

WINTER AND PLAYGROUNDS

A Practicum

Submitted To The Faculty Of Graduate Studies
In Partial Fulfillment Of The Requirements For
The Degree Of Masters Of Landscape Architecture

by

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1980

abstract

The design of playgrounds generally emphasizes summer conditions, although on the prairies winter can last for half of the year and often longer. This attitude exists perhaps because summer is usually identified as a time to be spent outdoors, and winter as the season which persuades us to move in.

The aim of this study has been to demonstrate ways in which playgrounds can be designed to permit comfortable and stimulating play in winter as well as summer.

The guidelines developed through the research have been applied to the design of the schoolyard at St. Ignatius School in Winnipeg.

acknowledgements

This practicum was done in conjunction with my work as research assistant to Professor Charles H. Thomsen for the Central Mortgage and Housing Corporation study on Winter and Play. Much of the information and many illustrations in this practicum appear in that report.

I would like to thank Professor Thomsen for the opportunity of working with him on this research, for his patience in guiding my practicum, and for many valuable lessons learned.

I would also like to thank the other members of my committee - Professor Carl Nelson and Dr. Imogene McIntire - for their perceptive and constructive criticism. As well, I must thank the students and parents of St. Ignatius School - especially Mrs. Doreen Bromley - for giving me the opportunity to learn with them of the intricacies of childhood and play.

Very, very important thanks go to my friends who were always there with help, encouragement, bright ideas, and movies.

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INVESTIGATIONS

the romance of winter

Many people view winter as an ugly frog waiting to be kissed and changed into the prince of spring. A common allegory portrays winter as death, as harsh and uncompromising. The end of winter signals a revival of hope, while the middle is an unspeakable time of nothingness.

This "night of the year" that we call winter does have the distinction of being at the end of one year and the beginning of the next. It knows us well, our virtues and our faults. It knows of our complaining about shovelling driveways, scraping ice, having your breath taken away by the cold. It knows of our sometime indifference, our attitude that winter is a necessary evil, a season that has to be plodded through. It knows also of our affection for it born with each first snowfall. Winter exists as does a piece of poetry, as a magnifying lens giving a better understanding of the life principles lying hidden within it.

And there is an amazing amount of life in winter. Although it lies under the ice and in the warmth of the ground, it is a life that comes of the confidence that this is a healthy suspension of activity. This is like knowing how to relax properly. It is like going on a holiday and not having to worry about day to day affairs. Winter lacks some of the frantic aspects of summer. It is a time to sit back and reflect.

And yet the history of settlement here is partly a history of surviving winters, winters which left people dead and frozen, clinging to fences within view of their homes. Prairie souls are possessed by winter. It is one thing we can be sure of.

Winter on the prairies moulds our perception of the land. It is a season with a richness that is at once beautiful and lonely. The horizontal eternity that is the prairies strengthens the relationship of man to his land. Winter on the prairies encompasses the large scale and



the small scale, from the ocean - like waves of whiteness, to the odd piece of prairie grass trying to keep its head above the snow.

The light of a prairie winter has a special quality also, with the intense blue of the sky sitting lightly on a white land, and with the leafless branches finding a second life in their shadows against the snow.

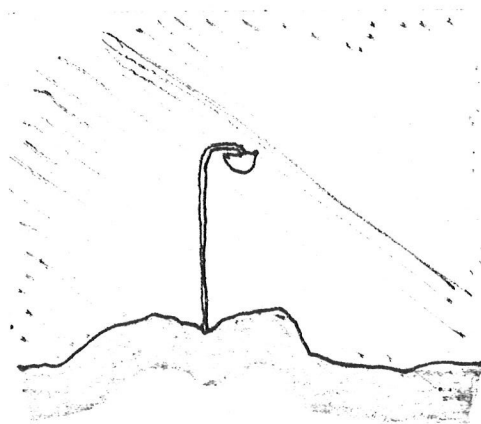
It is this second life that winter gives us also. We have only to be willing to take it.

And this is where we can learn from children. For theirs is a world that does not make a sharp distinction between times of year, theirs is a world of imaginings that hungrily and happily accepts a winter with none of the qualifications or disgruntlement of adults.

Morley Callaghan has said "...Kids use the winter. They play with it. Winter happiness seems to come to those who know how to use this season." Where there was flatness there is suddenly the potential for cragged mountain peaks. Where there were paths, grass, dirt, there is now the potential for making unlimited changes, for developing new paths, for marking new boundaries. Riding a sled standing up is like surfing on some eternal wave. Where before a pond was for swimming it is now possible to walk on it, to skate across it. A new environment arises from the fertile ashes that were autumn, an environment formed gradually, that changes everyday, that acquires a special beauty when a child in a brightly coloured snowsuit appears, with the coloured cheeks that come of the cold, health, and exuberance.

When you go to bed one night to the chilled brown of an autumn landscape and wake up the next morning to a light and white land, that really is a cause for celebration, a situation that demands putting on boots and coat hurriedly and making the new snow feel welcome.

1. Morley Callaghan and John de Visser, Winter, Toronto: McClelland and Stewart Limited, 1974.



This snow, this blanket that is suddenly pulled over a sleeping earth by a benevolent sky is an amazing material. Falling, it can land in the curve of your eyelashes giving the world a huge white blur, or it can slip off your cheek leaving behind a tiny drop of moisture, or when it lands on your mitt you can watch it dance into disappearing.

Winter has its own brand of sounds too. The whiteness seems to intensify talking, laughing, shouting. They are different sounds than in the summer. Sometimes they are carried on top of the howling wind, sometimes in the footsteps in the snow at night. Sometimes they are so clear and crisp, they are like slivers of diamond ice being propelled through the air and lost somewhere in the sky.

Amidst all that coldness though the sun can warm an upturned face until it becomes one big red freckled smile with amazing images floating behind the eyes.

play

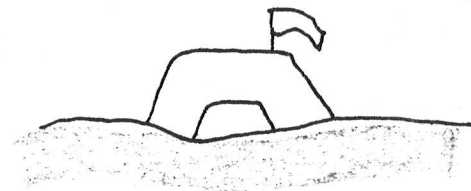
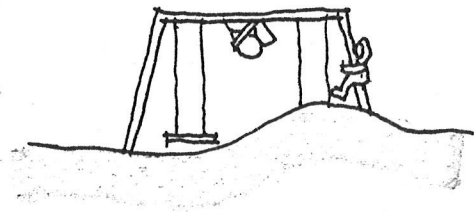
Prairie winters hold unexploited resources which provide a continuity for summer play experiences, but which at the same time broaden and expand them.

It seems though that the design of most playgrounds ignores winter. The use made of them in winter is a use made "in spite of". And the best play areas in winter seem to emerge in areas not meant for play - in the snow piled high by snow removal equipment along the sides of roads and walkways; in the snow of huge expanses of fields which can be cut, moulded and shaped.

Perhaps this creation of play environments that function during only one part of the year arises from a not complete understanding of play. The motives for and content of play certainly do not vary from summer to winter. It is the physical environment in which play occurs that changes and it is that environment and the changes that can provide stimulus.

The child's play environment must encourage opportunities and outlets in which a child can manipulate, experience and become familiar with the social, physical and cognitive aspects of play which are such an important part of the process of growing up. The winter environment provides all the "loose parts" characteristic of the adventure playground which successfully allows the challenge and stimulation necessary in a good play environment. Instead of the loose parts such as sand, dirt, and water of the summer playground, the winter environment has mountains of snow to be piled, carved, climbed, or sculptured.

This cognitive, or creative play in which ideas are tested, and the environment manipulated and transformed, is critical to development of the imagination. And winter and the imagination can be the best of friends.



In addition to cognitive play there are three other basic aspects of play that must be provided for - physical play, social play, and quiet play.

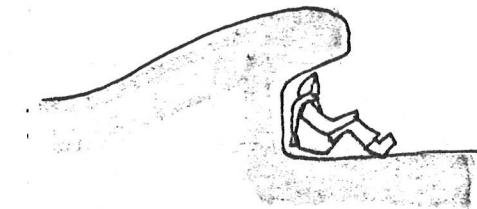
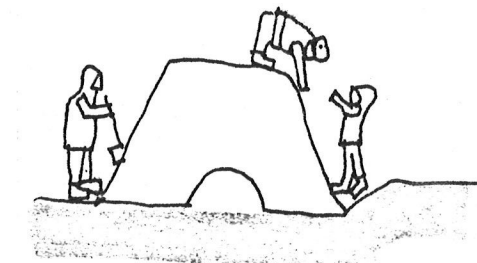
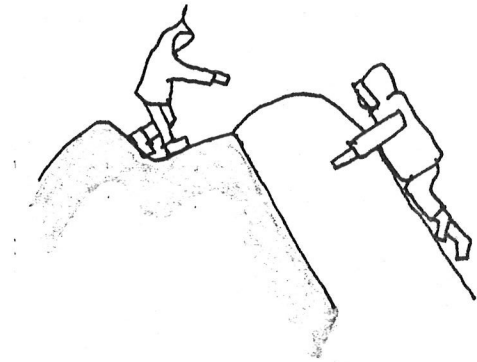
Each child has the need for exercise as well as the development of physical skills and muscle co-ordination. It is more important for the child to participate than to observe, as they learn more from their own involvement and movements.

Social play is important, for through it the child learns the use of language and an understanding of human relationships. Social skills are developed together with the ability to work with and learn from others.

Finally the child should be able to retreat from the main activities to play quietly as an individual or with a special friend. He should be able to just sit and contemplate.

These aspects must be considered for the design of play environments for all seasons. Although they often occur in areas for which they were not planned, or in ways which were not divined, the play environment should offer the choice and allow the variety.

This diversity is the most important and inclusive criterion for play areas. (Much information exists on play. It is not the intention here to reproduce all that, but rather to consider those general characteristics which are the underpinning of an area with good potential for play.) Children need some spaces with a sense of enclosure, some with a sense of seclusion and some with openness. The search for diversity has repercussions in many areas. There should be diversity in environments, in sizes, materials, surfaces, plants. All these should contribute to a diversity in activities. Play equipment and opportunities for incidental play should be of a type which have the potential for many different activities.



Winter itself is a good example of the provision of this diversity. It changes over the season. Intense cold and warm slush produce varied activities and environments. Early winter is a time of refreshing running, rolling in the snow, sliding. Later winter brings with it the slush that makes it possible to have puddle jumping contests, or that allows you to ride your bicycle and create a fine spray.

Observation of play in winter is the best indication that children play anywhere and everywhere. It also proves that children have the ability to enjoy winter. They will use garbage cans or fences or the mounds piled high from the cleaning of driveways. Most spontaneous winter activity, both of the kind that uses up a lot of energy and of the quiet kind, seems to occur in areas in the thick of other activities - pedestrian paths, parking lots, and streets. Contact with other such activities seems to attract children.

The design of children's play areas has parallels in, and is indicative of, problems in the area of urban design. That freedom which a child instinctively seeks to exercise is not catered to in the urban environment. However that freedom, excitement, and imaginative pull are symbolized in every successful play area, in the manipulable elements, in the colours, in the vibrancy, in the shouts, abandon and learning of children. It is for this reason, that while playgrounds exist negatively as a sign of lacks in the urban environment, they can also be approached positively, as a way of drawing in other elements in expanding and searching out the richness of an environment, with nooks and protruding elements, with activities to be created, with abandoned lots, and with activities to be watched.

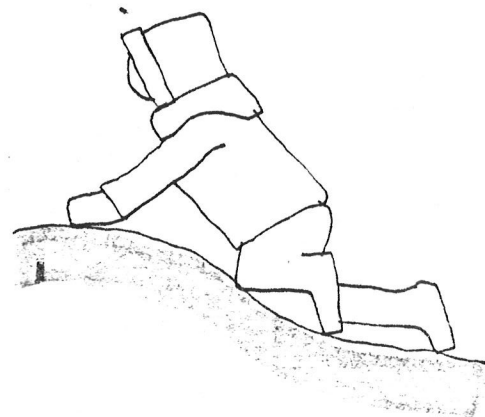
literature review

A review of the literature has shown that little information exists specifically on the subject of winter and play. As a result each component subject of the topic had to be explored in an effort to produce an integrated body of information. (The sources, listed under the titles of Play, Climate, Winter and Environmental Education, Planting and Playgrounds and Winter, Winter on the Prairies, are numbered for reference to the text and appear in the bibliography at the end of this report.)

A wealth of sources does exist on the subject of play and playgrounds. For the purposes of this study a few have been chosen to serve as basic reference texts. They range from those general sources, such as Richard Dattner and Lady Allen of Hurtwood, who provide a discussion of the theories of play, strategies, programs and equipment, to sources considering play within the expanded context of the city as it relates to the education and growth of the child (such as Pollowy and Bengtsson, who shows responses to certain design conditions through examples of developments in which play areas are totally integrated and are often one of the elements providing cohesion).

play

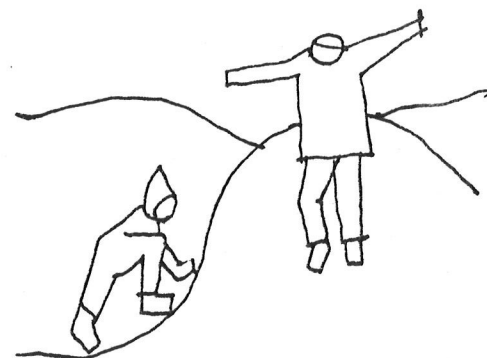
Several references contain information in the form of general design guidelines. In her article Clare Cooper Marcus (9) has organized data to aid in the design of housing areas sensitive to children's needs. Robin Moore (11) deals with playgrounds in all locations and offers guidelines under the following titles - location and spatial form; diversity; facilitation of social groups; fixed elements; loose resources; combination of fixed and loose resources; role of adults. The guidelines in the University of Illinois publication (8) try to incorporate the recreation characteristics and needs of various age groups. They also deal with surfacing materials, wind protection and advocate the importance of evaluation and maintenance.



Other references contain guidelines based on specific research studies. The Department of Environment (England) study details research carried out in 15 housing developments. Its purpose was to provide guidelines which would ensure that play be considered in the initial stages of design (5). In the study described by Vere Hole, 12 housing estates were examined and the purpose was to discover the use of space around the buildings for play. Holme and Massie (7) outline three surveys - one of two contrasting neighbourhoods, one of ten boroughs, and a survey of existing facilities in 19 boroughs - and make the statement that "Freedom to play is a casualty of an increasingly restrictive urban environment".

Some of these sources deal with winter play but only in a very cursory way. Most automatically accept the outdoors and nature as an invaluable part of the play experience, but this is usually based on a view of summer being the most important or flexible season of the year. There are only general statements about the importance of designing for all seasons.

Katherine Read Baker and Peggy Miller provide comprehensive descriptions and broad views of play and the outdoors. Through their descriptions of specific outdoor elements (sun, mounds, gardens) they outline a philosophy of allowing a child to learn and experience the most that he can. Although the book by Peggy Miller (10) contains some highly structured and defined areas (logs cut into predetermined shapes, pieces such as culverts and automobiles, that might have limited play potential) it is valuable for the way it relates activities to pieces of equipment which will accommodate them. For example for climbing one can have logs of various heights positioned vertically, or railroad ties secured crosswise in layers to form pyramids, ladder-like structures. With Zuk's articles (14,15) we move into more specific winter related information. Snow has a great potential as a building material for outdoor playgrounds, and allows winter playgrounds to be established anywhere.



Zuk also stresses the importance of observing and interpreting what children do with the snow and then changing play-grounds accordingly.

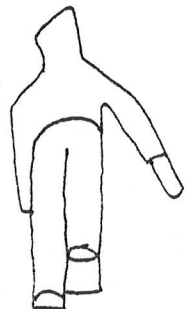
Out of all this information there are a number of points which present themselves over and over again and which have shown themselves to be of importance in considerations of winter play.

The necessity of a comprehensive view of play - climatic and social - is evident (2,5,8,11). A play area must be considered as one place among many in the continuous play space that is the neighbourhood (11). When play is not considered an integral part of the design, but is an afterthought or is thrown into left-over areas, valuable opportunities are missed, such as for example widening the junction of a foot-path to create a play area (8).

Children play everywhere (9). They "will be attracted to the safe interior landscaped areas...only if they are more interesting as play spaces than the surrounding roads or parking areas" (9). Vere Hole (6) found that successful play areas had pedestrian paths leading past, through, or into the playground. Play areas are best located in the midst of other activities (2).

Also site features such as fences and garbage cans, are liable to be used in play (2) and should be designed with this in mind (5). Further it is important to decide if planted or grassed areas are for appearance or not, and if so must be protected from children (9). In any case, all components of the built environment should be emphasized for incidental play opportunities (12).

Theories and views of play have undergone a great deal of change (7). The physiological bias of play theories, prior to 1900, gave way to theories which held play to be something apart, transcending immediate needs of life, but also being an inseparable part of development and socialization (7). Play, Piaget says, is part of the child's response to his environment, and so it is



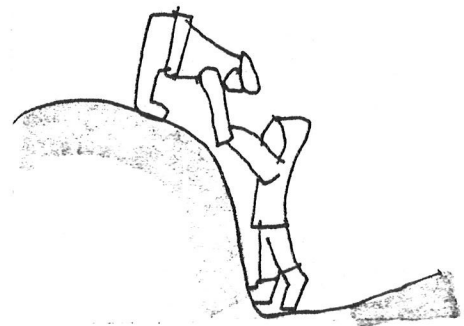
important to provide an environment which will allow development of the child's potential. "Play is essentially like a person hiding who now and then gives a sign of his presence, only to disappear again in the next instant." (7)

One cannot dispute that "play is essential to the development of (1) basic motor skills including perceptual-motor development and physical fitness and growth; (2) mental skills; (3) social skills; and (4) emotional maturity." (10) Play equipment should be selected in terms of the complexity and variety it offers. (2,5,6,8,13,14). Nothing should be a separate activity within itself. Equipment should allow a number of options (8). While it has been found that some conventional types of equipment should be maintained for younger children (based on several studies, Pollowy, p. 137) it is important also to make provision for loose materials, things that can be taken apart, built in a variety of ways (12, 15). Play equipment should be designed for use by several children simultaneously (12).

An interesting consideration arises in the examination of the times spent at activities. Vere Hole (6) found they were usually short. There was a great deal of moving on, changing, coalescing, dissolving. The University of Illinois (8) found that there were far greater lengths of time spent in fields and junkyards whereas the average time spent in a playground was 15 minutes (p.17). This is probably because the skills in a playground are easy to master, but the fields present complex opportunities and it is difficult to do the same thing twice.

One must provide areas both for very active play, and those activities requiring quiet, sheltered enclosed areas. In his study Vere Hole (6) noted a great deal of inactive play, sitting on door stoops, etc. However all types of areas can be utilized for either active or inactive play (8).

Flat, barren play areas may be good for the sports activities of older children, but restrict the explorations of the younger children who require the variety



of hills, grass, cobbles (14). Further to this, large open areas tend to encourage robust activities, while small areas lend themselves to quiet play (12, p.138-139).

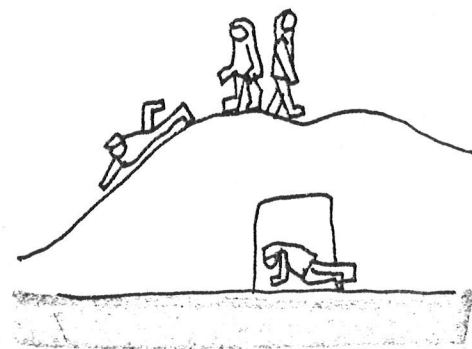
It is important to provide for age ranges and changes, as small children have a habit of growing up (2). Pollowy (12) documents these changes from infancy to adolescence through four areas - physical growth and activity development, personal and social development, intellectual and perceptual development, and design implications. At present the lack of differentiation between areas for use by various age groups is a serious problem. However, they should be considered separately, but not segregated (12, p.127).

Pieces of equipment also acquire different uses as children get older. For example, a swing is at first a gentle ride, then becomes a physical challenge, and finally a competitive tool.

Of importance also are the interests of both young and old of the community (7, p.79). Children must have areas into which they can retreat, but opportunities for respecting the worlds of others are important also. Teenagers have a need for peer groups and associations; adults engage in less vigorous and more social activities. The elderly should have areas which are private, yet connected to other areas, visually or physically, where they can sit and watch or become involved in their own activities.

The design of a playground should respond to the individual situation, especially in terms of climatic protection (2). Landscaping can play an important role in mediating the climate, and in the play experience. Earthmounds can serve both as windbreaks and as play structures. Such an integration, and year-round use are the ideal (2,10,8).

Thus, in the same way that it is important to base conclusions on certain principles of play, so a number of sources were consulted for principles regulating the relationships among climate, man and his environment.



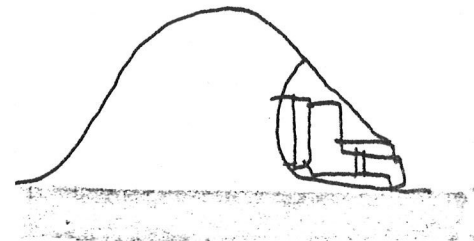
climate

Through the literature review a number of categories in this subject area became evident. One group of books and articles deals with the mechanisms of climate, with some reference to design. Another group presents information on climate through and for the planning process. Following this, references dealing with processes and elements specific to winter were explored.

One group contains books that have already been discussed in the section on play - Bengtsson (3), Hole (6), Marcus (9), and Housing Research and Development at the University of Illinois (8). These four sources made a concerted attempt to outline the effect of climate and climatic modifications on play areas - such things as integration of climatic protectors and play elements. Although the subject of winter play is not touched on very directly, the guidelines presented in these sources provide a climatic framework for winter design.

Within the group that outlines the mechanisms of climate, there are two books which are standard references for the relationship of the built environment and climatic influences - Olgyay (26) and Geiger (19) - and a third, Robinette (30), which draws upon the first two and provides the information in the form of design guidelines.

Geiger (19) concerns himself with the microclimate, which he describes as follows. "All the meteorological elements are subject to vertical changes because of the nearness of the ground and in a similar way they also vary horizontally within short distances. These variations are brought about by changes in the nature and the moisture of the soil, even by minute differences in surface slopes, and by the type and height of vegetation growing on it. All these climates found within a small space are grouped together under the general description of microclimate..."

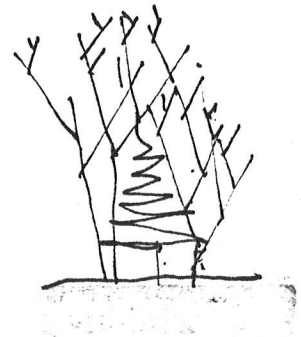


Although he offers very detailed and complex discussions of, for example, the laws governing the processes in the air close to the ground, one can find very valuable points for both the large scale and fine scale design of playgrounds. The melting of snow around tree trunks is explained, as is the micro-climate of gardens, potato fields and vineyards. (The temperature profile of a flower bed in August, when the plants are fully grown and with a dense leaf structure shows the zone of maximum temperatures raised to a higher level much more markedly than in grain with its vertical type of structure.)

Olgyay (26) presents climatic information in a general manner, of use mainly on the larger scale of site planning. He does however deal also with wind patterns around buildings, sun and shade, and indigenous methods of solving these problems.

Robinette (30), while he does offer a great deal of pure climatic information, has produced a book which is more valuable for its design guidelines and design examples. Much of the climatic information is very specific, often specific to forest conditions since it seems that so many of these studies are done from the vantage point of botany, or forestry. One finds out that shelter belts with a "pitched roof" cross-section are less effective in halting winds than belts with more or less vertical edges, or velocity reduction patterns for pampas-grass, foliated 3-year old Lombardy poplar, and Russian mulberry barriers at Colby, Kansas. However, through this exhaustive coverage, and the repeated emphasis on a number of objectives for each climatic type, Robinette provides a useful design checklist.

A number of articles in architectural and planning journals provide much similar information and emphasize the need for that information to be part of any design process.



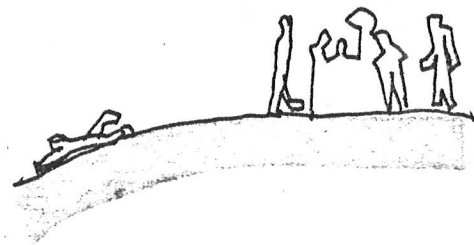
In his manual on the sun, Burberry (16) provides information on deriving sun-path diagrams, on estimating the effect of shading devices, on sun control, stating that "Designers of buildings need definition, in relation to modern conditions, of the need for sunlight in terms relevant to the design process; and values which make it possible to assess sunlight in relation to other factors which must be considered."

The articles by Shellard (31) and Manley (23) are general discussions of micro-climate and planning with the invaluable detail that must come with it. Along with hills and winds, and orientation as affects heat, light, wind, the effects of the nature of soil and the soil covering are described. (The soils of the lowest conductivity have the greatest temperature ranges at their surfaces, but are affected to the least depth. Conductivity is increased by an increase in moisture and a decrease in air content. Grass or snow reduces the depth to which cooling will penetrate the ground.)

The next group of books is similar to the previous in its applications, but the climatic information is presented as part of the total planning process.

Boris Culjat's book (17) is the result of work on the design of northern communities and thus contains mainly information on the planning of larger areas. He attempts to develop a philosophy of design for colder climates that would move beyond the existing approach which emphasizes mainly climatic modification and satisfaction of physiologic requirements. His proposed approach works towards maximization of positive and minimization of negative climatological elements towards satisfaction of existential requirements.

In his work Culjat identifies specific characteristics of the cold climate and their influence on the built environment and human behavior, with applications in a case study - the planning of the new town of Resolute Bay, Cornwallis Island, N.W.T. Ideal part solutions are developed

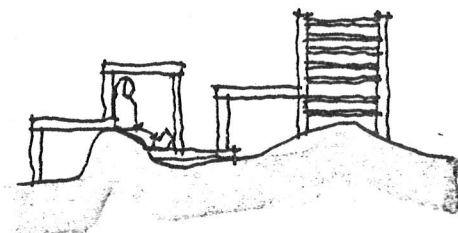


for four separate aspects of the cold climate - wind, solar radiation, temperature and precipitation. These four aspects are described under the headings of location, relation to other environmental elements, orientation, form and organization, materials. For example, location influences the amount of solar radiation through latitude, altitude, direction of slope, angle of slope, obstructions from clouds or surroundings, reflection from surroundings.

Climate affects not only physical environment but also the social environment. Outdoor spaces should work during cold times as well. In fact the cold climate has positive aspects - far beyond even the change of the seasons or the beauty of the winter landscape. There are dangers in separations from the natural environment. Ultimately also the built environment should respond to climatic change in a more meaningful way at a small scale. Culjat gives the example of lemon tree orchards in northern Italy. The basic structure system consists of terraces and of a post and beam framework. During the winter when the air temperatures become too low, but the sun is still strong, this structure is covered with glass and the hills are filled with greenhouses.

Kevin Lynch (22) deals with the climate as one aspect of site planning. His approach therefore ranges from considerations of orientation to heat characteristics of materials, and climatic effects of plants.

The final set of reference contains sources that concern themselves with specific winter characteristics. As a complement to the general climatic information it is important to deal with those individual elements of winter - snow, ice, wind, sun - their relationships, and ways of increasing or moderating their presence. These elements have characteristics which can be utilized in the general planning of playgrounds and also in the specific



design of areas or activities. The new properties formed by their relationships (e.g. snow drifting) can be controlled or harnessed in the creation of play spaces.

Snow offers a number of characteristics which are important in the understanding of its distribution and manipulation. Richter (29) gives an outline of snow, from its formation to ways of manipulating its retention. While the book was intended as an aid for the manoeuvres of the Red army in the period following the second world war, the publication is still viewed as one of the best sources for information on snow. Drift information is related to certain topographic characteristics. Other characteristics such as poor heat conductivity, reflectivity, toughness, density, compaction are important in designing strategies for the change of play areas. As well one can consider the development of richer play areas, by examining the slipperiness of snow, or the noise and sound emanating from snow.

The information contained in the Harrow-smith staff report (20) is based largely on the work of a firm of consulting engineers - Morrison, Hershfield, Teakston and Rowan, Limited. Their services include snow control studies, wind environment studies, solar studies, and engineering investigations. Snow fences can play a large role in directing snow into desired locations, as can the arrangement and relationship of buildings. Much of their work involves studies of snow collection with models and subsequent suggestions for change in configuration or change in location of such elements as doorways.

This application of climatic considerations to farm planning (e.g. snow collection and planning shelterbelts) is extended in the articles of Protz and Moen (27) and Darby (18). The usefulness of these lies in the examples of snow collection through farm layout and fence construction. Farm planning is based on general climatic principles which can be applied in other areas.



Pruitt (28) gives snow added life by examining the life in winter that depends on it. These ecological considerations, while centred mainly on the boreal forest, become also a way of looking at snow, as something indicative of complex processes.

The two descriptions of ice are included for their way of looking at this phenomenon with such wonder. John Miller's article (24) is a description of ice and its characteristics that begins with remembrances of the iceman and huge blocks of ice in which the author's sister could see people figure skating.

The mechanisms of its formation (freezing in columns) and the changes (such as frazil ice which is the slush of needles brought to shore by wind and waves smashing newly formed ice crystals) are described by Newbury (25). There are further stories, about the increasing clarity of ice the deeper you go because there is more time for the air bubbles to disappear, about the melting of ice along the crystal boundaries because impurities are forced into these areas.

The components of winter can also serve in fostering an awareness of the land around, of the living processes existing in both summer and winter. The manner in which playgrounds or schoolgrounds are developed for winter use is also dependent on a philosophy of environmental education, i.e., considering what can be learned about winter from the way in which elements are organized; considering the ways in which relationships can be made more obvious.

Thus characteristics of the winter climate can be studied for themselves but also for what they indicate about other phenomena and for the secrets they contain. For example, frozen over ponds act to protect dormant life forms waiting for warmer temperatures.

The two sources listed (only two of a possible multitude that are used in schools) are books valuable for the programs they describe. They should in

winter and environmental education



fact be read as a prerequisite to design, not only for the wonder they inspire about winter, but also for their ideas about winter environments open to exploration and learning.

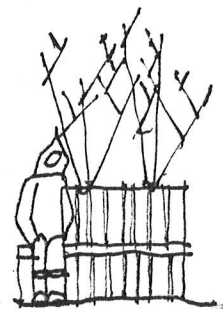
An outdoor environment that is intended to function over winter requires special considerations in terms of planting. In addition, a playground environment has its own set of conditions with regard to planting.

There are few references that offer specific information on the best planting for playgrounds. The sources listed (1,8,9,36,38,39) give some general criteria. Plant material should be selected and sited so as to allow maximum use of the area for play and to minimize maintenance problems, while providing a variety of colours and textures. Planting could be used to divide the different sections of the play area, but it is important to maintain visual access. Planting could be destined for shelter, for climbing, or simply for seeing the light filter through the branches.

More specific guidelines also exist. Trees should not be planted close to organized games areas. Small trees in open positions should have guards. Planted areas next to hard surfaces should have wooden edges, raised borders or retaining walls.

