

Learning Landscapes: Theoretical Issues and Design Considerations
for the Development of Children's Educational Landscapes

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Thesis submitted to the Faculty of the
Virginia Polytechnic Institute and State University
in partial fulfillment of the requirements for the degree of
Master of Landscape Architecture

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June, 2000
Blacksburg, Virginia

Keywords: learning landscape, child development, play theory, educational environment

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Lisa L. Weaver: Abstract

This study is designed to explore the applied behavioral research available to designers of educational landscapes and determine what aspects of that research can be extracted and applied to a physical landscape design. Its purpose is to create an awareness and understanding of the issues that designers should take into consideration to make an educational landscape design solution more developmentally appropriate for children. The literature review reveals that play forms the common link between learning and child development. The design considerations being presented in this study incorporate play. Being aware of and understanding the developmental and intellectual needs and abilities of children will give designers the foundation to make informed decisions and design choices in the creation of successful children's educational landscapes. The design considerations presented in this study are part of an exploratory investigation attempting to identify direct linkages between developmental/play activities and physical design elements. They offer a framework for creating landscape environments that meet the developmental needs of children. An existing educational landscape, the Jamestown Settlement near Williamsburg, Virginia will be evaluated in terms of these considerations. This educational landscape will be viewed from the perspective of a landscape architect aware of the developmental and play issues that surround child's learning as well as the potential for creating a site that offers a unique landscape experience. The outdoor learning environment is the site of the highest level of children's activity. It represents, at best, a potential site for investigation, exploration and practice of skills at various levels of complexity. At its worst, it is a static collection of objects offering little toward the developmental needs of the child. The landscape designer has the opportunity to provide a unique environment that supports the ways that children learn. The physical landscape has the potential to challenge children, offering choices in sight, smell, sound and touch. The landscape is ever-changing, providing broad learning opportunities where children can learn at their own pace, in their own unique style.*

* Keywords: learning landscape, child development, play theory, educational environment

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Introduction

Statement of Intent

In the past few years there has been an explosion of research focusing on children's learning abilities and developmental needs. The subject of play is vital to both topics. Flip through a copy of *Children's Environments Quarterly* or *The Journal of Research in Childhood Education* and one will find numerous articles on this subject. Play is an important component in the emotional, physical, social, and moral development of children (Bergen, 1988). Play theorists from Groos (1901) to Piaget (1962) to Vygotsky (1978) have studied play and its beneficial relationship to human development and education. Play fosters a wide range of developmental goals. Play allows children to select their own learning focus and pace of learning. It epitomizes the child's way of learning (Isenberg & Quisenberry, 1988; Rogers & Sawyers, 1988b; Sponseller, 1974). Given all the evidence that play is important to learning, has play been used effectively by landscape designers to promote learning in educational landscapes? The answer, unfortunately, is 'no'.

Landscape designers are creating environments beyond the four walls of the traditional classroom to educate children. These designers provide educational landscapes in the forms of zoos, museums, gardens, and special exhibits. Available evidence shows that the physical environment is relevant for children's development (Wohlwill & Heft, 1987; Wachs & Gruen, 1982; Hunt, 1979). The parts of the educational landscape and how they are arranged can affect the actions of children. Particular settings invite children to involve themselves in particular activities. For this study, the activities will encompass play, chosen for its direct connection to development and learning. The extent of children's participation in a play activity will largely depend on how well certain aspects of the surrounding physical space meet their developmental needs. Determining what these aspects are - through an extensive review of child development research, past and present educational practices and ideas proposed by play theorists - and presenting them in a way that may be universally understood by designers is the major focus of this study. The literature review will uncover a number of critical issues that landscape designers should be aware of in the creation of children's educational landscapes. These issues reveal a set of design considerations that landscape designers need to understand in order to create

developmentally appropriate children's learning environments. These design considerations act as a summary of the ideas presented by experts in the fields of child development, elementary education, child psychology and play theory and provide landscape designers with the comprehensive overview of the issues that should be included as part of an educational landscape. Secondly, an existing, 'successful' educational landscape, the Jamestown Settlement, will be analyzed. The design considerations will provide a window through which we may view the existing site, through the eyes of an informed landscape designer. The analysis will show ways in which the landscape design meets the developmental and educational needs of children as well as recognizing missed design opportunities in terms of the design considerations and the potential of the site itself.

The application of play theory and the recommendations developed regarding development and play have not been extensively utilized in regard to educational landscapes. Design-oriented publications like *Architecture Journal*, *Landscape Architecture*, and *Interiors* occasionally feature a child-specific, play/educational environment. Yet most articles fail to show if the designer really understands children and how those children are going to perceive, act, and react within that physical environment. Most often, the project is described as being "painted in bright primary colors" (Architecture Minnesota, 1993), "inspired primarily by Hansel and Gretel", with "Lego-like imagery" (Museum News, 1988), or in ephemeral designer buzzwords like "a poetry of light and shade" (Architectural Review, 1991). The needs of the child are being met with adult-derived stereotypes about what adults believe children need. Designers of non-traditional educational landscapes would benefit from a better understanding of the knowledge, capabilities and interests of the child, promoting the creation of landscapes that support and enhance the educational experience.

Importantly, a wide range of applied behavioral research is available to the designer. This existing applied behavioral research has the potential to affect landscape design by informing designers of children's requirements. This information can increase the depth and breadth of the designer's knowledge of children's play in relation to the environment. The use of play in design has been underutilized as a learning strategy "despite the hundreds of empirical citations documenting its power in cognitive development, language development, the growth of

imagination and creativity and the development of social competence” (Mann, 1996, p. 446; Ross, 1978). The relationship between the disciplines of the physical designer and the applied researcher is almost non-existent. A give-and-take relationship would benefit both disciplines – giving researchers a laboratory to test and validate their findings, and allowing designers to create a project with improved quality, more applicable educational value, and better client/user satisfaction. The design considerations presented in this study begin to bridge the gap between applied researcher and physical landscape designer.

The design of educational environments today needs to address the whole child. These landscapes should incorporate the fine gradations of physical, cognitive, social, and psychological development into the design process (Herrington, 1997). This type of holistic designing requires the designer to be knowledgeable not only of the intricacies of the site and the technology of his/her profession, but to recognize the user of the site is a child, and to ‘experience’ the project as the child will experience it, from the viewpoint of the child. The natural landscape should be recognized for its considerable potential, offering unlimited possibilities for children. “Landscape is open-ended, and intrinsic, and because of all its shades of the meaning, it can speak to the physical, emotional, social, and intellectual growth of a developing child. Rather than depending on equipment to give play its constitution, landscape architects need to collaborate with early childhood specialists so that landscapes for children can express and support the many facets of human development” (Herrington, 1997, p. 151).

Play is an important thread that runs through the stages of childhood development. It is the only activity that deals with every aspect of learning and development (Sawyers & Rogers, 1988b; Athey, 1974). Children play for enjoyment and instinctively want to play. In order to integrate play into a physical design, the designer must first understand that play is valuable and that children learn through play. Children are born learners and explorers. A child’s play changes and evolves as the child develops. “Children of all ages develop cognitively, socially, emotionally and physically thorough play. Play enriches the thinking of children and provides them with opportunities to create, invent, reason and problem-solve. Furthermore, as children play, they learn social skills such as how to negotiate, resolve conflicts, take turns and share” (Stone, 1995, p.104). Once landscape designers are aware of how children learn and interact

within an educational environment, and incorporate those ideas into the physical design, the design solution becomes more beneficial for children. Designers simply need to provide the environment to get children started, the child will handle the rest. Children will discover and invent play anywhere and everywhere and not just in designated play spaces (Senda, 1992; Cooper, 1975). A “natural learning environment supports each child’s construction of his own knowledge of the world and his place in it” (Stone, 1995, p. 104).

The second part of this study will focus on analyzing a play/learning landscape that has not received much attention in past research – that of the educational tourist destination. These sites are often the destination for a school-sponsored field trip or family vacation. The state of Virginia is overflowing with educational sites, ranging from civil war battlefields and museums to art museums and historic gardens. Most of these places have something in common – they are marketed toward educating visitors, visitors who want to expand their knowledge or expose themselves and their families to a piece of national history. Families bring their children to these sites for the afternoon or weekend. Schools deliver busloads of students for an extended history lesson. But are these educational tourist destinations really amenable to fostering children’s intellectual development? Have the designers of these types of landscapes utilized the applied behavioral research available regarding how children learn, play and develop and incorporated that information into the design? This study will look at one such landscape from the perspective of a designer who has an understanding of the issues and design considerations necessary for the implementation of a successful educational landscape, as well as, the insight to see the full potential of the natural site.

Study Site

The Jamestown Settlement near Williamsburg, Virginia was chosen for analysis. A tourist destination since its inception in 1957, the Jamestown Settlement offers a wide range of elements within its complex to study in relation to how children learn and play. The Jamestown Settlement is a favorite destination for school field trips. The Jamestown Settlement complex is considered a ‘successful’ educational landscape. The Jamestown-Yorktown Foundation, which oversees the Jamestown Settlement, offers programs that meet Virginia’s Standards of Learning (SOL’s) at all elementary grade levels (D. Shipman, personal communication). Almost seven hundred and fifty

thousand visitors were admitted to the Jamestown Settlement in 1999. Forty-nine percent of those tickets were sold to children - forty-five percent to children ages 6-12 and four percent to children under the age of six. Structured educational programs on site served 172,242 students during the 1998-1999 academic year (Jamestown Yorktown Foundation Monthly Visitation and Revenue Report, 1999).

The primary mission of the Jamestown Settlement is educational. The first sentence of the foundation's mission statement states; "The mission of the Jamestown-Yorktown Foundation is to educate and promote understanding and awareness of Virginia's role in the creation of the United States of America." This educational mission and the active marketing of the Jamestown Settlement toward elementary school age children in conjunction with the Virginia Standard's of Learning (D. Shipman, personal communication) support the selection of this site for analysis based on the design considerations.

A promotional brochure issued by the state of Virginia Board of Tourism describes the Jamestown Settlement site;

"Today, at Jamestown Settlement, you can see for yourself how colonists lived, endured hardships, and ultimately prospered. Three tall ships rest at anchor for you and your family to explore. A short distance away, the wood palisade of a re-created colonial fort encircles the wattle-and-daub structures representing the settlers' homes, workshops and public buildings. In the woods beyond, smoke wafts from the reed-covered dwellings of a re-created Powhatan Indian village like one Pocahontas might have inhabited. Costumed interpreters are your guides to the past, taking you and your family back to a time when life was harsher and more demanding. History here is much more than something to see. You'll touch it, smell it, hear it, even try your hand at some of it. And you'll know about Jamestown's special place in American history. It's the ultimate interactive adventure."

In addition to the three outdoor living areas described by the brochure, James Fort, the Ship Pier and the Powhatan Indian Village, this complex includes an indoor museum featuring a short introductory film and three permanent exhibit galleries that focus on three aspects of the history of the Jamestown Settlement; the English Gallery, the Powhatan Indian Gallery and the Jamestown Gallery. Special events are scheduled throughout the year in an open area within the complex. The Jamestown Settlement is located on approximately six acres of sparsely forested land adjacent to the James River. The riverfront landscape offers a canopy of mature deciduous and evergreen trees, understory trees, shrubs and wildflowers and an environmentally sensitive wetland area. The exterior displays of the Jamestown Settlement are scattered throughout this landscape and include physical re-creations of buildings and objects that can be explored by the visitor. The interior museums offer authentic artifacts and re-created life-size displays in a more traditional museum format. The multiple settings within the Jamestown Settlement complex, the large number of children visiting each year and the educational objectives surrounding the Jamestown Settlement make it a good choice for analysis in terms of the educational landscape design considerations being presented in this study. (Figs. 1 & 2)

