BRINGING NATURE INTO PLAY:

INTEGRATING NATURE INTO OUTDOOR PLAY ENVIRONMENTS FOR WHOLE CHILD DEVELOPMENT

by

KATIE ALANA CROSTA PIGOTT

(Under the Direction of Brad Davis)

ABSTRACT

Preschool children learn and develop through play. To understand how play environment design impacts children's behavior, three to five year old children were studied while engaging in free play in three outdoor play environments ranging from simple and traditional to complex and environmental. Field research confirmed that play environments rich in natural materials and a variety of settings are complex and dynamic, therefore encouraging more varied creative and imaginative play in addition to high physical activity levels, whereas playgrounds lacking natural settings showed more predictable play and children bored more easily. Current research, along with the field work conducted, shows that incorporating a variety of natural and manmade materials into complex outdoor play environments benefits whole child development. Further research is needed to study how duration of outdoor play and adult interactions impact children's behavior and relationship to nature, and how specific natural interventions may influence preschool playground design.

INDEX WORDS: Early childhood development, Behavior setting, Landscape architecture, Nature-based play, Playground design, Whole child development

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BA, Oberlin College, 2004

A Thesis Submitted to the Graduate Faculty of The University of Georgia in Partial Fulfillment of the Requirements for the Degree

MASTER OF LANDSCAPE ARCHITECTURE

ATHENS, GEORGIA

2012

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May 2012

DEDICATION

This thesis is dedicated to Michael, who provided endless encouragement for the last three years. I cannot thank you enough for always listening, being there for me, and helping me succeed.

ACKNOWLEDGEMENTS

I would like to acknowledge my committee: Alfie Vick, Marguerite Koepke, and Dr. Amy Kay, for generously sharing their time and expertise. Enormous thanks to Brad Davis for advising me along the way and helping me achieve my goals. Thanks to my class for providing three years of inspiration, encouragement, and entertainment. Last, but certainly not least, many thanks to my family for always believing in me and providing me with words of encouragement whenever I needed them. I could not have done this without you!

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CHAPTER 1

INTRODUCTION

The purpose of this research is to investigate innovative ways to improve the mental, physical, and emotional health of young children through playground design in the preschool or childcare environment. The general hypothesis is that children who spend more time outdoors in natural spaces develop into happier and healthier individuals. Not only are they healthier and more creative, but they also have a stronger sense of place, understand the natural world around them, and will be inclined to care for their environment (White and Stoeckun 1998; Louv 2008).

This thesis will cover the basics of early childhood development, the link between play and development, and the effects that nature has on children; study three preschool play environments, and draw conclusions on how to improve children's connections with nature through experiential play environments, and improve their own general health and well-being as a result.

Over the past couple of decades, there has been a dramatic shift in children's health and well-being. Serious health conditions such as obesity and depression have become increasingly more common in children, as they lead more sedentary lives than in the past (Helm 1996). Children are spending more and more time indoors – physical education classes are being cut from school schedules, and many parents would rather have their children indoors where they can watch over them. It is possible that American children today would rather spend their time indoors in front of a television or computer than exploring the outdoors around them. How can landscape architects, in conjunction with educators and other professionals, create and manage outdoor environments in a way that is intriguing to children—in a way that makes them prefer being outdoors?

This research presents an opportunity to positively impact future generations by improving the environments which they inhabit. By spending time outdoors, children can develop holistically – physically, mentally, socially, and emotionally - into individuals who can treat their peers and nature with respect. Outdoors, in rich natural landscapes, children can learn many important academic and life lessons. They can learn where food comes from and how it ends up on their table, they can learn about the relationships between humans and nature, and they can observe a variety of natural processes. By creating engaging landscapes in which children can learn and play, landscape architects have the opportunity to get children more active and engaged with the nature and communities around them.

There is a growing body of research regarding childcare and preschool playgrounds and their use; however, there is still a gap when it comes to the design interventions that can help improve these landscapes (Cosco 2005). The research presented in this thesis is significant because it has the potential to fill that gap by determining ways in which children can be reengaged with nature in their preschool play environments.

The purpose of this thesis is to understand the ways children use different types of preschool outdoor play environments, and how the design of these spaces encourages different types of behavior. Understanding these interactions, along with current research on the state of young children's play, will help to develop new design recommendations which can create positive change in the way that children develop personally, and feel about and interact with nature. The long term goal is to improve the health and well-being of young children, and create a happier, healthier, more connected society.

What interventions are necessary to create landscapes that reengage children with nature through the outdoor environments that they have access to, and consequently help children grow up to be happier, healthier individuals who have a strong connection to the earth and to one another?

First, a review of current literature will give insight into how the design of play spaces influences children's behavior, and how design can be used as a tool to positively impact children's health and well-

being. Second, a combination of participant observation and behavior mapping will be used in conjunction with student interviews, parent surveys, and teacher surveys, to understand the behavior of children in their outdoor play environments. The results of the literature review and the field study will result in design guidelines for creating engaging outdoor play environments which benefit the development of the whole child.

CHAPTER 2

CHILD DEVELOPMENT AND PLAY

Current research suggests that children are becoming disconnected with nature, and that this disconnect is threatening their physical and emotional health and well-being (Louv 2008). They are spending more time indoors, whereas they used to be outdoors much of the time, exploring their surroundings on foot. Now, many children are escorted places in their parents' car, and are losing the sense of the journey from here to there; they are losing their sense of place in the world. "Both at home and in child care, children are losing time, space, and the variety of experience outdoors that has been integral to the development of human kind. *They are losing habitat*" (Greenman 2003, 40). This decrease in time spent outdoors may likely lead to a "new type of childhood" in which children experience less direct contact with nature as children did in the past (Karsten 2005). This will limit the variety of childhood experiences. What are the detriments of this type of new reality?

For the purposes of this thesis, children's health and well-being encompasses the physical, mental, and emotional health of children, as benefitted by healthy development in the early years. It is affected by activities as well as habits and lifestyle choices, under the assumption that these are impacted by the spaces where children play and learn. This chapter will present the current state of children's health and well-being in the United State; the basics of early childhood development as they relate to play; existing playground typologies; and the importance of nature in children's lives. This chapter will show that the current reality of children's lifestyles make it essential to advance children's outdoor play and learning experiences.

The Unavoidable Decline in Children's Health and Well-Being

Both physical and mental health problems are growing in American children. A lack of opportunity for varied physical activity combined with poor nutrition choices has led to serious health risks including obesity, diabetes, and high blood pressure in children - conditions linked to lifestyle and environment (Greenman 2003; Mullen 1984). Centers for Disease Control data shows that between 1989 and 1999, the number of overweight children in the United States increased by almost thirty six percent, and at the same time two out of ten children were clinically obese (Louv 2008). Depression and Attention Deficit Hyperactivity Disorder (ADHD) have also been on the rise, and can be linked to a sedentary indoor lifestyle (Moore and Cosco 2000; Cosco 2005; Greenman 2003; Louv 2008; McCurdy et al. 2010).

Obesity is a risk factor for many other diseases and conditions which are becoming more common in children, including Type 2 Diabetes, asthma, hypertension, cardiovascular disease, nonalcoholic fatty liver disease, and obstructive sleep apnea. Of obese children, up to 80% will remain obese as adults, and adult obesity can increase the risk of cancer, stroke, and Alzheimer's disease, among other maladies (McCurdy et al. 2010).

There is evidence that adults are leading less active lives than in the past as well. Based on a study by the National Center for Health Statistics, in 2006 only 60% of adults participated in any physical leisure-time activity (McCurdy et al. 2010). This adult inactivity is likely to be inherited by their children in the home, making outdoor play at school crucial to their health. Landscape architects can play a positive role by designing engaging outdoor environments which encourage active and healthy lifestyle choices in the spaces which children occupy on a daily basis – school and childcare settings.

Children's Lack of Access to the Outdoors

In order to understand the connection between children' health and their exposure to outdoor space, it is necessary to understand where children play and learn. Aside from their homes, young

children commonly spend the most time in preschool or child care settings. Because these spaces are so common in children's experience of the built environment, there is a great potential to study them and make advances based on the findings (Keeler 2003; Pardee 2005; Herrington and Studtmann 1998; Cosco, Moore, and Islam 2010). Understanding how preschool playground design affects children's behavior and development is essential in being able to design landscapes which will improve children's physical, cognitive, social, and emotional development (Cardon et al. 2008).

Young children are spending less time outdoors. At childcare or preschool, outdoor time is not always seen as a necessity because teachers are focusing on academic achievement; it has been found that sedentary behavior is also high in childcare settings (Reilly 2010). At home, many parents keep their children indoors because of safety concerns. "Because children are spending so much time in front of television, as well as other screens, there is little time for exercising their predisposition for fantasy, imagination, and creativity—the mental tools required for success in higher-level math and science….Our schools are now contributing to the suppression of curiosity, imagination, and fantasy" (Elkind 2007, x).

The Development of Young Children

This thesis is limited to the study of three to five year old children because current research suggests that this period plays one of the biggest developmental roles in determining children's growth, as well as their personality traits and how they will relate to others and their surroundings (Cardon et al. 2008; Greenman 2003; Herrington and Studtmann 1998). In the early years, children acquire many skills which are essential to their growth and development into healthy adults. Many habits that last a lifetime are formed during these developmentally crucial years, including habits and feelings related to outdoor activities and nature (Wilkinson 1980; Moore 1980). Between the ages of two and six, children play more than during any other time period, and play is the main factor in their development (Vygotsky 1976; Frost, Wortham, and Reifel 2012). This section will discuss the basic developmental changes that

occur during this time period, and show how they are learned largely through play and "self-created learning experiences" (Elkind 2007, 7).

Early childhood is the time when children acquire basic motor skills, which can be categorized as fine motor, gross motor, and perceptual motor. Fine motor skills involve the use of the hands and fingers to manipulate items, while gross motor skills relate to the use of the whole body to move and build strength and balance. The preschool years constitute the "fundamental movement phase," in which children develop motor skills like running, jumping, climbing, throwing, and catching. After developing each skill, they combine them, gaining more and greater coordination of movement (Gallahue 1993; Frost, Wortham, and Reifel 2012; Hughes 2010). Traditional playgrounds are generally designed to build gross motor skills.

Preschool age children combine motor skills with the use of their senses to develop perceptual motor skills, which help them understand their place in their environment. This development occurs when children gain awareness of space, time, and their bodies and their movements (Frost, Wortham, and Reifel 2012; Gallahue 1989; Jambor 1990). This developmental phase can be enhanced by enriching play environments to help create a strong sense of place.

The cognitive development that occurs during the preschool years enables children to understand the world around them. Cognitive development is encouraged by sociodramatic and pretend play, which children often engage in during free play. In this type of play, children must think and socialize with their peers, allowing them to explore the manipulation of meaning in more complex ways (Berk 1995; Vygotsky 1976; Yawkey 1984; Frost, Wortham, and Reifel 2012; Hughes 2010). Dramatic play during the preschool years, in which children imitate reality by acting out different roles, allows them to explore complex forms of pretend play (Frost, Wortham, and Reifel 2012; Piaget 1962). Cognitive development can be encouraged in play environments that provide opportunities for pretend

play, including loose parts to move and manipulate, and spaces to occupy and interact with in a variety of ways (Elkind 2007).

During the preschool years, children also develop emotionally and socially. They come to realize that they are individuals, with unique characteristics and abilities; and begin to see their role among friends and family, and in the world around them. Young children also begin to understand their own emotions, and become able to regulate them. Social interactions in play environments require compromise and sharing, encouraging children's emotional and social growth. Young children also develop empathy. The design of preschool play environments can greatly affect the social interactions young children have with each other while playing, which can help determine how socially competent they become (Frost, Wortham, and Reifel 2012; Hughes 2010).

Playground Typology

There is a widespread belief that playgrounds are simply places to "blow off steam" or get rid of extra energy, as reflected by the design of many playgrounds (Greenman 2003). This belief overlooks the complexity of outdoor play and child development. Play environments should be thought of as places which "nurture and encourage, and integrate forms of play, interaction between children, interaction between children and nature, and between children and materials" (Frost, Wortham, and Reifel 2012, 297).

The state of Georgia's rules and regulations for childcare centers' play environments focus on the safety and security of the site, more than the features and layout of the space. These regulations are intended to decrease the amount of child injuries that occur in these spaces – through site design and maintenance - by providing security fences, suitable surfaces, designated fall zones, and by keeping the space clean and free of hazards. The regulations call for at least one hundred square feet of space per child, shady areas, and no more than twenty five percent hard surfaces. Play equipment should be

securely anchored and allow freedom of movement, while avoiding collisions (Rules and Regulations for the State of Georgia 1982).

Figure 2.1 Day care playground
www.mybt.budgettravel.com

The most common type of playground for young children in the United States is the *traditional* model. Traditional childcare and preschool playgrounds are focused on the development of gross motor skills as well as the minimizing of injury, and typically include such standardized elements as a swing set, a brightly colored stationary climbing structure, teeter totters, a sand box, and a tricycle track. These playgrounds are generally free of natural elements or loose parts, because these items are seen as possible hazards.

Figure 2.2 Day care playground
www.meyerdesign.com

The features in traditional playgrounds have predetermined uses, and do not offer children many opportunities to invent new uses; they also stimulate more solitary than social play (Hill 1980; Ellis 1973; Wilkinson 1980; Greenman 1988). Not only do the standardized, manmade playgrounds of so many preschools lack the feeling of actually being *outdoors*, but they also focus more on children's physical development than their cognitive, social, and emotional development. There is great reason to believe that playing in nature provides more complex benefits to young children than does playing in a manmade setting (Herrington and Studtmann 1998).

Creative playgrounds differ from traditional playgrounds in that they are designed for a specific site and incorporate natural forms and features into the play structure design. Topography may be incorporated for example, in the placement of slides. The main focus in creative playgrounds is the play structure itself, which tends to be more engaging than a traditional play structure due to its large size and complexity, and they often do not have many loose parts for play (Greenman 1988; Wilkinson 1980).

Figure 2.3 Creative Playscape, Georgetown, Texas
http://parks.georgetown.org/creative-playscape

Adventure playgrounds provide materials and objects rather than play equipment, giving supervised children the chance to build, construct, and create their own play. This type of play environment is always changing, and the change is child-directed. Children are encouraged to play with materials that are not typically associated with playgrounds, such as scrap lumber and metal, nails, tools and tires to work together to create and build (Hayward, Rothenberg, and Beasley 1974; Wilkinson 1980; Fjeldsted 1980; Bengtsson 1974; Frost 1992; Greenman 1988).

Figure 2.4 Berkeley's Adventure Playground
(http://www.good.is/post/adventure-playgrounds/)

Another type of play setting with components that relate to this study is the *playpark*. Playparks generally exist within public playgrounds, and rely on staffing by trained play leaders. The play leaders work to ensure that children are content in their play and engaged in their surroundings. They consist of a variety of settings, including traditional play equipment, sports areas, gardening and animal areas, and flexible areas in which children can create dynamic, changing environments. Playparks may also include facilities like kitchens, theaters, and workshops for crafts and construction (Wilkinson 1980; Brett, Moore, and Provenzo 1993).

Figure 2.5 Orlekken Playpark, Karlstad, Sweden (Brett, Moore, and Provenzo 1993, 80)

Environmental play yards provide children with opportunities to interact with their natural surroundings, including water, wildlife, and plants, all while experiencing life cycles and the interconnectedness of their environment (Greenman 1988). These play yards have been inspired by the Environmental Yard in Berkeley, CA – a school play environment that incorporates a nature area, manufactured play equipment, and an asphalt area for ball play. "The Yard is a condensed and largely contrived version of nature in the raw….it is a carefully designed and sensitively managed combination of the essences of the various natural systems appropriate to the surrounding region. It is a kind of museum in which all that is unique or significant about an area or culture has been assembled at one point to intensify experience and understanding – to make learning more feasible…" (Moore 1980, 56).

Figure 2.6 Environmental Yard, Berkeley, California (Brett, Moore, and Provenzo 1993, 121)

The issue of play environments is not just the physical design and structure of them, but also the mindset around outdoor play. The intention and design of a play space affects the ways that children use it. If a playground is designed to be used as a setting for brief physical play, and that is the way the teachers structure their curriculum, then the children will use it in that way. However, if a playground is seen more as a landscape for learning, and the teachers incorporate it into their curriculum for different subjects, then it will have a broader variety of uses and benefits.

Nature's Impacts on Children

Playing outside in nature positively impacts children's development and their long-term health and well-being. Nature has calming effects, while also encouraging inquisitiveness, creativity, and physical activity. It can also stimulate a desire to care for the earth. As mentioned earlier, children have a developmental tendency toward empathy, and this can be extended to nature by giving children time

to be with nature—to explore it and understand it (White and Stoeckun 1998; Cosco, Moore, and Islam 2010).

Given the chance and proper guidance, children will explore the natural world around them with wonder and curiosity. The natural world is different than the world children find inside their homes; it can accommodate a wider range of activities. Outdoors, children have the freedom to move and explore larger spaces, and peacefully experience the daily changes of the natural world. There is room for children to move their bodies in ways that are impossible indoors; they can run, jump, tumble, and climb. Children can be louder, wilder, and more expressive outdoors (Ryder Richardson 2006). The outside world is dynamic - it is always moving and changing – and this allows for endless possibilities of imaginative and interactive play, as well as opportunities to understand and care for the natural world (Moore and Wong 1997; Fjørtoft 2001).

Playing in nature is "intrinsically motivating and rewarding", it "promotes sensory exploration…connects children of all cultures, all ages, and all skill levels…provides interesting things to talk about and work together on…builds self-efficacy and self-esteem…promotes fine and gross motor skills…allows for seamlessly incorporating science, math, reading, social studies, and the arts…and "offers opportunities to create and appreciate beauty" (Hachey and Butler 2009, 44).

Nature encourages peace in children. Time spent in nature increases children's ability to concentrate, reducing symptoms of ADHD (Taylor, Kuo, and Sullivan 2001). Nature encourages children's observation skills, creativity, care, patience and a sense of connectivity with the environment (Crain 2001). Exposure to nature creates respectful attitudes toward nature. By spending time in nature, children are given the ability to take care of something – their environment – and recognize that they belong to something bigger than their immediate context (Ryder Richardson 2006). In playground settings, children learn to cooperate and share with other children, and these lessons may also be applied to the natural environment through free, unstructured play.

"The real contact with the elements, the seasons and the natural world, the range of perspectives, sensations and environments – multi-dimensional and multi-sensory – and the daily change, uncertainty, surprise and excitement all contribute to the desire of young children to be outside" (Ryder Richardson 2006, 8).

Outdoor Play and Early Childhood Development

The play environment that children inhabit affects their behavior, which in turn affects their development, health, and overall well-being. One major component is making children *want* to be outdoors in nature. Therefore, it is essential to design play environments which encourage children to be curious, physically active, and socially engaged. Having engaged adults who know how to lead children in play and learning is also essential. "The social behavior of children closely parallels the richness of their play environments. Barren, boring playgrounds and lack of supportive adults result in children abusing the environment and one another" (Frost, Wortham, and Reifel 2012, 295).

The problems presented in the beginning of this chapter show that there is a need to focus on development of the whole child through outdoor free play; whole child development encompasses children's physical, cognitive, and social, and emotional development. Play is an important, integrated experience, involving physical fitness, creativity and imagination, sense of inquiry, social interactions, self-confidence, and sense of responsibility (Hill 1980). The design of outdoor play environments should foster this complex, holistic development.

"Outdoor educational settings offer a unique sense of exploration and discovery, and a powerful impetus for young children to learn. Outdoor play helps them acquire intuitive knowledge" (Moore and Wong 1997, 133). Outdoor free, or unstructured play, in which children determine what activities to engage in, enhances children's physical, cognitive, social, and emotional development. It not only affects their motor development in different ways than directed physical education, but it also enhances their well-being by encouraging self-reliance and sociability; and stimulating creativity, inquisitiveness,

and happiness. Children also learn to compromise and negotiate with one another in their dramatic play (Frost, Wortham, and Reifel 2012; Ryder Richardson 2006; Hill 1980; Myers 1985).

Free play "provides a motivating force in the learning process. Springing from within, in response to freely discovered external stimuli, play is a natural universal endowment of young humans as it is with many other species. Free play arouses children's innate curiosity, motivating them to actively learn" (Moore and Wong 1997, 195). Giving children a variety of options and settings in which to play fosters curiosity and creativity. More playful children, especially those engaged in sociodramatic play, are also more creative (Lieberman 1965; Johnson 1976). A play environment that offers richness, flexibility, and little adult intervention can increase children's creative play (Pepler 1979). Children must be given every opportunity to develop in the most complete, enriching way possible.

"Playtime aids growth.
Play is a voluntary activity.
Play offers a child freedom of action.
Play provides an imaginary world a child can master.
Play has elements of adventure in it.
Play provides a base for language building.
Play has unique power for building interpersonal relations.
Play offers opportunities for mastery of physical self.
Play furthers interest and concentration.
Play is the way children investigate the material world.
Play is a way of learning adult roles.
Play is a dynamic way of learning.
Play refines a child's judgments.
Academics can be structured into play" (Caplan and Caplan 1973, xii-xvii).

Traditional preschool and childcare playgrounds are not designed to encompass these representations of play, and therefore, are not making the most of play and early childhood development. The goal of landscape architects should be to create outdoor play and learning environments that make it possible for children to experience all of these important aspects of play.

Adding loose parts – unstructured, moveable materials - to a play environment leads to creativity, increasing the possibilities for play and development. These loose parts cover a wide range of natural and manmade materials, including plants, pinecones, woodchips, sticks, sand toys, balls, pots

and pans, garden tools, art supplies, ribbons, and pieces of fabric. Stationary play equipment and materials tend to attract the limited type of play they were intended for (Pardee 2005; Pepler 1979). Items that are "unstructured, diverse in playability, and simple in design" are most appropriate for young children (Frost, Wortham, and Reifel 2012, 165). This description perfectly describes natural materials.

"The child who plays more vividly, and subsequently feels it was fun, has more optimism, more confidence and is better able to get on with his task of learning about man, society, culture and community. Apparatus such as swings and roundabouts do not help much in these developmental tasks. Of more value are the opportunities for exploring adult life and for access to facilities that allow children to experiment and become adventurous in meeting their needs and capabilities" (Fjeldsted 1980, 43). Incorporating nature into the outdoor play environment allows children to experiment, experience, and create in a richer, more complex setting. The next chapter will introduce the research methodology used to determine specific ways in which this incorporation of nature influences children's behavior.

CHAPTER 3

RESEARCH METHODOLOGY

This study will add to the growing data on preschool children's interactions with natural and man-made elements and settings in different types of outdoor play environments, and lead to criteria for creating environments that engage children with nature, while developing holistically – in all the areas essential to early childhood development. This chapter will describe the process of conducting field research for this thesis, including the IRB process and approval and the methodologies chosen for investigating case study sites. The goal of the field research is to investigate how design impacts children's behavior in differing outdoor play environments.

