Boundless Boundaries

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BOUNDLESS BOUNDARIES

Utilizing Architecture to Improve the Therapeutic Experience.

A Therapeutic Riding and Hippotherapy Facility.

BOUNDLESS BOUNDARIES

by
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A Terminal Project
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Humans dealing with physical and mental ailments can benefit from improvements in condition that many types of therapy can offer. One of these is equestrian-aided therapy. Its techniques offer a unique range of tools that are both mentally and physically beneficial to the patient.

“The activity of riding closely simulates human gait. The warmth from the horse and the rhythmical motion provides relaxation to spastic muscles. Exercises done on the horse are designed to improve balance, endurance, range of motion and strength” (HETRA, 2011).

In physical therapy with the horse, humans form a bond with the animal. The patients learn how to care for and ride the horse, while fostering a stable relationship. By working with the animal, patients enjoy themselves and are able to see improvement in confidence and even improvement in his or her condition. “Grooming a horse works to improve tactile responses and motor planning skills” (HETRA, 2011). The horse can be used as a part of not only physical but mental stimulation. Students can improve fine motor and non-verbal communication skills and routines, among other skills. With the many stimulating sensory experiences such as the noises of the horses, tactile experiences, barn smells, new and exciting sights, and possibly even tastes, therapy patients have many opportunities for betterment of their condition.

Like horses, an intimate relationship between architecture and humans is also possible. This is because architecture cannot be defined without human interaction--architecture is made complete through the viewer. Our bodies are the only things we have with which to experience space: in activating the body’s neurological systems by means of sensory experiences, we are able to stimulate ourselves mentally and physically, regenerating the disabled body. A proper therapeutic space activates the relationship between the viewer and the built form -- taking it beyond the architecture and into a user’s space. In many ways, architecture mimics the body -- it expands, contracts, has a skin, responds to the environment, is healed and deteriorates. The architecture body can be designed to aid in the healing process (as a second skin of the users).

For this project, The extent of the research and design decisions focused on the ways in which architecture can take its cues from the therapy world; creating a place that is as equally therapeutic and stimulating as the therapies housed within. The result: a project designed to incorporate architecture, horses and therapies that answers the question:
Can architecture become an instrument of therapy, where architecture becomes more than just the enclosure, but a tool for therapy providing a place that uses horses and architecture as the tools for human therapeutics?
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Research and Analysis

For persons with disabilities, therapy that uses horses can prove beneficial to their recovery or improvement in their condition in ways traditional therapy methods may fail or fall short. Therapeutic riding can be employed for the mentally disabled and for the physically handicapped, who may need an alternative activity. Hippotherapy can be beneficial to patients because of its incorporation of the horse into therapy. Hippotherapy from Greek, hippos (horse) means: ‘treatment with help of a horse,’ using the “horse’s movement as a tool to improve neuromuscular function” (Scott, 2005). It “is a form of physical, occupational and speech therapy in which a therapist uses the characteristic movements of a horse as a treatment tool to provide carefully-graded sensory input” (Equus, 2011).

“The horse’s motion closely replicates the human walk for the individual sitting astride the horse’s back. This improves flexibility, balance and muscle strength for those riders with physical disabilities. Additionally, the warmth of the horse’s body can significantly reduce spasticity and enhance coordinated actions of many muscle groups. It is an exceptional therapy for sensory integration disorders. For individuals with mental or emotional disabilities, the unique relationship formed with the horse can lead to increased confidence, patience and self-esteem” (Bergman, 2011).

“Grooming a horse works to improve tactile responses and motor planning skills” (HETRA, 2011) and therapy patients can improve fine motor and non-verbal communications skills during equine-assisted activities (HETRA, 2011). This therapy stimulates most of the senses through noises of the horse and nature; tactile experiences on the horse and in therapy activities; the smells of the horses, the barn and of the outdoors; and different sights, colors and games. Patients, therapists and families are able to see improvements in the patient’s progress and increased self-confidence, reinforcing and empowering the use of the therapy.

![Figure 1: A child at Equus for Humanity (in Southwest Ranches, Florida) performs a therapeutic task on horseback, just one of many sensory and motor skill conditioning components available to therapists aiding patients through the use of horses (Faubel & Burrows).](image)

BACKGROUND
Design Direction

It is this type of therapy that I wish to provide to the residents around Lincoln, Nebraska. A therapeutic riding center integrated with hippotherapy services does not exist near Lincoln. I chose this type of research and design project in order to combine my affinity for healthcare design with my love of horses. It is also my intent to explore and expand upon traditional methods of architectural design, creating not only multi-use spaces (architecture that can be used in therapy), but also healing space: where the architecture transforms the user’s experience psychologically and physically. This research contains the most thorough compilation of therapeutic architectural design available as therapy architecture design has not been widely published. The design decisions made were based on logical decisions and inferences from the research that was available. The project also includes information on what spaces are needed for equine hospitality, spaces for hippotherapy/therapeutic riding and the considerations of sustainably-built structures. Sustainability (as defined for this project) considers long-term use, energy efficiency, the user’s environment and surrounding environmental impacts. I believe that this element of architecture is important: not only does this save energy and resources, but a properly environmentally-controlled space can be therapeutically beneficial. Finally, The research done for the design focuses on a few categories: case studies, the therapy process, sustainable design, agricultural structures, healthcare design, horses and their needs, and materials and colors in the therapy process.

The Significance

In order to provide the most therapeutic environment possible, it is necessary to analyze healing environments: how an environment can better stimulate the user and improve the therapeutic experience. It is in utilizing every opportunity to create a therapeutic environment, transforming simple space into architectural, healing space that makes this design significant. “The architect must act as a composer that orchestrates space into a synchronization for function and beauty through the senses — and how the human body engages space is of prime importance” (Lehman, 2011). My design transformed occupied space into spaces that enhance the user’s therapeutic experience. To do so, I researched architecture’s role in providing transformative assistance to the disabled and through this project, was able to create transformative architecture which alters the human experience: achieving improved mood, therapy experience and stress-level.

Design Approach and Selection Criteria

I approached the research, design and critiques of this project with several filters that are important to my goals for the project. These filters include:

- Ways of creating transformative architecture.
- Therapeutic ideas, methods and designs for program selection and the design of the project (see Figures 3.1 and 4.1).
- The melding of art and architecture as found in Jill Downen’s work (Figures 4.2-4.5),
- Sustainable design and practices.
- The positive and negative aspects of the case studies and related subjects (therapy design, therapy animals and art in architecture).
- All relevant programmatic elements as discovered in the case studies and additional research.
Influences

At the outset of the design of the project, I focused on the work of architect, Peter Zumthor, who successfully orchestrated a “sensory trail” (see case studies and programming) and healing space in his work, Therme Vals (Figure 3.1). His design was inspirational because of the ways he used light, materials, scale, temperature and the site for a relaxed, meditative design. I take inspiration from his success.

La Source Bains Nordiques (Figure 4.1) also utilized similar design intents as those in Therme Vals (Figure 3.1). Although designed for another purpose, it is a building focused on creating a tranquil environment that is incorporated into the natural setting. Like Therme Vals, it uses a palette of simple materials with an integration of light and site.

I also took inspiration from the work of artist, Jill Downen, who blurs any distinction between art and architecture. Her art-inspired techniques and creativity meld two ingredients: art and architecture, creating a space of healing through art and connection with the body. I believe that humans cannot heal without the pleasure of art and architecture, when properly designed as an art form (see above), then becomes an occupied art; a healing space. With her influence, I wish to incorporate art and architecture, art and therapy, and art as therapy. Much like her work (Figures 4.1-4.5), I will create a provocative space meant to interact with the user/viewer and transform his or her experience: an improved therapy experience. It is these inspirations that I used to transform mere space into a healing environment.

Figure 3.1: Therme Vals by Peter Zumthor (O’Grady, 2009) The different baths and spaces provide changing sensory experiences and its low-contrast textures, colors and spaces provide a calming experience (O’Grady, 2009).
Therapeutic Research

What makes therapy therapeutic? In order to design an appropriate space for therapy, I must understand what types of facilities house therapy. I found information on a children’s playground, an elderly persons’ home and a psychological facility as well as information on therapy pets, healthcare design, standards, “healthy” design and research on horses. The following section highlights the important aspects of this research as it relates to designing an appropriate therapeutic environment.
Therapy for Children

Design for children is possibly the most important for this facility because they tend to be the group that uses equine therapies most. Children respond to places in which they can perform large motor activities (Gordon, 1972), where “encounters with elements and media that are distinctive to the outdoors and movement in a prescribed space that is less confining than that of an indoor setting” (Gordon, 1972). This means that large, open spaces are helpful to children’s development. Furthermore, providing the opportunity for multiple activities and movement like reaching, grasping, releasing, pushing and pulling, crawling, walking, running, jumping and climbing (Gordon, 1972). “For children with neuro-psychological disorders, these are big milestones” (Gordon, 1972). Children actually prefer “spaces which encourage movement, particularly of a mode other than walking (Dick, 1977). In order for young children to be willing to invest their time in rigorous activities, they must see immediate benefits (Gordon, 1972). This means that it is important for children to enjoy their therapeutic activities (perhaps this involves fun program activities or enjoyable materials). Children need a clear separation of activity spaces to “eliminate confusing stimuli” (Gordon, 1972). Since “children use architectural elements as behavioral cues.” Some things like faux plastic wood and corridors with no sense of space and time can be confusing [to children and the mentally-ill], so it is best that these items be avoided (Van Der Hidde, 1972). Therapy can be best achieved by using many types of motor skills and various materials.

Some of the activity spaces provided in one playground include: “Bridged Treehouses” (with multiple levels, different spatial relationships, scales and perspectives), “Foam and Sand Pits” (for the movement-restricted), “Sand and Water Tables,” and a “Hill and Hill Circle” (a grassy hill with a tree and a slide for playing in the grass and under the shade of a tree) (Gordon, 1972). For children, different spatial qualities are important to create stimulation that encourages excitement about learning (Dick, 1977). Children require different ways to access these places in order to accommodate different mobilities (Dick, 1977). It is equally important that children of all abilities have access to outdoor play areas, so providing appropriate entry to these types of spaces is important (Dick, 1977).

This playground indicates that children prefer curvilinear design rather than right-angles, paths that lead toward landmarks and paths that remain on the same level, while continuing to incorporate periodic level changes (Gordon, 1972). As with a tree, any scale changes where the child can see over an area or where a canopy can be placed overhead creates interest and gives the child a sense of power or as if they can hide (Gordon, 1972). It is important to know, however, that when in a high space, children often feel exhilarated, delighted, pensive or afraid and “forget about their activity” (Dick, 1977). Children prefer “exciting and different spatial experiences” (Dick, 1977). Large volumes have different qualities than small, but “little empirical evidence exists to serve as a guideline for optimal spatial solutions” (Dick, 1977). However, “space could influence the learning process” (Dick, 1977). Providing items at a child’s scale or level can help them feel included and interact with their environment (Dick, 1977). Finally, children can be motivated to walk if they are given somewhere to go; if the child wants to seek out an area or is intrigued by their surroundings, movement becomes less of a chore and more fun (Dick, 1977).