Figure 1

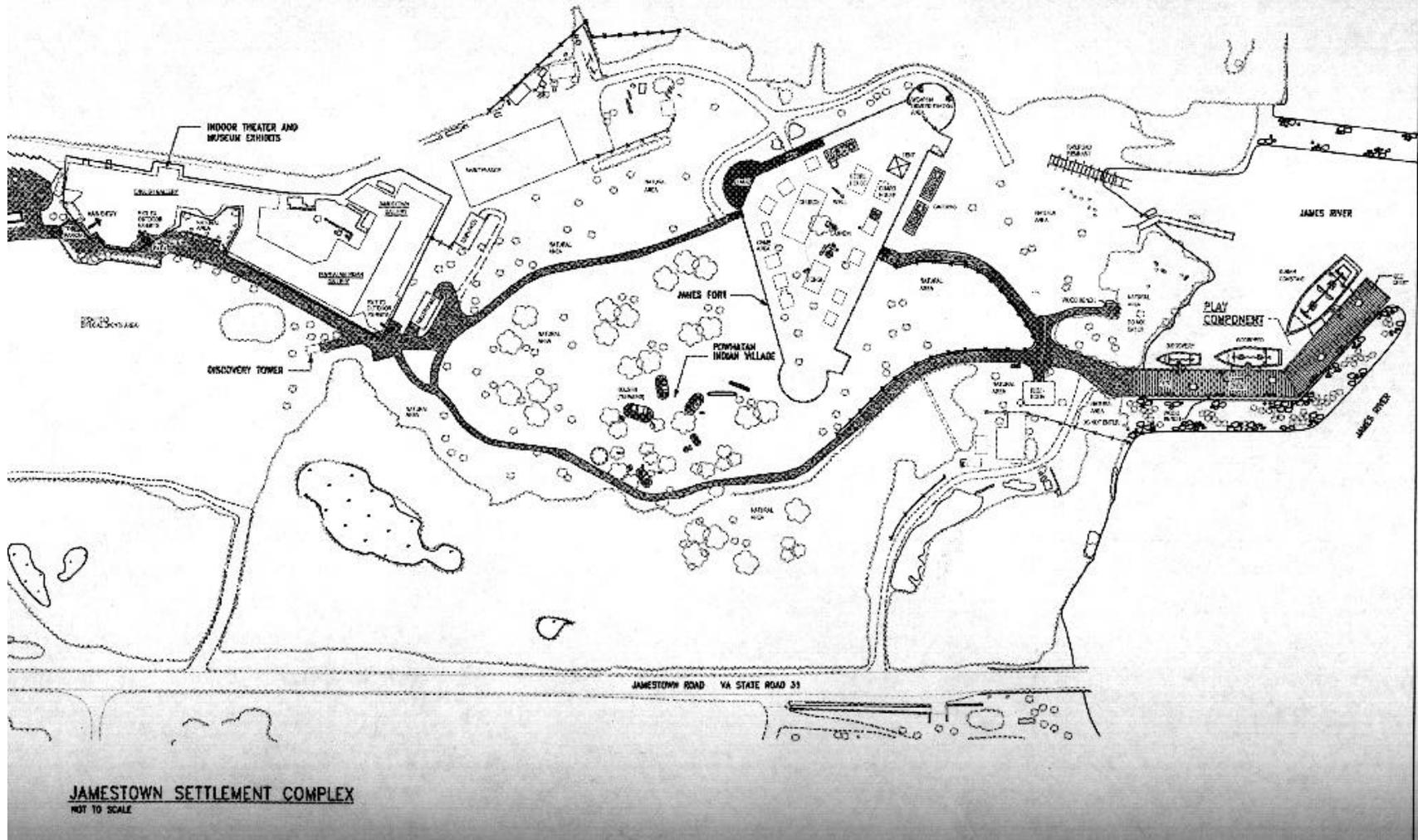
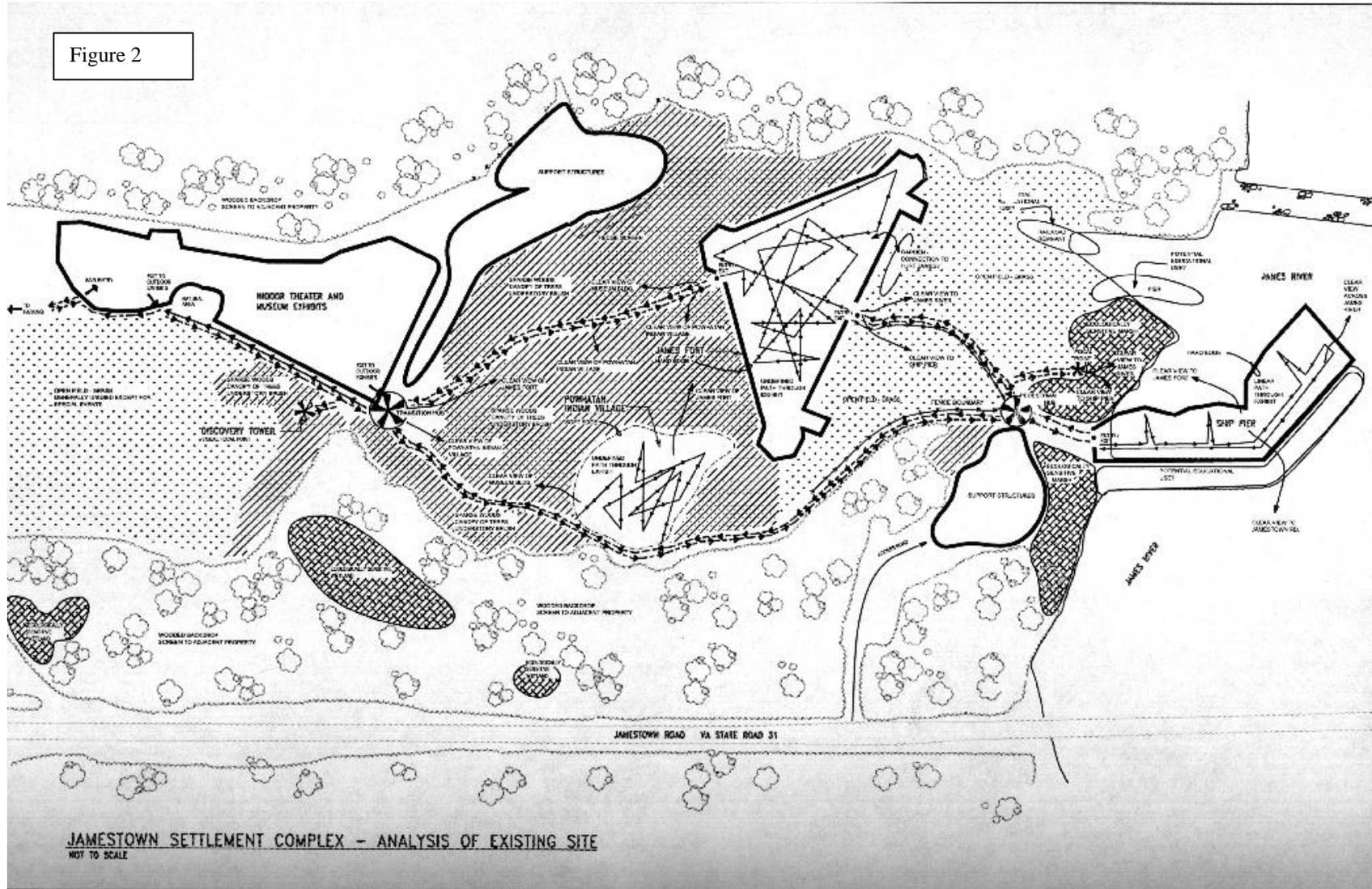


Figure 2



Primary Research Focus

This study is designed to explore the applied behavioral research available to designers of educational landscapes and determine what aspects of that research can be extracted and applied to a physical landscape design. Its purpose is to create an awareness and understanding of the issues discovered by behavioral research that designers should take into consideration to make an educational landscape design solution more developmentally appropriate for children. The literature review reveals that play forms the common link between learning and child development and that play is the singular design feature that must be included in a children's educational landscape. The design considerations being presented in this study incorporate play. These considerations are based on research undertaken by specialists in human development, psychology, education, architecture, landscape architecture, environmental planning, and environmental psychology. They address issues found in research in children's physical, psychological, and social development, as well as the address the intellectual abilities of children at various stages of development and have been published in a number of different sources. Similarly, issues regarding specific types of sites, such as outdoor play parks, urban children's spaces, classrooms, daycare centers, and formal playground areas, were evaluated and amended to serve as an instrument for analyzing an educational tourist landscape. Being aware and fully understanding the developmental and intellectual needs and abilities of children will give designers the foundation to make informed decisions and design choices in the creation of successful children's educational landscapes.

The design considerations presented in this project focus on the physical environment – those aspects of a landscape design that can be manipulated by the designer. “A good play and learning landscape must be designed as a range of settings carefully layered on the landscape. The design of a good play environment requires an interdisciplinary understanding of human development, and how that development can be stimulated by both natural and manufactured settings” (Moore, Goltsman and Iacofano, 1992, p. xi). By understanding the developmental and play issues that surround a child's intellectual growth, the designer can provide not only a better fit between physical design and user but a better overall landscape experience.

The design considerations presented in this study are part of an exploratory investigation attempting to identify direct linkages between developmental/play activities and physical design elements. This study looks to the science of applied behavioral research for insight and established fact that can be directed toward design. The resulting design considerations offer a framework for creating landscape environments that meet the developmental needs of children.

The following questions provided the initial direction of this study:

Child development questions:

1. What is the physical, social, and psychological condition of a child during the preschool years (3-6 yrs.), elementary school age years (7-12 yrs.), and adolescent years (13-18 yrs.)?
2. How do child develop intellectually during the preschool years, elementary school age years, and adolescent years?
3. How important is play? How does it relate to learning and development?
4. What are some recognized examples of developmentally appropriate educational design?

Landscape designer's questions:

1. How can one become a better designer, more in tune with the users of the environment and their needs?
2. What can a designer do to encourage and facilitate play, and therefore, learning within the landscape?

Significance of the Study

The need for growth of child-specific designs will continue as the world becomes more and more aware of the needs of children. Children spend a large percentage of their early years attending mandatory educational institutions. The necessity for educational settings that offer the specific environment that children require to learn and to develop into responsible, knowledgeable citizens is imperative. The issues being addressed in this study are an important critical set of elements that landscape designers should consider in developing and analyzing non-traditional educational sites as appropriate learning environments for children. The topic being addressed here - to make landscapes more developmentally appropriate - physically, socially, psychologically, and cognitively - for all user groups, should encourage further research. It is essential that the designer become more aware of and fully understand the needs of the user group that he/she is designing for, be it children, the elderly or the disabled. Truly understanding who will be using the site and how that person thinks, moves, and acts will make for better fit of environment and user, as well as, an extraordinary landscape experience.

Limitations of the Study

There are two limitations to this study. First, this study does not assume that 'if you provide it, they will play (and learn)'. It is understood, in the context of this study, that there are forces beyond the control of the designer that can be the cause for success or failure of an educational site. The moods, emotions, health, and personality of the visitor play a large role in how that person experiences the space. Who did the visitor come with? Did the child come willingly or was the child dragged to the site, kicking and screaming? Is the visit part of a well-intentioned family outing, or was the child required to come as part of a school assignment? All these factors affecting play and learning are beyond the control of the physical design. This study looks only at those elements of the physical design that can be controlled and manipulated by the landscape designer, which potentially, will affect the widest range of visitors possible.

A second limitation of this study is the lack of an agreed-upon definition of play. In the 1986 Webster's New World Dictionary there are ninety-seven different meanings for the word 'play.' Despite of the documented importance of play to child development and learning, even the child

development researchers themselves have a difficult time agreeing on a definition for play with the definition often varying from study to study (Rubin, Fein & Vandenburg, 1983). Overall, though, most researchers do concur on a common set of characteristics. The common characteristics of play are a) behaviors that are pursued for their own sake and are self-initiated, b) process-oriented, c) pleasurable, and d) exploratory and active (Rogers and Sawyers, 1988b ; Almy, Monighan, Scales & Van Hoorn, 1984; Christie & Johnson, 1983; Rubin, Fein & Vandenburg, 1983). It is critical for the designer to understand the incredible significance of play for a child. Therefore, in addition to these four characteristics of play, this study states a fifth characteristic; e) play is the primary way that children learn. The four previous characteristics all encompass this idea without specifically saying it. “Play is valued for its assumed benefits (direct or indirect, immediate or deferred) to learning and development” (Johnson, 1996, p. 82). Therefore, a play environment is relaxed and free from constraints, providing a background where children can initiate their activities for their own satisfaction, supporting their physical, social, emotional, and intellectual development.

Literature Review

A list of definitions has been provided in Appendix A to assist the reader in comprehending some of the information presented in this section. Definitions used were compiled from various sources, but are based on the accepted meaning of the word or phrase as used in the subjects of child development, play theory and developmental psychology. The definitions are provided to give the designer a way of interacting with researchers in these areas using specific vocabulary.

Introduction

The literature review provides an initial understanding of the problem and its context. An extensive literature review is essential in forming a solid foundation upon which to formulate worthwhile and relevant questions to begin the investigation. The overall lack of research on educational tourist destinations for children allowed a certain freedom that comes with investigating a previously untapped source. The literature review provided a solid base for this new research, lending support and justifying the study of an educational landscape.

This study is designed to explore the ways in which the landscape designer can provide a more appropriate learning environment for children. In turning to experts in the fields of child development, play theory and education, this study strives to recognize the issues presented by those experts and discover a way in which those issues can be translated into design considerations which aid landscape designers in the creation of a design of an educational landscape. An existing educational landscape site was then analyzed in connection to those considerations. Preliminary research in the fields of child development, play theory and education resulted in an abundance of information regarding certain environments; interior and exterior classrooms, daycare centers, and playgrounds. This study addresses a previously ignored environment – the educational site beyond the classroom. The design of this type of site should incorporate the issues addressed by the design considerations in such a way as to take full advantage of the surrounding landscape conditions, features and amenities.

This investigation has proceeded from several perspectives. The evolution of play and its linkage to child development were investigated. Research in the areas of human development, specifically childhood and adolescence, developmental psychology, and the psychology of how children learn and develop intellectually was reviewed. Past and current ideas regarding play

theory and its integration into the learning environment were also reviewed. From these topics, ideas and understandings were extracted that should be considered when creating a physical landscape design. Existing recommendations regarding the design of playgrounds, classrooms, and daycare centers were examined for their applicability to the design of educational landscapes. Further research looked at the history of outdoor children's environments; from the early childhood development gardens of Europe to the equipment-focused playgrounds of the United States. The overall investigation provided a better understanding of children and their developmental and intellectual needs, as well as, how those needs have traditionally been addressed in design. It revealed a set of issues that need to be taken into consideration in the design of children's education landscapes.

The following areas of study were selected and categorized for their relevance to the problem under investigation:

1. History of development/play research and the play/learning connection (how play supports intellectual development, past and current play theories and the types of play children use)
2. How children develop; physically, cognitively, and socially/psychologically
3. The history and evolution of children's landscape environments
4. Examples of developmentally appropriate educational environments

History of Development/Play Research and the Play/Learning Connection

The Middle Ages/Renaissance (A.D. 500-1600; approximately)

In the Middle Ages, childhood, as it is known today, did not exist. In medieval societies, there was no awareness of the child being anything other than a small adult. As soon as the child could live without the constant care of its mother, it became part of adult society (Dworetzky, 1984).

Play was not seen as a child-specific action – yet evidence of both adults and children playing can be traced back to antiquity. Early examples of play are evident in ancient Greek and Roman cultures. Archaeologists have found Roman toy soldiers. Paintings found on Roman sarcophagi show boys engaged in play activities. Ancient Egyptian wall paintings show children playing with balls and dolls and even jumping rope. Numerous written descriptions of children playing are also found in ancient texts (Hughes, 1991; Cohen, 1987). But these random examples are casually revealed and should not be mistaken for an actual interest in play. Play as a subject unto itself ‘did not get bad press so much as no press at all’ until Jean-Jacques Rousseau published *Emile* in 1762 (Cohen, 1987).