Procedures

Approval from the University of Georgia's Institutional Review Board was sought prior to beginning the study, as it involves human subjects. Approval was granted for all observations, interviews and surveys in November 2011. Three outdoor preschool play environments were chosen as sites where the researcher gathered qualitative data for the case studies. This data and the current research presented in Chapter 2 led to design guidelines for outdoor play environments which benefit whole child development.

The following methods of inquiry were employed at each case study site:

1) *Site inventory* was conducted at each site while free of children, prior to observations and interviews. The researcher documented and photographed the landscape and its features to develop a complete understanding of the design. Items inventoried include:

- amount of open space,
- play equipment,
- groundcover,

- hardscape,
- vegetation ,
- play structures,
- natural and manmade features,
- site furnishings,
- sun/shade,
- topography, and
- surroundings

Site inventory revealed the opportunities provided to the children while playing outdoors, and lead to an understanding of how certain elements and settings can play a role in children's play, learning, health and development. Each site was looked at as a collection of behavior settings "composed of people, physical components, and behavior. The concept is applied in design research by disaggregating the functional parts of the outdoor environment (i.e., climbing area, sand pit, water play setting, tricycle path, vegetable garden, etc.) as opposed to treating the play area as a generalized context for behavior" (Cosco, Moore, and Islam 2010, 514). A behavior setting can be thought of as a composition of natural and manmade elements that tend to encourage certain behaviors. An understanding of the composition and use of each behavior setting has led to informed future design decisions.

The site was then analyzed to answer questions, such as:

- What is the percent open space of each site?
- What is the ratio of artificial materials to natural features (or those made from natural materials?)
- What is the mix of behavior settings – and how many are there – on each site?

2) Because the aim of this research was to determine ways in which landscape architects can design play environments that will aid in the development of healthy children, o*bservation* was

conducted by the researcher in a series of visits to each preschool, in order to study patterns or themes that may emerge. A total of ten hours of observation was attempted at each case study site. Repeated visits were intended to reveal more nuances in the observation, as well as help the children feel more comfortable, and perhaps behave as they would without the researcher's presence.

To understand how children interact with their play environments, behavior mapping was used to track participant observations while children were engaged in unstructured free play. Direct observation of children is more common and appropriate than other methods such as direct interview, because children's cognitive and verbal skills are different than that of adults, making it more challenging for them to self-report on their activities (Ziegler and Andrews 1987). Along with narrative observation, the coding system presented in "Assessing Preschool Children's Physical Activity: The Observational System for Recording Physical Activity in Children-Preschool Version" was used as a standardized way to document the activity type and levels of young children (Brown 2006). These two factors are essential in understanding how children interact with their play environments. Direct observation revealed the relationships of the location, context, and activities that make up free play (Zeisel 2006; Cosco, Moore, and Islam 2010). Factors other than design may influence children's behavior and their relationship to nature, including their parents' perspectives on nature, the amount of time they spend playing outdoors, and the types of interactions they have with teachers during free play. These factors were not evaluated during this study because they vary among the sites and could not be controlled by the researcher.

Table 3.1 Coding System for Observing Behavior of Preschool Children (Brown 2006)

Activity level codes	Brief descriptions
1—stationary or motionless	Stationary or motionless with no major limb movement or major joint movements (e.g., sleeping, standing, riding passively in a wagon)
2—stationary w/ limb or trunk movements	Stationary with easy movement of limb(s) or trunk without translocation (e.g., standing up, holding a moderately heavy object, hanging off of bars)
3—slow-easy movements	Translocation at a slow and easy pace(e.g., walking with translocation of both feet, slow and easy cycling, swinging without assistance and without leg kicks)
4—moderate movements	Translocation at a moderate pace (e.g., walking uphill, two repetitions of skipping or jumping, climbing on monkey bars, hanging from bar with legs swinging)
5—fast movements	Translocation at a fast or very fast pace (e.g., running, walking upstairs, three repetitions of skipping or jumping, translocation across monkey bars with hands while hanging)
Activity type codes	
Climb	Climbing, hanging
Crawl	Crawling
Dance	Dancing, expressive movement
Jump/skip	Jumping, skipping, hopping, galloping
Lie down	Lying down
Pull/push	Pulling or pushing an object or child
Rough and tumble	Rough and tumble play such as wrestling play fighting
Ride	Cycling, skateboarding, roller skating, scooter
Rock	Rocking on a teeter totter or on a horse
Roll	Rolling
Run	Running
Sit/Squat	Sitting, squatting, kneeling
Stand	Standing
Swim	Swimming or playing in a pool
Swing	Swinging on a swing
Throw	Throwing, kicking, catching
Walk	Walking, marching
Other	Physical activity type other than the options listed above
Location codes	
Inside	Being inside the preschool building
Outside	Being outside the preschool building or in an indoor gymnasium
Transition	Lining up and waiting to move inside or outside or moving between two rooms within the building

Note. OSRAC-P = Observational System for Recording Physical Activity in Children-Preschool Version; PA = physical activity.

The researcher noted the following:

- behavior setting occupied or feature being played with,
- gender of participant,
- number of participants engaged in play with participant,
- duration of play,
- type of play,
- activity level,
- and any other notes.

The following types of questions were answered by analyzing the inventory of each site in conjunction with the behavior mapping and participant observation:

- How does the site design impact children's choices about play?
- How does the layout affect play and activity level?
- Does the number of behavior settings impact children's play?
- What types of behavior and play do each of the behavior settings attract?
- Do children engage more with manmade or natural features?
- Do children use manmade features differently than natural ones?
- Do children play differently on play equipment than in open space?
- What types and patterns of play does the design foster?

3) Each child was asked a series of questions while in their play environment, such as where is their favorite place to play in their outdoor play environment, and whether they prefer spending time indoors or outdoors. The *student interview*s led to statistics on children's views of play, their preschool play environments, and the outdoors (Appendix A).

4) To gain an adult perspective on the landscape, the teachers were asked to participate in an interview by the researcher. Teachers were asked questions like whether they feel the outdoor play environment at their school is conducive to learning, whether they incorporate it into their lesson plans, and how playing outdoors affects their students. After some observation, the investigator determined that a survey would be less intrusive and more convenient for the teachers. The responses to the *teacher surveys* added the perspectives of adults who use the environments with the children (Appendix B).

5) An informational packet was sent home to the parents of each child. In addition to asking permission for the child to participate, it also included a survey for the parents to fill out. The parents offered a different perspective on their child's behavior, which the researcher could not see during

observation and mapping. Parents were asked whether the school's outdoor play environment played a role in their decision to send their child there, as well as questions about their children indoor and outdoor activities and behavior. The responses were analyzed for key words and phrases, revealing similarities and differences in their perspectives and values. A review of the *parent survey* helped round out the analysis of everyone directly impacted by the outdoor play environment at each preschool (Appendix C).

Studying children in their school environments naturally creates some limitations in the study. Response rates varied due to parent interest, time to fill out forms, and comfort level with the research. The schedule of each school varied, and the teachers did not always conform to the scheduled outdoor playtimes. This required flexibility and a willingness to make necessary adjustments in expectations by the investigator.

Case Study Sites

As discussed in Chapter 2, three to five year olds attending preschools were chosen as the research demographic as they are not only going through crucial developmental changes, but they are also suffering a notable increase in health problems (Louv 2008). The study includes two case study sites in the greater Atlanta area, chosen because the design of their outdoor environments and their curriculum appear to reflect the values that would lead to children experiencing nature on a daily basis. A case study site in Bogart, Georgia was chosen because it represents a standard in traditional preschool playground design, focusing on manufactured play equipment with little to no use of natural materials.

Inman Park Cooperative Preschool (IPCP)

"Inman Park Cooperative Preschool provides a loving, fun and safe environment that supports our children's social, emotional, cognitive and physical development. We offer a curriculum of educational excellence that nurtures each child's unique gifts and talents. We are committed to environmentalism, creativity and diversity through an atmosphere of respect, collaboration, and cooperation" (Inman Park Cooperative Preschool).

Inman Park Cooperative Preschool was chosen for the study because it has an outdoor classroom – used for learning through free play - that is an integral component of a nature-based curriculum. Its design is most like the environmental play yard discussed in Chapter 2. Founded by community members in 1981, Inman Park Cooperative Preschool (IPCP) "is designed around the Creative Curriculum in which children learn through play. This philosophy is found both indoors and outdoors….With the belief that children should not be kept indoors, everyday children get to spend time exploring nature and experiencing a variety of hands-on learning adventures" (*Inman Park Cooperative Preschool*).

The guiding principles of IPCP are as follows:

- "each child creates his/her own learning experience by exploring and manipulating the environment and interacting with the world around them,
- physical development occurs through repeated opportunities to use the body in various ways,
- relating to peers and adults in a group setting is an important part of a young child's preschool experience,
- each child brings his/her strengths and challenges to any situation, [and]
- teaching a reverence and respect for one another, communities and ecosystems cannot be more powerfully taught than in a 'living Outdoor Classroom'"(*Inman Park Cooperative Preschool*).

IPCP is located at the corner of Waddell Street and Edgewood Avenue in Atlanta, Georgia, in the midst of urban homes and small businesses. The Outdoor Classroom, where the three to five year old children spend half of their day, is located across Waddell Street from the main school building. Fifteen years ago, the Outdoor Classroom was the site of a AAA parking lot.

Figure 3.1 Inman Park Cooperative Preschool Location Map

Physical Description

Figure 3.2 IPCP Outdoor Classroom, looking southwest from entrance

The Outdoor Classroom represents the educational philosophy and nature-based curriculum of IPCP. The space is made up mostly of natural elements, like stumps, straw, and living plants and trees; and relatively few manmade items.

There is a “stump jump,” which is a semicircular arrangement of stumps of varying sizes and shapes, placed at different orientations. The stump jump is like the natural version of a play structure – encouraging children to climb over the obstacles or walk along them, building gross motor skills, flexibility, and balance. There is also a willow house, made of a circle of live young willows, which are woven together in their branches creating a natural dramatic play setting. During the spring and summer months, children can play in the fort, hidden from their surroundings.

IPCP teaches the interconnectedness of nature, as well as the reliance of humans on nature and vice versa. Children start seeds in a cold frame, and plant the seedlings in the raised beds in a small vegetable garden. Children have the opportunity to tend the plants and harvest the produce. They also have chickens in the outdoor classroom, and two guinea pigs which they care for indoors. The children are taught responsibility and compassion by caring for these creatures.

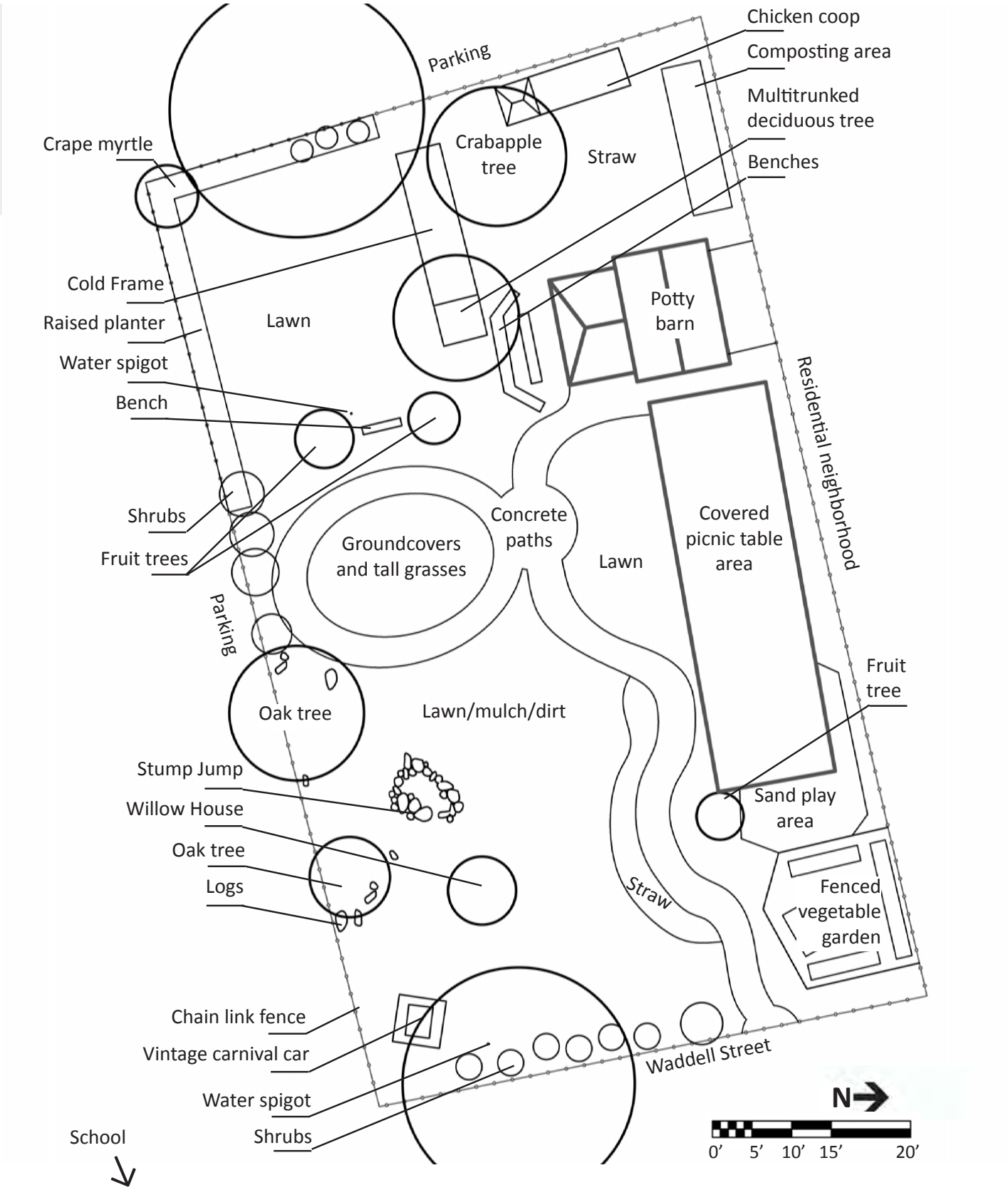

Figure 3.3: Inman Park Cooperative Preschool Site Map

The Clifton School

"Our hope for the Clifton School is to cultivate a community full of wonder, dreams and possibilities: a unique place where we value diversity and progressive education based on research" (The Clifton School).

The Clifton School is located on Clifton Road in Atlanta, and serves employees of Emory University, Centers for Disease Control, and CHOA, as well as full-time Emory University students. The Clifton School was chosen because the playground was designed by The Natural Learning Initiative, a research and design assistance program of North Carolina University's College of Design. This landscape is most like the creative playground discussed in Chapter 2. The Natural Learning Initiative's mission is "to help communities create stimulating places for play, learning, and environmental education – environments that recognize human dependence on the natural world" (*Natural Learning Initiative*).

The curriculum of the Clifton School is based on constructivism, meaning that children learn lessons "in the context of their daily lives and current experiences" and "build understanding from their relationships with others, previous experiences, and their environment." The school's mission is to "cultivate a community which respects and nurtures the rights of the learner in an environment that fosters life-long learning through collaboration, compassion, creativity, wonder, and curiosity." The goals of the Clifton School are

- "to enhance children's ability to learn and to construct their understanding of the world rather than to stress specific content areas…
- the development of a sense of autonomy and independence…[and]
- to strengthen each child's ability to relate to others and to the environment."

In order to achieve these goals, the Clifton School aims to

- "provide an enriched environment with many opportunities for physical, social, emotional, language, and cognitive development.

- foster active engagement with natural materials in the social world around us, rather than focusing on isolated 'learning lessons.'
- promote creativity, with the focus on the process rather than the product… [and]
- incorporate families in the learning process within the classroom" (*The Clifton School*).

Figure 3.4 Clifton School Location Map

Physical Description

Figure 3.5 Clifton School Play Environment, looking east from doorway

Figure 3.6 Clifton School play environment, looking east

The school forms one boundary of the playground, while the periphery is lined with chain link fence. One key feature of outdoor play environment is the way it incorporates the natural topography into its design. The grassy landscape has two relatively flat areas, connected by a sloping hill. Two large wooden play structures - which were made by a local craftsman - are the main features of the

playground. One play structure is ringed with a curvilinear sidewalk and the other is built into a hill. Two tire swings hang in an alcove between classrooms. There is a sandbox in one corner of the playground. Several raised beds are scattered around the playground, and are used for various plants, including vegetables and herbs. Several trees and shrubs are incorporated into the landscape.

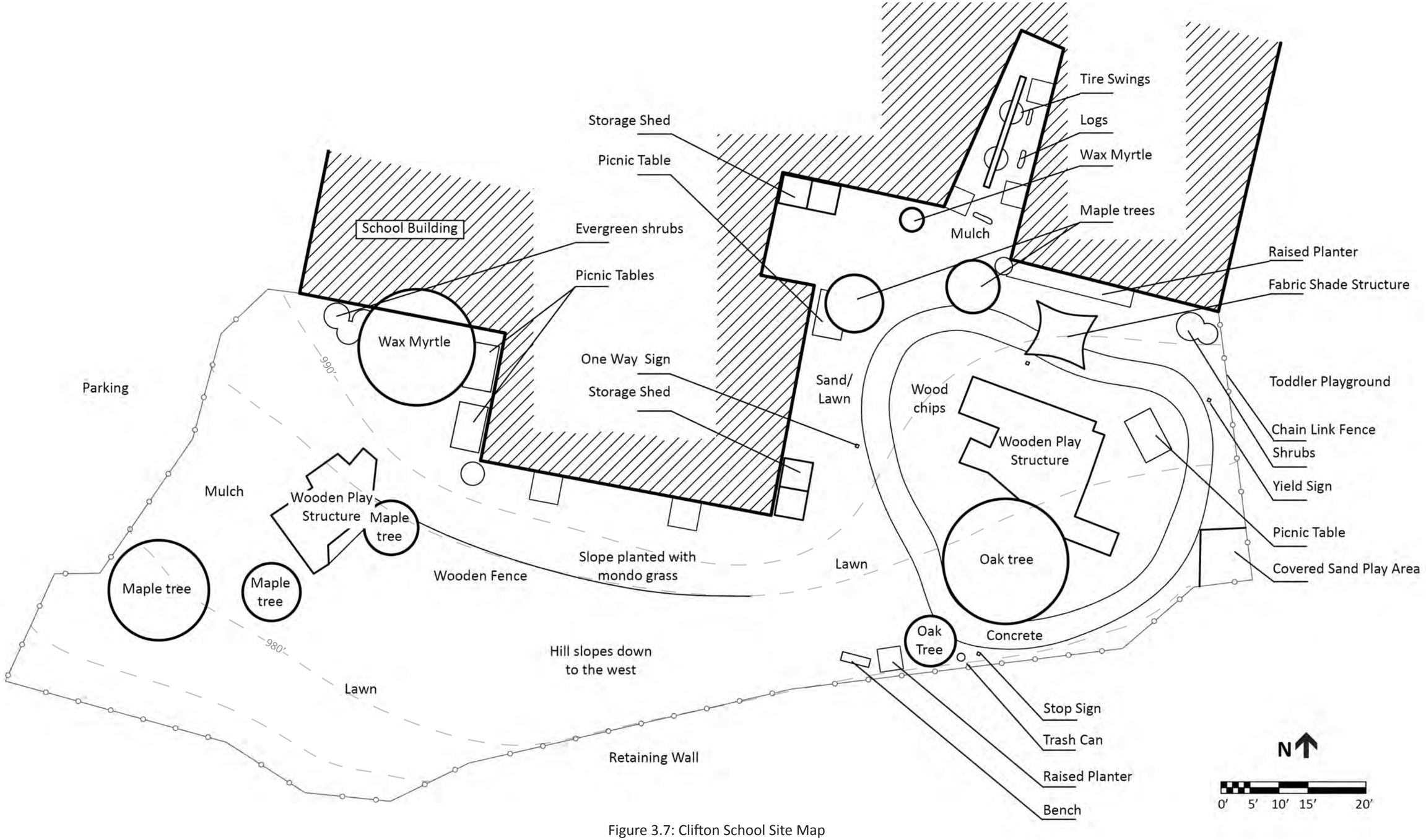

Figure 3.7: Clifton School Site Map

Champions for Children

Founded in 2003, Champions for Children is located in Bogart, Georgia, near the intersection of Monroe Highway and Ruth Jackson Road. Curriculum focuses on promoting the individuality of each child through structured and non-structured developmentally-appropriate activities. The school focuses on creativity and play as ways to build creative expression and problem solving skills (*Champions for Children* 2012). Champions for Children was selected as a control environment, because it is a traditional playground featuring standard manufactured play equipment and relatively few natural materials.

Figure 3.8 Champions for Children Locator Map

Physical Description

Figure 3.9 Champions for Children playground, looking north

Figure 3.10 Champions for Children playground, looking east

The outdoor area is a traditional playground. The classrooms on the rear of the building each open into a rectangle of grass, contained by a six foot tall, black chain link fence. There is a swing set; and sand box under cover; and a brightly colored climbing structure equipped with stairs, a tunnel, and two slides. The playground also contains tricycles and plastic toys. Balls hang in bags from the fences. The area is free from shrubs and trees, but a line of evergreen and deciduous trees runs parallel to the rear fence. Most of the materials in the playground are manmade. Each swing has a rubber pad

beneath it, surrounded by multicolor rubber chips. Rubber mulch chips cover the ground under the climber, which is clearly demarcated by a looping elliptical sidewalk.

