air. Analysis indicates that this is a windy part of the site. Capitalizing on this, a wind funnel is created by the placement of evergreen trees to the north. The trees will block the cold north winds in the winter and will funnel the cooling south winds in the summer. The trees are Alligator Junipers so that the winds will have the added benefit of fragrance. The shade from the overhead tree canopy, the water, the breeze, the pleasant aroma and the cool colors combine to create a pleasant spot to watch the birds, listen to them or just to relax. The plantings is this area are carefully planned so that there is never an absence of blue gray color. Examination of the planting plan, included in the appendix, shows a studied mix of evergreen plants, spring blooming plants, summer blooming plants and fall blooming plants.

Recalling the earlier statement that senses are heightened by contrast, this garden gives way to the arid Prairie. Full appreciation of the Prairie demands viewing from two perspectives. From the broad path along the Great Terrace, the Prairie is divided into

four (4) bands. Each band is a different Prairie grass. They sweep across, defining the radii. Standing above, looking down, the grasses sway in the breeze silhouetted against the lake in the background. In the fall, the grasses will have various colorations and seed heads. Seeing and hearing the grasses adds to the effect of dryness. The mown paths through the grasses allow circulation down into the Prairie permitting the visitor to circulate within the grasses. Once in the midst of the Prairie grasses, a feeling of being engulfed by the tall grasses evokes an intimacy with nature. True to the philosophy of the design, the pleasure is derived from a variety of senses, including the visual but not dependent upon it.

From within the Prairie the visitor can appreciate the wild flowers that are planted in drifts that are perpendicular to the radii of the grasses. The plantings are positioned by the radii emanating from the Brain. They emerge from the grasses adding color, fragrance and texture to the Prairie. The grasses will be mowed in the late fall. This will allow the new, early spring wild flowers to be clearly seen.

The colors progress according to the above mentioned color theory of Gertrude Jekyll. Color is necessarily visual. Adding to the interest of the color progression are the emotive responses to various

colors. In Color and Human Responses, Faber Birren has compiled the most common responses to colors. It is from this source the following responses are taken.

Blue is the color of conservatism and evokes feelings of accomplishment, devotion and introspection. From the blue area, the next color band is white which tends to evoke feelings of sterility. Those plantings fade into yellows; they generally have a spiritual, sunny connotation. Pink signifies a recall of youth, gentility and affection. Orange is seen as cheerful,luminous and warm. Impulsivity and excitement are associated with red. Attention to these responses contributes to the complexity of enjoyment of the garden.

The Prairie is indeed an area that will change dramatically with the seasons. The wild flowers will bloom at various times during the year creating a new look throughout the year. It will never be stagnant.

The theme of contrast is once again evident. The initial experience of the Blue/Gray Garden with its meandering hard path, water, cool effect changed abruptly to the arid, soft paths and dry sounds of the Prairie. Now the openess of the Prairie stops. The space becomes controlled.

To this point the visitor has enjoyed the stimulation of many senses at once. Now, in the central

node, the metaphorical Brain, the senses are segregated. This is an educational experience. The awareness of pleasurable sensations is not necessarily associated with the senses stimulated to evoke that pleasure. The organization of the central node is based on the human brain. That is, within the node, the senses are in the same relative position that their perception occurs in the human brain. For a graphic representation of this arrangement, refer to the diagrams of the human brain and the concepts found in the appendix.

Within this central node, The Brain, the plantings are predominatly red. This adheres to the Jekyll organization of color.

Main entry is on axis with the DeGolyer library and is clearly announced by the double limestone arches. This part of the garden is visible from the landing outside the library and the visual connection with the house is clear. The axis is terminated by a simple stucco wall through which is cut a human scale gateway.

On either side of the entry are water features. The first sense to be encountered is olfaction. The water serves to increase the humidity in the area and enhances the fragrances of the plantings. Throughout this part of the garden, the symmetry is obvious but

the two sides are not mirror images. Although the intent is the same on both sides, the experiences differ. On the right, the water drips quietly from one pool to the next lower level across Texas limestone blocks. On the left, the water sheets silently down in two stages into the lower pool. The plantings have been designed to provide year round fragrance. Herbs are used as ground cover and planted close to the walk so feet or wheelchairs have the opportunity to crush them and release the fragrance. Care has been taken that there will be year-round fragrance.

Moving into the next section, again rather abruptly, never permitting saturation of the sense, the auditory sense is awakened. The sound is derived from two primary sources: plants and a water feature.

Plants in this area were chosen on two sets of criteria. Their red or white color and their attraction for wildlife. Because many of the plants berry in the winter, there will never be an absence of wildlife. As an example, along the inside of the low wall, Harbor Dwarf Nandinas are planted. They not only provide food for birds, since they grow to the ground, they create an excellent spot for ground nesting birds and for squirrels. These animals will produce a rustling sound as they scurry beneath the plants.

The second source of auditory stimulation is the water rill. The entire node is surrounded by a low wall which contains water. The water bubbles up, then jets up producing a range of sounds. At the center of the wall on either side, there is a system of wind chimes anchored in the water. The chimes are aluminum tubes of varying heights and thicknesses. As the wind blows them, they hit against each other playing a constantly changing melody. Their erectness and pliability mimic the Prairie grasses on the other side of the wall.

The next experience is tactile. Texture is provided by a rough hewn battered wall, again of Texas limestone. The wall features plant pockets from which emerge a variety plants. The pavement changes abruptly and continues to change. In addition, there is a handrail made of cholla. Parts of the rail are left in the natural state, parts of it are finished smoothly so that the tactile sense is appropriatly perceived through the hands. Most of the plants in this area are in pots. This offers two advantages. The area is quite shady which presents a problem for growing a wide selection of plants. By growing them in pots, they can be changed often so that there will always be fresh healthy plants. The pots themselves contribute to the textural nature of the area. The selection of plants

for this area is interesting. Many of the most highly textured plants are what we commonly refer to as weeds. The dandilion is a perfect example. Grown in a pot and glorified, it can be appreciated for its inherent qualities. This group of plants will be the primary choice. The selection need not,however, be limited to weeds. Other highly textured plants will also be found here. Cacti are an obvious choice. There should be no set list of plants but rather as the staff or visitors suggest a plant it should be cycled in.

The trees planted in the auditory nodes near the texture wall also contribute to the texture. They were chosen for their bark or for the shadow cast by their foliage.

Next to the texture nodes are the two orientation nodes. These afford one of the most stark contrasts. There are no plants in these areas. One side is wheelchair accessible. It is an undulating walk that tilts slightly from side to side as it undulates. The other side is a set of narrowing steps that decend on a curve then ascend. The wall tilts inward toward the center. The kinesthetic sense is unmistakable.

Finally, the visual sense is accentuated. It occurs on the axis with the DeGolyer library. The previously mentioned white stucco wall with its center cut out to form a doorway is covered with red blooming

vines. The portion of the wall that was cut away to form the opening is pushed back and becomes one of the strongest elements in the garden. On this piece of wall is a bas relief of the plan of the garden. This piece will have to be commissioned to a very creative, talented sculptor. It must be a powerful, sensitive piece. This bas relief is where the blind come to understand the organization of the garden. It is fitting that the visual node is the location that allows the blind to "see" the garden. It must be more than a braille map. It is imperative that it also serve the sighted.

A Mesquite chip walk dissects the Brain. At the very center is a bronze grate from which a single flame flickers. The bronze grate can be removed to allow bark and wood of odiferous species to be burned. This flame is the representation of the thalamus, that part of the human brain where all senses come together. A flame was chosen because in the exploration of the senses and their preception, fire emerged as the element which appeals to the most senses. Reduced to its most elemental form, fire becomes a single flame. The simplicity is compelling.

Surrounding the flame is an amphitheater. In contrast to the relatively complicated Brain, the center is quite simple. It is low growing turf with

the Mesquite walk crossing it. There are three (3) stone edged grass seats circling the area. This is a calm, contemplative spot with its elegant adornment. It is the logical climax to the garden.

Exiting back down the axis toward the DeGolyer house, back through the double arched gateway that extends from the house and reinforces the axis, the limestone walk continues under the Mexican Plum trees, past the Jekyll garden which provides a comfortable transition to the adjoining garden. Again a stone archway gate announces the limits of the Sensory Garden.

Through the Jekyll garden, on the radius of the Brain there is a tram route which will connect with the main tram route of the arboretum, (see Appendix II). This tram route allows those who cannot or choose not to walk the entire site to have access to the garden. It is possible to disembark from the tram at the south end of the site, explore the Brain, then board the tram again at the lake side of the garden. The Prairie is wheelchair accessible, as are all parts of the garden.

Having approached the design process from a non visual perspective and building up layers of experience, finally allowing the visual sense to become an important element enriches the experience, creating a garden with a depth of enjoyment. For those who

choose to accept the garden at face value, it is a lovely garden, worthy of the time spent in it. For those who wish to delve deeper, the garden can be appreciated at a more complex level, in fact, there are enough layers of thought in this garden to provide enjoyment over and over. Had the concept begun with the visual, that would have remained the overwhelming sense, rather than becoming one of the senses through which the garden can be enjoyed.

RECOMMENDATIONS

When implementation of the Sensory Garden occurs, some recommendations to the Dallas Arboretum are:

1. Have Braille inscriptions to identify the features
2. Have brochures to distribute which shall include:
    a. Larger than normal lettering for the visually impaired
    b. Plans of the garden
    c. Concept and intentions of the garden
    d. Biological data on the sense organs
    e. Other pertinent information and drawings
3. Have guided tours available
4. Have items in the gift shop which reinforce the experiences in the garden
5. Have a sensory festival on the site
6. Have workshops given by
    a. A blind person
    b. An herb expert
    c. A deaf person
    d. A wheelchair user
    e. A biologist
    f. A botanist
    g. A meteorologist
    h. A landscape architect

i. A psychologist

j. An architect

k. A chef

7. Have a facility, such as a small restaurant, on the site to reinforce the sense of taste. The food in the restaurant would be prepared with as many plant species from the site as possible. This idea would serve as a educational tool. Too often landscape architects put species on their Planting Plans which satisy goals of color, odor, texture, form, linkage, enclosure, thermal control, etc., and fail to specify plants that provide food for humans (not to mention wildlife!)

8. Have area drains and fire grate designed to represent the plan of the "Brain".

9. Call the garden a Perception Garden instead of a Sensory Garden since perception refers to the psychological aspects of humans and sensory refers merely to the physiological aspects of man.

CONCLUSION

At the inception of this project, three (3) primary goals were established:

1. Provide a Development Plan for a highly usable Sensory Garden at the Dallas Arboretum which will stimulate the senses of orientation, listening, touching and feeling, smelling and tasting, moving and looking, thereby making the place more meaningful and memorable;
2. Provide educational experiences for those who visit the Sensory Garden;
3. Provide a Sensory Garden which will relate to and respect the natural landscape and architecture of the Dallas Arboretum and its environs.

The next step was to develop a concept. This concept is a unique approach to the design of a garden, or for that matter, any space. The overwhelming majority of gardens are designed to be a visual experience. This necessarily subjugates the other senses to an ancillary role. The other approach that is often used is to create gardens "for the blind". This approach implies that blind people experience other senses differently from the sighted. This is a

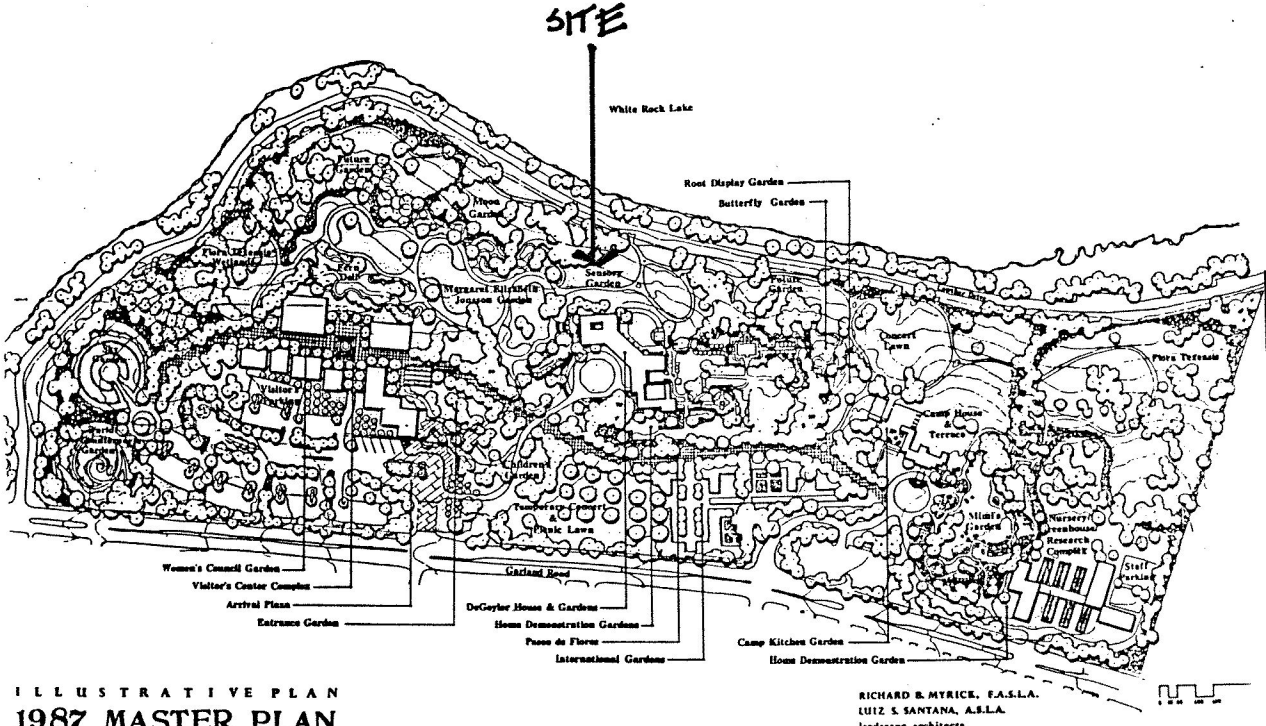
discriminatory approach. Gardens should be designed to appeal to a wide variety of the senses. If this is done, the visitor who lacks one sense can still enjoy the garden. The visitor who possesses all senses will appreciate the garden through all senses, not just the visual. This proves the hypothesis that if more stimulation of all senses were to occur in a place the place would become more meaningful and memorable.

There is a big difference between designing to appeal to all senses and designing a garden then adding the other senses. Such a design will necessarily appeal primarily to the visual sense, and only secondarily to other senses. It is not unlike the art of cooking. If one spice overwhelms the other tastes, they are there, but barely noticed. If a delicate balance is struck, the spices compliment one another and heighten the enjoyment of each spice. This concept and design have struck that balance, thus truly creating

A SENSORY GARDEN FOR THE DALLAS ARBORETUM.