The 17th Century

At the beginning of the 17th century, European attitudes about children were beginning to change. The explosion of thought in the areas of science and law brought with it the realization that the world could be shaped and controlled. Suddenly, education became extremely important. Children were now thought of as innocent and uncorrupted individuals that needed to be nurtured and trained in order to be able to shape and control the world when they became adults. At the end of the 17th century philosophers began to wonder specifically how children develop. English philosopher, John Locke (1632-1704), proposed the idea that children are born *tabula rasa*, or blank slate. He believed that the child was completely new at birth and every behavior that the child would later exhibit would be acquired through interaction with the environment. Culture would therefore determine the child’s life. Locke argued that children need firm adult direction and that indulgence should be avoided. Parental direction is necessary for the mind to “be made obedient to discipline and pliant to reason when it is most tender, most easy to be bowed” (Cohen, 1987, quoting Locke). John Locke published his theory in *Some Thoughts Concerning Education* in 1693. Its influence would reach across Europe and penetrate

the newly colonized United States over the next hundred years. As the century ended, adulthood and childhood were seen as different stages of life and their respective activities of work and play were seen as two opposing forces, one purposeful and necessary and one wasteful and unimportant.

The 18th Century

Play as a subject was first addressed during the 18th century. Children were beginning to be seen “as more than an incomplete version of an adult...,” and should be appreciated for who they were (Hughes, 1991, p. 6). Here play and the freedom surrounding it were regarded as normal and part of a natural innocence. Jean-Jacques Rousseau, a French philosopher, is considered the first to find ‘play’ worthy of philosophical consideration (Cohen, 1987). His classic book on education, *Emile*, written in 1759, advocates the child’s right to play. Rousseau believed that little harm would come to children if they were allowed to grow and play without excessive adult supervision. “Rousseau criticized those who would ‘rob these little innocents of the joys that pass so quickly’ ... We must never forget all this should be play, the easy and voluntary control of movement which nature demands of them, the art of varying their games to make them pleasanter without the least bit of constraint. To a child... work or play are all one....’, provided, Rousseau added, that both are carried out ‘with the charm of freedom’” (Cohen, 1987, p. 23). This ‘discovery’ of play as a subject worthy of research spawned a variety of theories regarding the reasons that children play. In Germany, philosopher Friedrich Schiller (1770-1835) developed the theory that play was an escape from reality. Once the daily needs of life – food, clothing, shelter – were provided, play “could make us whole and unserious” (Cohen, 1987, p. 24). Play was seen as aesthetic and enjoyable. For Schiller, “play did not lead to chaos and self-indulgence. It was a means for human beings to express their desire for beauty, for enjoyment, for pleasure and through ‘having’ those experiences, to become more whole” (Cohen, 1987, p. 24).

19th Century

By the middle of the 1800’s, many of the philosophical speculations present in the 1700’s were already being replaced by a new approach. While many discussions of child development and the significance of play were taking place in the educational and philosophical communities over the

last century, very few children had benefited from those ideas themselves. But in the mid-1800's that began to change. In Europe and later the United States, a growing interest in children's welfare emerged from the exploitation of child labor in factories and mines. Laws were passed to limit the number of hours that children could work. These laws gave children free time they had never known before. This inadvertently resulted in a greater scientific interest in play during the late Victorian era (Cohen, 1987). According to Victorian standards, if children decided to use this newly found free time for play, then play must have some purpose. Play, it was determined, must be used to improve oneself.

Educators of this era took the innovative ideas of Rousseau and Schiller, who saw play as an act unto itself, and merged them with stricter Victorian standards of play as education. The result is one that is still present in many examples of play research today - play, while necessary and enjoyable, has a greater purpose.

Frederich Froebel (1782-1852), a German educator, developed the first *kindergarten*, which opened in that country in 1837. *Kindergarten* literally means 'a garden of children' and was designed to be a place where children were 'allowed to blossom'. Play is the medium for education in Froebel's kindergarten. Here, children were allowed to play and encouraged to do so by interested adults rather than have educational facts forced upon them, as was the standard in traditional schools at the time (Spodek, 1974; Cohen, 1987). While Froebel saw this as a gentle type of education, it was really quite structured. Children were instructed in their play. For example, children were told that the configuration of blocks was a stable and that they should play with the horse figurines near the stable. Rather than allowing the child to determine what the configuration of blocks represented to them, or allowing the child to manipulate the blocks himself, the child was 'gently' pushed in a certain direction. Nevertheless, kindergartens spread quickly across Europe and the world over during the next few decades.

Maria Montessori (1870-1952), an Italian educator, recognized the structure in Froebel's style and theorized another approach. She believed that children needed to develop and learn at their own pace, through freely chosen activities. The teacher in a Montessori school acts as an

observer who guides the child to choose for himself/herself. Play is still considered to have an educational function, but the child sets the pace.

The 20th Century

It was not until the late 19th century that scientific investigations of developmental processes were undertaken (Sigelman, 1999). Empirical efforts to record and study behavior marked the recognition of developmental psychology as a discipline. Expanding on the biographical writings of Charles Darwin¹ (1809-1882), who recorded his own son's development, psychologists looked to children for answers to questions regarding social, motor, emotional, language, and physical development. Play was also receiving its share of research attention. Herbert Spencer argued in 1873, that play was just a way of working off excess energy. Karl Groos, in his studies of play in both animals and humans (1896 and 1901, respectively), saw play as a functional action. Play was the way animals and humans 'pre-exercise their skills.' In practicing these skills, humans and animals were sharpening their instinctive behaviors. In 1916, G.T.W. Patrick determined that play was the exact opposite of Spencer's theory – it was a means to renew energy. Each of these early play theories seems to have some element of truth within it. They are often used as starting points for more contemporary theories on play.

More recent studies on play include the psychoanalytic theory of Sigmund Freud (1856-1939), a Viennese physician who saw play as having emotional value that allows children to “reduce anxiety” and “explore unwelcome feelings without repercussions of adult disapproval” (Hughes, 1991, p. 18). Erik Erikson modified Freud's theory to include play as having an ego-building function, bringing about “the development of physical and social skills that enhance a child's self-esteem” (Hughes, 1991, p. 18). Cognitive theorists regarded play as a tool for promoting intellectual development. Jean Piaget (1896-1980) is arguably the most well-known researcher in the field of intellectual development. His theory stresses stages in which children actively construct increasingly complex understandings by interacting with their environment (Sigelman, 1999). These developmental stages of sensorimotor, preoperational, concrete operations, and

¹ Darwin's curiosity about child development came from his theory of evolution. He believed that infants share many characteristics with their non-human ancestors. Therefore, the evolution of the individual child could offer insight about the evolution of the entire species (Sigelman 1999).

formal operations encompass all levels and ages of human development and are still being used by researchers today.

Mildred Parten studied the social development of young children in the early 1900's. Her categories of social play have endured since the 1930's and continue to be used today. Although her initial studies were aimed at preschoolers, the categories are adaptable to all levels of child development. Social play does not mirror the developmental stages. Children of any age and developmental level may engage any of the categories at any point in their childhood. Four main categories include solitary play, where the child plays alone with objects; parallel play, where the child plays independently among other children; group play is when children share and all children in the group are pursuing similar activities; and cooperative play, which is an organized type of play. Children work as a unit to solve a problem. There is a division of labor – each child can be engaged in a different activity, applicable toward a goal (Mulligan, 1996).

The nursery school movement in England in the 1900's, along with the accompanying reform of kindergartens in the United States, marked the acceptance of 'play' as a legitimate part of early childhood education (Spodek, 1974). John Dewey (1859-1952), an American educator, spearheaded the reform of kindergartens in the United States. He broke away from the earlier educational models of Froebel and Montessori that used play as the primary focus. Dewey believed that the best way to educate children was to tie it to their experiences of the world around them. He thought play could be useful in helping children to "function at higher levels of consciousness and action" (Saracho & Spodek, 1995). Play would be used as a tool, structured by teachers to support education but was not seen as educational unto its self. This play/education movement has continued and expanded ever since. In the last twenty years the study of play has taken an upswing (Pepler & Rubin, 1982). The current focus on health concerns and the importance of stress reduction and relaxation for both adults and children has boosted the interest in play and leisure.

Modern researchers are generally convinced the play has numerous benefits for children. "Play offers the child the opportunity to make sense out of the world by using available tools. Understanding is created by doing, by doing with others and by being completely involved in

that doing. Through play the child comes to understand the world...” (Chaille and Silvern, 1996, p. 277). Play “allows children to make discoveries that go far beyond the realm of what we adults think is important to know” (Wasserman, 1992, p. 133). “Children play for the experience of control, for curiosity, for the intrinsic motivation of fun and to learn. The types of play are nicely intertwined with developmental stages” (Mann, 1996, p. 446). The idea of ‘play’ has come a long way – a “phenomenon once thought to be developmentally trivial and psychologically irrelevant” is now accepted as playing a major role in life. (Pepler & Rubin, 1982, p. 108) (see Table #1)

Theories of Development/Play (Table #1)

<i>Theories</i>	<i>Reasons for Play</i>	<i>Greatest Benefits</i>
<i>Surplus energy</i> H. Spencer, F. Schiller J. Sully	To discharge the natural energy of the body	Physical
<i>Recreation</i> M. Lazarus	Regenerate energy expended in work	Physical
<i>Renewal of energy</i> G.T.W. Patrick	To avoid boredom while the natural motor functions of the body or restored	Physical
<i>Recapitulation</i> G.S. Hall	To relive periods in the evolutionary history of the human species, eliminate ancient instincts	Physical
<i>Practice for adulthood</i> K. Groos	To develop skills and knowledge necessary for functioning as an adult	Physical, intellectual
<i>Psychoanalytic</i> S. Freud, A. Freud, E. Erikson	To reduce anxiety by giving a child a sense of control over the world and an acceptable way to express forbidden impulses	Emotional, social/psychological
<i>Cognitive-Developmental</i> J. Bruner, J. Piaget, B. Sutton-Smith, L. Vygotsky, R. Gagne	To facilitate general cognitive development To consolidate learning that has already taken place while allowing for the possibility of new learning in a relaxed atmosphere	Intellectual, social/psychological
<i>Arousal Modulation</i> D. Berlyne, G. Fein, H. Ellis	To keep the body at an optimal state of arousal To relieve boredom To reduce uncertainty	Emotional, physical

(adapted from; Keller and Weiller, 1993; Hughes, 1991; Sawyers and Rogers (b), 1988; Johnson, Christie and Yawkey, 1987)

How Children Develop (Physically, Cognitively, and Socially/Psychologically)

Researchers interested in human development study the way in which human beings and their behaviors change over time. A child's life is a time of significant development in all areas of growth including physical, cognitive, and psychological/social. Physical development deals with the growth of the body, and the learning and mastery of gross and fine motor skills. The development of balance, coordination, and movement are also aspects of physical development. As the child matures, physical development will include hand/eye coordination and fine manual dexterity. Cognitive development is concerned with thinking and learning processes. It has been described as the process by which man acquires spatial information, codes it, stores it, and applies it to his comprehension of the everyday world. It explains how people 'know the environment' (Craik, 1974; Kaplan & Kaplan, 1974). Human cognitive development reaches from the early understanding of the permanence of objects by infants to the development of memory skills, logical thinking, and finally, to abstract thinking, and the ability to reason. Psychological development includes the forming of self-esteem, confidence and a sense of self-identity. Social development includes the development of socialization skills and interacting with others.

Child Development From Preschool through Adolescence

This section discusses childhood development from preschool through adolescence. The design considerations being presented in this study will address child developmental issues across these ages. It is important to note that in the second part of this study, the Jamestown Settlement, as part of its marketing to elementary school age children, ages 7-12 yrs., in connection with the Virginia Standard's of Learning program, is best suited for analysis regarding children ages 7-12 yrs. and the design considerations will be used to focus on the issues of children of that age group.

Preschool (3-6 years of age)

Between three and five years of age, children are rapidly developing their physical, cognitive and psychological/social competence as they interact with their environment. It is a time of great change. Physically, preschoolers are mastering gross and fine motor skills like walking, running, jumping and skipping. Socially, the developing child goes from totally adult-dependent to

learning to play and share with others. Children throughout this stage are beginning to create a sense of self-identity and, toward the end of the stage, have the need to express themselves as individuals. Intellectual development comes through experience and exploration of their environments. Preschoolers begin to understand and use symbols. With the development of language skills, young children ask questions constantly, always interested in the world around them. It is a time of radical and rapid change, where play occupies most of the child's waking hours.

Physical Development (3-6 years of age)

The development of gross and fine motor skills advances along a generally steady time line for most normal children. By the age of three, most children have mastered a variety of skills; jumping, hopping on one foot, skipping, and running. By four or five years of age these skills have become more refined, with an increase in body control. One reason motor skills develop so rapidly during the preschool years is that children spend a great deal of time practicing them (Feldman, 1997). "To become a master player is the height of achievement for children ages three to five" (Jones, 1997, p. 18). Physical play is the work of early childhood, used to develop body and skills (Berger, 1980).

A five to six-year-old has improved on all previous skills to the point of mastery. By this age, children have grace and skill at many things (Berger, 1980). Motor skills are displayed without regard. Children are more adventurous, stretching the limits of their newly developed skills. Activities are being performed with greater fine motor skill and finesse. Eye-hand coordination is becoming more developed. Children at this age have a good sense of balance and are able to use their hands and feet with considerable skill, although some of the more detailed fine motor skills such as writing are still difficult (Berger, 1980). Greater control over the body is a significant milestone during the preschool years (Caplan & Caplan, 1983). This control acts as a signal that the child is ready to enter school.

