



# Academy Journal

October 19, 2005 | Print this page | Email this page

## **The Peaceful Garden**

**Abstract** | **Article**

***St. Vincent Healthcare's neonatal intensive care unit (NICU) was in trouble. Though they were ranked in the top 25 percent of NICUs in the country, a person would never guess their high level of care by judging the setting. Simply put, this 400-horse-powered engine was trapped in the chassis of an old and crammed Pinto. The best spot to rebuild this unit sported a design as troublesome as they come, and the hospital had their sights set on increasing capacity by 25 percent. Our design firm had our work cut out for us, but we had a lot going for us, as well.***

***We toured other NICUs and determined where the bar was, then set out to raise it. We enjoyed a great relationship with this client and endeavored to elevate our work at the regional hospital and take it to the next level. The theme, "The Peaceful Garden," drove the team of more than 100 people to produce a state-of-the-art NICU with every comfort sick babies, their families, and the staff could ever want. We scrutinized the environment, sound, and lighting. We fussed over major and minor design elements. We walked the path the nursing staff tread daily to ensure we were designing the smartest ways for the critical care providers. In the end, the Peaceful Garden inspired us all to create a place of healing unlike any NICU in the country.***

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## The Peaceful Garden

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### Our Client

**St. Vincent Healthcare is a large regional hospital that takes in a patient base from Wyoming, Idaho, North and South Dakota, and Montana. The neonatal intensive care unit (NICU) has earned a rank in the top 25 percentile of nurseries in the country, a testimony to its consistency of care.**

**Despite a Level 3 designation with high-tech equipment, the 20-year-old NICU lacked room to move about and was deficient in storage space, practical usage areas, and a supportive interior. The nursery generally averaged 15 babies at a time but could accommodate 17. Only about 2 percent of the babies are transported to other hospitals, and transports generally involve complex diagnosis or complex surgeries.**



Everywhere you look in the newly renovated Peaceful Garden NICU, something different appeals to the eye. Colorful plant and nature laminate inlays adorn the walls of the pod and provide a variety of colors and shapes. (Photo by Phil Bell)

**Two neonatologists provide care for the babies, and more than half of the nursing staff is neonatal-certified. The NICU also is staffed with a full compliment of respiratory therapists, a specially trained pharmacist, a radiologist, and pediatric specialists from neurology, cardiology, ophthalmology, urology, and hematology/oncology.**

**The hospital had a strategic plan to expand and enlarge the NICU to easily handle 20 bassinets, an increase of 25 percent in capacity.**

### The Issues and the Challenges

**At their average census of 15 babies, the staff reported feeling like they were working on top of each other. We spent many hours observing their work and surroundings and found it to be environmental chaos. According to the hospital's director of mother/newborn services, a census of 10 infants in the NICU was considered to be very busy and**

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### Small and Rural Hospitals: Critical

**created a disruptive environment. The existing space was 1,152 square feet.**

**We found no room and few amenities for families to stay with their baby. Families reported feeling in the way, and from our observations, they were.**

**Lighting was dated and inadequate. The number of medical gas outlets and power outlets per bassinet was low and did not meet today's guidelines. The mechanical system was outdated and undersized. The comfort level within the unit varied dramatically between hot and cold seasons and could vary depending on the number of patients in the unit. The unit had no windows or skylights. Finally, the interior finishes were bland and very institutional, creating an environment far from uplifting or supportive for families and staff.**

**The building was in need of mechanical updates. The renovation would need to include replacement of existing HVAC and plumbing and electrical systems as well as a complete change of interior walls and spaces. The water piping had to be rerouted for six floors.**

### **A Layout Like No Other**

**The space chosen for the NICU was originally designed in a triangular configuration. Windows lined two of the three sides but were nestled in individual alcoves notched out of the wall. The room was a series of narrowing spaces. As we toiled with the variety of ways to deal with the space, we came up again and again with unusable plans. We questioned if the existing space was capable of being turned into a functional design. Easily, we could say this was one of the most challenging existing plans we ever came up against. In addition, we wanted to create each individual infant space, or pod, in an identical orientation so the nurses would not get confused when going from pod to pod. Our work definitely challenged us.**



The floor plan of the entire unit shows the complexity and flow of the triangular shape with the added difficulty of the "nook and cranny" windows. We really worked to provide a functional flow through the unit.