Appropriate plants are thus identified in terms of general characteristics, with only two of these references giving specific plant lists. Arnold (36) gives a plant list for the north-eastern United States with the proviso that selection of materials would depend on the type of playground surroundings and other factors. The annotated plant list given in the University of Illinois publication, (8) while not directly applicable to this area, shows a good method of setting one up. The only problem in both seems to be the lack of information on specific attributes of these plants with respect to playgrounds.

planting and playgrounds and winter



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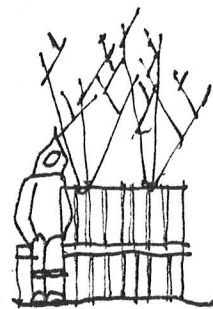
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planting and playgrounds and winter



There are a number of references (35,37, 40,41,42,43) that offer suggestions for winter planting that will leave winter not a forgotten season but rather one with colour, texture, and other attributes such as attracting wildlife.

The sources listed are primarily of gardening interest (except 37 and 42) and thus the greatest emphasis seems to be on visual effect. However another important aspect of appearance would be the role the planting would continue to fulfill as a barrier, or in the creation of spaces.

Appearance would also include colour and texture. Noting changes in appearance from season to season would provide valuable lessons in biology and in the workings of different environments. Certain plants through their uses would provide introduction to historical application.

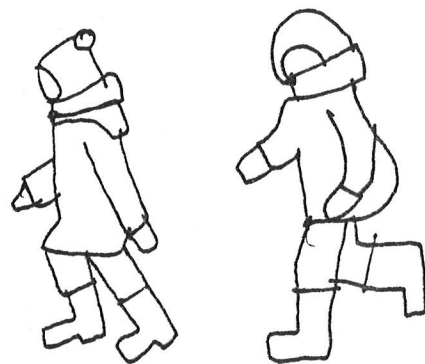
Finally there are those sources describing historical winters that have attracted themselves to the mystique of the prairie landscape and those present winters clothed in a romance that makes them an integral part of the prairie soul.

Morley Callaghan's text (44) to John de Visser's photographs has some of the very special winter memories - a father teaching his son to skate, the old man on a street whose special delight it was to shovel other people's driveways, remembrances of winter nights which gave the exuberance for endless party-going.

Grove's work (45), as Roy's (47), is an important piece of Canadian literature with fascinating winter imagery. Grove's essays describe several trips made between two small Manitoba towns over the space of a year. The most arresting are those descriptions of the winter with its vagaries, mysteries and secrets.

Kurelek's book (46) holds those paintings which capture the activity and imagination special to winters of play, the beginning and the end of all these explorations.

winter on the prairies



physical factors

In designing play environments that can be used in all seasons one could approach the situation by attempting to control physical factors through protection and elimination. But one can move beyond this creation of shells to the stance of using these physical factors to develop a richer play environment - e.g., admitting sunlight to produce shadows, having special places for listening to the sounds of the wind, or falling rain.

For this reason, some basic mechanisms have been outlined, so that one can approach each factor and each situation individually. As with a friend one should be sensitive to their vagaries.

snow

Snow is that chameleon - like gift of winter. It arrives as and becomes a variety of materials. The best indication of this is in the snow terminology of the Kobuk Valley Eskimo (Alaska).²

With snow as this given material we could approach it by just deciding to clear certain areas of it, but actually our manipulation of it can be a bit more sophisticated. Several characteristics are important in these considerations - radiation properties of snow, heat conductivity characteristics, density, compacting, toughness, and thawing of snow.

One of the properties that is most evident and that everyone has had direct experience with is that of its reflective power. 70-95% of the solar energy falling on snow is reflected. The intense sparkling of snow is due to a large number of flakes being placed on the same plane and reflecting the light simultaneously. During the day shadows are particularly visible while the snowfalls of late autumn create nights illuminated by light of a very magical

ENGLISH	ESKIMO (ALASKA)
SNOW	ANNIU
SNOW THAT COLLECTS ON TREES	QALI
SNOW ON THE GROUND	API
DEPTH HOAR	PUKAK
WIND-BEATEN SNOW	UPSIK
SMOKY OR DRIFTING SNOW	SIQOQ
SMOOTH SNOW SURFACE OF VERY FINE PARTICLES	SALUMA ROAQ
ROUGH SNOW SURFACE OF LARGE PARTICLES	NATATGONAQ
SUN CRUST	SIQOQTOAQ
DRIFT	KIMOAQRUK
SPACE FORMED BETWEEN DRIFT AND OBSTRUCTION CAUSING IT	ANYMANYA
SHARPLY ETCHED WIND-ERODED SNOW SURFACE (GASTRUGI OR SKAVLIER)	KAIIOGLAQ
IRREGULAR SURFACE CAUSED BY DIFFERENTIAL EROSION OF HARD AND SOFT LAYERS	TUMARINYIQ
BOWL-SHAPED DEPRESSION IN SNOW AROUND BASE OF TREES	QAMANIQ

2. William O. Pruitt Jr., "Life in the Snow", Manitoba Nature, Winter 1973.

quality. Old compacted snow reflects only 30-50% of solar energy falling on it, and wet snow even less. The process of thawing dulls the edges of snowflakes and they lose their ability to sparkle.

The heat conductivity of snow is poor. It has good insulating qualities, preventing heat from leaving the soil and cold from leaving the atmosphere (illustrated by the presence of unfrozen soil in areas where there has been an early snowfall and the fact that the presence of snow cover over a water area also prevents the formation of a thicker coat of ice. Dense snow has better heat conductivity than loose snow, with ice possessing a heat conductivity about 12% better than that of snow.

The density of snow (the proportion of the quantity of water obtained from snow to the amount of snow being examined) changes throughout the season. The density decreases to a minimum in January, when it begins to increase until it reaches a peak in the spring, when the sharp edges and corners of snowflakes undergo external thawing, and compacting of the snow is due to the compressing action of the surface tension of tiny particles of water enveloping snow crystals. Fluctuations in density (diminishing after a snowfall, rising after a thaw or rainfall) create a layering of loose and compact snow.

The bearing capacity, or toughness, of snow doesn't always depend on its density. With a rise in temperature, and thawing, the water increases the density, but the snow becomes brittle (spring snow is very compact but not very tough). The toughness of snow depends on the processes of recrystallization, which are at their best when the snowflakes have been loosened. If snow is to be used in building structures it should be loosened and rolled out in order to make it as tough as possible.

The process of thawing, being a time of changes can be manipulated in a variety of ways. During the early periods of

snow formation

Snowflakes happen to be formed everywhere throughout the atmosphere, but come together to form snow cover in these areas where the air temperature above the earth is below 0°C for a period of time. The ice crystals formed when water vapour reaches levels with sub-zero temperatures usually melt in falling and new crystals form around their edges. High flying clouds produce minute ice crystals, while the snow falling from low-flying clouds might sometimes be only drops of mist.

snow cover properties

The type of snow and cover is subject to a great many influences. Climatic conditions at the time it falls will have a hand in its nature and shape. Snowflakes are also subject to deformation while they fall. The snow cover itself changes with occurrences of hoarfrost, sleet, and evaporation. It begins also to condense with the force of gravity acting on it, with thawing followed by freezing, with the influence of the wind. The nature of the soil surface beneath the snow is also important in terms of the depth to which it is frozen and the fluctuation of temperature within the cover.

temperature and snow

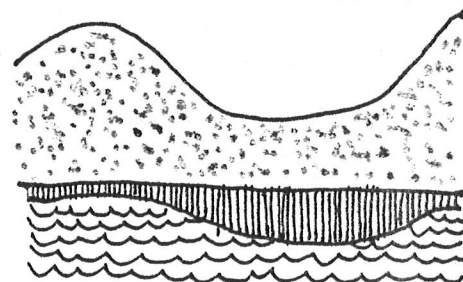
Temperature while snow is falling affects the ultimate state of the snow cover. In colder temperatures the snowflake develops new crystal growths on its sides. Such snowflakes produce a very puffy and light snow cover. Snowflakes in above 0°C temperatures have a simple form because the fine needles have melted away. A snow cover produced in these circumstances is more solid.

noises in the snow

The cracking of snow is connected with the processes of recrystallization of the snow being affected by a load. The vibrating movements produced by the transposition of particles increase with load application until the frequency is great enough to produce a sound.

compaction of snow

Fresh snow forms a loose layer which eventually becomes more compact under its own weight and the weight of further snowfalls. This compacting (with the air space between flakes becoming smaller and with a subsequent increase in the density of snow) is influenced also by other factors. Snowflakes may shatter or slip into vacant spaces or snowflakes may freeze together at points of contact. These processes occur constantly throughout the winter.



thawing dark objects which have fallen down into the snow absorb more heat than the snow and the area around them often thaws right through to the ground. For example, deep craters form in the snow around tree trunks since heat is provided for the area around the tree. Snow sprayed with cinders absorbs 2.8 times more heat than clean snow.³ The colouring of snow with a dye also accomplishes the same end, but only in the initial stages of thawing, when the direct heating power of the sun is of prime importance. During the later stages of spring when thawing depends also on the heat content of the air, the pressure of soiled particles slows down the process of thawing.

The uneven distribution of snow also has an effect on the rate of snow melt. When the winter has been windy and snow has been moved around, melting is bound to begin in some places sooner than in others. The heat absorbed by these areas contributes to the thawing process. The cover of least thickness usually occurs on the top most parts of slight elevations and steep slopes directly exposed to the wind.

Another consideration is that of ground cover. The rate of melting over short grass has been shown to be greater than that over longer grass.⁴ This occurs because the longer grass acts as a better insulator. With the short grass there is a better thermal contact between the soil surface and the base of the snow.

wind

In the old story of the sun and the wind mightily trying to outdo each other in forcing a man to take off his cloak, the sun won the contest through the gentle intensity of heat. The howling and blustering of the wind forced the man only to pull the cloak tighter about him.

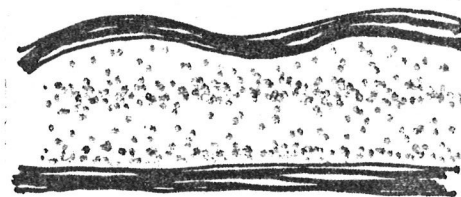
3. G.D. Richter, Snow Cover, Its Formation and Properties, Moscow: Publishing House of The Academy of Science, 1945, p.71.

snow densities

TYPE OF SNOW	DENSITY
Newly fallen snow	.035 - .16
Loose, fresh, and in clusters	.04 - .07
Loose, newly fallen	.06 - .08
Loose, fresh, medium flakes	.08 - .12
Loose, fresh fine granules	.08 - .16
Loose, fresh granular	.13
Newly fallen, wet	.13
Fresh snow	.14
Newly fallen with rain	.16
Wind swept snow	.16 - .27
	.22

DENSITY OF SNOW	DESCRIPTION
.01 - .10	Very Loose
.10 - .25	Loose
.25 - .35	Medium
.35 - .45	Dense
.45	Very Dense
.32 - .35	Snow is firm enough to support person without skis
.35 - .38	Foot leaves slight print
.40	Human Foot leaves no imprint

G.D. Richter, Snow Cover, Its Formation and Properties, Moscow: Publishing House of The Academy of Science, 1945, P.15&19.



4. Keith Smith, Principles of Applied Climatology, London: McGraw Hill, 1975, p.34.

types of wind flow

Wind flow occurs in primarily three ways. In the case of laminar air flow, layers or streams of air flow on top of one another in parallel patterns. Turbulent air flow involves air masses moving in the same direction, but in a random pattern. Separated air flow occurs when layers of air flow on top of one another, with each layer varying in momentum.

wind and temperature

Wind increases convective and evaporative cooling. A howling wind does not change the air temperature. What is produced for the body is a continuous heat loss and the sensation of a lower temperature through the removal of a protective film of air and moisture. Under conditions of bright sunshine the cooling is reduced.

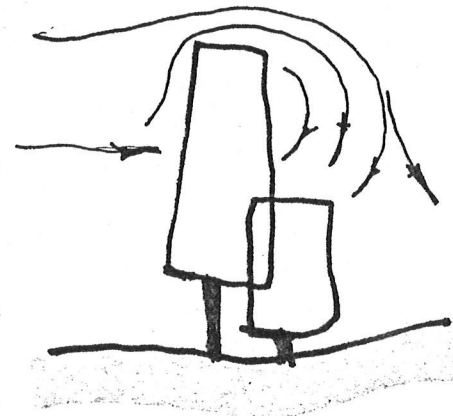
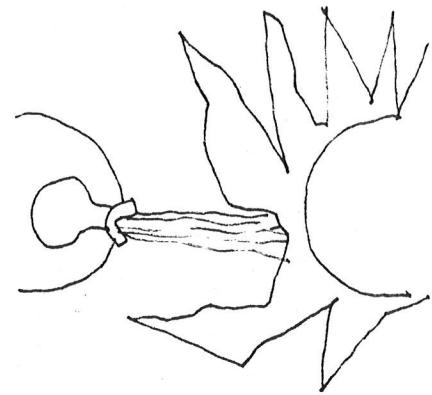
And that is how we approach the wind. We tighten our cloaks and put up solid walls. However solid walls can create more problems than they solve. There are other ways of approaching the wind and its effects on the micro-climate.

On a world - wide scale wind is produced by variations in the density of the atmospheric mass. This occurs largely through an uneven distribution of the sun's heat on the surface of the earth. On a smaller scale the wind may be a modification of these larger scale movements or may be an air movement set up by elements of that locale - the presence of water, vegetation, or certain topographical features.

The immediate surrounds of an area - trees, shrubs, walks, fences, buildings - can create high and low pressure areas. The introduction of a rough barrier into the airflow will result in the formation of a pressure eddy in front of the barrier and a suction eddy leeward of it. In the case of a solid wall, because the wind cannot pass through, the air currents passing over are forced downward creating an intense suction effect. The barrier can effect wind over a distance of from two to five times the height in front and from ten to fifteen times leeward.

A baffle added to a solid fence increases the area of protection. A baffle slanted away from the wind lets the wind flow over gently. In one study the greatest protection two feet away from the fence came with the baffle at an angle of 65° .⁵ When the baffle is slanted toward the wind the flow is forced straight up, with the area near the fence receiving the greatest protection.

Wind can also be controlled through various methods of channelling. The ventury effect is based on the principle of channelling an air mass



vegetation and wind

Vegetation acts as an obstruction to wind through the creation of frictional drag. Even differences in the height of grass have been shown to influence wind speed.¹ As the air moved from a longer to a shorter grass cover there was an acceleration of wind speed at a height of 1 metre, with an increase of from $2\frac{1}{2}$ to $4\frac{1}{2}$ m./sec. over the first 50 metres and an increase of from $4\frac{1}{2}$ to $4\frac{3}{4}$ m./sec. over the next 50 metres.

(Keith Smith, Principles of Applied Climatology, London: McGraw-Hill, 1975, P.42.)

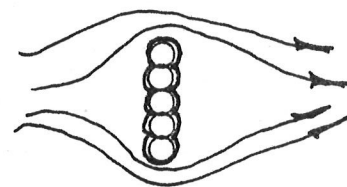
Farmstead shelterbelts will provide minimum protection for farm buildings and service areas when three rows of trees are located at least 100 feet from the main building. In an area of heavy snowfall a single row of caragana or willow should be planted 50 to 100 feet outside the main shelterbelt to provide a snow trap.²

(Saskatchewan Agricultural Services Co-ordinating Committee, Guide to Farm Practice in Saskatchewan, 1978, P.126.)

The optimum density for a shelterbelt is 50 to 60%.

5. Sunset Books, How to Build Fences and Gates.

through a small opening. A windward oriented channel, be it a street or a tunnel, can accelerate the prevailing winds.



wind and snow

"The wind plays strange pranks with snow; snow is the most plastic medium it has to mould into images and symbols of its moods . . . in every case there had been two walls, as it were, of furious blow, and between the two a lane of comparative calm, caused by the shelter of a clump of brush or weeds, in which the snow had taken refuge from the wind's rough and savage play. Between these capes of snow there was an occasional bare patch of clean swept ground. Altogether there was an impression of barren, wild, bitter-cold windiness about the aspect that did not fail to awe my mind; it looked inhospitable, merciless, and cruelly playful".⁶

In the city on rare occasions also the wind and snow join forces to present just such a face. Usually however, this is mitigated by the presence of structures and what does happen is that the snow collects in places where it creates minor annoyances and irritations - in doorways, on roadways - and does not collect in places where it might be useful - for insulation of plant life, for the creation of mounds.

Although we cannot control it completely we can guide it partially, gently persuade it to move in certain directions. By understanding that a physical obstruction will cause the wind flow to become a number of turbulent air zones on the leeward side of an object we can begin the manipulation. Because of the lower wind velocity

wind and snow drifting

Over 90% of drifting snow moves along within a foot of the ground. It moves in three ways. In suspension, particles are taken up into fast moving layers of air. Through saltation, larger particles roll along the ground propelled by the wind until they hit an obstacle and make a hop. With surface creep particles too large to be moved by saltation are knocked forward by the impact of bouncing saltating grains.

wind and snow compaction

The density of the snow increases with the strength of the wind. Snowflakes are treated in several ways by the wind. They can be broken apart and shifted closer to each other under the pressure of the wind. The wind might also just push the snowflakes against each other. When the snowflakes are broken into smaller pieces, they are able to fill the air spaces within the snow cover.

6. Frederick Philip Grove, Over Prairie Trails, Toronto: McClelland and Stewart Limited, 1957, p.66.

windbreaks, snowfences,

Usually the prevailing winds which cause drifting come from a different direction than the winds which bring the snowstorm responsible for the snow.

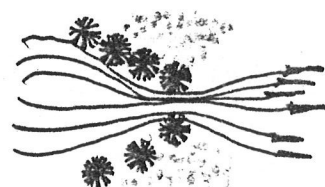
Solid wooden upright screens are quickly covered up by snow and must be extremely strong to withstand air pressure. A large sloping snowdrift occurs on the windward side. If the fence were placed at an angle of 45° to the wind the trough would be eliminated.

Elevated wind-deflecting solid screens do not cause any snowdrifts to form. The ground immediately below them is free of snow. The wind is deflected and directed at a sharp angle in to the cut.

A windbreak on a ridge increases the protected area. (Building up the centre of a lane slightly higher than its edges helps the wind to scour the road clean).

The standard snow fence is four feet high with 1½" laths spaced 1½" to 2" apart.

It is about 6" to 8" off the ground. By moving such a collecting fence as the drift accumulates, even higher drifts can be created.



in these areas, the force of gravity releases the snow from its encounter with the wind.

The presence of an obstacle will cause the snow to collect around it in drifts of varying configurations. The drifts then "seek to fill in the area of turbulence created by the obstacle, bury it, and form an aerodynamically smooth surface over which the wind can flow smoothly again. They seek, in other words, to streamline themselves."⁷

Snow falling in calm weather usually assumes the shape of objects where it accumulates. With a wind a triangular snowdrift is stretched out on the leeward side of trees, shrubs, clusters of grass. A row of tall weeds acts as a natural snow trap and produces a drift on its leeward side as would a snow fence. A denser fence will create a shorter drift, while the height of a fence is directly related to the length of a drift.⁸ "The rule of thumb is that a standard snow fence of 53% porosity will form a drift on its leeward side 10 times as long as the fence is tall. Thus a 4 foot high fence will develop a drift next to itself extending 40 feet toward the protected area, a five foot fence a drift 50 feet long, and so forth".⁹

The illustrations on the next page show the drifting patterns arising in different situations.

grouping of elements

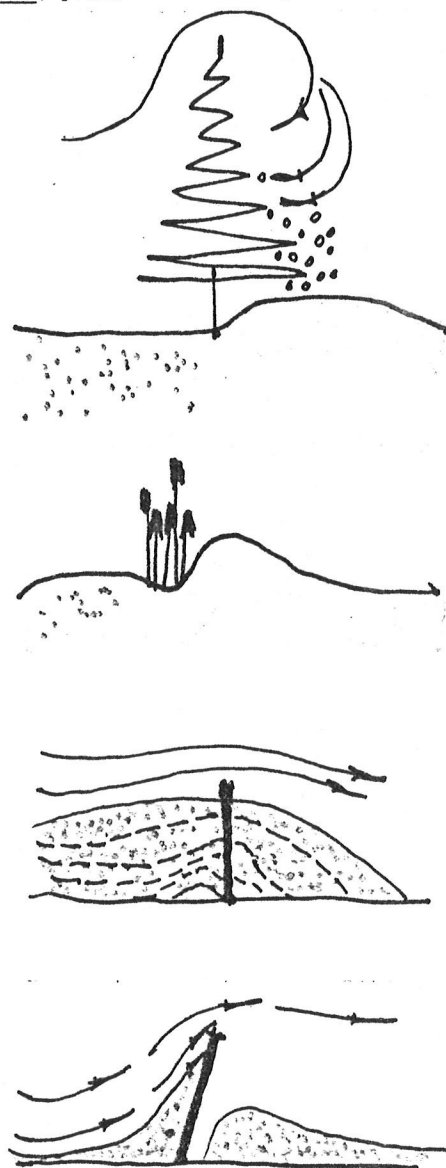
It is recommended for farm buildings that groupings in "L" and "U" shapes be avoided as adjacent buildings will deflect snow towards each other. Farm sheds should be open away from the prevailing winds (and thus should face in a south-easterly, or easterly direction).

Swirl chambers are used on farms to move snow farther out from a building (Harrow-smith, p.72). This usually involves a fence at least 8 feet tall built onto the corners of the shed to be protected. The fence forms a 16' by 16' boxed in area at each corner with one side of each box consisting of a long piece of fence. Snow blowing over a building roof will deflect into these areas; from which it will be thrown out farther away.

7. Harrowsmith Staff Report, "The Best Defence is a Good Snow Fence", Harrow-smith, December, 1979, p.69.

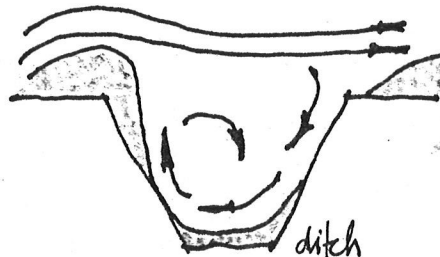
8. IBID, p.71.

9. IBID, p.71.

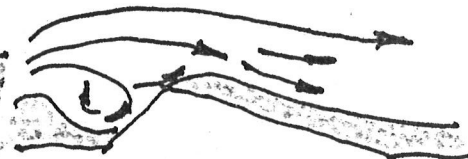




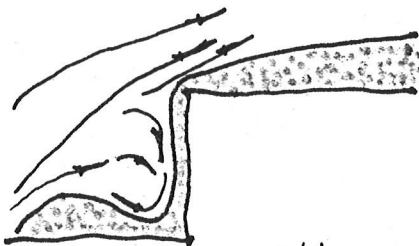
small isolated elevation



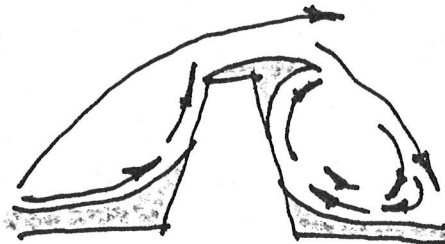
ditch with sloping sides



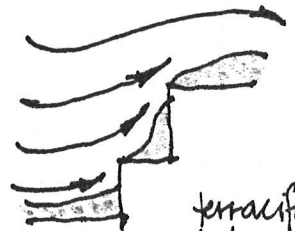
narrow ridge with steep slope exposed to wind



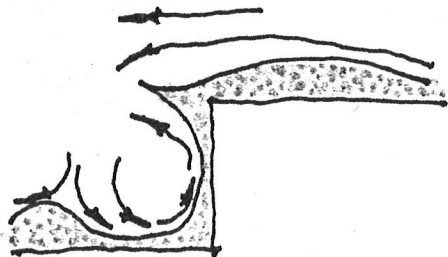
upright wall facing wind



high ridge



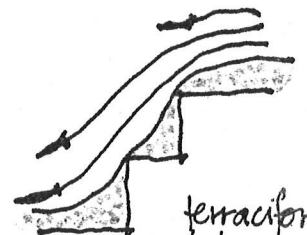
terraciform ledges on slopes



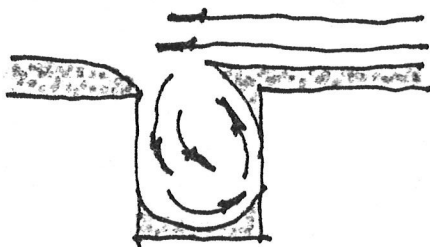
upright wall against wind



low ridge



terraciform ledges on slopes



ditch with steep sides



narrow ridge with gently inclined slope facing wind

G.D. Richter, Snow Cover, Its Formation and Properties, Moscow: Publishing House of The Academy of Science, 1945

solar radiation

We accept the sun as a part of everyday, as a signal that night is past, as something that adds heated punch to summer and a gently warmed brilliance to winter. It is a resource that can be used on a continuum of scales, from the use of complex solar collection systems to the use of an appropriately textured and coloured surface.

Heat intensity is controlled by a number of conditions both on the ground and in the atmosphere. The effect of atmospheric conditions (such as the degree of cloudiness), the season, the time of day affect the angle of the sun's rays, the distance they must travel, and thereby the temperature. Rays travelling a shorter distance and through fewer obstructions are stronger. Thus at noon, when the sun is at its highest point and has a shorter path through the atmosphere, a slope perpendicular to the direction of the rays will allow for the greatest intensity of energy of the day. (In summer the intensity is greatest on slopes which are flatter, since the angle of the sun moves toward becoming perpendicular to the earth's surface in winter. When the sun is low, the steeper slope is better for warmer temperatures).

In addition to the angle of slope, the direction of a slope also plays a role in determining the intensity of radiation. The coldest direction for a slope is that which faces north since the slope is never directly in the path of the sun's rays. The warmest direction changes throughout the year, moving from a southwest slope in January to a southeast slope in the spring and early summer and back to a southwest slope through the summer and autumn.

Conditions at the ground surface, such as soil types and cover, control temperatures largely through processes of heat exchange. An area covered with grass will be cooler than an area of bare soil since vegetation lowers the temperature by transferring

cloudy and clear days

Solar radiation arrives in a form that is partly direct and partly diffused. Diffusion is minimized on cloudless days since there is less atmosphere in the way of the sun's rays. Clear days bring with them a large daily temperature range, which can be accounted for by a large amount of incoming radiation and a largely unobstructed path for outgoing radiation. Since clouds conserve outgoing heat at night, clear winter days are cooler than cloudy days because the outgoing type of radiation prevails for a long period of time as a result of the long night.

temperature at the ground

Heat exchanged by day depends on solar radiation, while at night the heat radiation from the surface of the earth governs this transaction. During hot periods the ground absorbs heat and reserves it. This heat is then given out to the air at night and other cooler periods. (In high mountain areas, the plant world lives close to the ground taking advantage of all possible heat).

The effectiveness of this regulation is increased with the thermal conductivity of the ground. Rock has good heat storage capabilities. Sandy soil heats up tremendously in its uppermost layer, but because of lower heat conductivity (due to air spaces between the sand grains) the heat does not penetrate as deeply as in granite. Peat soils have higher temperatures due to their dark colours. The thermal conductivity of soil also increases with a rise in its moisture content as water conducts heat better than air.

It should be noted that in winter the influence of the ground diminishes. However, its composition and cover can still affect such processes as snow melt. Snow melts more quickly over shorter grass than longer grass because of a better thermal contact between the soil and the base of the snow.

Vegetation can lower the air temperature by

- a) transferring moisture from the ground into the surrounding air;
- b) retarding ventilation by trapping cold air which has sunk to the ground; and
- c) trapping insolation and shading a part of the soil.

grass and soil

Bare soil will cool more slowly than an area covered with grass since the vegetation aids in a more intense radiation exchange. At night a layer of air trapped within the cover keeps the heat close to the warm soil surface, which is at the same time being heated by the upward conduction to ground level of heat energy stored from the day.

moisture from the ground into the surrounding air, by trapping cold air which has sunk to the ground, and by shading a part of the soil.

Soil types vary in their capacity to retain heat, and then emit it during cooler periods. With areas of rock having excellent heat storage capabilities, decorative mulches such as marble, chips, rocks or bricks are useful for warming the soil. Loose mulches such as grass clippings, leaves, or straw, and decayed vegetation and leaf litter have a low heat conductivity and therefore provide good insulation. One often sees leaves popping out from rapidly heated leaf litter before even the leaf buds of trees are conspicuous. (When a bed of grass and weeds dies down in the autumn, the ground cover of organic material becomes a centre for frost.)

The microclimate of an area can also be affected through the use of surfaces with specific colours or textures. Roughly textured, wet or dark coloured surfaces absorb and retain more solar radiation. Such materials have a lower albedo (the proportion of reflected radiation to insolation) than materials which are smooth, dry, or light coloured. In areas where outdoor surfaces have high reflectivity (a high albedo) and low conductivity, temperature changes tend to be abrupt and extreme (e.g. polished silver does not have the capability of absorbing heat and then releasing it slowly during cooler periods). In areas of materials of low albedo and high conductivity (e.g. wood, red clay brick) heat is absorbed and held in reserve until needed.

Reflectivity may be required at one time, while absorptivity may be called for during another season. Low winter rays can reach deepset dark coloured absorptive surfaces. (When the sun angle is low, vertical surfaces facing the sun receive more solar heat than horizontal ones.) High summer rays can be intercepted by horizontal elements of high reflectivity. Since solar radiation from the south is more vertical than that from the east or west, obstructions intercepting radiation from the east and west may have to be lower.

insulation of the ground

When soil is plowed it is looser, contains more air, and is a poorer conductor of heat. Because of less heat transfer from the lower layers of the ground, the surface is colder at night. Before the onset of colder weather a frost glaze can be observed in such disturbed areas.

albedo

The term albedo indicates the rate of reflected radiation to the insolation. An albedo of 40% or .4 means that the ground reflects 40% of the radiation and absorbs 60%.

reflectivity

Reflectivity of Some Typical Materials With Respect To Solar Thermal Radiation. (Olgyay, p.295)

SURFACE	% OF REFLECTIVITY	
	SOLAR RADIATION	THERMAL RADIATION
Silver, polished	93	98
Aluminum, polished	85	92
Whitewash	80	--
Cooper, polished	75	85
Chromium plate	72	80
White lead paint	71	11
White marble	54	5
Wood, pine	40	5
Asbestos cement (aged one year)	29	5
Red clay brick	23-30	6
Galvanized iron, oxidized	10	72
Black matte	3	5

SURFACE	% REFLECTIVITY
Fresh, dry snow	.80 - .95
Cloud surface	.60 - .90
Older snow cover	.42 - .70
Dry grass	.32
Dry, light sandy soils	.25 - .45
Desert	.24 - .28
Dry clay or grey soils	.20 - .35
Dry sand	.18 - .30
Meadows	.15 - .25
Deciduous forests	.15 - .20
Asphalt	.15
Rock	.12 - .15
Rye and wheat fields	.10 - .25
Bare dry ground	.10 - .25
Moist grey soils	.10 - .20
Coniferous forests	.10 - .15
Wet sand	.09 - .18
Bare wet ground	.08 - .09
Dark soils	.05 - .15

(Victor Olgyay, Design with Climate Princeton, New Jersey: Princeton University Press, 1963, P.295.)

ice

"Ice is like that: Now you see it, Now you don't ... on a late afternoon I saw ice crystals suddenly materialize, hesitate for minutes, then sprout forth more daggers ... by morning the whole pond would be stilled by a thin drumskin of crystals. Breezes were sealed out, the water beneath stood still except where minnows darted, sounds carried from far shores, ricocheting off the glaze. I've since been to Vermont ponds when the new-formed ice so hushed the air that I could hear it strain and break many yards down shore as beavers pushed up from below. They poke their heads out, looking surprised, sniff the air and halt for minutes with their front paws over the transparent lid over their world ... ice holds on to life right up to its last black inches. One evening a lake lies covered with leaden pieces of a puzzle that the wind pulls apart and fits together. The morning after its adazzle with sun and waves".¹⁰

Ice is perhaps the most mysterious of the factors. We can all remember those nights of long-awaited hockey games between arch rivals, or those nights of simply skating around and around and around so that sleep brought with it no anxieties but only the pleasant and powerful dreams of childhood.