Cognitive Development (3-6 years of age)

There are a number of cognitive theories of development, but the one that is the most generally accepted, is that of Jean Piaget (Spencer, 1995; Sawyers & Rogers, 1988b; Smilansky, 1968,

Parten, 1932). Jean Piaget, a Swiss psychologist and well-respected researcher in the field of cognitive development, classified stages of cognitive development to correspond with the approximate stages of physical development used in this study.

Although infants and toddlers are not being addressed in this study, it is important to understand the cognitive progression that occurs during that time. These events and actions directly affect cognitive development in the preschool years.

Piaget calls the cognitive development that occurs from birth until about two years of age sensorimotor. During this time, infants develop their knowledge of the world by physically acting on objects. Infants will spend more than fifty percent of their time in this ‘practice play’, repeating actions over and over to the point of mastery (Sponseller & Jaworski, 1979). This stage “involves a gradual progression through simple reflexes, single coordinated activities, interest in the outside world, purposeful combinations of activities, manipulation of actions to produce desired outcomes and symbolic thought” (Feldman, 1997, p. 156). Once children become capable of symbolic thought their ability to understand, imagine and communicate increases rapidly (Berger, 1980).

Preoperational thought is the stage of development associated with children of approximately preschool age, 2 to 7 years old, according to Piaget. It is a time when symbolic thinking grows, mental reasoning emerges, the use of concepts increases and imaginary beliefs are constructed. During this stage there is less dependence on physical actions – mental activity is the primary focus. It is the time of pretend or symbolic play; when a block of wood can represent a cup at an imaginary tea party. One hallmark of this stage is egocentric thinking, thought that does not take the perspective of others into account. A child speaking on the phone to a grandparent will often answer a question with a nod of the head, unaware that the non-verbal response cannot be seen through the phone line.

Children typically speak their first words between 8-14 months (Feldman, 1997; Dworetzky, 1984) and quickly increase their vocabulary from that point onward. Language development progresses through a pattern of single word phrases, two-word combinations and telegraphic

speech. The development of language corresponds with the child's growing sense of relationships between objects in the world and their acquisition of general mental concepts. Preschoolers rapidly develop an improved sense of grammar and shift gradually toward more social speech as they themselves become more social. As language becomes better developed, it becomes a tool for forming ideas and regulation actions (Berger, 1980).

Social/Psychological Development (3-6 years of age)

While learning to master the motor skills needed for physical development, the child begins the move toward self-reliance and peer interaction (Esbensen, 1987). Many motor skills have been developed and refined by this stage. The mobile child becomes curious about other children. Confidence in walking and running moves the child farther away, exploring beyond the previous boundaries. Children are more confident and more daring, willing to push the limits of their skills. Preschoolers social skill development begins as communication skills improve. Socially, this age is when onlooker and parallel play begins. The preschooler begins to interact with others from a distance, playing the same games as the others, but not directly interacting. Young children may use this type of play to become acquainted with and gain acceptance by older or unknown peers (Santrock, 1998). The character of preschool play changes over time, growing more interactive and cooperative. Children develop their first true friendships in the later preschool years (Dworetzky, 1984). As young children learn to become more self-sufficient and to care for themselves, they develop school readiness skills like following instructions and identifying letters, and spend many hours at play with their peers. Playing with others prepares preschoolers for the demands of school and the social relationships they will later develop (Santrock, 1998; Berger, 1980).

Summary and Developmentally Appropriate Practices (3-6 years of age)

The first five years of life “work their subtle power on us throughout our lives. We remember few specifics. But our bedrock emotion security – our trust – comes from this time. We spend our first years striving to develop what psychologists call ‘a sense of competence.’ This drive for mastery - of grasping, crawling, walking, talking and play – leads to astonishingly rapid and broad learning” (Nabhan & Trimble, 1994, p. 21). Young children spend the majority of their waking hours interacting with the physical environment (Herrington, 1997). Practice play,

solitary play, constructive play, dramatic play – these are the activities that fill the preschoolers life. As preschoolers, children begin to play with other children, communicating with each other and sharing toys. Appropriate learning environments will provide props and tools that foster the types of play that preschoolers engage in. They should be allowed to express their independence and participate in self-guided activities.

Elementary School Age (7-12 years of age)

These years are some of the easiest in a child's life. Physical development is relatively problem-free making it easy to master new skills. At this stage of development most children are able to learn quickly and think logically. The brain is fully developed and children become capable of more sophisticated learning. Socially, the child's world "seems perfect, for most school-age children think their parents are helpful, their teachers are fair and their friends loyal." (Berger, 1980). Writer, Edith Cobb emphasized the potency of this time in her essay 'The Ecology of Imagination in Childhood'. This is a time when children are 'in love with the universe.' Here, she says, lie 'latent power and purpose, the seeds of the writer's art, the painter's vision, the explorer's passion.' "These are the years when the child is seen by societies throughout the world as a vessel into which knowledge, skill, and tradition – in short, culture – can be steadily and reliably poured" (Konner, 1991, p. 240).

Physical Development (7-12 years of age)

Slow and steady growth marks this developmental stage. Compared to the extreme growth occurring from birth through the preschool years and the physical changes that occur in adolescence, this stage is quite uneventful. The major developments in motor skills are improved muscle coordination and manipulative skills (Feldman, 1997). At this stage children can perform almost any motor skill as long as it does not require adult strength or judgment (Berger, 1980). School age children are learning to ride bicycles, ice skate, and swim – all activities that require overall coordination and strength. These are the years where a child progresses from tying shoes and fastening buttons to being able to use each hand independently. By the age of twelve children can manipulate objects almost at the level of an adult (Feldman, 1997).

Cognitive Development (7-12 years of age)

Intellectually, children in the school years grow substantially. As they enter the concrete operations stage, for the first time they are capable of applying logical thought processes to concrete problems. Concrete operational thought, according to Piaget, occurs from the ages of about seven to twelve years. It is defined by the active and appropriate use of logic, but only in concrete circumstances. For example, at this stage the child has the ability to apply reversible mental action on real, concrete objects. Another feature is the understanding of conservation; the knowledge that quantities such as mass, weight and volume are unrelated to the arrangement and physical appearance of objects. The child can classify objects, reasoning about their interrelationships. Children of this stage are overcoming the egocentric perspective that was present as preschoolers, a process called decentering, and are able to take multiple aspects of a situation into account. This is a stage of concrete, physical reality. Children cannot understand truly abstract or hypothetical questions or ones that require formal logic to answer.

During middle childhood, short-term memory capacity expands greatly. The child is developing individual memory functions and by approximately age ten, all aspects of memory (encoding, retrieval, rehearsal, search, clustering elaboration and organization) will be present, although not yet fully developed or able to be controlled (Dworetzky, 1984). Language improves tremendously with school and parental encouragement. The extent of the child's vocabulary continues to increase. The average six-year-old has a vocabulary of between 8,000 and 14,000 words and within three years has added 5,000 more words (Feldman, 1997). Grammar and syntax improve although there are still some pronunciation and comprehension difficulties. School aged children enjoy telling jokes, evidence of developing memory, logic, and social skills (Berger, 1980). Children master fundamental skills of reading, writing, and arithmetic, and are formally exposed to the larger world and its culture. Achievement becomes important. Self-control increases (Santrock, 1998).

Social/Psychological Development (7-12 years of age)

These are the years where children struggle to answer the question "who am I? Here children begin to view themselves less in terms of external physical attributes (short, thin, with blond

hair) and more in terms of psychological traits (smart, pretty, a fast runner) (Feldman, 1997). In addition to working on their self concepts, children in the middle school years are also developing self-esteem. They are also creating a sense of self-efficacy, forming expectations about what they are capable of doing and achieving. Social dependence on peers is strong during the early education years. Children are more interested in same sex friends and less dependent on their parents and families. Family, school, and community can have a profound effect on the personality and achievement of a child at this stage.

Summary and Developmentally Appropriate Practices (7-12 years of age)

At this stage the development of the mind overshadows any development of the body. Children in the early school years increasingly create dramas in miniature by manipulating puppets, blocks, cars, small animal and people figurines. Play progresses to formal and informal games with peers. This type of play enhances their coordination and physical abilities as well as refining their social skills. These games require the concepts of cooperation and competition. Board games, computer games and jump rope are played during these years. Children will create their own games; riddles, number games, and secret codes allow them to exercise their growing understanding of language (Sutton-Smith, 1980). Children in elementary school are moving on to “the exercises of initiative, making choices and learning to sustain their play, relationships, and oral language – their modes for developing knowledge about the world” (Jones, 1997, p. 18).

Adolescence (13-18 years of age)

Adolescence has been described as “probably the most challenging and complicated period of life to describe, study or experience. Between the ages of ten and twenty, more changes occur, and greater individual variation is evident, than during any other period”(Berger, 1980, p. 459). A significant amount of physical growth comes with the adolescent growth spurt. There is great diversity in the cognitive development during these years. Many adolescents enter a stage of adolescent egocentrism while others progress to the stage of abstract thinking, a defining characteristic of adult thought. Psychologically and socially, adolescents are developing even more diversely. As they work to construct their self-identity, this group “strives for the emotional maturity and economic independence that characterize adulthood” (Berger, 1980, p. 459)

Physical Development (13-18 years of age)

The rapid physical growth that occurs during adolescence rivals that of infancy. There is an increase in muscle growth with a corresponding increase in strength. Fine motor skills are being mastered, often in response to choices made about self and future. Computer keyboarding or typing may be mastered by those students looking in that direction for a future career. Carpentry and other craft skills may be preferred by some. Still, others will excel at the piano keyboard or guitar strings. Adolescence is a time of adjusting motor skills to coordinate with the body's new height, size and shape as well as with the psychological/social choices pertaining to self-identity.

Cognitive Development (13-18 years of age)

Formal operational thought defines the cognitive development of the adolescent. Thought is no longer limited to concrete experiences. Adolescents at this stage are able to think abstractly, make-up hypothetical situations, speculate and fantasize - emphasizing possibility more than reality (Santrock, 1998; Berger, 1980). Thought begins to become more logical, devising questions and systematically testing answers and solving problems. There are significant improvements in mental processes during this time. Adolescents are learning how to organize memories and develop strategies for how to apply what they have stored. Memory capacity is increased. Adolescents have improved perceptual, verbal, math and spatial abilities. They can pay attention for longer periods of time. Cultural factors can have a significant effect on the cognitive development of the adolescent (Berger, 1980). There is even some question today as to whether this level of formal operational thought is ever reached by everyone. Some studies show that only 40-60% of college students and adults have reached this stage (Feldman, 1998).

Social/Psychological Development (13-18 years of age)

The pursuit of independence and self-identity are important. Adolescents struggle to define themselves and their role in society. These struggles often cause friction with parents and family. Figuring out where they belong is a major problem for this group. Friendships occupy a prominent place in the adolescent's life. School groups and social cliques serve as references for comparing social success. Adolescents tend to conform to peers that they admire and are very

susceptible to peer pressure. Thought becomes more logical, abstract, and idealistic. More and more time is spent away from the family. Individual self-concepts begin to grow more distinct, with each adolescent ultimately deciding what is best for himself/herself. It is a time of conflict and choice. Issues of career, money, politics, sex, and religion will be addressed. Levels of self-esteem become separate and distinct, as the adolescent comes to place different values on different aspects of themselves. Some adolescents will enter a stage of 'adolescent egocentrism' where they enter into a state of self-absorption, and view themselves as the center of everyone's focus. This egocentric view can cause social problems, as adolescent's rebel against authority. Cultural factors, gender, race, and socioeconomic status can have substantial effect on self-esteem.

Summary and Developmentally Appropriate Practices (13-18 years of age)

Adolescents “practice tasks to meet others standards, and develop greater understanding of the logical relationship among the concrete objects in their world” (Jones, 1997, p. 18). Play for the adolescent has progressed into formalized games with rules. Winning becomes important. Organized team sports support social development, where peers become more important than family. Adolescents channel their energies into specialized clubs which support their personal interests (music, home economics, books, drama, etc.) By participating in and taking a role within that group, the adolescent comes to better understand how they fit into society (Isenberg & Quisenberry, 1988). “Play is often viewed as the way in which the juvenile, through his/her extended childhood, learns the skills necessary in adulthood” (Pellegrini and Bjorklund, 1996, p. 12).