APPENDIX I

1987 Master Plan for the Dallas Arboretum



ILLUSTRATIVE PLAN

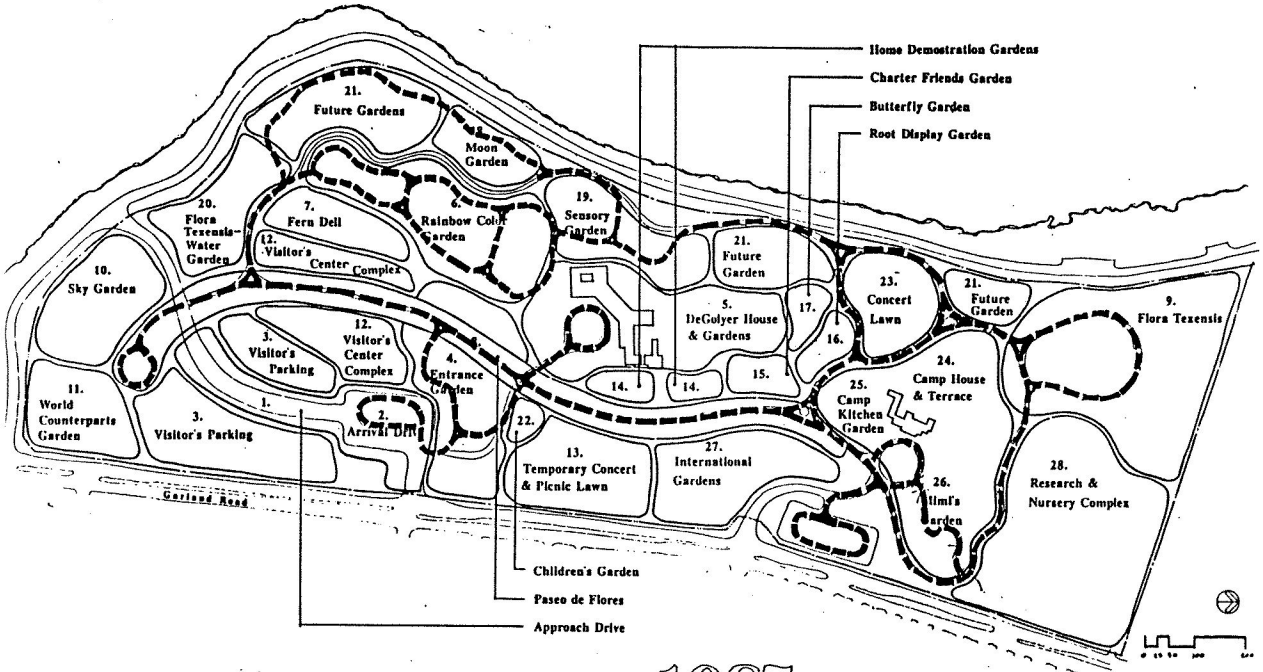
1987 MASTER PLAN

DALLAS ARBORETUM & BOTANICAL SOCIETY

RICHARD B. MYRICK, F.A.S.L.A.
LUIZ S. SANTANA, A.S.L.A.
landscape architects
planners

APPENDIX II

Tram Route/Land Use Plan



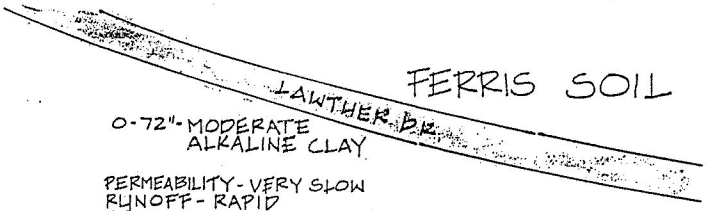
TRAM ROUTE
LAND USE PLAN

1987
MASTER PLAN UPDATE

DALLAS ARBORETUM & BOTANICAL SOCIETY

APPENDIX III

Site Inventory

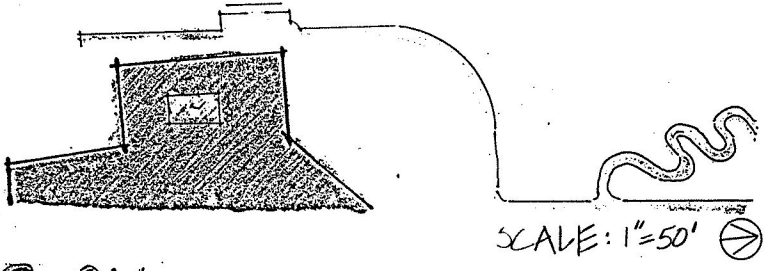


FERRIS SOIL

0-72"- MODERATE ALKALINE CLAY

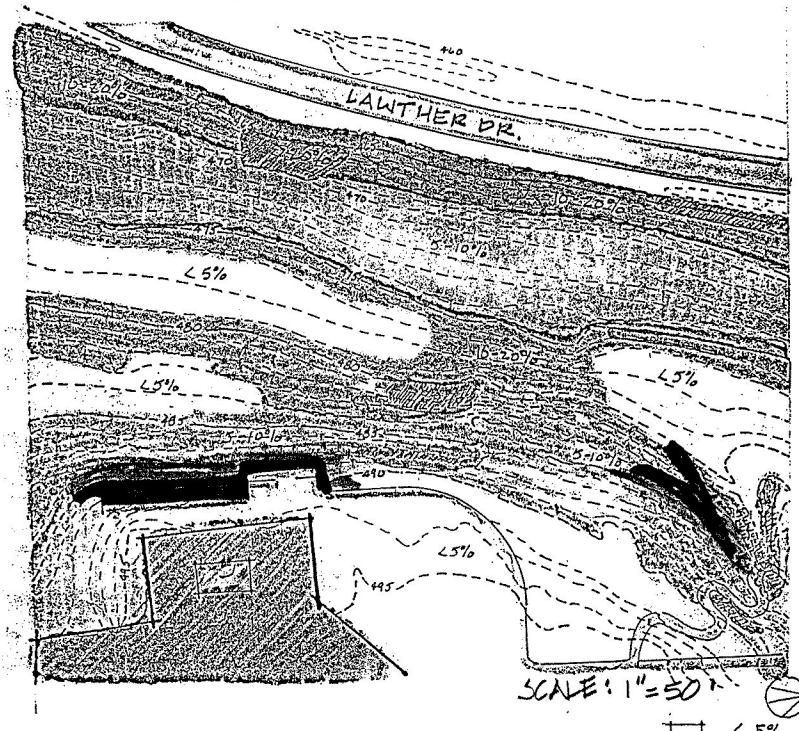
PERMEABILITY - VERY SLOW
RUNOFF - RAPID
EROSION HAZARD - HIGH
AVAILABLE WATER CAPACITY - HIGH

HIGH SHRINK - SWELL POTENTIAL
LOW STRENGTH & CORROSIVITY
SLOPES - UNSTABLE



SCALE: 1"=50'

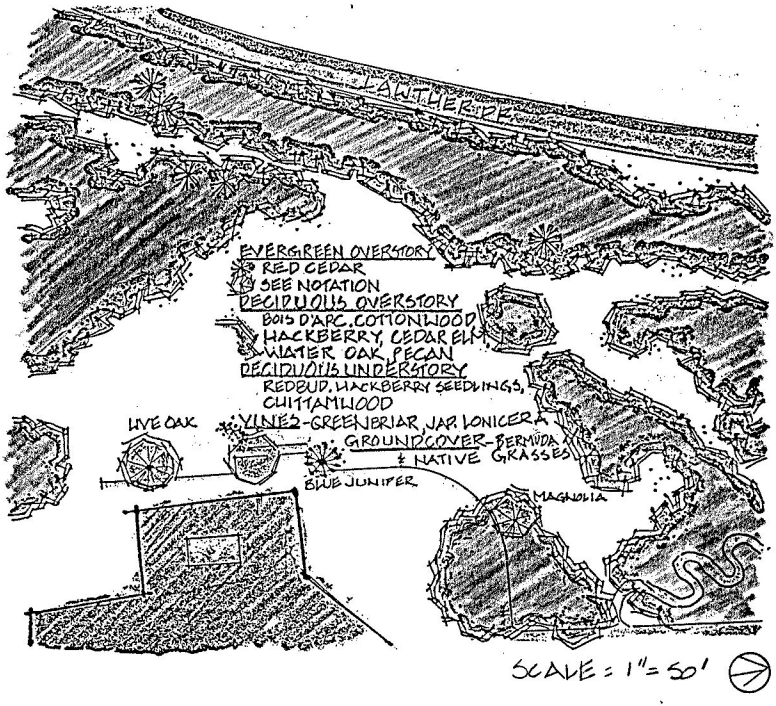
SOIL


LAWTHER DR.
440
470
460
480
490
495
<5%
5-10%
10-20%
>20%
SCALE: 1"=50'
< 5%
5- 10%
10-20%
>20%

TOPOGRAPHY

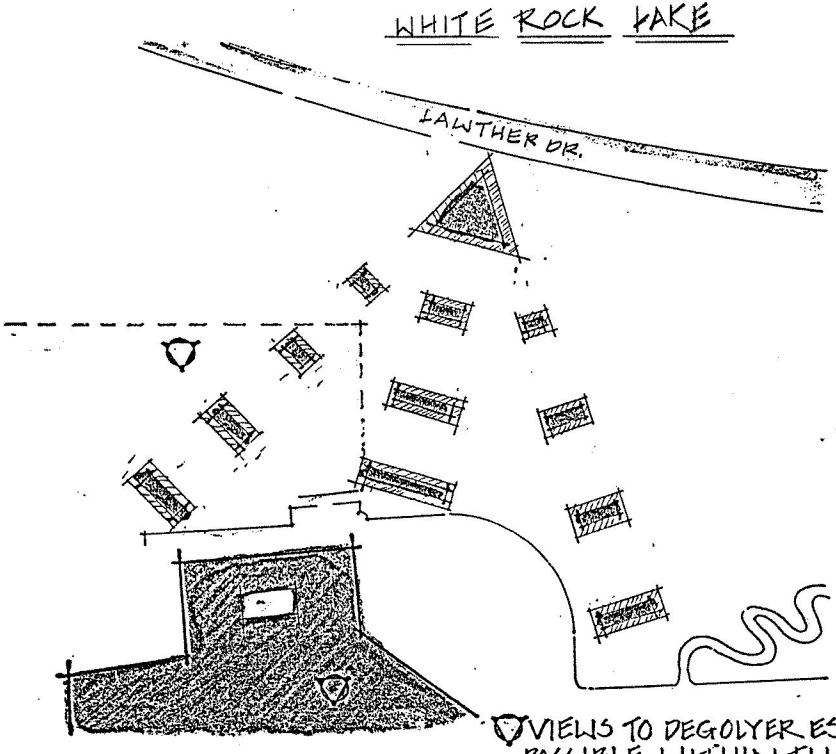

LAWTHER DR.
+LP
+LP
470
475
480
485
440
+HP
SCALE: 1"=50'
INTERMITTANT STREAM
RIDGE
SHEET RUNOFF

HYDROLOGY



VEGETATION

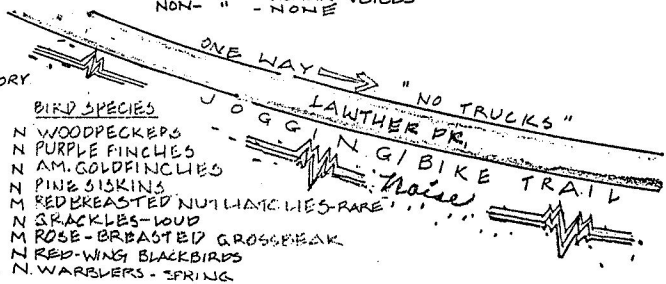
LOWLAND WOODS & DISTURBED GRASSLAND


WHITE ROCK LAKE
LAWTHER DR.
VIEWS TO DEGOLYER ESTATE POSSIBLE WITHIN THIS ZONE
SCALE: 1"=50'

VIEWS

NOISES:

OBTRUSIVE - REMOTE CONTROL BOATS
HUMAN VOICES
NON- " - NONE



M = MIGRATORY
N = NON- "

BIRD SPECIES

N WOODPECKERS
N PURPLE FINCHES
N AM. GOLDFINCHES
N PINE SISKINS
M RED BREASTED NUTHATCHES - RARE
N GRACKLES - LOUD
M ROSE-BREASTED GROSBEAK
N RED-WING BLACKBIRDS
N. WARBLERS - SPRING

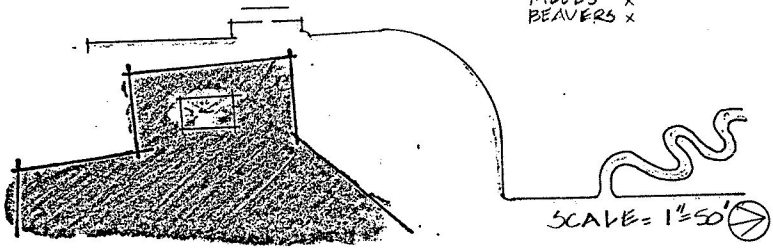
SNAKES

POISONOUS - COPPERHEADS
- WATER MOCCASINS

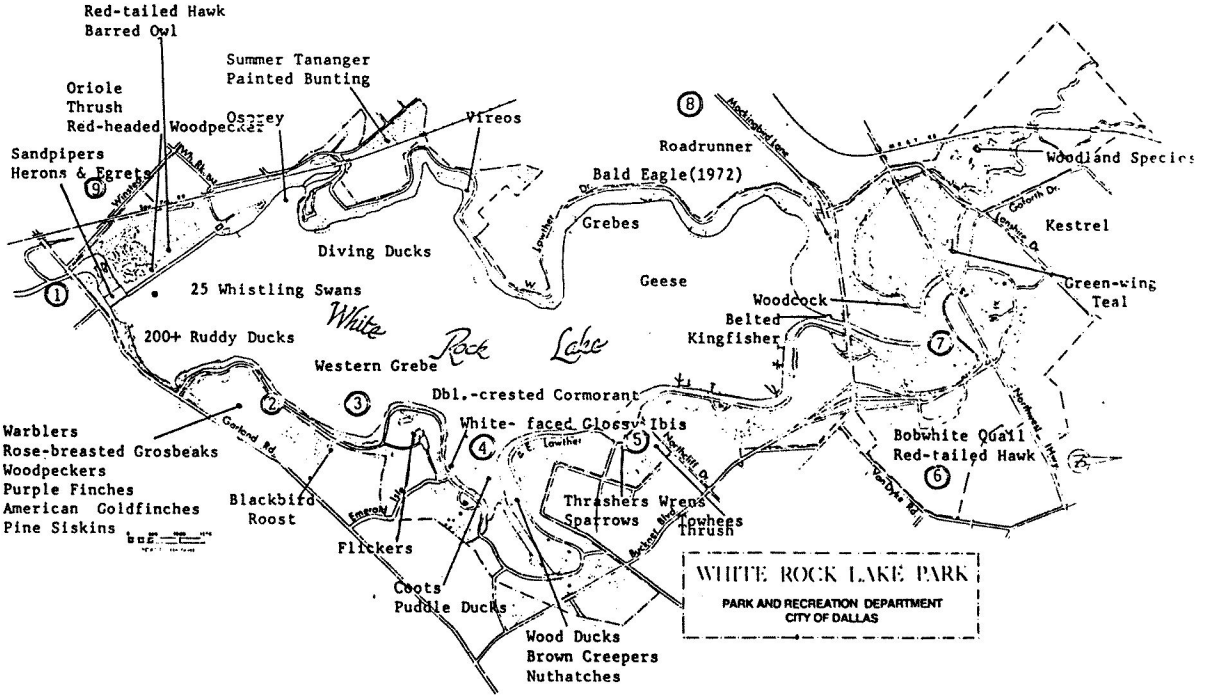
NON-POISONOUS - "GOOD" GARDEN SNAKES

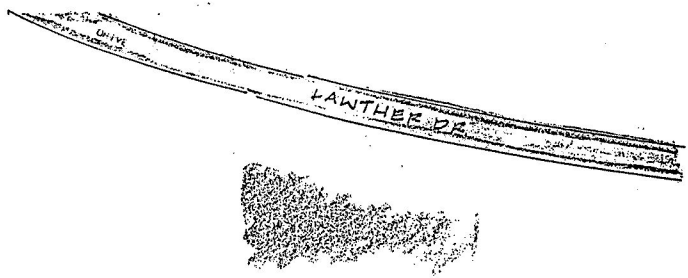
MAMMALS

RACOONS - LIVED IN CAMP HOUSE
RATS - EAT VEGETABLES & SEED
ARMADILLOS
SQUIRRELS - EAT BULBS
RABBITS - " EAT EVERYTHING
FEREL CATS
MOLES x
BEAVERS x

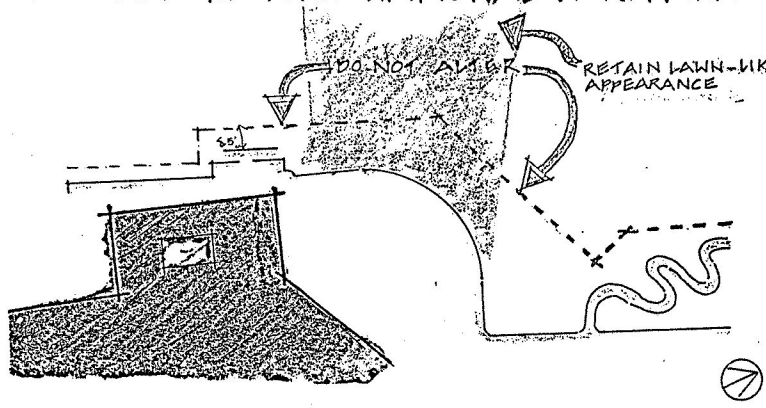


NOISES & WILDLIFE


Red-tailed Hawk
Barred Owl
Summer Tananger
Painted Bunting
Oriole
Thrush
Red-headed Woodpecker
Osprey
Vireos
Sandpipers
Herons & Egrets
Diving Ducks
25 Whistling Swans
200+ Ruddy Ducks
White Rock Lake
Western Grebe
Dbl.-crested Cormorant
White- faced Glossy Ibis
Warblers
Rose-breasted Grosbeaks
Woodpeckers
Purple Finches
American Goldfinches
Pine Siskins
Blackbird Roost
Flickers
Coots
Puddle Ducks
Wood Ducks
Brown Creepers
Nuthatches
Thrashers Wrens
Sparrows
Towhees
Thrush
Roadrunner
Bald Eagle(1972)
Grebes
Geese
Woodcock
Belted Kingfisher
Woodland Species
Kestrel
Green-wing Teal
Bobwhite Quail
Red-tailed Hawk
WHITE ROCK LAKE PARK
PARK AND RECREATION DEPARTMENT
CITY OF DALLAS



REGISTERED HISTORIC NATIONAL LANDMARK



HISTORY

No 10-300 REV. 10-74

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

NATIONAL REGISTER OF HISTORIC PLACES INVENTORY -- NOMINATION FORM

cc. RKI
cc. Pat Spillman
cc. Mitchell Pari
+ 1 copy for M.P. Team
Mrs. M.P. Updike DeGolyer

FOR NPS USE ONLY	
RECEIVED	
DATE ENTERED	

SEE INSTRUCTIONS IN *HOW TO COMPLETE NATIONAL REGISTER FORMS*
TYPE ALL ENTRIES -- COMPLETE APPLICABLE SECTIONS

1 NAME

HISTORIC: The DeGolyer Estate

AND/OR COMMON: Everette DeGolyer House (Rancho Encinal)

2 LOCATION

STREET & NUMBER: 8525 Garland Road — NOT FOR PUBLICATION

CITY, TOWN: Dallas — VICINITY OF

CONGRESSIONAL DISTRICT: 5

STATE: Texas — CODE

COUNTY: Dallas — CODE

3 CLASSIFICATION

CATEGORY	OWNERSHIP	STATUS	PRESENT USE	
__DISTRICT	X PUBLIC	__OCCUPIED	__AGRICULTURE	__MUSEUM
X BUILDING(S)	__PRIVATE	X UNOCCUPIED	__COMMERCIAL	X PARK
__STRUCTURE	__BOTH	__WORK IN PROGRESS	__EDUCATIONAL	__PRIVATE RESIDENCE
__SITE	PUBLIC ACQUISITION	ACCESSIBLE	__ENTERTAINMENT	__RELIGIOUS
__OBJECT	__IN PROCESS	X YES: RESTRICTED	__GOVERNMENT	__SCIENTIFIC
	__BEING CONSIDERED	__YES: UNRESTRICTED	__INDUSTRIAL	__TRANSPORTATION
		__NO	__MILITARY	__OTHER

4 OWNER OF PROPERTY

NAME: City of Dallas, Park and Recreation Dept.