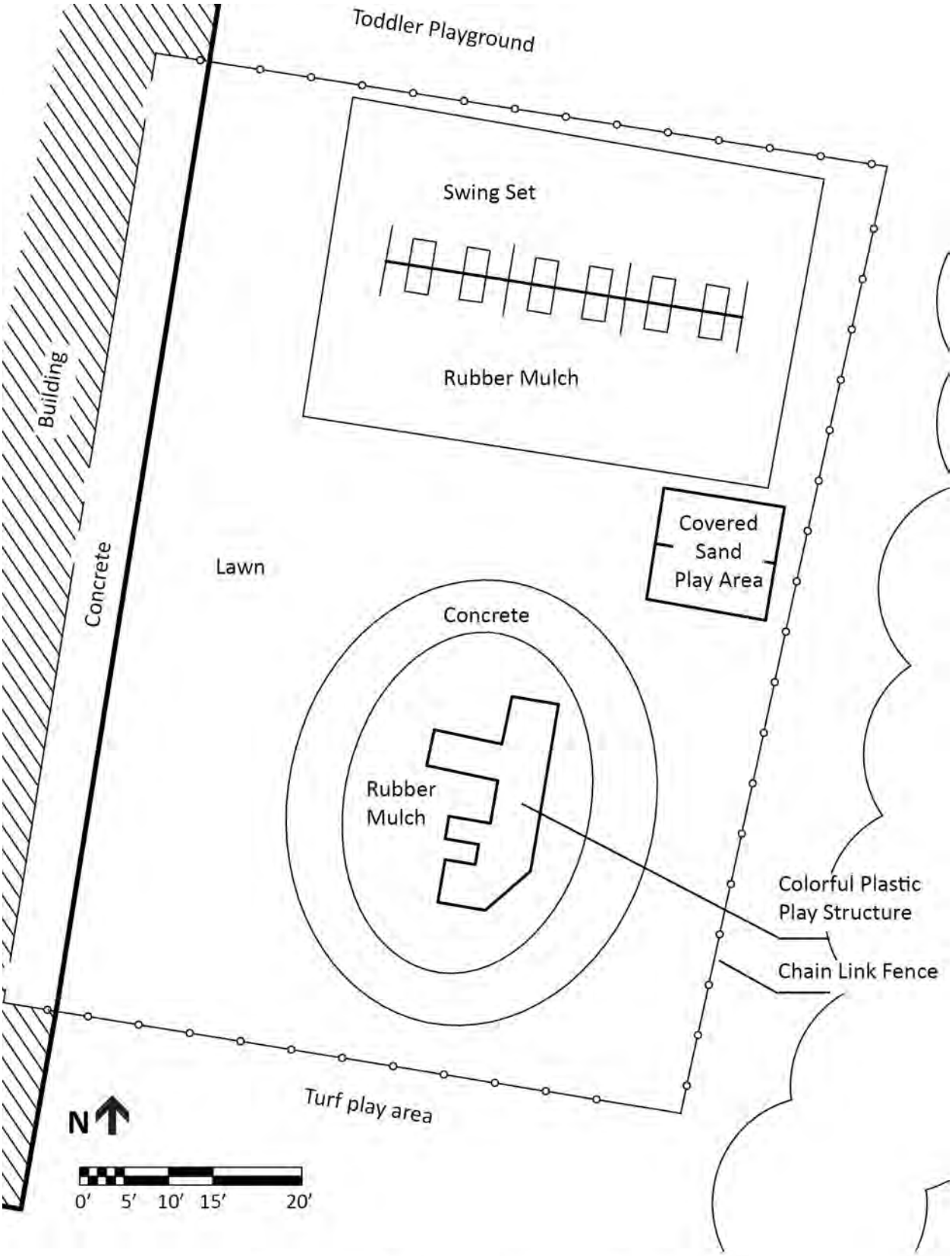

Figure 3.11: Champions for Children Site Map

CHAPTER 4

RESULTS AND ANALYSIS

At each of the three case study sites, three to five year old participants were observed during free play outdoors. The investigator continuously scanned the play environment, noting where each participant was, what s/he was doing, and how long s/he occupied that space or stayed engaged in that activity. Activity level and type were also noted, based on The Observational System for Recording Physical Activity in Children-Preschool Version. When possible, the continuous patterns of play were noted as well. The observation resulted in one composite behavior map for each site, which shows how the children used their play environment. This chapter includes the results of site inventory (including delineation of behavior settings), observations, surveys, and interviews for each case study site, along with an analysis of how each outdoor play environment's design affects behavior.

Inman Park Cooperative Preschool

An analysis of the site inventory led to the delineation of behavior settings in each outdoor play environment. Each setting is made up of elements in a distinct spatial arrangement. The results of the participant observation and behavior mapping are linked to these settings and the opportunities they afford, based on the belief that the design and layout of the environment affects the behaviors which take place there. Changes in the design of play environments can bring about changes in behavior, and thus in the development of young children (Herrington and Studtmann 1998).

Table 4.1 Inman Park Cooperative Preschool Site Inventory

Total Area	Approximately 8,915 square feet
Open Green Space	Approximately 2,929 square feet (or 33%)
Paved Space for Biking/Running	Approximately 775 square feet (or 9%)
Groundcover	Woodchips, leaf mulch, straw, grass, dirt, concrete
Vegetation	Fruit trees (fig, plum, pear, crabapple), crape myrtle, three oaks, willows, deciduous vines, deciduous and evergreen shrubs, potted plants, herbs, fall vegetables
Sun/Shade	Balanced mix of sun and shade throughout the day due to covered area and several large trees
Topography	Almost entirely flat with slight berm at Willow House
Surroundings	Chain link fence surrounds landscape; parking and road to the south; road to the east; residential area to the north; and parking to the west
Site Furnishings	Potty Barn (including covered patio with table, chairs, and shelves for play prop storage), covered picnic table area with two adult size and two child size picnic tables, one adult size bench, one child size bench
Play equipment	No stationary manufactured play equipment, Stump Jump, Willow House, vintage carnival car, 2 plastic teeter totters, dramatic play setting (“market” stand), variety of play props (sand toys, pots and pans, art supplies, etc.)
Other features	Chicken coop with six hens, composting station, rain barrel,

	two water spigots, several logs and stumps, fenced vegetable garden, cold frame, bat house, and bird feeders
Behavior Settings (see Table 4.2)	Compost and Chicken Area, Cold frame, Potty Barn, three Gathering Spaces, 3 Open Spaces, Edge Area, Loop Path, Curvilinear Path, Stump Jump, Willow House, Carnival Car, Vegetable Garden, Sand Play Area

Table 4.2 Inman Park Cooperative Preschool Behavior Settings

Behavior Setting	Features
Compost and Chicken Area 	Chicken pen with enclosed roosting area Composting stations One deciduous multitrunked tree One crabapple tree Mixture of straw and dirt groundcover

Cold frame 	Cold frame built of lumber for starting seeds Attached planter with large, multi-trunked tree
Potty Barn 	Indoor restroom Covered patio area Table, chairs, bins of play props Garden supply and tool storage Rain barrel

Gathering Space (3)   	1) Covered area - several picnic tables 2) Bench with two fruit trees and water spigot 3) Two amphitheater style benches

Open Space  	Mixture of grass, mulch, and dirt groundcover Three plastic teeter totters Two orange traffic cones Child size bench “Supermarket” stand
Edge 	Chain link fence A mixture of shrubs, vines, and trees Raised planter Several logs

Loop Path 	Concrete path Central area planted with tall grasses, surrounded by small fence (generally off-limits)
Curvilinear Path 	Concrete path
Stump Jump 	Stumps of various sizes for climbing

Willow House 	Grass/mulch space encircled by several willows
Carnival Car 	Vintage carnival ride car, on wooden platform

Vegetable Garden 	Six raised beds Enclosed by wooden fence
Sand Play Area 	Sand surrounded by concrete edge Bins of plastic sand toys

Figure 4.1: Inman Park Cooperative Preschool Behavior Settings

Observation Findings

Of approximately fifty children invited to participate in the study, twelve participated. During three visits, these twelve children were observed in the outdoor classroom for a total of ten hours. IPCP operates from 9:00 a.m. – 1:00 p.m. and each child spends about half of that time outdoors when weather permits. There is a high teacher to student ratio; each class of ten to fourteen children was generally accompanied by three or four adults, supervising and providing guidance where necessary. The adults encourage the children to do what they like, however they were very engaged when necessary.

During the ten hours of observation, a total of 317 points where recorded and compiled into one behavior map. Each point symbolizes one child and his/her activity. The attributes of each point are activity type, activity level, gender of participant, who the child was playing with, and duration of activity. Figure 4.2 shows the percentage of the total activity which occurred within each behavior setting.

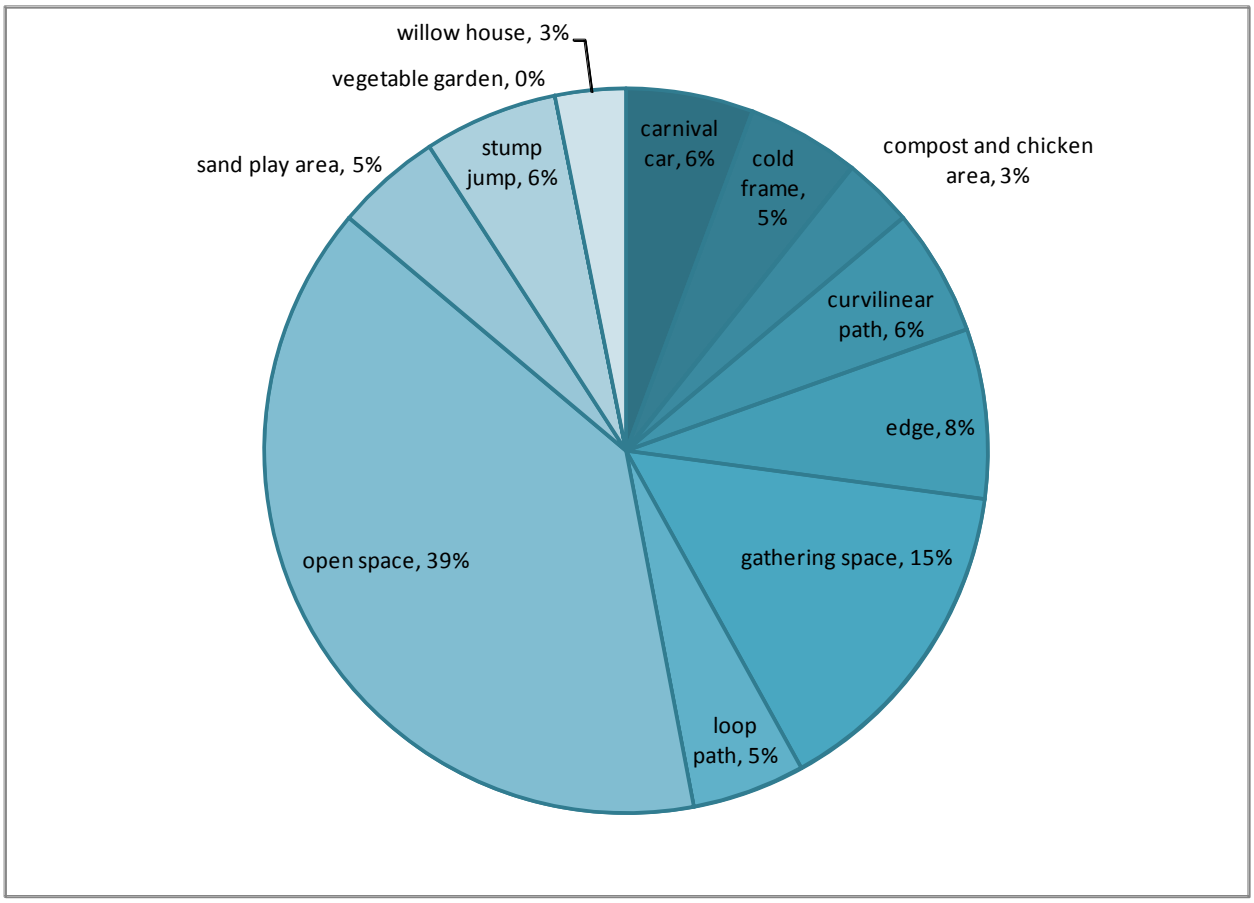

Figure 4.2 Inman Park Cooperative Preschool, percentage activity in each behavior setting

The IPCP outdoor classroom has thirteen different behavior settings. At least three percent of the total activity occurred in each, with the exception of the vegetable garden; as children must be accompanied by an adult to enter the fenced area. This shows that during free play, children used the entire environment that was available to them.

Figures 4.3 and 4.4 show the distribution of solitary and social play at IPCP – overall and within each behavior setting. Both solitary and social play are important in the developmental process, however children engage in more social play as they develop; and the settings in which more social play was observed may encourage more social development. Overall, seventy-two percent of the activity observed was social.

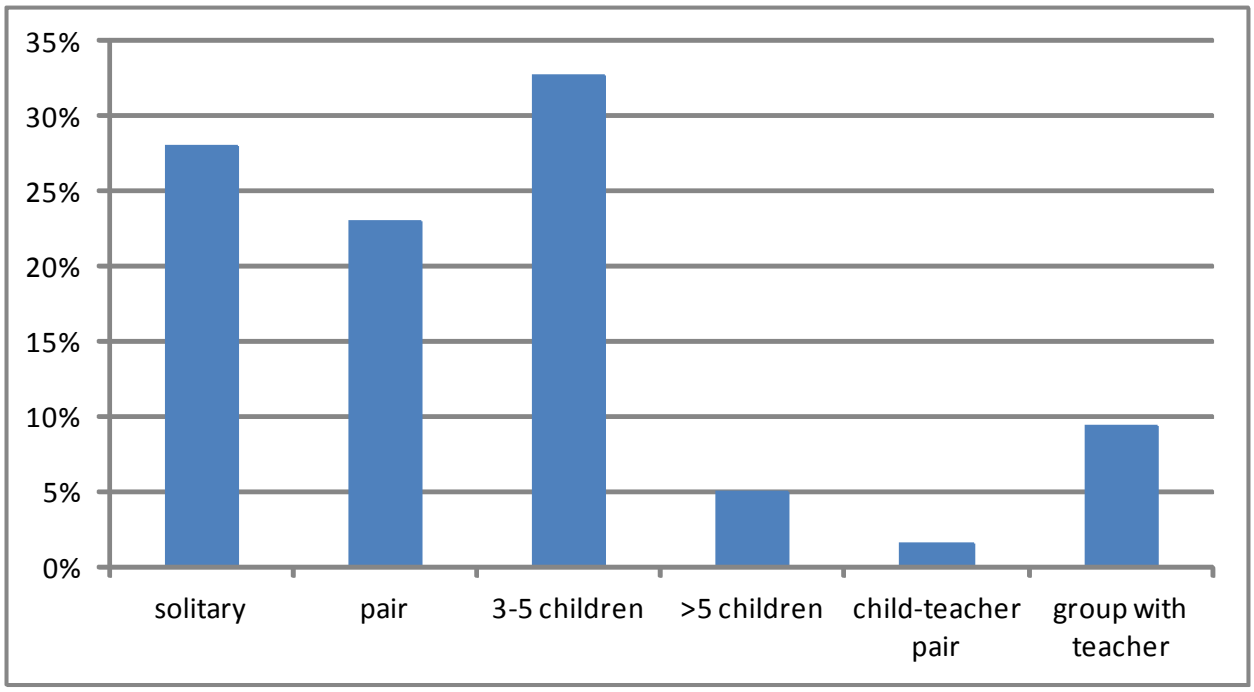

Figure 4.3 Inman Park Cooperative Preschool overall percentage solitary and social play

The children at IPCP engaged in slightly less solitary play than at the other case study sites. This may be because the natural elements and flexible design provided many opportunities for working and playing together. Social play is an important component of play for preschool children, and it was observed in high numbers at all three case study sites. This shows that three to five year old children are likely to socialize with one another through play regardless of their setting. The percentage of activity involving a group which includes a teacher was higher at IPCP than at the other schools – almost ten percent - because IPCP teachers always had a learning activity, such as an arts and crafts project or science experiment, in which the children could choose to participate.

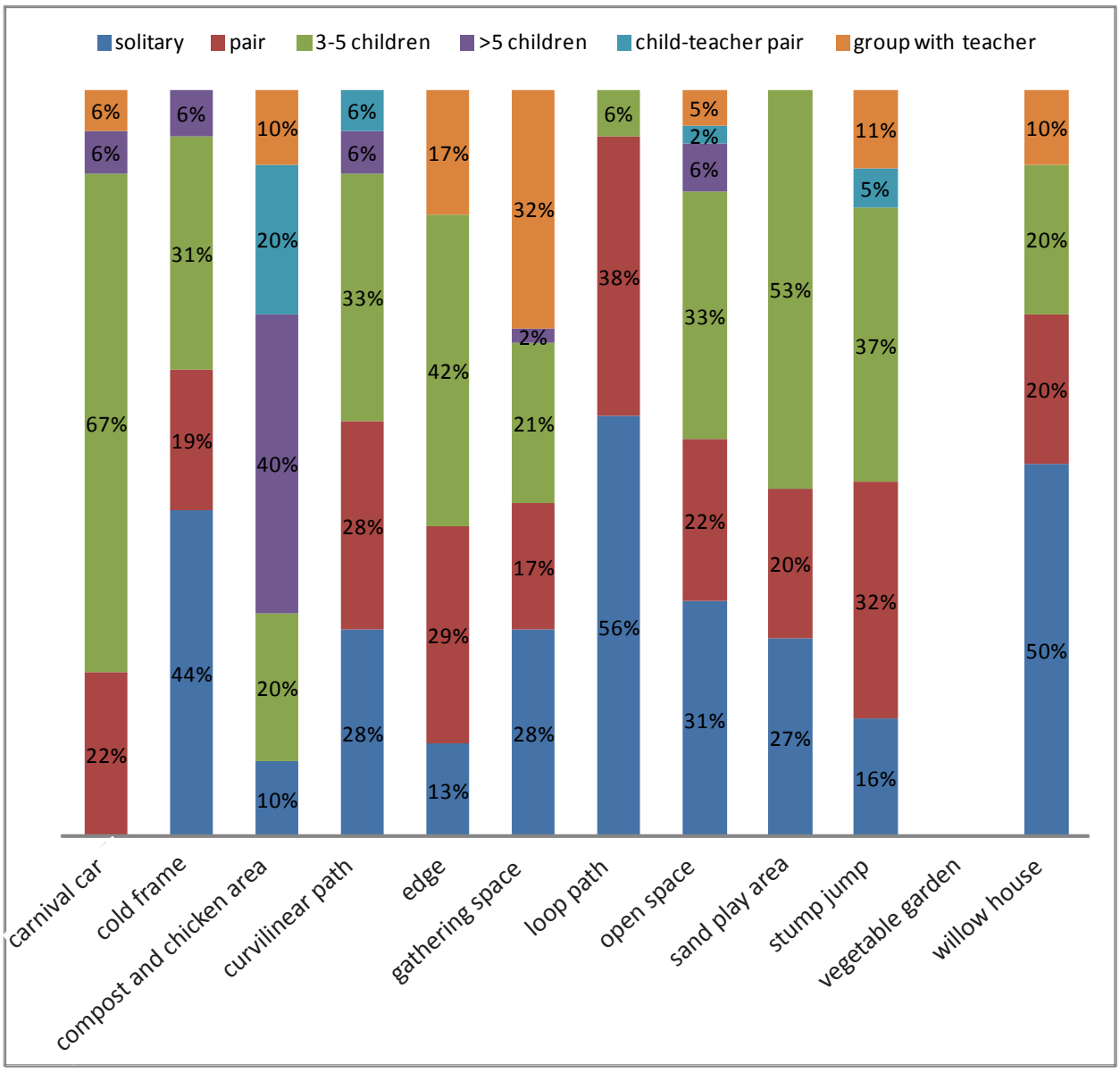

Figure 4.4 IPCP, distribution of solitary and social play by behavior setting

The *carnival car*, where six percent of activity occurred, was attractive to the children as a dramatic play setting. It offers a semi-enclosed space which the children are drawn to for sociodramatic play. They ran to it often and generally inhabited it in pairs or with a few friends, pretending to drive it or clean it. All of the play here was social, and sixty seven percent involved groups of three to five children.

The *cold frame*, where five percent of activity occurred, was also used predominately as a dramatic play setting. They played inside the structure which is enclosed on the back and both sides, as well as partially enclosed on the top. Just over half of the activity involved children interacting with other children; they were observed using it as a princess palace, a train car, and a fire truck. This activity may differ in other seasons however, when it is used to raise seedlings.

The *compost and chicken area*, where three percent of activity occurred, was mostly used for observing the chickens, digging for worms in the straw, and hiding behind compost tumblers. Thirty percent of the activity in this setting involved teachers – as children were often supervised in this area, learning how to behave around the chickens. Children were rarely alone here. It is a somewhat open space, but it did not receive as much use as the other open spaces in the outdoor classroom.

A wide variety of activity types, and six percent of the activity, occurred on the *curvilinear path*. It attracted imaginative play, physical activity, and expressive movement; children also gathered items such as sticks, leaves, and pieces of glitter, and travelled from one place to another along the path. Seventy two percent of the activity here was social.

The *edge*, where eight percent of the activity occurred, was delineated as a separate behavior setting because it appeared to hold a special charm to the children; they behaved differently near the boundary fence than they did closer to the interior of the play space. The edge is composed mostly of natural elements like leaves, sticks, logs, shrubs, and trees. These natural elements create special micro-environments – nooks and crannies - for the children to inhabit; they can attain a sense of privacy by separating themselves from the open space. These nooks and crannies can be thought of as smaller behavior settings within behavior settings, or sub-behavior settings. The vegetation, fence, and natural elements create spaces of varying degrees of enclosure which the children are drawn to because they are at a child's scale. Children generally ventured into this space with others – eighty seven percent of the time. The edge was used for hugging and climbing trees, hiding behind shrubs, dramatic play such

as “building a campfire” and playing “Super friends,” playing with sticks and leaves, and occasionally watching what was happening outside the fence.

The *gathering spaces*, where fifteen percent of the activity took place, were used for arts and crafts activities facilitated by teachers; various imaginative play, including making mud pies, using large paint brushes and rollers to “paint” and “clean” the area; talking; eating; and resting. Thirty two percent of the activity involved adults guiding children in activities in the covered picnic table area.

Five percent of the activity occurred on the *loop path.* Children chased one another, ran all around the outdoor classroom, and used their imaginations. They also hugged one another, talked, and gathered sticks and dirt on the loop path. The interior space bounded by the loop path was rarely used, as it requires adult supervision and is separated by a twelve inch high fence. Over fifty percent of the activity here was solitary – generally children moving across the space from one activity to another. Pairs of children also used the path to chase and talk together. Unlike the other two case study sites, the loop path is used less frequently as a “track” for repetitious travelling; it generally seems to blend into the ground plane as a whole. The loop path is not designed to be a central feature, so the children do not rely on it for a large portion of their play.

The *open spaces* were used more than any other space – thirty nine percent of the total activity occurred here. There was a high level of fast-paced activity here with lots of running, expressive movement, and dramatic play. Children used this space and the variety of props – including many natural loose parts, including sticks, woodchips, logs, and leaves - within it to conduct creative games and weave imaginative tales. For example, a group of boys pretended they were protecting a nest of baby eggs in the grass for the majority of their outdoor time during one observation session. They took turns protecting the space, being careful who they let near. Children also played “Farmers Market” with the more traditional dramatic play stand that was situated in the open space, selling vegetables to their friends. Children used shovels and their hands to dig in the grass, dirt, and mulch; found “treasures;”

chased one another; negotiated and compromised; screamed; “flew;” rocked on teeter totters; and moved objects around in the space.

The *sand play area* was “off limits” during the first day of observation; it was covered by a tarp and had puddles in it due to recent rain. During the second two days of observation, children used shovels to dig in the sand, talking with each other while they played. Five percent of the total activity took place there. Fifty three percent of the activity involved groups of three to five children playing together. Other studies state that sand play areas generally experience heavy usage; the difference here may be that there are so many other available options.