An individual sees the world in different ways, receptors for humans include “distant receptors” like the eyes, ears and nose and “immediate receptors:” skin, muscles and membranes. These different receptors affect how humans see the world, but in children, the need to touch is more immediate than that need in an adult (Dick, 1977). A human’s sense of space is the total of the sensory inputs: auditory, visual, olfactory, kinesthetic and thermal (Dick, 1977). This means that it is important to stimulate each of these senses in order to
make a space which can be appropriately understood by its users. The experience of spatial qualities is what affects a child’s ability to concentrate on his or her activity and will perhaps even affect his or her mood (Dick, 1977). “A child who learns to know and master himself [or herself] and the world has a sense of [him or herself] as one who is capable of handling a predictable environment” (Gordon, 1972).

Design for the Elderly

As a potential user of the facility (though, generally older than most clients that use equine therapy), the elderly have a place in its design. The particularly frail elderly tend to require no stairs or a pitch that is at or below 1:20, consistent and bright lighting levels, tinted west-facing windows, colored wayfinding, handrails in corridors and eight-foot-wide corridors as is found in nursing homes (Ware, 1993). In the case of those ages 65 to 85, this group need straight-run stairs, ADA (American Disability Act - accommodation for those with disabilities) restrooms and accessibility in all rooms (Ware, 1993).

Design for the Mentally Ill

“A therapeutic environment deals with our surroundings: how we shape them and how our surroundings influence us (Van Der Hidde, 1972). The treatment for persons with “imbalanced mental capacities” is to “emphasize social interaction” and “communication with others” because “every person is a potential healer and every contact a therapeutic act” (Van Der Hidde, 1972). A patient must be able to orient him or herself and others within the environment (Van Der Hidde, 1972), an environment which should be in support of therapy. In fact, “a good environment can be a therapy in itself” (Van Der Hidde, 1972).

Just like other therapeutic spaces, all of the senses should be stimulated: olfactory, visual, auditory, thermal and tactile senses (Van Der Hidde, 1972). A lack of changes in a variety of sensations (like different things to touch) can prove to be negative in a therapeutic environment (Van Der Hidde, 1972). But an environment should also allow everyone to have his or her own territory and solitude, as this is just as important as social activity (Van Der Hidde, 1972).

As is true with children’s spatial preferences (soft, curvaceous forms), so too is it for adults in a child-like state (Van Der Hidde, 1972). Also, long corridors with repeating doors can become confusing and scary and distort a sense of time (Van Der Hidde, 1972), so it is important that this be remedied for the mentally-ill patient. For these people, decorations and a sense of place can be key to their healing. “Materials should be judged and used for their therapeutic value, i.e., the feelings they arouse in people” (Van Der Hidde, 1972).

Pets and Therapy

Research indicates that persons with pets are overall more healthy mentally and physically than their pet-free peers. This is why it is common practice to take dogs, cats and miniature horses into nursing homes and hospitals. These benefits exist because of the bonding that occurs between humans and the animals. Not only do equine-assisted activities involve bonding, but they promote social interaction with therapists, volunteers, instructors and other clients as well (Van Der Hidde, 1972).

“'The outside of a horse is the best thing for the inside of a man' (an ancient Greek
As a treatment tool for therapy (Scott, 2005), a horse can heal the mentally, emotionally and physically “challenged” (Scott, 2005). “Riding aligns the hips and promotes stability. That’s the same thing surgery would do” (Scott, 2005). This means that it is possible for those who may need surgery to forego such drastic action by first attempting to ride a horse to better his or her condition. Because horseback riding is more recreational that other forms of therapy, it can also remove the negative connotations a client may have regarding therapy, creating an interesting activity to mask the monotonous sometimes painful treatments (Scott, 2005). For children and those in wheelchairs, being on horseback can provide an opportunity for a spatial change, where the client can look down on his or her world, changing his or her perspective (always looking up at the world) (Scott, 2005).

Horses are used by speech-language pathologists, physical and occupational therapists, and their trained assistants. It is the use of the horse in conjunction with other types of therapy (including but not limited to those previously listed) to achieve therapeutic results that is the focus of hippotherapy. Generally, hippotherapy is used to benefit children and adults’ therapeutic needs. Many of the conditions that can benefit from hippotherapy include: sensorimotor dysfunction, impaired coordination, abnormal muscle tone, impaired balance, impaired communication, postural asymmetry or poor posture control, decreased mobility, limbic issues that relate to arousal, functional limitations (such as those related to sitting, standing, speech and language, walking, and behavioral and cognitive abilities) (Scott, 2005). Many of the specific conditions that can benefit from equine therapy include: developmental delay, Down Syndrome, Cerebral Palsy, strokes, functional spinal curvature, language and learning disabilities, Multiple Sclerosis, Sensory Integrative Dysfunction and traumatic brain injury (Scott, 2005).

Equine Facilitated Psychotherapy (EFP) is another type of equine therapy in which a licensed mental health professional assists in equine activities with patients. These include: riding, grooming, lunging, carriage driving, vaulting, ground handling. These activities are meant to build a relationship with horse and rider (Scott, 2005). Many persons with mental health disorders (including “Attention Deficit Hyperactivity Disorder, anxiety, Autism, persons with behavior difficulties, language disorders, depression, those with major life changes -- including divorce, loss or trauma, mood and personality disorders, Post Traumatic Stress Disorder, and psychotic disorders like Schizophrenia) “learn about themselves through interaction with their environment, including the people, animals and situations involved” (Scott, 2005). These equine-assisted activities can help “promote psychological healing and growth” because they: improve self-esteem and self-awareness, provide social skills training, encourage sensory stimulation, develop trust in a safe environment, develop body awareness, body sensory stimulation, motor skills, verbal communication, choice-making sequencing and problem-solving and goal-setting skills, and increase responsibility and care-giving (Scott, 2005).

In greater detail, equine activities include: hands-on tasks with the horse in the outdoors, caretaking (i.e. grooming, saddling and feeding), riding, following directions, working with a group, completing tasks and trusting adults. When a client receives the correct response from the horse with which they are working, they can see an immediate reward for doing something right, as the horse will respond correctly (Scott, 2005). It is this sense of psychological empowerment when the client gains control of his or her body and the control of the environment that aids in the healing process (Scott, 2005).

“Experts say [walking] is the only exercise we need if it is done consistently.” This means that therapy patients can reap huge benefits by this one simple exercise. “No other modality mimics the walking gait of a human and stimulates virtually every movement system in the body [than horseback] because the horse’s movement is similar to the patterns of
movement of the human pelvis while walking (Scott, 2005). The benefits of walking or horseback riding include: “greater strength and agility, improved balance and posture, weight-bearing ability, improved circulation, respiration and metabolism” (Scott, 2005). This activity is one that involves more than just muscles, it involves coordination of the brain, different body parts and balance (Scott, 2005).

A horse's body temperature is four to five degrees warmer than that of humans, helping to stretch muscles and reduce spasms, especially in one’s legs. If the rider is able, a bareback pad can help distribute the horse’s warmth and massaging actions better than in a hard saddle. In equine-assisted activities, there is also a marked release of endorphins, promoting psychological and physical healing (Scott, 2005).

Atop a horse, clients can learn motor skills and play games as well. A client might learn shapes and colors, the names of plants and animals, etc. Learning these things and then reaching for them can be combined for cognitive betterment in addition to hand-eye coordination, motor skills and reaching and grasping skills (Scott, 2005). There are many games that can be played on horseback including relay racing, freeze tag, red light/green light and baseball (Scott, 2005). There are also several tools involved in equine-assisted activities. They include plastic rings, stuffed toys, basketballs, plastic rings, weights, bicycle handles, whips (Scott, 2005), mailboxes, leaves, and many others (Gottschall interview, 2011). Some riders are independent enough to ride without side walkers and can do vaulting activities (like gymnastics on horseback) and even those who need assistance can stand on a horse’s back (Scott, 2005). Another activity on horseback is carriage driving. “Many people drive because they can’t ride, but many simply like it better.” This activity can be relaxing and even nostalgic. It encourages upper body strength, hand-eye coordination, balance, attention span and spatial awareness (Scott, 2005). Many clients who are afraid to ride on a horse, who may be too heavy or who cannot straddle a horse opt to try carriage driving (Scott, 2005).

In World War One, German soldiers were recorded to use horses as a part of their rehabilitation. Even ancient records of horseback rehabilitation have been found (Scott, 2005). In recent history, Liz Hartel, a silver medal winner from Denmark in Grand Prix Dressage at the 1952 Helsinki Olympics, had overcome mobility problems from a bout with Polio, bringing attention to the therapeutic benefits of horseback riding (Scott, 2005). Today, the North American Riding for the Handicapped Association (NARHA, now known as PATH International: Professional Association of Therapeutic Horsemanship International) is a professional group with whom equine instructions must be certified. This is in place to ensure the safety of clients, volunteers and instructors (Scott, 2005). Unfortunately for the therapeutic riding world, the medical community has not had enough clinical findings to officially endorse the activity for medical benefits (Scott, 2005).

Hippotherapists are not meant to teach riding skills, but should be aware of good horsemanship. They are to be familiar with clients and horses in order to properly match them together for a successful ride (whether the horse has a high-strung temperament, a choppy gait or a gentle disposition). Hippotherapists are trained in “hippotherapy, equine movement and equine psychology” (Scott, 2005) in order to obtain a successful and safe session. That session will generally be a one-on-one with the client and leader with the addition of two side walkers (in place to help keep the client on the horse) (Scott, 2005). Post-hippotherapy, recreational riding and equine activities can be a way to continue maintenance therapy (Scott, 2005).

Hippotherapy horses are usually past their prime and are usually trained horses from ranches, rodeos or showing. They need to be able to ride for thirty minutes to one hour and to trot two to three times daily. They will be asked to turn tight circles and should not spook easily. Horses will be asked to tolerate people walking beside them with a rider on their back.
so should be used to ground work. One of the most difficult tasks for the horse to perform is a “half halt” where he or she must slow down at a moment’s notice, stop and then quickly speed up. This task is difficult for a horse to understand (Scott, 2005). There is a lot of work invested for a therapy horse to be to a point where they can perform these unnatural tasks.

**Healthcare Code Research**

Designing a therapeutic facility, similar to the design of a hospital, the building entrance must be on grade and clearly marked. Furthermore, patients should not have to travel through activity areas. Areas in multi-occupancy buildings are not to be shared. This means keeping areas of other programs separate from therapy. Clients are to have a separate toilet facility from the public, to be accessible without having to pass through the public hall. Any examination tables used in the design require three feet of clearance on three sides (American Institute of Architects, 2006). These facilities need general office space for business keeping, storing records and staff gathering. The building should comply with the requirements for office spaces (and business occupancies). Corridors need to be at least five feet wide for public spaces and three foot eight-inches in width for staff areas. Patient doors need to be three feet in width for handicapped access. Ceiling heights should be at least seven-feet ten-inches high except in restrooms, storage, corridors and other minor spaces. It is important that each healthcare building has at least two separate exits not only for fire codes, but for safety and convenience. Finally, any windows and doors with glazing within 18-inches of the floor shall contain safety glass, wire or plastic glazing (American Institute of Architects, 2006).