STREET & NUMBER: City Hall, Room 406, Main and Harwood Streets

CITY, TOWN: Dallas — VICINITY OF — STATE: Texas 75201

5 LOCATION OF LEGAL DESCRIPTION

COURTHOUSE, REGISTRY OF DEEDS, ETC: Dallas County, Texas

STREET & NUMBER: Records Building

CITY, TOWN: Dallas — STATE: Texas 75201

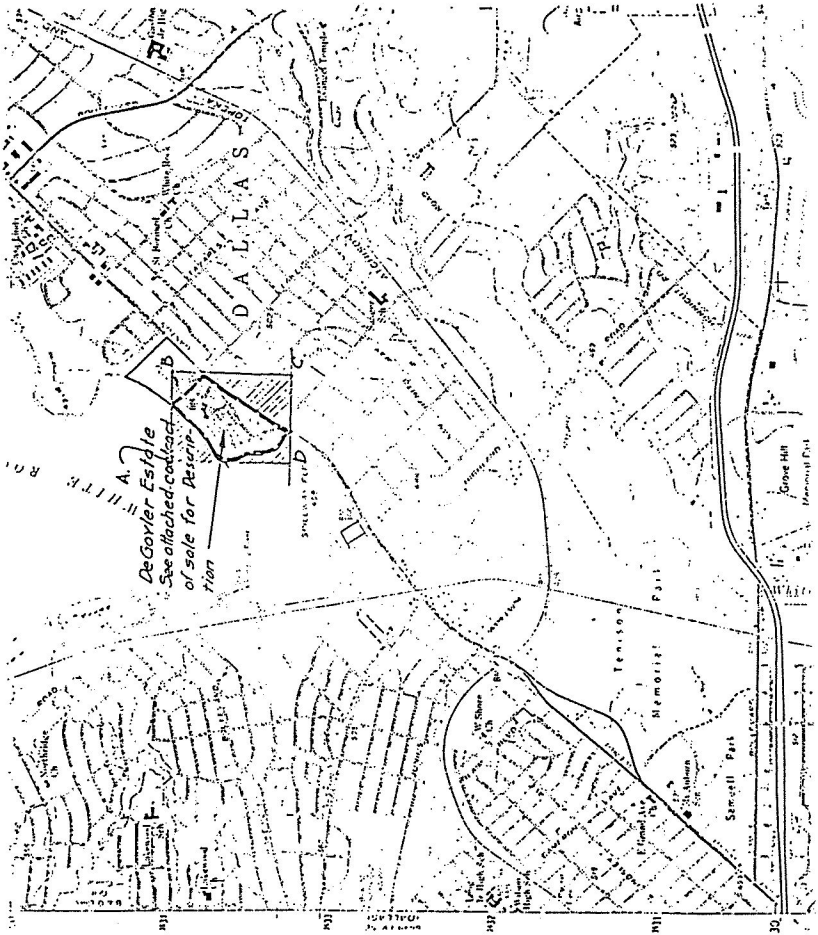
6 REPRESENTATION IN EXISTING SURVEYS

TITLE: C. A. Lovejoy Survey, Dallas County Abstract Number 830 and 831 City Block Number 4411, Recorded in Volume 74229, pages 0967-0972 D.C.

DATE: October 21, 1974 — __FEDERAL __STATE __COUNTY XX LOCAL

DEPOSITORY FOR SURVEY RECORDS: Dallas County Records Building

CITY, TOWN: Dallas, — STATE: Texas 75202



THE DEGOLYER ESTATE
8525 GARLAND ROAD
DALLAS COUNTY, DALLAS, TEXAS

UTM
A. 14/713405/3633980
B. 14/713945/3633980
C. 14/713945/3633260
D. 14/713405/3633260

MAJOR BIBLIOGRAPHICAL REFERENCES

Tinkle, J. Lon, Mr. De
Lundberg, Ferdinand, The Rich and the Super Rich
Amory, Cleveland, "Mr. De of Texas", "Saturday Review", Jan. 26, 1957.
Rogers, John William, The Lusty Texans of Dallas

GEOGRAPHICAL DATA

ACREAGE OF NOMINATED PROPERTY: 43.057 acres

QUADRANGLE NAME: See attached U.S.Coast and Geodedic Survey Map' QUADRANGLE SCALE:

UTM REFERENCES

	ZONE	EASTING	NORTHING
A	14	7 13 4, 95	36 3, 39 8, 0
B	14	7 13 9, 45	36 3, 3 980
C	1, 4	7 13 9, 45	36 3, 32 6, 0
D	14	7 13 40 5	36 33 2, 6, 0
E			
F			
G			
H			

VERBAL BOUNDARY DESCRIPTION

See attached boundary description

LIST ALL STATES AND COUNTIES FOR PROPERTIES OVERLAPPING STATE OR COUNTY BOUNDARIES

STATE	CODE	COUNTY	CODE
STATE	CODE	COUNTY	CODE

FORM PREPARED BY

NAME / TITLE: Joe R. Williams, Project Director
Diana X. Clark, City of Dallas, City Arts Program

ORGANIZATION: Texas Historical Commission — DATE: May 25, 1977

STREET & NUMBER: P. O. Box 12276-Capitol Station. — TELEPHONE: 475-3094

CITY OR TOWN: Austin, — STATE: Texas 78711

STATE HISTORIC PRESERVATION OFFICER CERTIFICATION

THE EVALUATED SIGNIFICANCE OF THIS PROPERTY WITHIN THE STATE IS:

NATIONAL ___ STATE X LOCAL ___

is the designated State Historic Preservation Officer for the National Historic Preservation Act of 1966 (Public Law 89-665). I hereby nominate this property for inclusion in the National Register and certify that it has been evaluated according to the criteria and procedures set forth by the National Park Service

STATE HISTORIC PRESERVATION OFFICER SIGNATURE

TITLE — DATE 1-27-78

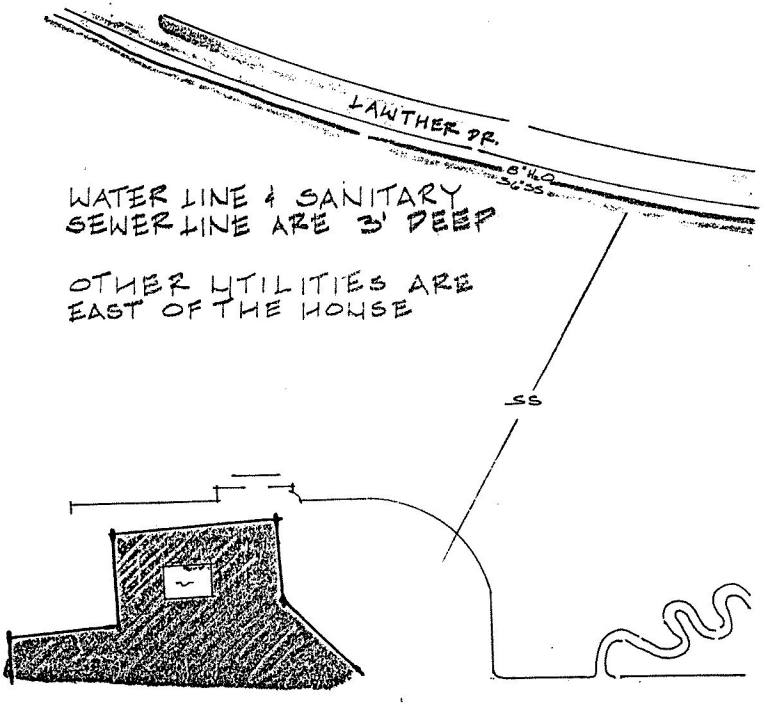
FOR NPS USE ONLY

I HEREBY CERTIFY THAT THIS PROPERTY IS INCLUDED IN THE NATIONAL REGISTER

KEEPER OF THE NATIONAL REGISTER — DATE

ATTEST: — DATE

CHIEF OF REGISTRATION



UTILITIES

SCALE: 1"=50'

Four conditions existing on the site:

Shady/windy = SH/W

Shady/calm = SH/C

Sunny/windy = S/W

Sunny/calm = S/C

These conditions can be manipulated by design

Ideal deciduous vegetation should:

Foliate in April

Defoliate in October

Winds:

Warm temperate winds are from the south

Northerly winds are the source of cold, discomforting winds

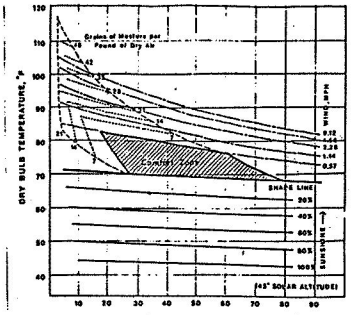


Figure 8-1 Bioclimatic chart.

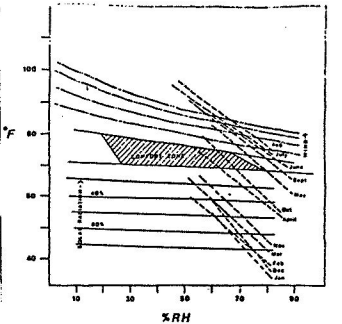


Figure 8-37 Normal conditions at Dallas-Fort Worth.

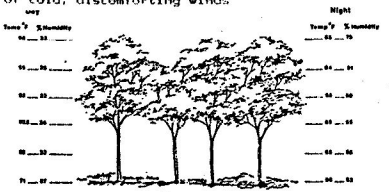


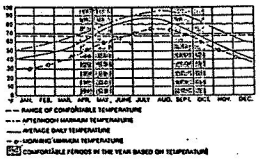
Figure 8-13 Vegetation and temperature/humidity changes.

"McPherson, "Planting Design for Solar Control," p. 147 citing B. A. Hutchinson, P. G. Taylor, R. L. Wendt, and The Critical Review Panel, *Use of Vegetation to Ameliorate Building Microclimates: An Assessment of Energy Conservation Potentials* (No. 1913) (Oak Ridge, Tenn.: Oak Ridge National Laboratory, 1982), pp. 17-18.

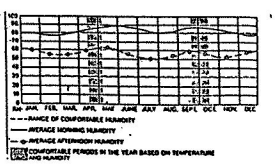
DIEW.

Diagrams for Climate Conditions:

Average Temperature



Average Relative Humidity



MICROCLIMATE

* MOST COMFORTABLE AREA

Figure 8-19 Air movement night.

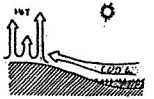


Figure 8-20 Air movement shoreline—day.

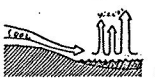


Figure 8-21 Air movement shoreline—night.

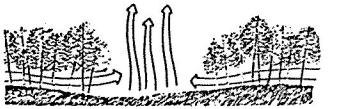
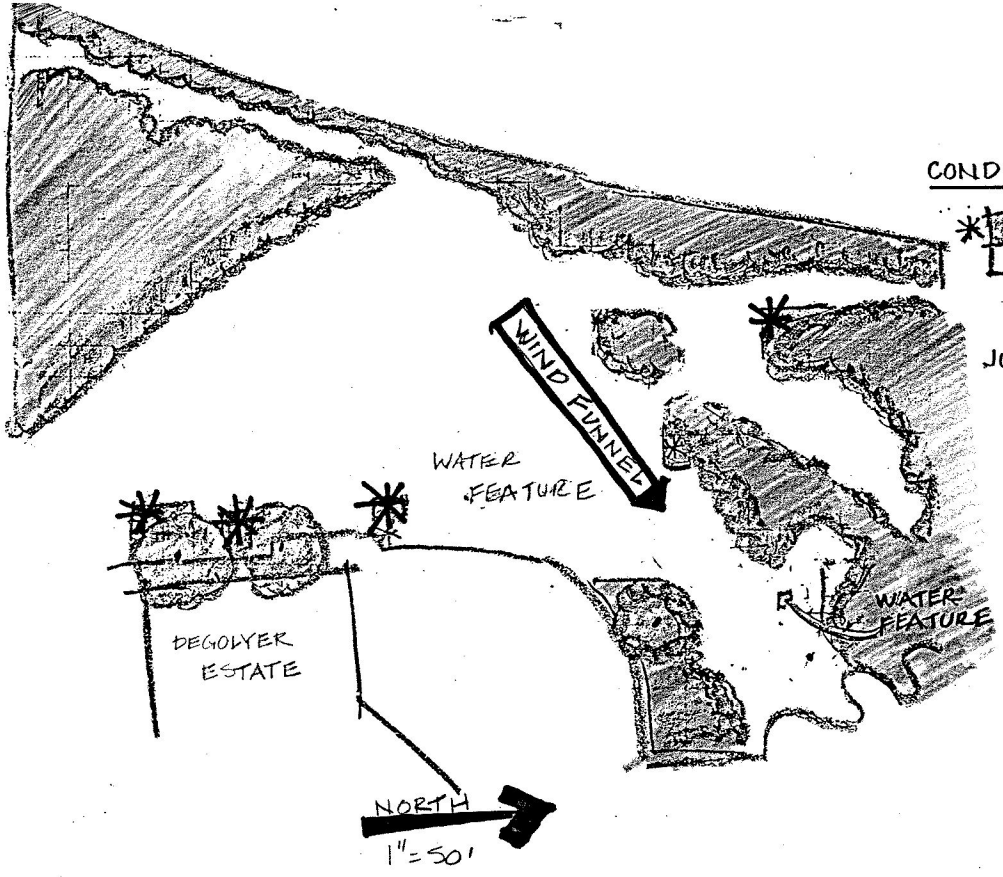
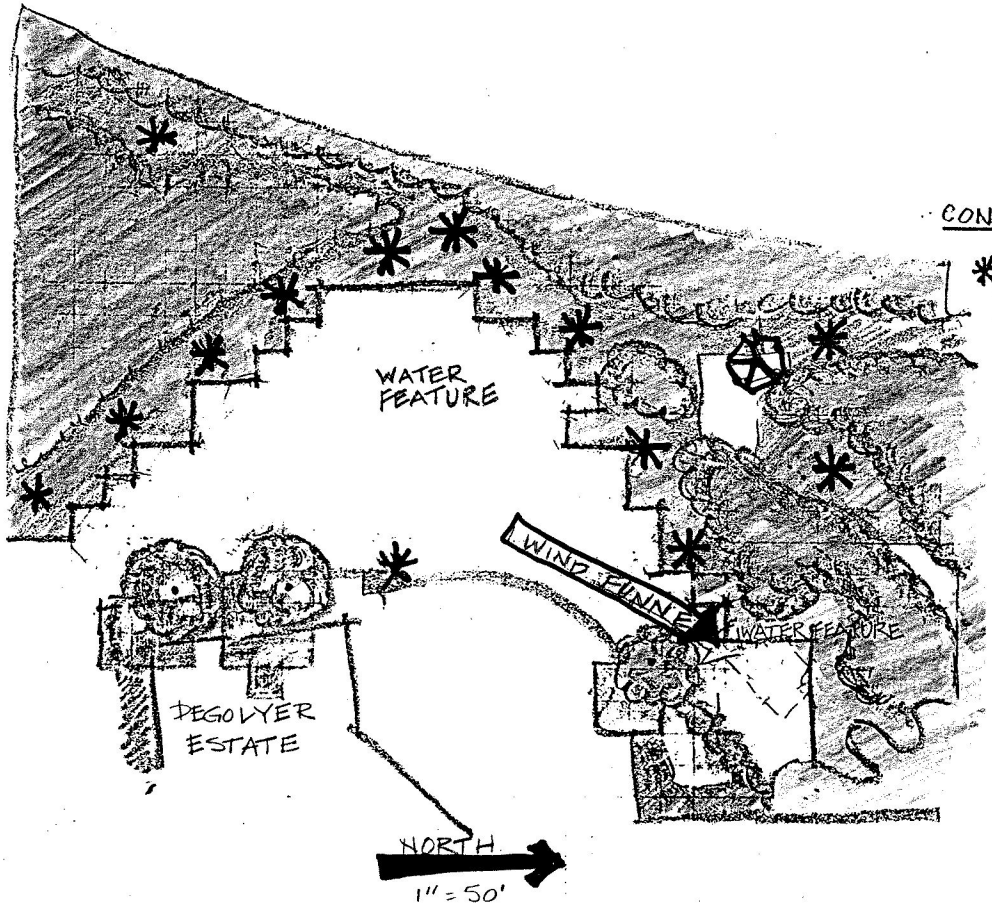


Figure 8-17 Flow of air from forest to plain.