Summary of Developmental Milestones in Childhood (Table #2) *in approximate order of increasing difficulty*

	Physical Development	Language Development	Cognitive Development	Social/Psychological Development
Birth to six years of age	Reflexive, instinctive actions Lifts head Rolls over Sits without support Holds and manipulates a toy Crawls Stands without support Walks using furniture for support Walks without support Climbs and descends stairs Runs, jumps, hops Builds tower with blocks Dresses and undresses doll Pedals tricycle Strings and laces shoes Can hold and use a crayon Can hold and use utensils Builds a bridge with blocks Bounces and catches a ball Skips with alternating feet Roller skates Rides a two wheel bike with training wheels Prints first name with pencil	Able to recognize human language patterns at birth Language develops rapidly in step-by-step process; babbling, language sounds, rhythm, pacing and length of sounds mimic adult speech, imitation Use of single words to stand for whole ideas Two-word stage allows descriptive language Telegraphic speech Increased vocabulary and longer sentences Uses language to express feelings Understanding of syntax and grammar Relatively clear speech Begins to create stories to share with others Fluent speech Seeks new meaning in words Loves to listen to stories being read aloud	Infants begin to understand object permanence Begin to use representations and symbols Explore responsive objects Repeats interesting actions Information processing speed increases Imitation of adult/peer behavior Children show egocentric thinking and centration Can sort objects by color and size only Trial and error problem-solving Make believe play occurs Inanimate objects are alive Very observant Asks questions constantly Confuses fact with fiction Memory, attention span, and symbolic thinking improve Developing a sense of time Beginning to memorize rhymes, songs, etc. Practices writing, forming numbers, etc. Likes picture games Intuitive thought begins	Total dependence on adult caregiver Infants look, smile and reach out for one another Has attachment to caregiver Begin to assert sense of independence Solitary play Moves away from safety of attachment Watches others play Parallel play Development of purposeful behavior Begins to feel empathy Begins to share Assumes more responsibility Enjoys being with peers Development of self-concepts Sense of gender and racial identity emerges Morality is rule-based and focused on rewards and punishments Play becomes more constructive and cooperative Greater need for autonomy Very creative players – uses imagination

Summary of Developmental Milestones in Childhood (Table #2) *continued...*

	Physical Development	Language Development	Cognitive Development	Social/Psychological Development
Seven to twelve years of age	<p>Slow, consistent growth Smoother, more coordinated motor skills Physical sports and athletics; biking, swimming, skating, baseball, tennis, basketball More control over the body allows child to sit and pay attention for periods of time Fine motor skills are mastered – like tying shoes, fastening buttons, learning to write cursive, typing Can use hands independently Can work on fine craft details and play musical instruments</p>	<p>Better memory and logic skills Enjoy telling jokes Vocabulary, syntax, and grammar continue to improve Learns to read and write more skillfully Uses advances sentence structure</p>	<p>Can apply logical operations to problems associated with the concrete world personally experienced Understand conservation, decentration, and reversibility Can sequence and classify Has good understanding of numbers Can learn rules to games but can only apply one step at a time (ex. chess - cannot see possible moves ahead) Memory encoding, storage and retrieval improve</p>	<p>Understanding of social conventions improve Developing a sense of self Use psychological traits to define self Self-esteem improves Sense of self-efficacy develops Peers become very important Friendships patterns emerge</p>

Summary of Developmental Milestones in Childhood (Table #2) *continued...*

	Physical Development	Language Development	Cognitive Development	Social/Psychological Development
Thirteen to eighteen years of age	<p>Growth spurt Increase in muscle growth with corresponding increase in strength Fine tuning of motor capabilities for the adult-like body Physically capabilities peak in 20's – including strength, senses, coordination, and reaction time</p>	<p>Verbal skills improve and are refined for adult use</p>	<p>Reasoning is formal and abstract Ability to reason is fully developed Can use formal logic to consider a problem in abstract Can think about games 4-5 moves ahead of present (ex. chess) Able to think hypothetically Can focus on possibility rather than reality Can divide attention between two or more thought All memory abilities (encoding, retrieval, rehearsal, search, clustering, elaboration and organization) develop further Can understand principles of chemistry, physics, and algebra</p>	<p>New type of egocentrism develops (belief that one is always being observed and overestimates their importance to others) Confusion about self, identity crisis Parent/child relationship problems may occur Peer relationships are highly important Peer relationships provide social comparison and help define acceptable roles Popularity issues become important Ability to consider complex philosophical, moral and ethical questions Questioning beliefs about religion and politics Questions traditional customs and laws Sense of invulnerability Minor lawbreaking can occur Need for independence both physical and emotional Develop concept of their relationship to larger society</p>

(Santrock, 1998; Feldman, 1997; Beacham, 1996; Bergen, 1988)

History and Evolution of Children's Landscape Environments

Children's play environments evolved from two major perspectives – physical fitness and child development. The formal playground had its origins in Germany in the early 1800's. It focused on outdoor play and exercise-training and was usually created by moving indoor exercise apparatus' outdoors. These playgrounds addressed the needs for large-motor development, allowed children to let off steam and provided an area for some social growth (Wilson, Kilmer & Knauerhase, 1996). Although the first playground was established in the United States in the state of Massachusetts in 1821, they were not very successful in this country and by the 1830's interest had faded to the point that only a few were created over the next fifty years.

But playgrounds had continued to evolve in Europe. Issues surrounding child development had transformed the playground beyond a simple piece of exercise equipment. In the late 1800's, Dr. Marie Zakerzewska, an American visitor to Germany, brought back information on the 'sand pile' playgrounds that she had seen in that country. Developed as part of Froebel's kindergarten, these natural playgrounds gave children the opportunity to interact with the environment. Soil, sand, water, plants, and animals became the 'equipment' of this playground. Play was less structured and more imaginative. The introduction of 'sand gardens' in 1886 marked the beginning of the first serious play movement in the United States directed at young children (Frost & Wortham, 1988). With the kindergarten reform in the United States in the early 1900's, playgrounds became a melding of the two perspectives, physical fitness and child development. Kindertartens and nursery school playgrounds became a combination of commercial structures and sandlots or open space for free play. Swings, seesaws, jungle gyms and slides could be found on every school playground.

As playgrounds grew in number and popularity, concern over their control led to the founding of the Playground and Recreation Association in 1906. This group developed recommendations regarding many aspects of the playground, from size to time of use to equipment to be used. Interest grew and between 1890 and 1920, \$100 millions of dollars were spent on American playgrounds (Cohen, 1987). Play environments and the play equipment of the 1950's and 1960's were influenced by artists, architects, recreation specialists, educators and commercial manufacturers (Frost & Wortham, 1988). Expanding research in the field of child development,

where it was becoming accepted that ‘play’ performs an important role in cognitive, intellectual and social development as well as in physical development, inspired innovative new play environments. Borrowing from Europe, where playground development was (and still is) much more inventive and cutting edge, adventure or junk playgrounds made their way to the United States after World War II. Adventure playgrounds feature recycled, low-cost materials and were created to give problem children a place ‘to be noisy, raucous and violent (up to a point)’ if it stopped children from being noisy, raucous and violent in mainstream society (Cohen, 1987). Scrap lumber, tires, railroad ties and even old cars were put to use as part of the playground. While these playgrounds flourished in Europe, they never really caught on in the United States (Henniger, Strickland & Frost, 1985). Another trend in playground design in both Europe and the United States featured fantasy playgrounds. Fantasy structures were designed to stimulate imaginative play within a specific theme. These theme playgrounds, such as a nautical or western playground, allowed children to play within a theater setting. Historically, play structures have taken many different forms, even having been the focus of a nationwide design competition, sponsored in part, by the Museum of Modern Art. But “although the motives (aesthetic quality, play value, safety, and manufacturability) were worthy, play sculptures were frequently more appealing to adults than to children” (Frost & Wortham, 1988, p. 22). All too often, play spaces tend to focus on what the adult designer *thinks* that children would like (Herrington, 1997). During the 1970’s, an increasing variety of equipment was designed for playgrounds. Modular wooden equipment with decks and attached play options ruled the market. These structures offered a wide range of designs allowing for complexity and challenge, giving designers freedom to tailor the design to the specific site.

Expanding on the playground safety guidelines published in 1981 by the U.S. Consumer Product Safety Commission and following a number of injury-related lawsuits, manufacturers and consumers began to look at playgrounds more closely. Employing the expanding body of knowledge about play and play environments, “more than 450 articles and books between 1970 and 1982”, the people responsible for play environments, designers, consumers and manufacturers, were beginning to “combine their expertise to ensure safer, challenging, aesthetically pleasing, developmentally sound places for children’s play” (Frost & Wortham, 1988, p. 23). Today, play environments strive to address the whole child – providing an

environment that responds to all the developmental needs of the child, integrating both nature and technology.

Examples of Developmentally Appropriate Educational Environments

The first and most vocal proponents of quality educational environments are educators. As a result, many examples of ‘quality’ children’s environments - preschools, daycare centers, and playgrounds – are found in educational journals. Educators have developed numerous associations and committees to ensure that these sites provide children the best that they can offer. The potential of outdoor education is also receiving its share of attention. It is part of the movement toward experiential learning that is supported by statutes in 30 states that require environmental education (Bishop, 1998; Dannenmaier, 1994). Asphalt playgrounds are being replaced with wetlands, marshes and meadows where natural processes can be observed. These schoolyard ecosystems encourage creative play. There are places of free exploration and play. Children’s zoos, such as the Tisch Children’s Zoo in Central Park, New York, are making an effort to explain the importance of animal habitats and conservation at depths appropriate for young children. The zoo uses simple and direct graphics to supplement hands-on displays. This redesigned zoo eliminated the nursery rhyme theme that previously permeated the site. The new design encourages curiosity – pedestrian pathways meander through the zoo, revealing new exhibits around every corner. Children are encouraged to climb up, in, over and under elements of the site. Even the design of children’s gardens has embraced the developmental needs of the child. The Everett Children’s Adventure Garden, part of the New York Botanical Garden, mixes nature, science and play. A maze is created at child eye level, “presenting itself as a curious, tactile adventure”... constructed with irregular steps, and providing recesses for children to hide in. There are exhibits specific to each age group. It is a place where the distinction between school and garden blurs (Bennett, 1998). The Coombes County Infant and Nursery School in England encompasses in its design all of the cutting edge ideas about play, education and development. This school, according to the principal, is a true ‘kindergarten’ – “a garden in which children could be close to trees, plants, animals, insects and birds, and where they could experience the cycles of plant growth and decay.” The designer of this environment worked with the educators and administrators to find a developmentally appropriate design. Collectively, they wanted to create “a place for purposeful play and effective teaching that also was beautiful and

ecologically useful. The educators wanted ways “to use our schoolyard to enhance and integrate the curriculum. For example, [the teachers] not only teach the children that the school site was once part of the Windsor Great Forest, but show them a bit of living history from that era – a 400 year-old hedge that still borders part of the property” (Humphries, 1998, quoting the principal of Coombes County Infant and Nursery School).

The designers of these environments understand children. They are obviously aware of the importance of play and its connection to the landscape and developmental and educational issues surrounding childhood and took all of those issues into consideration while creating these designs. These examples are the types of environments that all designers of children’s landscapes should be working toward. Integrating play into the educational curriculum, be it in a formal classroom or outside the traditional setting, gives children the best opportunity to use their natural propensity for play to support their physical, cognitive, social and intellectual development. Play also ‘affords teachers the opportunity to go with the ‘natural flow of learning’” (Stone, 1993, p. 3). Children love to play. In play, they are able to create new things, take risks without the fear of failure, direct their own learning and actively engage their minds and hands (Wasserman, 1992). “Children of all ages should be provided opportunities within the integrated curriculum to play with words, paints, cubes, problems, materials and music as they become the writers, poets, artists, architectures, scientists and musicians of tomorrow” (Stone, 1996, p. 107).

Methodology and Procedures

Introduction

This study will be conducted in two parts. First, an extensive literature review was undertaken, drawing from a variety of experts in fields relating to child development, education and play theory. From this review, a number of design considerations were discovered and will be presented to assist the landscape designer in the creation of developmentally appropriate learning environments for children. Second, the design considerations will be used to analyze an existing educational landscape, the Jamestown Settlement, in terms of elementary school age children. Analyzing the site as a landscape designer that understands the developmental, educational and play issues that influence and shape children will reveal how the design of this landscape meets the developmental and educational needs of children and will direct attention to those areas where the site was not used to its fullest potential, either for children or as an overall landscape experience.

Recognition of Design Considerations

Part one of this study involves studying the research available to landscape designers regarding child development, education, and play theory then determining which elements and ideas can be extracted and applied to the physical design of an educational landscape. From this research a set of design considerations are being presented that provide a framework for the designer of children's educational landscapes to create a developmentally appropriate design. The preceding literature review provides an overall summary of the types of research examined for this purpose.

In reviewing the existing literature, focus was directed toward extracting ideas that could be manifested as part of a *physical* landscape design, as opposed to ideas that rely on teacher-student interaction or other element outside the realm of the landscape designer. Ideas discovered in the literature review were collected and categorized for developmental appropriateness and applicability to a landscape design. Developmental categories include physical development (including language development), cognitive development, and social/psychological development. Ideas were accepted, eliminated and/or modified to work with the physical design of an educational landscape for children. Evaluating the ideas required looking not only at the idea as it is presented but also recognizing the overriding concept behind the idea. Seeing the big

picture and focusing on the overall concept results in a comprehensive collection of design considerations that broadly address the ideas found in child development research, educational research and play theory research and influence the design of educational landscapes by exposing the designer to issues that may not have been considered in this situation before. Examples of accepted concepts included the idea of providing safe challenges; while the idea was originally applied to elementary school playgrounds, the concept will easily translate to an educational landscape. Ideas that were eliminated include items pertaining to room size and child-adult ratios. These ideas were irrelevant and inapplicable to a physical landscape design. Other ideas, specifically related to the fields of architecture and interior design, were modified to work with an educational landscape. Ideas regarding accessibility were expanded beyond the current ADA definition to include the concept of multiple scales – making the landscape and elements within it accessible to children of all ages, sizes and developmental stages. Overall, eighteen design considerations are suggested and provide a comprehensive framework for the landscape designer to create developmentally appropriate educational landscapes. They address the concepts of physical development, cognitive development, social/psychological development and intellectual development within the context of play. The design considerations presented here and later used as a tool for analyzing the Jamestown Settlement are intended to cover the widest range of learning and development options possible, to ensure that children of various ages and levels of development are represented.

To assist the researcher and landscape designer in visualizing the possible relationships between the design considerations, the concepts that they address and the ideas related to play within each concept, a matrix was created. This matrix allows for an exploration between the concepts that should be considered in the design of an educational landscape and the potential benefits that their inclusion may produce. The three major categories of child development - physical, cognitive and social/psychological - are divided into sub-categories relating to play. Physical development has three sub-categories; gross motor skills, fine motor skills and language development. Cognitive development is subdivided into four types of play, each contributing to a child's cognitive development at different ages. These sub-categories include functional/practice play, constructive play, dramatic/symbolic play and games with rules. Finally, the social/psychological developmental stage is divided into five sub-categories.