**Design for Health**

“For insights, it is useful to look not at buildings, but at zoos. Zoo design has gone through a radical transformation in the past several decades. Cages have been replaced by natural habitats and geographic clustering of animals. In some places, the animals are free-ranging and the visitors are enclosed in buses or trains moving through the habitat. Animals now exist in mixed species exhibits more like their natural landscapes. And, as in nature, the animals have much greater control over their behavior” (Heerwagen, 2008).

“Zoos could keep animals alive, but they couldn’t make them flourish. Caged animals often exhibit neurotic behaviors” (Heerwagen, 2008). As an animal, humans require the same natural setting to flourish. A design that incorporates nature and the environment into building design is the most beneficial for creating a healing atmosphere. “Because humans evolved in a natural landscape, it is reasonable to turn to the natural environment for clues about preference patterns that may be applicable to building design” (Heerwagen, 2008).

In environmental psychology, there are many qualities which make comfortable building design. They include:

- “Opportunity to engage in spontaneous social encounters.”
- “Opportunity for relaxation and psychological restoration.”
- “Opportunity for privacy and for movement between interaction and solitude, as desired.”
- “Opportunity for learning and information sharing.”
- “Opportunity for connection to the natural environment.”
- “Opportunity for regular exercise.”
• “Sound levels not much above or below that of nature.”
• “Meaningful change and sensory variability.”
• “An interesting visual environment with aesthetic integrity.”
• “Sense of social equity and respect.”
• “Ability to maintain and control personal comfort.”
• “Making sense of the environment” (Heerwagen, 2008).

These are all elements that should be considered when designing a therapeutic environment; they can be critical pieces to creating an engaging and enjoyable atmosphere for all users of the building.

**Design for Horses and Riders**

Horses, an integral member of equine therapy, see the world differently than humans. It may be important to consider this when designing a facility that heavily incorporates horses in its program. Though horses can be unpredictable or “flighty,” it is not because of their vision, but because they are a prey species (Miller, 2010). Horses can see better than cats or dogs, but not quite as well as humans. They can spook when they see an unfamiliar object in the distance and, because of their lower visual capabilities, distant objects can appear grainier than for us humans. It is also more difficult for horses to see objects within about 10 inches of his or her face (Miller, 2010). It is important for all humans with equine interactions to know that horses cannot see between their eyes (near the forehead), under their noses, nor directly behind their bodies (a space about the width of their head). This is important to know because horses can spook at activities occurring in these areas (like a predator sneaking up on it), creating a dangerous situation for unsuspecting humans (Miller, 2010).

Horses are even able to see color, but not as humans see color. Because they have only two photoreceptors (humans have four), horses see fewer types of color. They see only two hues (blue and yellow), while intermediate hues are seen as a mix of gray and white. Furthermore, a horse’s world is more washed out (even sepia-toned or pastel in color) than a human’s, giving horses a much less vivid view of the world (Miller, 2010). This means that most color choices in a facility with horses will have little impact on a horse’s behavior.
Case Studies

In order to gain an understanding of what sizes, spaces and programs should be included in the design, I researched local and national therapeutic horseback riding and hippotherapy facilities. Contained in this section is a compilation of the local facilities (in and nearby Lincoln, Nebraska) and several whose websites and whose contact information are readily available on the internet. I found it important to first discover what services are available locally and to then find out what programs, spaces, staff and client needs are possible for a facility like the one proposed for this project.

The case studies include: local riding centers (HETRA, Sunrise EquiTherapy and Windsong Equitherapy site visits), out-of-town centers (Pegasus, Sycamore Lane Therapeutic Riding Center, Sumlar Therapy & Study Center, Eqkus for Humanity, Freedom Woods and Rocking Horse Rehab websites and contacts made with them), and an equine facility (like the proposed, but un-built Nebraska Horse Park).

Figure 11.1: The HETRA indoor arena. This space is used by clients and staff for therapy and horseback riding lessons. It is 60 feet by 100 feet in area and is seen (by director Edye Godden) as too small for the needs of the therapeutic riding program.
### Figure 12.1: Local Equine Centers: Highlighted elements indicate possible spaces to be used.

<table>
<thead>
<tr>
<th><strong>HETRA</strong> (Heartland Equine Therapeutic Riding Academy)</th>
<th><strong>Windsong Equitherapy</strong></th>
<th><strong>Sunrise EquiTherapy</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>LOCATION</strong></td>
<td>Omaha and Valley, Nebraska, (7 acres in Valley)</td>
<td>Lincoln, Nebraska, 5 acres.</td>
</tr>
<tr>
<td><strong>SERVICES OFFERED</strong></td>
<td>Hippotherapy, therapeutic carriage driving and therapeutic riding.</td>
<td>Therapeutic riding</td>
</tr>
<tr>
<td><strong>EMPLOYEES</strong></td>
<td>13 staff: 3 occupational therapists, 1 physical therapist, 8 NARHA certified instructors, 10 staff are cart driving instructors. 4 full-time staff: 3 use the office above the barn.</td>
<td>1 coordinator, 1 therapeutic riding instructor, 1 instructor-in-training and 1 volunteer coordinator.</td>
</tr>
<tr>
<td><strong>CLIENTS</strong></td>
<td>Space enough to serve 100 with both programs; currently serve 85.</td>
<td>7-8 clients one night a week</td>
</tr>
<tr>
<td><strong>PROS</strong></td>
<td>Overhead hay storage and feeding, 12’ x 12’ stalls, sizeable office space, heated barn</td>
<td>ADA restroom (port-a-potty), adequate arena size (120’x60’), several different gated areas for horses, and 5 acres of land to use and adjacent property that include hills and tree to use for therapy.</td>
</tr>
<tr>
<td><strong>CONS</strong></td>
<td>100’ x 60’ arena: want space for 3-4 students at a time, need a freestanding facility on company property</td>
<td>No hard surface for ADA parking-to-barn accessibility, not sprinkled, hay storage is inside of arena, difficult access to outdoor arena, 20-30-year-old barn and stalls weren’t built to suit the program, small tack storage (9’x9’), no cross-ventilation in arena, a gravel road (not ADA accessible), and drainage: dry lot and several stalls flood.</td>
</tr>
<tr>
<td>CIRCULATION</td>
<td>Entry through private drive, double aisles with double-loaded stalls, arena on one end. Stairs in front and back leading to upstairs apartment/office and hay loft.</td>
<td>The barn is adjacent to the other outbuildings, located near the main road and the property owner lives in a house at the farthest end of the property.</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>SITE PLANNING</td>
<td>Barn is on the west side of a group of privately-owned buildings.</td>
<td>No stairs to traverse, access from parking to arena is poor.</td>
</tr>
<tr>
<td>PARKING</td>
<td>Enough room for 5-10 vehicles in front of the barn, also parking on private property.</td>
<td>Parking for clients (room enough for about 3-4 vehicles) is located close to barn and close to the entrance, parking for volunteers is just across the entrance road.</td>
</tr>
<tr>
<td>STRUCTURAL</td>
<td>A wood truss-framed metal-sided building.</td>
<td>The arena is enclosed with a wood-trussed, metal-sided building. Other outbuildings are of a similar make.</td>
</tr>
<tr>
<td>ADA CONSIDERATIONS</td>
<td>Disabled persons have access to the arena and hallways between parking and arena.</td>
<td>The ADA port-a-potty is located on the exterior and is enclosed by a fence (slightly difficult to traverse if handicapped).</td>
</tr>
<tr>
<td>PROGRAM</td>
<td>Arena, 15 stalls, can use private outdoor arena, 2 ton above-stall hay storage, tack room, bathroom, apartment used as an office with kitchen.</td>
<td>Arena, 4 horse stalls (in poor condition), several dry lots, outdoor arena, parking, tack room/storage and trails.</td>
</tr>
<tr>
<td>WISHES</td>
<td>A combined facility in Elkhorn, Nebraska, A larger indoor arena and a turn-out paddock for the horses.</td>
<td>An observation deck above arena, bigger barn/arena (at least 200’ long), oval arena and space for 3+ horses, a round pen adjacent to arena, indoor plumbing, varying arena floor types: different footing for different activities, bigger tack room, more horses (3 would be great), indoor air-conditioned space, insulation, an outdoor obstacle course, space for jumping and dressage, heated wash racks, manure disposal, easier access for horses to water, double-long outdoor arena (200’-300’ long), trailer access to stalls, tack in the same location as the arena, and trees to provide a windbreak and shade.</td>
</tr>
</tbody>
</table>

**Analysis**

According to the HETRA director, Edye Godden, the size of the facility and client capacity is adequate, but she would prefer an arena larger than 100 feet by 60 feet in order to accommodate multiple clients on horseback at once. See Figure 11.1 (Godden, 2011).

At Windsong Equitherapy (Figures 15.4-15.7), the program rents its 5 acres. Though it is sufficient for their purposes, the size of the space limits future expansion. Furthermore, the indoor arena is only partially ADA (American Disability Act)-compliant. The transition from parking to the arena is also treacherous and unstable. However, the site does have a semi-ADA outhouse. Another problem that the Windsong Equitherapy director, Christina Gottschall, has stated is that the arena has poor ventilation, which can be used for only two seasons and sometimes during the summer (when the weather is not too hot) (Gottschall interview, 2011).

Director Julie Wood provided me with Sunrise EquiTherapy’s building plans for their 13 acres (Figure 16.1). This indicated several ideas for adjacencies, sizes and needs of her program. She also provided information regarding the Nebraska Horse Park, a proposed racetrack in Lincoln, Nebraska which was to house the Sunrise EquiTherapy’s program alongside the public racetrack. Currently, she rents from a local landowner and uses the indoor and outdoor arenas provided (Gottschall interview, 2011).
Figure 15.1: **Top Left** The HETRA mounting ramp. Volunteers and staff help clients from wheelchairs to horseback in this area. The ramp is presently unsafe due to the lack of handrails.

**Figure 15.2:** **Right** A colorful ring rack/game. Clients use these rings as a tool for therapy: reaching and balancing on horseback and learning colors.

**Figure 15.3:** **Bottom Left** The front of the HETRA barn. Clients arrive through one of the two 12-foot entry doors and staff have the opportunity to traverse the stairs into the office (former apartment).

**Figure 15.4:** **Top Left** The Windsong mounting ramp is presently too steep for ADA accommodations, and volunteers put themselves at risk to prevent horses from walking off while clients mount.

**Figure 15.5:** **Bottom Left** The staff and volunteer parking is on grass and is far from the barn.

**Figure 15.6:** **Bottom Right** The property affords several trails, hills and opportunities for clients’ interactions with nature and different terrain.