Children used the *stump jump* for six percent of their activity, climbing and hopping, usually with a teacher’s assistance. This setting was also used as a gathering space for small groups of two to five children, who rested or talked here before running to the next activity. It was rarely used for solitary activities.

The *vegetable garden* was not used by any of the participants during observation; as its use requires adult supervision, making it unavailable for free play.

The *willow house*, where three percent of the activity happened, was a setting for tumbling and manipulation of trees and their branches. Children also played Superman and other imaginative games here. The activity was evenly split between solitary and social play. Children did not generally stay long in the willow house, as the study was conducted in the winter. The willow house serves as more of an enclosed dramatic play area in the spring and summer months.

Figure 4.5 provides a visual representation of how each behavior setting was used. The word size reflects the percentage each particular activity occurred in each behavior setting.

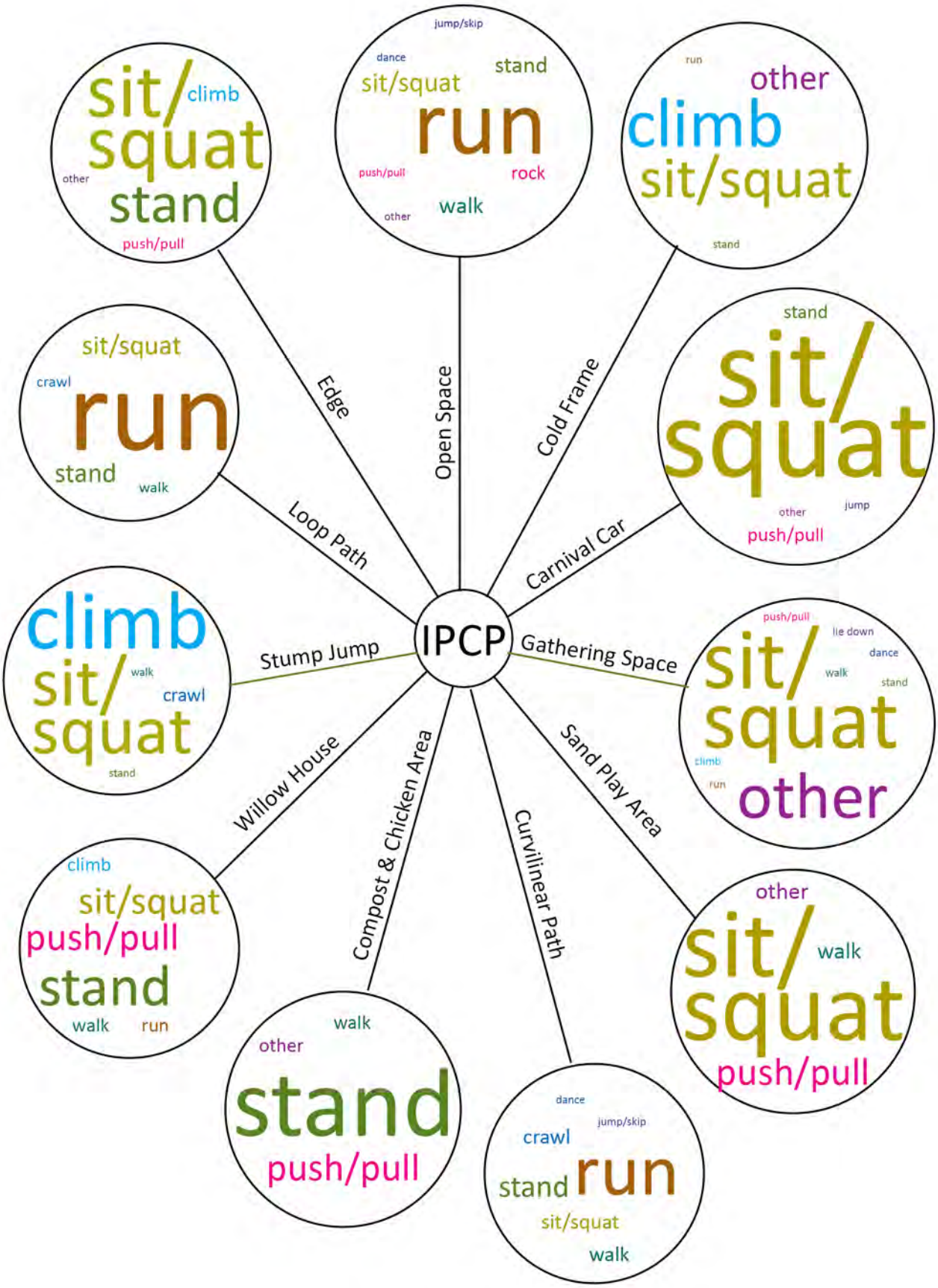

Figure 4.5: Inman Park Cooperative Preschool, activity types in each behavior setting

Activity Levels

A full range of activity levels occurred during observation in IPCP's outdoor classroom. The highest activity levels, which include fast movements like running and skipping, were mostly observed in the open spaces of the landscape, confirming that open space facilitates big and fast movements. Much of the fast activity in the open spaces involved children running from one place to another, or using moveable elements to enhance their activities. For example, children ran around the loop, across the grass, stopped off briefly in the willow house, then continued running to a gathering space. This shows that the layout, not the behavior settings alone, plays a role in children's play; having many interesting places to go encourages movement and creativity.

Much of the sedentary activity, including standing, sitting, squatting, was observed in the sand play area, gathering spaces, edge, and compost and chicken area. These behavior settings all have places to sit down and things for children to do with their hands, such as dig in the straw, shovel sand, and touch shrubs. Medium levels of activity, including walking and other slow and easy movements were observed all over the outdoor classroom. IPCP activity levels show that having flexible, multi-use space allows for flexible usage and a variety of activities.

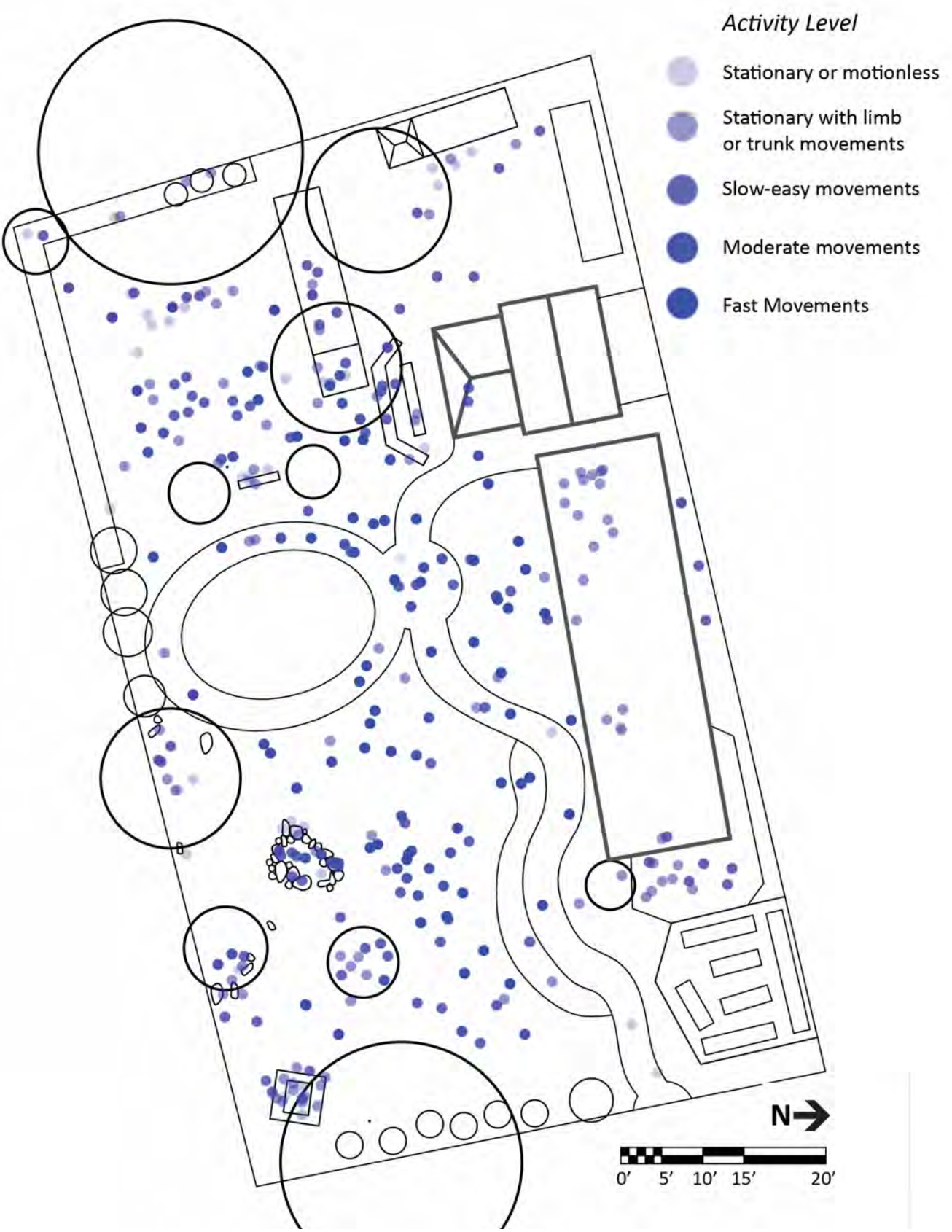

Figure 4.6: Inman Park Cooperative Preschool composite behavior map of activity levels

Natural Features and Qualities

IPCP contains many natural features and qualities. There are many trees and shrubs throughout the site. A bat house and bird feeders, along with flowering vegetation, attract wildlife to the site. Logs are used to create the climbing structure. A cold frame, chicken coop, vegetable garden, fruit trees, and composting area teach the children, first hand, about food systems.

Effects of Design on Behavior

IPCP has more behavior settings than the other case study sites, and the behavior settings are more flexible in use. The open nature of the outdoor play environment, paired with the many different settings, leads to a wide variability in activity types and levels. Children move freely throughout the space and appear to transition easily from one activity to another. The open layout allows for flexible use and easy transitions; however it takes the children a few minutes to figure out what they are going to do. During observations, many stood still for a couple of minutes, surveying the situation—maybe thinking of the possibilities or options—before beginning to play. This is different from the other two case study sites, where many children ran directly to a behavior setting and began playing right away. At IPCP, once the children transitioned to their outdoor space, they moved easily from one area to another, and they took their imagined stories or play props from one behavior setting to another. The lack of pre-programmed play equipment allows for imaginative play and endless options for activities. Children become accustomed to using their imaginations and cooperating with one another. Imaginative play is harder to quantify than qualities like activity level and duration of play, but many imaginative behaviors were observed. Children used loose parts, like logs, straw, and "treasures" to create stories in which they played roles for extended periods of time. They became engrossed in their tales, and some lasted the whole outdoor period. This reaffirms other studies that show that loose parts encourage children to be physically active and socially engaged (Bundy 2009).

At IPCP's Outdoor Classroom, teachers offered more guidance to students than at the other schools. There were often two to four adults with each class rather than the one or two noted at the other two case study sites. The teachers acted as positive role models for the children, offering them suggestions on ways to handle conflict, and opportunities to participate in activities geared towards a better understanding of nature and the environment. These interactions tended to be positive, focusing on the ability of the child to make good decisions. Having strong adult role models in the outdoor space made it possible for the children to explore new things and learn more from their surroundings in ways that were not observed at the other two sites. "The key to success in developing resilient, peaceful children is the community nature of the process. Peace is a collective phenomenon and a profoundly important characteristic of the human condition. It can only by conserved collectively" (Moore and Wong 1997, 120).

Children played with one another in pairs or in groups, enhancing their social development. Fine motor skills are developed by the manipulation of natural materials; and gross motor skills are developed by running, dancing, climbing and balancing on irregular logs, and the expressive movements involved in dramatic play. The benefits of this landscape are the free, flexible space combined with the nature-based learning scenarios, such as the compost and chicken area, and the arts and crafts stations created by teachers. Children learn about nature as it relates to a variety of subject matter, and then they take that knowledge into their play. Because learning and play are linked in this setting, play will enhance the children's learning on a daily basis.

It is possible that because IPCP children spend half of every day outdoors that they are more inquisitive, engaged with, and comfortable in their surroundings. Perhaps children need to be immersed in a natural environment with proper guidance and leadership for long periods of time on a regular basis before the space becomes a true learning environment. The more time they spend there, the more they gain from their surroundings.

Analysis of Student Interviews

Interviewing students in their outdoor play environment reinforced that direct observation is the most practical way to gain knowledge about their use of and feelings about their landscape. Young children vary in their ability to answer the questions asked of them. Also, it was difficult to interview every participant due to absence and timing. One hundred percent of the six children interviewed said they enjoyed playing in the outdoor classroom. Due to the complexity of the landscape, each child had a different favorite place to play in the outdoor classroom, including the car, the sand box, the "kitchen," and a bench. When asked what they were playing, fifty percent were playing imaginative games with at least one other friend. Four out of the six children prefer being outside to being inside, "cause you can feel the breeze," "because I love playing," "because I don't like playing inside," and "cause it's cool." Overall, the children's comments showed a desire to play outdoors and an appreciation for nature.

The interviews paired with observation showed that the participants were content with their outdoor play environment. They appear engaged with their surroundings, and willing to talk about creative activities, imaginative games, and their friends. The varying responses for favorite places and activities correlates with the varying options allowed to the children in this environment.

Analysis of Parent Surveys

Ten parent surveys were submitted. Review of the surveys revealed many shared values among the participating parents that seem distinctly and consistently tied to an appreciation of nature, which differs from the responses from parents at the other two schools. This was the only school in which one hundred percent of the parents said that the outdoor play environment played a role in their decision to send their child to IPCP. This is worth noting because the environment is so different from other preschool play settings in the area. Thirty percent stressed that IPCP's outdoor play environment is crucial because they live in an urban setting. Most parents identified the calming effect that nature has

on their children. They felt that playing outdoors in a natural environment increases creativity, confidence, and happiness. They said that by spending time in IPCP's outdoor classroom, the children gain an appreciation for nature and living things, as well as for their place in nature. They also learn to respect and care for the natural world around them. Fifty percent of participating parents stated that their children participate in gardening at home; gardening is one of the activities that sets IPCP apart from many other preschools in the area. All of the parents believe that playing outdoors in nature affects their children differently than playing indoors. Thirty percent claim this has something to do with the freedom they experience while they are outdoors. Based on survey response, parents send their children to IPCP because they value nature, and want their children to explore it, while learning about themselves and their place in the world at the same time. Respondents seem to want to transfer their values regarding nature to their children, and believe the Outdoor Classroom is an appropriate venue for facilitating this learning.

Analysis of Teacher Surveys

Two teachers submitted surveys. Both said that the outdoor classroom impacted their decision to work at IPCP. They both felt that the outdoor play environment is conducive to learning, and they incorporate nature into their lessons. The teachers' attitudes are different at IPCP than at the other schools. They actively engage the students in learning through the use of natural elements. The environment is not simply a backdrop for play; it is a rich setting that the children can engage with for education and development. One teacher stated that counting and sorting leaves teaches math, watching the life cycle of a caterpillar teaches science, making tree rubbings teaches art, and writing names with sticks teaches literacy. Both teachers noted positive impacts of nature on their students; "being outside is calming," and "children tend to create their own play." Both teachers believe the landscape benefits the development of the children in general ways by exposure to fresh air and sunlight, and in more specific ways: running and balance promote gross motor skill development,

digging for worms and making mudpies promotes fine motor skill development, sorting leaves by color promotes cognitive development, counting crabapples promotes math skills, and noticing color changes promotes artistic development. They noted that children are generally happy, excited, busy, creative, inquisitive, and calm in the outdoor classroom. The teachers observe the children "cooking," digging, searching, gathering, and painting; while engaged in imaginative, creative, rough and tumble, group, and solitary play. Both teachers believe that playing outdoors affects children's behavior. One stated that "children who are comfortable with the outdoors are more creative," and the other believes that "freedom of movement gives children independence," which affects the way they are engaged in activities.

The Clifton School

Table 4.3 The Clifton School Site Inventory

Total Area	Approximately 12,813 square feet
Open Green Space	Approximately 8,434 square feet (or 66%)
Paved Space for Biking/Running	Approximately 801 square feet (or 6%)
Groundcover	Grass, woodchips, mulch, mondo grass, dirt, and concrete
Vegetation	Two wax myrtles, four oak trees, two maple trees, mix of evergreen and deciduous shrubs, mondo grass
Sun/Shade	Much of the playground is in the shade except for midmorning and midafternoon due to the tall surrounding buildings
Topography	Eastern section of the playground is relatively flat, while the western half slopes down to the north and the east, creating a grassy hill

Surroundings	Playground edges which are not bordered by the school building are enclosed with chain link fencing; school building to the north; toddler playground to the east; a shear drop off to a two lane road and tall office buildings to the south; parking lot to the west
Site Furnishings	Four picnic tables, one trash can, one bench
Play equipment	One multilevel wooden climbing structure consisting of monkey bars, two slides, tire climber, rock climbing walls, chain climber, a variety of steps, moving bridge, and various platforms and walkways; one multilevel wooden climber - built into the hill -consisting of two latching doors to platforms, one vertical ladder, one forty-five degree ladder, two slides, and a variety of platforms and walkways; two tire swings
Other features	Several tricycles with rear seats, plastic sand toys, balls, logs, three traffic signs, one fabric shade structure, wooden retaining walls, wooden fence, two storage sheds, several wind chimes, bird houses and feeders, and various raised planters
Behavior Settings (see Table 4.4)	Open Space (including grass and mulch hills), Loop Path, Sand Play Area, four Gathering Spaces, two Play Structures, Tire Swing Area

Table 4.4 Clifton School Behavior Settings

Open Space (including Grass Hill and Mulch Hill)  	Predominantly grass with sand, and mulch in areas Includes various planters, shrubs, and trees Bounded on west, south, and east sides by chain link fence
Loop Path 	Concrete path for running and tricycle riding

Sand Play Area 	Partially covered by wooden pergola Plastic shovels

Gathering Space (4)    	1) Two picnic tables, one multi-trunked wax myrtle, three evergreen shrubs 2) One bench, one raised planter, and oak tree 3) One picnic table and maple tree 4) One picnic table

Play Structure Areas (2)  	East – On flat ground with wood chip groundcover, encircled by concrete loop path West – Built into a hill, with wood chip groundcover
Tire Swing Area 	Two tire swings hanging from wooden beams, four large logs, mulch ground cover

Storage Shed (2) 	Wooden storage sheds for tricycles and other loose parts

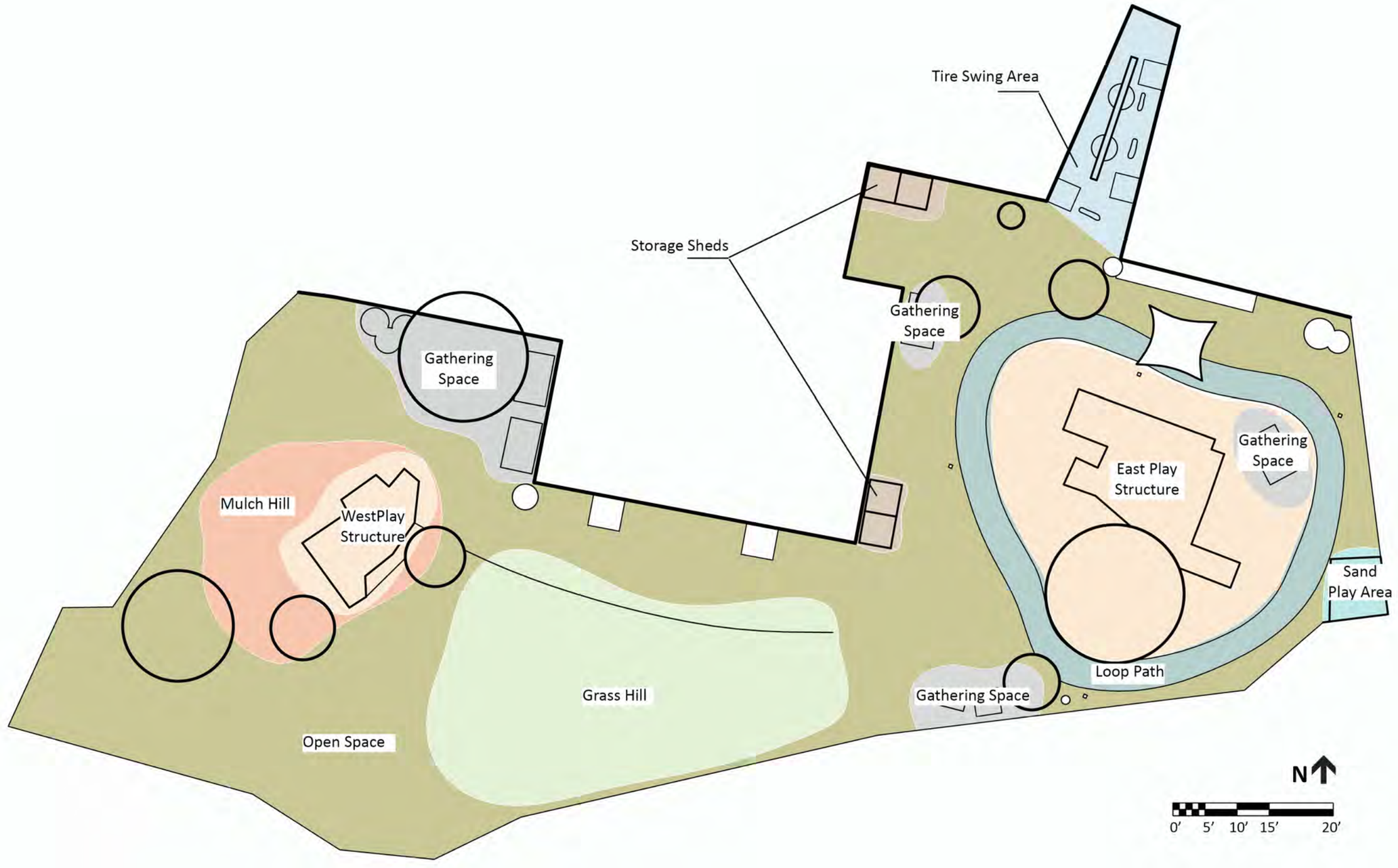

Figure 4.7: Clifton School Behavior Settings

Observation Findings

Of approximately eighty three to five years olds invited to participate in the study; nineteen participated. The Clifton School operates a full-day program and children generally have outdoor free play for two forty five minute periods daily. During six visits, the participants were observed for a total of nine hours. During the nine hours of observation, 275 points were recorded and compiled into on composite behavior map. Figure 4.8 shows the percentage of the total activity which occurred within each behavior setting.