Solitary play, parallel play, group play, cooperative play/problem solving and self-esteem/identity are the types of play activities that support this type of development. This matrix is not designed to be a blueprint for a successful landscape design, but to graphically show the many possibilities for creating developmentally appropriate designs for different groups of children. (Figs. 3 & 4)

Figure 3
 Potential Relationships among Design Considerations, Developmental Concepts and Play (for all children)

		Accessibility	Graphics and Signage	Manipulability	Multisensory Stimulation	Safe Challenge	Graduated Challenges	Variety of Spatial Experiences	Mystery and Curiosity	Evidence of Completion	Continuation of Experience	Permanent Landmarks	Diversity within the Landscape	Social Interaction	Varying Sizes of Social Spaces	Retreats and Breakaway Points	Undefined Spaces	Natural Environment	Multiple Scales (for built items)
Physical Develop.	Gross motor skills	○ □ Ñ		○		○ □ Ñ	○ □ Ñ	○ □ Ñ					○ □ Ñ				○ □ Ñ	○ □ Ñ	
	Fine motor skills	○ □ Ñ		○ □ Ñ	○ □ Ñ	○ □ Ñ	○ □ Ñ				○ □ Ñ		○ □ Ñ				○ □	○ □ Ñ	○ □
	Language skills	○ □ Ñ	○ □ Ñ						○ □ Ñ		○ □ Ñ		○ □ Ñ	○ □ Ñ	○ □ Ñ				
Cognitive Develop.	Functional-Practice Play	○ □ Ñ		○	○	○ □	○ □		○ □	○	○ □		○ □ Ñ					○	
	Constructive Play	○ □ Ñ		○ □ Ñ	○ □ Ñ	○ □	○ □ Ñ			○ □ Ñ	○ □ Ñ		○ □ Ñ	○ □ Ñ				○ □	
	Dramatic/Symbolic Play	○ □ Ñ		○ □	○ □			○ □	○ □	○ □	○ □		○ □ Ñ	○ □	○ □		○ □	○ □	○ □
	Games with Rules	○ □ Ñ	○ □ Ñ	○ □ Ñ	○ □ Ñ	○ □ Ñ	○ □ Ñ			○ □ Ñ	○ □ Ñ		○ □ Ñ	○ □ Ñ	○ □ Ñ		○ □ Ñ	○ □ Ñ	
Social/ Psychol. Develop.	Solitary Play	○ □ Ñ	○ □ Ñ	○ □ Ñ	○ □ Ñ	○ □ Ñ	○ □ Ñ	○ □ Ñ	○ □ Ñ	○ □ Ñ	○ □ Ñ		○ □ Ñ			○ □ Ñ	○ □ Ñ	○ □ Ñ	○ □ Ñ
	Parallel Play	○ □ Ñ	○ □	○	○	○ □	○ □		○ □	○ □			○ □ Ñ				○ □	○ □	○ □
	Group Play	○ □ Ñ	○ □ Ñ	○ □ Ñ	○ □ Ñ	○ □ Ñ	○ □ Ñ	○ □ Ñ	○ □ Ñ	○ □ Ñ	○ □ Ñ		○ □ Ñ	○ □ Ñ	○ □ Ñ	○ □ Ñ	○ □ Ñ	○ □ Ñ	○ □ Ñ
	Problem solving	○ □ Ñ	○ □ Ñ	○ □ Ñ	○ □	○ □ Ñ	○ □ Ñ		○ □ Ñ	○ □ Ñ	○ □ Ñ	○ □ Ñ	○ □ Ñ	○ □ Ñ					○ □ Ñ
	Self-esteem and identity	○ □ Ñ		○		○ □ Ñ	○ □ Ñ			○ □ Ñ	○ □ Ñ	○ □ Ñ	○ □ Ñ	○ □ Ñ	○ □ Ñ	○ □ Ñ			

○ birth – 6 yrs.
 □ 7 – 12 yrs.
 ▽ 13 – 18 yrs.

Figure 4
Potential Relationships among Design Considerations, Developmental Concepts and Play (for elementary school age children)

<input type="checkbox"/> 7–12 yrs. (elementary school age-appropriate for the Jamestown Settlement evaluation)		Accessibility	Graphics and Signage	Manipulability	Multisensory Stimulation	Safe Challenge	Graduated Challenges	Variety of Spatial Experiences	Mystery and Curiosity	Evidence of Completion	Continuation of Experience	Permanent Landmarks	Diversity within the Landscape	Social Interaction	Varying Sizes of Social Spaces	Retreats and Breakaway Points	Undefined Spaces	Natural Environment	Multiple Scales (for built items)
Physical Develop.	Gross motor skills	<input type="checkbox"/>				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>					<input type="checkbox"/>				<input type="checkbox"/>	<input type="checkbox"/>	
	Fine motor skills	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				<input type="checkbox"/>		<input type="checkbox"/>				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Language skills	<input type="checkbox"/>	<input type="checkbox"/>						<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
Cognitive Develop.	Functional-Practice Play	<input type="checkbox"/>				<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>						
	Constructive Play	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>				<input type="checkbox"/>	
	Dramatic/Symbolic Play	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Games with Rules	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						
Social/ Psychol. Develop.	Solitary Play	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						
	Parallel Play	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Group Play	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						
	Problem solving	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>					<input type="checkbox"/>					
	Self-esteem and identity	<input type="checkbox"/>				<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			

The eighteen design considerations are presented in this study to assist the landscape designer in the creation of a developmentally appropriate educational landscape for children. The landscape designer has the opportunity to provide a unique environment that supports the ways that children learn in conjunction with the natural landscape. The physical landscape has the enormous potential to challenge children, offering choices in sight, smell, sound and touch. The landscape is ever-changing, providing broad learning opportunities where children can learn at their own pace, in their own unique style. These design considerations, when taken into account as part of an overall educational landscape design for children, facilitate a design that offers children the flexibility to learn and develop in a play setting specific to their unique developmental needs and educational abilities.

Established recommendations, issues, concepts and/or ideas from a variety of sources were the primary origins for the educational landscape design considerations presented in this study.² They address issues related to landscape design, play, physical development, cognitive development, social/psychological development and intellectual development.

1. Accessibility – educational exhibits and the surrounding landscape must be accessible to the intended users. Accessibility means that children can get to and progress through the site safely and that the site is barrier-free, meeting ADA guidelines. It should also be ‘psychologically accessible (attractive and secure)’ as well as mentally accessible – a site that children can understand.
2. Graphics and Signage – exhibits should incorporate signs that are applicable to a variety of age and reading levels. Graphics, beyond written words, will apply to a larger range of children. Language development varies widely during the childhood years. Providing opportunities for the many different levels of skill (tape-recorded messages, large pictures to tell a story, simple words, detailed descriptions) will give every child the chance to participate.

² *Play For All Guidelines, 1992; Design of Children’s Play Environments, 1992; The Playful City Conference Workbook, 1990; The Early Childhood Playground: An Outdoor Classroom, 1987; Play is FUNdamental brochure, 1987; Play in the Lives of Children, 1988, Developing and Promoting Caring Attitudes Toward the Natural World, 1997, Learning in the Museum, 1998.*

3. Manipulability – some aspects of the landscape should allow children to manually change them to serve their own purposes. Loose parts and play props are used throughout childhood at varying developmental stages. “In any environment, both the degree of inventiveness and creativity, and the possibility of discovery, are directly proportionate to the number and kind of variables in it” (Nicholson, 1971). Manipulable items can include; sand, water, dirt, vegetation, small toys and tools.
4. Multisensory Stimulation – the educational landscape should expose children to the “greatest range of colors, smells, textures, shapes, sized, sounds, objects, materials, interactions, people, climate, time, space, movement, and change” (Play For All Guidelines, 1992). Sensory elements should be used in such a way as to reinforce information for children, allow them clues to finding their way, or chose the sensory element that they are most comfortable with and build upon it. Children learn best when they are enjoying themselves, exploring the world through their senses (Fowler, 1993).
5. Safe Challenge – “Play areas should provide highly challenging settings with many different events for the physical development of the upper body, balance, and coordination without exposing children to unnecessary hazards” (Play For All Guidelines, 1992). This type of activity relates directly to coordination, which “affects judgment about taking risks – the ability to visualize a movement before making it. A challenge is a risk that the child can see and chooses to undertake or not. Children need to take risks to challenge their skills and courage” (Play For All Guidelines, 1992). Safe challenges can exercise physical skills, help develop courage and judgment, and offer a child a sense of achievement upon completion.
6. Graduated Challenges – landscapes should provide activities with a broad range of challenges and graduated levels of safe risk-taking to children of different ages and stages of development. This is where children test their skill levels and build self-confidence. Safe challenges (Guideline ‘5’) should, ideally, provide several levels of difficulty for each activity. Activities do not have to be dangerous to be challenging. Types of graduated challenges can be

balance beams or cargo nets of various heights (using broader widths at the tallest height gives the appearance of being more dangerous and challenging while remaining safe.) “The important aspect of graduated challenges is that the challenge be ‘perceived’”(Schneekloth, 1985, quoted in Play For All Guidelines). High places are another type of graduated challenge, “the smaller the high place, the more dangerous it is perceived, even if well-protected by edges and railings” (Schneekloth, 1985, quoted in Play For All Guidelines). This type of activity speaks directly to the psychological development of children of all stages.

7. Variety of Spatial Experiences – the landscape should incorporate elements that teach spatial concepts like over/under, in/out, up/down, right/left, depth and direction. Types of spatial elements are as follows; high places from which to view activities, different sized spaces to crawl in, under, over and through, places to fall, jump and drop safely and a series of climbing experiences. “Children need a place to travel above the ground plane; climbing, resting and playing” (Play For All Guidelines, 1992). Spatial variation should offer a diversity of light and sound. Variation arouses activity in children. Variety excites a child's imagination. This category can be used in conjunction with the idea of ‘challenge’ and is applicable to children of all ages and developmental stages.
8. Mystery and Curiosity – the landscape should not reveal itself all at once. Allowing children to wonder what is ahead or around the corner adds to the experience of the site. Mystery has been described as a promise of additional information associated with a change in vantage point (Ulrich, 1977). The unknown offers ambiguity, uncertainty and anticipation. It forces the visitor to become a participant instead of an observer. The primary benefit of ‘variegated, lively, enriched environments’ is a rise in exploratory behavior and efforts at problem solving (Greenbie, 1976).
9. Evidence of Completion – “children need evidence of their success and accomplishments – milestones that tell them they are improving their skills” (Play For All Guidelines, 1992). Completion can be designated visually or

physically. Some examples of visual completion are design elements that show clear stages of achievement “such as climbing platforms at different heights, viewed by all, or positive signals at the point of completion or accomplishment, such as a bell to ring or something that can only be seen from the top” (Play For All Guidelines, 1992). Physical elements of completion are certificates, finished projects or crafts, elements that can be taken home as a trophy.

10. Continuation of the Experience – educational landscapes should provide the opportunity for children at all ages and developmental levels to continue their experience of the site at home or school. Souvenirs, puzzles, coloring books, and other tokens of their visit should be available.
11. Permanent Landmarks - landscapes should have permanent landmarks— elements that remain fixed provide familiarity, security and identity. These items may be used by children to navigate through the site; whether lost, or simply finding their way among the exhibits. Dominant visual cues and elements tend to be features of high information. “People tend to concentrate on unusual, unpredictable contours (sharp curves and corners, unusual or novel [visual] elements). These are ‘noticeable differences’ and as such, serve as focal or orienting points” (Rapoport, 1977).
12. Diversity within the Exhibit/Landscape- due to the ever-changing needs of children, landscapes need to offer variety. “Some aspects should change continually. Other aspects should be predictable to foster feelings of security.” The successful educational landscape will balance novelty and predictability. “Major areas, main access routes, and principal play opportunities should be easily seen. Many minor ‘backwaters’ should be designed to be discovered over time” (Play For All Guidelines, 1992). There should be a great deal of flexibility – physical elements that can be changed and moved around are needed. Children change as they grow and develop. Elements within the site must change too. Rearranging or rotating elements of the site, in addition to adding special equipment for particular activities is one way to keep the site ‘new’ to the child.

- 13. Social Interaction* – a landscape that encourages social relationships for different-sized groups should be provided. Examples include; bench groupings, enclosed sitting areas, and small shelters. Also included in this category for an educational tourist destination area, are group events led by an employee of the facility. Group activities can be designed for all ages and developmental levels. Play offers opportunities for children to develop their social competence by interacting with a variety of children in a non-structured manner (Pellegrini and Bjorklund, 1996).
- 14. Variety Sizes of Social Spaces* – a variety of spaces, from small to large, are necessary to support different-sized groups of children engaged in different social activities. This guideline recommends spaces within the landscape with child-sized furniture or exhibits, as well as private, semi-private and public areas for children to interact.
- 15. Retreats and Breakaway Points* – “although children need to interact with their peers, they also need to be alone, to get away and dream, to escape from external pressure. They need secluded spaces to engage in quiet cognitive, social, and manipulative play, individually or in small groups. Nooks are required for solitary play and for watching others” (Play For All Guidelines, 1992). This guideline recognizes the need to give children a way out of challenging activities without feeling like a failure or to watch a play group from a distance, if they choose not to join in. Children of all ages and developmental levels need places to get away for social reasons as well - areas to interact with friends. Crowded environments can lead to mental strain because of constant pressure to interact with other people (Weinstein, 1995). Both the extrovert and introvert should be comfortable in the environment. It is also important that the paths connecting areas of the landscape offer a variety of flow lines and break away points. Play is movement and choice of path offers a variety of options to different children (Senda, 1992).
- 16. Undefined Spaces* – areas of the physical design that have no specific programming value can become anything the child wants, encouraging fantasy play. Areas that contain ambiguous, generic items will allow the child to use

their imagination. Providing a tower or a platform stage that looks too much like a tower or stage, offers the child no opportunity to transform the object to meet his/her needs (Senda, 1992). Open space should be large enough to accommodate even the most energetic play.