**Figure 15.7:** **Top Right** Several sections of dry lots afford different options for housing horses.
Once funding and a design have been finalized, the Sunrise program will construct on this 13 to 18-acre plot of land. (The extra five acres to the northwest could be donated to the program in the future.)

(Google, 2011)

**Figure 16.1:** The future site of Sunrise EquiTherapy.

**Figure 16.2:** **Top Left** The most recent (at the time of publication) proposed floor plan for the Sunrise EquiTherapy program site (Wood, 2011). The highlighted doors are for air circulation and the circled observation room could be best located in the center of the arena for my design.

**Figure 16.3:** **Top Right** The site plan (Wood, 2011) proposed for the Sunrise EquiTherapy site shows the outdoor arena, the four dry lots and the sensory walking trail on the property.

**Figure 16.4:** **Bottom Right** This rendering indicates the appearance of the building to be constructed on the Sunrise EquiTherapy site (Wood, 2011).
Online Resources

The following is a series of facilities available online. Their programs range from therapeutic horseback riding, hippotherapy, aquatic therapy, physical therapy, speech therapy, art therapy, drug and alcohol counseling, martial arts, occupational therapy, group therapy, music therapy, social skills program, support groups, and therapeutic carriage driving, to name a few.

The research of these case studies was done to discover important additional program elements and sizing, site selection and design elements that are beneficial for a horse-based therapy center. I contacted several facilities around the country that offered hippotherapy and therapeutic riding to understand what elements work and what elements are unacceptable from those that use these facilities daily.

**Sumlar Therapy** (Sumlar Therapy, 2008)

**LOCATION** Rural, located between several cities in Ozark, Alabama, 5 acres

**SERVICES OFFERED** Hippotherapy, physical therapy, occupational therapy, speech therapy, aquatic therapy, tutoring, homework assistance, and graduation exam preparation

**EMPLOYEES** 4 physical therapists, 6 occupational therapists, 5 speech therapists, 1 tutor, 3 office staff, 1 horse handler, and 2 horses

**CLIENTS** Serve 100, 35 with hippotherapy

**PROS** Large therapy spaces and kitchen, facility contains arena, pool and clinic with physical therapy, occupational therapy and Speech therapies

**CONS** Small Arena @ 80’x80’

**WANT** 36’x36’ barn with 12’x12’ stalls (some with movable partition walls for 12’x24’ birthing stalls), 12’x12’ tack room, another 12’x36’ barn with 12’ overhead equipment storage, another arena or trails.

**PROGRAM** 6 private treatment rooms (12’x10’), a pool (24’ round, 4’ deep), an adult and toddler restroom, waiting room, therapists offices (30’x20’), a gym (30’x20’), and a kitchen.
Freedom Woods Equestrian Center (Freedom Woods, 2011)
LOCATION North of downtown Chicago, in forest preserve
PROGRAMS OFFERED Hippotherapy, therapeutic riding, horse showing, riding lessons, summer camp
STAFF 20 volunteers (need 3 per rider), 1 hippotherapist, 1 physical therapist, 18 horse trainers, 2 NAHRA (North American Handicapped Riding Association) (PATH International, 2012) certified instructors
CLIENTS serve 30-50
PROGRAM SPACES 103 stalls (12’x14’ and 10’x12’), outdoor arena (220’x150’), 3 indoor arenas (two: 70’x170’, one: 80’x100’), 2 wash racks, trails on property, heated barns, an office (20’x20’)

Rocking Horse Rehab (Rocking Horse Rehab)
LOCATION West Orange, New Jersey
PROGRAMS OFFERED Hippotherapy, developmental riding (post-hippotherapy), therapeutic riding, equine assisted activities, Mighty Mustangs (social skills program), Parent Time (parental therapy support group), Saddles and Sunshine (siblings of disabled children support group), Hay University (young adults with developmental delays), aquatic therapy, occupational, physical and speech therapy, therapeutic martial arts, music programs, signing, therapeutic yoga, art therapy, summer camps, and summer school programs.
EMPLOYEES 13 staff: 2 Speech language pathologist, 4 staff, 1 physical therapist, 1 martial arts instructor, 1 clinical social worker, 1 clinical drug and alcohol counselor, 1 psychodramatist, 1 NARHA certified riding instructor, 1 NARHA therapeutic riding instructor, 1 music instructor, 1 licensed creative arts therapist (LCAT), 1 occupational therapist.

Bergmann Centre (Gunnar)
LOCATION Poplar Grove, Illinois, 20 acres of pasture
SERVICES OFFERED Hippotherapy and therapeutic riding
EMPLOYEES 2 physical therapists, 2 occupational therapists, 1 speech language pathologist, 4 therapeutic riding instructors, 1 equine director, 1 barn manager and 1 barn assistant
PROGRAM PIECES 40 box stalls, 2 heated indoor arenas, large parking lot, drive-through awning, lunch room/viewing room, tack room
Case Study Analysis

This research collected several design ingredients: the program activities and daily user capacities (including clients, guardians and visitors per day and the number of staff and volunteers per client needed). This information also afforded me with sizing information for the additional spaces beyond those existing in the local equine therapy facilities.

Programming

The following is a list of proposed spaces, activities, staff and amount of clients based on the case study research. Larger and more highly-saturated boxes indicate a higher importance of items to be included in my design.

Figure 19.1: ACTIVITIES

- Social Skills Program
- Family Therapy
- Art Therapy
- Singing
- Music Program
- Summer School
- Homework Assistance
- Tutoring
- Exam Preparation
- Riding Lessons
- Aquatic Therapy
- Therapeutic Yoga
- Martial Arts
- Summer Camp
- Hippotherapy
- Therapeutic Carriage Driving
- Therapeutic Riding
- Equine-assisted Psychotherapy
- Developmental Riding
- Horse Showing
- Barn Education
- Physical Therapy
- Speech Therapy
- Occupational Therapy
Figure 20.1: **USERS**: This diagram shows the different occupancies of the many case studies. These indicate the options possible for my design.

- **Space to serve 100 clients with both programs, serve 85.**
- **Serve 25 clients/week**
- **Serve 100, 35 with hippotherapy**
- **Serve 30-50**
- **Serve 20**

- **20 volunteers (need 3 per rider), 1 hippotherapist, 1 physical therapist, 18 horse trainers, 2 NAHRA certified instructors**
- **10 staff, 20 volunteers**
- **2 physical therapists, 2 occupational therapists, 1 speech language pathologist, 4 therapeutic riding instructors, 1 equine director, 1 barn manager and 1 barn assistant**

Figure 20.2: **SPACES**: This diagram shows the amounts of land possible or necessary for an equine therapy facility and the different spaces involved inside and outside.

**Amount of Land**

<table>
<thead>
<tr>
<th>5 acres</th>
<th>13 acres</th>
<th>20 acres</th>
<th>5 acres</th>
<th>7 acres</th>
<th>200 acres</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Interior</strong></td>
<td><strong>Interior Barn</strong></td>
<td><strong>Interior Barn</strong></td>
<td><strong>Exterior</strong></td>
<td><strong>Exterior</strong></td>
<td><strong>Exterior</strong></td>
</tr>
<tr>
<td>Barn Managers Quarters</td>
<td>Manure Disposal</td>
<td>Tack Room/Reception/Volunteer Break Room with Kitchenette</td>
<td>Round Pen</td>
<td>Hay/Grain Storage</td>
<td></td>
</tr>
<tr>
<td>ADA Restroom</td>
<td>Wash Racks</td>
<td>Arenas (170’x70’ and 80’x100’)</td>
<td>Loafing Sheds</td>
<td>Outdoor Arena (300’x150’)</td>
<td></td>
</tr>
<tr>
<td>Office</td>
<td>Stalls (12’ x 12’)</td>
<td>Jumping Course</td>
<td>Pasture</td>
<td>Drive-through Awning</td>
<td></td>
</tr>
<tr>
<td>Locker Rooms</td>
<td>40 Box Stalls</td>
<td>Obstacle Course</td>
<td></td>
<td>Pool</td>
<td></td>
</tr>
<tr>
<td>Conference Rooms</td>
<td>Observation Room Arena-Adjacent</td>
<td>Arena (150’x80’)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 Private Treatment Rooms (12’x10’)</td>
<td>103 Stalls (12’x12’ and 12’x14’)</td>
<td>Arena (120’x60’)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Observation Deck Above arena</td>
<td>Above-Stall Hay Storage</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Based on the case study research, the following diagrams indicate services and occupants to be included in the design of this thesis project. Again, larger and highly-saturated boxes depict more important and necessary elements in the design of the project.
**Figure 21.1:** SERVICES: This diagram indicates the services that can be offered at this equine therapy facility.

- **Hippotherapy**
- **Therapeutic Riding**
- **Equine Assisted Psychotherapy**
- **Therapeutic Carriage Driving**
- **Riding Lessons**
- **Horse Boarding**
- **Summer Camp**
- **Aquatic Therapy**
- **Occupational Therapy**
- **Physical Therapy**

**Figure 21.2:** STAFF/USERS: This is a compilation of the many users that will be in the facility.

<table>
<thead>
<tr>
<th>Instructors</th>
<th>Clients</th>
<th>Volunteers</th>
<th>Guardians/Family</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 NAHRA cert. instructors</td>
<td>100 over 5 days per week</td>
<td>Need 3 per rider</td>
<td>1.5 per client x 20 clients/day</td>
</tr>
<tr>
<td>4 full-time staff</td>
<td>20/day</td>
<td>20/day</td>
<td>20/day</td>
</tr>
</tbody>
</table>

**Spaces**

After the compilation of research, I decided on the elements with the most potential for inclusion in this facility. They are as follows:

- Potential sites range from the site requests of HETRA for a location in Elkhorn, Nebraska to a site near the city of Lincoln, Nebraska to the future site of Sunrise EquiTherapy near Eagle, Nebraska. The program spaces include indoor and outdoor arenas, an entry space/reception, offices, barn manager’s quarters, hay storage, equipment storage, a tack room, a number of horse stalls (the size and capacity of the facility to vary based on site), a ramp area, an observation room for families, grooming stalls and a wash bay, restrooms, therapy/examination/workout rooms, a large meeting space, a covered porch (as with hospital design) and a sensory-stimulating trail. Several size requirements for these spaces include: the horse stalls (between five and fifteen minimum) should not be smaller than 10 feet by 12 feet; an arena should be wider than 80 feet by at least 150 to 200 feet.
long by approximately two stories tall; the barn manager’s apartment should contain a kitchen and bedroom, totaling at least 40 feet by 15 feet in dimension; the observation room should be at least 170 square feet; the grooming stalls should allow for wheelchair space on either side of the horse, at least 17 feet wide by 12 feet deep; the office(s) should be a minimum of 12 feet by 12 feet; the tack room should be at least 10 feet by 10 feet; the restrooms should be ADA accessible (as with all spaces) and there should be enough fixtures for the occupancy of the building; the ramp is best placed in its own area, outside of the arena and on the end of a straight-away for clients to gain their seat, with space enough for two ramps (approximately 21 feet by 12 feet); and therapy room(s) at 9 feet by 13 feet.