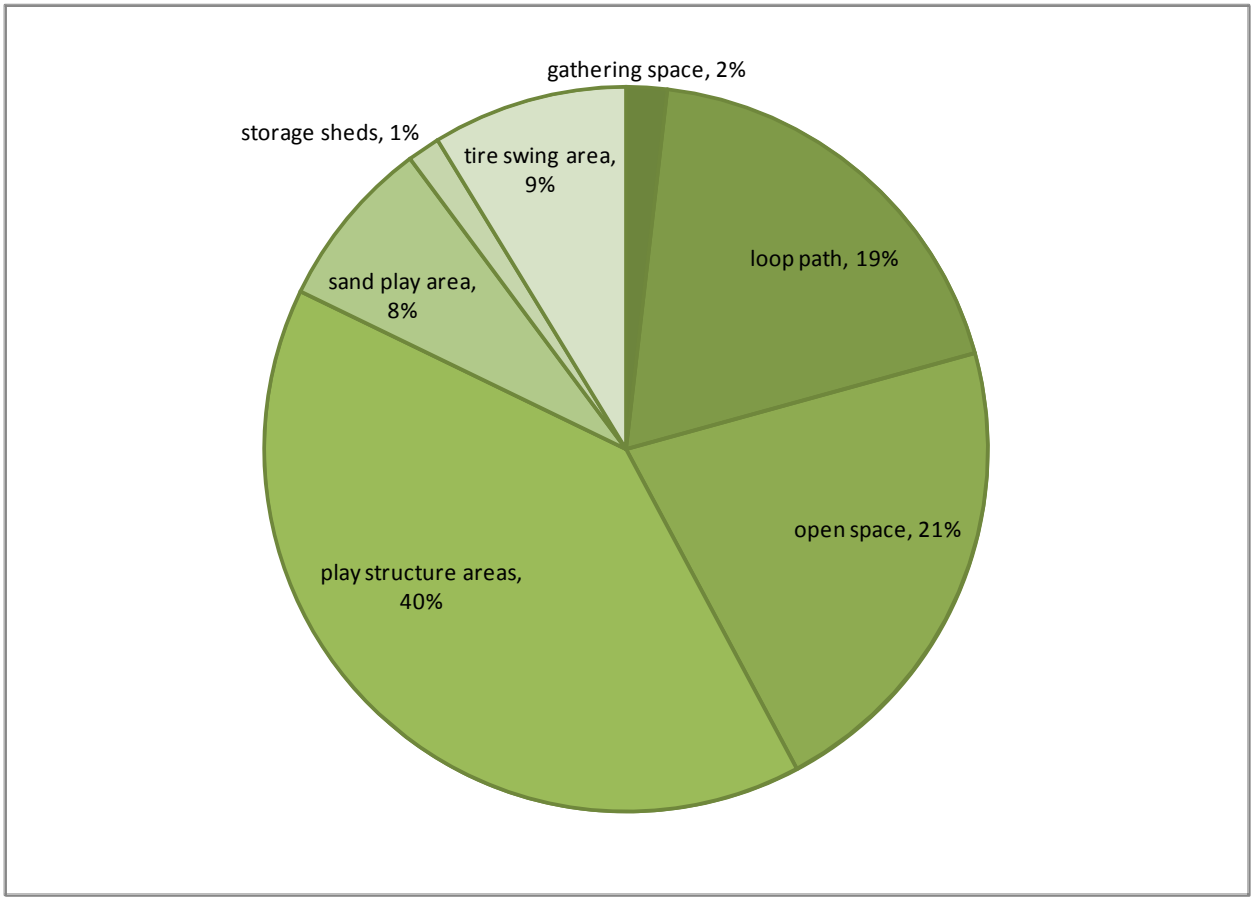

Figure 4.8 Clifton School, percentage activity in each behavior setting

The greatest amount of activity occurred on the play structures, with open space, and the loop path having the next two largest amounts of activity. The tire swing area and sand play area also experienced moderate amount of use. There was a lack of activity in the western portion of the play

environment because the building blocks visibility of it from the eastern portion; children must be accompanied by adults in this area, and there were usually not enough adults to make this possible. This is something for designers to consider when creating play spaces. The topography changes combined with the way the play environment wraps around the school building decreases visibility, resulting in underutilized play space, which might otherwise be enriching.

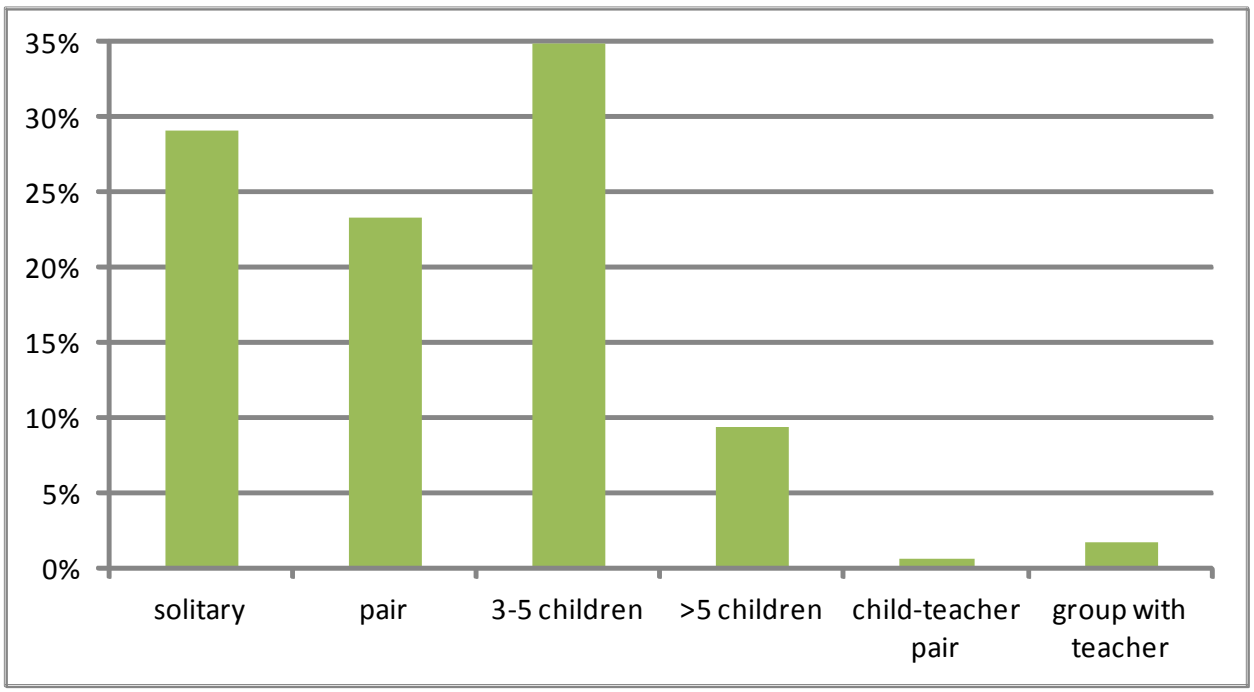

Figure 4.9 Clifton School, overall percentage of solitary and social play

Seventy one percent of the total activity at the Clifton School was social; generally involving groups of three to five children. Only three percent of the activity included adults; they generally stood to the side while the children played.

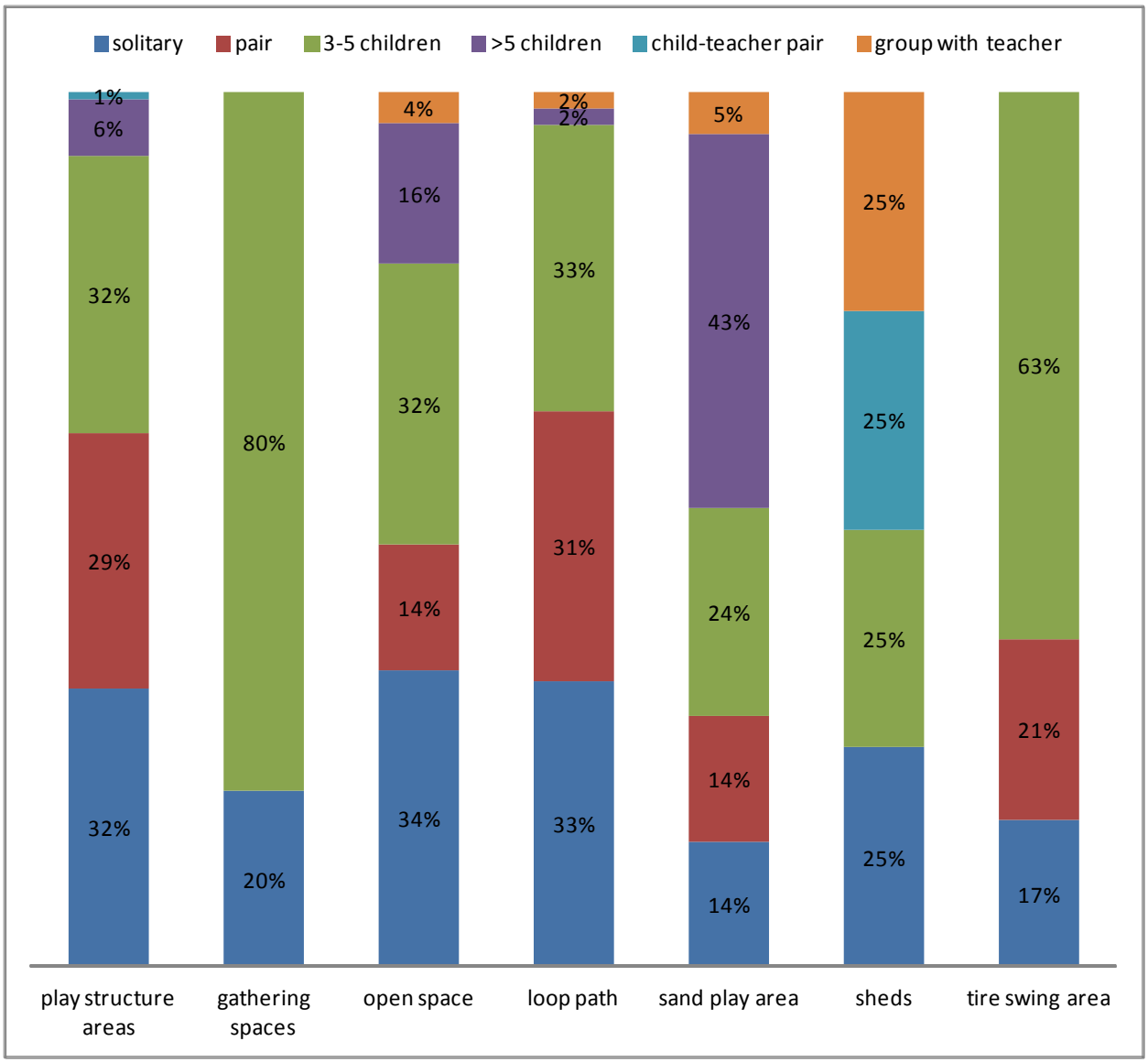

Figure 4.10 Clifton School, distribution of solitary and social play by behavior setting

The *play structure areas*, which are made up of the east and west play structures, were the most used behavior settings in the Clifton School's outdoor play environment; forty percent of the activity occurred in these settings. The play structure areas create sub-behavior settings by nature of their design, size, and complexity. Spaces with varying degrees of enclosure exist within and underneath the structures which can be used for activities other than climbing. This shows that complex elements increase function while encouraging children to explore more varied play and learning activities. Thirty two percent of the activity was solitary, and sixty eight percent was social.

The west play structure is built into a hill, so children can run up the hill to access the upper level of the structure. Children also pretended that the wood chips under the play structure were gummy bears and chocolate, offering them to each other. The east play structure attracted the expected climbing and sliding, but it also attracted dramatic play and creative games. Children inhabited the space underneath the climber to create intricate stories together, have quiet conversations, and play with woodchips and sand; these spaces seem to have a certain allure to children because of their concealed nature. Children chased one another, screamed, played with and moved the woodchips, and talked here. Observation showed that play structures can provide more opportunities than just climbing and other gross motor skill exercises.

The *gathering spaces*, in which two percent of the observed activity occurred, were used very infrequently during observation. They were generally used for resting – places to briefly get away from the high activity of the open space and play structure areas. Twenty percent of the activity was solitary and eighty percent involved three to five children. One unexpected use was the construction of a see saw by two girls in one of the gathering spaces; they balanced a log on the edge of a raised planter and rocked back and forth on it for more than ten minutes.

A variety of activities, constituting twenty-one percent of the overall activity, took place in the *open space*. There was running, chasing, screaming, ball play, rough and tumble play, and imaginary play. Children carried a log up the hill and watched it roll down; they carried natural items like pine cones, wood chips, and sand around the space; they talked about “making cakes;” they picked clovers and showed them to one another; and they played in a large puddle, experimenting with the properties of dirt and water. Slightly more solitary behavior was observed in this behavior setting than in the others, and seventy six percent of the activity was social. These observations show that free play in open space becomes richer when loose parts and natural elements are available.

The *loop path* was another highly used behavior setting; nineteen percent of activity occurred there. The setting was predominately used for tricycle riding and running, but it was also used as a space to sit, lie down, and build structures with sand and woodchips. Many of the children observed riding tricycles were engaged in imaginative scenarios, such as "playing family" and "driving a choo choo train." This reinforces the idea that children use their imaginations everywhere. The loop is intended for one way traffic, so the children also learn to negotiate space and cooperate with one another in this setting.

The *sand play area*, where eight percent of the activity was observed, was used for playing in the sand with sand toys. Generally the activity level was lower here than in other behavior settings, and the children were engaged in pretend play. Children used the plastic shovels and buckets to scoop sand and "dig for treasures and dinosaur bones." The concentration level of the children here was high, and play became more complex as they carried sand back and forth from the sand box to the path and other places on the playground. Activity involving groups of more than five children was observed more in the sand play area than other settings as they often worked together in groups to build with the sand.

The *storage sheds*, which were used to store loose parts like tricycles and balls, were generally empty during playtime, making them a possible space for the children to inhabit. Children used them to hide from friends and from the cold wind. Only one percent of the total activity occurred in these behavior settings.

The *tire swing area*, where nine percent of the activity occurred, was mostly used for swinging, spinning, and pushing one another. Children also played with the mulch and logs in this area. There was singing, "tire swing shows" in which girls showed off their swinging and spinning skills, and learning to negotiate and take turns. The tire swing area attracted a noticeably greater amount of girls than boys; eighty three percent of the participants who played in this space were female. Sixty three percent of

the activity involved groups of three to five children pushing, swinging, and interacting together. Only seventeen percent of the activity was solitary.

Figure 4.11 provides a visual representation of how each behavior setting was used.

Figure 4.11: Clifton School, Activity types in each behavior setting

Activity Levels

The play structure area, the loop path, and the open space attracted the highest activity levels and fastest movements. These areas are larger than other behavior settings, making it possible for the children to make big movements with their bodies, developing their gross motor skills and social skills. Low levels of activity, like standing, sitting, and squatting occurred in the sand play setting and open space. Generally children with sedentary behavior in these settings were engaged in imaginary games with friends, or exploring the natural world around them. Medium levels of activity, like walking and other slow and easy movements were spread throughout the outdoor play environment, as children moved from one place to another alone or with friends.

Concentrations of activity are visible in the play structure area, the tire swing area, the sand play area, the loop path, and the grass hill. The large play structures were the most popular settings in the outdoor play environment, attracting all levels of activity and type of play.

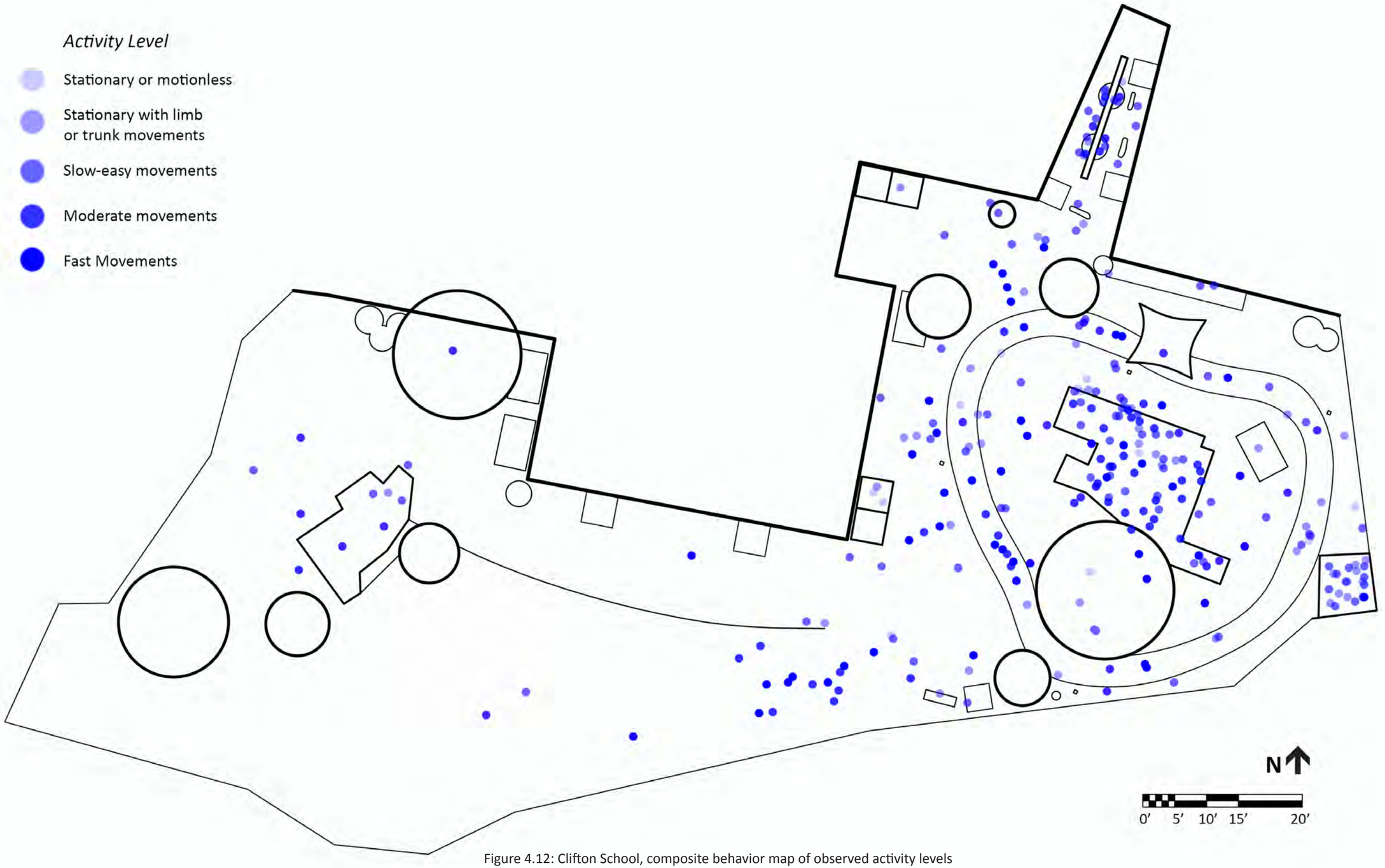

Figure 4.12: Clifton School, composite behavior map of observed activity levels

Natural Features and Qualities

Unlike the other two sites, topography is incorporated into the Clifton School's play environment. Observation revealed that these topography changes attract different types of activity than flat land; children generally run up and down the hills rather than walk on them, and most of the rough and tumble activity occurred on the hills. Hills invoke curiosity and encourage children to strengthen muscle and achieve balance.

The two large play structures in the landscape are constructed mostly from lumber, and the neutral colors blend in with the landscape. The slides are the only components that are brightly colored (blue and yellow) plastic. Wood chips and natural mulch are used as groundcover, which provides children many loose parts to play with. Bird feeders are used to attract wildlife into the environment. Finally, several logs are placed around the landscape, creating opportunities for play and imagination.

Effects of Design on Behavior

Children appeared to have their favorite places to play and favorite activities in this landscape. Day after day, children ran to the same behavior setting as soon as they come outside. Children tended to play in the same setting for extended periods of time. Many of the settings were in close proximity to one another, making it easy for children to transition from one to another. Due to the layout of the environment, children were often not able to play in the lower section of the playground, greatly limiting the amount of space that the children could inhabit.

The large, varied design of the play structures made them spaces for physically active use as well as imaginative play. Many children used the structures at the same time due to its large size and the many smaller areas which existed within them. There were always children engaging in other activities within these smaller, more enclosed settings, such as exploring underneath the structure and creating new worlds. Children were drawn to areas where there were loose items to play with, such as sand, woodchips, sticks, and mulch; and they enjoyed carrying these items around and using them in other

areas of the playground. It is possible that the play structure was the most popular setting because it is literally the focal point of the landscape.

One notable difference regarding social play at the Clifton School is that there was consistently less solitary play across the behavior settings than at the other schools. This could be evidence that the behavior settings at the Clifton School attract more social play, and that there is a lack of spaces for children to be alone or play by themselves. This could be related to the openness of the space and the large size of the play structures.

Analysis of Student Interviews

Ten students were interviewed at the Clifton School. One hundred percent said they enjoy playing on the playground. The slides were the favorite place to play for fifty percent of those interviewed. The other fifty percent preferred the climber, tires wings, and sand box. Fifty percent of the students said they were just playing a pretend game, including "fairies," "family," and "making a cake." One girl responded that she and her friends were building the biggest sand castle in the world so that they could go inside of it. Eight out of ten children said they preferred being outside to being inside, and one responded that he liked both. The reasons for enjoying the outside more included "because there's lots of sand and woodchips," "because it's funner," "I love to run around outside," and "because I like to play on the slide."

There is a lack of variability in the favorite places and activities of students interviewed. Children tended to direct their play to the manufactured behavior settings more than the open green spaces - perhaps because there were few loose parts and nooks and crannies there. The space is so wide open that it ignores the individual child's scale; this was confirmed by observations in which individual children rarely used the open space.

Analysis of Parent Surveys

Nineteen Clifton School parents submitted surveys. Seventy nine percent said that the school's outdoor play environment played a role in their decision to send their child to the Clifton School, largely because of its ample open space and interesting, age appropriate play structures. Ninety five percent of parents believe that the outdoor play environment plays a role in their child's development by providing proper space and materials for motor development, social development, and creative development. Seventy nine percent of parents believe that outdoor play affects their children differently than indoor play, because it allows them to "burn off energy," try new things, use their imaginations, and access fresh air. Based on survey results, Clifton School parents seem to value outdoor play largely for its physical and social developmental impacts.