Ice is easy to manipulate on a scale as gross as that of providing areas of ice for activities such as skating. On a finer scale there are other things that could be considered.

Freezing of water is a process of crystallization involving the rigid alignment of molecules. Ice crystals are at first random in orientation, but through the forces of attraction a regular structure is created. This occurs at 0°C. The process is affected by the presence of sunshine, wind, or impurities. Wind will result in the formation of rough ice surfaces. Snow cover serves to insulate and results in reduced ice formation. Also the rate of freezing of a body of water gradually decreases as the ice layer itself begins to act as an insulating barrier.

ice formation

As the ice front advances across a pond surface, the water freezes along the temperature gradient. The ice has less strength and a tendency to shear along these vertical planes. This occurs because the melting point of the basal plane is lower than within the actual ice crystal through the accumulation of impurities in these areas. With the formation of ice, impurities are forced out of the new crystalline structure into the remaining liquid. The last part to be frozen contains most of the impurities. The whitish centre of most ice 'cubes' can be explained by this.

ice colouring

It is difficult to have dye spread evenly through ice because as freezing proceeds the dye (foreign molecules) is forced to the basal planes. This can be alleviated by adding the dye when the water reaches 0°C.

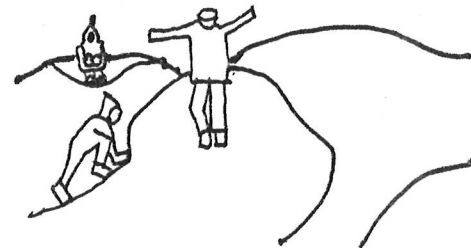
¹⁰. John W. Miller, "Knowing Ice", Audubon Magazine, January, 1980, Vol.82/No.1.

Clearer ice can be produced by promoting a slow freezing rate with the use of warm water, minimal freezing temperatures, and forms made of poor heat conducting material. (A slower freezing rate allows more impurities to escape). The direction of freezing is important, and this can also be controlled. If, for example, the top of a form is insulated, this will be the last zone of crystallization and can serve as an escape for the gas being forced from the forming ice.

In using ice forms for the creation of ice of a specific shape, the contact surface of the form should be smooth and non-porous in order that the ice not adhere in it. Plastics are waterproof, have a smooth surface, and are durable with respect to cracking due to thermal expansion. Wood has good forming strength but might require a plastic line because it sticks to the ice.

the prairie climate

"Canada may have been called Our Lady of the Snows, but in the summer, if you are on a plane on your way to Winnipeg, you can see that this countryside, all the way out to the plains, is really an astonishing pattern of lakes...But it was beyond this Lake Country in Winnipeg - where they used to have air maps showing that for fliers Winnipeg was the centre of the world - that I felt colder than I had ever been in my life...I began to shiver. The wind tore into my bones. My jaw began to tremble. I felt dizzy. Our voices, the discussion about Europe, sounded idiotic. Voices from a faraway, fantastic, warm other world. Then I really believed in those stories of the Winnipeg winters of '36 and '37, when it had been fifty below for days. Those winters seemed to be all around me slowly killing me as they had killed others who had wandered away from home...Now I felt a numbness in me as I stood there holding the arm of my friend.



It was the wind. I asked myself, what am I doing here? Is all of Canada a longing for Spring?...Well, my cold night in Winnipeg was admittedly a shameful experience - for a Canadian. I wasn't myself. I was caught offguard by the bitter heavy wind. It must have weakened the spirit. It made me, for the moment, give in when I knew that the wonder of the country was that people never gave in to the winter...And anyway, the truth is that those western cities...seen in the fantastic winter sunlight, have a lovely sparkle." 11

11. Morley Callaghan and John De Visser, Winter, Toronto: McClelland and Stewart Limited, 1974.

The prairie climate is characterized by mild summers and cold winters, controlled by the continental interior location and the mountains to the west. The expansiveness of the prairies results in varying climatic classifications - from subarctic in the north to humid continental in the south and highland in the southwest.

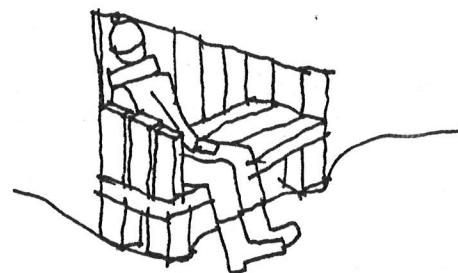
This expansiveness is also one of the factors contributing to a variety of microclimates. These differences can be quite pronounced. For example, a low marshy area might have a frost free season that is a month shorter than adjoining areas relatively few metres higher.

The prairie climate is also characterized by a high number of hours of sunshine - ranging from 2000 to 2300 per year. The maximum usually occurs in July with a possible ten hours per day. A minimum of 2.5 hours per day can occur in December. However prairie winters are usually very bright.

Winter snowfall can be relatively light in the southwestern plains. There can be an average of 8½ inches per month from November to February, with about 9 inches in March. Minimal snowfalls of 2 inches might occur in October, April and May. North, northwest, south and southeast winds account for the greatest percentage of wind throughout each month. The strongest winds come from the north and northwest. The average rainiest months are June and August with maximum rains coming as thunderstorms. July and August are the hot months, although humidity is usually not high enough to create discomfort.

But perhaps, "after the summer maybe there
is some kind of solace for the spirit in
the snow and ice".¹²

12. IBID.



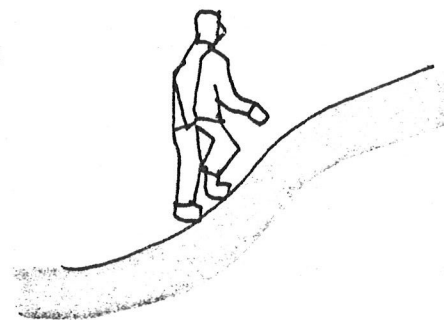
GUIDELINES

winter design criteria

Out of all this arises a recognition that the informality, spontaneity and richness that winter provides are to be greatly valued in considerations of the play environment. It is perhaps a paradox to delineate design guidelines which will structure it. However the purpose of these is more to create an awareness of possible variables.

These guidelines are organized into two camps. The first deals with specific components - site analysis, site planning, site activities, play structures, mounds, and plant material - running on a continuum of criteria that are general and on a large scale to those that are more specific. The second group deals with general issues - designing for all the seasons and for changes in the seasons, maintenance, safety, and adapting existing playgrounds.

It is difficult when a subject is divided into such categories not to repeat yourself or not to find strategies which really belong to more than one category. I have therefore for each category given general "objectives" and then outlined the guidelines in terms of "mechanisms". This has not obviated repetition, but indicates the different emphasis which the guidelines might have.



site analysis

Site analysis should lead to an understanding of the site in general terms and for each season. One can then determine those site characteristics which require changing, and those which provide ways of achieving a playground for the whole year.

Determine for each season wind directions, areas of sun, the influence of existing structures, circulation routes, the influence of existing vegetation.

objective

mechanisms

For each season then define aspects particular to that season e.g., in winter, areas of snow accumulation and areas of sun; low areas which would affect the drainage of snow in spring; in summer those areas requiring shade. Each site and program will have specific requirements.

Map the optimum zoning of activities for each season.

site planning

Planning of the site should take into account program requirements, site characteristics and climatic considerations.

Following site analysis and in tandem with conceptual development determine optimum locations for the activities required. For example the play structure should be in an area in which at least some part of it will receive sun during the winter day. However one might find that an area of sun in winter requires shading in summer, or that the area of sun requires wind protection. Such things should be noted as they will eventually be important in detailed design.

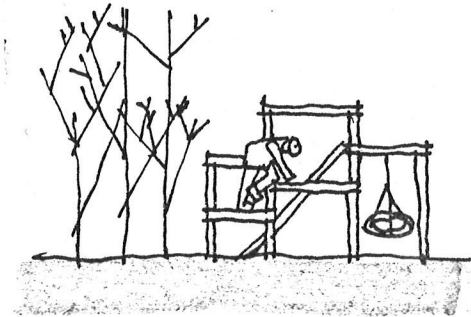
Existing winter sun pockets on the site should be retained.

Site planning should encompass each season and the change from one season to another.

The area should be planned so that some parts of it are usable during the transitions from season to season. For example, the sun can be used to melt the snow in certain areas, so that they will have spring earlier and will be usable when other areas are under water. (Also the thawing of snow can be intensified by the

objective

mechanisms



objective

mechanisms

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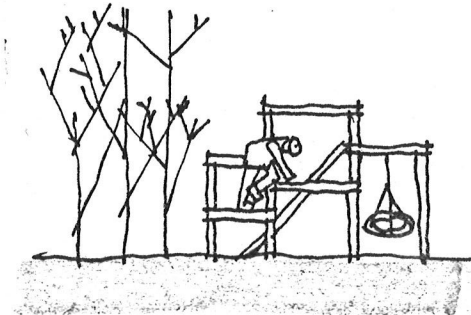
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objective

mechanisms



objective

mechanisms

presence of vegetation, twigs, cinders). Spring winds can be used to dry off wet fields.

The winter play area should allow a sequence of activities.

This requires an integration of built elements and snow elements. Ideally the structure, mounds, ice areas would form a circuit of play in which no component would be isolated. The relationships among these components should allow activities to develop. For example, a deck can lead to a mound. However no component should create dangers in relation to another. For example an ice area should not provide an alien element. It could be enclosed by a mound, and then its shape or size would not be such that would encourage active hockey games.

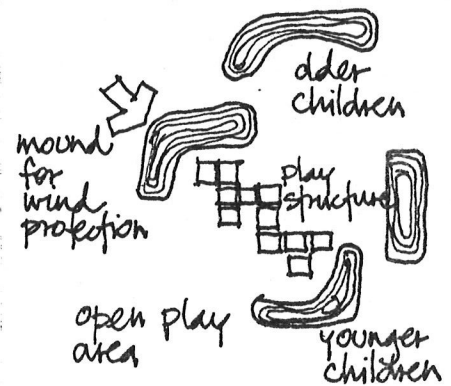
The winter playground should be allowed to develop through use to provide the opportunity for spontaneous play. This is the paradox in planning for winter playgrounds. For although it seems that playgrounds are not really designed with winter in mind, the children using them rise above the situation and are very ingenious in their responses. The objective then is to provide a playground with a variety of environments in different stages of development, designed not to inhibit the potential of winter but to expose it.

The winter playground should develop partly through use and through changes in the season. (The differences in types of snow have an effect on activities.) The traffic of children can sculpt snow in certain ways. Thus if for example mounds are located across a circulation route, a path is worn, which in turn becomes icier or wetter over the season.

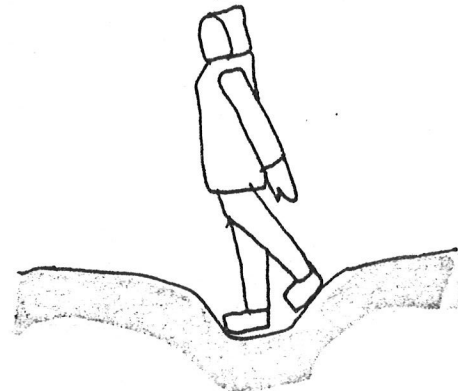
The integration of existing landscape features also allows spontaneous winter play. The accumulation of snow around certain elements

objective

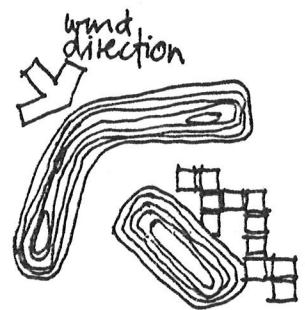
mechanisms



objective



mechanisms



creates interesting spaces or nooks.
Snow can slip off the roof of an
existing structure and create instant
mounds.

The play area should allow visual contact with
centres of other activities.

Screening, shelter planting and mounds
should not isolate the play area.
(This is important from the point
of view of informal supervision
also.)

Specific locational planning conditions must
also be met.

Areas designated for ice should
have a nearby water source, if the
area is an extensive one.

Entry into mound areas for trucks
collecting and carrying snow should
be clear of planting and built
elements.

objective

mechanisms

objective

mechanisms

site activities

Winter play areas should provide for a
variety of activities and environments -
areas for active and quiet play, areas for
older and younger children, areas for
activities such as sliding, climbing,
running.

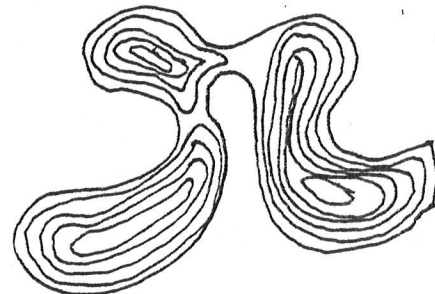
The layout of snow mounds can be
used to define spaces, to create
quiet nooks and enclosed areas.

Areas accommodating larger groups
will encourage more activity.

Warmer spaces for less active
pastimes can be created by form-
ing sheltered spaces and/or
spaces with heat absorbing colours
and materials. Light can be re-
flected into an area lacking it.
Canopies can be used to reflect

objective

mechanisms



back out-going radiation. The direction and angle of slopes will influence the intensity of radiation.

The winter play area should provide for activities that do not require a great deal of equipment e.g., sliding without toboggans, skating without skates.

Winter play areas should contribute to the child's understanding of his environment, to an understanding of snow and its place in our lives.

Planting of a type that is visible in winter (in the form of pods or skeletons) or that attracts wild-life should be included.

Allowance should be made for children adding snow to places or buildings in the snow.

Free areas should be left for experimentation - for the building of snow shelters, for measurement of snow depth, for examination of the life in snow.

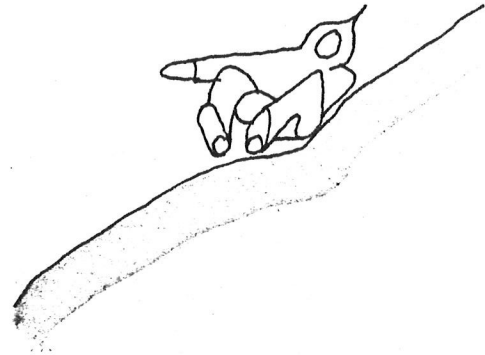
Children should be involved in the building of the winter playground. They can map out mounds, create paths. They should be provided with the tools and loose parts that will allow them to modify the area.

The elements of winter can be used in the creation of new play experiences.

A path could follow the peaks of a series of mounds.

In winter a slide doesn't have to go up and down but could curve around.

Winter allows the opportunity for the creation of fantasy environments - tunnels, mazes, ice houses. The wind can be funnelled to create different shapes in the snow.



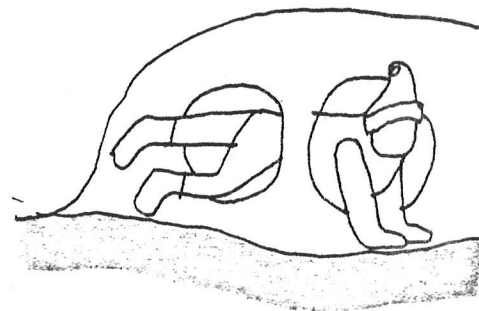
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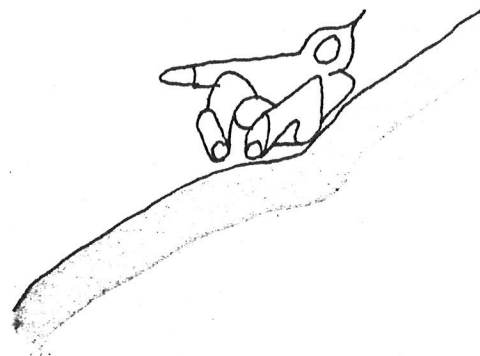
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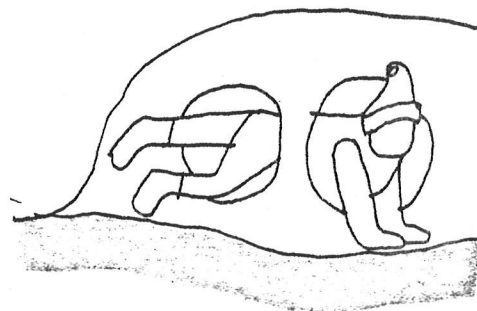
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mechanisms



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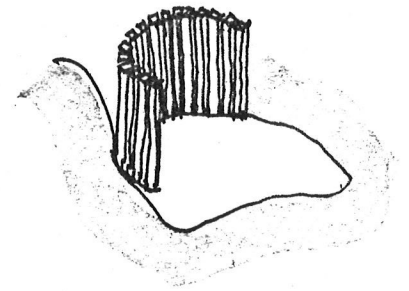
Winter can provide a variety of sensations - warmth from the sun, the pinching of a howling wind. One could for example make an area where you walk from calm into wind. Similarly areas of light and darkness can be created. The sun casts interesting shadows in the snow. The light reflected by the snow can be captured.

Each snowfall brings with it the potential for change - mounds can be increased in size; new mounds can be created, new boundaries defined, new paths developed.

Different types of snow can be used to encourage various activities.

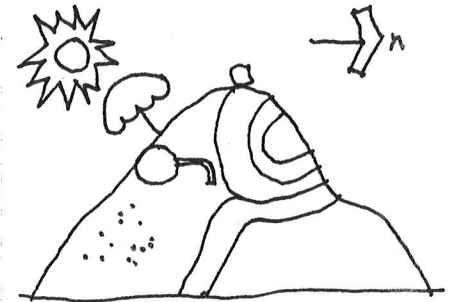
Snow play areas should be sited in several locations of varying conditions (sunny, shady, windy) to produce snow of different conditions such as wet or dry. Wet snow is good for building. Dry snow is good for rolling around in.

Changes in the density of snow throughout the season also affect activities. For example, as snow increases in density through the winter it becomes better for snowballs.



objective

mechanisms



play structures

The siting and design of play structures should involve consideration of climatic conditions throughout the year. The play structure can become a tool in the modification of those conditions.

The play structure should be sited so that at least some part of it receives sun at some time during the winter day.

objective

mechanisms

Heat absorption requirements will disappear in the summer and shade may have to then be provided. This could be accomplished through the use of deciduous trees which will lose their leaves in the winter, or by designing the structure so that parts of it will provide shade in other areas. Since winter sun rays will affect largely vertical surfaces because of their low angle heat absorbing surfaces should be vertical while horizontal surfaces will provide protection from the summer sun. Grass could be planted around heat absorbing elements for cooler conditions in the summer.

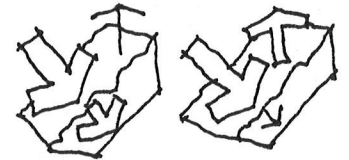
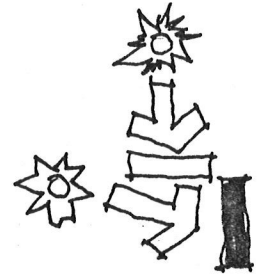
Similarly parts of the structure used for climbing in the summer can act as wind protectors or snow collectors in the winter.

Colours can serve to absorb or reflect the heat of the sun, depending on their darkness. They are important also for the variety that they lend to a largely monochromatic winter environment.

The type of material used will also influence heat absorption. For example, wood structures will help in creating a more comfortable play area.

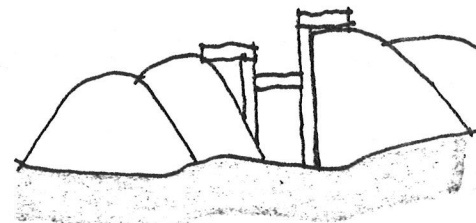
The play structure should be designed so that it will be adaptable to new winter use.

Structures can be designed to function in a different way with snow. For example snow can fall over horizontal surfaces creating tunnel areas. Previously inaccessible heights will be accessible. Swings can become catapults into piles of snow.



objective

mechanisms



mounds

The location of mounds should be a response to existing play patterns and should reinforce zoning.

Mounds should relate to other elements of the play area insofar as potential activities do not cause those elements to be dangerous. For example, a mound could be used to enclose a structure, but if it were to intensify activity in a small area it might be better to have the mounds exist in a linear fashion with the structure as a part of that play network.

Mounds should be located so that they can be added to as more snow falls.

With the locations of mounds determined it is important to guard against obstructions in the design such as trees and built elements that will make it difficult to mound snow, or that will become hazards in an area of mounds.

The grouping of mounds, their relationships, their height can have an effect on the kind of play going on around them.

A series of interconnected mounds of varying heights will allow a number of activities to go on and different age groups to co-exist. This could also be done by creating an area of smaller mounds which the older children might not be inclined to use.

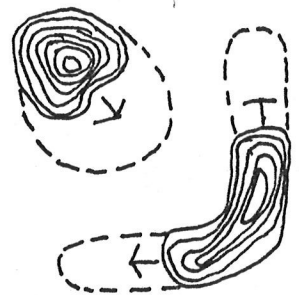
Mounds can be used as space forming elements, to protect quieter play areas or to direct traffic.

Mounds can be used in climatic protection.

A mound set against a prevailing wind will provide a protected area.

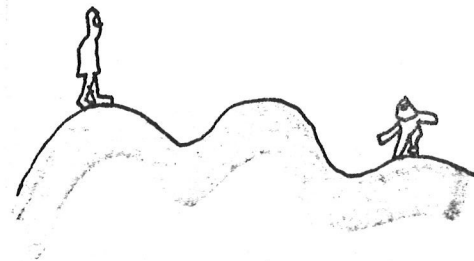
objective

mechanisms



objective

mechanisms



objective

mechanisms

Warmer south facing pockets will provide sheltered areas.

The orientation of a mound will regulate its duration.

A north facing mound will last longer than one facing south because it will be protected from very intense thawing action from radiation.

The shade of adjacent buildings and vegetation will also affect duration. A mound protected by the shade of an existing building will last longer than one exposed to the elements.

Adequate drainage should be ensured for the mounded area in the spring.

Mounds should be located in an area which will not be prone to pooling or in which drainage is directed away from buildings. They should therefore be in an area slightly higher than adjacent areas.

If drainage is seen to be a problem, towards the end of winter the snow can be redistributed, gradually levelled out.

An attempt should be made to utilize as much onsite snow as possible to preclude the danger of having debris in the snow.

Use vegetation, and fences to collect snow.

Grassed or planted areas should not be completely denuded of the snow which serves to insulate them over the winter.

plant material

(please see appendix for plant lists)

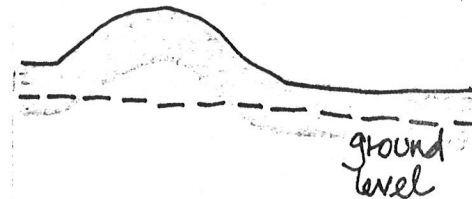
Vegetation used in a winter playground should be chosen to meet a number of criteria - climatic protection, visual screening, its role

objective

mechanisms

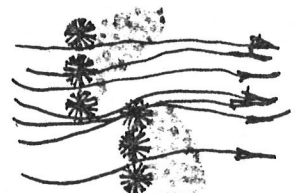
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mechanisms



objective



as play equipment, its visual aspects in winter, its ecological role.

Trees and shrubs can be used to block or channel the wind, provide shade, or force the deposition of snow.

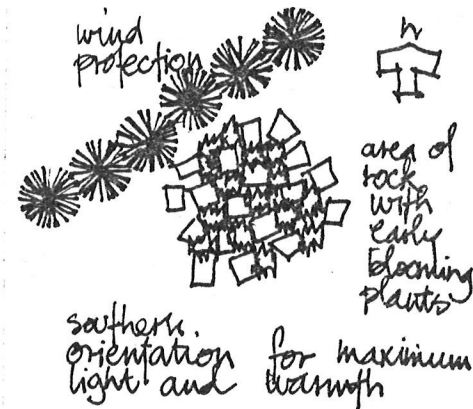
Shrubs are effective for windbreaks in a child's area due to their size and the way they catch drifting snow.

Vegetation can be used in play - climbing trees, for boundaries, for obstacles.

Special conditions can be created. For example, an especially warm area (with maximum wind protection and maximum sun exposure) will permit the flowering of early spring plants. This could be aided by the use of rocks which will hold and radiate heat. (However morning sun shining on frosted plants could cause damage and so these winter and spring plants should not be oriented to the east.)

Because young plants are more brittle in the winter and are subject to more damage from bending and pulling, they should be well protected. This can be accomplished by grouping them or by having them out of the range of heavy activity.

mechanisms



GENERAL ISSUES

designing for changes

Each change from one season to another brings a new set of circumstances which can be met to allow the functioning of the play area.

As summer becomes autumn, an increasing use of heat absorbing materials is necessary, especially when the playground is still used in the evening.

objective

mechanisms

As autumn becomes winter, protection from wind is also important. Snow fences could be erected. Some planting can be done, and protection should be provided for young plants.

With winter becoming spring, some of the perennials that appear early in the year can be used. Thawing can be promoted in some areas, while some areas that are wet will provide children with water play areas. Winds can be used to dry off some areas such as sports fields. Increasing use in the evening requires heat absorption and wind protection.

As spring becomes summer, preparation for planting can occur. Breezes should be channelled for ventilation. Areas of shade are required.

Some elements can be designed to change with the seasons, to acquire new uses.

A sports field might become an area of mounds, a patch of land might become an ice rink.

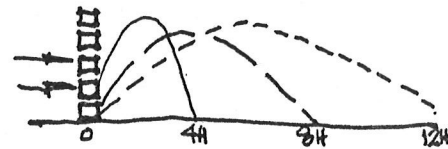
Equipment which can be added to or taken apart should be used - movable goal nets, screens.

Some areas could remain the same in winter as in summer. For example, asphalt areas could be cleared of snow.

Existing landscape features should be considered in terms of their potential for play. Some enclosures become accessible in the winter and could be used for jumping from.

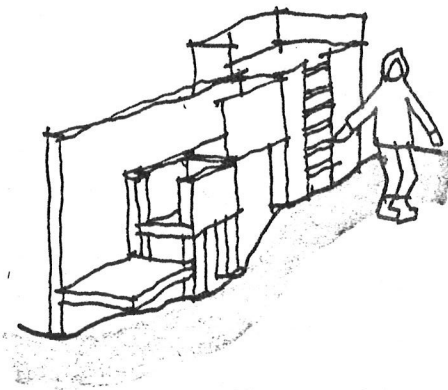
The siting of elements of the play area should permit use during different seasons and should make use of seasonal changes.

Certain areas might be located so that the sun will melt the snow faster and the area will be usable while some other parts are still undergoing a wet thaw.



objective

mechanisms



objective

mechanisms

Paved surfaces would be usable in the spring.

maintenance

Those changes that occur as a result of seasonal changes, and that might require maintenance if they were not considered part of the play experience should be incorporated into the design.

In some areas the melting snow can be used to provide an area of water play.

Fallen leaves in the autumn can provide a good jumping pile.

Perennials that appear early or that persist in some form through the winter should be planted.

Large areas designated for ice activities should be close to a water source.

Those areas designated for snow mounding should be of a surface that will permit this - e.g., a hard surface that will not be disturbed by snow gathering or by great amounts of snow resting on it.

The playground should encourage modification by the children using it, and their care of it should allow these changes.

Children can be given certain plants or areas of plants to look after.

If an ice area is included, it should be close to an accessible water source and children should be able to make repairs.

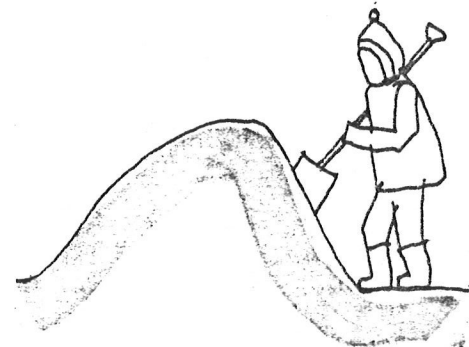
Tools should be available which the children can use to remound snow or add to existing mounds.

objective

mechanisms

objective

mechanisms



Places should be available in the play area where children can build structures.

safety

The location of elements of the play area with respect to other activities should not create the potential for dangerous situations.

If snow mounds happen to or are forced to occur adjacent to streets or parking lots, they should be directed away from the traffic. This could be accomplished by forming the mound so that the steeper more interesting slope is directed away from the cars.

Areas of ice activities should be sited away from hard vertical surfaces, and dangerous corners.

The potential for development of slippery surfaces should be kept away from walls by ensuring drainage in the other direction and by keeping potentially water forming elements away from those areas.

Basic maintenance should be considered in its implications for safety.

If snow is brought in from off the site it should be free of debris.

Metal parts should be avoided or if they exist should be painted a dark colour.

Temporary structures frozen into the snow should be refrozen throughout the winter and removed at the beginning of the thawing period.

Tripping hazards should be eliminated by removing snow around elements which might cause problems, piling up snow in those areas, or at the outset designing elements which will be of sufficient height to be noticeable.

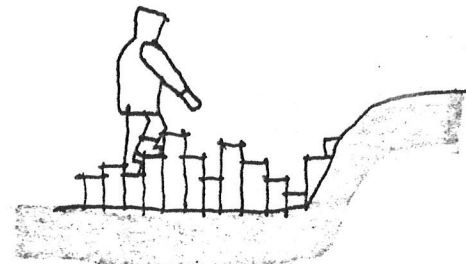
objective

mechanisms



objective

mechanisms



Informal supervision should not be impeded by the location of mounds or other playground elements.

Snow mounds should not completely obstruct the perimeter of the play area.

If a vegetative screen is to be used along the perimeter, high headed trees should be used intermittently to allow views in.

adapting existing playgrounds

It should be determined which existing elements enhance winter play and which ones require changes.

The site should be analyzed for wind patterns, areas of shade, snow collection. For example, the addition of a climbing wall may serve as protection against the wind.

If the existing equipment is of a type that renders it unusable during the winter (e.g., steel swings) it may be necessary to make the winter play area a separate play area.