Figure 22.1: PRELIMINARY ADJACENCIES: These spaces, sized in order of importance. Leaders indicate favorable adjacencies between the spaces.
**Adjacencies**

The following are two adjacency matrices that were developed to discover appropriate placement of interior and exterior program spaces. These matrices helped inform the design in both section and plan. (See Figures 42.1 and 43.1 for the initial design layouts.)

**Figure 23.1:** Adjacency Matrix: In this diagram, the spaces to be included in the program are listed in matrix form. The lighter pink color indicates potential adjacencies, while the dark red colors show mandatory adjacencies. These spaces were derived from the case studies.

### Exterior Elements

<table>
<thead>
<tr>
<th>Outdoor Arena</th>
<th>Riding Trail</th>
<th>Grain Storage</th>
<th>Hay Storage</th>
<th>Machine Storage</th>
<th>Client Parking</th>
<th>Staff Parking</th>
<th>Entrance to Site</th>
<th>Dry Lot(s)</th>
<th>Pasture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barn</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>Outdoor Arena</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Riding Trail</td>
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<td></td>
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<td></td>
<td></td>
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<tr>
<td>Grain Storage</td>
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<td></td>
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<td></td>
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<tr>
<td>Hay Storage</td>
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<td></td>
<td></td>
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<tr>
<td>Machine Storage</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Client Parking</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Staff Parking</td>
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<td></td>
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<tr>
<td>Entrance to Site</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Dry Lot(s)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pasture</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Interior Elements

<table>
<thead>
<tr>
<th>Indoor Arena</th>
<th>Toilet</th>
<th>Entrance</th>
<th>Feed Storage</th>
<th>Equipment</th>
<th>Mechanical</th>
<th>Mounting Ramp</th>
<th>Observation Area</th>
<th>Barn Manager’s Quarters</th>
<th>Tack Room</th>
<th>Volunteer Area</th>
<th>Meeting Room</th>
<th>Office</th>
<th>Kitchen(ette)</th>
<th>Therapy Rooms</th>
<th>Storage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indoor Arena</td>
<td>Toilet</td>
<td>Entrance</td>
<td>Feed Storage</td>
<td>Equipment</td>
<td>Mechanical</td>
<td>Mounting Ramp</td>
<td>Observation Area</td>
<td>Barn Manager’s Quarters</td>
<td>Tack Room</td>
<td>Volunteer Area</td>
<td>Meeting Room</td>
<td>Office</td>
<td>Kitchen(ette)</td>
<td>Therapy Rooms</td>
<td>Storage</td>
</tr>
</tbody>
</table>
Environmental Concerns

By designing with the environment and sustainability in mind, building energy use is minimized and occupants benefit from the harmony with the environment. It is that harmonious environment that helps clients and therapists focus on therapy rather than the uncomfortable building housing the therapy.

Nebraska is in climate zone five (Department of Energy, 2006). In order to meet Passiv Haus standards (using passive heating and cooling, increasing energy retention and reducing energy consumption) (Harvest Build Associates), the building must meet the following insulation levels: walls: R-50 to R-60, foundations: R-40 to R-50, windows and doors: R-7 or higher, roof/attic: R-60 to R-80.
This information is important for future materials selection and wall construction, as this will determine whether these goals can be reached. The wall dimensions are critical factors in calculating the space they will require.

**Options:**

**TRADITIONAL BATT INSULATION**- Requires 16-19" of wall insulation to meet Passiv Haus Standards. This option is possible because of the amount of space available for the construction of the building. With several acres (a space which is necessary to adequately house several horses), the large wall thickness will not eliminate valuable space.

**SUPERINSULATION**- In order to be considered superinsulated, south-facing glass should be no more than five percent of the total floor area and five percent of glass for the three other directions combined. It also requires that the building have an 80 percent heat recovery rate (Mother Earth, 1986). This option is an inappropriate choice. Because of the importance of incorporating nature into therapy, it is equally important to open the walls with fenestration, letting clients and users alike view onto the site. Furthermore, ample lighting (preferably daylighting as it is to what our eyes and bodies have evolved) helps with tasks like horseback riding, grooming, weight lifting, etc.

**BIOMIMICRY**- Is the design the building using techniques found in nature that improve upon existing standards. This is a viable option, but not an important part of the design of this facility and would only be addressed if it suited the program.

**WASTE STREAM LOOPS**- Where the design eliminates waste by using waste from one stream as fuel for another. This is an opportunity to expand program to include mutually-beneficial elements.

**HAYBALE INSULATION**- This option usually needs to be combined with stud construction and be 21 to 25-inches thick to meet Passiv Haus standards (Sustainable Sources, 2010). Like traditional batt insulation, haybale construction is a viable option with the space given for this facility type. It can also be locally-sourced as it may come from a field down the road.

**GREEN ROOF/BERM**- This prevents heat from solar radiation on the roof and reduces storm water runoff. It can save 25% of cooling energy costs. An 8-inch densely-planted green roof is R-20 in value (Peck and Kuhn). This in addition to insulation could reach the R-60 to R-80 values necessary to meet Passiv Haus standards.

**ADOBE**- Adobe requires 25-30-inches thick to meet Passiv Haus (Harvest Build Associates) and usually needs to be supplemented with other insulation types. This building type may prove combersome, especially when reaching multi-story heights of the indoor arena space.
Site Selection and Analysis

Site Analysis/Choices

The potential sites for this design were those which met one of the following options: a site near Lincoln, Nebraska, to create a hippotherapy/therapeutic riding facility in an area currently lacking one; the future home of Sunrise EquiTherapy, near Eagle, Nebraska (see Figure 16.1); or the future home of HETRA, near Elkhorn, Nebraska, meeting the needs of that program. My broad site selections were chosen based on size (a minimum of five acres, as is the size of Windsong Equitherapy) and location (near Lincoln or Elkhorn). I finalized the site selection based on climate, flood plains/topography, flora, fauna, proximity to major populations, etc. Proper site selection is important because it affects design decisions, which are based on whether the space becomes and promotes a transformative, healing experience; whether it can become a tool for therapy; and whether it meets the needs of the program.

The following is a decision-making analysis regarding site selection. It contains a map of Lincoln and its future expansion zones, which has been edited to highlight major roadways (blue lines) and the two most favorable sites (the brighter circles). I also compare the sites and reasons for preference of one over the other.

Analysis

FOCUS: To avoid urban infrastructure and noise not found in the country, but be easily accessible for the clientele.

Selection Process

1. Locate site away from expanding Lincoln borders to preserve country progression (an integral part of the therapy process--the removal of clients from busy city lives and into the healing natural environment), but near Lincoln population and amenities, preferably Tier 2 or Tier 3 expansion zones.

2. Locate near Omaha/Interstate and major roadways for out-of-town access.
3. Avoid flood plains, existing buildings and sites not meeting the focus.
4. Analyze Options (see Figure 28.1).
5. Select site with the most desirable elements:
   - Water
   - Hills
   - Mild Climate
   - Ample Flora
   - Ample Fauna
   - Appropriate Context: few buildings, but close to amenities: groceries, entertainment, large population draws, etc.
   - Sun Angles: sun exposure opportunities, etc.
   - Winds: calm winds, wind breaks, opportunities for wind energy, etc.
Figure 27.1: LINCOLN GROWTH MAP (Lincoln of Lincoln, 2012)
Figure 28.1: SITE COMPARISONS (Google, 2012)

Site 1

- 640 Acres
- Ample elevation changes (an important part of equine therapy)
- Nebraska climate (see climate data below)
- Deciduous and evergreen trees in runoff areas (20+ feet high), crops, grasses
- Rural Nebraska fauna (see fauna data)
- Near Walmart and Lancaster Event Center, large residential structure on east end of property for out-of-town clients to use or rent.
- Near 100% sun exposure
- Nebraska winds, ample wind breaks (see “air” chart)

Site 1

- 80 Acres
- No water feature
- Minimal hills
- Nebraska climate (see climate data)
- Crops, grasses, and water
- Rural Nebraska fauna
- Near Walmart and Lancaster Event Center, Small farmstead on west end, gravel road access
- Almost 100% sun exposure
- Nebraska winds, minimal wind breaks (see “air” chart)
- Corner lot for maximum exposure

Figure 28.2: CLIMATE DATA

Sunrise, Sunset and Sun Angle
Lincoln, NE (Dewey, 2011)

Air Direction and Speed
Lincoln, NE, mph (Dewey, 2011)

Average High and Low Temp.
Lincoln, NE (Dewey, 2011)

Average Precipitation
Lincoln, NE (Dewey, 2011)

Average Soil Temperature (ASHRAE 2009) Lincoln, NE

53 Degrees Fahrenheit
Figure 29.1: SITE PHOTOS: These images were taken of the chosen site. They are an indication of the quality of spaces found on the site.

After choosing the appropriate site (highlighted in red -- Figure 28.1), an in-depth schematic analysis was necessary to determine building placement. The following diagram shows those options.
Figure 30.1: This site analysis reveals the best schematic design locations for the site, view corridors onto the site (through the trees), views from the site to the surrounding context and locations of trees and water.

Corner:
Can be used as advertisement (maximum visibility) and for wayfinding.

Hills:
Provide berm-like conditions and reduce visibility of man-made structures.

Valley:
This portion of the site cannot be seen from the road, creating a private sanctuary.

Water:
If the building is placed at this location, its design can incorporate this water feature.

Trees:
Existing natural windbreaks that reduce visibility from the road and site.
Before any specific design decisions were made, several categories for design (site selection, the design of the building complex, building materials, building layout and configurations) were categorized. I then collected as many ideas for those categories as possible.

<table>
<thead>
<tr>
<th>Site Selection</th>
<th>HETRA's new site</th>
<th>Sunrise EquiTherapy's future site</th>
<th>The proposed Nebraska Horse Park site</th>
<th>Site selection choice 1: 96th and Havelock</th>
<th>Site selection choice 2: 148th and Holdrege</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complex Design</td>
<td>Central Focus</td>
<td>In-Line</td>
<td>City Center</td>
<td>All-In-One</td>
<td>Clusters</td>
</tr>
<tr>
<td>Building Materials</td>
<td>Berm</td>
<td>Metal Building</td>
<td>Concrete</td>
<td>Stick</td>
<td>Fabric</td>
</tr>
<tr>
<td></td>
<td>SIPs</td>
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<td>Haybale</td>
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<tr>
<td>Building Layout</td>
<td>High-Rise</td>
<td>Single Story</td>
<td>Stepped</td>
<td>Underground</td>
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<td></td>
<td>Double-Loaded</td>
<td>Centered/ Random</td>
<td>Centered/ Rectilinear</td>
<td>Centered/ Circular</td>
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<td>Corridor</td>
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<tr>
<td>Configurations</td>
<td>Spread vs.</td>
<td>Served vs.</td>
<td>Calm vs. Work</td>
<td>Social vs. Private</td>
<td>Nature vs. Internal Focus</td>
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<td></td>
<td>Clustered</td>
<td>Serving</td>
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**Figure 31.1: DESIGN POTENTIAL:** The highlighted boxes indicate the most likely choices for the design of the building.