Analysis of Teacher Surveys

Two Clifton School teachers submitted surveys. Both thought the outdoor play environment could be improved, because although it has a lot of space, it lacks a variety of features with which the children can engage. Suggestions for improvement included adding a sensory garden, an outdoor classroom, a walking trail, a larger track, a picnic area, a ball field, and more opportunities for hands on digging, building, and pulling. Neither teacher offered examples of ways in which the outdoor play environment is conducive to the children's learning; however they do try to incorporate nature into their lesson plans. Both teachers stated that the outdoor environment benefits the children's social development, as they engage in creative play with other children. The teachers observe happy, excited, and bored moods in the children while playing outside. They observe the children playing hide and seek, painting, collecting items in buckets, playing ball, picking flowers; and engaging in a variety of dramatic, solitary, and parallel play. One teacher believed that having "ample time to run freely and explore outside" makes the children more cooperative and less hyperactive when they are indoors. The other teacher stated that free play outside "allows children to be free and release any energy from being inside of a school or classroom setting."

Champions for Children

Table 4.5 Champions for Children Site Inventory

Total Area	Approximately 8,702 square feet
Open Green Space	Approximately 4,351 square feet (or 50%)
Paved Space for Biking/Running	Approximately 1,456 square feet (or 17%)
Groundcover	Lawn, multicolored rubber mulch under play equipment, concrete
Vegetation	Grass
Sun/Shade	Entire playground is in full sun for most of the day, as the building is one story and landscape is treeless
Topography	Flat
Surroundings	Six foot high chain link fence encloses landscape; childcare building to the west, toddler playground and highway to the north, row of small to medium size trees to the east, office park to the south
Site Furnishings	None
Play equipment	One brightly colored plastic play structure composed of two slides, two sets of steps, climbing platforms, one tunnel, musical components, and finger maze; one swing set with six swings
Other features	Two plastic teeter totters, nine tricycles, plastic child size picnic table, plastic child size basketball hoop, sand toys, and a variety of balls

Behavior Settings (see Table 4.6)	Play Structure Area, Loop Path, Sand Play Area, Swing Set Area, Linear Path, and Open Space

Table 4.6 Champions for Children Behavior Settings

Play Structure Area 	Rubber mulch groundcover with brightly colored plastic play structure
Loop Path 	Elliptical concrete path encloses play structure area

Sand Play Area 	Covered sand play area with sand toys, including dump trucks and buckets
Swing Set Area  	Six swings on rubber mulch bed

Linear Path 	Covered linear path along the building edge
Open Space 	Grass open space with no other vegetation or materials

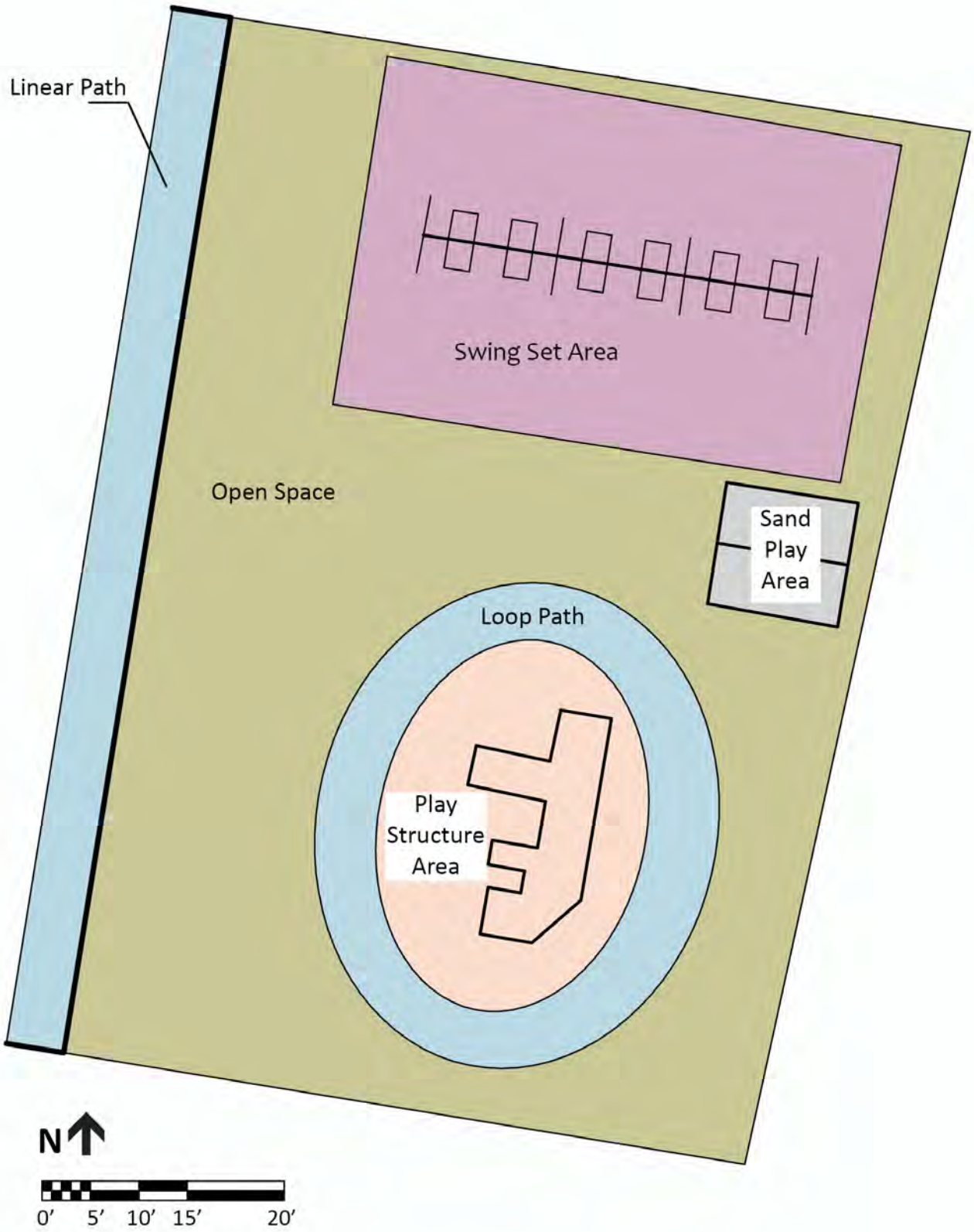

Figure 4.13: Champions for Children Behavior Settings

Observation Findings

Of approximately fifty three to five year olds invited to participate in the study; fourteen participated. Champions for Children is an all-day program and each class has two forty-five minute periods for outdoor free play. During six visits, the children were observed for a total of six hours. During two additional visits, no observations were made either because the children did not go outside during their scheduled outdoor playtime, or the participants were not present. Students at Champions for Children are not allowed to play outdoors if it is under forty degrees—another factor that made it difficult to achieve the desired ten hours of observation.

During the six hours of observation, 168 points were recorded to create a composite behavior map. Figure 4.14 shows the percentage of the total activity which occurred within each behavior setting.

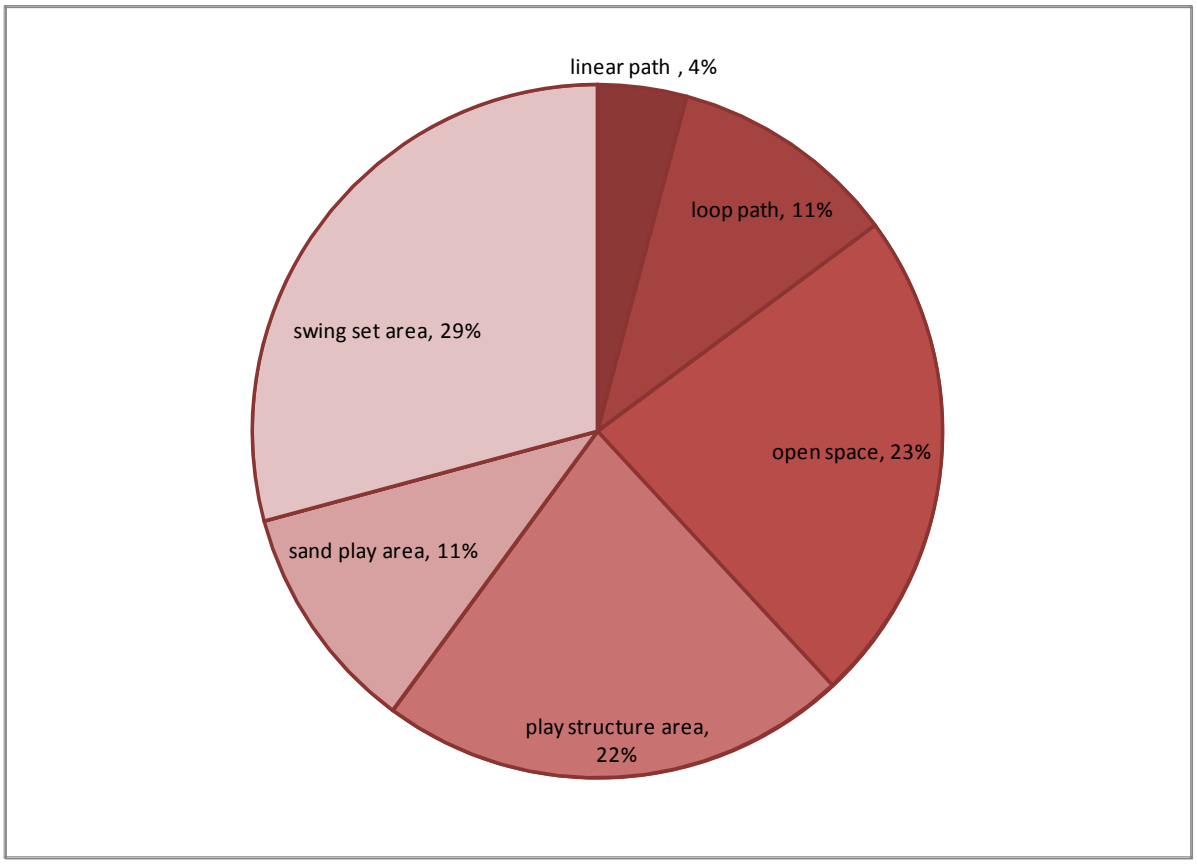

Figure 4.14 Champions for Children, percentage activity in each behavior setting

The behavior settings are fewer, simpler, and more straightforward than at the other schools. Observation showed that this has a major impact on children's behavior. The activity was strongly concentrated in the constructed play settings, with predictable activity from day to day. The swing set area was the most popular behavior setting and children spent the longest amounts of time there, followed closely by the open space and the play structure area. The remaining activity was split between the loop path and the sand play area, with the linear path experiencing the least amount of activity.

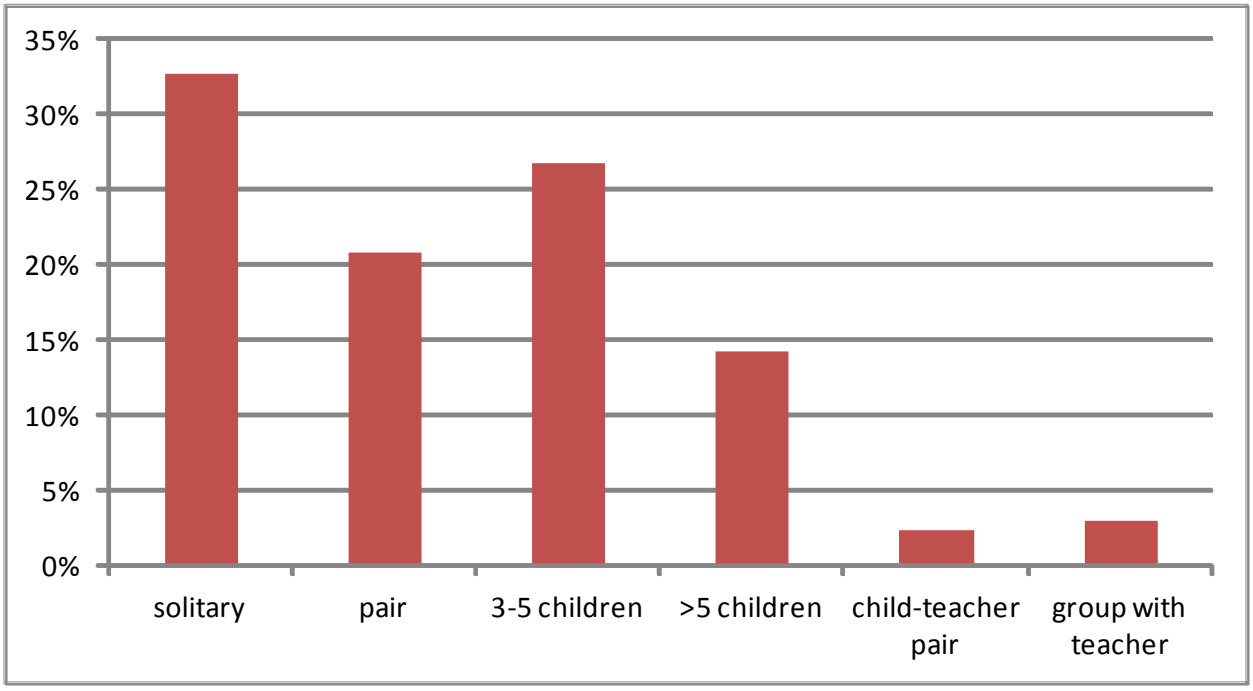

Figure 4.15 Champions for Children, overall percentages of solitary and social play

Champions for Children students engaged in slightly more solitary play than students at the other two schools – thirty three percent were observed alone. There was also more activity in groups of more than five children than at the other schools. This could be due in part to having fewer behavior settings and fewer opportunities to spread out and engage in different activities. The children here were more likely to move together through the space in large groups.

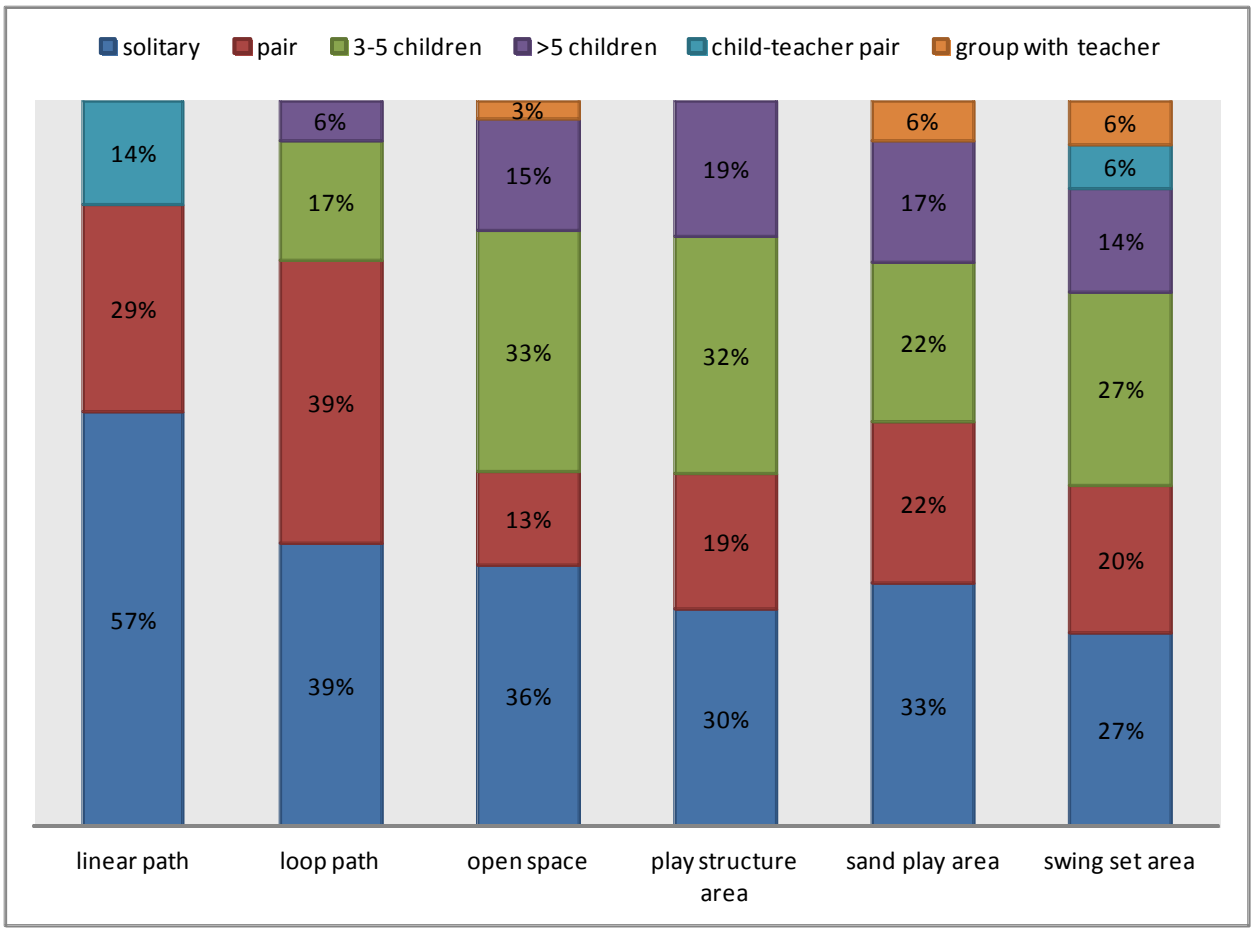

Figure 4.16 Champions for Children, distribution of solitary and social play by behavior setting

The *linear path* was the transition zone between indoors and outdoors and only four percent of the total activity occurred on it. Children sat quietly, engaged in make believe scenarios, and chased back and forth here. Play props such as tricycles, balls, and a child size picnic table and basketball goal were stored in this setting, but could be moved by the children. Fifty-seven percent of the play here was solitary – more than any other setting, and no large group activities were observed here.

The *loop path*, where eleven percent of the activity occurred, was generally used for riding tricycles and running. Children also pushed plastic sand trucks along it, and engaged in make believe scenarios involving yelling and growling. Seventy eight percent of the activity observed involved individuals or pairs of children playing together. A variety of both quiet and boisterous activity was observed here.

The majority of the fast movements - like running and skipping - occurred in the *open space*, where twenty three percent of the activity took place. This is also where most of the imaginary games took place. Sixty three percent of the activity was social. Children played "Power Rangers," "My Little Pony," and a variety of robot and monster related games. Much of the pretend play involved chasing and yelling, and seemed to be based on television shows. Children also rocked on plastic teeter totters in this space when they were available. Ball play and organized racing were also observed.

Children used the *play structure area* for climbing, sliding, sitting, talking, imagining, and wandering. Twenty-two percent of the activity occurred here. The play structure does not offer many level changes or other intricacies for exploration, so children generally climbed the stairs, crawled through the tunnel, and slid down the slide. One girl crawled around like a "kitty cat" and another yelled "you can't catch me!" to anyone listening. Children were generally supervised by a teacher in this behavior setting – although non-participating students were the ones observed interacting with the teachers here. Children did not use the area underneath the play structure as they did at the Clifton School, showing that not all play structures are created equal. Champions for Children's play structure lacks the complexity and size that would help create smaller spaces within which the children could play.

The *sand play area* was equipped with plastic sand toys, including buckets and dump trucks, which were used in and out of the sand box. Eleven percent of the activity occurred here; children filled buckets with sand and sometimes took them out of the setting to build elsewhere. When this happened, they were told that the sand had to stay in the sand box. Children also participated in a game of "hot lava" which a teacher initiated; the whole class stood on the edge of the sand box and walked slowly around, trying to balance and not fall in. Sixty seven percent of the activity was social.

The *swing set area*, where twenty nine percent of the activity occurred, was predominantly used for swinging, with children occasionally sitting on the ground. Twelve percent of the activity in this setting involved teacher interaction, as the teachers often pushed children on the swings. Children

talked to one another and were often pushed by a teacher. Children sometimes pushed empty swings or swung on their bellies. This area was generally quieter than the others. This most popular behavior setting seemed to have less social and cognitive activities than the other settings.

Figure 4.17 provides a visual representation of how each behavior setting was used.

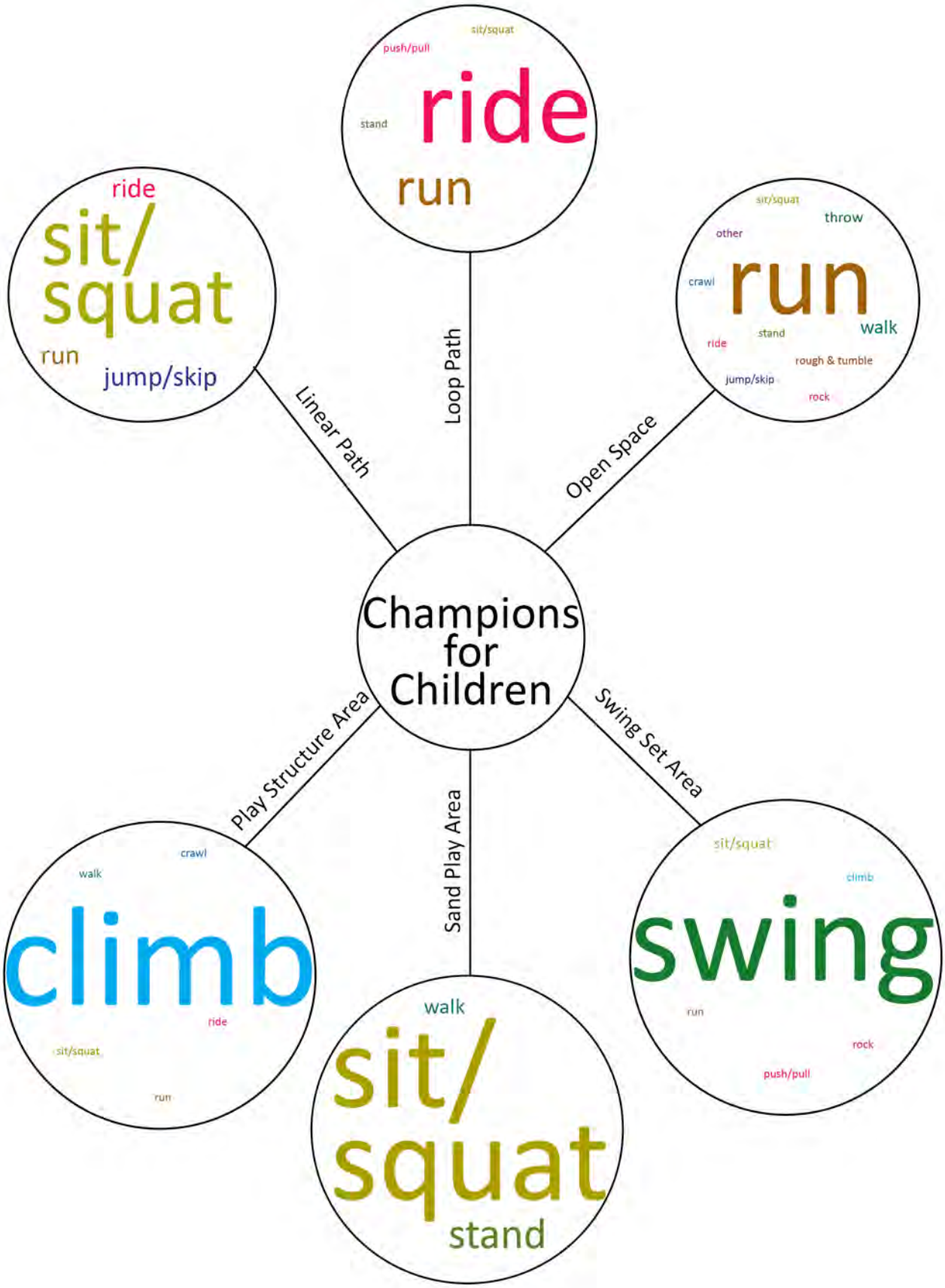

Figure 4.17: Champions for Children, types of activity in each behavior setting

Activity Levels

Activity level observations were clustered in each behavior setting. High levels of activity, including running, swinging with leg pumps, and vigorous climbing were observed in the open space, the swing set area, the loop path, and the play structure area. Mostly sedentary activity was observed in the sand play area and on the linear path. Children used their imaginations in all areas of the playground, though this behavior was observed with greater frequency in the open space and in the play structure area. The fully programmed playground resulted in relatively predictable behaviors: children generally ran in the open space, climbed in the play structure area, rode tricycles on the loop path, swung in the swing set area, and sat in the sand play area.