If the existing equipment is of a material and organization that will permit winter use, new structures and mounds can be placed in a way that will integrate the winter play environment with that existing, and will allow wind direction and snow collection in areas desired.

Existing site props can be utilized in this integration.

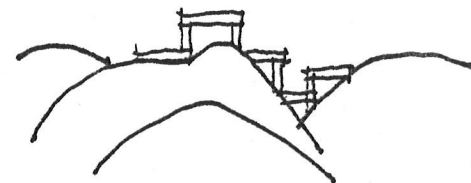
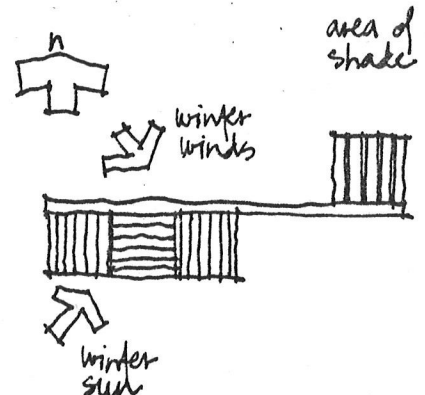
It could be possible to paint certain areas to make them more comfortable.

objective

mechanisms

objective

mechanisms



DESIGN APPLICATION

site description

St. Ignatius School is a Roman Catholic school offering grades one through eight. The 250 students come primarily from the area bounding the school. A small number are however brought in from outlying areas. Since the schoolyard, a court described by a U formed by the school, convent and church, is undeveloped, the parents have for a number of years been attempting to initiate action. In 1979, Mrs. Bromley, then president of the parents' association, approached Professor Charles Thomsen for help in the organization of a design-in. Early in 1980 it was suggested that this site would be a good one to use for application of my practicum research into designing playgrounds for winter use. Previous to my becoming part of the project, questionnaires had been filled out by the students, parents and teachers. A drawing and model building exercise was also done by the children. I was involved in presenting the project and questionnaire to the local senior citizens' club which also hoped to make use of the site. In May, 1980 the design-in was conducted with a group of twenty people (including two children, two fathers, two teachers and one representative of the senior citizens' club).

The school forms an L extending from the Northwest corner of the block to midway along the southern edge of the block. The remainder of the southern face is occupied by the convent and church. The church fronts onto Stafford, the eastern side of the block. The yard then is open, except for a frost fence, to the north along which face runs Corydon, a major street. At this point Corydon is largely a commercial street, except for a few breaks for walk-up apartment blocks. However the streets immediately parallel to Corydon are composed of single family houses.

Thus the site and the area around the site provide a good mix of interests. The supermarket, across Corydon from the school is symbolic of a desire on the part of the students to watch and participate in other activities, and also provides the schoolyard with people taking a short-cut through the area.

The richness of this environment then provides advantages in terms of the presence the grounds can have in that theatre, and in terms of what "extras" the children can observe and learn.

The yard has an area of asphalt immediately in the vicinity of the school and the remainder of the yard is a compacted mud and gravel surface. The existing asphalt is in poor shape with cracks due to heaving, while the gravel area has drainage problems. The area is quite bleak with almost no vegetation. It is quite a bit more interesting in the winter when the asphalt surface is cleared of snow, and a ridge of mounds is formed at its side.

site issues

The questionnaires answered by the children indicated a great dislike for the area of gravel in the yard and the desire, as a result, for more grass was often very insistently stated. The asphalt area was liked, mainly for the games painted on it. More such games were requested. It was mentioned as a favorite place in the winter.

There was a heavy request for sports fields - soccer, football, baseball - with attendant goal posts, yard lines, back stops. Hockey and skating rinks were also mentioned. Basketball nets were requested, as was a tetherball.

The size of the playground proved to be an appreciated characteristic. Possibilities of a track were mentioned. Some of the older children wrote of the need to exclude some of the younger children from certain areas, and requested for them climbing apparatus. The younger children themselves requested play structures with a variety of activities.

Other more specialized and exotic things were mentioned - a target and a sealed off area for snowballs, huge rocks displayed near the fence.

Drawings done by the children showed predominantly play structures and sports fields. Many showed a great number of activities occurring in the yard, but they did not take up a lot of space in the drawing. The yard was represented as having a great deal of open space. Some drawings showed pieces of equipment scattered throughout the area, while others showed one complex structure.

Another group of children built models of plasticine. Again they showed a great variety of desires. Some showed the predominantly open spaces of sports fields. Others showed scattered play structures which would each accommodate one or two activities. A few portrayed structures of greater scope.

The teachers expressed approval of the wide play spaces and the fact that children could use the whole playground. It was noted that the asphalt area should be expanded and should provide for more hard top games. The lack of equipment was of great concern - both equipment for muscular development and the development of imagination. The grounds offer no shelter from the winds and one teacher noted that poor drainage forced them to hang around steps and walls. More grass, trees, sports markings were required. The school yard in its present state did not allow solitary play. Another criticism concerned the fact that the use of snow was not developed to its full potential.

The senior citizens meeting in the church basement are an active group, with activities ranging from ceramics to political discussions. The development of some outside areas for them would add to the variety and also make it easier at some times of the year for those who find it difficult to negotiate the stairs to the church basement.

They expressed an interest in such activities as horseshoes, shuffleboard, croquet, lawn bowling, suggesting that perhaps tournaments could be arranged which would allow the students to use such areas also. They stated the desire to sit outside under

shade trees, and a number liked the idea of a community park in which you could sit for a while after having done your shopping at Safeway or which the people in all the surrounding apartments could use. Most however supported the idea that it was important not to take away too much of the childrens' valuable play space.

One specific problem was mentioned - that of the side door of the church leading into the sacristy. It seems the children often use this door to come down into the church. There is also often a great deal of noise outside this door, disturbing the club meetings and discussions. Several people also mentioned a concern that the development of the grounds might increase vandalism.

One parent commented that the development of the grounds for the children was of primary importance. The community was accommodated in other areas. Another thought that the yard could be utilized for general community activities in the summer. Zoning for various ages and planning for good supervision were thought to be crucial. One parent objected to "dangerous climbing equipment" while others asked for a climbing apparatus, trees, a sand box, fitness trail, shaded grass areas, forests and lots of room.

These expressions illuminate a number of site issues.

- *The conflicts due to the wide range in ages of the children must be resolved.
- *Site development should permit interaction among senior citizens and children only if desired. Therefore it is important that each group have separate areas, but the potential for the sharing of certain activities does exist.
- *Further zoning problems exist with respect to the need for quiet for the church and convent area.
- *It is important to maintain the sense of open space which the yard presently gives, but at the same time to provide the potential for more variety of activity. (This could

perhaps be accomplished through the multi-use of spaces.)

- *The drainage problems of the site must be considered in the design.
- *There is a lack of trees and grass.
- *The potential problem of vandalism must be considered.
- *The development of the yard requires climatic protection.
- *Due to economic constraints development will have to be phased.
- *This schoolyard should present itself to the street and community but also maintain its independence and role as a yard for the school.

program

While no definite program was given, preliminary consultations and analysis gave rise to a number of possibilities. The yard is to serve mainly the students and senior citizens. Community use would occur peripherally with the yard being used as a circulation route as it is presently or perhaps for something like the fitness trail. Thus the most important components for the students were seen to be the play structure, the asphalt area, sports field, sitting areas, planting, and areas for incidental play. The senior citizens were interested in sitting areas, lawn games and shade.

In the winter the play environment should provide for largely the same activities - climbing, jumping, running, swinging, balancing, throwing, building, etc. - but it will probably do it in different ways. For example, mounds will serve as the instruments for many of these activities. Jumping can be from up to down, or down to up, rather than across. Ice is an accepted and expected part of winter. Thus there are new activities. Sliding is definitely easier in the winter.

Materials for building and throwing, under the guise of snow, are very apparent.

For senior citizens winter is the time for indoor activities. The possibility however of sitting outside on intensely sunny and warmer winter days should not be ruled out.

site analysis

Concurrently with these investigations a site analysis was carried out. (Please see Appendix for plans.)

Because the area of the school along Harrow and Jessie is difficult to supervise during recess, the central court is the area of major use and therefore of major importance in development. Since recesses are staggered the areas immediately adjacent to the school should be relatively quiet. The classrooms for the younger children are located in the southern wing of the school. Play areas and equipment for them should be around that area for purposes of supervision, ease of movement and the safety of having an area where older children might not venture.

The gym wall at the north end of the site provides one of the few vertical surfaces without windows and is great for ball playing. The surface around it then, ideally would be a hard one.

The optimum area for the senior citizens is at the eastern end of the interior court since this is closest to their entrance to the church basement. This location would also give a limit to the play area and keep the children away from the administration wing wall and the convent where noise presents a problem.

The winds, as can be seen from the plans, come from a variety of directions. The ones of major importance are those blowing through the court from the open side on Corydon. In

late winter north and northeast winds are strongest and screening from them along Corydon is required. This is true also of spring except that the north wind acquires a bit more prominence. In summer the northwest wind returns to a prominence which persists through the fall.

Areas of shade were plotted for each month at various times of the day. As one moves from December to June one can see the area of shade decreasing and then from July to December it increases. On a summer morning the central court is sunny around the school, but shady by the church. This area of sun decreases through the seasons until in winter it is a small pocket in the northwest corner. Noon brings with it a minor area of shade by the school but a much larger area of sun in the central portion of the site throughout the seasons. In the afternoon the area of sun around the school increases and only in winter is there an area of shade in the northeast corner.

On the basis of the climatic analysis and zoning requirements summaries for each season were compiled. In winter No. 1* defines an area where at least part of it receives some sun during the winter day. The northwest corner by the gym wall could be kept clear for winter ball and hardtop games. If mounds were placed in area 6, some would last longer due to the shade. Parts of areas 1 and 5 might be good for a brief time of sitting and enjoying the winter sun.

*please see the plan on page 76
(Appendix - St. Ignatius site
analysis drawings).

Spring offers similar conditions. Sitting and enjoying the sun becomes more probable and possible and as a result a park-like area could be considered. The area suggested for location of play equipment for optimum winter sun would still require wind protection in some form as would a spring sitting area in the southeast area of the site.

In summer parts of the play equipment area would require shade. Elements used for winter snow collection could be adapted for sun protection.

With autumn a return to winter-like conditions is encountered. As a result heat retention is important in certain sitting and play areas.

site specific criteria

The seeming openness of the site was mentioned as a positive feature by many people. This should be maintained by having the sports fields as one large area and other activities on the perimeter.

Because of the small area of the yard, individual sports fields cannot be defined. Rather, the field area has to serve many sports informally.

The Corydon side of the yard presently allows informal supervision of the area. Any planting or screening along this side should therefore not completely obstruct these views in.

The major play facilities are best placed near the school both for the safety of the children, and due also to the zoning necessitated by other uses of the site. However something of a buffer area between the major play area and the school should be evident.

Since the whole area is quite exposed to winds from several directions, most emphasis should be placed on finding the sun in the winter. Mediation will have to be through built elements and vegetation. It would be difficult, and would diminish site potential, to solve wind problems through orientation.

The sizes of the elements of the play structure and their location should be varied to accommodate the varying ages of the children.

Within this variation however the play area should not be formed of scattered pieces, but should be a cohesive whole.

The area for the senior citizens should be one that is completely accessible, that is with walks not interrupted by steps or changes in levels. This is especially important since part of the purpose of this area is that it serve as an alternate summer meeting place

for those people who have difficulty using stairs to the church basement.

The area designated for the senior citizens should permit privacy for their activities but should also take into account the fact that sometimes their activities might include sitting and watching children play.

The route into the yard for trucks must be kept clear for the gathering and mounding of snow.

A route free of obstructions has to be maintained to those areas designated for mounds.

Parts of the play structure should serve for wind protection in the winter since orientation to eliminate wind is not possible without sacrificing other site potentials.

Areas of major planting should be confined to the perimeter of the site, where it will serve for climatic protection and will not interfere with the activity of the play areas. Rougher, minor areas of planting could occur in other areas.

design objectives and concept

The aim of the students, parents teachers, and senior citizens has been to articulate a development of the yard that would allow use for a number of different activities and various age groups.

The problem was stated as one of wanting a playground. There is a playground there right now. Although it is one that could be described as a big open empty field and it does have disadvantages, it also has advantages. It allows digging and scraping in many corners. It allows unplanned for plants to emerge.

The aim then is to provide that freedom and looseness and undefined potential within an area providing both a more formal zoning and direction, and the added richness of a more varied group of materials, objects, plants, and activities.

The search for an area that provides for explorations and spontaneous play led to thought about back alleys, which contain nooks, corners, and garbage cans - repositories of a great deal of urban richness.

A back alley has a structure, but one that is full of surprises. Its basic structure is that of a secondary and straight transit way. But along its edges sheds protrude and recede, garages open up and disclose cars and junk, or are tightly closed with painted doors.

Fences too can be very tight, or they can disclose the neatly ordered backyards hidden from the disorder of the alley. It is here in the alleys that weeds thrive, along those two-dimensionally, hugging building sides. There are some open vistas, some closed. But open a garbage can and find treasures.

In winter alleys become more neglected, but the troughs that are car tracks, and the snow order their imperfections. Some parts are hidden, but new things are exposed - like the persistent skeletons of weeds which are reminders of a season past and one to come.

These quantities are described by Charles J. Zerner in an article in which he writes of streets and alleys that provide for play.¹³

"In plan, the street that is alive has a complex, differentiated contour created at the juncture of dwelling and sidewalk. It is a living edge

13. Charles J. Zerner, "The Street Hearth of Play: Children in the City", Landscape Autumn, 1977, p.23.

that might be called the zig-zagging edge of a building. By zigging and zagging, by alternately protruding upon the sidewalk and then receding a few feet, the line created by dwelling facades and the plane of the sidewalk creates a whole family of realms in which children situate themselves and locate zones for different activities along the street. A street that is a hearth of play is one in which the contours of dwellings create the possibility of different currents of movement along the street, different rhythms of flow...

A stream, with its branches and meanderings, its alteration of rapid, unimpeded flow through straight portions of its banks and the eddies and pools created by naturally occurring variations - obstructions to flow - has a symphony of currents, eddies, and rhythms. It offers places where the rhythm of movement is stilled in a pool below a waterfall and places where the currents are rushing headlong and unimpeded...

Think of a natural stream's topography. Imagine the banks that slope down to the stream, alternately grassy or covered with moss, strewn with rounded boulders or slippery as a mudslide. A child approaching a stream, climbing down its banks, finds places to rest, places to climb, and places simply to watch the flow of water."

design description

(please see appendix for drawings)

Through the north - south circulation, the site lends itself to an alley leading from the gate opening on Corydon through to the pathway between the school and convent. The siting of the play structures for best sun exposure in winter reinforces this. The planting required along Corydon for climatic protection, as well as the planting along the convent wall define another transit way in the form of a fitness trail.

The configuration of the asphalt area (put near the school for the purpose of having a clean hard surface between the play area and entry into the school) arose through the two alleys leading to the back entrances of the school. These are secondary alleys and define a central open area of grass as well as providing spontaneous play opportunities. The junctions of the alleys are used to provide "resting places", plazas and benches and plants. The asphalt area could be cleared in winter.

The alley surfaces are a mixture of compacted gravel-ground, pea gravel, and rough planting. These planted areas are edged by extensions of the path (similar to the crack down the middle of the alley) which is formed of railway ties and hydro poles (some of which rise above the ground). The planting is of a type - rough grasses, wild plants, shrubs - that will allow the children to run through them, play with them - that will be a natural part of the play area, as weeds in an alley, not peripheral. It also strives in winter to be a presence, if only through its skeletons.

The play structure was sited and designed as a part of that alley edge. To that end it has open edges, vertical faces on which could be painted

typical alley facades, and scattered planting. The play structures and their roles as alley edges are designed so as to allow additions by the children - nailing boards and building.

And so it is the intent of development to provide a structure to be built upon, to be adapted, to have boards nailed against, "windows" installed, benches created. It would be ideal if the area evolved to resemble the description that follows. Use hopefully will allow it to.

"The material imagination of children works, even thrives upon a fodder of natural and cultural materials that lie in profusion and glorious disarray in the abandoned lots, warehouses, wharfs, and workbins - the reliquaries and vegetal graveyards of the city. These materials abandoned and lying about, form a yeasty compacted mixture of objects, vegetation, and ruins which, like the nutritive matting of leaf mulch upon the forest floor, nurtures the mad schemes and fantastic imaginings of urban children... These sites are temporarily possessed for sandlot baseball or transformed into strange, weedy jungles and parched deserts of the imagination... Each dusty leaf, each spidery thicket of Queen Anne's lace a sign of the vegetable kingdom outside the city... They are sites in the city that have gone to seed (they are seedy) and are fertile in their potentialities for play. It is in these weedy places halfway between evergreen garden gone to seed and warehouse wasteland that the quintessence of a city is to be found and explored." 14

14. IBID.

conclusion

Designing a playground that will consciously respond to winter involves the addition of a number of variables, which are simply offshoots of variables generally considered - solar radiation, winds, zoning, accepting spontaneity and adaptability. The difficulty lies in finding the fine line between a playground orchestrated for every movement, and one allowing development through the impudences of winter - which is the advantage that many play areas presently have, except in those cases where the design or materials used present definite hazards for the winter.

The other difficulty, which also forms part of this fine line, involved not getting caught up and taken in by those very tangible variables of climatic directives and seasonal conflicts i.e., tempering sense with nonsense.

This is all the more difficult since it seems at times that the human mind doesn't work by flowing but by slipping backwards and forwards. For example, an idea for summer has to be tested for its implications for winter, and somewhere in this process something is lost. The tangible variable moves in and takes over. The whole sense of the area becomes one of little pieces.

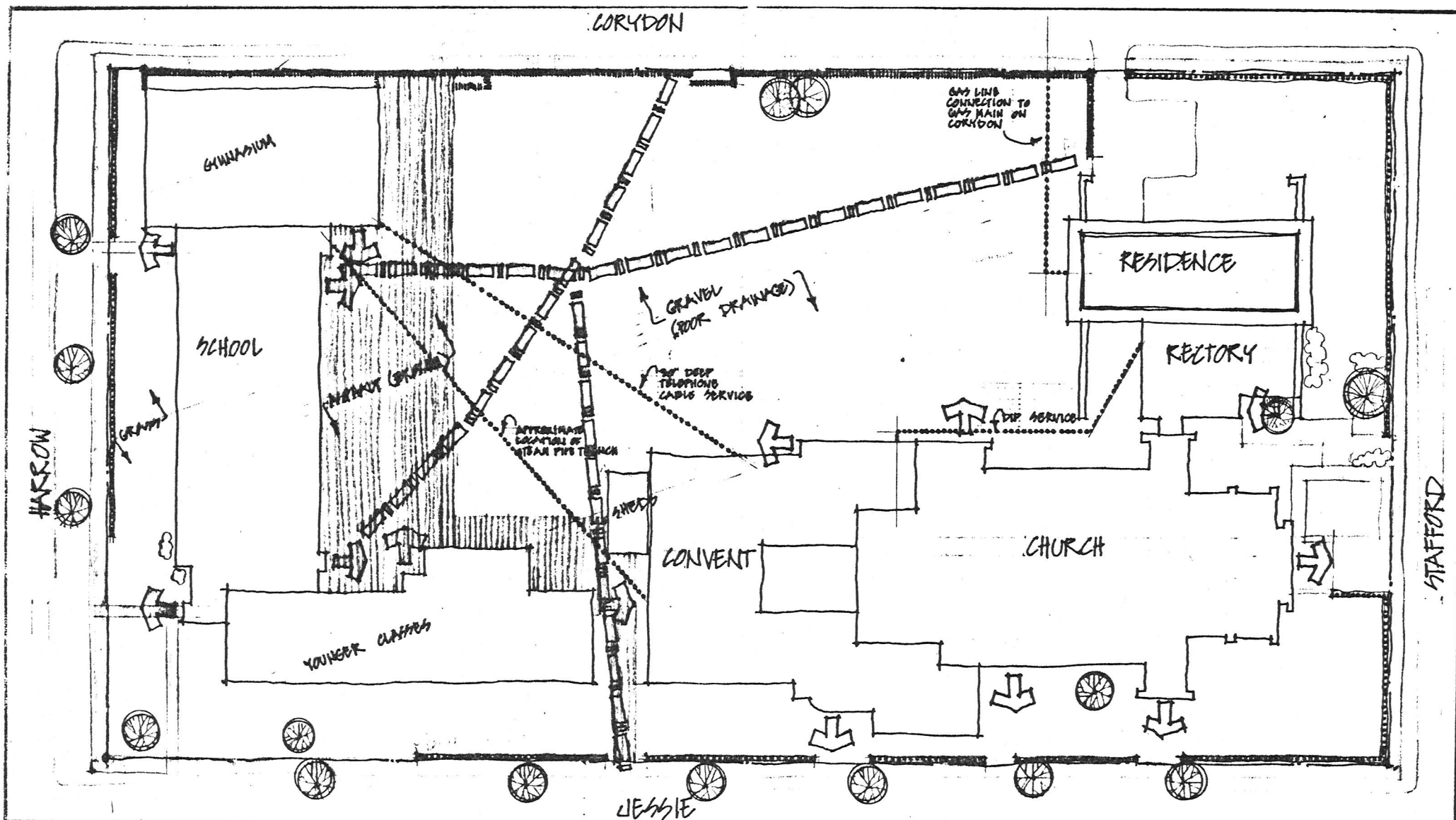
It seems that usually at each point in the design, some season had precedence. The design thus has areas in which summer considerations ruled and those in which summer was subservient to winter. Only the odd area was the result of a happy relationship between the two. This probably occurred in those areas where the changes are those related to natural occurrences - changes in vegetation, changes in sun direction, areas where snow collects naturally, and in those presently unknown areas where things will happen accidentally.

And so the beauty of winter lies in never really quite knowing what will happen.

And the problem is to design an area which will allow those spontaneous activities to occur while providing a play area that moves smoothly from season to season.

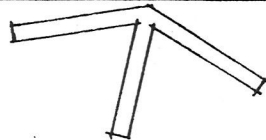
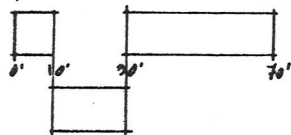
How does one design the potential for activities over a number of seasons, without stipulating that those activities must occur in a certain place? The answer is in diversity, in providing for varied conditions. One can jump by leaping over an area of sand, or by going from the top of one mound to the top of another, or by jumping over a pile of leaves. The conscious inclusion of all seasons increases the vocabulary of that diversity, and allows the activities to link the seasons.

APPENDIX

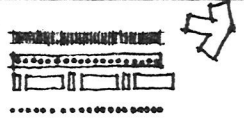


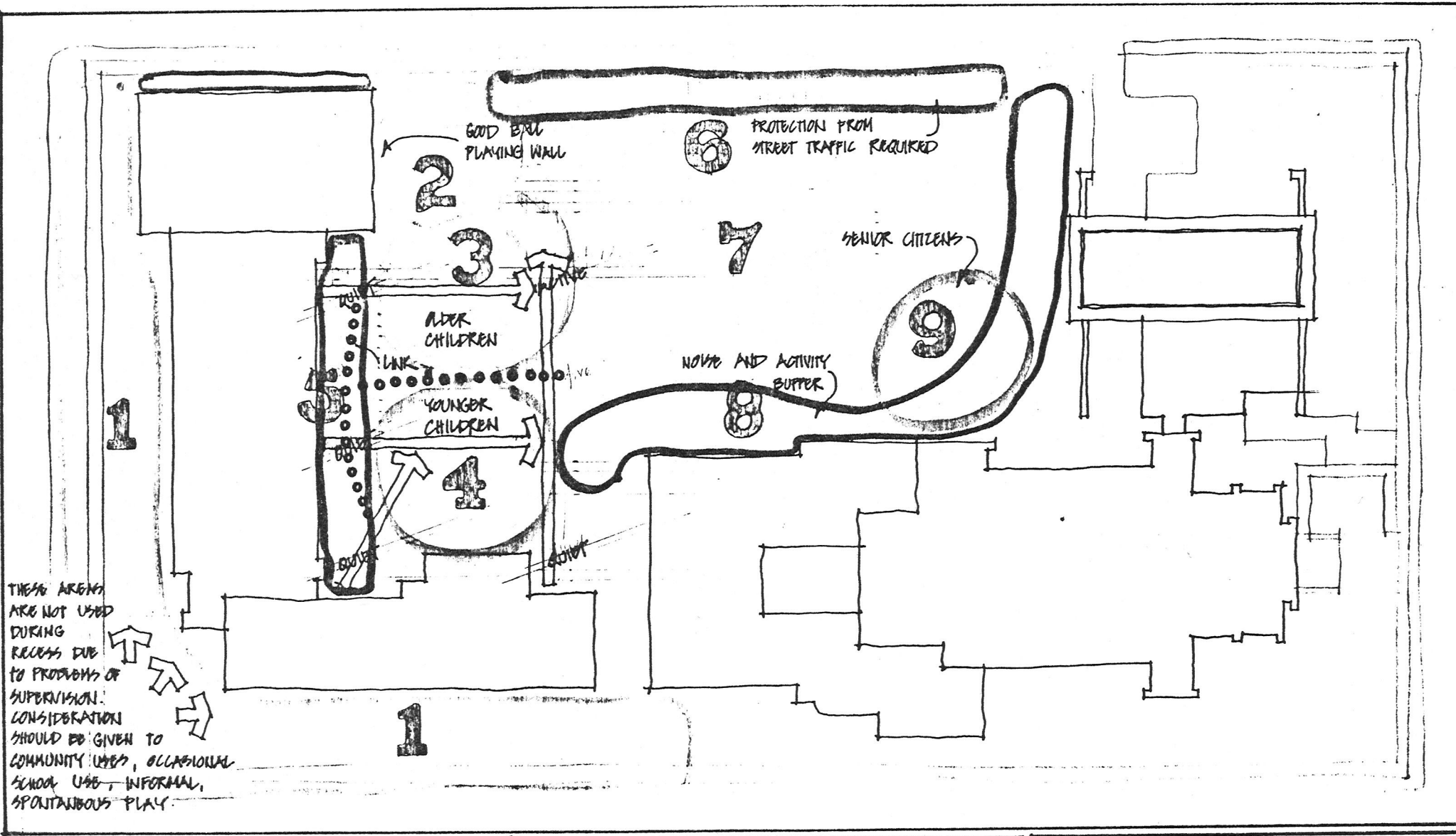
ST. IGNATIUS
SITE ANALYSIS

SITE
CONDITIONS



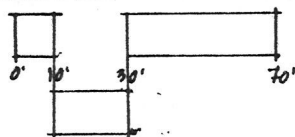
BUILDING ENTRANCE
8' HIGH FROST FENCE
2' HIGH WROUGHT IRON FENCE
CIRCULATION (UNDERPINNING)
UNDERGROUND SERVICES

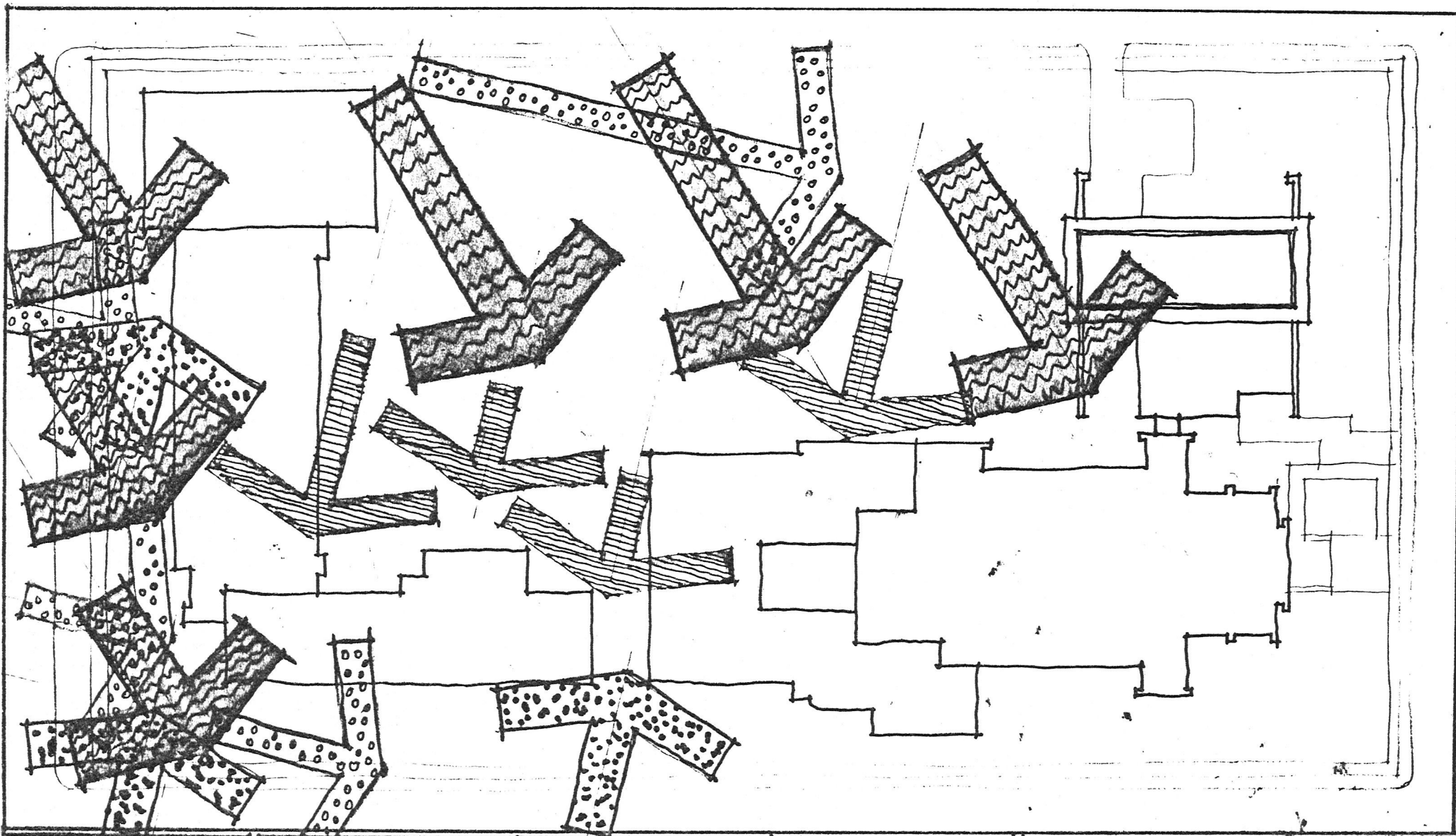




ST. IGNATIUS
SITE ANALYSIS

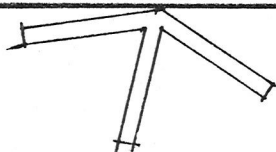
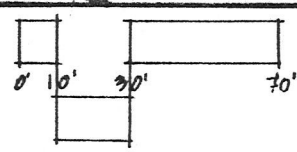
SITE
ZONING



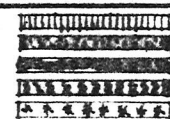


ST. IGNATIUS
SITE ANALYSIS

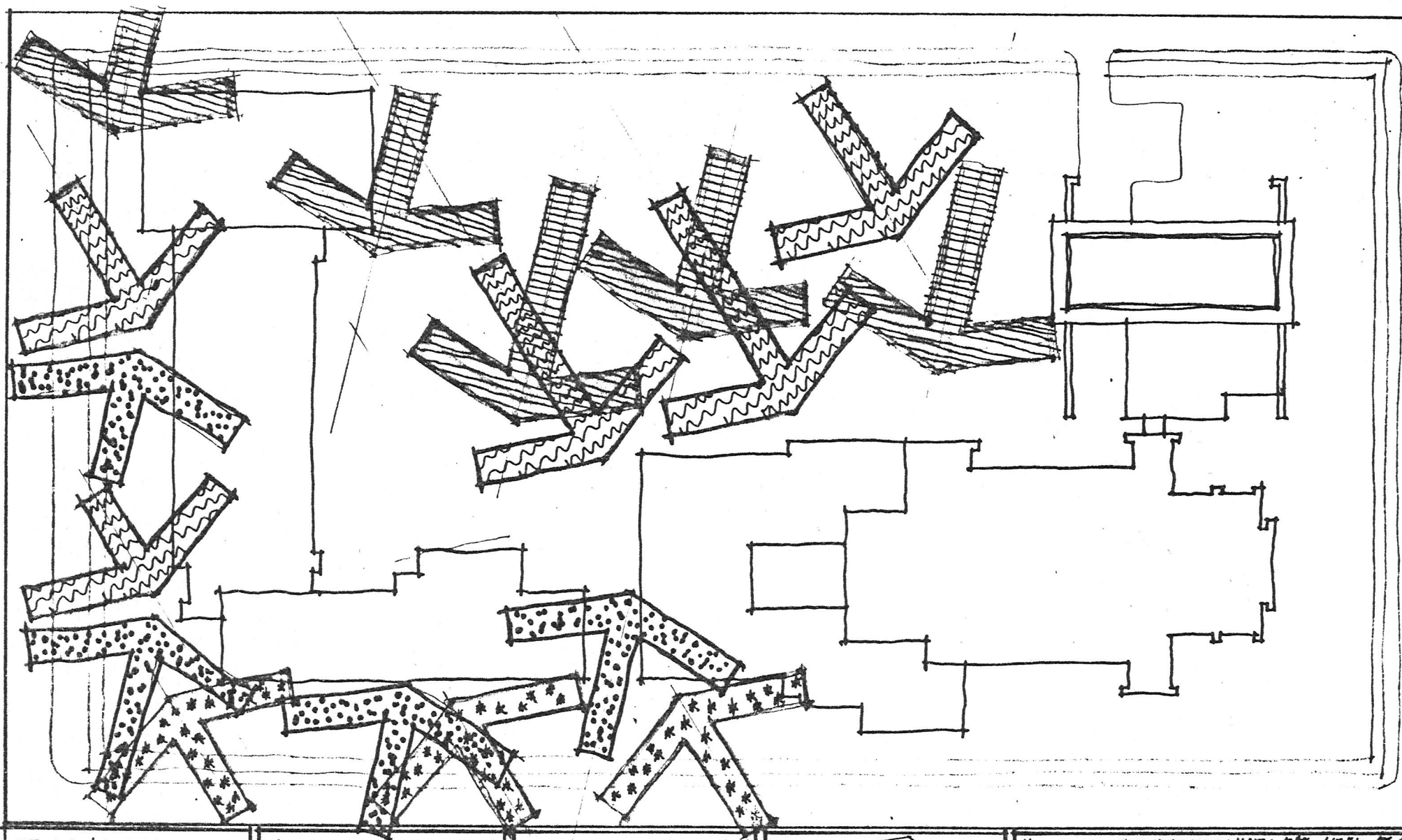
WINDS
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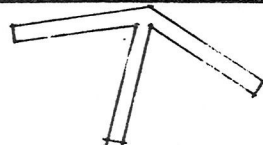
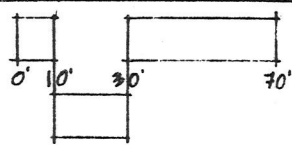


NOTE: THE SIZES OF THE
ARROW HEADS INDICATE
RELATIVE FREQUENCIES.