From these options, I chose several that most met the criteria for design, project goals and design best suited for therapeutic horseback riding.

**SITE:** For the site, I felt that choosing the future site for Sunrise EquiTherapy’s building (and redeveloping their program to fit my research) could allow me to present the results to the program director. Also, the sites at 96th and Havelock and 148th and Holdrege Streets (as seen in the site analysis) might be viable options.

**COMPLEX:** The way the building (or series of buildings) is situated on the site can affect
the way in which the users experience therapy and their comfort; whether there is too far of a walk from one building to another or it is exposed to too much sun (which could cause overheating). The most feasible orientations are (see matrix Figure 33.1) central focus (buildings facing a focused center), in-line (a series of buildings facing each other), all-in-one (one building) and clusters (several different groupings of buildings) because they group the spaces as closely together as possible to minimize exterior transitions between program elements (as weather or site conditions may not be favorable). Also, keeping the buildings closer together helps reduce the need for climate control as each space helps heat or condition the next. Also, it reduces the amount of exterior surface area (which can either pull heat or conditioning from the space more rapidly than if the spaces were in a more confined area).

BUILDING MATERIALS: The most likely building materials to be used include: earth/berm (using the site as a source of temperature regulation and as a wind break), concrete, haybale and SIPs (Structural Insulated Panels -- pre-fabricated panels that have an extremely high insulation--around R-14--that also speed the process of building (Structural Insulated Panels Association)).

BUILDING LAYOUT: A single-story building will help reduce the amount of vertical circulation needed, especially for those in wheelchairs. A stepped building layout will utilize the sloping of the site. An underground building design can provide an interesting space for curious clients and can help increase the amount of temperature regulation provided by the earth. If the building is laid out with a double-loaded corridor, the spaces can be neatly organized. Taking that a step further, if the double-loaded corridor then becomes spokes from a central feature, the layout gains interest, while keeping spaces neatly organized and away from other important features.

CONFIGURATIONS: Each of the proposed configurations are viable for the design of the building. They can be incorporated into separate parts of the program, as required by the elements within the program space. For example: Calm vs. Work would separate the different relaxation functions from the more strenuous activities while Nature vs. Internal Focus represents the effects of clients viewing (or interacting with) nature versus the creation of areas that require an internal focus.
### Site Selection

<table>
<thead>
<tr>
<th>Site selection</th>
<th>This site is between several major roads (the future Lincoln bypass, Holdrege and 148th streets), is located near Lincoln, Waverly and is a short jaunt from Eagle and Omaha, Nebraska. The site also contains many desirable features (see site selection information).</th>
</tr>
</thead>
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### Complex Design

<table>
<thead>
<tr>
<th>Central Focus</th>
<th>City Center</th>
<th>All-In-One</th>
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<tbody>
<tr>
<td>Due to the needs of the clientele (potentially physically disabled), and the necessity of space adjacencies, it is best that the buildings be close together or that the spaces be in one structure. Therapy can then be in the architecture rather than the walk between buildings.</td>
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### Building Materials

<table>
<thead>
<tr>
<th>Berm</th>
<th>Concrete</th>
<th>Haybale</th>
<th>SIPS</th>
</tr>
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<tbody>
<tr>
<td>These options provide the most energy efficiency potential, a goal for the design of the project.</td>
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</table>

### Building Layout

<table>
<thead>
<tr>
<th>Single Story</th>
<th>Stepped</th>
<th>Underground</th>
</tr>
</thead>
<tbody>
<tr>
<td>The low-lying options are best for this design because of the context: they do not distract from the country feeling and views. The stepped design could be implemented into the hillside to reduce height and to play on the site. An underground building could increase site use and reduce travel distance for clients.</td>
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<tr>
<th>Double-Loaded Corridor</th>
<th>Centered/Rectilinear</th>
<th>Centered/Circular</th>
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<tbody>
<tr>
<td>The double-loaded corridor can prove to be too elongated to benefit the program. However, a serpentine configuration may occur. The other configurations may highlight the most used space and the centerpiece of the program: the horses.</td>
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### Configurations

<table>
<thead>
<tr>
<th>Served v.s. Serving</th>
<th>Calm v.s. Work</th>
<th>Social v.s. Private</th>
<th>Nature v.s. Internal Focus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Each of these spatial divisions is necessary within the design. Clients, staff and visitors each have spaces that need to remain separated, horses and therapeutic spaces require calm and clear divisions, social and private spaces should remain separate and nature and inward-focused spaces provide different benefits in therapy.</td>
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</table>

**Figure 33.1: Design Decisions:** Based on the preliminary decisions, this chart was created to organize the ideas for a final design selection.
Agricultural Buildings

There are several archetypes of farm building, layout and design for structures used in the care of and use of horses. For the selection of the site, the direction of the wind (see Figure 28.2) might influence the placement of auxiliary buildings and wind breaks (such as trees). Land contours are important for farming and drainage and route efficiency and accessibility of certain areas by the roads (Neubauer, 1961). Any roads on the site should be at least 16 feet wide with eight feet of that paved (Neubauer, 1961) (and even more in commercial applications). Research suggests that a double-wide barn should run north-south so that each side has half of the day’s sun (Neubauer, 1961). However, it is reasonable to assume that, by providing natural daylighting to each stall, this will provide the same effect. It is important to know that light can blind horses (Neubauer, 1961), so a balance between lighting, ventilation and avoidance of direct lighting should be maintained. Designing open stalls will help allow ventilation throughout the building. Horse barns should have eight-and-one-half to nine feet ceiling heights. The floor should be concrete with a slope of at least one inch for every seven feet for drainage (Neubauer, 1961). Horses are best fed on the floor, a more natural position for their heads or while overhead feed storage is acceptable, feed is best kept in a feed room as it helps keep dust and hay out of the barn (Neubauer, 1961).

Feed should also be considered for horse care. Horses require 1.3 pounds of grain per 100 pounds of horse and 1.3 pounds of hay per 100 pounds of horse (these figures are based on heavy work loads) (Neubauer, 1961). An allowance of two tons of hay per horse per year should be allotted (Hopkins, 1913). Each ton of hay takes up about 500 cubic feet of space (150 cubic feet for bailed hay or one-third of the space of loose hay) (Hopkins, 1913). When grain is used, the silos can be kept underground which can limit the amount of above-ground space needed for storage (Hopkins, 1913).

Structure

After creating the diagrams in Figures 35.1-35.3, I selected a structure type for the building. For the indoor arena, I elected to use the traditional farm structure and chose a metal building. For the other program areas, I again wanted to maintain simple building forms and styles, to emphasize focus on the materials inside and out. The structural design for these areas was chosen prior to the exterior material choice and are indicated in the wall sections in Figures 35.1-35.3. For the wall elements (including insulation and construction) and materials, Passiv Haus design was considered in the attempt to create an energy efficient enclosure.
Materials

As depicted in the sections, the materials were extensively researched and selected in order to enhance the therapeutic experience. The following research indicates the reasons for the material selections.

Materials, color and lighting all play a role in the way in which we perceive our environment. Though not widely accepted by all scholars, the affects of color on humans has been studied. Some have found that “there is a correlation between color and bodily functions, but the benefits are obscure” (Flynn and Piper, 1980). With sensory deprivation (and an
elimination of color), one has a psychotic reaction with hostility and lethargy and a change in behavioral performance, while visual stimulations and color can affect one’s thermal comfort (Hopkins, 1913).

Different colors can change different bodily responses or moods. Warm colors like red, yellow and orange are believed to be involved with “extroverted, aggressive or muscular tasks” (Hopkins, 1913) or excitement and stimulation (Sharpe, 1974). Warm colors can increase pulse, heart rate and respiration (especially red) (Sharpe, 1974).

**Red** is perceived as a color synonymous with aggression, danger, blood and fire (Flynn and Piper, 1980). It can accelerate the growth of plants and development in some animals, increases sexual activity and can heal wounds (Birren, 2006). It can distract the body’s equilibrium, raise blood pressure, increase restlessness and facilitates the creation of ideas. With red, weights seem heavier. In its pure hue, it is too strong to be palatable (Birren, 2006).

**Orange** is most pleasing in tints (peach, salmon and tan) and can stimulate a high appetite (Birren, 2006).

**Yellow** is associated with cheer, happiness and fun (Birren, 2006). It can increase metabolism and helps increase visibility. Yellow appears brighter than white (Birren, 2006).

**Cool colors** like blue and green are associated with calm, security, peace (Birren, 2006) and restfulness (Birren, 2006).

**Greens** like yellow-green are neutral. Blue-greens reduce muscle tension and increase concentration and meditation. This color goes well with peach (Birren, 2006).

**Blue** is in contrast to red. It has been found to retard plant growth, inhibit wound healing, lowers blood pressure and pulse, and weights (when lifted in a blue area) appear lighter. Blue is a suitable color for homes, but is generally not appropriate for schools, hospitals, etc. Pale blue can tire a human’s eyes (Birren, 2006).

**Neutrals** and cool colors can cause the body to slow down (Birren, 2006). They mimic the blue sky or a body of water (Flynn and Piper, 1980). They are also noted to cause humans to make “introspective and disciplined” actions (Flynn and Piper, 1980).

**Purple** recalls royalty, dignity and sadness (Sharpe, 1974). When used in large amounts, it can disturb the eye’s focus (Birren, 2006).

**Black, Brown and Gray** are associated with depression, melancholy and sadness (Sharpe, 1974).

**White, Gray and Black** can make an eye’s focus difficult. White feels balanced, black feels negative and gray feels passive (Birren, 2006). However, these colors are noted to be emotionally neutral (Birren, 2006).

The following lists a series of noteworthy color design information:

Lighter colors make a space appear larger than darker colors (Flynn and Piper, 1980). Lower contrast areas can be depressing because of their connotation with overcast skies (Flynn and Piper, 1980). Larger areas need contrast in order to define a strong figure-ground relationship (Sharpe, 1974). Colorful settings are good for group settings as they “break down social barriers” (Flynn and Piper, 1980). “A circus is less likely to make a person neurotic than the tan waiting room of a railroad dept” (Birren, 2006). Primary colors give the sense of security and stimulation.” For the elderly, it is best to soften this effect with pastels (Sharpe, 1974). If colors are placed helter-skelter, the affect can distort the spatial and psychological orientation of its observers (Sharpe, 1974).

Color has even been seen to affect one’s body position (like crossing arms). Children, when read a sad or happy story and asked to color a photo post-story would use either a brown or yellow Crayon, respectively (Sharpe, 1974). Whether ingrained in our species through evolution, there is certainly a social component to learned color behaviors. Persons
with psychological disorders whose favorite colors were in the warm family displayed neurotic tendencies while cool-colored preferences showed more psychotic-tending behaviors (Sharpe, 1974).