17. Natural Environment – children should be able to make close contact with a variety of vegetation and wildlife habitats. Many children today have limited opportunity to interact with nature. Research indicates that environmental education is critical to the wholesome development of the child (Wilson, Kilmer & Knauerhase, 1996). The use of outdoor programming is necessary to prevent the emergence of fears and phobias about nature (Wilson, Kilmer & Knauerhase, 1996; Cohen, 1984) and to promote awareness about natural resources and their preservation (Roger Tory Peterson Institute, 1991; Wilson, 1993). “Spaces endowed with trees, water and living creatures are the spaces most basic and important to children’s play” (Senda, 1992, p. 97).
18. Multiple scales – support elements of the landscape should incorporate items at a child’s scale. Places that allow the child to function without parental help are appropriate at almost all ages and encourage development. Examples of this include seating and drinking fountains. At an educational site, it is important that exhibits be accessible to children of all heights. The designer should think about the idea of growth and the way the things in the world change in scale as a child develops (Fowler, 1993).

The design considerations are presented to make the landscape designer aware of the concepts surrounding child development, education and play that need to be addressed in an educational landscape design. They are not a checklist to be followed. Their purpose is to make the designer aware of the critical developmental, educational and play concepts that are applicable to the design of a physical landscape. There is great flexibility in the design considerations – giving the landscape designer the ability to focus on the type of developmentally appropriate design solution that is most successful for a given situation. The considerations may be used collectively to provide a overall educational landscape that has something to offer everyone, or certain issues may be

represented more heavily, resulting in a design that is tailor-made for a specific group of children or focuses on a specific developmental activity. The design considerations are a tool for the landscape designer to use in creating a site-, situation- specific design solution.

Analysis of Existing Educational Landscape

The second part of this study will reveal how the design considerations can also serve as a tool to analyze an existing educational landscape. It is necessary to look at an established education landscape for direction on how the design considerations may be applied to a physical design and to understand the many possibilities that they provide. The Jamestown Settlement, considered a successful educational landscape, was chosen for analysis primarily due to its educational mission, the number of children visiting the complex each year, and its compliance with the Virginia Standard's of Learning program. This is an established educational landscape, marketed toward children and their teachers as providing an environment representative of a period of time in the history of this country. For the landscape designer the site offers special opportunities to address the land as a function of the education experience. The site offers a variety of landscape types within its boundaries - a wild, natural landscape is presented as home of the native Powhatan Indians; a more domesticated landscape as created by the early settlers in an attempt to pioneer a civilized society in this country; and a river landscape, encompassing untamed water, wind, salt and sun, important to both the Powhatan Indians and the early settlers. The overall palette of the site is very rich – promising a unique educational experience.

While this site is visited by children of all ages, the Jamestown-Yorktown Foundation's compliance with the Virginia Standard's of Learning is specifically targeted toward elementary school age children, which account for forty-five percent of annual ticket sales (D. Shipman, personal communication). Focusing the analysis of the Jamestown Settlement on children in this age group, 7-12 years old, will inform designers how this site currently caters to elementary school age children's developmental and educational needs and reveal gaps where improvements may be made. The literature review showed

that in elementary school age children the development of the mind overshadows any development of the body. By this age, children have mastered many of the aspects of their growing bodies and are focused on expanding their minds and developing social relationships. Physical development takes place in conjunction with cognitive and/or social development. Elementary school age children engage in dramatic play by manipulating puppets, blocks, cars, small animal and people figurines. Formal and informal games with peers become important as the child develops. These games require the concepts of cooperation and competition, refining their social skills. Elementary school age children enjoy creating their own games; riddles, number games, and secret codes testing themselves and their expanding abilities. Social/psychological and cognitive development dominate the lives of the elementary school age child. Children at this age are striving for independence. These are the years where children are able to learn quickly and think logically. An educational landscape outside the traditional classroom setting is an ideal learning environment for this group of children. The natural environment has inherent elements that can be used to enhance these developmental needs.

Since the Jamestown Settlement is an established environment and considered successful as an educational landscape, by the Jamestown-Yorktown Foundation and the State of Virginia Standards of Learning Program, it is important to understand the developmental/play elements that are already evident on the site which contribute to its success. The Jamestown Settlement complex will be visited and studied for its role as a successful educational landscape. The design considerations will be used as a way to analyze the site – looking for evidence that the designer demonstrated an understanding of children’s needs and has included elements within the landscape that are related to developmental concepts, play theory concepts and educational concepts. During a site visit the Jamestown Settlement complex will be mapped to reveal existing areas that contain activities and exhibits that are developmentally appropriate for elementary school age children , areas that incorporate concepts found in the design considerations and the relationship between the activities and the landscape. This mapping will reveal an overall pattern – showing how the designer of this landscape understood and addressed the

developmental and educational needs of children in the physical design. The resulting map will present this successful educational landscape as seen through the eyes of an informed designer that understands the needs of the users.

Data Analysis and Results

Recognition and Evaluation of Design Considerations

The process of discovering and evaluating the design considerations presented is documented in the methodology section of this study. The resulting eighteen considerations incorporate the issues surrounding child development, education and play theory that are relevant to a physical landscape. Presenting the issues in terms that relate to a physical design, in the form of design considerations, gives designers of children's landscapes a point of reference for looking at a potential site for a new design or for analyzing an existing landscape.

Analysis of Existing Educational Landscape

The Jamestown Settlement was visited on a Sunday morning. A weekend was chosen to avoid children that may be visiting on a school field trip. The study was not intended to be observational in terms of children's actions and therefore every effort was made to exclude children visiting the site from the data collected. This study focuses on the *physical* design of an educational environment and it was, therefore, important not to be biased or influenced by the activities of children on the site. An observational study within an educational landscape should be undertaken as a second phase of this study at a later date to further validate the connection between the issues that the design guidelines address and the activities of children. The day was warm and sunny, but extremely windy. The site became increasingly crowded as the visit progressed. The ages of visitors ranged from infants in strollers to senior citizens. The researcher spent approximately four hours studying, mapping, photographing and gathering the information necessary for analyzing the Jamestown Settlement complex.

Description and Analysis of the Site

The site easily divides into four distinct exhibit areas, all connected by clear paths and marked by signs. The Jamestown Settlement complex is organized along a circuitous path, articulated by the concrete pathways connecting specific exhibits. (Fig. 5)

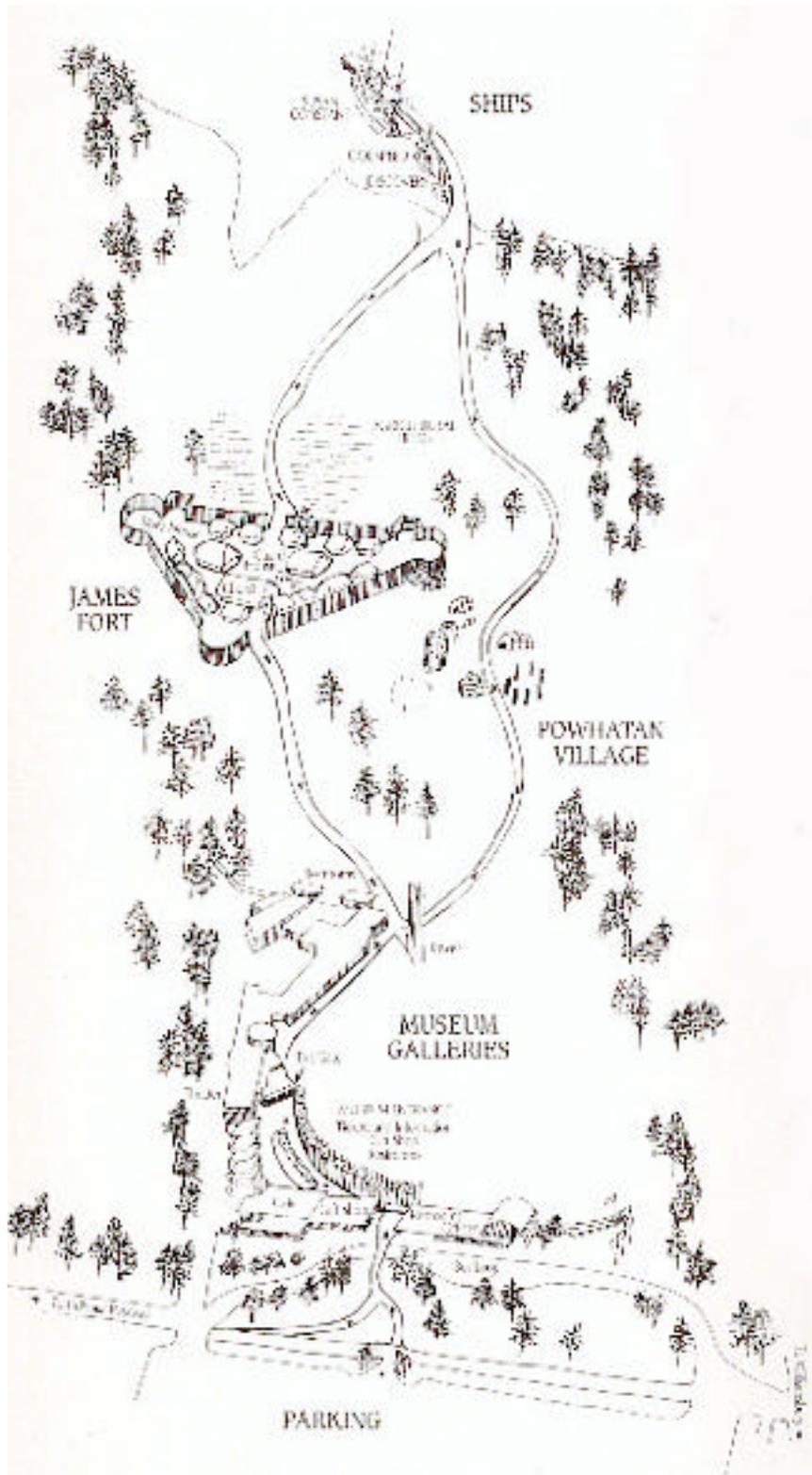


Figure 5
Overhead view of
Jamestown Settlement
layout

The visitor's experience begins at the interior museum building, the first exhibit within the Jamestown Settlement complex. Upon entry to the museum building, visitors are directed toward a small movie theater that shows an introductory film about the history of the Jamestown Settlement. Upon exiting the theater, visitors may either proceed through the museum galleries or exit the building and walk directly to the exterior exhibits, bypassing the information presented in the museum galleries altogether. Currently, bypassing the museums will have little effect a child's educational experience. The museum galleries are not designed with children in mind. The museum functions as a traditional natural history museum presenting a history of the Jamestown Settlement. Exhibits are generally behind glass and supplemented with signs and graphics. The first gallery of the museum is 'The English Gallery.' In this area, paintings, sculptures and authentic artifacts tell visitors about the history of England in the 16th century. Full-sized maps, a large globe positioned on the floor and miniature replicas of ships document the voyage of the early colonists. (Fig. 6,7) The path continues toward an area where information is given about navigation and life aboard the ship. (Fig. 8) While most exhibits here are behind glass or out of reach, there are a limited number of hands-on exhibits in this area of the gallery, mainly in the form of push-buttons.



Figure 6

^ The English Gallery has
 ^ portraits and sculptures
 ^ depicting important people
 ^ in the history of the
 voyage to Jamestown >>>



Figure 7

>>> Untouchable still-life
 >>> displays convey what life at
 >>> sea was like for 4 months
 >>> during the voyage

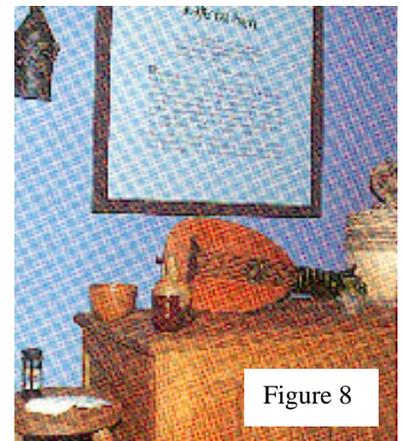


Figure 8

The next connecting gallery, ‘The Powhatan Gallery’, focuses on the life of the Powhatan Indians, the people indigenous to the Tidewater, Virginia area where the Jamestown Settlement is located. Artifacts and weapons are kept under glass in a low, child-height display. The wall above contains a large mural, depicting the outdoor landscape during the early 1600’s. Full-sized bronze sculptures of a Powhatan family stand on a pedestal in the center of the room. Various aspects of the Powhatan way of life, including food, clothing and shelter, are represented in this gallery. (Fig. 11) A life-size three-dimensional display showing white-tailed deer and a young Powhatan man dressed in hunting clothes sits behind a glass display case approximately three feet off of the floor. (Fig. 9) Miniature models of a traditional Powhatan house, *yehakin*, are also displayed behind glass. (Fig. 10) One exhibit, a reproduction of a Powhatan chief’s ceremonial robe, lies in a glass covered floor display and is viewed from above. There is one hands-on display, regarding the making of clothes from hide, in this gallery.



Figure 9

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^^ Life-size displays represent aspects of Powhatan
^^ Indian life – a hunting scene is depicted here
^^

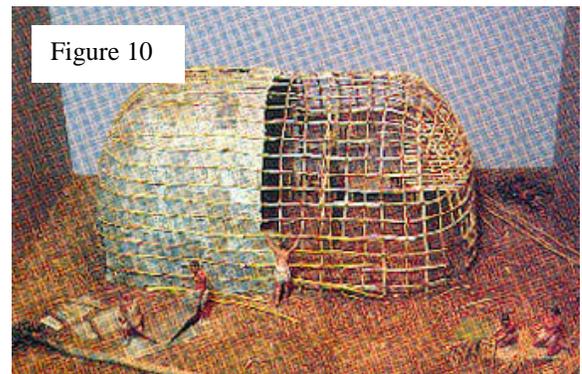


Figure 10

^^
^^ The Powhatan Gallery shows a model of
^^ how the *yehakins* were constructed
^^



Figure 11

<<<<<< The five seasons of the
Powhatan Indian year are described
in this display; stressing the
importance of the land in hunting,
planting and harvesting of food.