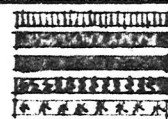


ST. IGNATIUS
SITE ANALYSIS

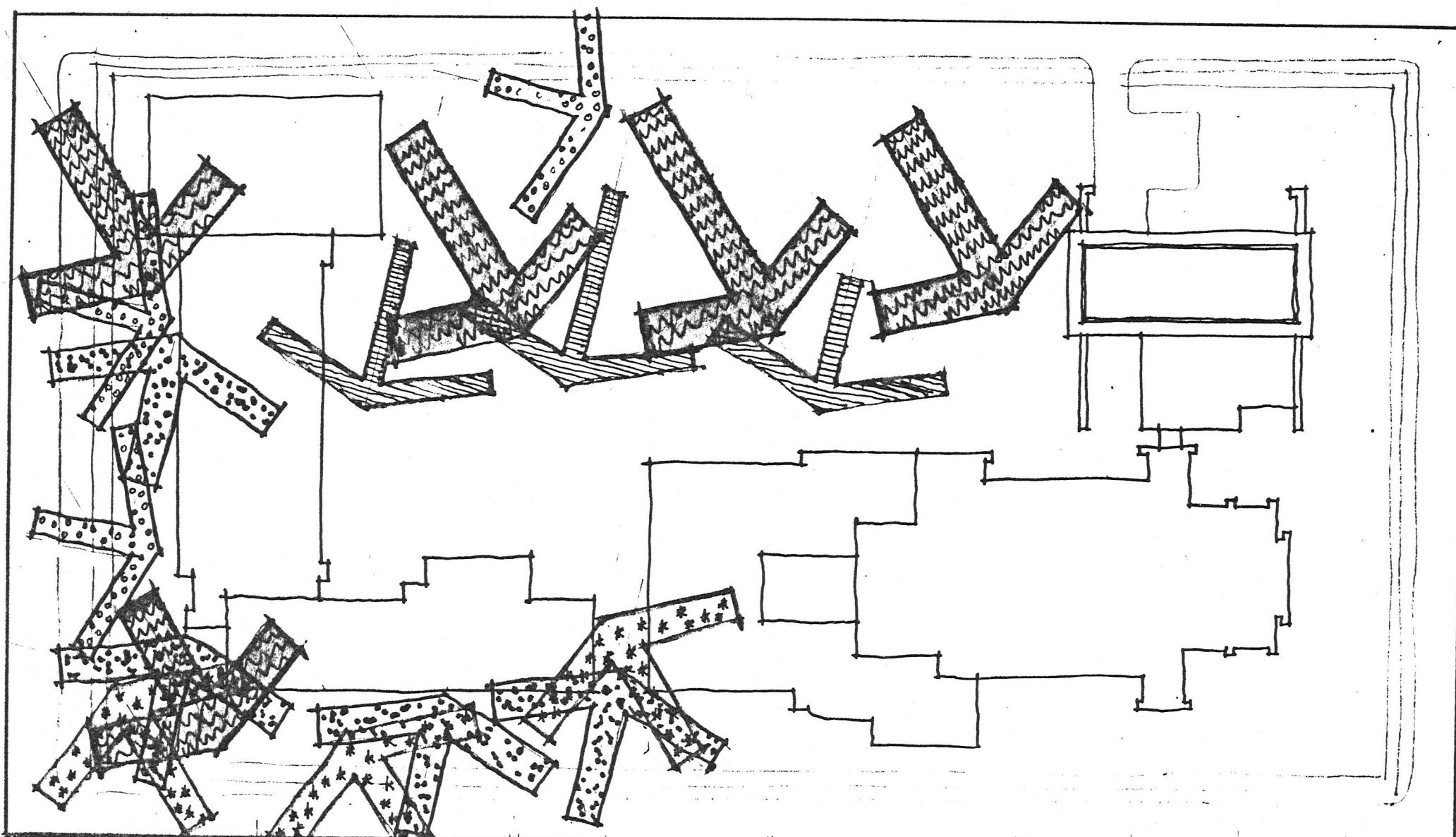
WINDS
MAR., APR., MAY



N
S
W
NN
SE

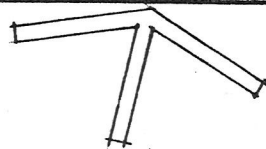
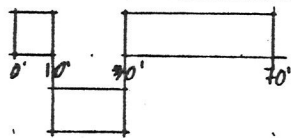


NOTE: THE SIZES OF THE
ARROW HEADS INDICATE
RELATIVE FREQUENCIES.

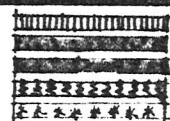


ST. IGNATIUS
SITE ANALYSIS

WINDS
JUNE, JULY, AUG.



N
NW
SE

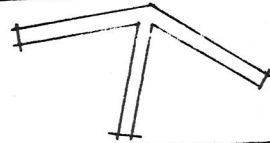
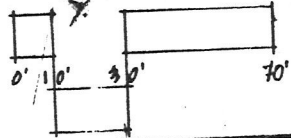


NOTE: THE SIZES OF THE
ARROW HEADS INDICATE
RELATIVE FREQUENCIES

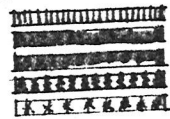


ST. IGNATIUS
SITE ANALYSIS

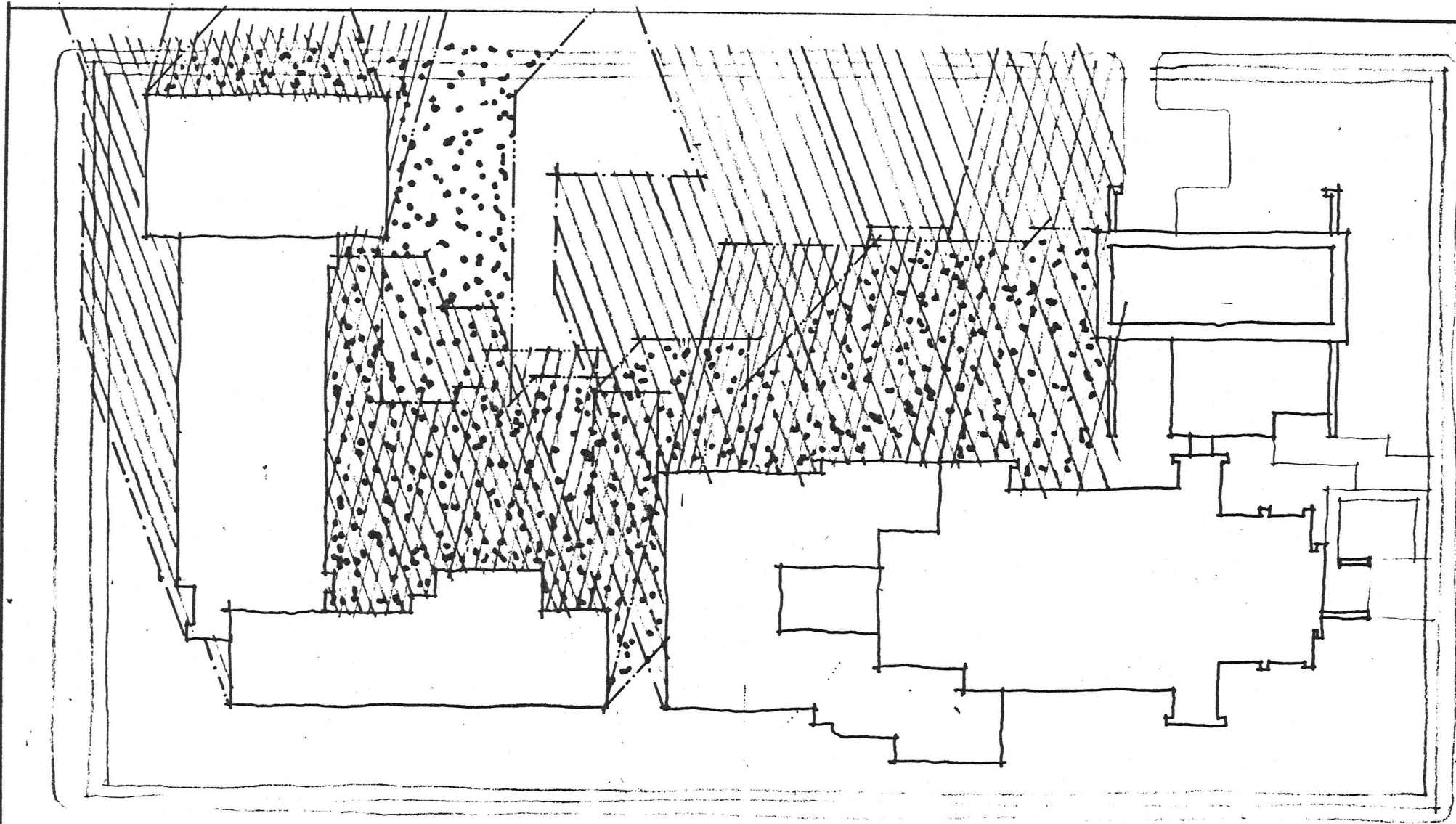
WINDS
SEPT, OCT, NOV.



N
NW
SE

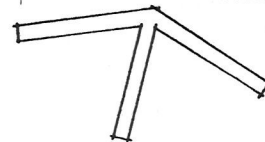
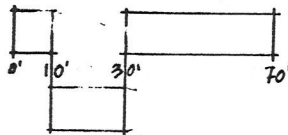


NOTE: THE SIZES OF THE
ARROW HEADS INDICATE
RELATIVE FREQUENCIES

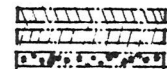


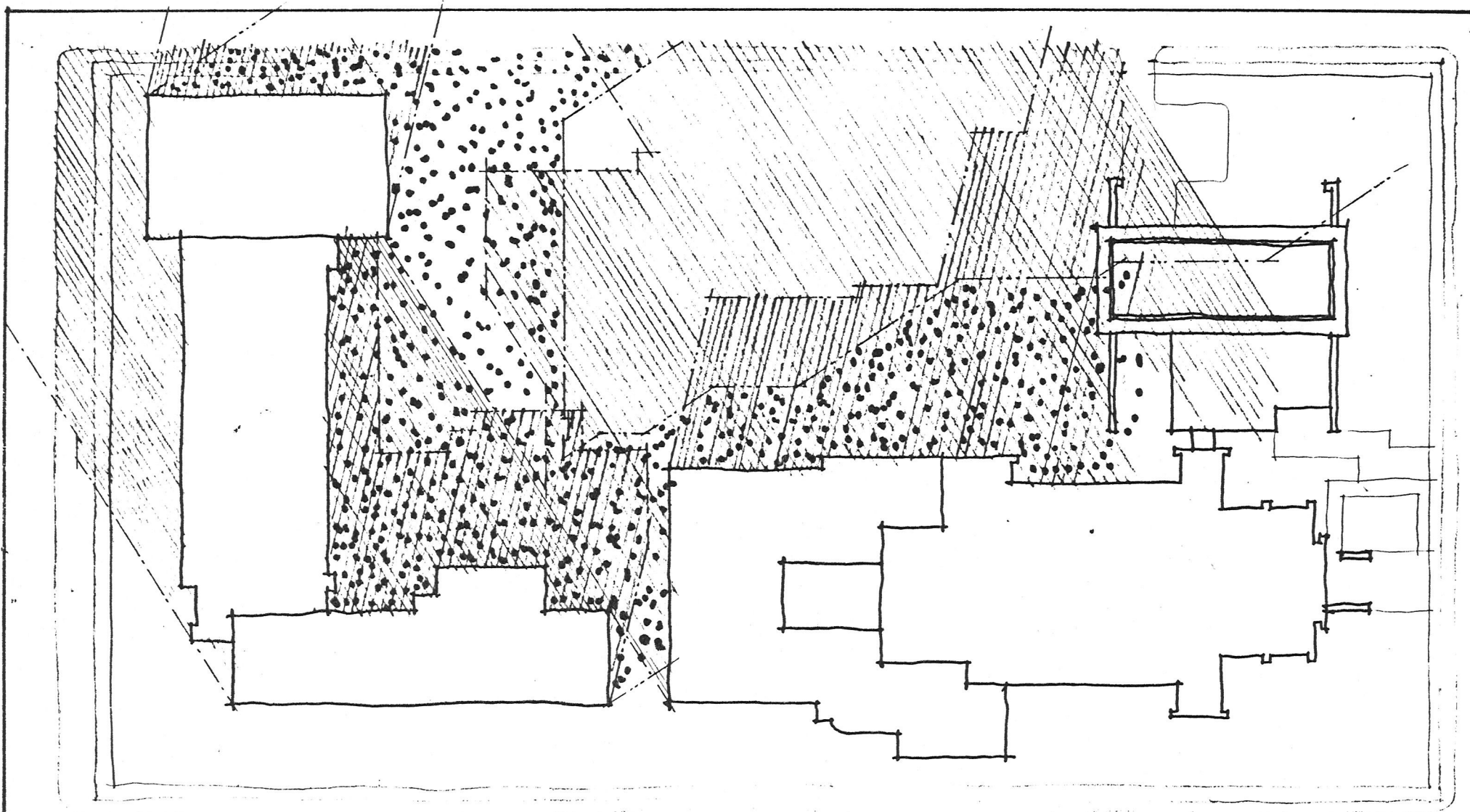
ST. IGNATIUS
SITE ANALYSIS

AREAS OF SHADE
DECEMBER



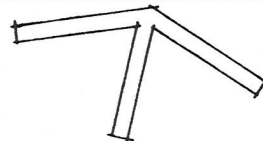
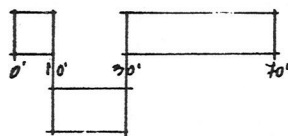
10 A.M.
12 NOON
2 P.M.



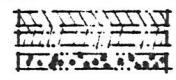


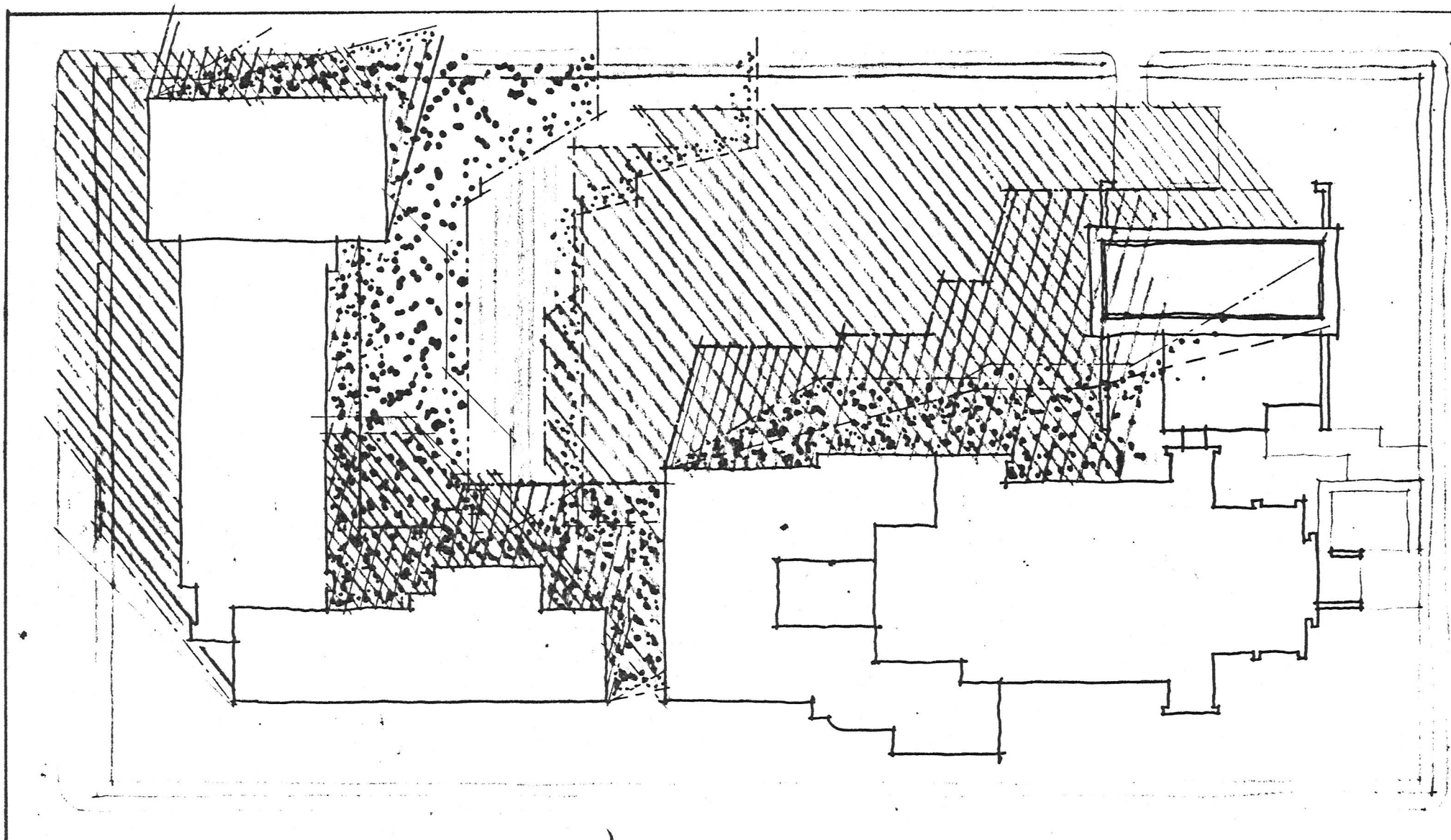
ST. IGNATIUS
SITE ANALYSIS

AREAS OF SHADE
JAN./NOV.



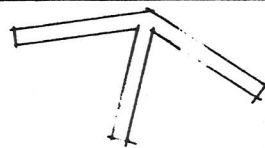
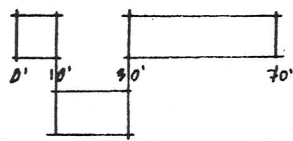
9 A.M.
12 NOON
3 P.M.



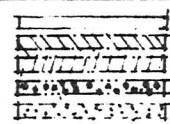


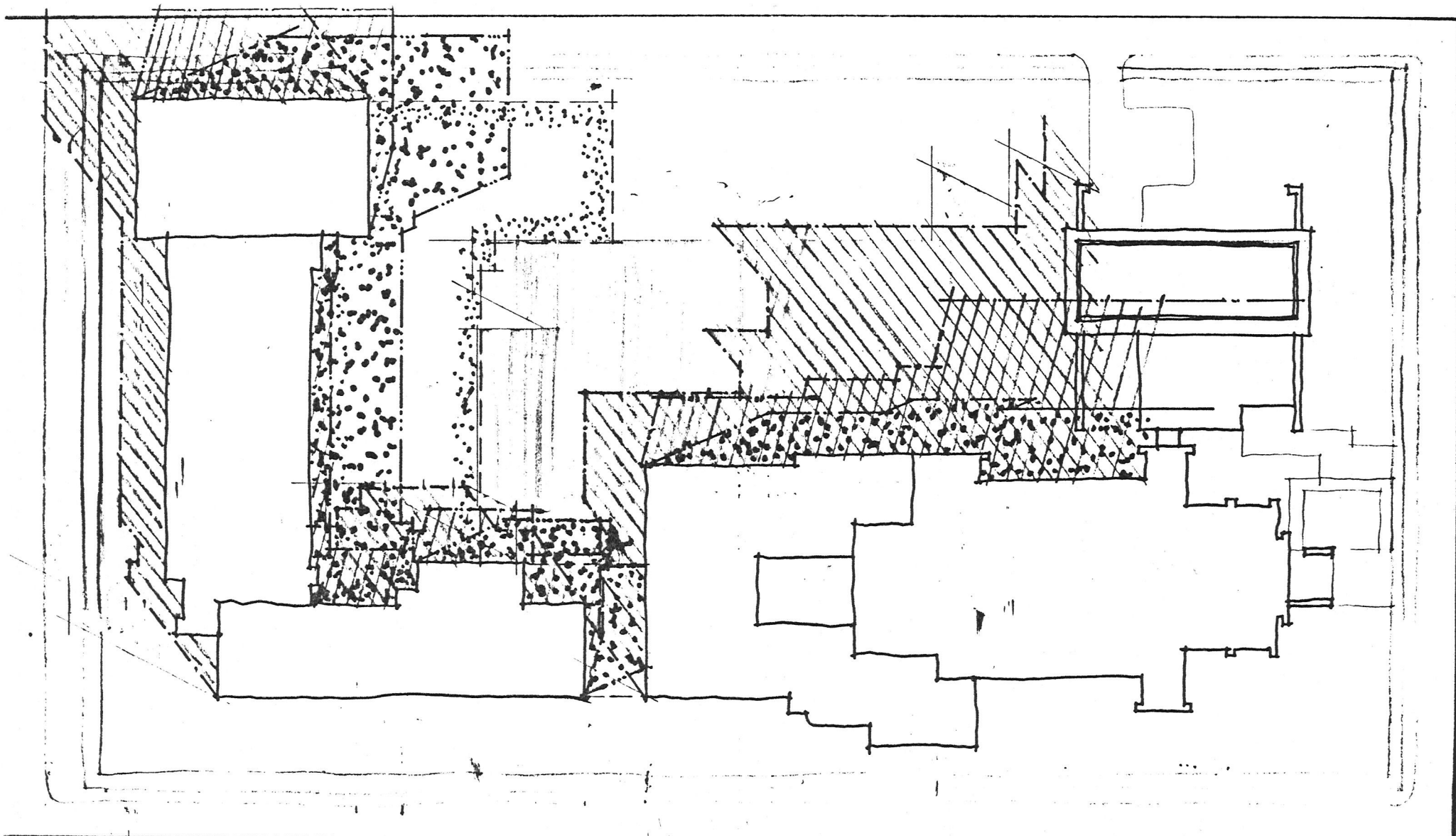
ST. IGNATIUS
SITE ANALYSIS

AREAS OF SHADE
FEB. / OCT.



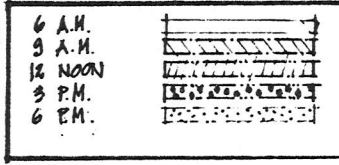
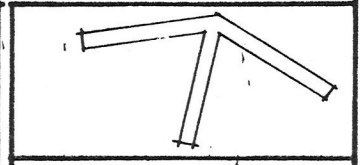
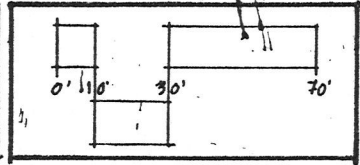
8 A.M.
9 A.M.
12 NOON
3 P.M.
4 P.M.

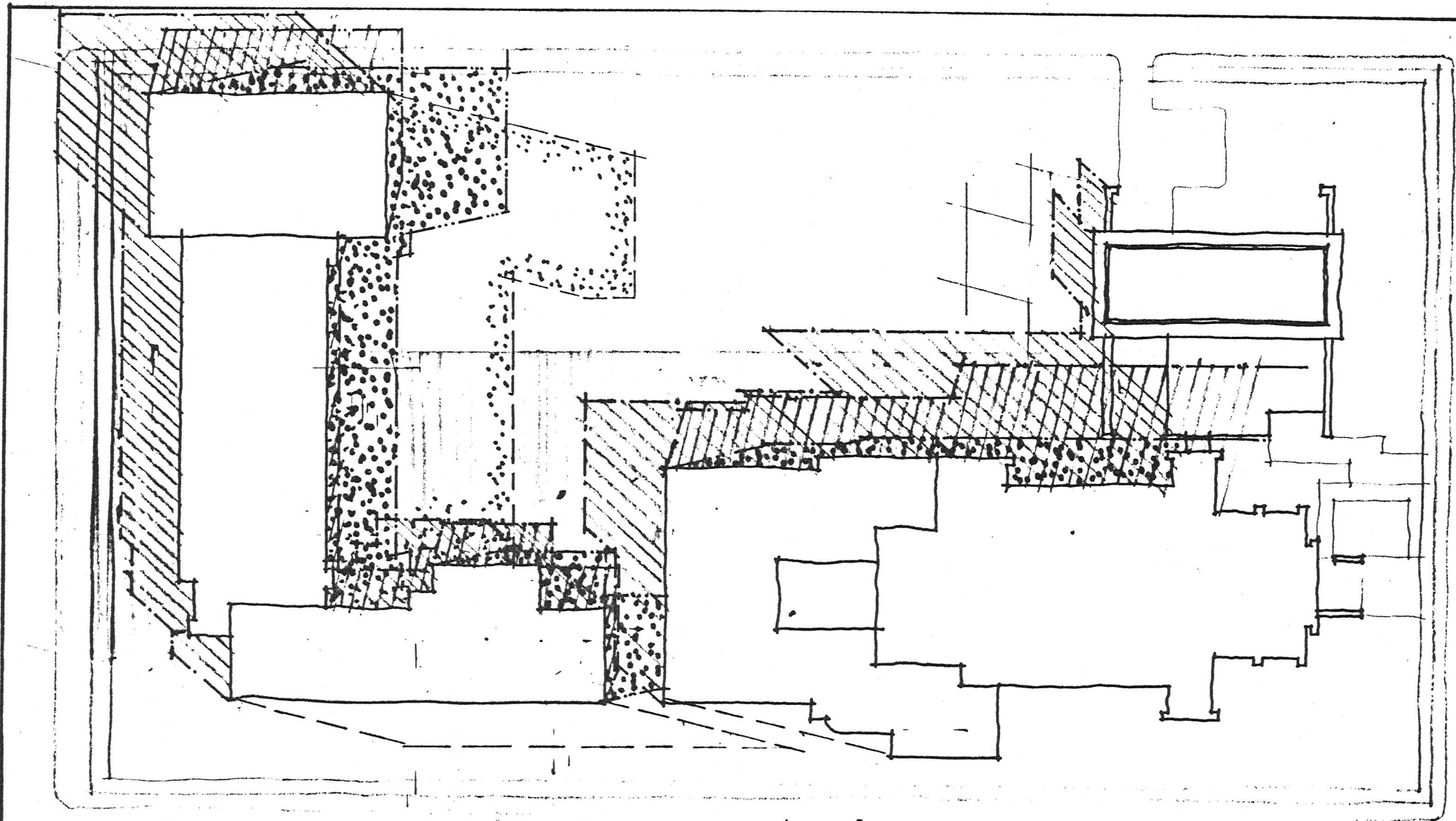




ST. IGNATIUS
SITE ANALYSIS

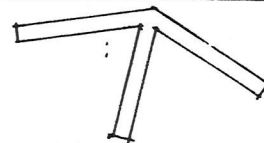
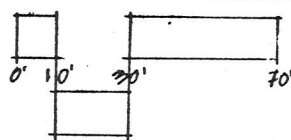
AREAS OF SHADE
MARCH/SEPT.