For specific spaces, Farber Birren states that “exacting mental and visual tasks are better performed with softer and deeper colors in the environment” (with task lighting included) (Birren, 2006). Industrial or dirty spaces should have soft/gray tones because they lack “aggression” and are less distracting (Birren, 2006). Areas with blue and yellow are “tiresome,” so accenting with bluish-green and peach can subdue these spaces. Cool colors should be placed in thermally-warm spaces (blue, green) and warm tones should be in cool spaces (ivory, cream, peach) or in vaulted space and places which lack natural light. Yellow is an appropriate color for stairwells and white for storage spaces (Birren, 2006).

Lighting is another important aspect of architectural design. It can provide a sense of wayfinding, mood, temperature and space. Lighting design for medical care facilities generally focuses on recovery and comfort. The elderly and unwell are more sensitive to lighting level changes and light sources (Whitehead, 2002), so lowering the intensity of sources and providing constant light is beneficial. Task lighting should be without glare and unobtrusive -- an integration into the architecture or furniture will help eliminate task lighting as a nuisance. Accent lighting is used in healthcare facilities as an aid to wayfinding (Whitehead, 2002). The environment is important in a person’s recovery (Whitehead, 2002), so engaging that space through lighting can help.
Therapy (n): regimented treatment of the body and mind.
Architecture (n): the thoughtful manipulation of space.

Therapeutic architecture (n): the manipulation of space that promotes mental and physical healing through the therapeutic process.

Everywhere, we are connected to architecture: through space, form, light, materials and color. The way in which a space is manipulated is what sets our mood; architectural space can be inviting or off-putting. The way in which light bounces off of or holds onto materials, vibrant or dull colors, vacuous versus intimate spatial configurations and even temperature can shape our mood in a space.

Architecture should always have purposeful design intent, interacting with the human experience. However, we generally focus on the enclosure, making the experience about aesthetics and the visual. In therapy, all of the human senses are activated to allow the body to expand or heal as much as possible. Therefore, therapeutic architecture must be involved with all five (when possible) senses, engaging its users’ activities through form, materials and color, lighting, site design, adjacencies, activities, etc.

Therapy requires a total release of control to another, trusting that improvement can be made. It also requires a setting in which one can be released from distractions to focus on that improvement. It is the intent of this project to use an existing therapy method (equine-assisted therapy) and incorporate the architecture into the therapeutic activities in as many ways as possible. The architectural setting will not only have aesthetic appeal, but will promote a tranquil state (see Figures 3.1 and 4.1) and will provide a sensual experience to enhance the client’s therapeutic experience.

The elements of this project involve the discovery of therapeutic design/architecture, therapeutic forms, design for humans and horses, and all other ways to enhance the human therapeutic experience. This design consideration can be implemented across many genres of architecture, challenging the ways in which we experience our surroundings, enhancing not only the place, but the roles that architecture plays in our lives.

Conceptual Design

The research done for the facility has led to the design decisions that follow. As has been the intent throughout the entire project, every decision was made to enhance the therapeutic experience, to create a space designed with sustainability in mind and to incorporate architecture in as many ways as possible in therapy. The following was presented to the faculty of the College of Architecture at the end of the fall semester, 2011. The two-dimensional representation of the six-foot by eight-foot board used in that presentation is found at the end of this section.

The following diagram depicts the most important aspects of therapeutic activities: those that stimulate the senses (center ring), spaces that stimulate the senses (mid ring) and spaces/designs that stimulate and accommodate movement (outer ring).
Figure 39.1: These ideas were the jumping off point for design: how can the building incorporate movement and sensory stimulation into its design and to engage the users who are there to benefit from improved healing effects? And to answer the question: how can architecture become a tool for therapy?
Therapy requires an incorporation of senses, focusing on the healing and improvement that comes from the client’s actions. Separation of user space through scale, location and atmosphere are some ways to separate stimuli, using architecture to aid in the therapeutic process. The diagrams above show the relative scales of the horse, the horse and rider, and the human.

Figure 40.1: In addition to a space which stimulates the senses, a sense of space and an appropriate scale helps humans understand their surroundings and creates a sense of balance. It is that balance that keeps the user from being confused so that he or she can focus on the most important task: therapeutic advancement.

Design for Therapy

Based on the information gained through research and case studies, the following is a list of what I have deemed appropriate for therapeutic space:

• **Raw/Simple Materials:** Visually strong materials that don’t compete with the surrounding nature. Also materials that can be touched with varying tactile (and, if possible, scent) characteristics for a variety of sensory-stimulating opportunities.

• **Indirect Lighting:** Underwater lighting (if applicable), daylighting through ceiling, colored lighting as tactile experiences or as temperature changes.

• **Varying Spaces:** Different sizes/configurations, different sensory experiences and changes and plays in lighting.

• Create a provocative space meant to interact with the user/viewer and transform his or her experience/enhance the therapeutic environment. This can be done through rich materials or by odd or engaging shapes and forms.

• Utilize art as therapy, either by the placement of art or by creating a provocative space as
occurs in an art installation.

- Create a meditative retreat.
- Minimize visual impact within nature, allowing for views in nature and for a harmonious structure.
- Integrate a healing, relaxing environment with nature.

**Figure 41.1:** This sketch was inspired by the design decisions matrix (Figure xx) to create some real-life/three-dimensional/relatable forms for the final design of the building.

---

**Initial Schematic Designs**

The following schematic designs attempted to organize a building based on spatial separation of horses ( ), humans atop horses ( ) and humans ( )

**DESIGN IDEAS**

- Utilize the corner as advertisement.
- Organize elements to progress users across site.
- Play with volume and flow through client, rider and horse spaces.
Figure 42.1: INITIAL SCHEMATIC DESIGNS.

Figure 42.2: STUDY MODELS: These models were created to visualize the schematic designs.
Figure 43.1: FINAL SCHEMATIC DECISIONS

Both of the possible schematic designs (also see Final Schematic Designs) focus on the therapeutic as well as the design of spaces and volumes based on the human, horse and rider and horse scales. They have been analyzed to emphasize the experience of the client as well as the horses (throughout the site and the structure), the flow of spaces/adjacencies and places that provide opportunity for further design work.

Schematic Floor Plans
Figure 44.1: SCHEMATIC DESIGN 1 FLOOR PLAN, NTS
Figure 45.1: SCHEMATIC DESIGN 2 FLOOR PLAN, NTS

- **Spaces Integral to Therapy**
- **Therapy-Specific Arena**
- **Therapy Horse Stalls**
- **Public Horse Stalls**
- **Staff Spaces**
It is important that clients begin their therapeutic journey from the moment they leave for the facility. As they leave the city limits and journey into the country, their connection to nature begins to calm and heal. That journey continues on the site and through the structure and is a part of every design decision made.

The progression through space is integral to the therapeutic experience.

Client Experience

The client’s progression through the site and through the building is integral to the healing/transforming/therapeutic process. Both proposed schematic designs (see Figure 47.1) address the client’s views and path through the building and the site. The first scheme promotes a sanctuary-like setting, focusing on healing and avoiding distractions. The second design incorporates the clients with the general public -- hose boarding and riding horses at the facility -- and allows for intermingling/interaction (in an attempt to break current traditions/rules regarding the separation of clients and the public--see hospital design).
Figure 47.1: SCHEMATIC DESIGN 1 CLIENT PROGRESSION AND VIEWS, NTS: This figure shows the client’s progression through schematic design 1. It indicates the different views onto the site and in the building (potential areas for design development) as well as the major stopping points within the building. The therapy and public spaces are clearly separated in this scheme.

- Spaces Integral to Therapy
- Therapy-Specific Arena
- Therapy Horse Stalls
- Public Horse Stalls
- Staff Spaces
- Client Path
Figure 48.1: SCHEMATIC DESIGN 2 CLIENT PROGRESSION AND VIEWS, NTS: This figure shows the client’s progression through schematic design 2. It too indicates the views onto the site and in the building as well as the major stopping points within the building.

Figure 48.2: These sections depict the vertical changes among the three differently-scaled segments of the building in both schemes. This allows for the use of architecture through level changes and attempts to use the site as a way of thermal regulation.
Because horses are a user of the building as well as humans, I developed this diagram marking the path of the horse through the building and the site. The horses need to be able to be loaded properly into the building (as indicated in the needs of Windsong Equitherapy), they should have comfortable use of the site and ample space to roam, should have large stalls (12 feet by 12 feet) for comfortable housing, easy access into the arenas (indoor and outdoor), and access to loafing sheds (covering on the site in the case of inclement weather).

Both schemes focus on the horse’s route through the building as well as across the site. On the southern end, an outdoor loafing shed will become the horse’s place and sanctuary among the grasses, away from vehicular and human traffic.
Client Experience Perspective

As one of the necessary elements of the client experience, the approach to the building and the way in which the building interacts with the site is important to therapy: a calming experience that does not distract from, but enhances the therapeutic experience.

Figure 50.1: This image shows the minimal impact of the building on the site, while remaining recognizable to its users.

Energy Design Considerations

The following sections show the energy design elements considered in both schematic designs.

Figure 50.2: Ventilation: It is important to reduce weather exposure, but to also promote ventilation to reduce stuffiness found in poorly-designed arenas. This will help increase the comfort of the space year-round.

Figure 50.3: Solar Angles: lighting and heating opportunities available to reduce energy use and to increase interior light levels.

Figure 50.4: Earth Use: This will help minimize wind exposure (wind may reduce energy efficiency) and visual impact, while regulating internal temperature. This can help increase the energy efficiency of the building.
**Figure 51.1: INDOOR ARENA DESIGN PERSPECTIVE:** This initial design for the indoor arena involves plane(s) that change the scale of certain areas within the space. This is the design direction of the space: inspiring movement and balancing a sense of place.

**Figure 51.2: FUTURE DESIGN DECISIONS**

This plan indicates potential areas for design development (colored bubbles) to be considered after this December review. These are areas with opportunities for meeting spaces, places with ample client access and places with lots of potential for therapeutic design; all elements to be expanded upon and addressed in the second semester.
Figures 52.1-52.3: The design will focus on clean lines and integration with site: not only preventing distraction from views, but enhancing the scene, all therapeutic elements as is inspired by the above images (“New Zealand”, 2011) (“10 unconventional architectural”).

Figures 52.3-52.5: These images (above) portray the feeling of the design of the horse stalls. It is to mimic the language of traditional stall design (left and lower right) and to keep the space open for easy ventilation (upper right) (Sloan, 2009) (Bajo, 2011).
**Figure 53.1:** Inspired by the images above, these sketches depict the stall design and entrance into the building.

**Figure 53.2:** The entry to the facility, as simplified above, should be one of the many welcoming, therapeutic points in the building; it should incite action, movement and gesture inward toward the healing environment inside.

**Figure 53.3:** This sketch shows different opportunities to incorporate the movement sketches (see Figure xx) to the building schematics.