MICROCLIMATE
JUNE 21, 11 A.M.

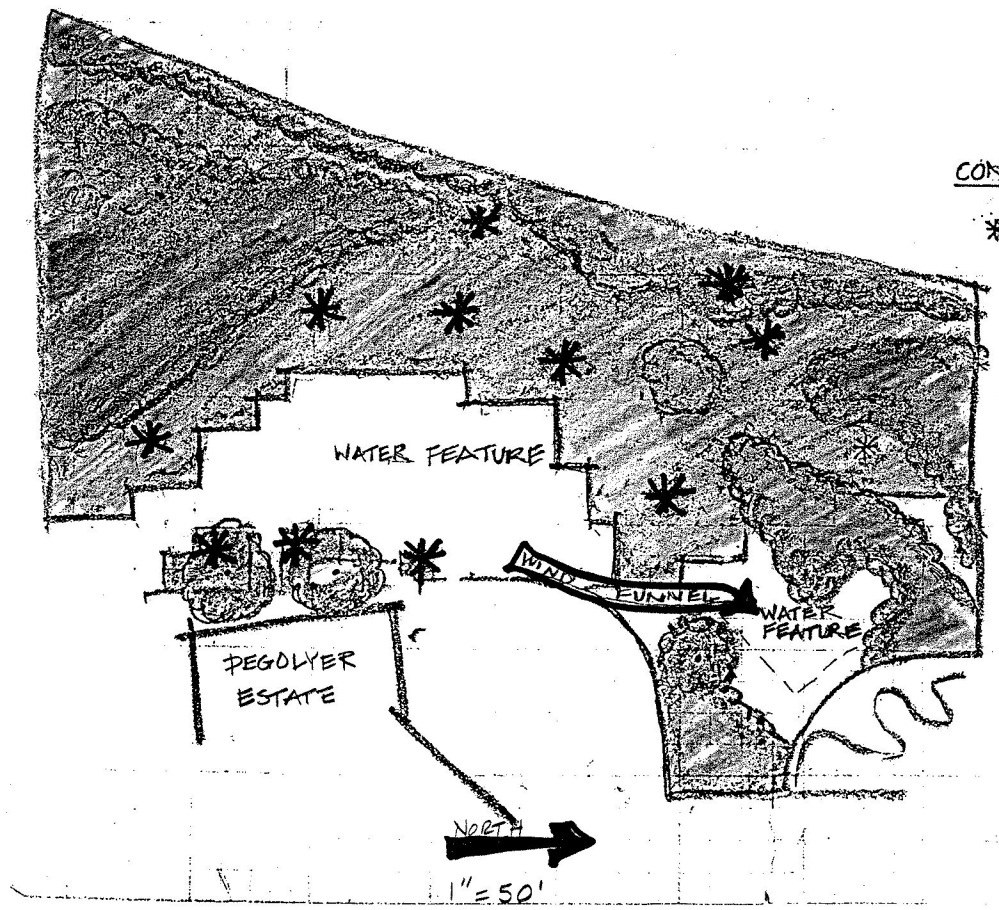


CONDITIONS (* = IDEAL)

* SH/W = SHADY, WINDY
SH/C = SHADY, CALM
S/W = SUNNY, WINDY
S/C = SUNNY, CALM

JUNE 21
4 P.M.

MICROCLIMATE
JUNE 21, 4P.M.

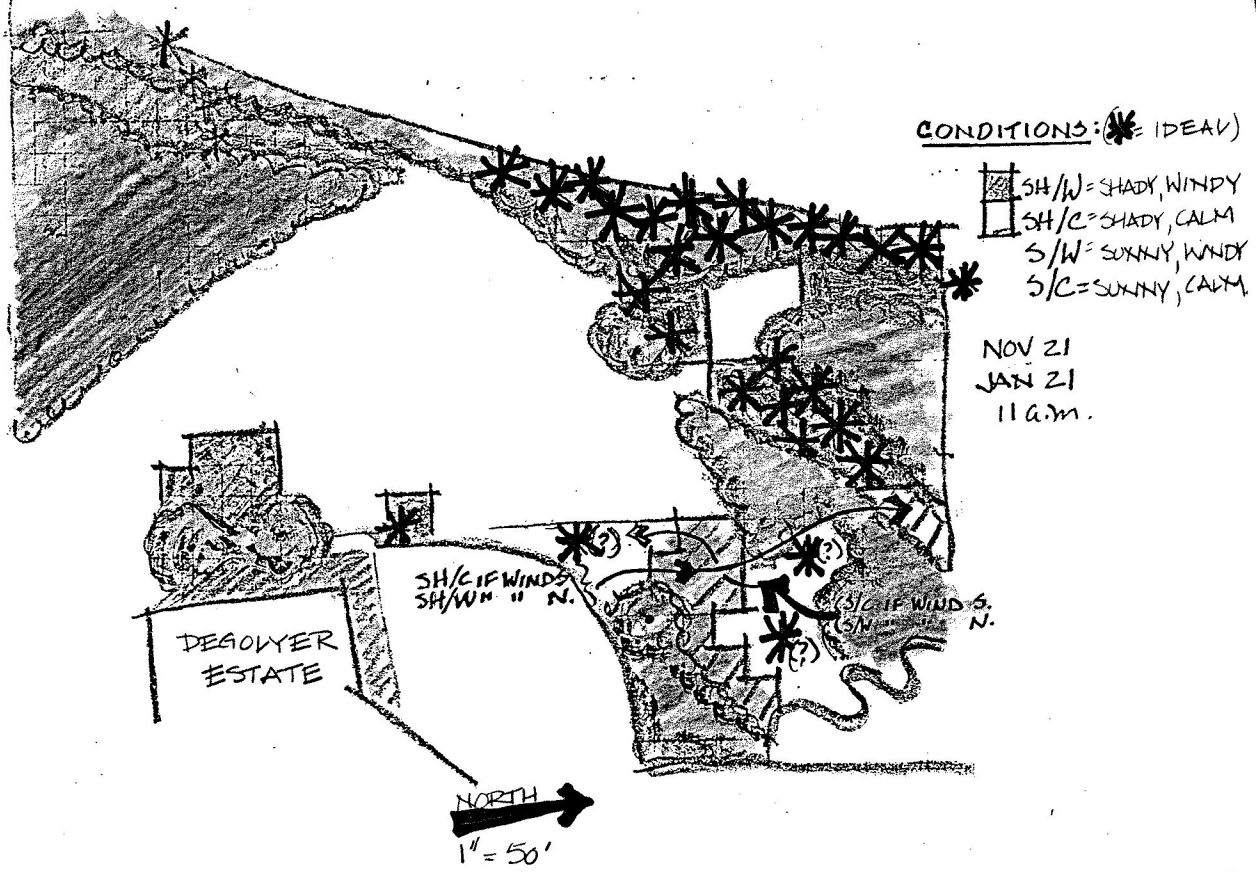


CONDITIONS: * = IDEAL)

SH/W = SHADY, WINDY
SH/C = SHADY, CALM
S/W = SUNNY, WINDY
S/C = SUNNY, CALM

JUNE 21
7 p.m.

MICROCLIMATE
JUNE 21, 7P.M.



MICROCLIMATE
NOV 21/JAN 21, 11AM.

MICROCLIMATE
NOV 21/JAN 21, 4PM.

MISCELLANEOUS

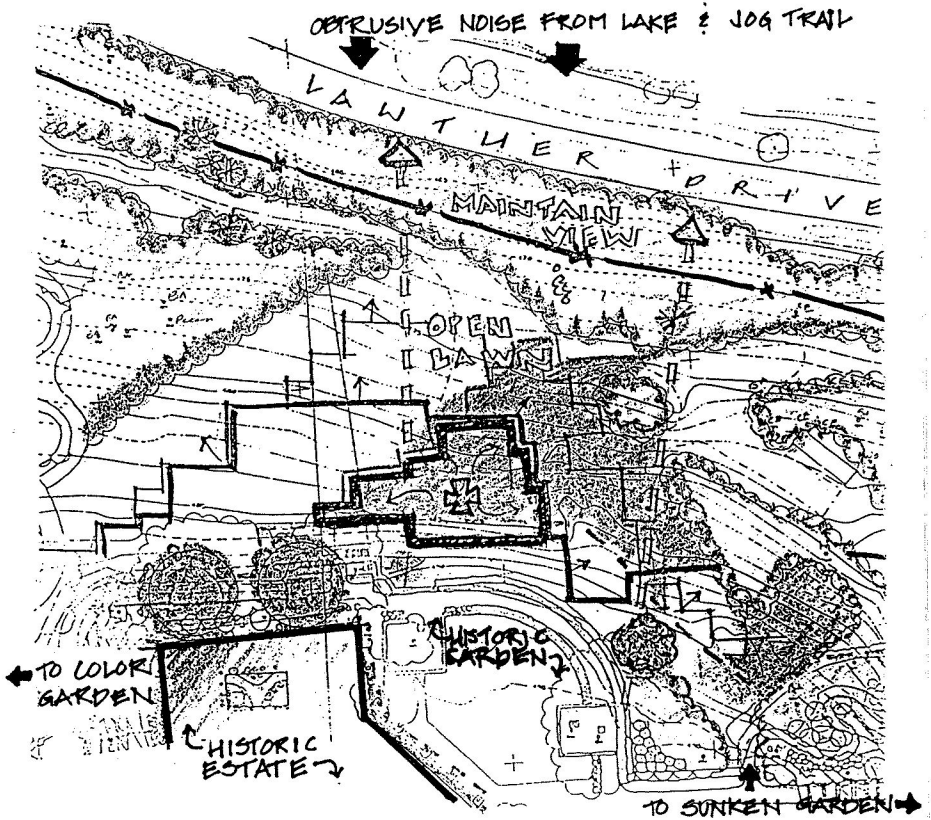
CIRCULATION – •EMERGENCY ACCESS INTO THE SITE REQUIRED
•WHEELCHAIR ACCESS FROM SUNKEN GARDEN & JONSSON GARDEN
•ACCESS FROM DEGOLYER STAIRS ON WEST SIDE OF ESTATE

CULTURAL – AREA TO WEST OF GREAT TERRACE TO REMAIN OPEN

APPENDIX IV

Site Analysis

SITE ANALYSIS



ONLY LOCATION ON SITE WITH CONTINUAL SUN

BEST WINTER SEATING (SUNNY)

BEST SUMMER SEATING (SHADY) — 4 P.M. / 7 P.M.

WATER FEATURE - SUNNY WINTERS

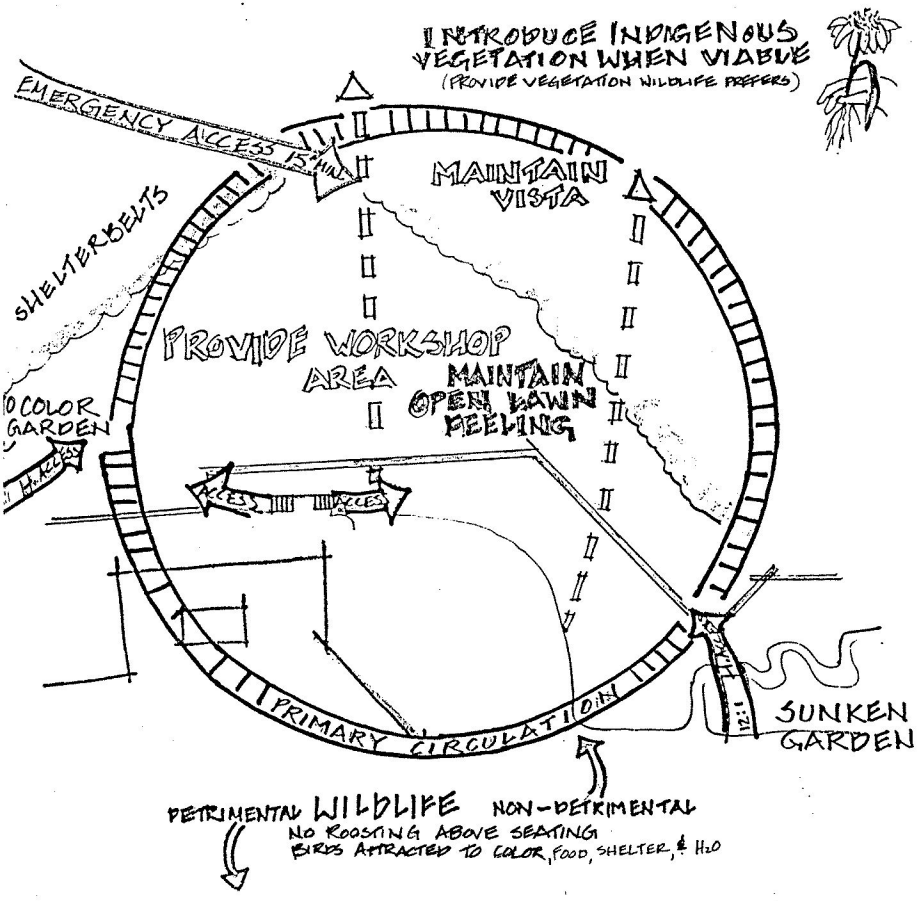
NORTH →

SCALE 1" = 50'-0"

APPENDIX V

Relationship of Program Elements other than Stimulators

RELATIONSHIP OF PROGRAM ELEMENTS OTHER THAN STIMULATORS

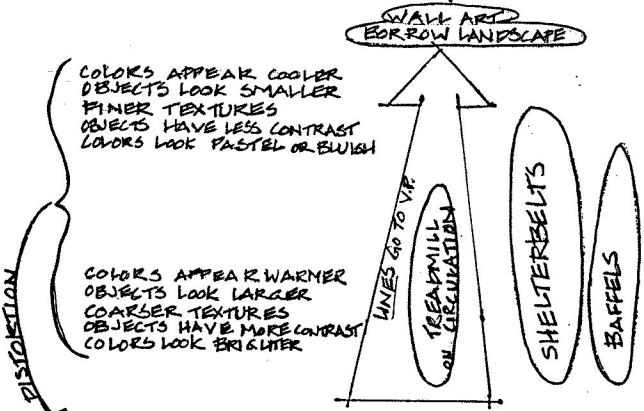


APPENDIX VI

Relationship of Stimuli to other Program Elements

RELATIONSHIP OF STIMULI TO OTHER PROGRAM ELEMENTS

VISTAS → MOVEMENT & PERSPECTIVE



DEPTH ILLUSIONS

CUBISM

- WALL ART ON 1SIDE OF WALL & OBVERSE ON OTHER SIDE
- SHOW TREE ROOT:

CIRCULATION ← IF TOO MUCH CIRCULATION IS PROVIDED WILL PEOPLE RECEIVE ENOUGH STIMULATION? — KEEP CIRCULATION & SEATING, WELL-BALANCED → STIMULI

VERTICAL MOVEMENT

RAMPS
SWINGS - PLACE IN SUNNY WINTER AREAS & CALM AREAS
ARCHED BRIDGES
TILTED WALKS

AUDITORY

PLACE PLEASANT SOUNDS UPWIND OF SEATING.
ALLOW FOR WILDLIFE HABITATS UPWIND OF " & CIRCULATION

FIRE

PLACE IN SEATING AREAS
" WHERE THERE'S NO CANOPY
" IN ENCLOSED AREA TO ↑ WARMTH IN WINTER
BURN VEGETATION WITH PLEASANT ESSENTIAL OILS
AFFECTS MANY SENSES: HEARING, SMELLING, FEELING, SEEING

WATER

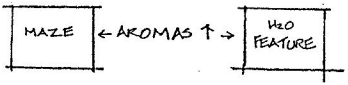
↑ OLFACTION
↑ COOLING
(VS) PASSIVE → "MORE ENDURING EXPERIENCES THAN ACTIVE"; REFLECTIVE
ACTIVE = NOISE MASKER

MAZES

POSSIBLE COMPONENTS:
TEXTURES
BAFFELS - TREE TRUNKS, TRELLIS, "WINDOWS"
SHADOWS
AROMAS
WATER FEATURES
WIND FUNNELS
UNDULATIONS
WALL ART
REFLECTIVE SURFACES
NON- "
USE OF COLOR FOR THERMAL PSYCHOLOGY
HIDE & REVEAL
LOUVERED WALL - ↑ AIR CIRCULATION

HEIGHTENED SENSE OF HEARING
IF PLACED IN SUN, ENCLOSING ELEMENT → SHADE & SHADOWS
DISTORTION OF PERSPECTIVE POSSIBLE WITHIN.