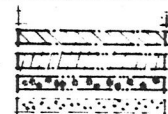


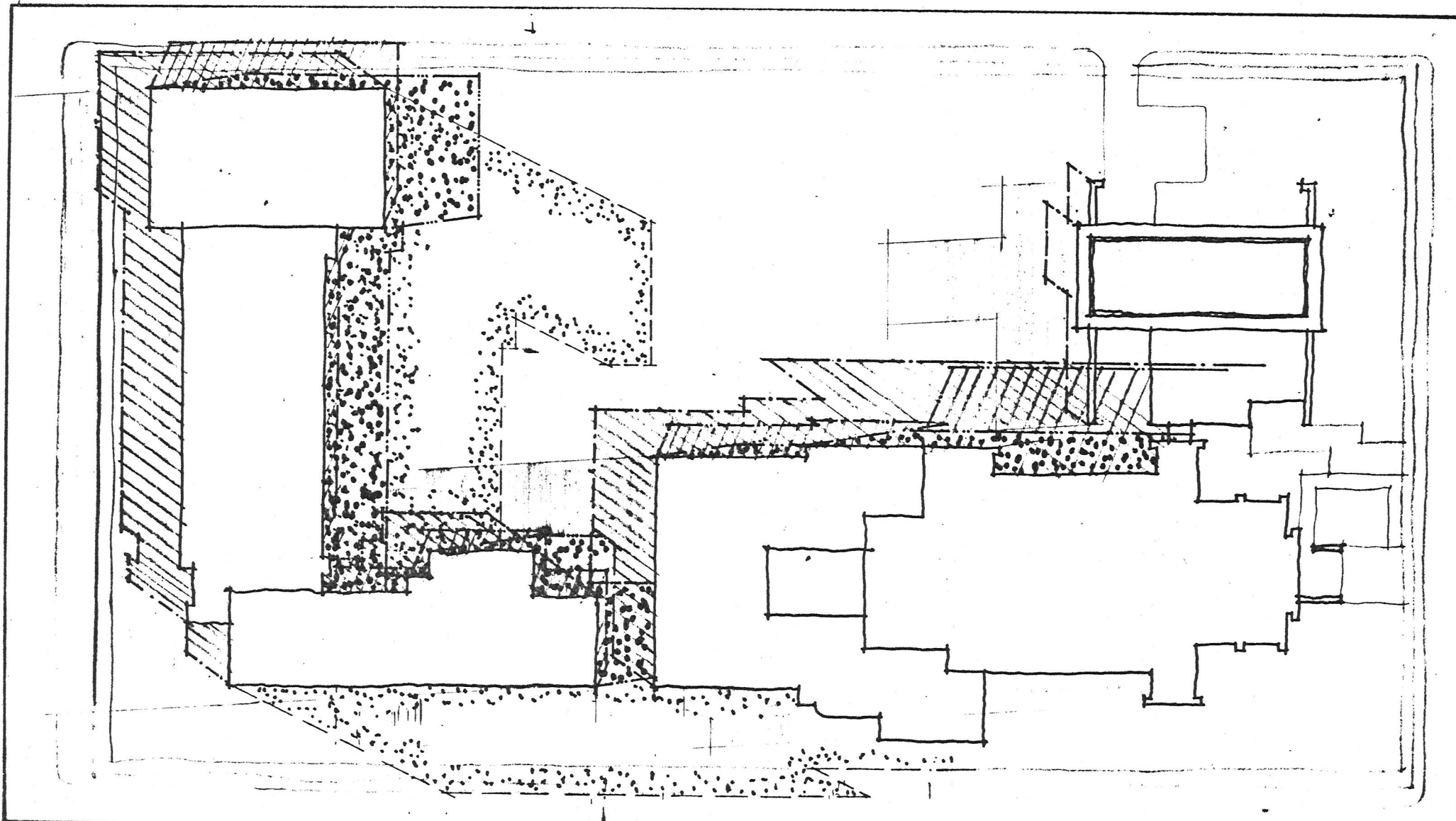
ST. IGNATIUS
SITE ANALYSIS

AREAS OF SHADE
APRIL/AUGUST



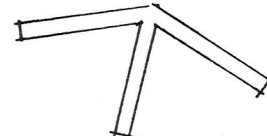
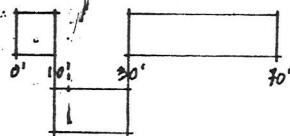
7 A.M.
9 A.M.
12 NOON
3 P.M.
5 P.M.





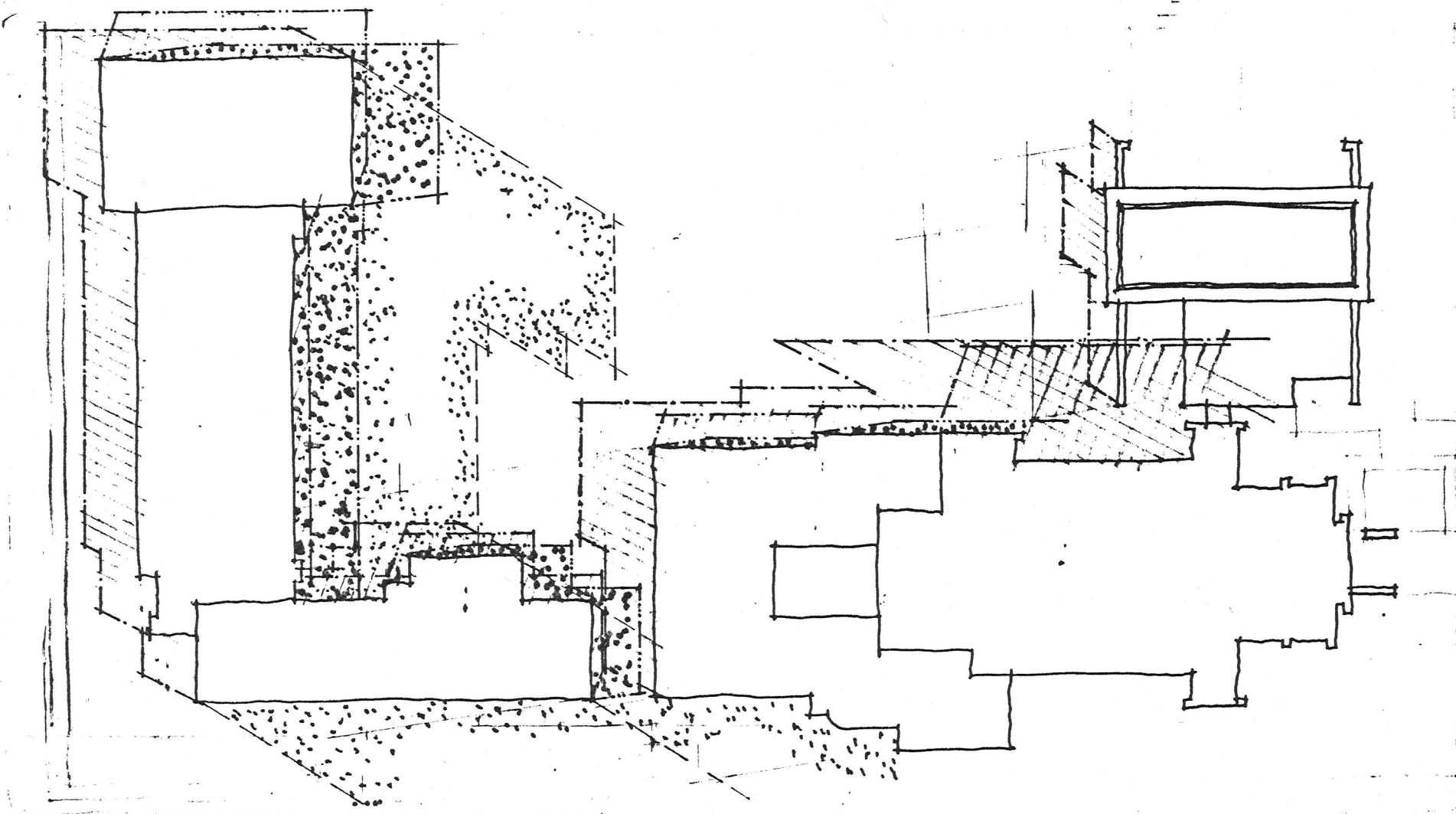
ST. IGNATIUS
SITE ANALYSIS

AREAS OF SHADE
MAY/JULY



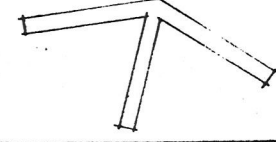
6 A.M.
9 A.M.
12 NOON
3 P.M.
6 P.M.



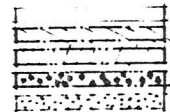


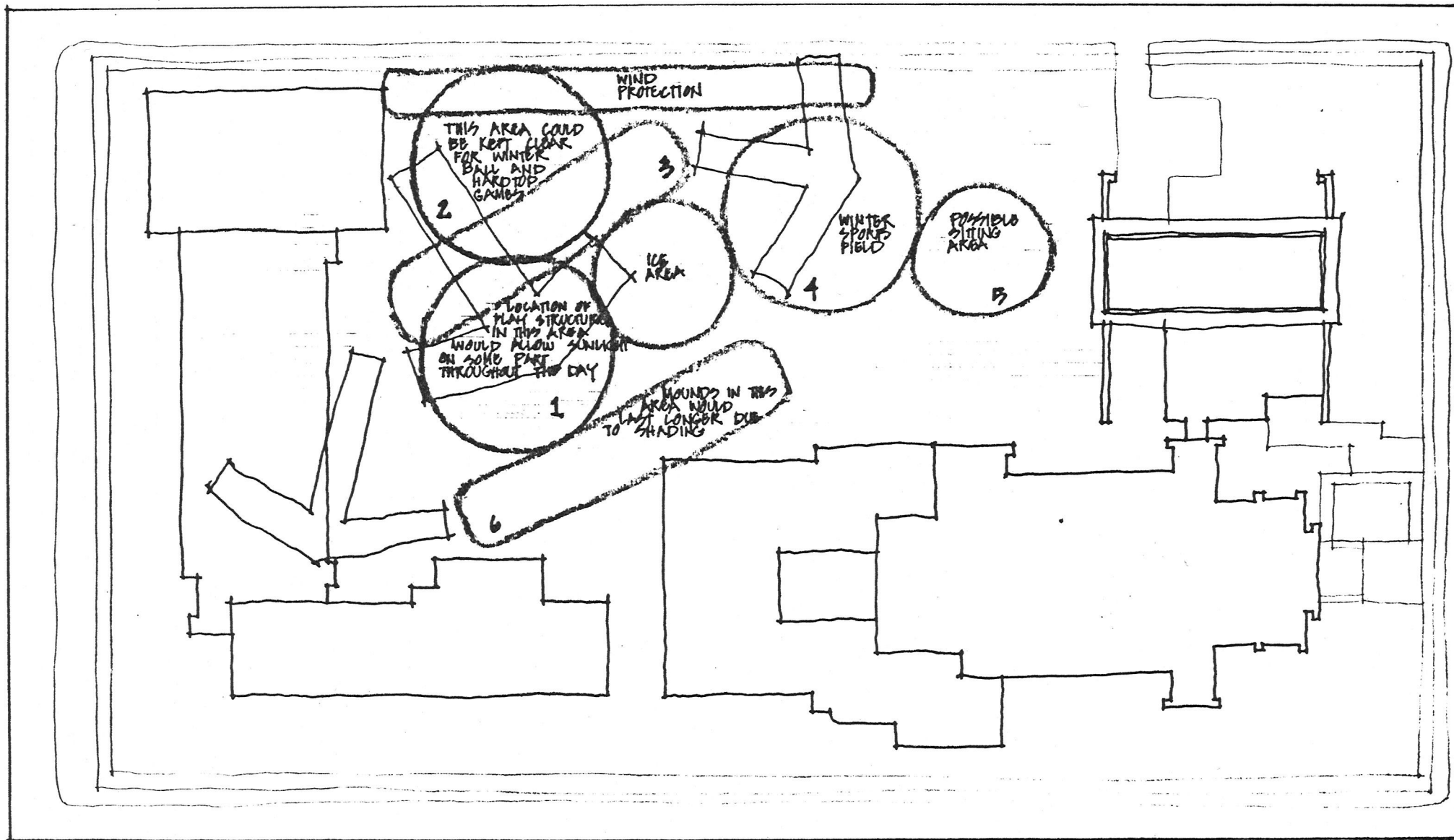
ST. IGNATIUS
SITE ANALYSIS

AREAS OF SHADE
JUNE



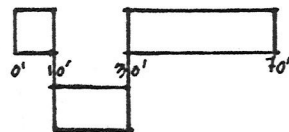
6 A.M.
9 A.M.
12 NOON
3 P.M.
6 P.M.

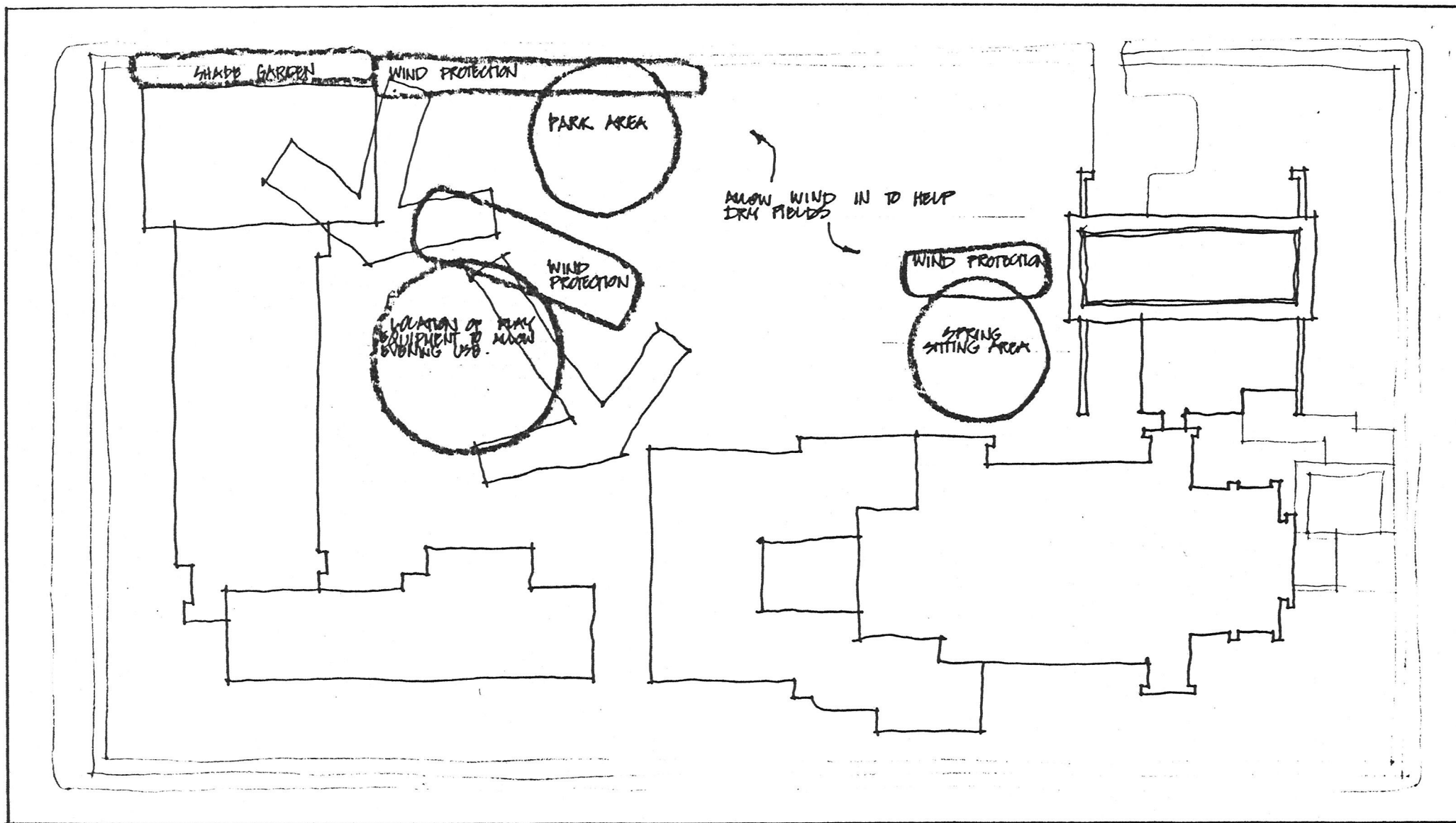




ST. IGNATIUS
SITE ANALYSIS

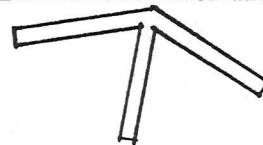
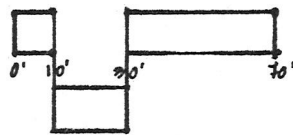
WINTER
CONDITIONS

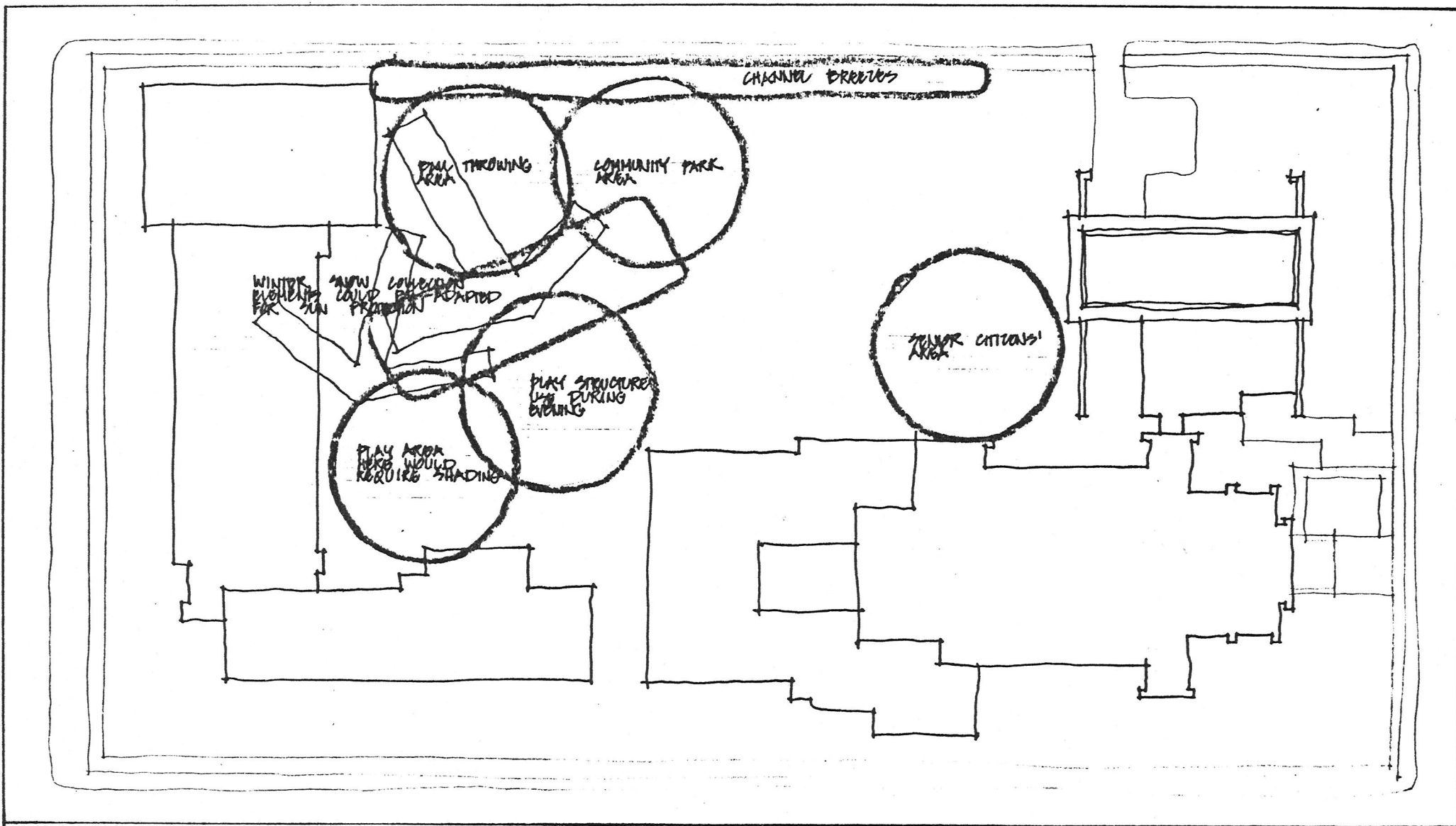




ST. IGNATIUS
SITE ANALYSIS

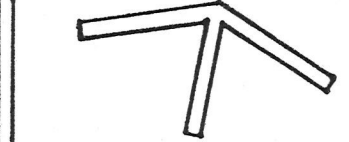
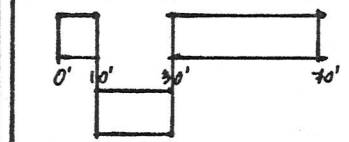
SPRING
CONDITIONS

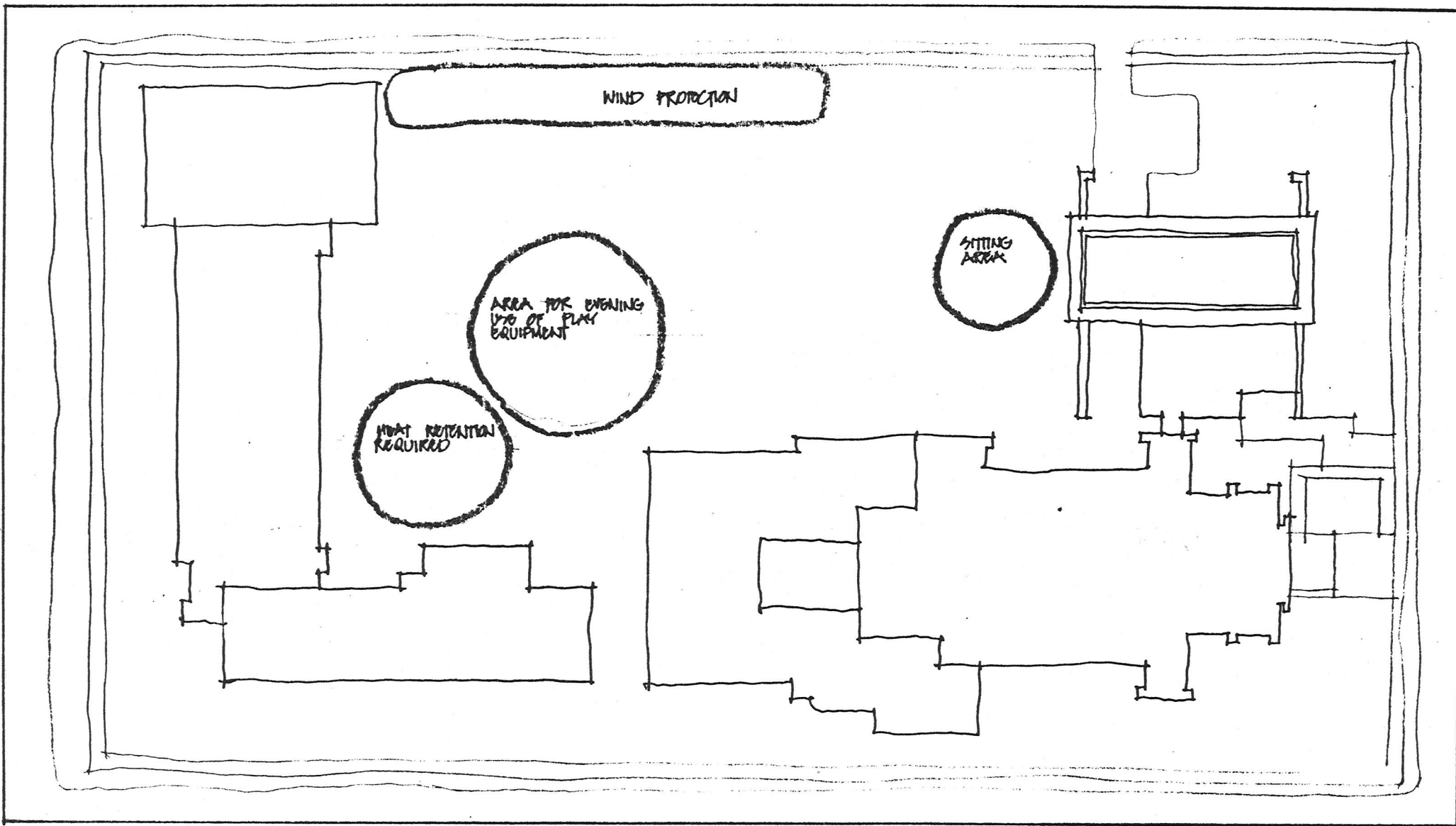




ST. IGNATIUS
SITE ANALYSIS

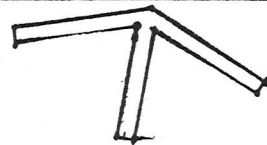
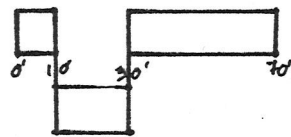
SUMMER
CONDITIONS

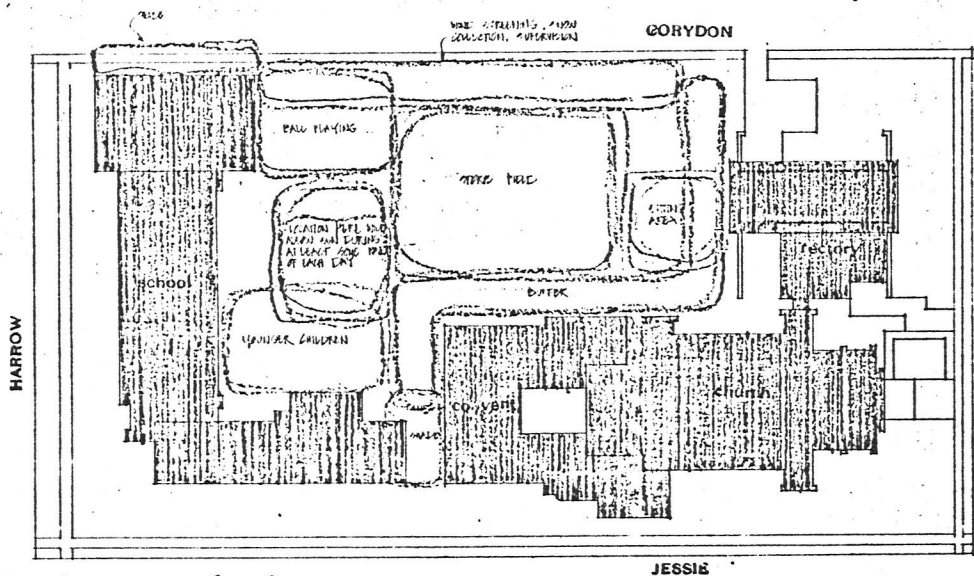




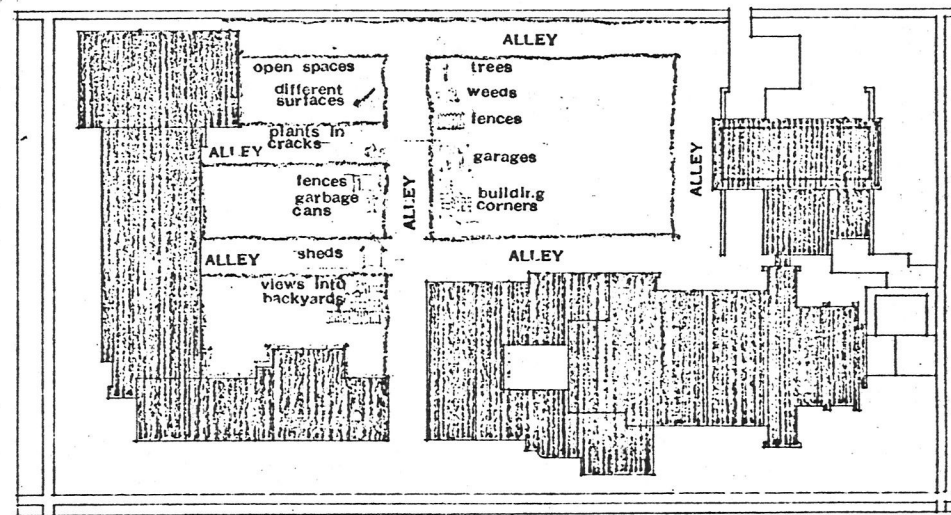
ST. IGNATIUS
SITE ANALYSIS

AUTUMN
CONDITIONS





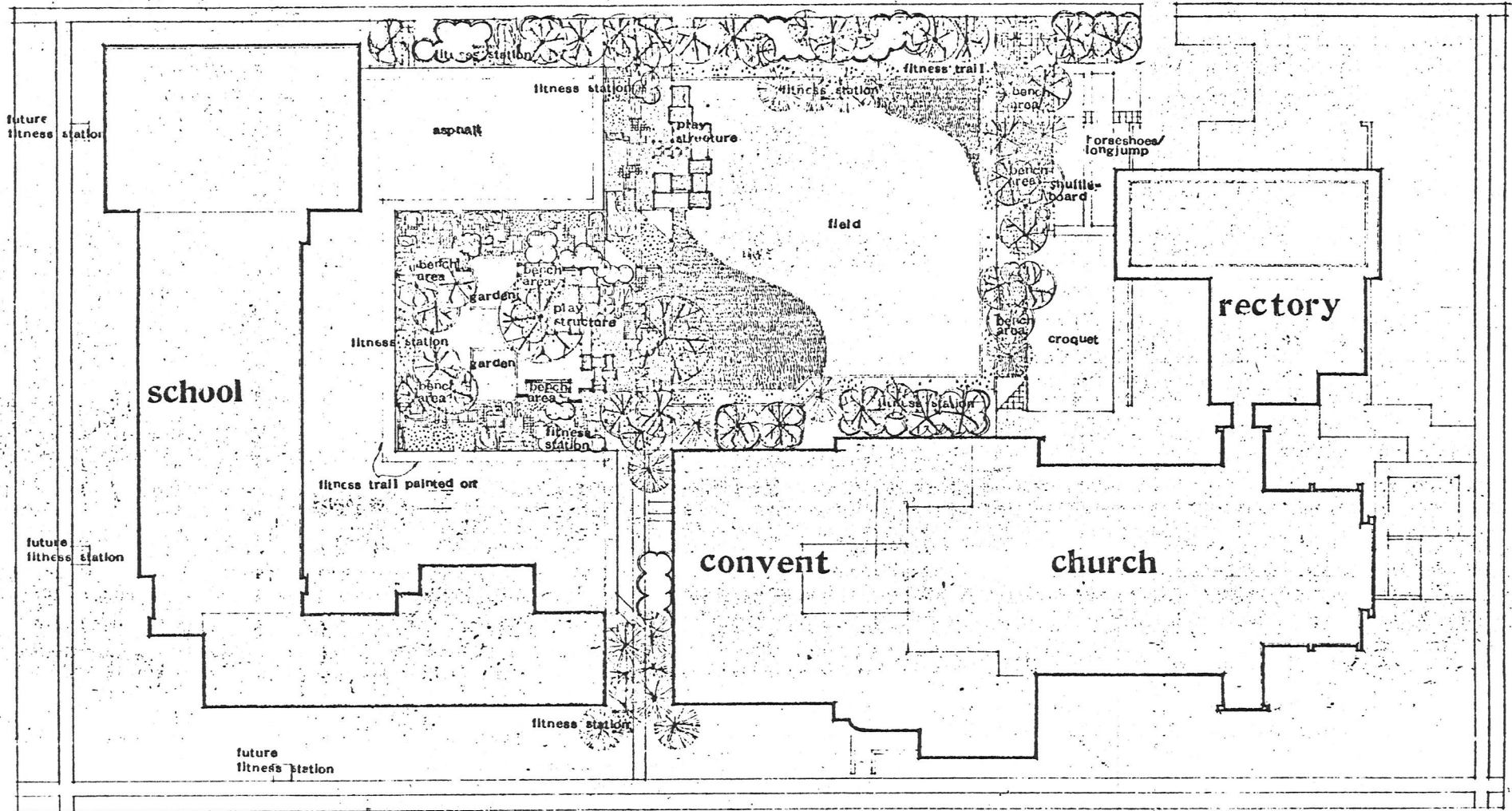
site analysis



concept

ST. IGNATIUS
SCHOOLYARD
site analysis
and concept

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Borowiecka
Department of
Landscape
Architecture
University of
Manitoba dec. 1980