**Figure 53.4:** This image shows the earliest direction of color contrasts to be implemented in the space. It turns a normally stark space into one with interesting features. It also highlights rather than hides the structure.
Because the senses are how we experience our surroundings, the design elements were chosen to activate and enhance sensual experiences. Examples include: a sensory trail (where clients activate their senses on horseback), changes in texture, embracing the smells of nature, horses and manure, etc. These images show different materials, elements in the design of the building, and different ways to activate the senses, from the smell of the horse (Horse Breeds Info, 2011), its manure and hay (EyeKonic) to the feel of stone (Tile Contractors, 2011), bricks (Automatic, 2011), sand (Sloan, 2009) and water (Bonfire, 2011), etc.
Figure 55.1: STRUCTURE The structure of the building was to be a responsible derivation of a metal building. Because a metal building can be ugly and an energy hog, a “responsible” metal building would mitigate those problems. With ample insulation (see Passiv Haus standards) and wise fenestration choices, the building design wouldn’t have to include an inappropriate waste of resources (Alibana, 2011) (Shandong Hongyuan Group Co., Ltd., 1996).

Fall 2011 Presentation

The following image is the two-dimensional representation of the boards presented to the tenured faculty at the College of Architecture for entrance into the second semester of the thesis design project.
Can architecture become an instrument of therapy, where architecture becomes more than just the enclosure, but a tool for therapy, providing a place that uses horses and architecture as the tools for human therapeutics?

**BOUNDLESS BOUNDARIES**

**DESIGN FOCUS: THERAPY**

**DESIGN DECISIONS**

**SITE ANALYSIS**

**SCHEMATIC DESIGN**

**INITIAL DESIGN OPTIONS**

**FINAL SCHEMATIC DECISIONS**

**DESIGN FOR THE THERAPEUTIC**

**CASE STUDIES**

**HETRA's Current Valley Site**

**PRELIMINARY SERVICES**

**FUTURE DESIGN DEVELOPMENT**

**SENSORS**

**MOVEMENT**

**DESIGN FOCUS: SCALE**

**DESIGN FOCUS: PROGRESSION**

**PROGRESSION**

The proper motion through space is integral to the therapeutic experience.
Figure 57.1: This photo was taken of the three-dimensional project boards presented to the faculty at the December review.
After receiving feedback from those present at the December mid-thesis review, I was able to finalize the design of the building, to choose materials and colors, and to iron out the client experience.

I focused my designs on the client areas. The reason for the project is to create a therapeutic environment and, though it might be ideal to make all environments therapeutic, I felt that my efforts were best spent in the client areas. To promote a sense of unity between the spaces, I utilized several circular shapes in both ceiling and wall materials as well as in the design of the final presentation materials. See the end of this section for the final presentation board.

**Plans and Sections**

The final building design settles into the hillside in the previously-decided location as indicated in the site plan (Figure 59.1). Public and therapy spaces were kept separate in order to satisfy health code requirements. The following diagrams indicate the final design decisions for site and buildings alike.

**Site Plan**

Figure 59.1 shows the relative orientation of the building to the 80-acre site. The position of the water to the south and the trees on the site indicate many of the native features that were untouched to help preserve the natural feeling and to prevent unnecessary site infringement. Also nestled within the site are the loafing sheds and the various program elements as laid out in the exterior site adjacency matrix (Figure 23.1).
Figure 59.1: SITE PLAN, NTS: These 80 acres were designed to incorporate many of the program activities of equine therapy both in the building and throughout the site. Most importantly, it focuses on the client experience as well as the horse experience.
Floor Plans

Because the building takes advantage of the slope of the site, the clients and the general public enter into the second floor. This design also allows for the use of ramps and stairs that can be incorporated into the therapy. (See the client progression section regarding the progression through spaces.)

Plan - Main Level

Entering under a drop-off awning (see Site Plan Figure 59.1), clients or their caregivers have the option of parking at the entrance to the building (just off of the entry loop) or, if more ambulatory, at the top of the site.
Figure 61.1: PLAN MAIN LEVEL, NTS

Plan - Lower Level

Housed on this level are the spaces involving the horses: the arena, tack rooms, feed, stalls, etc. Though this level is lower than the on-grade entrance, access to this level is also on-grade so that the clients and horses can easily use the site for therapy activities or so that the horses can be turned out onto the site for exercise, to eat grass and for socializing.
Figure 62.1: PLAN LOWER LEVEL: scale 1/64" = 1'

- Other Building Levels
- Therapy Arena
- Exterior Sand
Figure 63.1: 1/2 OF PLAN LOWER LEVEL, NTS
Figure 64.1: 1/2 OF PLAN LOWER LEVEL, NTS
Plan - Upper Level

Though only two rooms, the upper level not only provides visual interest to the building on the exterior, but another opportunity for clients to ascend into another level, again using the architecture to do so.

Figure 65.1: PLAN UPPER LEVEL: scale 1/64" = 1'

Client Experience

Because the client’s progression through the therapeutic environment is of the utmost importance, the first site interventions begin to shape the way a person perceives and accepts his or her surroundings. Figure 66.1 shows the client’s path through the building (orange) and the different points of interaction within the site and building (colored circles). The following is the documentation of the client’s experience through the therapeutic process.
Figure 66.1: CLIENT EXPERIENCE

- Private therapy
- Physical therapy
- Check-in/greeting desk
- Hippotherapy rooms
- Therapy arena
- Therapy stall
- Sensory trail/exterio
- Therapy tack room
- Therapy wash racks
All of the materials used inside and outside of the building were chosen not just for aesthetic reasons, but for sensory stimulation and to minimally impact the building’s placement on the site. The materials selected for the exterior are indicated on these elevations and in the following renderings and images from the materials board.
The array of exterior building materials were chosen to provide interest both visual and textural interest for clients and visitors. Clients can use the materials during therapy as a way to activate their senses.
EXTERIOR MATERIAL PHOTOS

- DRI DESIGN PANELS - Horse and Human Areas
- BRICK - Driveway
- FABRIC - Sensory Trail
- SPLIT-FACE CMU - Equine Areas
- STONE - Human Areas
- WOOD - Entry
- DUNE TILE - Entry
CLIENT ENTRY HALL

Orange and Brown Paint: As the carpet transitions, so does the wall color. As a warm color, orange enhances the energized feeling.

“WADE” Wall Tile: Creates visual interest and provides a tactile surface.

Purple, Grey and White Paint: These colors relax and prepare those entering for the excitement within the building.

Gray and Green Carpet: The neutrals lead clients calmly into the space while the pattern excites, mimicking the intent of the wall paint.

Gray and Yellow Carpet: A transition down the neutral hallway leads clients to a more energized physical therapy space. Yellow, a warm color, encourages that energy.
MEDITATION ROOM

“QUINCY” Wall Block: Filters backlighting, giving an interesting light pattern and can be used for tactile and visual stimulation.

Continuous Wood Surface: Used as a warm neutral color coupled with architectural elements, engaging the user.

Blue Paints: Promotes a relaxing environment.
“BIG DOT” Wall Panel: Creates a tactile therapy surface within the circular theme.

Blue and Orange Paint: Blue to make weights appear lighter, orange to stir activity.

Neutral-Colored Flooring Path: Carpeting, glass and ceramic tile, and cork provide different surfaces for clients to experience frictional and tactile changes (see materials images).

Red and Blue Rubber Flooring: See paint color description.
PHYSICAL THERAPY
MATERIAL IMAGES

TEXTURED FLOORING - Walking Path
GLASS TILE - Walking Path
CARPETING - Walking Path
RUBBERIZED FLOORING - Weight Areas
RUBBERIZED FLOORING - Walking Path
CORK FLOORING - Walking Path
TILE FLOORING - Walking Path
Concrete: A new material for clients to touch, smell and experience.

Green Ceiling Plains: Green, a cool color, helps relax clients and the planes provide scale change.

Wood of Alternating Stain: Incorporated to warm the concrete finishes, which ties into the meditation room and the exterior

Metal: Another material for therapy. The metal rods on the side give clients a tool for therapy and an interesting wall feature for visual stimulation.
TACK ROOM

“ZELLE” Wall Tile: Creates visual interest and provides a tactile surface.

Green and Yellow Paint: Neutral and stimulating colors for humans (seen as white-gray and pale yellow to the horse occupants).

Tack: As a part of the therapy process, the tack (horseback riding materials) provides different smells, feelings and weights for clients.
An arena is an interesting and cavernous space. The users can do anything from groom a horse to gymnastics on horseback.

In order to incorporate scale into the space, I designed a ceiling (right) reflecting the design of other therapy spaces (circles), while housing the necessary arena mechanical and plumbing (watering) and lighting systems.
“Hydro-Keep”: Reduces the need for arena watering, while also reducing the amount of dust.

Red, Peach and Black Paint: Red accelerates activity, peach calmly compliments red, preventing over-saturation, while black provides the needed contrast and interest to the space.
Review and Remarks

Overall, the building incorporates the intent of the project: to create a healing, therapeutic architecture that not only houses a therapy program, but whose design becomes an active part in the therapy process. I hope that my research and conclusions can inspire others to research, design and document ways in which architecture can heal and activate. I am also proud to have compiled what is one of the few therapeutic architecture designs (I have yet to find another building designed with the same therapeutic intent, that has been published for others to research). It is my hope that my research and design will inspire others to think about the total impacts and implications of creating functional environments.

Final Review Presentation

The following image shows the digital representation of the presentation and materials boards shown to those present at my final review.
DESIGN FOCUS: THERAPY

SITE SELECTION
- Select site with the most desirable elements
  - Nebraska climate (see climate data)
  - Crops, grasses, and water
  - Rural Nebraska fauna (see fauna data)
  - Near Walmart and Lancaster Event Center, large market draws, etc.

DESIGN: ARCHITECTURE
- Manipulate space that promotes awareness of pain
  - Through form, materials and color, lighting, site design, adjacencies, activities, among others
  - Focus on that improvement

PHYSICAL THERAPY
- Therapeutic treatment in which a therapist guides the patient
  - The body and mind

THERAPY AREAS
- Therapy: hippotherapy, physical therapy
- Therapy: therapy arena, therapy stall, therapy wash racks
- Therapy: sensory trail/exterior

BOUNDLESS BOUNDARIES
- Can architecture become an instrument of therapy, where architecture becomes more than just the enclosure, but a tool for therapy providing a place that uses horses and architecture as the tools for human therapeutic intervention?

FINAL PRESENTATION
- Final presentation
- Physical therapy
- Therapy arena
- Therapy stall
- Therapy wash racks
- Therapy trail/exterior
- Therapy: hippotherapy rooms
- Physical therapy
- Client entry
- Check-in/greeting desk
- Neutral hallway
- Filters backlighting, enhances the therapeutic environment

Figure 85.1: FINAL PRESENTATION AND CRITIQUE: Photo by Jimmy Rohr


http://www.lincolnweather.org/ accessed October 15th


(Sycamore Lane Therapeutic Riding Center, 2011)


BIBLIOGRAPHY
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