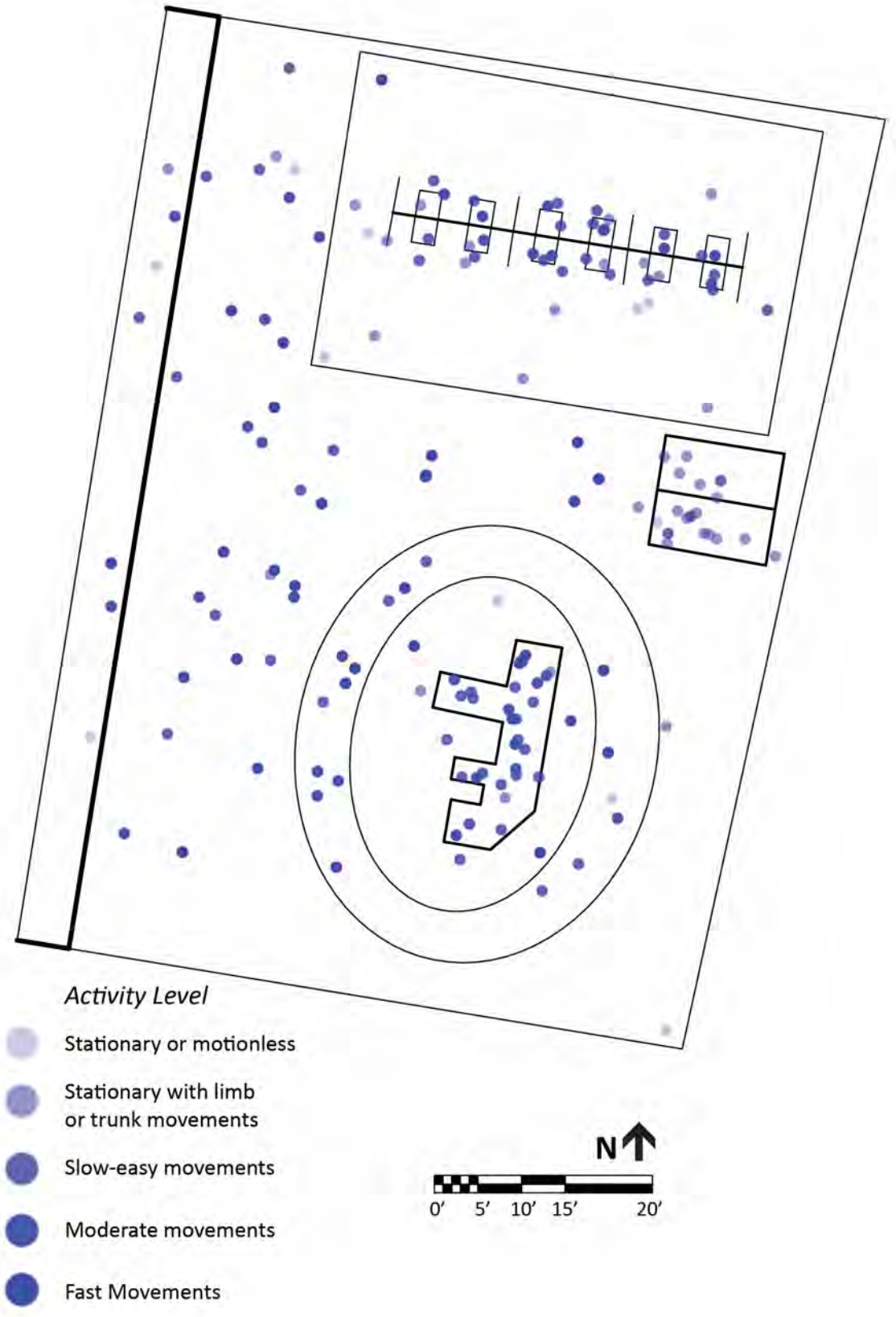

Figure 4.18: Champions for Children, composite behavior map of observed activity levels

Natural Features and Qualities

Grass and sand are the only natural elements found within the playground. A row of medium size trees creates a buffer between the preschool and its neighbor, attracting wildlife to the area.

Effects of Design on Analysis

There was more whining, crying, and complaining on the Champions for Children playground than at the other two sites. For example, children often ran to the teacher seeking ideas for new activities in which to participate; this is likely a result of the few options for play and lack of complexity that exist within this landscape. Children seemed to require more teacher involvement in order to maintain engagement in activities, which proved a challenge as there was often only one teacher with each class. This is different from the Clifton School, for example, where the children were rarely observed requesting teacher intervention or assistance. The playground design at Champions for Children is limited, which limits the children's ability to create their own play and sustain themselves for long periods of time. A standard "playground teaches a set, rigid repertoire mainly because of its properties of non-manipulability and inability to change with the changing needs of the child" (Fjeldsted 1980, 43).

The Champions for Children playground is an example of a space that does not provide diversity, and therefore, does not experience a broad variety in play. The children seemed to bore more easily than at the other case study sites. A greater variety of settings and opportunities provided in a play setting will result in children entertaining themselves for longer durations with more varied play. "If there is no incentive to go higher, for instance, the child's physical development will not be stretched and he/she will soon get bored" (Hill 1980, 25). Not only do the children have fewer opportunities afforded by their environment, but they also spend less time outdoors than at the other schools. Perhaps if the outdoor play environment were richer, teachers would be more inclined to take the children outdoors more often.

Analysis of Student Interviews

Eight students were interviewed on the playground. One hundred percent said they enjoy playing on the playground. The swings are the favorite place to play for seventy-five percent of the participants. The remaining twenty-five percent favor climbing and sliding on the play structure. Fifty percent commented on imaginary play games they were participating in that day; including "kitty cat," "Super Girls," and "Power Rangers." Thirty-eight percent responded that they preferred being indoors, because "it's warm" and "Mommy and Daddy are inside." An equal amount preferred being outdoors, "because it has a playground;" "because there's swings out here and we can swing; because we get to run around and we don't get to do that stuff inside." They appear to associate the outdoors with playgrounds and play equipment. Twenty-five percent said they liked being both indoors and outdoors because "I got a really big old trampoline outside and I like it because I get to jump on it whenever I want to;" and "cause outside we can run and inside we can play." One hundred percent of the children interviewed mentioned indoor activities as their favorite thing to do when they are not at school. This differs from the other two sites where the children's responses include outdoor as well as indoor activities.

Analysis of Parent Surveys

Thirteen surveys were submitted by Champions for Children parents. Sixty-one percent of the parents said that the outdoor play environment played a role in the choice of preschool. It was a less important factor to them than to the parents at the other two schools. Many parents shared the belief that the outdoor environment plays a role in their children's physical, social, and creative development. Ninety-two percent of parents believe that playing outdoors affects their children differently than playing indoors, generally because it allows them to "run off energy" and use the loud voices that they cannot use inside. The survey results indicate that parents mostly associate outdoor play with physical development and an opportunity to use up excess energy before going back indoors to learn.

Analysis of Teacher Surveys

Unfortunately, the survey results for Champions for Children do not reveal as much about the use and effects of the outdoor play environment because only one teacher submitted a survey with very brief answers. The playground did not play a role in her decision to work at the school. She thinks the playground is good because it is "open." She stated that the playground has an effect on the children's socialization and coordination, and that the children seem happy and energetic while outside. She sees them playing chase games in which one pretends to be the "bad guy."

Concluding Thoughts

The field research revealed the overall difficulty involved in conducting participant observation. Such field work requires many hours in an unknown context, and scheduling can be difficult. Each school has outdoor play time as a part of their daily schedule, but this schedule is not always abided by. For example, Champions for Children classes seem to frequently miss or shorten their outdoor play time. When asked about this situation, a preschool teacher responded that it depends on what types of activities they are doing inside that day. This experience suggests that free play outside is not always as important as indoor activities, such as crafts. Maybe these indoor activities could be taken outdoors as a way to give the children more nature exposure than they are currently getting. If the outdoor play environment is rich, diverse, and stimulates learning and development, it will be used more and offer more benefit to the children.

CHAPTER 5

UNDERSTANDING PLAY ENVIRONMENTS AS EXPERIENTIAL LANDSCAPES FOR LEARNING:

DESIGN GUIDELINES FOR WHOLE CHILD DEVELOPMENT

"When children are provided with opportunities to work directly with the living environment, to creatively manipulate it, to interpret it through the imagination, and to invest it with positive feelings of enjoyment and trust, they feel good about themselves individually and collectively, and feel that their school is a great place to be" (Moore and Wong 1997, 133).

This section will provide a theoretical framework for a recommended play environment typology, based on current theory and case study analysis. Chapter 2 showed that nature is a powerful, healing, energizing, and inspiring force that has many positive effects on children. Analysis of the study results showed that children are attracted to large play structures if they have varied uses and are big enough for many children to play on at once; and that children enjoy imaginary and creative play, and they engage in these types of play when they are given a variety of materials. It showed that children are more likely to be engaged in a wide variety of activities if they are in an environment filled with a variety of engaging settings for exploration. Nature and natural elements can best provide this diversity and richness of experience because they are dynamic, always changing, complex, and moveable. This researcher acknowledges that factors other than design may influence children's behavior during outdoor free play.

The field research showed, as suggested by current research, that non natural and manmade features and elements of each outdoor play environment attracted predictable, limited, and repetitious patterns and types of play (Moore and Wong 1997). Natural areas did tend to attract a larger variety of play, including a lot of imaginative play; although it is useful to note that imaginative play did occur in

almost every area of the play environments. Children often talked about their imaginary games, and parents similarly discussed them in their surveys.

Young children need places to be wild, noisy, and highly active. They also need spaces for quiet reflection, and for the building of fine motor skills through exploration of movements. They need spaces to be alone, with one or two others, and with a large group of children. They need quality, dynamic settings which will attract their attention day after day. They need play environments that will make them *want* to be outside, and will encourage healthy behaviors and lifestyle choices, such as regular outdoor activity and exercise.

By focusing on the milestones in early childhood development, this chapter will outline the steps that designers can take to create outdoor play environments for young children that will encourage their healthy development. The design recommendations presented in this chapter were derived by applying the literature cited in Chapter 2 to the participant observations recorded at the three case study sites.

Designing with Early Childhood Development in Mind

The play environment can be designed to encourage development of the whole child by providing spaces which can be used in a variety of ways. The environment should promote *gross motor development* and physical health by providing spaces where children are encouraged to move their bodies and build their physical strength by trying new things. Climbing structures, open space, and topography encourage physical activity. The environment should promote running, skipping, jumping, climbing, throwing, catching, riding, rocking, and balancing.

The environment should promote *fine motor development* by providing materials for the children to manipulate with their hands and fingers. They should be encouraged to gain control over small movements by playing with mud; building with small items; grasping sticks, rocks, and leaves; planting seeds; and picking berries. Landscape architects can encourage these types of activities by

designing in places for children to wash up before returning indoors. This may help encourage the attitude that getting dirty is okay!

Perceptual motor development should be encouraged by providing elements which stimulate all the senses, while teaching body, spatial, temporal, and directional awareness. Gardening and wildlife areas are recommended spaces for perceptual motor development, teaching children to move carefully and thoughtfully through space, and giving children the opportunity to understand how their actions can change the surroundings. Nooks and crannies should also be part of the design, giving children a range of spaces they can inhabit. Children will develop a sense of place in their surroundings.

Cognitive development can be encouraged through many types of settings. Adults can provide children with arts and crafts materials, natural and manmade loose parts, water, sand, and dramatic play settings to encourage creative and imaginary play. Children should also have materials with which they can build.

The environment should encourage *social-emotional development* by providing a setting in which children can learn about themselves, as well as negotiate and cooperate with other children. They should be given the opportunity to share, cooperate, and engage in imaginative play. Children have the opportunity to relate to one another differently in outdoor settings than indoors. They can play, run, and imagine together, all of which stimulate social and emotional growth and well-being. Open spaces, nooks and crannies, dramatic play settings, gathering spaces, and edge habitats create spaces for social-emotional development. In a play environment that incorporates nature, children will also develop empathy for the natural world. If the full range of early childhood development is considered in the design process, the play environment will benefit whole child development.

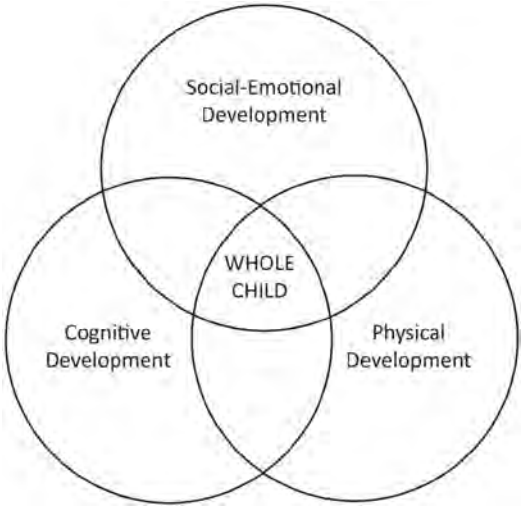

Figure 5.1 Whole Child Development

General Design Recommendations

Rather than wiping clean whatever setting exists behind a preschool to build a traditional playground, designers and educators should look at what exists there to begin with, taking into consideration that there are already natural features that can be incorporated- regardless of the context – including the sky, weather, and whatever vegetation or wildlife may be present. Topography, sun and shade patterns, vegetation, and natural features should all be considered, and used as amenities where possible. "Instead of just purchasing equipment, planning can take the form of finding solutions: what will allow children to jump, encourage them to gather or pretend, provide the opportunity to collect, sort, transport, gather, or construct? What loose parts will encourage discovery, science, and math? What environmental features will teach respect and understanding of the natural world?" (Greenman 2003, 42).

The play environment shall be complex and dynamic, while exhibiting variety and richness. It should be thought of as an experiential landscape for learning. This can be achieved by considering goals and objectives, as well as recommended settings (Table 5.1). Use of this information will help ensure that the above criteria are met in the design of outdoor play environments.

GOALS
The goals of an outdoor play environment are to stimulate:

OBJECTIVES
To meet these goals, designers and educators should create play environments that provide:

RECOMMENDED SETTINGS
The following behavior setting types can be used to meet the design objectives:

Whole Child Development	Gross Motor Development	Fine Motor Development	Perceptual-Motor Development	Cognitive Development	Social-Emotional Development
Physical activity	●	●	●	●	●
Creativity		●		●	●
Curiosity	●	●	●	●	●
Learning through play	●	●	●	●	●
Social interactions with other children				●	●
Interactions with and attraction to nature	●	●	●	●	●
Prolonged outdoor activity	●	●	●	●	●
Child's scale features and spaces			●	●	●
An integrated layout promoting easy flow between activities	●	●	●	●	●
A variety of textures of both natural and manmade materials	●	●		●	●
Natural and manmade loose parts		●		●	●
Sun and shade				●	●
Moveable features to encourage flexibility	●	●	●	●	●
A variety of settings	●	●	●	●	●
Big settings for physical activity	●		●		●
Enclosed spaces for imaginary activity			●	●	●
Spaces for loud and active behavior	●		●		●
Spaces for quiet and restful behavior		●		●	●
Open green space	●	●	●	●	●
Pathways	●		●		●
Dramatic Play Setting			●	●	●
Water Play Area		●	●	●	
Sand Play Area		●		●	●
Play Structure Area	●		●		●
Animal/Wildlife Area		●	●	●	●
Sensory Garden		●	●	●	
Vegetable Garden	●	●	●	●	●
Edge Habitat		●	●		●
Gathering Spaces				●	●

Table 5.1: Play Environment Design Recommendations for Whole Child Development

Goals

In order to achieve whole child development through play space design, the following goals must be met. The space must stimulate physical activity, creativity, curiosity, learning through play, social interactions with other children, interactions with and attraction to nature, and prolonged outdoor activity. Designers and educators should consider all of these goals with equal weight during the design process.

Objectives

The objectives in Table 5.1 can be used to meet the goals associated with whole child development. Play environments should be designed and built at a child's scale. This can be achieved by creating spaces with varying degrees of enclosure that children can enter into by themselves or with others. Micro-environments, sub-settings within behavior settings, and *nooks and crannies*, are all worth considering. Nooks and crannies are places where children can retreat; they can hide in these spaces when they want to be alone, or they can be used for games of hide and seek. Nooks and crannies are places to discover and explore. These can be created with natural features, play structures, or in edge habitats.

The play environment should have an integrated layout that promotes easy movement between activities. The design should make it easy for children to transition from one area to another; the spaces should "flow." Design that encourages children to be creative, rather than providing a predetermined set of options for play, will flow well.

The play environment should contain a variety of textures of both natural and manmade materials. The field research showed that when children had more variety of elements with which to engage, they exhibited a wider variety in their behavior. A variety of vegetation should be used, including trees, shrubs, groundcovers, annual plants, perennial plants, grasses. The play environment should contain a variety of plants, and special consideration should be given to fall, winter, and spring

planting design, as these are the seasons when children spend the most time at school. Trees provide shade and a place to climb, improving gross motor skill development. Shrubs can be used to create small spaces and places to hide, as was observed at both IPCP and the Clifton School where children were attracted to the small spaces created between shrubs and fence line. Children at both of these schools were also observed handling leaves, branches, and flowers.

Figure 5.2 Multi-trunked trees provide climbing opportunities, IPCP

Natural element like rocks, sticks, wood chips, dirt, and sand add to the textural value, as do manmade materials such as concrete, plastic, rubber, metal. A variety of materials enhances children's sensory experience of their play environment.

A variety of natural and manmade loose parts should be available in the play environment, giving children the opportunity to create their own play through the manipulation of loose parts. Rocks, sticks, logs, and mulch, wheeled toys, sand toys, blocks, balls and other loose parts provide the variety that children need to develop holistically. These elements give children the opportunity to construct, create, imagine, push, pull, carry, and so much more. They can develop their fine motor skills through manipulating the different materials with their hands. At both IPCP and The Clifton School, children were observed engaging with a variety of loose parts, touching them, collecting them, moving them, and using them to create and build. Children at the Clifton School worked together to stack logs on top of one another, carry and roll them, and built a see saw.

Figure 5.3 Logs and woodchips, Clifton School

A mix of shade and sun should be created through the use of trees, shrubs, arbors, or other structures. Children can observe the way light and shadows interact in these spaces. IPCP's Outdoor Classroom achieves a balance of sun and shade through the use of trees, shrubs, and built structures; making it comfortable year round. The Clifton Schools' play environment was shaded much of the day by tall buildings, making it uncomfortably cold and windy during the winter. Champions for Children

was in full sun much of the day, which is comfortable in the winter months, but will be unpleasant during the summer. A balance of sun and shade provides comfort for its inhabitants in all seasons.

The play environment should consist of moveable features to ensure flexibility of use. For example, the IPCP Outdoor Classroom had a variety of features which could me moved to promote different uses of the space, such as a dramatic play setting and small benches. Such items can be rearranged to create new spaces.

The play environment should consist of a variety of settings. Having multiple and complex settings gives children more variety and choice. They can explore their options and engage in a variety of activities. These settings should include large settings for physical activity, enclosed spaces for imaginary play, spaces for loud and active behavior, and spaces for quiet and restful behavior.

Recommended Settings

A variety of behavior settings should be used to meet the design objectives; they should be designed to encourage the full range of early childhood development (Table 5.1). Settings within settings should always be considered in order to create a more complex play space. Children learn through exploration, and the desire to explore is amplified by complexity and mystery, which can be created in such micro-environments (Kaplan, Kaplan, and Wendt 1972). Table 5.1 provides suggestions for behavior settings which afford a variety of learning opportunities to young children. The table shows that by providing a variety of behavior settings, designers can make sure that all areas of childhood development are facilitated. Designers and educators should work together to examine the play environment as a landscape made up of different components, all of which influence children in different ways. They can be combined to make the most out of the environment, based on space, budget, available materials, and other factors.

Open green space gives children a place to run fast, jump, and chase one another; if loose parts are provided, it likely offers more possibilities for activity than any other play environment setting.

Open space can be used for dramatic play, expressive movement, or exploration of the natural world. The open space was used for a range of slow and easy to vigorous activity at all three case study sites.

At IPCP, children participated in the widest variety of activities in the open space and the gathering spaces; including running, rocking, expressive movement, and dramatic play. At the Clifton School, more activity types occurred in the open space than in any other behavior setting, including running, chasing, screaming, ball play, rough and tumble play, and imaginary play. At Champions for Children, most of the activity that occurred in the open space was fast, like running, chasing, and monster play. This can be explained by the fact that there were rarely items in the open space for them to play with and engage in more fine motor or cognitive play. Opportunities for activities in open space are enhanced by the placement of loose parts.

The natural topography of the site should be incorporated into the play environment where possible. This gives children a chance to climb and run with different feelings than on flat ground. Mounds can be added to pique curiosity where there is no topography. Play structures can be built into hills, making the level changes more interesting. The Clifton School's west play structure is built into a hill, creating many interesting spaces for the children to inhabit, however its decreased use is also in part a result of the overall topography of the site. Therefore, topography should not interfere with visibility and safety.