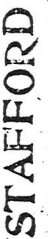
**ST. IGNATIUS
SCHOOLYARD
site plan
summer**

0 5' 10' 20' 40'
Alexandra
Borowicka
Department of
Landscape
Architecture
University of
Manitoba dec. 1980

legend

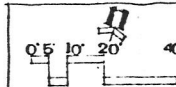
- ground
- grass
- pea gravel
- planting
- wood chips

HARROW



JESSIE

**ST. IGNATIUS
SCHOOLYARD**
site plan
winter



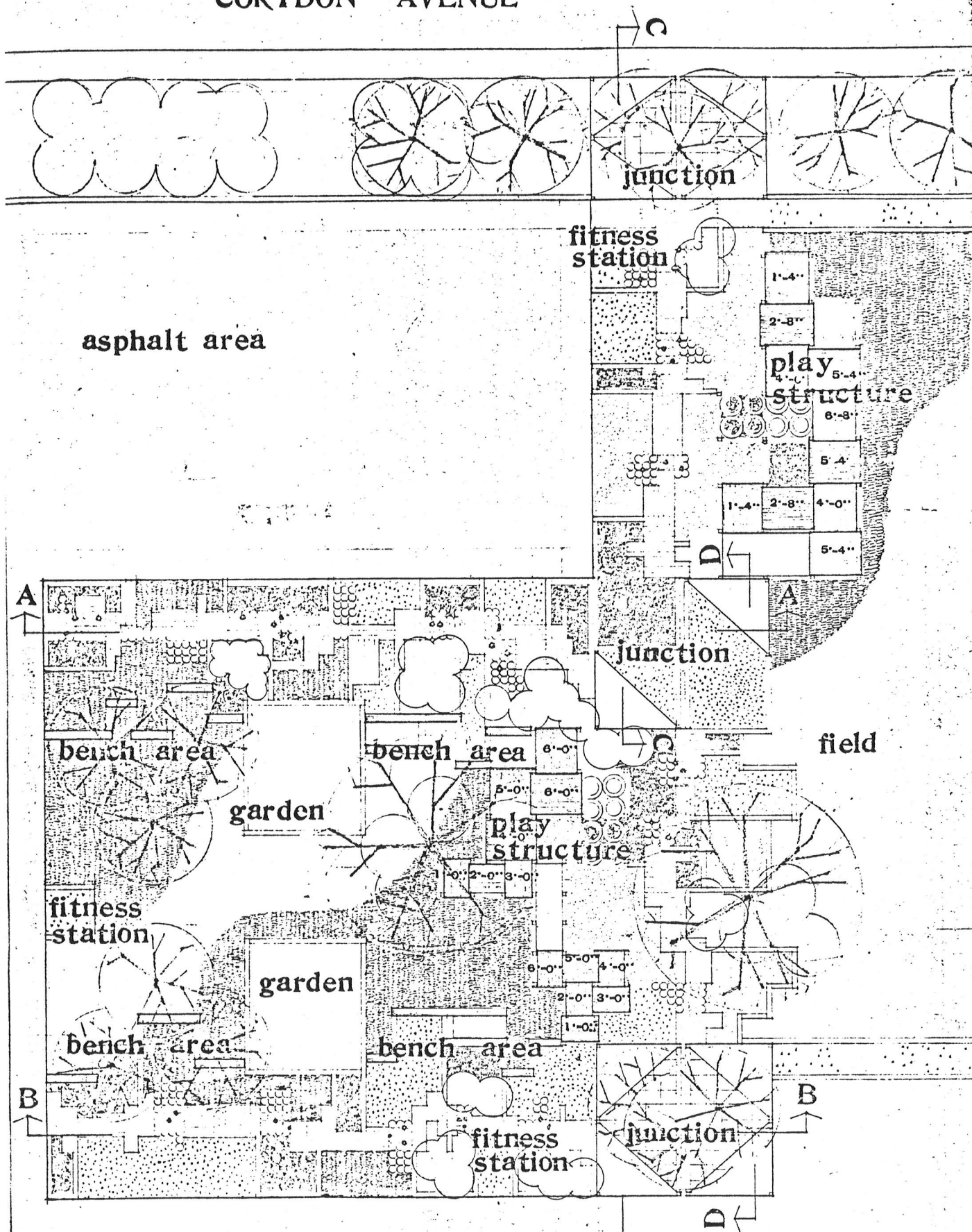
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Department of
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Architecture
University of
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THIS FINDING SHOWS LARGER SNOW ACCUMULATIONS
EXIST WITH AND UNDER* AROUND SOME RIVER BENCHMARKS
AND VEGETATION.

legend

snow mounds
 ice
 plants





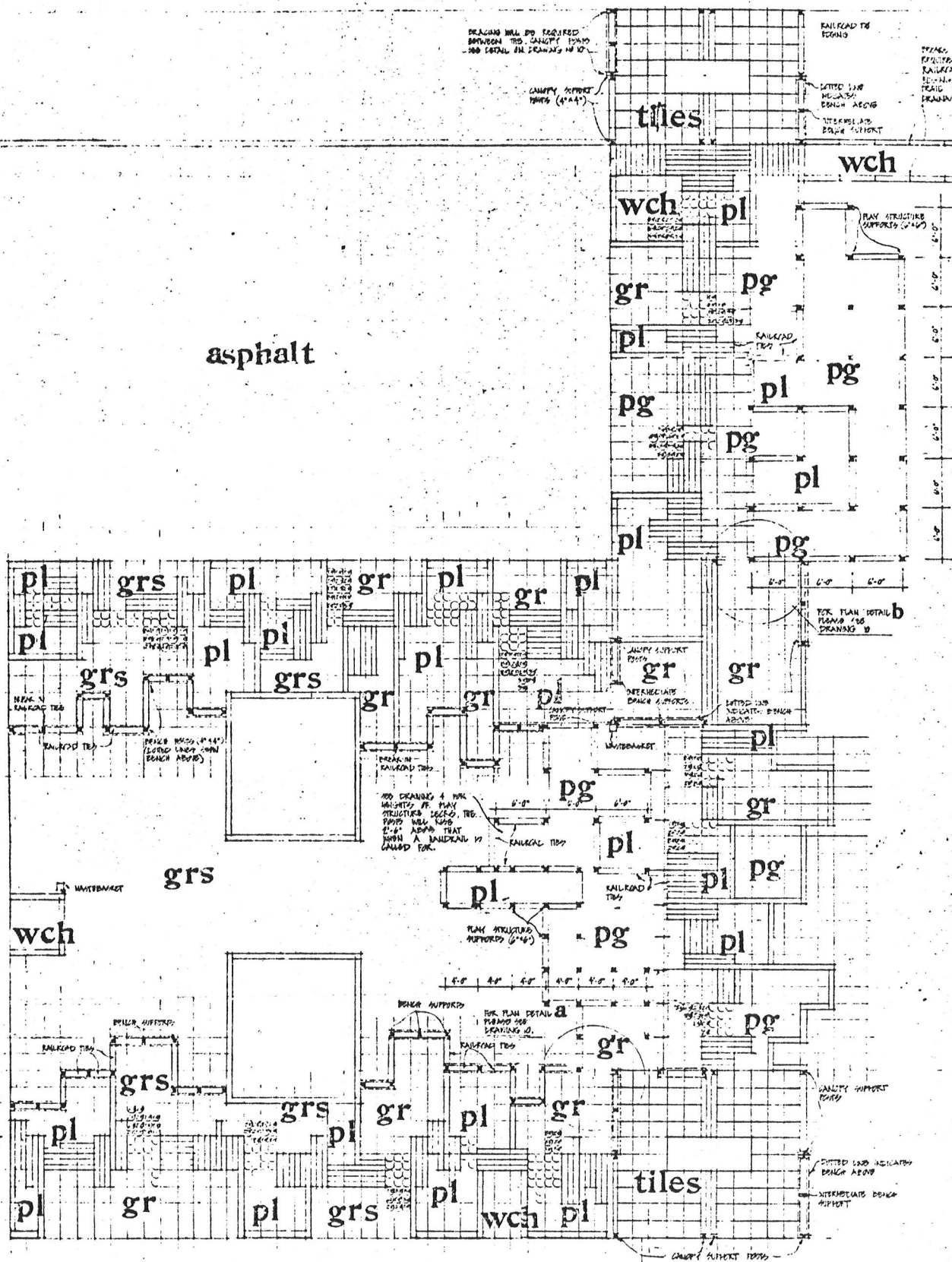
**ST. IGNATIUS
SCHOOLYARD
plan of play
area**

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Borowicka
Department of
Landscape
Architecture
University of
Manitoba
dec. 1960

notes
PLANTING: TREES, TO 2000 HEIGHT SPECIFIED
IN DRAWINGS AND II

legend

- ground
- grass
- pea gravel
- planting
- wood chips



**ST. IGNATIUS
SCHOOLYARD
play area grid**

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notes

THE DRAINAGE BASIN CONDITIONS AT SEVERAL LEVEL - 50
IN ORDER TO PLAY ATTRIBUTES
THE RAILROAD TIES AND HYDRO PILES ARE LAID OUT
IN A 2' X 2' GRID TO ACCOMMODATE VARIATIONS IN
LEVELS.
THE HYDRO PILES ALIGNED WITH DIMENSIONS LONG TO THAT
HEIGHT ABOVE THE GROUNDLINE.
THE REMAINING HYDRO PILES AND RAILROAD TIES,
INCLUDING THOSE UNDER THE PLAY ATTRIBUTES, ARE
FLOWN WITH THE GROUND.

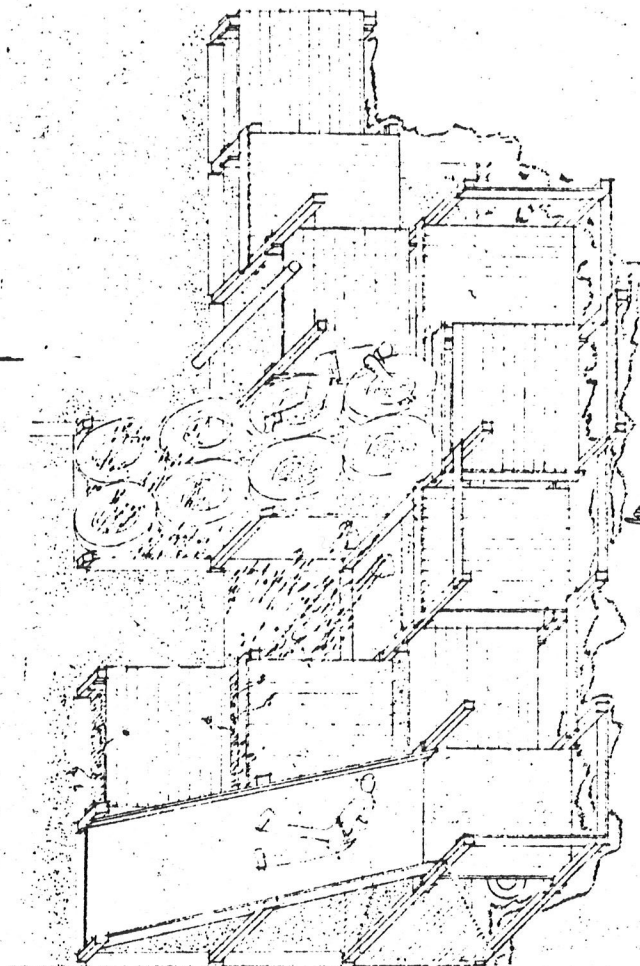
ALL MAIN STRUCTURE MAJOR TOWNS ARE 2-4-6
CANYON TOWNS AND BENCH TOWNS ARE 1-1-1

legend

ground gr planting pl
grass grs wood chips wch
pea pg
gravel

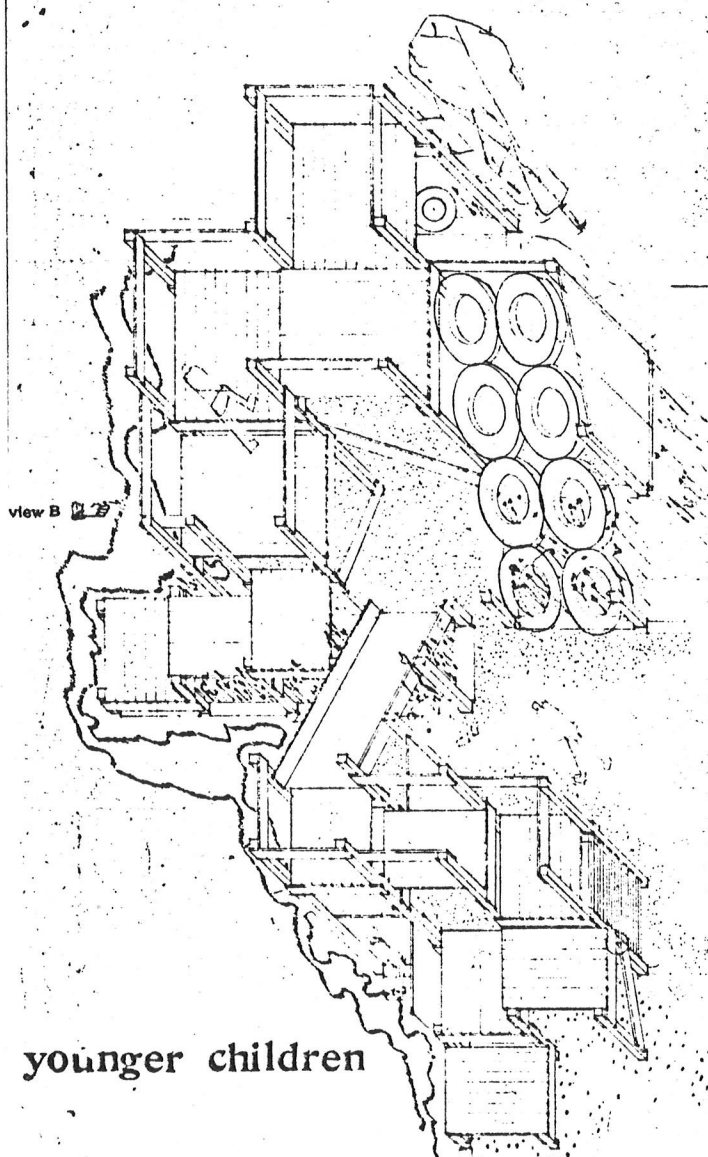


view A



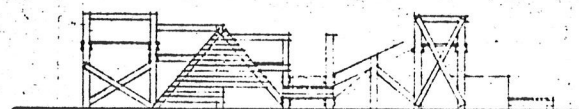
view A

older children



view B

younger children



view B

ST. IGNATIUS
SCHOOLYARD
play structure
summer

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younger children

older children

ST. IGNATIUS
SCHOOLYARD
play structure
winter

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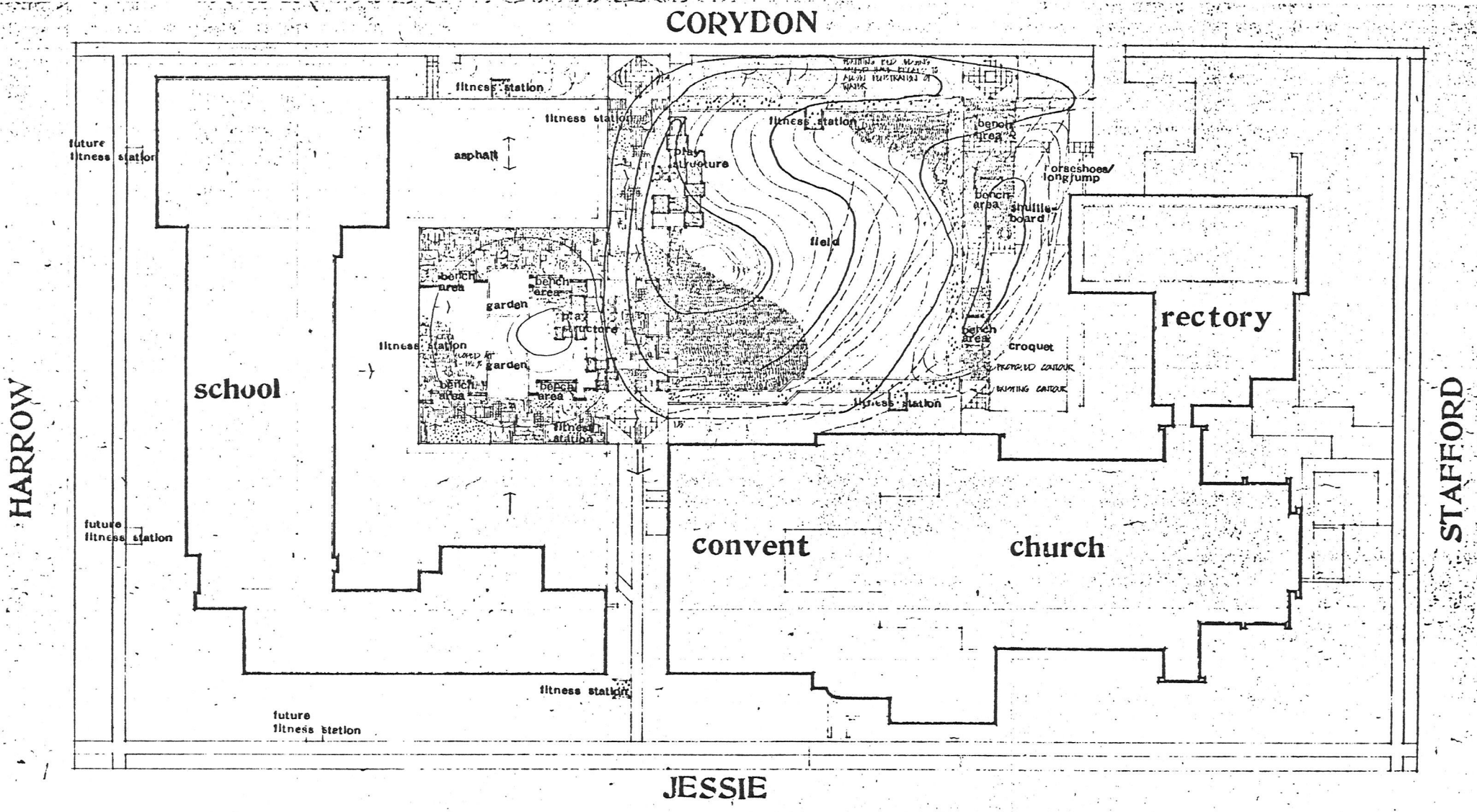


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legend

ground	
grass	
pea gravel	
planting	
wood chips	

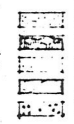
- ground
- grass
- pea gravel
- planting
- wood chips



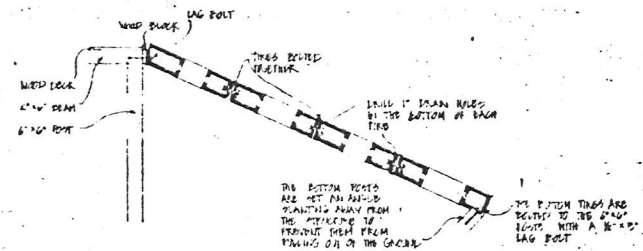
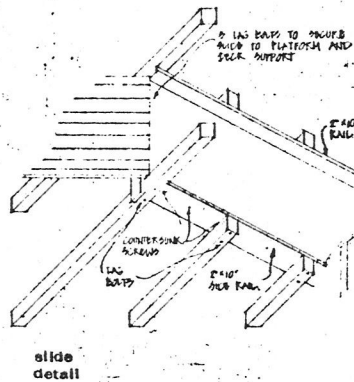
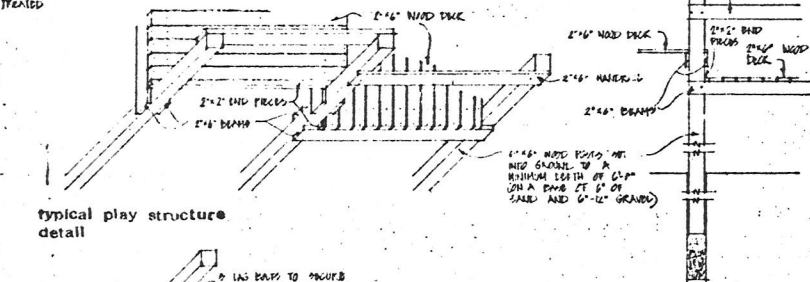
**ST: IGNATIUS
SCHOOLYARD
site plan
grading**

0 5' 10' 20' 40'
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Architecture
University of
Manitoba dec. 1980

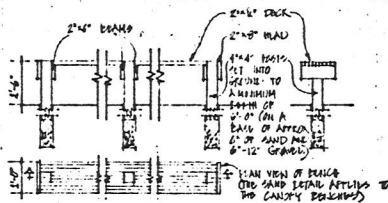
legend
ground
grass
pea gravel
planting
wood chips



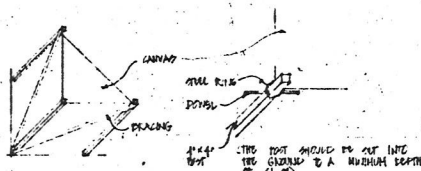
typical play structure
detail



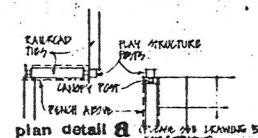
tire ramp detail



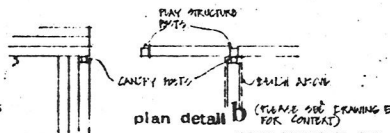
bench
detail



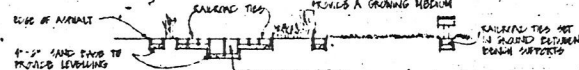
canopy
detail



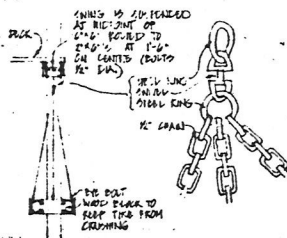
plan detail A



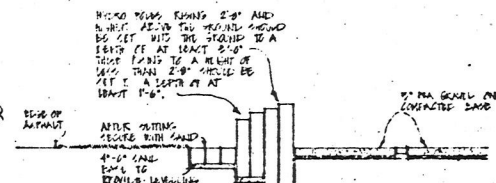
also detail



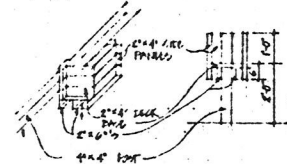
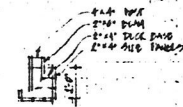
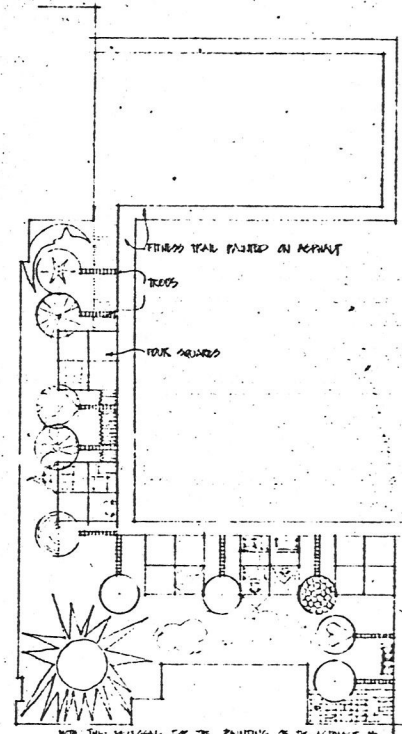
typical section 1 (PLEASE SEE DRAWING FOR CONTENT)



fire swing detail



typical section 2 DRAWING

wastebasket
detail

asphalt painting

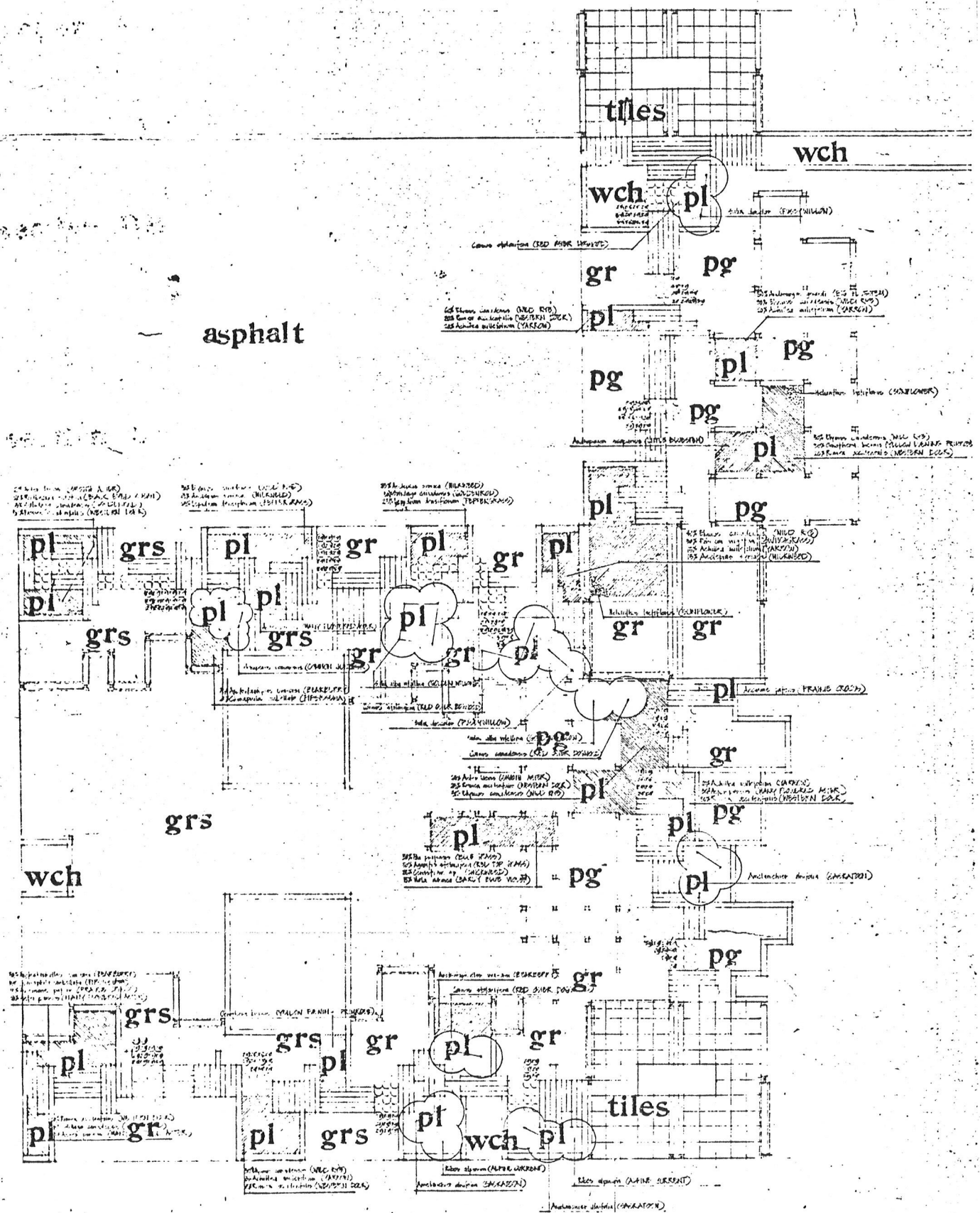
THE MEANS FOR THE PAINTING OF THE MURALS IS
A FORM THAT A PERSONAL, BUT ELASTIC, TO
DEMONSTRATE A MOTIVE OF PROVIDING A STRUCTURE
WITHIN WHICH TO COLLECT AND CONTRIBUTE THEIR
OWN IDEAS. INSPIRED BY THE CONCEPT OF DUST
AND OTHER COMMON OBJECTS, THE ARTISTS
CHOOSE THE "MATERIAL" THAT SERVES THEM BEST
TO EXPRESS THEIR IDEAS THROUGH THE FREE THINKING OF THE SINGLE
PERSON. THE WORKS OF THE TWO CIRCLES OF
ARTISTS ARE SEPARATELY CONTROLLED BY THE CIRCULAR
AND OTHER COMMUNITY MEMBERS.