OLFACTION - SEE ATTACHMENTS



∴ HAVE AROMATICS IN ENCLOSED SPACES OR WHERE HUMIDITY IS HIGH & AIR CIRCULATION IS LOW.

- ESSENTIAL OILS MUST BE:

  VOLATILE – ∴ ↑ HEAT ; RAIN & IRRIGATION ↑ VOLATILITY; BRUISING ↑ VOLATILITY
  SOLUBLE IN H_2O OR FATS

- ESSENTIAL OILS DERIVED FROM VEGETATIONS:
  LEAVES
  FRUIT
  FLOWERS
  WOOD
  BARK
  ROOTS

  ∴ PLANT VEGETATION WITH AROMATIC PARTS
  BURN " " " "
  USE VEGETATIONS " " " FOR PAVING
  " " " " " MULCHES

- MONCRIEFF'S RULES OF ODOR PREFERENCE – SEE ATTACHMENTS
- RELATIONSHIP OF OLFACTION TO VISION:

172 THE CHEMICAL SENSES BY MONCRIEFF

THE CHEMICAL SENSORY SYSTEM II: SMELL

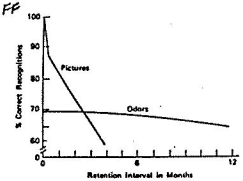


Fig. 10.9 Correct recognition of visual and olfactory stimuli as a function of duration. Note that the superiority for the pictorial stimuli in the initial stages of recognition performance falls off quite rapidly whereas the performance for odors remains relatively stable. (Based on Shepard, 1967, and Engen & Ross, 1973.)

apparently come from the human body: While not conclusive, some evidence suggests that sex identification is possible based only on olfactory cues (sweat), and that an infant as young as six weeks of age can identify the scent of its mother (Russell, 1976).

When the complex odors from familiar inanimate objects and materials are used as stimuli with specific training procedures, identification by adults is quite good. In an investigation by Desor and Beauchamp (1974), the distinct odors of 64 common sources were used (e.g., coffee, popcorn, human urine, molasses). With some laboratory training in identifying odors, subjects approached near-perfect identification. The fact that training enhances odor identification points out the significant role played by learning processes. Indeed, from his investigation Cain (1979) concluded that, aside from controlling for the inherent confusability of the stimuli, successful odorant identification depends on the familiarity of the odorant, the establishment of a long-standing association between an odor and its name, and some aid or prompting in recalling the odorant's name (i.e., hints to individuals when in a "tip-of-the-nose" state. See also Lawless & Engen, 1977; Lawless, 1978).

One of the striking aspects of odor memory is that although the initial identification and recognition of odors is not nearly as high as for visual stimuli, the retention of the memory for odors is quite long lasting (see Figure 10.9). That is, although there is only moderate recognition for odors compared to say, pictures, the memory of odors show relatively little loss over time. Engen and Ross (1973) reported that when their subjects were given a diverse set of 20 odors of familiar household products, they recognized (in a two-alternative, forced-choice task) about 70% when tested immediately after inspection. However, when tested again, 1, 7, 30, and 90 days later, approximately 70% of the original odors were still correctly recognized. Moreover, when about 20% of the original subjects were tested 1 year later, their average recognition score was almost 65%. Coupled with comparable experiments with visual material (Shepard, 1967), this suggests that odor memory may be less influenced by the passage of time than visual memory. A speculation offered by Engen and Ross (1973) is that visual stimuli such as pictures are easily identified after a brief inspection because they contain multiple distinguishable attributes (e.g., shape, size, color) that can be used in an encoding process, whereas odors produce more unitary experiences. Thus, for recognition performance the all-or-none coding of odors may affect initial acquisition and promote immediate errors, but it also renders odors quite resistent to subsequent confusions.

It is this aspect of odor experience artists refer to so often, for odors seem to be coded in an all-or-none fashion. This kind of coding is less efficient and may encourage errors in the early tests of retention, but it leaves odors resistant to confusions in later tests when pictures may be confused because they share a single attribute such as color. (Engen, 1977, P. 10.)

APPENDIX VII

Cut and Fill Estimate

CUT & FILL ESTIMATE – CONTOUR-PLANE METHOD

VOLUME = i (A+B+C....) WHERE i = CONTOUR INTERVAL = 1 HERE
A & B & C... = HORIZONTAL PLANE AREA

USING A 64 SQ. GRID/SQ. INCH.
AT THE SCALE OF 1" = 20', 1 SQ. IN. = 400 SQ. FT.

HORIZONTAL PLANE	# OF SQUARES ON GRID. CUT	# OF SQUARES ON GRID FILL
492	5	–
491	–	–
490	8	2
489	64	2
488	110	25
487	112	23
486	101	–
485	97 + 275	–
484	180+ 500	12
483	22+ 503	89+ 475
482	475	500
481	448	857
480	309	800
479	275	869
478	430	850
477	305	850
476	298+277	790
475	140	665
474	117	650
473	200 + 136	05
472	118 + 93	–
471	100 + 100	33
STEPS	192+180	
TOTAL	5962	7595
÷ 64	93.15 SQ. IN.	118.67 SQ. IN.
X 400	37,260 CU. FT.	47,468 CU. FT.
÷ 27	1,380 CU YD.	1,758 CU YD.
+20% COMPACTION OF CUT	1,656 CU YD.	1,758 CU YD.
EXCESS		102 CU. YD.

APPENDIX VIII

Correspondence

TELEPHONE
(202) 857-7000
TELEX 64184

CABLE ADDRESS
NATGEOSOC, WASHINGTON

National Geographic Magazine

WASHINGTON, D. C. 20036

ILLUSTRATIONS STAFF

March 7, 1988

Betty Presnall
Box 79417
Saginaw, Texas 76179

Dear Ms. Presnall:

Your letter regarding Smell Survey results has been referred to me for reply.

Unfortunately there is no more printed information available beyond what appeared in the October 1987 issue of National Geographic Magazine. The raw statistical data is currently only available on mainframe computer IBM tapes and probably not useful to you in that form.

Copies of the original Smell Survey are available upon request at no charge if you wish to conduct your own survey for educational purposes.

I am sorry I cannot be of more help. Your design thesis sounds very interesting, and I wish you the best of luck in researching it. Thank you for sharing your interest in smell with us.

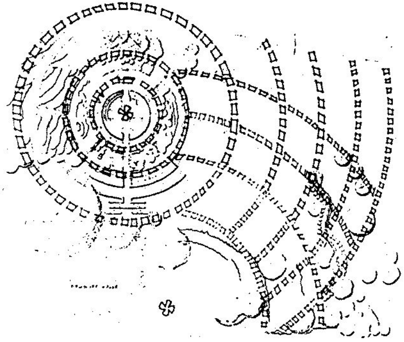
Sincerely,

Carolyn Mudd

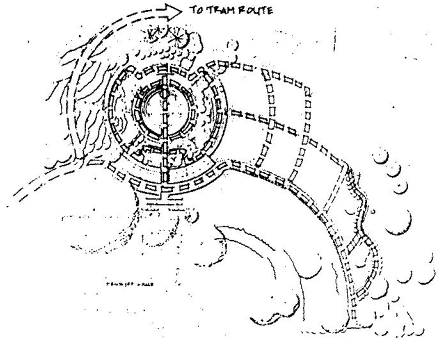
Carolyn Mudd
Illustrations Assistant
(202)857-7178

APPENDIX IX

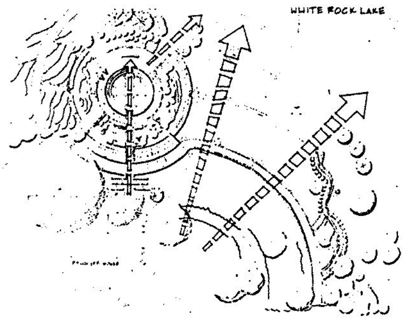
Site Drawings



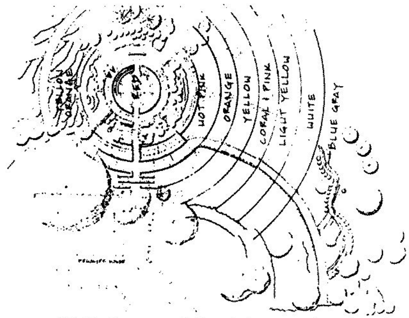
RADIAL ORGANIZATION



CIRCULATION SYSTEMS



VIEWS AND VISTAS



JEKYLL COLOR CONCEPT

PATRICIA SMITH
BETTY PRESNALL

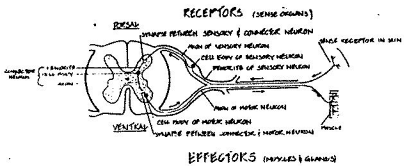
CONCEPTS
SENSORY GARDEN

DALLAS ARBORETUM & BOTANIC SOCIETY
8617 GARLAND ROAD DALLAS TEXAS

DABS

SHEET 1 OF 16

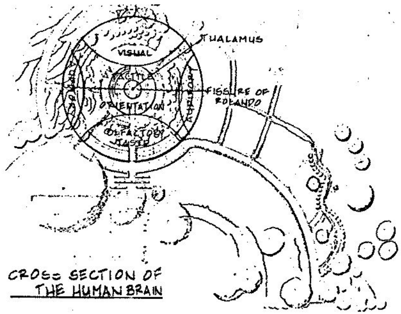
DATE



REFLEX ARC : PATHWAY OF AN IMPULSE

SYSTEM	MODE	RECEPTOR	STRUCTURE	ACTIVITY	TYPE INFO	STIMULI	
ORIENTING	TRAVELING & GENERAL ORIENTATION	MECHANO- & GRAVITY RECEPTORS	VESTIBULAR ORGAN OF INNER EAR	EQUILIBRIUM & BALANCE	DIRECTION OF GRAVITY, PUSHED & PULLED	VISTAS [illegible] TWISTED WALKS, BRIDGES UNDULATING [illegible] BRIDGES	MAZES SWINGS
AUDITORY	LISTENING	MECHANO-RECEPTORS	COCHLEA (INNER EAR)	ORIENTING TO SOUNDS	NATURE & LOCATION OF VIBRATORY EVENTS	ECHO [illegible] RUSTLING PLANTS CHIMES [illegible]	WATER SURFACE PIPE
SMELL-TASTE	SMELLING / TASTING	CHEMO-RECEPTORS / CHEMO- & MECHANO	NOSE / MOUTH	SNIFFING / SAVORING	NATURE & SOURCE OF [illegible]	PLANT PRODUCTS FOR [illegible] & [illegible] [illegible] ASSOCIATION MEMORY	
VISUAL	LOOKING	PHOTO-RECEPTORS	EYES & OCULAR MUSCLES	ACCOMMODATION, PUPILLARY ADJUSTMENT, [illegible]	SIZE, SHAPE, [illegible], LOCATION, COLOR, TEXTURE, MOVEMENT	[illegible]	[illegible]
HAPTIC CUTANEOUS	TOUCHING & FEELING	MECHANO & THERMO-RECEPTORS (SKIN)	SKIN	EXPLORATION	CONTACT [illegible] SHAPE, [illegible]	[illegible]	[illegible]
HAPTIC KINESTHETIC	MOVING	PROPRIO-RECEPTORS	JOINT, MUSCLES, TENDONS & LIGAMENTS	EXPLORATION BY APPENDAGES	AWARENESS OF MOVEMENT OF BODY PARTS	[illegible] CHANGES IN ELEVATION	CHANGES IN [illegible]

HUMAN PERCEPTUAL SYSTEM

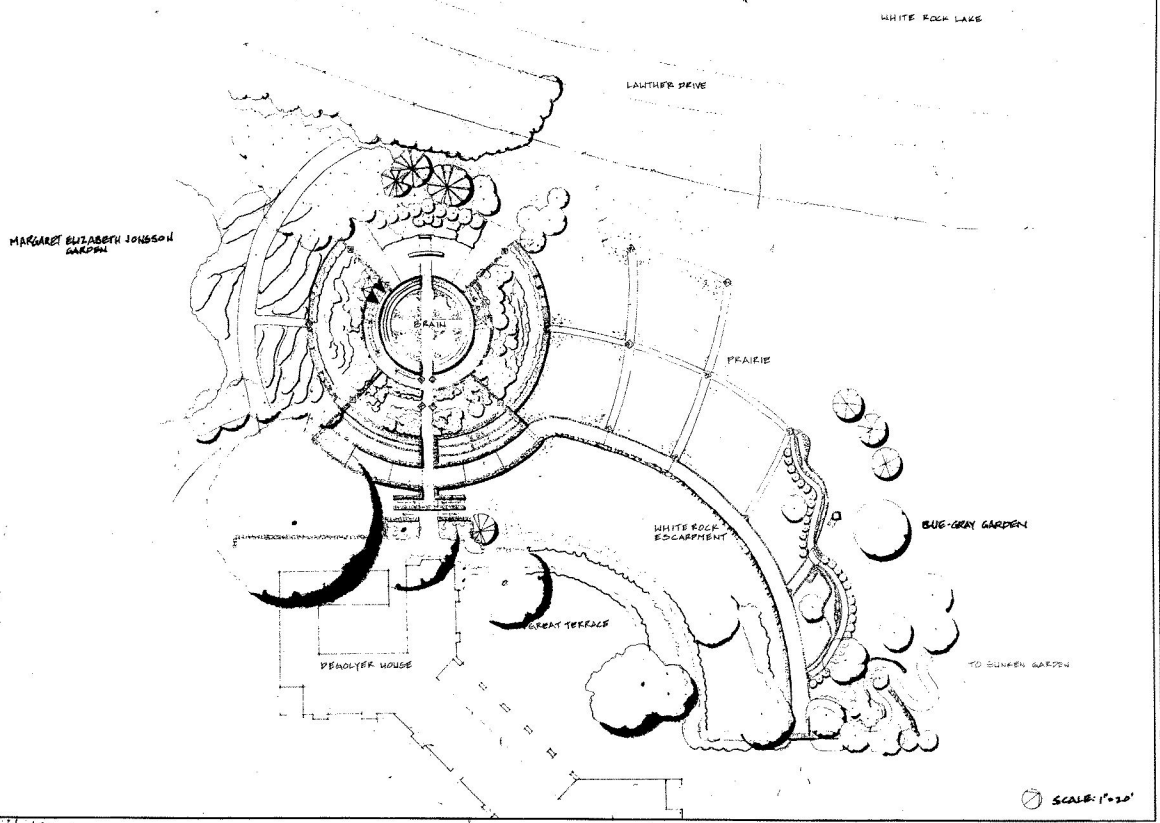


CROSS SECTION OF THE HUMAN BRAIN

PATRICIA SMITH
BETTY PRESNALL

CONCEPTS
SENSORY GARDEN

DALLAS ARBORETUM & BOTANIC SOCIETY
8617 GARLAND ROAD DALLAS TEXAS
DABS
SHEET 2 OF 16
DATE [illegible]