(Drawing by Alan S. Godfrey, AIA)

### **Exceeding Past Performances**

**We had worked with this client's complex needs and expectations in the past and had a long-term relationship, doing projects that met their high standards. Although our team understood the hospital's culture, customs, and performance expectations, we felt the hospital needed to see another side of our company. We saw this project as an opportunity to exceed our previous performances and to**

#### **Access and Beyond**

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President and CEO,  
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#### **HOSPITALity: Surgery Center Design for People, Not Procedures**

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*enlighten the hospital's perspective on our design abilities.*

### **Concern for Staff**

*One of our client's key concerns was one that is shared throughout the healthcare industry: a shortage of nurses and high staff turnover. NICU settings are very labor-intensive, and nurses are at a premium. Our client saw environmental support for the staff as a critical issue.*

*We knew that reducing staff stress through ergonomic design solutions as well as careful consideration of other issues such as air quality, noise, and light would significantly affect staff health and productivity. In addition, the client knew they were sending a much-needed message to staff: Maintaining the health and safety of staff members is an important goal for the organization.*

### **Tracing Their Steps**

*As designers and planners, we strove to alleviate some of the nurses' complex choreography. Two studies showed that when nursing staff save walking time around a unit, it translates into more time spent on patient care activities and interaction with family members.*

*We found the NICU nurses receptive to the idea of an open-floor format with a radial design. Prep time could be reduced by storing the many nursing supplies at individual infant stations. We also set out to design an overall layout that reflected a closer alignment of work patterns and the physical setting, such as redesign of the pharmacy, respiratory therapists' area, and the milk-preparation station.*

### **Not So Loud**

*In general, studies of the effectiveness of noise-reduction measures suggest that environmental interventions are more successful than organizational interventions, such as staff education or establishing quiet hours (in a NICU, all hours are quiet hours). Several studies focused on infants in NICUs and found higher noise levels produced a decrease in oxygen saturation levels; an increase in blood pressure, heart, and respiration rates; and worsened sleep for the infants.*

*With our chosen open-design plan, we knew we were up against noise-control issues.*

### **Not Just Health but Healing**

*The focus of our design was to create a NICU that helped the infants recover and be safe, gave the parents a place of comfort, and assisted the staff to do their jobs better. The physical environment needed to breathe of healing.*

*NICU units are equipment-intensive. We felt challenged by the opportunity to address the technicality of a menagerie of hoses and hookups. We took on the challenge of making*

***the interior design so beautiful and so engaging that the medical equipment would either be hidden or would disappear into the background.***

### ***The Creation of a Dream Team: Preliminary Work and a Project Delivery System***

***Our design/construction team and the hospital began working together even before the project was funded. Using a preliminary sizing study, the design/construction team worked closely with the hospital to determine the best location. One by one, three locations were ruled out until we settled on the fourth for the project. We also spent considerable time formulating an appropriate project budget and schedule.***

### ***Planning for the Present and the Future***

***We wanted to address all the issues the hospital brought up and those relative to trends in healthcare design. Consequently, more research went into this project than normal. Early planning resulted in a master plan for the development of what would become the Women's and Children's Pavilion, and three phases were identified.***

***The first phase included renovation of existing patient space for the new NICU suite. The second phase was the renovation of the old NICU into support space for women's health services, containing equipment storage, family overnight-stay rooms, a triage room for expectant mothers, and office spaces. The third phase included renovations to provide an enhanced arrival lobby and improved wayfinding from the elevator and corridor to all elements of the floor containing women's and children's health services.***

***Once the project received administrative approval, our team visited NICU facilities that were considered state of the art within the United States. We narrowed our search to two neonatal units located in Ohio. One hospital emphasized a very thematic design, while the other had a functional appeal. We wanted to merge the two elements, and we had a reference point to shoot from. Now that we could see the bar, we asked ourselves, "How do we raise it?"***