The final section of the meandering museum building houses ‘The Jamestown Gallery.’ This area provides exhibits depicting life for the first settlers. Again, most of the artifacts, model reproductions, weaponry and armor are shown behind glass. (Fig. 12, 13, 14, 15, 16) There are a few exhibits that allow visitor interaction; a small video screen that allows the visitor to push a button and choose which film they want to view, a push-button that starts an audio description of one aspect of the early settlers’ lives, and push-buttons that light up a wall map, showing areas inhabited by settlers, Powhatan Indians, or both. The final area, just before leaving the building, provides a continually looping film about the Jamestown-Yorktown Foundation and its involvement with the complex.



Figure 12

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^^
^^
Tobacco – the crop that was ultimately responsible for the survival of the Jamestown Settlement is presented in this display



Figure 13

^^
^^
^^
^^
Portraits and sculptures of prominent Jamestown residents are presented



Figure 14



Figure 15

^^
^^
^^
^^
The roles of women and the relationship with the Powhatan Indians are described in these exhibits

Model of ship and the cargo it carried during the voyage across the ocean >>>>

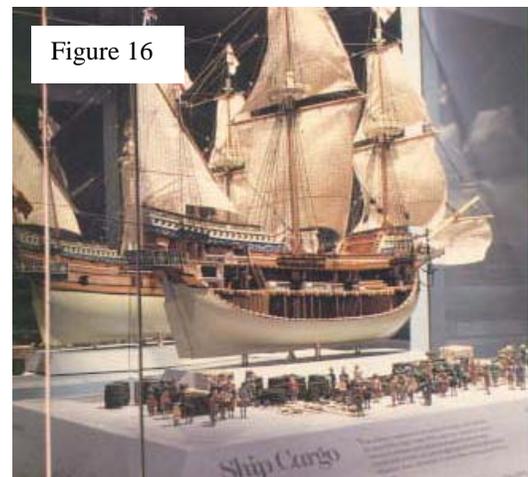


Figure 16

The transition between this exhibit, the museum galleries, and the exterior exhibits occurs as the visitor exits the museum building. Here visitors find a plaza containing a multistory brick tower, built in the 1950's as a memorial to the original Jamestown Settlement. (Fig. 17, 18) This tower is visible from most of the other areas of the complex, serving as a permanent visual reference point in the landscape. From this tower plaza area, the visitor is presented with two concrete paths. The Powhatan Indian Village lies to the right and its houses can be seen in the distance. James Fort lies to the left and the high wooden walls surrounding it can also be seen from the tower plaza. The Jamestown-Yorktown Foundation prefers that visitors begin their experience of the site with the Powhatan Indian Village and tour guides, when available, will direct visitors in that direction. There is no indication in the form of signs or graphics to inform the visitor of this preference, which will send the visitor on a chronologically accurate path, if a tour guide is not present. At the time of this site visit, a tour guide was available and visitors were sent down the path to the right. The path is a straight walk under a canopy of mature trees directly to the Powhatan Indian Village.



Figure 17

^
^ Plaza Tower; transition between
^ museum building and outside exhibits



Figure 18

^
^ Path between museum building and
^ outside exhibits

The Powhatan Indian Village is a loosely organized collection of elements situated under a canopy of trees. Powhatan houses, *yehakins*, of varying sizes are scattered throughout the area. Doors to the houses are open and visitors are encouraged to enter by costumed interpreters. The interiors are filled with reproduction artifacts; deer skin beds, baskets, a fire pit, reed mats, drying grasses and herbs. (Fig. 20) Surrounding the houses are various special displays where visitors can try their hand at scraping the fur from a deer hide with a shell, grinding corn with a primitive mortar and pestle, watch a costumed interpreter cook wild game bird and soup over the open fire of the outdoor kitchen, or practice their hunting skills with corncob arrows and moving rope targets. (Fig. 19, 21) In this area visitors are encouraged by the costumed interpreters to interact with exhibit elements. An overhead canopy of trees provides patches of filtered shade over the village. A naturalized wetland area is located on the periphery, although it is not incorporated into the design of the Jamestown Settlement complex.



Figure 19

^^ The Powhatan Indian Village Exhibit is a re-creation with traditional
 ^^ Powhatan Indian dwellings, artifacts and costumed interpreters.



Figure 20

^^ The Powhatan houses
 ^^ are open for exploration



Figure 21

Interpreters encourage children to explore hands-on displays – like this deer hide exhibit >>>>>

The transition between the Powhatan Indian Village and the Ship Pier is another naturalized area. Parts of the area are posted “environmentally sensitive area – please keep out” while other parts have no signs at all. No other information is given about the ‘environmentally sensitive areas.’(Fig. 22)



Figure 22
‘Environmentally Sensitive Area’ –
one of many within the Jamestown
Settlement complex
<<<<<<

The path continues blindly toward the water and the Ship Pier. There is no direct view of the pier or the water from the Powhatan Indian Village but the James Fort is visible on the left. As the visitor approaches and leaves the canopy of trees, tall, colorful masts can be seen in the distance. This area contains a wide wooden pier and full-sized replicas of the three ships that the early settlers sailed over from England. (Fig. 23, 24) The largest ship lies at the far end of the pier. Each ship may be boarded by walking up a narrow ramp and stepping over the edge of the ship. Varying degrees of access are offered within each ship although none of the ships are ADA compliant or wheelchair accessible. The largest ship, the *Susan Constant*, allows visitors to go below deck and walk out on the stern or the bow. Costumed interpreters are available to answer questions and provide information about the ships and the voyage from England. Canvas tarp-covered cargo is sporadically strewn around the pier. “See chests” are placed along the pier inviting visitors to look inside.



Figure 23

<<<<<< The Ship Pier Exhibit displays reproductions of the three ships that made the voyage from England to settle the Virginia coast. Ships may be boarded and explored.



Figure 24

Results of Analysis

While the Jamestown Settlement was chosen due to its educational mission, the number of elementary school age children visiting this site each year, and its commitment to the Virginia Standard's of Learning program, it was apparent during the site visit that this is not an educational *landscape*. The overall reading of the site is that it is comprised of four distinct and separate exhibits placed upon the land – the museum gallery, the Powhatan Indian Village, the Ship Pier and the James Fort exhibit. The surrounding landscape currently offers no support for the messages being presented in the exhibits, nor does it serve an educational purpose unto itself. An overall site map of the Jamestown Settlement was used to locate areas that incorporate the concepts found in the design considerations. This map reveals an educational landscape that is only utilizing half of the site in its current design. The completed map confirms the original impression of the site – this landscape is essentially four separate educational exhibits set upon the land, connected by concrete pathways. (Fig. 1, pg. 7) The surrounding natural landscape acts only as a backdrop for the exhibits, offering no support for the educational messages being presented. The majority of the land is unused, often serving as a transitional space between exhibits. It is here, in these transitional spaces, that the Jamestown Settlement complex fails as a *landscape*. These areas appear to have been ignored by designers and their potential for supporting the educational messages of the existing exhibits or acting as educational elements unto themselves is unfulfilled. These spaces provide the opportunity to connect the separate exhibits into a singular educational experience. The following photographs (Fig. 28, 29, 30, 31) show examples of these transitional spaces.



Figure 28

^^ Design opportunity - transition between
^^ James Fort exhibit and Ship Pier; open field



Figure 29

^^ Design opportunity - entry to Ship Pier
^^ exhibit; environmentally protected area

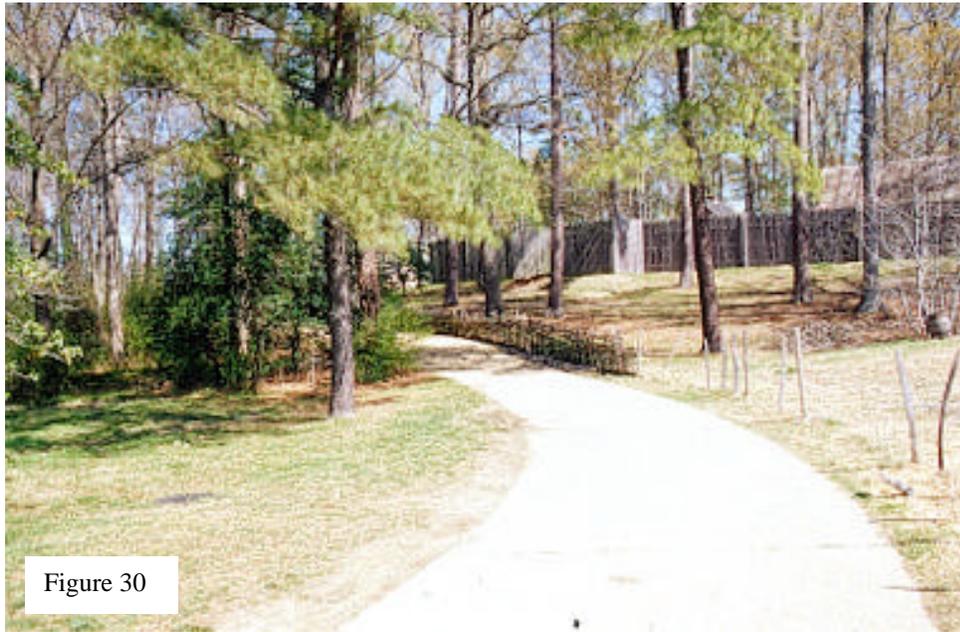


Figure 30

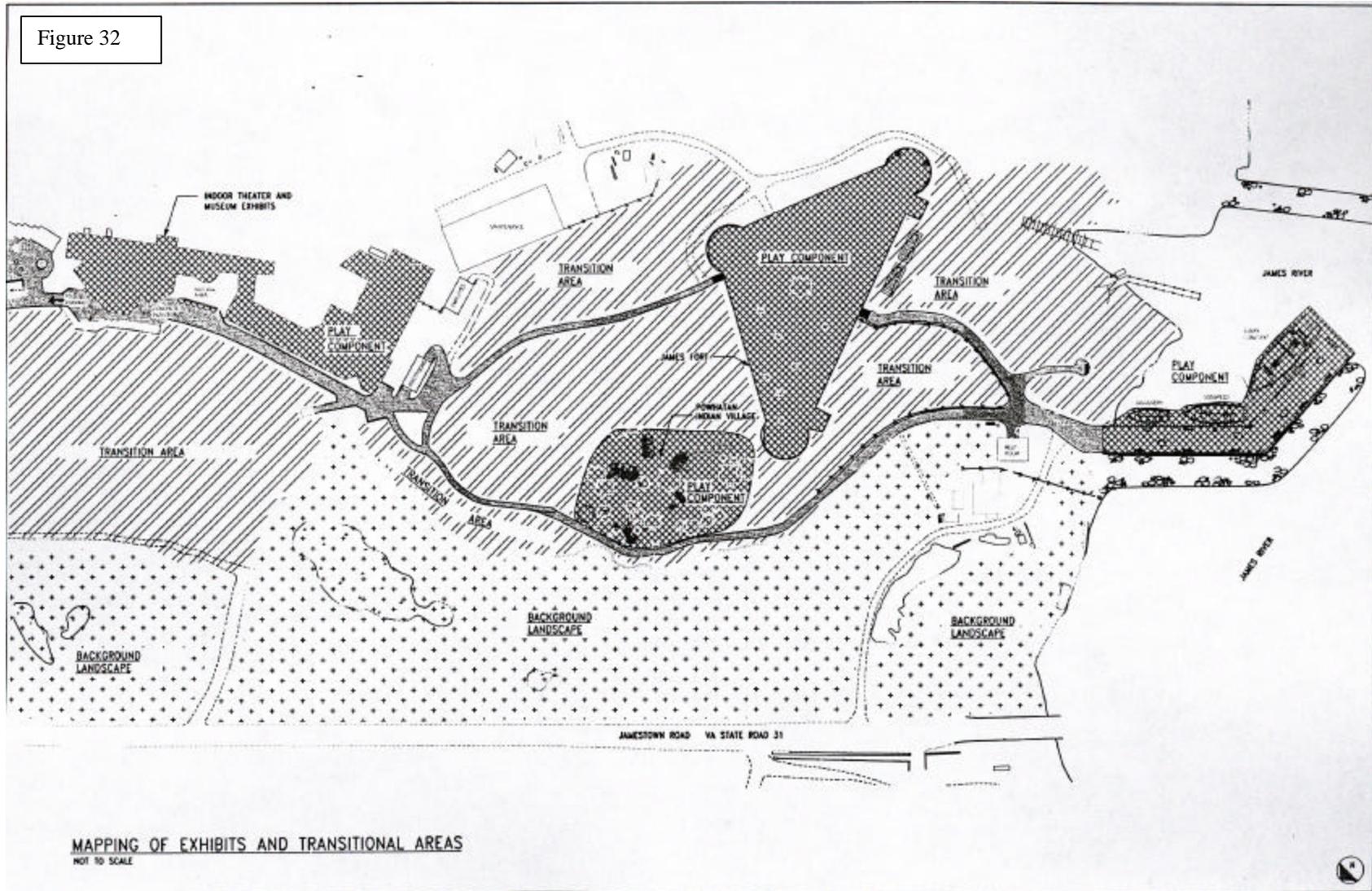
^^ Design opportunity - transition between Ship Pier and Powhatan
^^ Indian Village; passing James Fort



Figure 31

^^ Design opportunity - transition between Fort James and Ship Pier; natural marsh

Figure 32



In order to see how these transition spaces may best be considered as part of a design to create a cohesive educational landscape experience, it is necessary to look in greater detail at the activities occurring at each exhibit. These exhibits are the structure that forms this educational landscape. Expanding on the issues and ideas presented by their displays will provide greater insight into the educational potential of the transitional spaces in between.

The messages that these four exhibits are striving to express should be supported and enhanced by the surrounding landscape using the design considerations as a tool. The matrix was used to explore how the activities occurring within the exhibits may relate to the design considerations and the overall concepts of child development, education and play theory. (Figs. 34, 36, 38, 40) Enlarged maps of the four major exhibit areas of the site were used to evaluate developmentally appropriate play activities occurring within each exhibit. (Figs. 33, 35, 37, 39)