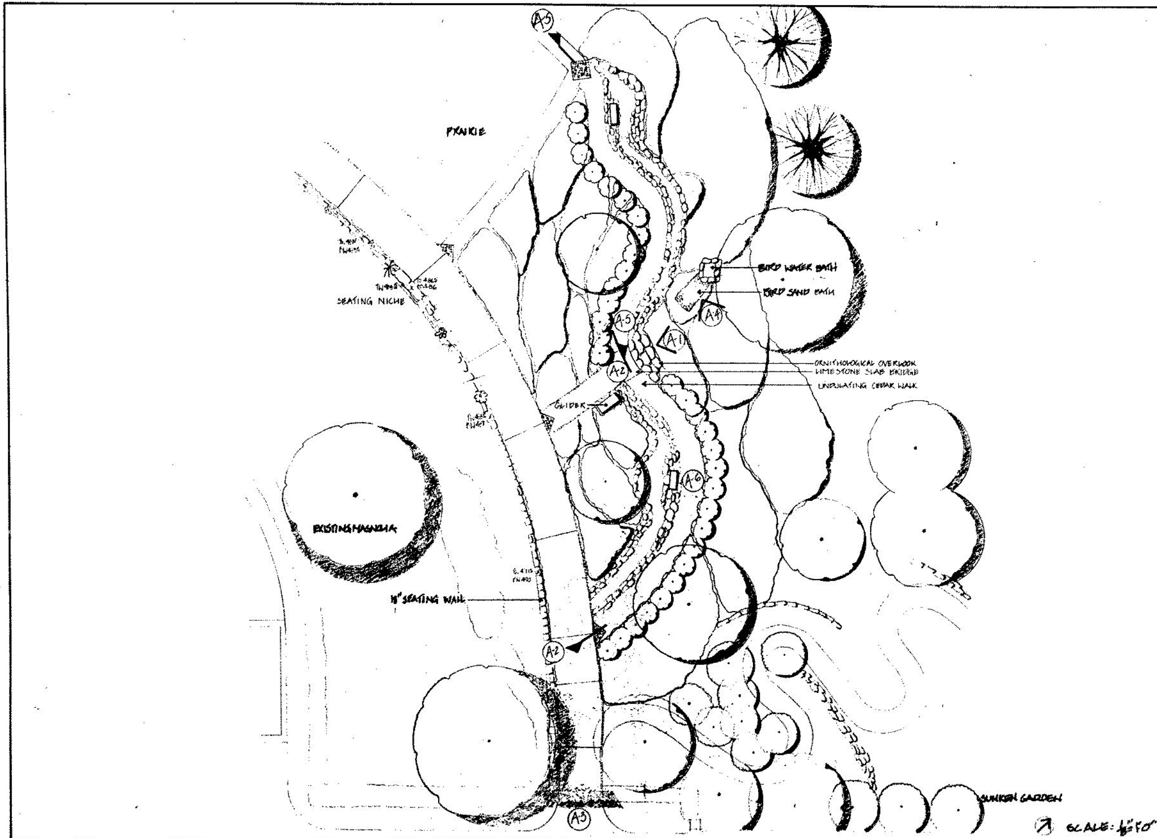
PATRICIA SMITH
BETTY PRESNALL

DESIGN DEVELOPMENT PLAN
SENSORY GARDEN
DALLAS ARBORETUM & BOTANIC SOCIETY
8617 GARLAND ROAD DALLAS, TEXAS

DA35

SHEET 3 OF 16

DATE 4-27-90



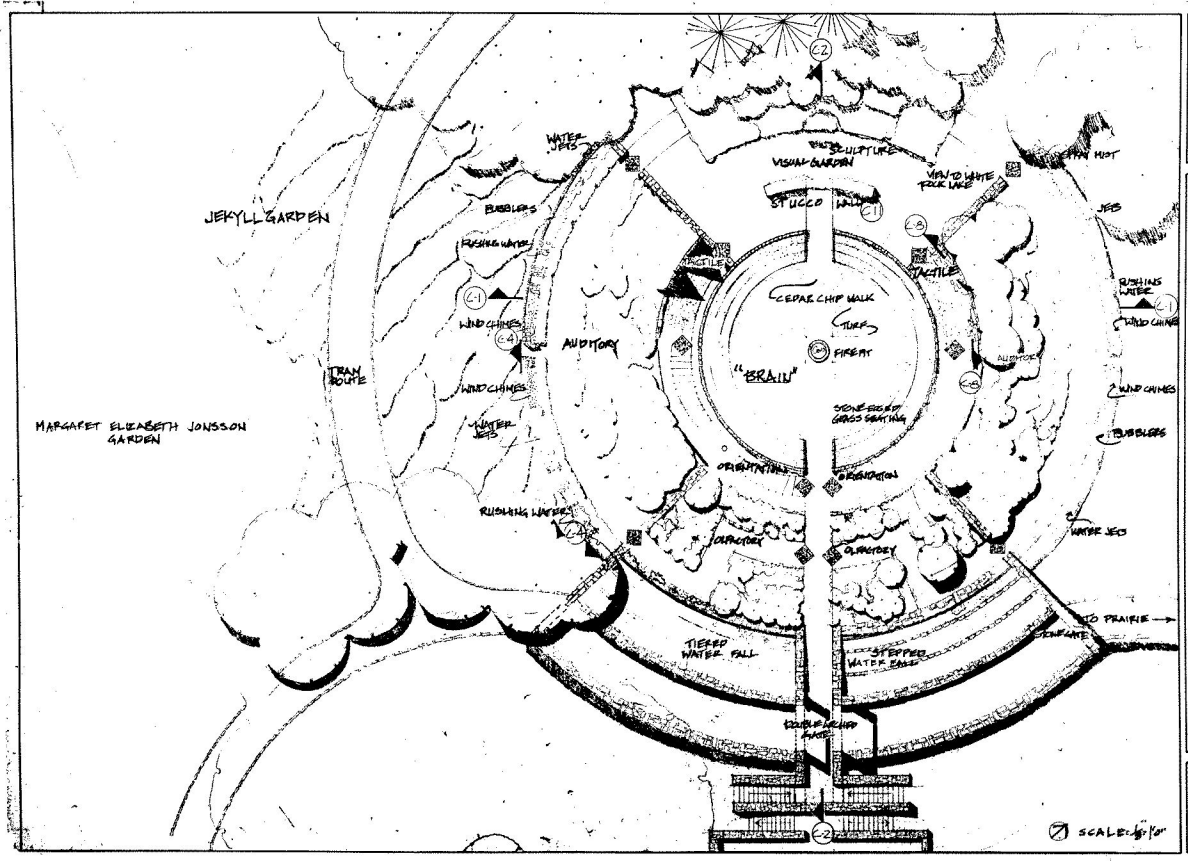
PATRICIA SMITH
BETTY PRESNALL

DESIGN DEVELOPMENT PLAN - BLUE GRAY GARDEN
SENSORY GARDEN
DALLAS ARBORETUM & BOTANIC SOCIETY
8617 GARLAND ROAD DALLAS TEXAS

DABS

SHEET 4
OF 16

DATE 4-21-05



PATRICIA SMITH
BETTY PRESNALL

DESIGN DEVELOPMENT PLAN - BRAIN - JEKYLL
SENSORY GARDEN
DALLAS ARBORETUM & BOTANIC SOCIETY
8617 GARLAND ROAD DALLAS, TEXAS

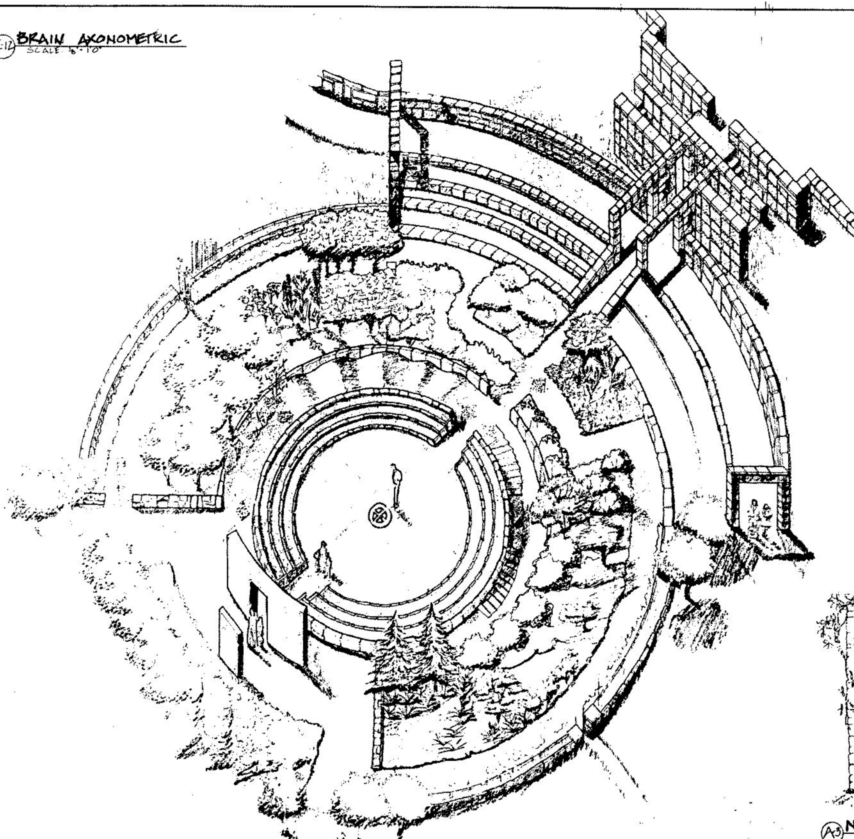
DABS

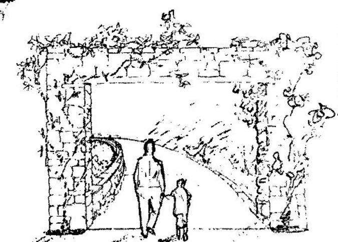
SHEET 5 OF 16

DATE 1-27-88

C-12 BRAIN AXONOMETRIC

SCALE ⅛"=1'0"





A3 NORTH GATEWAY PERSPECTIVE

PATRICIA SMITH
BETTY PRESNALL

DETAILS

SENSORY GARDEN

DALLAS ARBORETUM & BOTANIC SOCIETY

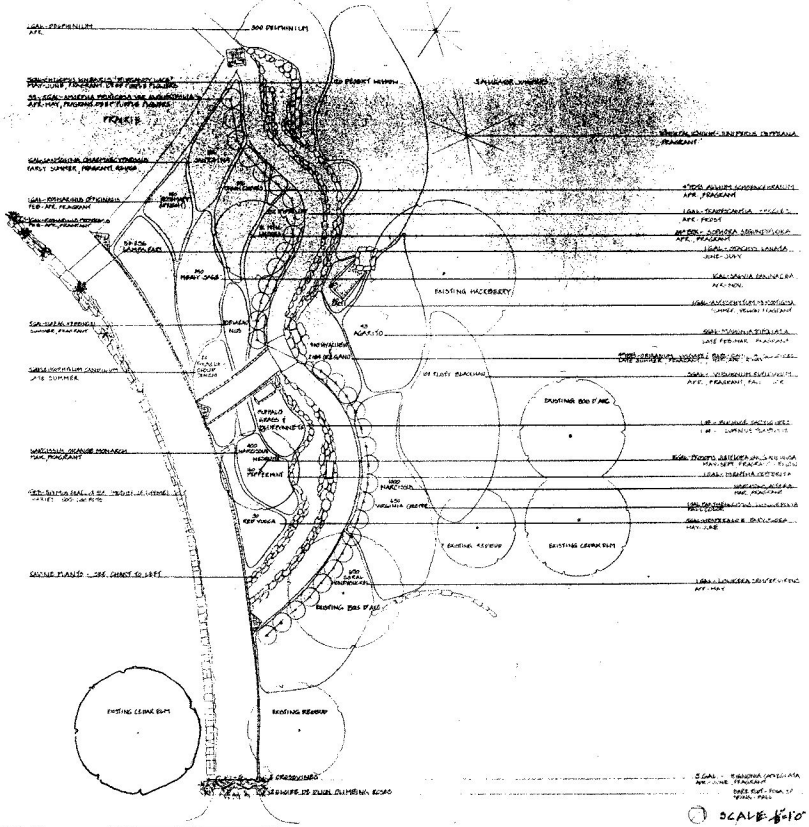
8617 GARLAND ROAD DALLAS TEXAS

DABS

SHEET 6 OF 16

DATE 4·27·88

NOTE: PLANTING FOR THIS GARDEN ADHERES TO GERTRUDE JEKYLL'S THEORY OF COLOR DRIFTS TRUE TO HER PHILOSOPHY. PLANTS ARE PLACED ON THE SITE BY THE LANDSCAPE ARCHITECT.



RAVINE PLANTS:

HT.	BOTANICAL NAME	COMMON NAME	BLOOMS
VINE	CLEMATIS PITCHERI	PITCHER LEATHERFLOWER	APR.-SEPT.
"	CORIACEA	CORIA FLOWER	MAY-OCT.
8"	TUNBERGIA ALBIDA	PEARL-EYED WEED	JUNE-SEPT.
8"	OXALIS VIOLACEA	VIOLET WOOD SORREL	MAY-MAY
36"	IRIS GERMANICA FLORENTINA	ORRIS ROOT	EARLY APR.
1'	IRIS VERSICOLOR	BLUE FLAG	MAY-EARLY JUNE
24"	IRIS VIRGINICA SHREVEI	BLUE FLAG	APR.-JUNE
1-3'	IRIS HEXAGONA	WILD IRIS	APR.-JUNE
1-2'	SCHIZANTHUS CANDIDUS	BUTTERFLY HYACINTH	APR.-FROST
1-2'	SWERTIA CARINATUM	BLUE BOWL GENTIAN	JUNE-SEPT.
36-72"	SYNDESMON MINUS	BLUE-EYED GRASS	MARCH-APR.
8-12"	" FRANCISCOT ESCHSCHOLTZIA	" " "	MARCH-APR.
1-2'	HYPERICOCARPUS HYPERICIFOLIUS	ST. JOHN'S WORT	MAY-JUNE
1-3'	SAGITTARIA PLATYPHYLLA	ARROWHEAD	JUNE-SEPT.
1'	MONARDA CANARENSIS	WILD COLUMBINE	APR.-MAY
1-4'	LOBELIA CARDINALIS	CARDINAL FLOWER	AUG.-OCT.

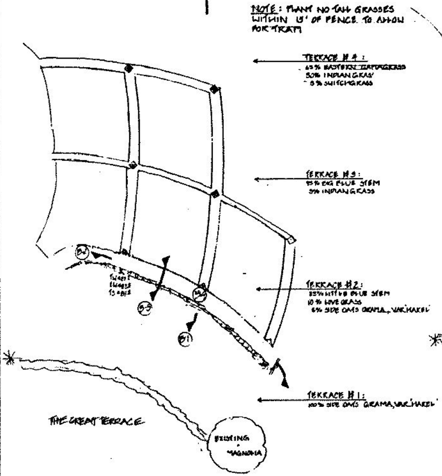
PATRICIA SMITH
BETTY PRESNALL

PLANTING PLAN - BLUE-GRAY GARDEN
SENSORY GARDEN
DALLAS ARBORETUM & BOTANIC SOCIETY
8617 GARLAND ROAD DALLAS, TEXAS
D.A.B.S.