***From our preliminary work, our project team identified the following goals:***

- ***Provide a comfortable and warm environment for the infants' families***
- ***Provide a suitable environment that features diminished environmental stimuli such as lighting and noise***
- ***Create a nurturing thematic design that is appropriate for infants and their families.***

### ***More Than Just Talk***

***The project team met weekly during the design and construction process to ensure timely and consistent communication between project stakeholders. We chose to***

*take extra steps and use methods to visually communicate the design elements to the hospital users. We created three-dimensional, hand-drawn renderings of the designs in color. We also built a three-dimensional CAD isometric of the casework for each unit. Our designers compiled a material palette showing proposed materials, color, and textures for the project. Finally, we built two full-size mockups of the casework, one of cardboard and the other of particleboard.*

*The full-size mockup was set up in the hospital so the NICU staff could review it and give feedback. It was left in place for a month and was thoroughly tested by the staff.*

#### *The Ideas and Solutions: Little Peas in a Pod*

*During the tours of the Ohio hospitals, the team decided on a pod design for the layout of the bassinets within an open suite. The pods would consist of a central piece of casework with four arms projecting from the core to create four spaces for bassinets. Two center pods would serve eight bassinettes, and the remaining eight bassinettes would be located around the perimeter of the room. Two isolation rooms in the NICU would hold two bassinettes each, and one would be big enough to handle three.*

*One of our greatest desires was to create a design for the unit that conveyed a memorable theme. We challenged our design architect and our interior designer to come up with an out-of-the-box concept. Their design concept was truly all we had hoped for as an architecture firm. It was timeless yet ever changing. It was symbolic and still stood on its own. It was whimsical yet was grounding.*

*The project theme was "The Peaceful Garden." The design architect created a poem to describe the garden, and that poem adorns an entire wall as people enter the NICU. It became the design concept and the descriptive mission statement for the project:*

*Many layers of green,  
Is the peaceful garden*

*A pair of trees stands in the center,  
Reach strong branches out*

*Green canopies under a blue sky,  
Give shelter and comfort to new life*

*Little seeds that take hold,  
Have hope to grow and bloom*

*Butterflies and song birds,  
Beckon to join them*

*In many layers of green,  
That is the peaceful garden.*

*The poem captured the essence of the theme. The NICU would be a garden*

**offering each newborn a beautiful place to develop and grow in an environment of peace and serenity. We designed the garden theme into every element of the NICU: At the center of the garden are two trees from which all life begins. Their branches cover the most fragile of the babies. As the newborns become stronger, they move to the perimeter pods to develop fully and bloom before leaving the garden unit. The theme is expressed in color, form, texture, light, and pattern and conveys an organic environment.**



Family and visitors to the NICU are introduced to the theme, "The Peaceful Garden" before entering the unit. The poem and paintings hint at a wonderful garden journey awaiting. (Photo by Phil Bell)

**As visitors enter the unit, they are greeted by a faux painting of the tree elements and garden colors and patterns. The poem, etched on the curve of a wall, gently wove its way around a corner and pointed to the doors of the NICU. Curved edges wind through the carpet and cabinetry. Specially made privacy screens are in the shape of butterfly wings. The windows have an etching-like treatment with bird and leaf designs. The ceiling tiles have star and sun impressions and are powder-coated to match the painting.**

**Every detail was attended to.**



Backlighting behind the tree branches provides a "filtered sunlight" element to the unit. The trees are massive and imposing as they spread out over eight pods. (Photo by Phil Bell)

**We found the theme of The Peaceful Garden to be more than just a nice mantra. Many studies show strong evidence that even brief encounters with real or simulated nature settings can elicit significant recovery from stress within three to five minutes. These studies show stressful or negative emotions diminished while levels of pleasant feeling increased.**

**The babies will likely never see the details of the tree above them or the etchings of plants in the windows, but their caregivers and families will, and that was good enough for us. The garden was created to touch all who saw it and to be a place of refuge, a place of nurturing, a place of growth.**

### **The Trees**

**Key to the whole theme and concept was the creation of two clusters of aspen trees. We created the image of two big trees in the center of the garden with their branches**