(IN THE TRAINING - THERE IS AWARENESS OF
THE NECESSITY AND IMPLICATIONS OF WORDS
AND IDEAS. THE ARTISTS OF THE TWO
CIRCLES ARE INITIATED BY PROGRESSIVE

**ST. IGNATIUS
SCHOOLYARD**
details

Alexandra
Borowiecka
Department of
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Architecture
University of
Manitoba dec. 1980

CORYDON AVENUE

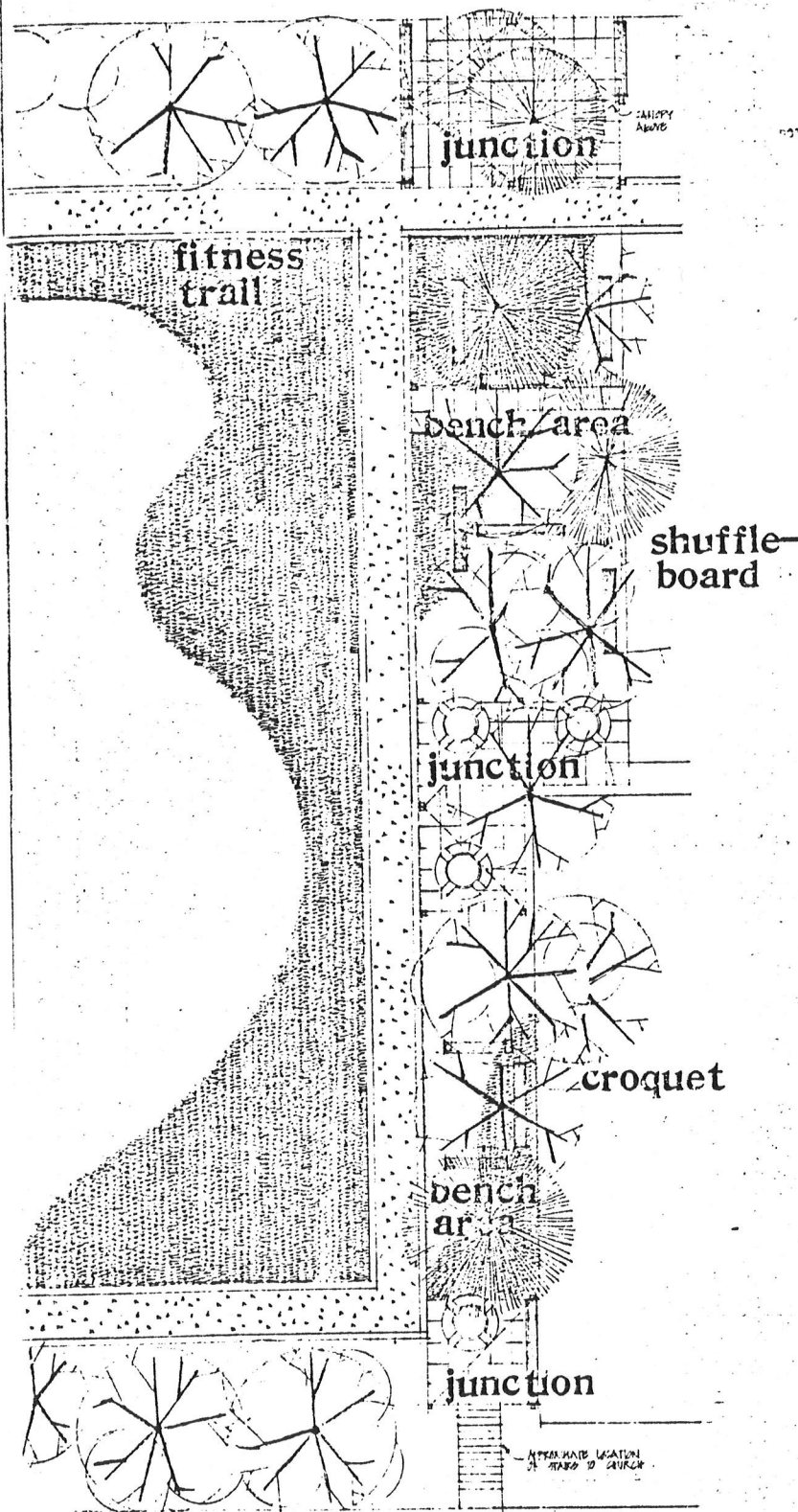


**ST. IGNATIUS
SCHOOLYARD**
play area grid
planting (alley)

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Department of
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Architecture
University of
Manitoba dec. 1980



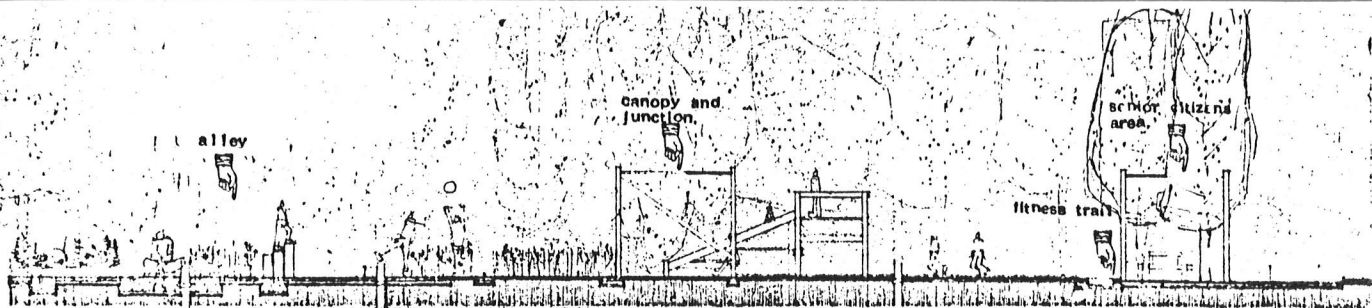
legend	
ground	gr
grass	grs
pea gravel	pg
plantings	pl
wood chips	wch



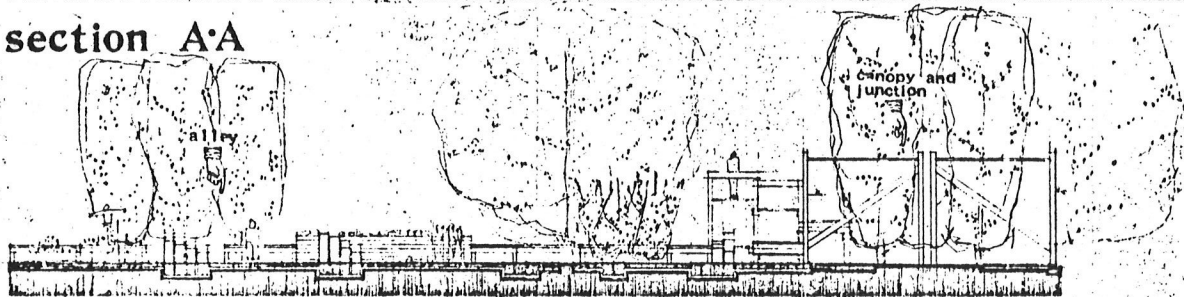
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SCHOOLYARD
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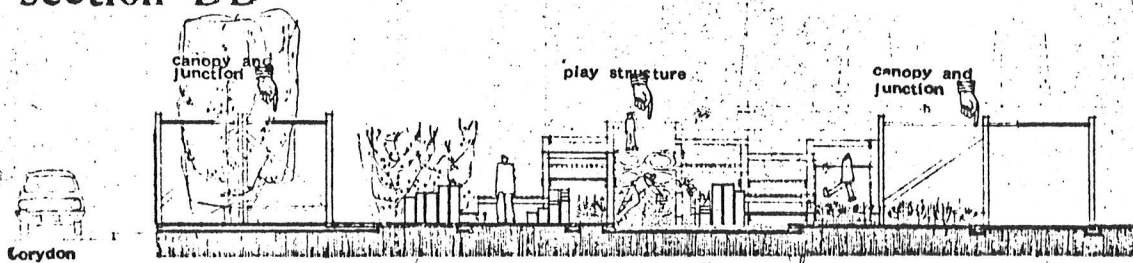
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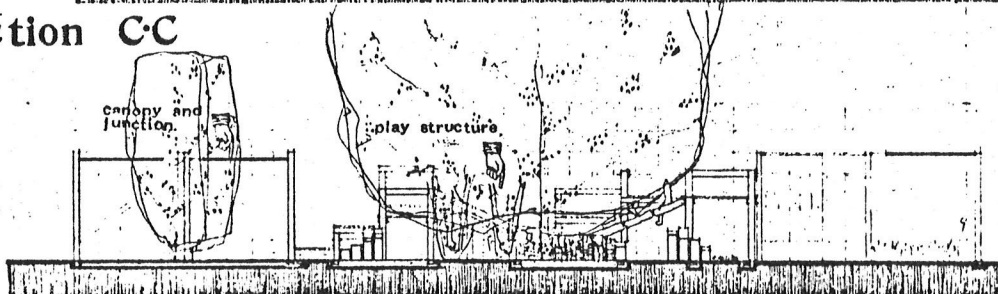
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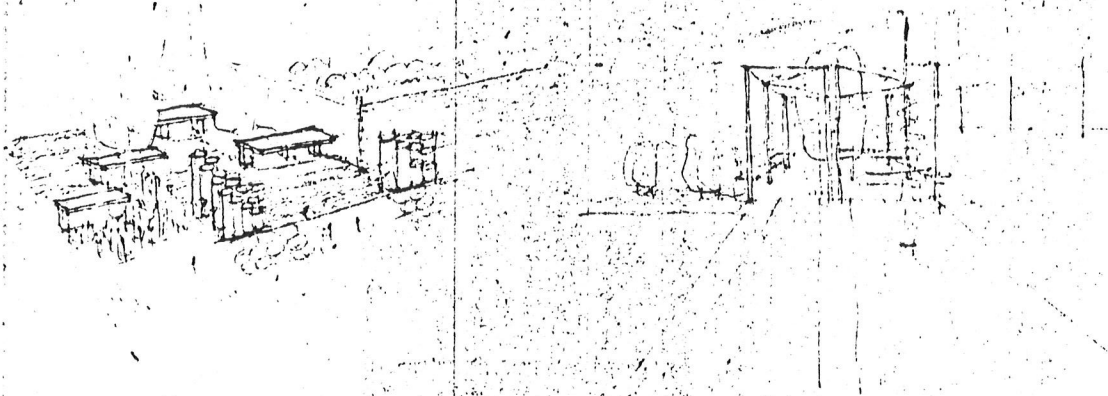
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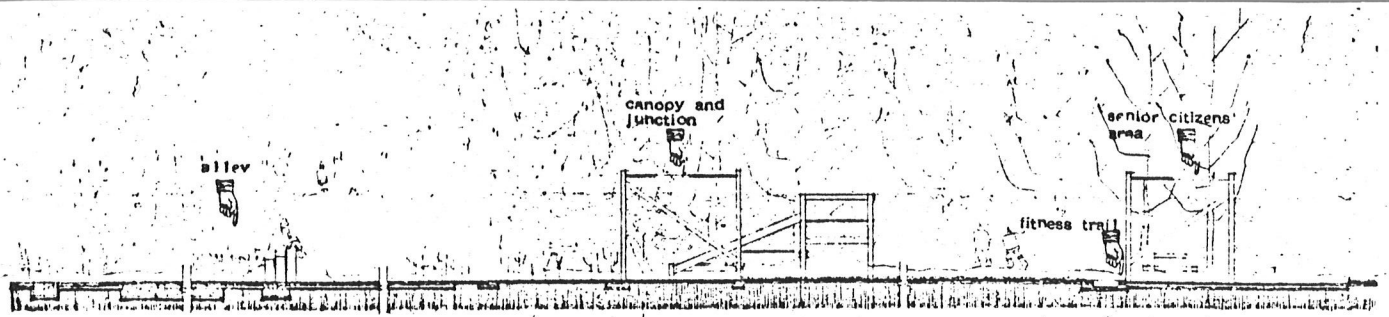


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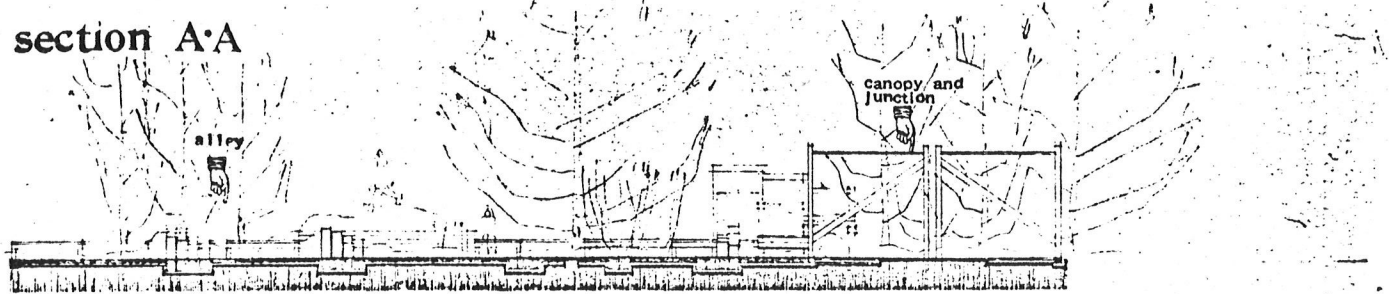


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sketches
summer

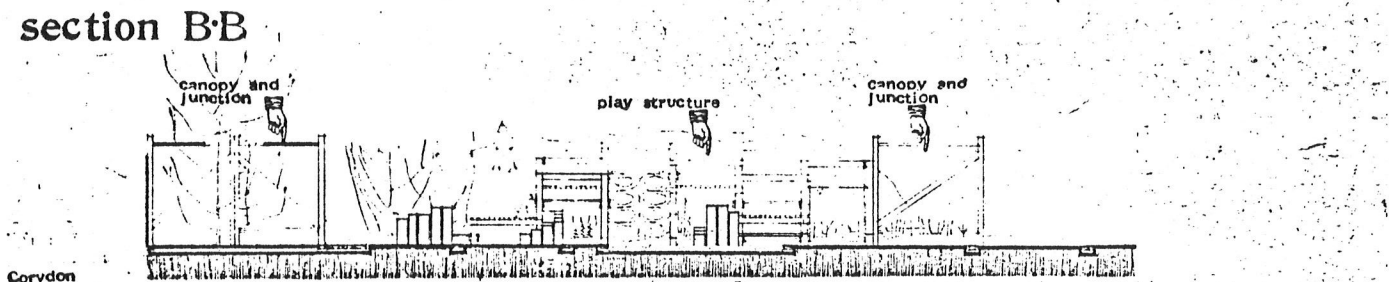
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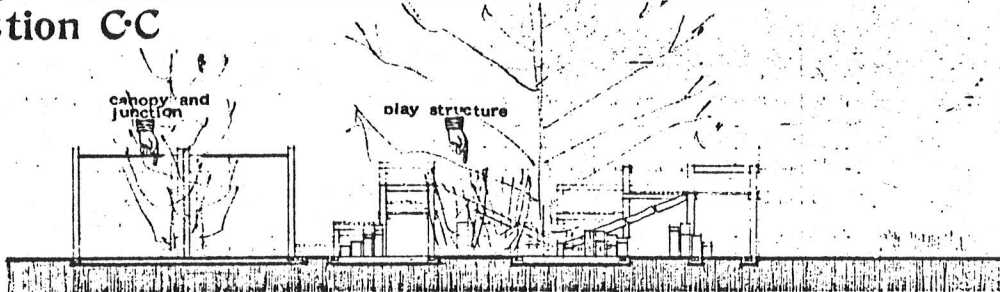


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Corydon

section C-C



section D-D



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sketches
winter

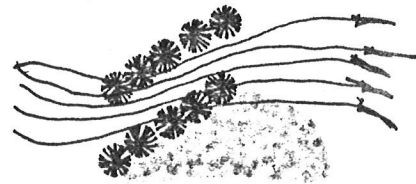
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plants and a winter playground

The functions to be fulfilled by plants in a winter play environment are varied. One should consider such things as the arresting effect of red twigs against white snow, or berries hanging heavily from delicate networks of bare branches, or the warm colours of grasses holding their own against a cold world. Of importance, also, are the birds that come to feed at certain trees, the history to be learned by looking at a plant and coming to know how it was used, the food and drink that came from its flowers and fruits, and the ways in which plants mark the changing of the seasons, providing a transition through colours and flowers and fruits and making visible the continuity of growth.



The plant lists compiled here, are but a beginning in terms of those plants that could be used in a play environment trying to take advantage of winter. There are many other plants that should be used in a playground, but those listed have been chosen for very definite winter interest. The bias has been to the selection of native materials, since many of them are a natural aspect of a prairie winter. They also provide an environment that does not have to be "protected" from the exuberance of children, but rather belongs to them.



There are six categories of plants. Autumn plants include those of interest beyond summer flowering, those that flower into the fall, and those that acquire interesting colours.

Plants of visual interest in winter include those with striking skeletons, coloured branches, persistent berries, and grasses. The grasses were chosen mainly, for their height and their ability to lend a soft and warm texture to the landscape. (They should be cut back to the ground in early spring just before new growth begins.)

Early spring plants are those which flower in April and May, providing signs of

approaching warmth and quickening growth.

The last three categories could be listed under the title of environmental education. Several of the plants of winter interest provide food that can be consumed by people. There are also those plants that, throughout the winter, provide food for birds and insects. Finally, those plants which provide good examples of insect galls are listed.

Following these lists, the plants are briefly described, with an explanation given of their major "winter play area" characteristic.

plant lists

autumn plants

Anemone patens	Prairie Crocus
Aster laevis	Smooth Aster
Aster pansus	Many Flowered Aster
Helianthus laetiflorus	Rhombic Leaved Sunflower
Oenothera biennis	Yellow Evening Primrose
Rudbeckia serotina	Black-eyed Susan
Solidago canadensis	Goldenrod
Parthenocissus quinquefolia	Self-clinging Virginia Creeper
Englemanni	
Rhus typhina	Staghorn Sumac
Acer ginnala	Amur Maple
Acer spicatum	Mountain Maple
Acer tataricum	Tatarian Maple

winter visual interest

Achillea millefolium	Yarrow
Asclepias syriaca	Common Milkweed
Chimaphila umbellata	Pipsissewa
Oenothera biennis	Yellow Evening Primrose
Rumex occidentalis	Western Dock

Cornus stolonifera	Red Osier Dogwood
Fraxinus nigra	Black Ash
Malus sp.	Crabapple
Salix alba sericea	Siberian White Willow
Salix alba vitellina	Golden Willow
Sorbus sp.	Mountain Ash

Grasses

early spring plants

Anemone patens	Prairie Crocus
Cerastium sp.	Chickweed
Ranunculus rhomboideus	Prairie Buttercup
Viola adunca	Early Blue Violet
Viola pedatifida	Crowfoot Violet
Arctostaphylos	Bearberry
uva-ursi	
Salix discolor	Pussy Willow

food for people

Asclepius syriaca	Common Milkweed
Gaultheria procumbens	Teaberry
Lepidium densiflorum	Peppergrass
Rumex occidentalis	Western Dock
Shepherdia argentea	Silver Buffaloberry
Acer saccharum	Sugar Maple

attracting wildlife

Lepidium densiflorum	Peppergrass
Oenothera biennis	Yellow Evening Primrose
Solidago canadensis	Goldenrod
Arctostaphylos	Bearberry
uva-ursi	

Juniperus communis	Common Juniper
Salix discolor	Pussy Willow
Acer saccharum	Sugar Maple
Fraxinus nigra	Black Ash
Malus sp.	Crabapple
Pinus sp.	Pine
Symphoricarpos occidentalis	Western Snowberry
Viburnum sp.	Bush - Cranberry

*In the winter half of the diet of the chickadee is the small eggs or larvae of insects and spiders which are nestled in bark crevices. They also eat the seeds from pines and hemlocks. When the snow covers the tops of the branches, they can still hang beneath to gather seeds and insects.

*Winter insects (springtails or snow fleas) are often found at the base of a tree on warmer winter days where the sun has melted through, and where they can come out to feed.

plants with insect galls

Insect galls are deformations of plants caused by insects and used by them for food and protection while developing. The insect disrupts the normal growth of a plant, either through physical irritation or chemical secretion. The plant grows a deformity around the insect, which the insect then uses for food and protection.

- Elliptical Goldenrod Gall
- Goldenrod Ball Gall
- Goldenrod Bunch Gall
- Oak Gall
- Willow Petaled Gall
- Willow Pine Cone Gall

plant descriptions

wild flowers

Achillea millefolium

Yarrow

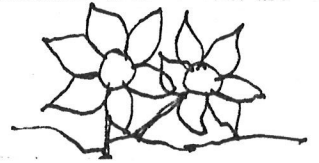
Yarrow is a perennial, flowering from June to August. Its height ranges from one to two feet. It spreads by seeds and shallow roots. The leaves, which are finely cut to resemble feathers, are very fragrant. If the snow is brushed away from the base of the plant and the leaves of the rosette around the stalk are crushed, the smell is very strong and spicy.



Anemone patens

Prairie Crocus

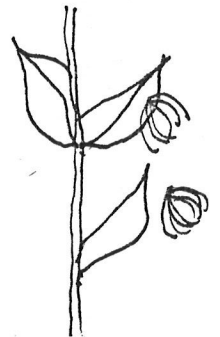
These pale blue and mauve perennial flowers are among the first to appear in the spring. The leaves arise from a thick wood taproot, and the plants can persist into September.



Asclepius syriaca

Common Milkweed

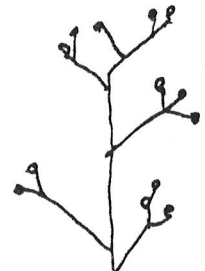
This perennial spreads by seeds and underground rootstocks. It can reach a height of from two to four feet. In winter, the pods turn silvery gray on black stems and contain silky seeds. The spring shoots of this plant can be eaten cooked, like asparagus, or raw if they are still young.



Aster laevis

Smooth Aster

The bright, violet-blue flowers of this perennial appear with dark green, thick leaves. The height ranges from one to four feet, and the plant has a tendency to flop. Flowers last from late July to late September.



Aster pansus

Many Flowered Aster

Small and numerous flowers are found on one side of a curved stem. Clusters of wiry, hairy stems arise from a thick rootstock to a height of 8 inches to 24 inches. The leaves of this plant are gray-green and linear. Flowers occur from late July to late September.



Cerastium sp.

Chickweed

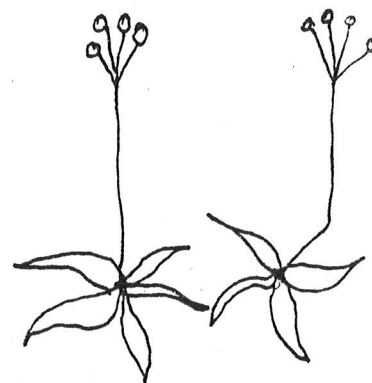
The small, white flowers of these perennials appear early in spring. Because the stems are

semi-prostrate, the height of the plant does not extend much beyond ten inches.

Chimaphila umbellata

Pipsissewa

The shiny leaves of this evergreen plant grow in whorls off erect stems up to a height of 12 inches. The plants are found beneath pines and oaks, connected by an underground root-stock. One can often see the flower stalks and seedcases sticking through the snow.



Gaultheria procumbens

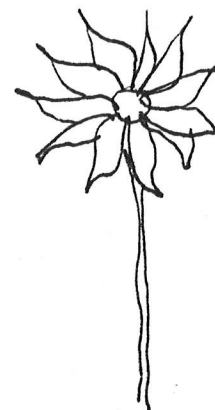
Teaberry

The bright, red berries of this plant last all winter, but they are generally hard to see beneath the shiny evergreen leaves. The plant is about 6 inches tall. The leaves and berries contain oil of wintergreen. A good tea can be made by combining equal amounts of boiling water and fresh leaves and letting them sit for a day or two.

Helianthus laetiflorus

Rhombic Leaved
Sunflower

The yellow heads of this tall perennial extend from one to three inches. The flower can be seen well into September.



Lepidium densiflorum

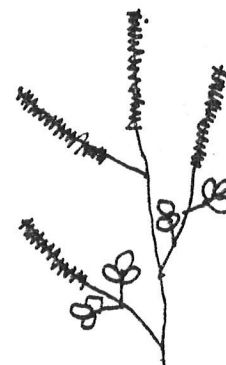
Peppergrass

Peppergrass is an annual plant, from 8 inches to two feet high. It seems to appear everywhere in the city, even in sidewalk cracks. The seeds are used by sparrows in winter, but because the winter stalk is brittle, it often breaks off, and is blown about. The spring shoots of those plants grown in controlled conditions provide a good salad green.

Melilotus alba

White Sweet Clover

This perennial can reach 7 feet in height. The white flowers which are scented appear from June to August.



Oenothera biennis

Yellow Evening
Primrose

This biennial grows from 2 to 6 feet in quite a bushy and branched form. It spreads by seeds. The flowers appear from July to September. In winter, the pods turn deep brown,

on darker brown stems. The almond shaped winter fruits are split into 4 sections at the unattached end, and curl back like petals. These cases are often used by insect larvae. The roots of the first year rosette can be eaten, after boiling them twice if they taste too peppery.

Ranunculus rhomboideus Prairie Buttercup

The light, yellow flowers of this low, eighteen inch plant appear in the early spring.

Rumex occidentalis Western Dock

Dock is a perennial, reaching three feet in height. The fruits are enclosed in dry, papery, reddish-brown sepals, which give the plant a reddish-brown skeleton in fall and winter. New leaves are sent up each fall in the form of a rosette. This can be gathered in winter to produce something similar to spinach.

Solidago canadensis Goldenrod

This perennial ranges in height from one to five feet. It provides food for sparrows, finches, and juncos. The flowers last from late July to October. Goldenrods are also important for the Elliptical Gall and Ball Gall which are both found on the stem and are made by moths and flies. A Bunch Gall is often formed at the tip of the stalk.

Viola adunca Early Blue Violet

The stem of this perennial can be up to 6 inches in height. The small, purple flowers appear in early spring.

Viola pedatifida Crowfoot Violet

The violet-blue flowers of this perennial appear in early spring. The plant is about 6 inches high. Because the leaves are very finely cleft, the plant is not noticeable in the grass until the flowers come into bloom.



shrubs and ground covers

Arctostaphylos uva-ursi

Bearberry

The berries of this ground cover cling to the branches well into the winter. Small, pink flowers appear in the spring. The leaves are about one inch long, egg-shaped and glossy. If the plant is grown in full sun, the shiny, green leaves turn bronze in winter. Large plants do not transplant readily from the wild. Small divisions or newly rooted runners provide a better approach.



Cornus stolonifera

Red Osier Dogwood

This shrub assumes a broad and oval form, and can reach 7 feet in height. The twigs of this shrub are very apparent in winter for their bright, red colour. Old branches tend to become browner, but if they are removed the new shoots will possess the red bark.

Juniperus communis

Common Juniper

This juniper is a two foot high evergreen shrub. It spreads out from its centre, and provides winter cover for birds who eat the berries and nest in the foliage. The juniper should be kept out of the early spring sun by not giving it a southern exposure.



Parthenocissus quinquefolia
Englemanii

Self-clinging

Virginia Creeper

This vine acquires a good, bright-red foliage in the fall if it is grown on south or west walls.

Rhus typhina

Staghorn Sumac

The staghorn sumac is a shrub notable for its autumn coloration.

Salix discolor

Pussy Willow

This shrub is famous for its catkins which can be collected early in the spring. It is the home of two insect galls - the Willow Petaled Gall and the Willow Pine Cone Gall.

Shepherdia argentea

Silver Buffaloberry

This is a thickly branched shrub reaching a height of from 7 to 15 feet. The berries remain on the shrub after the leaves have fallen off, and after a frost can be used for jelly. They are much sweeter at this time. However, they should be used in a limited way, because of a high saponin content which can cause irritation of the digestive system.

trees

Acer ginnala

Amur Maple

The amur maple is a 15 foot high tree, excellent for autumn colouration that ranges from bright-scarlet to deep wine-red. When plants are exposed to full sun, the best leaf colouration occurs.

Acer saccharum

Sugar Maple

This 40 foot tree is round-headed and requires a protected location. The buds and flowers are eaten by grosbeaks, purple finches, nuthatches. It is important in the production of maple sugar.

Acer spicatum

Mountain Maple

The mountain maple grows to about 10 feet. Its autumn colouration is striking. As well, during the summer, its bright-red samaras are conspicuous.

Acer tataricum

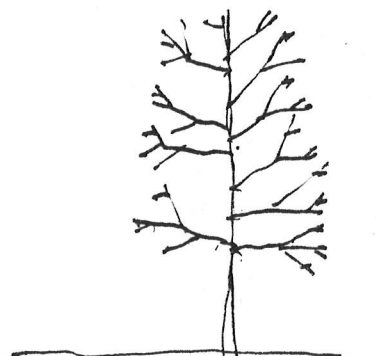
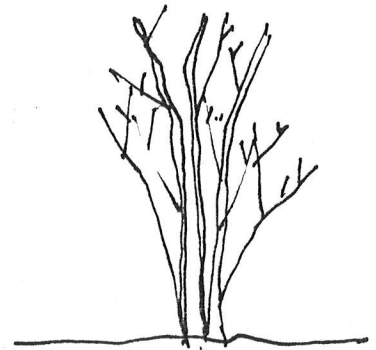
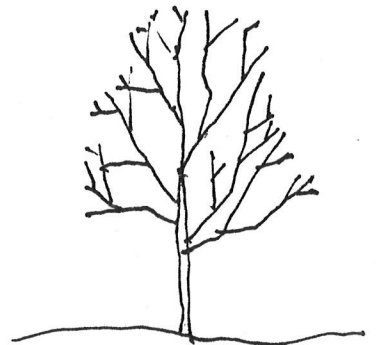
Tatarian Maple

The tatarian maple, a 20 foot tree, is notable for its autumn colours. Also, its fruit and petioles are bright-red throughout the summer.

Fraxinus nigra

Black Ash

This is a 30 foot, slow growing tree with ascending branches. Its fruit has an elongated wing and often persists over the



winter. Finches, grosbeaks, and cardinals eat the seeds in fall and early winter.

Malus sp.

Crabapple

The crabapple is a medium sized tree. It is attractive to wildlife, as it sometimes holds its fruits throughout the winter.

Salix alba sericea

Siberian White Willow

This willow has an upright spreading head. The undersides of the leaves have silky hairs which give them a silvery-white appearance. As the tree grows older the trunk becomes a warm-orange colour.

Salix alba vitellina

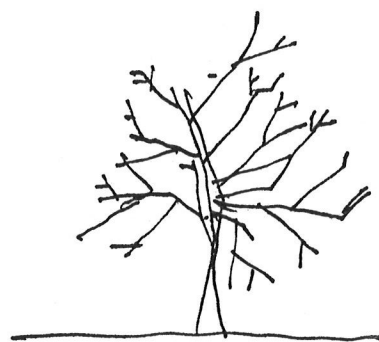
Golden Willow

The golden willow is a 30 foot, round topped tree. Its bright and yellowish bark stands out in winter and early spring.

Sorbus sp.

Mountain Ash

The mountain ash is a deciduous tree with dark-green foliage and showy clusters of fragrant, white flowers and scarlet fruit. The fruits persist throughout the winter.



grasses

Agrostis stolonifera

Red Top

Red top is a perennial grass about two feet in height. It has feathery seed heads.

Andropogon gerardi

Big Bluestem

The big bluestem is a tall coarse grass evident in the winter because of the lignification of its stem.

Andropogon scoparius

Little Bluestem

The little bluestem is an erect, purplish grass with short, broad leaves.



Bromus ciliatus

Brome Grass

Brome grass is a perennial grass, 2 to 4 feet in height.

Calamovilfa longifolia

Sand Grass

Sand grass is a coarse grass with long, tough leaves and long, creeping roots. It is a perennial and grows from two to five feet in height.

Elymus canadensis

Wild Rye

Wild rye is a perennial grass, 3 to 5 feet in height. It has tufted and nodding seed heads.

Panicum virgatum

Switch Grass

Switch grass is a bluish-green grass with creeping roots. It is perennial, and grows 3 to 6 feet in height.

Poa pratensis

Blue Grass

This is a dark-green perennial grass, 1 to 4 feet in height.

Sorghastrum nutans

Indian Grass

The long, flat leaves of this grass taper to sharp points. It is a perennial, 3 to 8 feet in height.



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