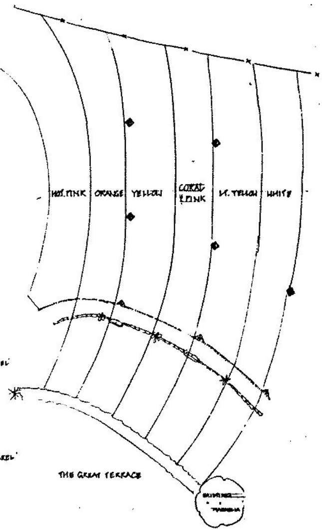
SHEET 7 OF 16

DATE 4-27-98

1



PRAIRIE GRASSES
SCALE 1" = 20'



PRAIRIE WILDFLOWERS (LEGUMES & FORBS)
SCALE 1" = 20'

DRIFTS OF LEGUMES & FORBS

FLOWER COLOR	BOTANICAL NAME	COMMON NAME	HT.	BLOOM	COMMENTS
WHITE	LONICERA ALBIFLORA	WHITE HONEYSUCKLE	VINE	MAR-APR	ON WALL
	GNAPHALIUM WRIGHTII	CUDWEED	18"	SUMMER	
	ERIOGONUM ANNUUM	WILD BUCKWHEAT	1-6'	-	
	SILPHIUM ALBIFLORA	WH. FLOWER ROSINWEED	2-5'	-	
	ACHILLEA MILLEFOLIUM	YARROW	1-2'	MAY-JN	FRAGRANT
	ARGEMONE ALBIFLORA	WHITE PRICKLY POPPY	1'	APR-JUN	ON WALL
	" AURANTIACA	" " "	1'	SUMMER	
LT. YELLOW	POTENTILLA RECTA	CINQUEFOIL	2'	MAY-AUG	
	CLEMATIS DRUMMONDII	OLD MANS BEARD	VINE	JUN-SEPT	ON WALL
	ARGEMONE MEXICANA	YELLOW PRICKLY POPPY	1-1½'	APR-OCT	
	MELAMPODIUM CINEREUM	PLAINS BLACKFOOT DAISY	1'	APR-FROST	FRAGRANT
	CHRYSANTHEMUM LEUCANTHEMUM	OX-EYE DAISY	1'	APR-JUNE	ON WALL
CORAL	SPHAERALCEA ANGUSTIFOLIA	COPPER MALLOW	1-4'	APR-OCT	ON WALL
	RUMEX HYMENOSEPALUS	CANAIGRE	1-3'	FEB-APR	
	WISSADULA HOLOSERICEA	VELVET-LEAF	5-6'	SUMMER	FRAGRANT
PINK	PEREZIA WRIGHTII	PEREZIA	1-3'	MAY-AUG	ON WALL
	PHYSOSTEGIA DIGITALIS	OBEDIENT PLANT	3'	JN-AUG	ON WALL
	" PRAEMORSA	"	1-2'	AUG-OCT	
	ARGEMONE CHISOSENSIS	PINK PRICKLY POPPY	1'	MAR-MAY	
	PENSTEMON COBAEA	WILD FOXGLOVE	2'	APR-MAY	ON WALL
	OENOTHERA SPECIOSA	SHOWY PRIMROSE	6-18"	APR-JN	
YELLOW	CHRYSACTINIA MEXICANA	DAMIANITA	1-2'	JN-OCT	ON WALL
	SOLIDAGO ALTISSIMA	TALL GOLDENROD	3-6'	JUN-NOV	FRAGRANT
	SILPHIUM ASPERRIMUM	ROSINWEED	3-8'	SUMMER	
	COREOPSIS LANCEOLATA	GOLDENWAVE	1-2'	MAR-JULY	ON WALL
	THELESPERMA [illegible]	[illegible]	1'	MAR-SEPT	
	DALEA AUREA	GOLDEN DALEA	2'	MAY-JN	
	OENOTHERA SERRULATA	DAY PRIMROSE	6-18"	APR-JN	
	HELIANTHUS MAXIMILIANA	MAXIMILIAN DAISY	3-10'	JN-OCT	FRAGRANT
	SANTOLINA CHAM.	SANTOLINA-GRAY	1'	EARLY SUMMER	ON WALL FRAGRANT
	" SEMPERVIRENS	" GREEN	1'	"	"
	LANTANA HORRIDA	TEX. LANTANA	1'-3'	APR-OCT	
	TARAXACUM OFFICINALE	DANDELION	18"	FEB-JN	
	VIGUIERA DENTATA	GOLDEN EYE DAISY	2-4'	JN-OCT	ON WALL
ORANGE	ASCLEPIAS TUBEROSA	BUTTERFLY WEED	12-16"	MAY-JN	
	RATIBIDA COLUMNARIS	MEXICAN HAT	2-3'	JN-FROST	ON WALL
	GAILLARDIA PULCHELLA	INDIAN BLANKET	1-2'	MAR-FROST	
	LONICERA SEMPERVIRENS	CORAL HONEYSUCKLE	VINE	MAR-MAY	ON WALL FRAGRANT
HOT PINK	CALLIRHOE INVOLUCRATA	WINE CUP	1'	APR-JN	
	PAVONIA LASIOPETALA	ROCK ROSE	2-3'	APR-SEPT	ON WALL
	DALEA GREGGII	GREGG'S DALEA	2'	MAY-AUG	
	" FRUTESCENS	SHRUBBY "	3'	LATE SUMMER	
	OPUNTIA SP.	CACTI	4-8'		ON WALL
	VERBENA ELEGANS	HAIRY VERBENA	1'	SUMMER	ON WALL FRAGRANT
	MONARDA FISTULOSA	BEE BALM	2-4'	MAY-AUG	"

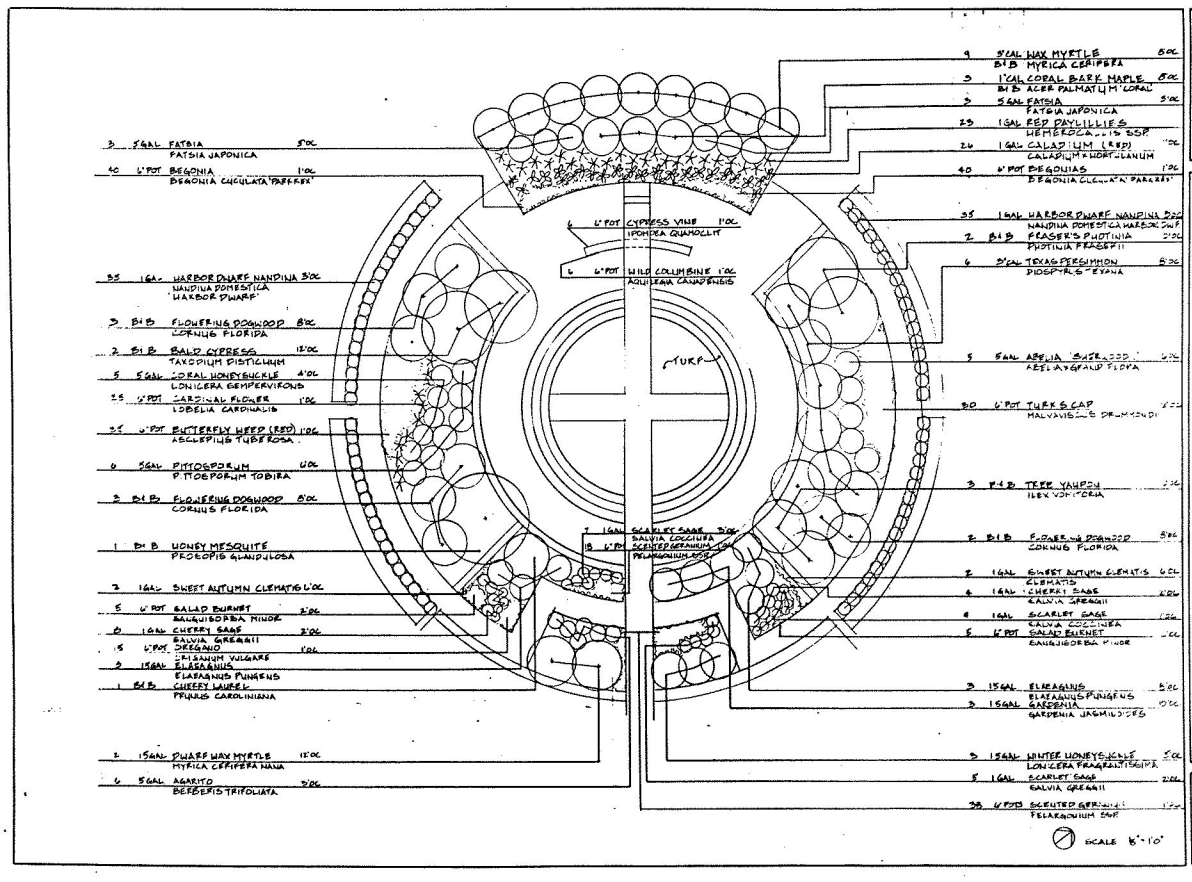
PATRICIA SMITH
BETTY PRESNALL

PLANTING & DESIGN DEVELOPMENT PLANS - PRAIRIE
SENSORY GARDEN
DALLAS ARBORETUM & BOTANIC SOCIETY
8617 GARLAND ROAD DALLAS TEXAS

DABS

SHEET 8 OF 16

DATE 4-27-80



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PLANTING PLAN - BRAIN SENSORY GARDEN

DALLAS ARBORETUM & BOTANIC SOCIETY
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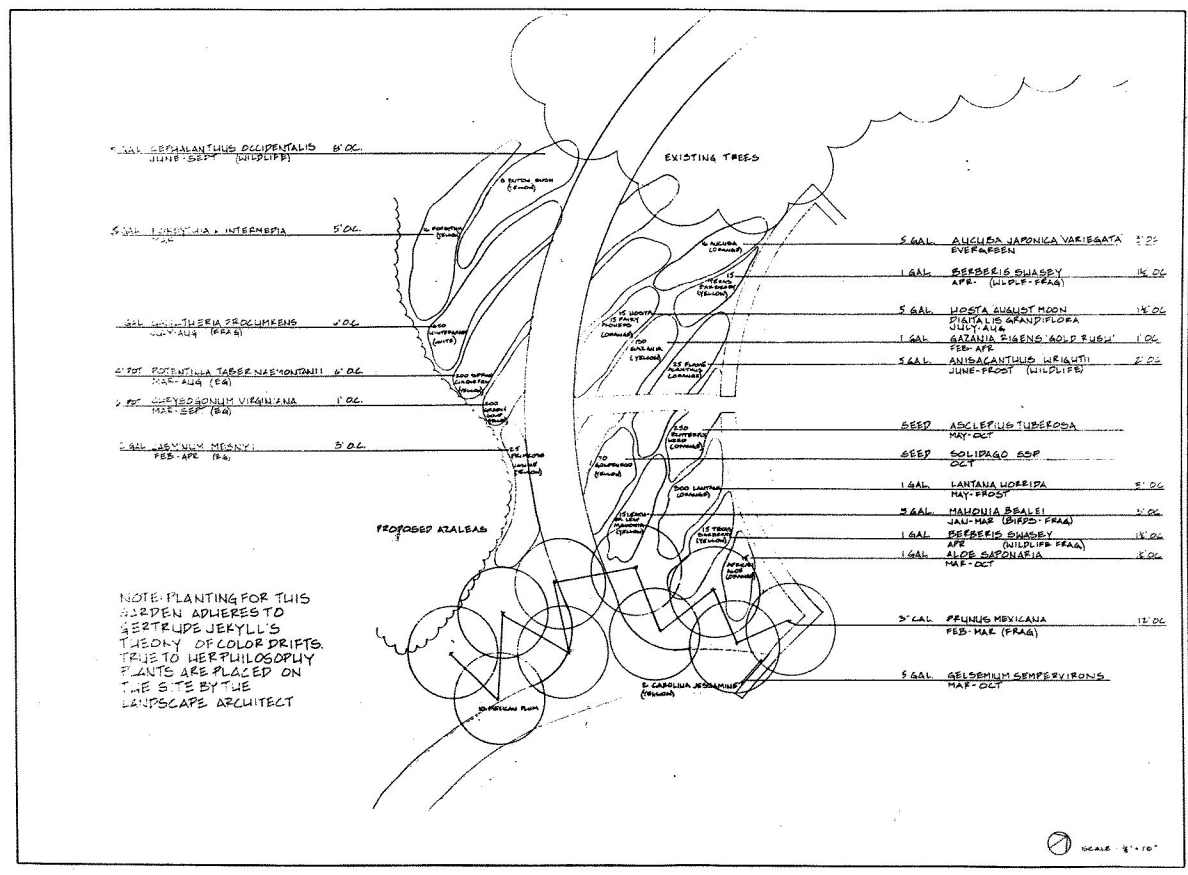
SHEET 9 OF 16

DATE 4-27-90



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PLANTING PLAN - JEKYLL GARDEN

SENSORY GARDEN

DALLAS ARBORETUM & BOTANIC SOCIETY
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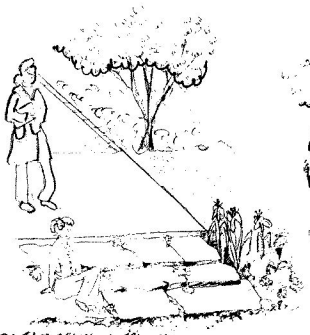
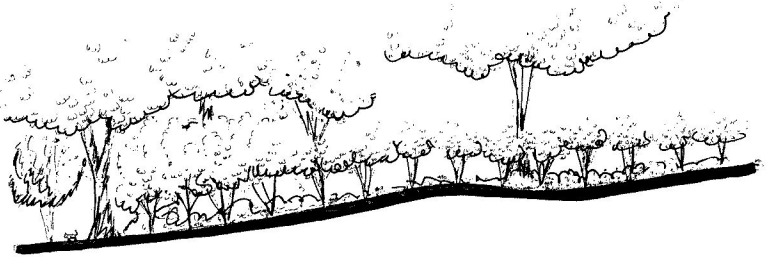
SHEET 10 OF 16

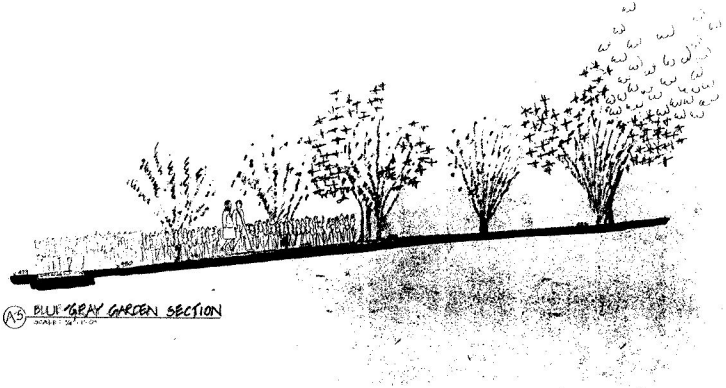
DATE: 2-23-80



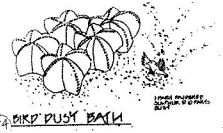
A1 ORNITHOLOGICAL OVERLOOK



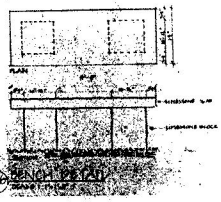
A2 BLUE-GRAY GARDEN SECTION
SCALE



A3 BLUE-GRAY GARDEN SECTION
SCALE



A4 BIRD DUST BATH



A5 BENCH DETAIL

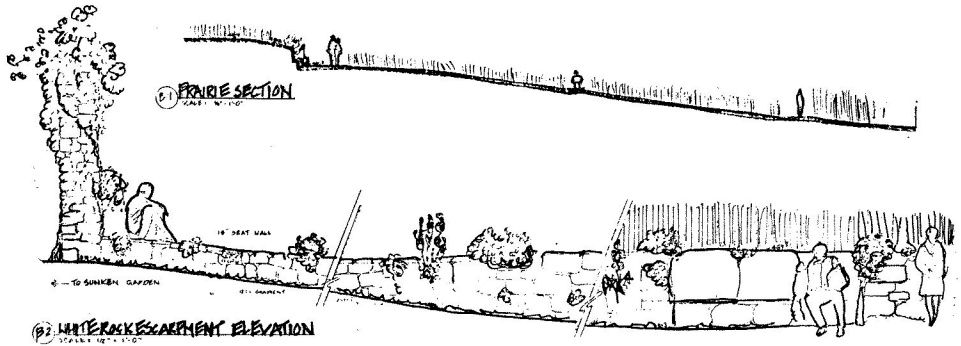
PATRICIA SMITH
BETTY PRESNALL

DETAILS
SENSORY GARDEN
DALLAS ARBORETUM & BOTANIC SOCIETY
8617 GARLAND ROAD DALLAS TEXAS

DABS

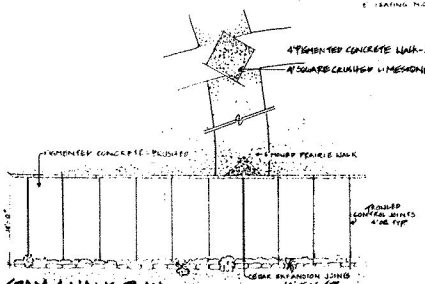
SHEET 11
OF 16

DATE 1-27-86



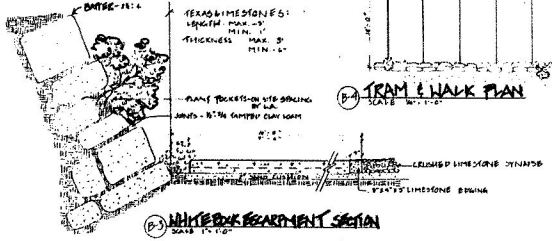
B-1 PRAIRIE SECTION
SCALE: 1/4"=1'-0"

B-2 WHITEROCK ESCARPMENT ELEVATION
SCALE: 1/4"=1'-0"