**and leaves folding out over the individual pods and providing a canopy of protection for not only the whole unit but directly for the most critical infants. We envisioned telling parents their infants would be safe under the branches and could move out to bloom as they became healthier. More time was spent on the design of the trees and their look and feel than on any other aspect of the NICU.**

**The canopy was initially designed in layers overlapping each other and draping downward from the ceiling to reflect a drooping branch. However, we soon determined the design above the canopy was a code concern. Also, the area would be a problem for dust accumulation and would be nearly impossible to clean and maintain.**

**The solution was to redesign the tree canopy so that it turned upward. This eliminated the top surface and eliminated cleaning the tree. The redesign also allowed more conventional light fixtures to be used to illuminate the translucent canopy.**

**Our project manager, the technical architect on the project, chose to step out of the box and look for different construction and materials to make the trees. The material had to meet fire and smoke ratings and yet be translucent to allow light to filter through. His work was cut out for him to marry this critical design element with function and to stay within code parameters. We searched the country and found a producer who specialized in environmental graphics and fabrications and who worked on projects for Disney and other theme parks. We communicated and collaborated back and forth for weeks with this company to make the three-dimensional branches work.**



Who would ever know what is encased inside the trees? Nametags hang on the branches for each child. The little blue divider is shaped to provide privacy for the parents yet allow the nurses to look across the space and see the other babies.  
(Photo by Phil Bell)



**The white aspen tree trunks provide casework for the medical gas hoses and hookups and wiring. Each trunk has 64 electrical circuits, yet hides all the hardware.**

**In the end, the trees became the central feature of the NICU design. They softly light up the unit as if sunlight is filtering through leaves and they provide a graphical element that is visually engaging and unique.**

Without the white bark covering, these trees are a menagerie of 64 circuits, 12 med gas lines, phone data lines, two types of power, and lighting circuits. Everything is modular for easy service.  
(Photo by Alan S. Godfrey, AIA)

### **The Lighting**



***The open floor plan created a need to put the lighting situation under a microscope, so to speak. Our desire to develop natural lighting for the unit and bring it deep into the internal space led us to employ the expertise of an outside lighting-research company. Our scaled mockups of the unit and the natural lighting components showed us that simply adding light shelves to the windows would bounce light from the ceiling and bring it deep into the unit.***

***The lighting is controlled individually by employing several different types of lighting. Indirect LED lighting under the shelves and cabinets of each pod gives a nightlight glow but doesn't bother the babies. A more direct halogen lamp inside a canister turns to create a spotlight for specific bassinette procedures. Nearly all lighting is on dimmers to regulate their intensity. Around the perimeter of each pod is a two-by-two florescent fixture.***



The nurses control room gives an excellent visual of the entire unit but is still separated to provide privacy for the babies and for the sensitive information contained behind the work clerk's desk. We were able to provide natural lighting behind the desk, which the nurses requested.

(Photo by Phil Bell)

***The lighting was designed with the new trend in infant healthcare that addresses the babies' need to swing from day to night lighting, as well as the need to keep lighting on an individual level.***

### ***The Sound***

***The potentially noisy open floor plan and loud sound levels of the NICU were attacked several different ways. Different angles were used on the pods to break up the sound. An acoustical ceiling was installed. Tack board and wall covering material were added to the pods to absorb sound. Carpet around the perimeter of each pod also absorbs sound.***

***We also thought staff and family needed some cues to help keep their noise level appropriate. We had signs similar to exit signs manufactured and installed throughout the unit with the word "Quiet" on it. The light in the signs comes on at 60 decibels. In a similar manner, the apnea and bradycardia alarms on the babies' monitoring systems are signaled with an indicator light. This helps the nurses quickly identify which baby needs attention in the open format layout.***

***Additionally, fire codes require regular alarm tests; we installed strobes only in the NICU with the audio alarm outside the unit. Also, a noisy oscillator unit was encased in a closed-glass room. HIPAA issues were considered as parent privacy rights were addressed through privacy***

*screens, design, and acoustics.*

### ***Individual Pod Design***

***The full-scale mockups allowed staff to give considerable input to the placement of their work needs such as gloves, waste reciprocals, baby supplies, and medical-gas hookups and equipment. We used this mockup for the various contractors to figure out how to get their equipment connections perfect. The final model needed to be functional and not experimental. In the end, the pods were adjusted first and foremost for the nursing staff. Each pod was arranged in the same way so the nurses could go right in and work without confusion.***