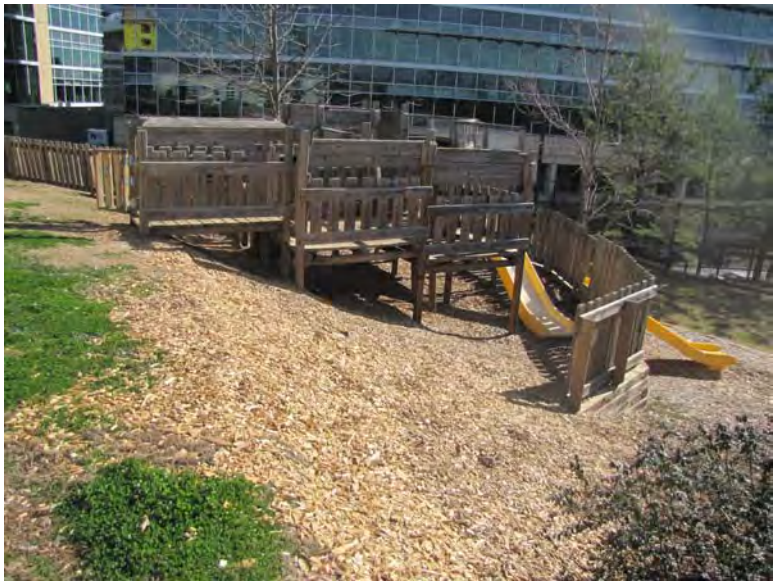

Figure 5.4 Play structure built into a hill, the Clifton School

Pathways should be included to encourage movement through the environment and to different areas. Paths should be interesting, and more complex shapes than simple loops should be included. While riding his tricycle around the loop path at Champions for Children, one child diverted from his course on each loop to visit the sandbox. A more complex path system exhibiting hierarchy would make it easier and more likely for this type of exploratory behavior to take place.

Dramatic play settings are spaces in which children can be creative and learn to learn to communicate and interact with other children through make-believe scenarios. These settings can be created within other settings, such as underneath play structures and along fencelines, or on their own, as playhouses, child-size kitchens, and other structures.

Water is enticing to children, especially if they can touch it or mix it with *sand* or dirt. None of the case study sites incorporated water into their play environments. However, children at IPCP were attracted to rainwater that formed a puddle on the tarp covering the sand play area on the first day of observations. They shoveled sand into the water and watched as the two mixed. At the Clifton School, children gathered around a mud puddle and used buckets to scoop more dirt into the puddle,

experimenting with the mixture. Incorporating water into a play environment would attract curiosity. Water and sand play settings can be combined or separate.

Play structures are important for the development of gross motor skills and the setting they create for dramatic play. Natural timber can be used to create a structure that blends into the landscape, rather than standing out from it, as brightly colored plastic structures do. Children can test their limits on play structures, taking healthy risks. Structures give children the opportunity to climb, swing, and jump; which helps them gain balance, strength, and confidence. Play structures can also be used as dramatic play settings in which children can act out adult roles and learn how to navigate the world. Observation at the Clifton School showed that the area underneath play structures is very intriguing to children. The large wooden play structures created micro-environments, or sub-behavior settings, underneath that were suitable for gathering, hiding, pretending, and discussing.

Figure 5.5 Wooden play structure, Clifton School

While imaginative play can happen anywhere in a play environment, much of it was observed on or under play structures where available. However, vegetation and other natural materials can be used

to create new spaces in which children can conduct this creative play. Placing such interventions in underutilized spaces in a play environment can attract new attention to these areas, making more opportunities for a variety of behaviors. Children will use their imaginations to determine what the space should be used for, and it will be different for different groups of children (Herrington and Studtmann 1998).

Inviting *wildlife* into the play environment will enhance children's learning. They can learn about life cycles through exposure to bugs, worms, birds, and butterflies. Several IPCP parents mentioned that their children have had conversations with them about the bugs and critters they see in the Outdoor Classroom. They learn about life cycles by observing caterpillars. One child at the Clifton School stopped riding his tricycle and stared up into the sky as a bird flew over. Use of bird houses, bird feeders, bat houses, and flowering plants that attract birds and butterflies are a few ways to attract wildlife into the play environment.

Figure 5.6 IPCP Bat House

Sensory gardens can be used to benefit children's developing senses. Incorporating a variety of vegetation benefits children's senses. Plants exhibiting a variety of size and structure can provide visual stimulation. Herbs can be used for smelling and tasting. Tall grasses and other plants can be used to create sound when the wind blows through them. Plants can be used to exhibit fuzzy, spiky, smooth, and rough textures.

Vegetable gardens can be used to teach children about food systems, and how to tend to growing edible plants. Children can grow fruits, vegetables, and herbs with the help of a teacher. Gardening is incorporated into the curriculum at IPCP and the children have participated in planting seeds, tending plants, harvesting vegetables, and eating the produce. The Clifton School children also have some vegetable seedlings in various planters. This gives them a hands-on understanding of where their food comes from, as well as the stages of growth.

Figure 5.7 Vegetable seedlings at the Clifton School

The *edge habitat* provides an interesting opportunity for designers. As observed at IPCP, children are drawn to this edge space where they can connect visually with the outside world, interact with the fence, and have quiet conversations. The edge should be planted to create hiding places, and it should visually address what lies beyond the boundary. Other creative design elements, such as frames

or view portals, can be used to attract children to the edge. Designers should consider the fenceline as an element of the overall design, rather than a simple boundary.

Figure 5.8 IPCP edge habitat

Gathering spaces should be incorporated as places to rest, learn lessons, and eat. Gathering spaces can be made from logs, hay bales, benches, or picnic tables. The gathering spaces at IPCP were used more than at the other two schools; children worked on arts and crafts projects, sat and talked to adults, and ate their snack or lunch here. They provided a quiet, calm atmosphere where focused work could occur.

In conclusion, preschool outdoor play environments should contain a mix of manufactured and natural materials, as they provide different developmental benefits to children. Nature can enhance a standard playground, just as gross motor skill play equipment can enhance a natural playscape. The research shows that broadening the understanding of what playgrounds are, will allow educators and designers to utilize these outdoor areas more effectively. We can create spaces of magic and possibility for children, giving them the opportunity to grow into happy, healthy individuals who care for each other and the planet.

CHAPTER 6

CONCLUSION

This thesis has investigated the current state of children's health and well being by providing an understanding of early childhood development and its relationship to outdoor free play. Three Georgia preschools were used as case study sites to explore the effect that design of outdoor play spaces has on the behavior of three to five year old children. Direct observation and behavior mapping were used to record childhood behavior in each outdoor play environment. Children were interviewed and parents and teachers were surveyed to add different perspectives to the information gathered. The results of the case studies reaffirmed existing research that discusses the importance of nature and outdoor free play in the holistic development of children, while adding to the growing body of knowledge which is helping to develop a clearer picture of how the design of play spaces impacts both children's behavior, and their development.

The literature review revealed that American children are spending less time outdoors and this is playing a role in the increase of health problems. Literature shows that besides the home environment, children spend the most time in preschool and childcare environments, and this gives educational settings great potential for making a positive impact on children's development, health, and well-being. Landscape architects can take this opportunity to create outdoor environments which encourage whole, healthy development, while also creating in children a desire to be outdoors in nature. Literature also highlights the common misconception that children's playgrounds are simply places for children to run off their energy before returning to the classroom to learn. This misconception was affirmed in parent surveys, particularly at Champions for Children and the Clifton School. Landscape architects have the opportunity to develop these spaces into experiential landscapes

for learning by incorporating a variety of natural and manmade elements to create rich playscapes benefitting whole child development.

The field research revealed that the design of outdoor play environments impacts the way that children behave within these spaces. When children have a rich, complex space with an integrated layout that consists of a variety of behavior settings and materials, they will engage in a wide variety of activity levels and activity types. When their play space consists solely of manufactured play equipment, they will engage in a more limited, easily predictable array of activities. The idea of micro-environments, or sub-behavior settings, came to the surface through observation of children playing underneath play structures and behind shrubs along fences. This provides an opportunity for designers to consider settings within settings when designing play spaces. This shows the importance of designing at a child's scale by creating spaces with varying degrees of enclosure.

The design of the play space is not the only factor in the children's behavior, however. The amount of time spent outdoors as well as teacher involvement play roles in promoting variety in play and whole child development. The more time the children spend outdoors, the more accustomed they become to their environment, and the more willing to experiment and explore they become. Having adults who are qualified to lead and direct children in outdoor activities also helps promote development and positive interactions with the environment and with other children.

A theoretical framework was developed to help guide the design of new outdoor play environments, as well as the renewal of existing ones. The framework aims to develop children who are happier, healthier, and more connected to their communities. Designers and educators should think of outdoor play environments as experiential landscapes for learning, and create them with a variety of behavior settings which benefit physical, cognitive, social, and emotional development. The framework is organized into goals, objectives, and recommendations as a way to give designers and educators flexibility in designing spaces that benefit the children who will use them.

Playscapes should stimulate physical activity, creativity, curiosity, learning through play, social interactions with other children, interactions with and attraction to nature, and prolonged outdoor activity. To meet these goals, play environments should be designed to provide features and spaces at a child's scale, an integrated layout, variety of textures and materials, variety of natural and manmade loose parts, a balance of sun and shade, moveable features, and a variety of settings that accommodate different types and levels of activity.

The play environment should be thought of as an integrated layout of multiple behavior settings, and settings within settings should be considered as opportunities to add further complexity. Open green space, pathways, dramatic play settings, water play areas, sand play areas, play structures, wildlife or other animal areas, sensory gardens, gardening areas, edge habitats, and gathering areas can be used as behavior settings to meet the desired goals and objectives. These settings should incorporate a variety of vegetation, stationary and moveable natural and manmade materials, topography, nooks and crannies, and sun and shade to enhance a rich variety of play, activity, and development.

Next Steps

Further field research at case study sites should be undertaken in order to add to the existing data regarding children's play spaces and their affect on whole child development. Experimental studies should be undertaken, in which the investigator studies the site, makes physical interventions in it, and then studies it again to compare the results. Experimental studies can help refine the design recommendations laid out in this paper and others. The design recommendations presented in Chapter 5 could be applied to the three play spaces that were studied here and the results could be compared. Recommended landscape interventions can be installed and studied to determine ways in which these affect children's behavior and teacher's perceptions.

Observation suggested that children become more comfortable, creative, and engaged when they spend more time in complex outdoor environments. However, further research is needed to study how the duration of outdoor free play among preschool outdoor play environments impacts activities. This could lead to interesting findings that would positively impact whole child development.

More research is also needed to study how adult involvement affects children's behavior, learning, and development during outdoor free play. Research suggests that engaged, trained leaders positively impact children's free play time. Combining such play leaders with a complex, rich play environment may further improve children's play experience, as well as their overall development.

By providing preschool children with a varied environment that combines open green space, natural features, and manufactured play equipment, we provide them the opportunity to develop their cognitive, physical, and socio-emotional selves; we give them the opportunity to develop a healthy lifestyle, rather than a sedentary, indoor one with all of the associated health risks. Because children communicate differently than adults, and cannot necessarily make decisions regarding their environments, we must do everything we can to give them environments in which they have great opportunities to experience themselves, other children, and nature.

Landscape architects and educators can work together to create experiential landscapes for learning that encourage children to explore and experiment, create and socialize, run and play. Young children learn and develop through play, so they need well-designed spaces which they can make the most of to become happy, healthy, and creative members of society.

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APPENDIX A

CHILD ASSENT SCRIPT AND INTERVIEW

Child Assent Script

I would like to know if you would be willing to help me with a research project about things kids do in their playgrounds. Your outside play time will be pretty much like normal, I will just be on the playground observing what goes on while you play outside. I will also ask you some questions. There are no right or wrong answers to these questions; I just want to know what you think.

If you decide to do the project with me, your answers will be kept just between you and me. You can also decide to stop at any time, or you can choose not to answer questions that you do not want to answer.

Do you have any questions for me? Would you be willing to do the project with me?

Student Interview Script

1) Do you like to play out here?

2) Where is your favorite place to play here?

3) What do you like to do when you come outside?

4) What were you just playing? (or what are you playing now?)

5) Do you prefer being inside or outside?

- Why?
- Where is your favorite place to play when you are not at school?

APPENDIX B

TEACHER CONSENT AND SURVEY

Informational Letter

Dear Teacher:

I am a graduate student under the direction of Professor Brad Davis in the College of Environment & Design at The University of Georgia. I invite you to participate in a research study entitled Understanding the Role of Nature-Based Play Environments in the Health and Well-Being of Children that is being conducted as a Graduate thesis. The purpose of this study is to develop of a set of design guidelines which design professionals can use in the creation of play environments which will positively impact the physical and emotional health and well-being of children.

You have been chosen to participate because you work with children between the ages of three and five years old. Your participation will involve being interviewed by me at your school, and should only take about twenty minutes. Your involvement in the study is voluntary, and you may choose not to participate or to stop at any time without penalty or loss of benefits to which you are otherwise entitled. Your answers will be confidential. The results of the research study may be published, but your name will not be used. In fact, the published results will be presented in summary form only. Your identity will not be associated with your responses in any published format.
The findings from this project may provide information on how children benefit from spending time outdoors, including specific actions that parents, teachers, and designers can take to improve children's health and well-being by providing an engaging natural play environment. There are no known risks or discomforts associated with this research. There is no compensation associate with your participation in this study.

If you have any questions about this research project, please feel free to call me at (404) 863-9646 or send an e-mail to kcrosta@uga.edu. Questions or concerns about your rights as a research participant should be directed to The Chairperson, University of Georgia Institutional Review Board, 629 Boyd GSRC, Athens, Georgia 30602; telephone (706) 542-3199; email address irb@uga.edu.
By completing and returning this questionnaire in the envelope provided, you are agreeing to participate in the above described research project.

Thank you for your consideration! Please keep this letter for your records.

Sincerely,
Katie Crosta

Teacher Consent Form

I, _____, agree to take part in a research study titled, "Understanding the Role of Nature-Based Play Environments in the Health and Well-Being of Children," which is being conducted by Ms. Katie Crosta, from the College of Environment & Design at the University of Georgia under the direction of Professor Brad Davis. My participation is voluntary which means I do not have to be a part of this study if I do not want to. I can refuse to participate or stop taking part at any time without giving reason, and without penalty or loss of benefits to which I am otherwise entitled. No information that identifies me will be gathered as part of this research.

- The reason for the study is to investigate how environmental designers can reengage children with nature and its associated benefits through the design of nature-based play and learning environments.
- The goal of this study is to provide landscape architects with guidelines for working with educators to improve the physical and emotional health and well-being of children through environmental design. No direct benefits will be provided to me for participating in the study.
- If I agree to take part, Ms. Katie Crosta will ask me a few questions about the outdoor play environment at my school. The expected duration of participation is twenty minutes.
- The research is not expected to cause any harm or discomfort. I can quit at any time. My job will not be affected if I decide not to participate or to stop taking part.
- No individually-identifiable information will be collected about me.
- The researcher will answer any questions about the research now, or during the course of the project, and can be reached by telephone at 404-863-9646 or email at kcrosta@gmail.com. I may also contact the professor supervising the research, Professor Brad Davis, at 706-542-5194 or bdavis@uga.edu.
- I understand the study procedures described above. My questions have been answered to my satisfaction, and I agree to take part in this study. I have been given a copy of this form to keep.

_____	_____	_____
Name of Researcher	Signature	Date
_____	_____	_____
Name of Teacher	Signature	Date

Please sign both copies and return one to the researcher.
Additional questions or problems regarding your rights as a research participant should be addressed to The Chairperson, Institutional Review Board, University of Georgia, 629 Boyd Graduate Studies Research Center, Athens, Georgia 30602; Telephone (706) 542-3199; E-Mail irb@uga.edu.

Teacher Survey

1) What is the educational philosophy of the school?

2) What do you know about the design of this playground/ play environment?

- Who designed it?
- What was the design process?

3) Did the playground play a role in your decision to work at this school?

4) How much time do the children spend outside?

5) What do you think of this playground?

6) What do you like about this environment?

7) How could this environment be improved?

8) Do you like spending time out here?

9) Do you feel that this environment is conducive to learning?

- If so, can you give any examples?

10) Do you incorporate the outdoors into your curriculum?

- If so, can you give some examples?

11) Do you see any effects that playing here has on the children? (creativity, attention, socialization, etc.)

12) Do you think this landscape benefits the development of the children?

- If yes, how so?

13) What is the general mood of the children while playing outdoors? (happy, creative, bored…)

14) What do you like about this environment?

15) What features/areas do children use the most?

16) What features/areas are underutilized?

17) What types of play do you see the children engaging in while outside?

18) Do you think that playing outside affects the way the children act or behave (when they are outside or when they are inside)?

APPENDIX C

PARENTAL CONSENT, PERMISSION, AND SURVEY

Informational Letter

Dear Parent:

I am a graduate student under the direction of Professor Brad Davis in the College of Environment & Design at The University of Georgia. I invite you and your child to participate in a research study entitled Understanding the Role of Nature-Based Play Environments in the Health and Well-Being of Children, which is being conducted as a Graduate thesis. The purpose of this study is to develop of a set of design guidelines which design professionals can use in the creation of play environments which will positively impact the physical and emotional health and well-being of children.

You have been chosen to participate because your child is between the ages of three and five years old, a significant period developmentally. Your participation will involve completing a brief survey and should only take about fifteen minutes. Your involvement in the study is voluntary, and you may choose not to participate or to stop at any time without penalty or loss of benefits to which you are otherwise entitled. Your answers will be confidential. The results of the research study may be published, but your name will not be used. In fact, the published results will be presented in summary form only. Your identity will not be associated with your responses in any published format.

Your child is also being invited to participate in the study. I will be observing his/her participation in free play outdoors at school. Regular playtime will not be disrupted for this study. The estimated observation time for the class (those who choose to participate) is two hour intervals, with a total of ten to twenty hours spread over several visits. The purpose is to determine how children interact with their outdoor play environment. I will also ask your child a few questions about playing outdoors, which will only take about five minutes.

The findings from this project may provide information on how children benefit from spending time outdoors, including specific actions that parents, teachers, and designers can take to improve children's health and well-being by providing an engaging natural play environment. The findings could also help create a future in which people are more positively engaged with their surroundings and with one another. There are no known risks or discomforts associated with your participation in this research. In order to decrease any discomfort or nervousness your child may feel, teachers will be present while they are being asked to participate, and through the duration of the study. There is no compensation associate with your participation in this study.

If you have any questions about this research project, please feel free to call me at (404) 863-9646 or send an e-mail to kcrosta@uga.edu. Questions or concerns about your rights as a research participant should be directed to The Chairperson, University of Georgia Institutional Review Board, 629 Boyd GSRC, Athens, Georgia 30602; telephone (706) 542-3199; email address irb@uga.edu.

By completing and returning this questionnaire in the envelope provided, you are agreeing to participate in the above described research project.

Thank you for your consideration! Please keep this letter for your records.

Sincerely,
Katie Crosta

Parental Consent Cover Letter

Dear Parent,

The attached survey is a part of the research study "Understanding the Role of Nature-Based Play Environments in the Health and Well-Being of Children," which is being conducted by Ms. Katie Crosta, from the College of Environment & Design at the University of Georgia under the direction of Professor Brad Davis. Your participation is voluntary, which means you are not required to answer the questions and submit the survey. You can refuse to take part in the research study or stop taking part at any time without penalty or loss of benefits to which you are otherwise entitled.

If you choose to participate in this study, please complete the survey and return it to your child/children's teacher at your earliest convenience. The survey is anonymous, so please do not include your name. While answers to all of the questions are preferable, you may choose to skip any questions you wish.

- The reason for the study is to investigate how environmental designers can reengage children with nature and its associated benefits through the design of nature-based play and learning environments.
- The expected duration of your participation in the study is fifteen minutes.
- There will be no direct benefit to your for participating in the study.
- The goal of this study is to provide landscape architects with guidelines for working with educators to improve the physical and emotional health and well-being of children through environmental design.
- No individually-identifiable information will be collected about you or your child.
- The researcher will answer any questions about the research now, or during the course of the project, and can be reached by telephone at 404-863-9646, or email at kcrosta@gmail.com. You may also contact the professor supervising the research, Professor Brad Davis, at 706-542-5194 or bdavis@uga.edu.

Sincerely,
Katie Crosta
MLA Candidate 2012
College of Environment and Design
The University of Georgia

Parental Permission Form

I agree to allow my child, _____, to take part in a research study titled, "Understanding the Role of Nature-Based Play Environments in the Health and Well-Being of Children," which is being conducted by Ms. Katie Crosta, from the College of Environment & Design at the University of Georgia under the direction of Professor Brad Davis. My child's participation is voluntary which means I do not have to allow my child to be a part of this study if I do not want to. My child can refuse to participate or stop taking part at any time without giving reason, and without penalty or loss of benefits to which your child is otherwise entitled. No information that identifies my child will be gathered as part of this research.

- The reason for the study is to investigate how environmental designers can reengage children with nature and its associated benefits through the design of nature-based play and learning environments.
- The goal of this study is to provide landscape architects with guidelines for working with educators to improve the physical and emotional health and well-being of children through environmental design. My child will receive no direct benefit for participating in the study.
- If I allow my child to take part, my child will be observed in free play in his/her outdoor play environment. The observation will take place for between 10-20 hours over the period of two months, and will not interfere with learning and play time. On one visit, the researcher will also ask my child a few brief questions about the playground.
- The research is not expected to cause any harm or discomfort. Relationships will be built between the researcher and the preschool teachers in an attempt make the children more comfortable with a new person in their school. The teachers will be present during the study, and they will help the children understand that the researcher is there to learn about children and their playgrounds. My child can quit at any time. My child's grade will not be affected is my child decides not to participate or to stop taking part.
- No individually-identifiable information will be collected about my child.
- The researcher will answer any questions about the research now, or during the course of the project, and can be reached by telephone at 404-863-9646 or email at kcrosta@gmail.com. I may also contact the professor supervising the research, Professor Brad Davis, at 706-542-5194 or bdavis@uga.edu.
- I understand the study procedures described above. My questions have been answered to my satisfaction, and I agree to allow my child to take part in this study. I have been given a copy of this form to keep.
-

_____	_____	_____
Name of Researcher	Signature	Date
_____	_____	_____
Name of Parent	Signature	Date

Please sign both copies and return one to the researcher.
Additional questions or problems regarding your child's rights as a research participant should be addressed to The Chairperson, Institutional Review Board, University of Georgia, 629 Boyd Graduate Studies Research Center, Athens, Georgia 30602; Telephone (706) 542-3199; E-Mail irb@uga.edu.

Additional questions or problems regarding your rights as a research participant should be addressed to The Chairperson, Institutional Review Board, University of Georgia, 629 Boyd Graduate Studies Research Center, Athens, Georgia 30602; Telephone (706) 542-3199; E-Mail irb@uga.edu.

Parent Survey

Please continue on reverse or attach another sheet if necessary.

1) Did the outdoor play environment at your child's school play a role in your decision to send him/her there?

- If so, can you explain why/how?

2) Does your child talk to you about his/her outdoor play environment?

- If so, could you share a story?

3) What, if any, role do you think the school's outdoor play environment plays in your child's development?

4) How much time does your child spend outside when he/she is not at school?

- What types of activities does he/she participate in?

5) What types of activities does your child participate in while indoors?

6) Do you feel that playing outdoors affects your child differently than playing indoors? Please explain.