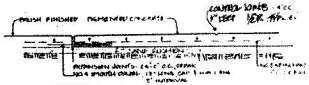


B-4 TRAM & WALK PLAN
SCALE: 1/4"=1'-0"

B-5 PRAIRIE WALK PERSPECTIVE



B-3 WHITEROCK ESCARPMENT SECTION
SCALE: 1/4"=1'-0"



B-6 CONCRETE WALKS
SCALE: 1/4"=1'-0"

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DALLAS ARBORETUM & BOTANIC SOCIETY
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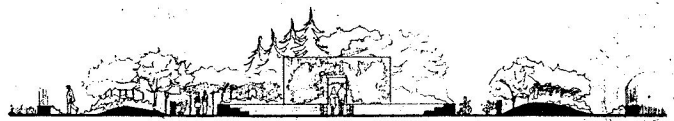
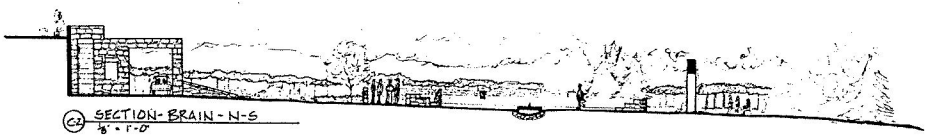
SHEET 12
OF 16

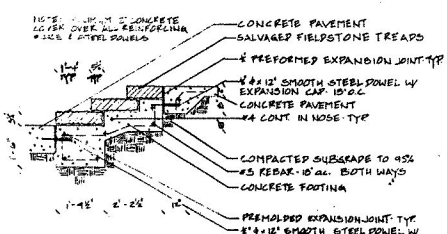
DATE 4-25-86



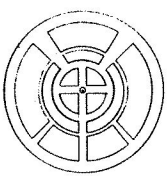
(C1) SECTION - BRAIN - E-W
3/8" = 1'-0"



(C2) SECTION - BRAIN - N-S
3/8" = 1'-0"

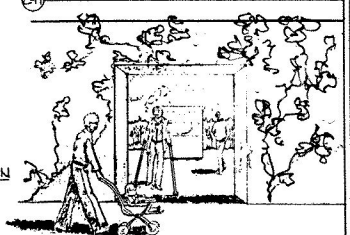


(C3) SECTION - LEDGESTONE STAIRS
3/4" = 1'-0"



(C4) FIRE GRATE & DRAIN DESIGN
NOTE: GRATES TO BE BRONZE

(C5) PERSPECTIVE - STUCCO WALL



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SENSORY GARDEN
DALLAS ARBORETUM & BOTANIC SOCIETY
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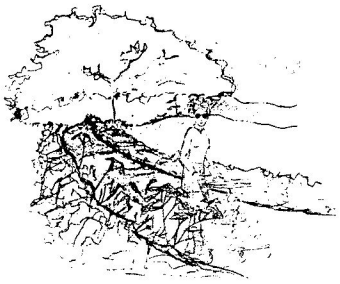
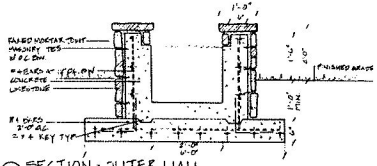
SHEET 13 OF 16

DATE 4-[illegible]

E-4 ELEVATION-OUTER WALL
1" = 1'-0"

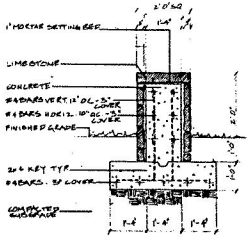


E-7 PERSPECTIVE-JEKYLL GARDEN

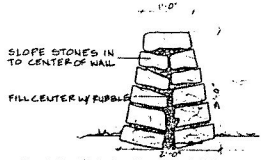


E-5 SECTION - OUTER WALL
3/4" = 1'-0"

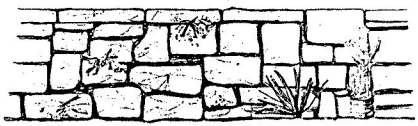
E-6 HUMMINGBIRD AT TURK'S CAP



E-8 SECTION - OUTER WALL ENDS
3/4" = 1'-0"



E-7 SECTION - TACTILE DRY WALL
1/2" = 1'-0"



E-9 ELEVATION - TACTILE DRY WALL
1/2" = 1'-0"

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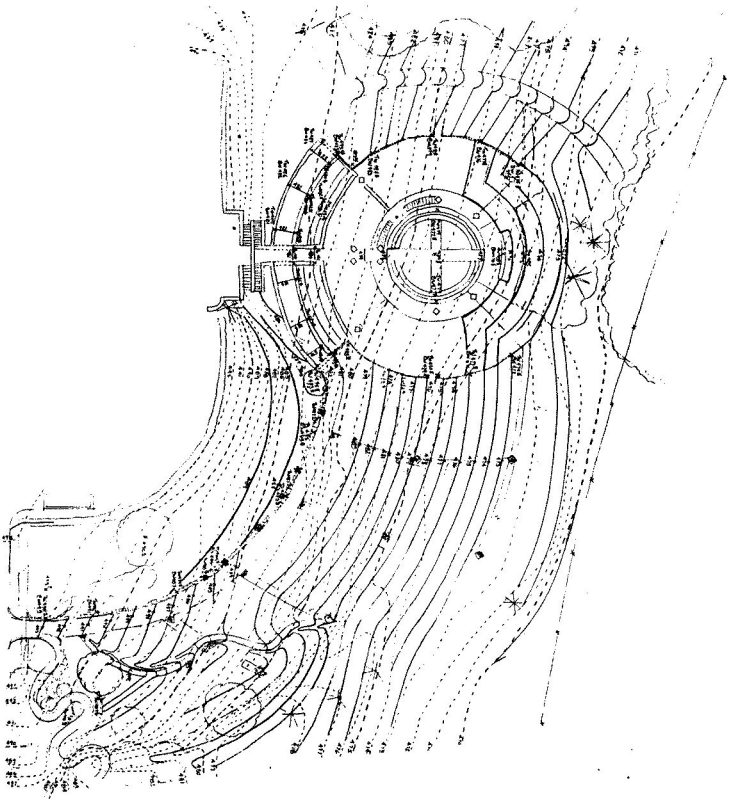
DETAILS
SENSORY GARDEN
DALLAS ARBORETUM & BOTANIC SOCIETY
8617 GARLAND ROAD DALLAS TEXAS

DABS

SHEET 14 OF 16

DATE 4-27-86



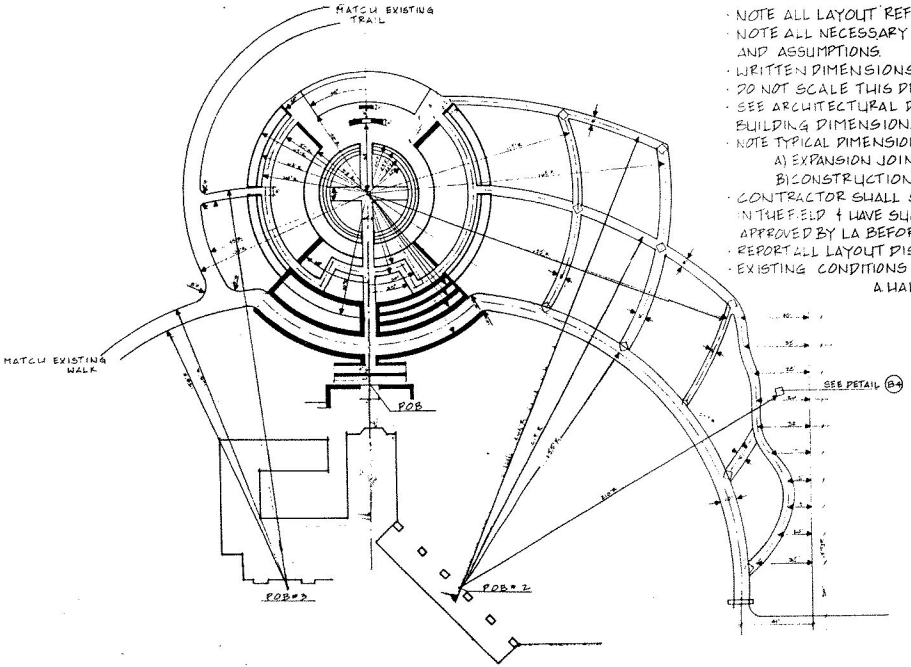
SHEET 15 OF 16

DATE

DABS

GRADING PLAN
SENSORY GARDEN
DALLAS ARBORETUM & BOTANIC SOCIETY
8617 GARLAND ROAD DALLAS TEXAS

PATRICIA SMITH
BETTY PRESNALL



- NOTE ALL LAYOUT REFERENCE POINTS.
- NOTE ALL NECESSARY SURVEY DATA AND ASSUMPTIONS.
- WRITTEN DIMENSIONS SHALL PREVAIL
- DO NOT SCALE THIS DRAWING.
- SEE ARCHITECTURAL DRAWINGS FOR BUILDING DIMENSIONS.
- NOTE TYPICAL DIMENSIONS:
  - A) EXPANSION JOINTS EVERY 24'
  - B) CONSTRUCTION JOINTS EVERY 6'
- CONTRACTOR SHALL STAKE LAYOUT PLAN IN THE FIELD & HAVE SUCH STAKING APPROVED BY LA BEFORE CONSTRUCTION
- REPORT ALL LAYOUT DISCREPANCIES TO LA
- EXISTING CONDITIONS SURVEYED BY A HALFF & ASSOC

PATRICIA SMITH
BETTY PRESNALL

LAYOUT PLAN
SENSORY GARDEN

DALLAS ARBORETUM & BOTANIC SOCIETY
8617 GARLAND ROAD DALLAS TEXAS

DABS

SHEET 16
OF 16

DATE 1-1-96

BIBLIOGRAPHY

Albers, Joseph. Interaction of Color. New Haven, Conn.: Yale University Press, 1963.

Austin, Richard, Hulvershorn, J. Kip, Thomas R. Dunbar, and Kim W. Todd. Graphics for Landscape Architecture. New York: Van Nostrand Reinhold Company, 1986.

Bienfang, Ralph. The Subtle Sense. Norman: The University of Oklahoma Press, 1946.

Birren, Faber. Color and Human Responses. New York: Van Nostrand Reinhold Company, 1978.

Bloomer, Carolyn M. Principles of Visual Perception. New York: Van Nostrand Reinhold Company, 1976.

Bord, Janet. Mazes and Labyrinths of the World. New York: E.P. Dutton and Company, Inc., 1976.

Brown. Jane. Gardens of a Golden Afternoon. Harmondsworth, Middlesex, England: Penguin Books, Ltd. 1982.

Byne, Mildred Stapley, Arthur Byne. Spanish Gardens and Patios. Philadelphia: Washington Square Press, 1924.

Canter, David. The Psychology of Place. New York: St. Martin's Press,1977.

Carstens, Diane Y. Site Planning and Design for the Elderly. N.Y.: Van Norstrand Reinhold Company, 1985.

Cytowic, Richard E. Encyclopedia Britanica, Yearbook of Science and the Future, 1987. S.V. "The Joined Senses of Synthesthesia".

Fitch, James Marston. American Building 2: The Environmental Forces that Shape It. Boston: Houghton Mifflin and Company. 1972.

Geldard, Frank A. The Human Senses. N.Y.: John Wiley and Sons, Inc., 1953.

Gilbert, Avery and Charles J. Wysocki. "The Intimate Sense of Smell", The National Geographic, Sept. 1986.

Goffman, Erving. Behavior in Public Places . N.Y.: The Free Press, 1963.

Hall, Edward T. Beyond Culture. Garden City: Anchor Press/Doubleday, 1981.

Hall, Edward T. The Hidden Dimension. N.Y.: Doubleday and Co., Inc., 1966.

Hall, Edward T., and Mildred Hall. The Fourth Dimension in Architecture. Santa Fe: The Sunstone Press, 1975.

Hampton, F.A. The Scent of Flowers and Leaves, Its Purpose and Relation to Man. London: Dulau and Co., Ltd., 1925.

Heshong, Lisa. Thermal Delight in Architecture. Cambridge, Mass: MIT Press. 1987.

Itoh, Teiji. Space and Illusion in the Japanese Garden. translated by Ralph Friedreich and Masajiro Shimamura. New York: John Weatherhill and Kyoto: Tankosha (jointly), 1973.

Itten, Johannes. The Elements of Color. N.Y.: Van Norstrand Reinhold Company, 1970.

Jakyle, John A. The Visual Elements of Landscape. Amherst: The University of Massachusetts Press, 1987.

James, G. Truett, "Climate and Site", Site Planning: Environmental Process and Development. pp. 89-128. Edited and written in part by Gene Brooks.Englewood Cliffs, N.D.: Prentice Hall, 1987.

Jekyll, Gertrude. The Making of a Garden. Edited by Cherry Lewis. Woodbridge, Sulfolk, England: Baron Publishing, 1984.

Jekyll, Gertrude. Wall and Water Gardens. London: Country Life Ltd./George Newess Ltd., 1901; introduced and revised by Graham Stuart Thomas, Salem, New Hampshire: The Ayer Company, 1983.

Jekyll. Gertrude. Color Schemes for the Flower Garden. London: Country Life Ltd./George Newness Ltd., 1908; reprint ed., Woodbridge, England: Baron Publishing, 1982.

Jekyll, Gertrude, and Weaver, Lawrence. Gardens for Small Country Houses. London: Country Life Ltd./George Newness Ltd., 1912; reprint ed., Woodbridge, England: Baron Publishing, 1981.

Jellico, Susan, and Jellico, Geoffrey. Water, the Uses of Water in Landscape Architecture. London: A and C Black Limited, 1971.

Jones and Jones of Seattle, Washington. Technical Reports for the Dallas Arboretum Master Plan. (1983) Updated by R.B. Myrick and Luiz Santana (1987).

Knobel, Edward. Field Guide to the Grasses, Sedges and Rushes of the United States. New York: Dover Publications, Inc. 1980.

Lynch, Kevin and Malcolm Rivkin, "A Walk around the Block", Environmental Psychology p. 363. Edited by Harold Proshansky, William H. Idttelson and Leanne G. Rivlin. New York: Holt Reinholt and Winston, 1976.

Mach, Dr. Ernst. The Analysis of Sensations and the Relation of the Physical to the Psychial. Translated by Sydney Waterlow, M.A. New York: Dover Publications, Inc., 1959.

Marks, Lawrence E. The Unity of the Senses. New York: Academic Press, Inc., 1978.

Marks, Lawrence. Sensory Processes. N.Y.: Academic Press, 1974.

Moncrieff, R.W. Odour Preferences. N.Y.: John Wiley and Sons, Inc., 1966.

Moncrieff, R.W. The Chemical Senses. London: Leonard Hill Books, 1967.

Mueller, Conrad G. Sensory Perception. Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1965.

Netter, Frank H.M.D. The CIBA Collection of Medical Illustrations Vol I, Nervous System. Rochester, New York: The Case-Hoyt Corp., 1972.

Rapoport, Amos. The Meaning of the Built Environment. Beverly Hills: Sage Publications, Inc., 1982.

Report on Prairie Simulation. A review from the Ninth North American Prairie Conference, July 1984, Dallas Texas: The Native Prairies Association Newsletter No. 3, (July 1985).

Report on Preserving Texas' Natural Heritage. Austin Texas: Lyndon B. Johnson School ofPublic Affairs Policy Research Project Report No. 31, (1978).

Revesz, G. Psychology and Art of the Blind. Translated by Dr. H.A. Wolff. Ann Arbor, Michigan: University Microfilms International, 1977.

Riskind, David H. and Arnold Davis. Report on Prairie Management

and Restoration in the State Parks of Texas, Arlington, Texas: Planting design class at UTA, 1986.

Riskind, David H. and O. Brown Collins. Report on the Blackland Prairie of Texas: Conservation of Representative Climax Remnants. Arlington, Texas: Planting design class at UTA, 1986.

Rutledge, Albert J. Anatomy of a Park. New York: McGraw Hill Book Company, 1971.

Ryan, Julie. "Are We Seeing the Last of the Tall Grass Prairies?" Texas Parks and Wildlife, August 1985, pp. 5-9.

Schiffman, Harvey Richard. Sensation and Perception. N.Y.: John Wiley and Sons, Inc., 1982.

Villee, Claude A. Biology. Philadelphia: W.B. Saunders Company, 1963.

Waskowski, Sally and Julie Ryan. Landscaping with Native Texas Plants. Austin, Texas: Texas Monthly Press, 1985.

Wilson, Forrest. A Graphic Survey of Perception and Behaivior for the Design Professions. New York: Van Norstrand Reinhold Company. 1984.