Close-up of an individual pod, showing the complex yet unobtrusive design of the med-gas lines and clinical equipment. The station has a work surface exclusively for the nurses and one for the parents. Parents also get their own drawers and spaces. Each pod is oriented in the same way. (Photo by Phil Bell)

***Then we added many features for the parents to make their child's area personal. A large leaf-shaped tack board allows parents to put up pictures and cards, while both staff and parents use a dry-erase board to communicate vital information. The walls of the pods vary in height to please the eye, break up sound, give privacy, and allow staff to see across the unit.***

***The medical director recently told us that parents decorated their baby's pods for Halloween and the Christmas holidays with little lights and fixtures. Our goal of creating a space of ownership for the families seems to have been realized.***

***And More to Come***

***Phases 2 and 3 of the project were completed in April.***

***Phase 2 involved adding another family waiting room, two more lactation rooms, rooms for rest for NICU moms, and another family-care room for families who stay the night with their babies before discharge. Phase 2 also added more storage and offices, a staff-education room, a labor and delivery triage room, and a space for lactation consultants. Another important aspect of Phase 2 included the remodel of a general surgical floor to become a 16-bed women's surgical area.***

***Finally, Phase 3 remodeled the floor's entrance to reflect the specialized care of that floor. Distinctive artwork, pleasant door arches, and new paint and carpet completed the look.***

***A Few More Results: What the Babies Don't Know***

***The patients and their families will never know about some of our efforts.***

***For instance, HEPA-filtered and humidified air was important to us but goes quietly undetected. The babies may not appreciate the effort it took to bring natural light into the darkened recesses of the NICU, nor do they know we researched lighting options to give them full-spectrum lighting. The little patients did not have to miss a beat in care as there was no downtime or disruption to services; the equipment and bassinets were uneventfully moved one by one and reconnected moments later.***



The perimeter pods are for the healthier babies and provide more natural daylight and privacy. Each floor space around the perimeter and within the center cluster of pods is approximately 120 square feet.

(Photo by Phil Bell)

***The babies never will know how the final numbers came in under projections and the remaining \$75,000 was returned to the hospital. These funds provided five new telemetry monitors for the unit.***

***Ten years from now, the NICU may look different. We realize that healthcare needs change quickly. We designed the spaces and arranged the pods and isolation rooms to allow the unit to flex above the 20-patient count, if needed. Some of the pods contain more electrical outlets to permit doubling of bassinets. We more than doubled the size of the space and increased the capacity by 25 percent. We even toiled with the casework to accommodate various pieces of telemetry equipment for the future.***

#### ***What the Babies (and Their Families) Are Saying***

***The babies tell us the unit is quieter and more peaceful. We know this because apnea and bradycardia instances have decreased since the NICU construction. They say their parents feel better about the environment—or at least the parents said so when surveyed. Positive responses to the question, “My infant’s room was quiet and restful,” went from an average score of 56 percent to 87 percent after the move.***

#### ***What the Staff Is Saying***

***The staff, medical director, and newborn doctors say the unit meets and exceeds their expectations. The evidence of this is in the increase of babies the hospital now handles: numbers are up from an average of 15 babies to an average of 18, and they have***



**even handled 22 with a couple of sets of twins in the mix.**

***The thematic design of the healing garden has created a unique identity for the NICU. The hospital is now marketing this project to the community as an example of a positive and aggressive trend in their delivery of healthcare as a leading regional provider.***

The nurse demonstrates the room in each pod once a bassinet is in place. The clinical equipment is integrated into the design and snuggled discreetly behind the bassinet. The unit has plenty of circulation space, with room to expand.

(Photo by Phil Bell)

### ***Striking a Chord in the Community***

***Four months after the NICU was up and running, a wealthy Billings, Mont., businessman toured the new unit. He was moved. He found the Peaceful Garden inspiring and touching, and he chose to demonstrate this through a sizable charitable contribution to the hospital. His transformational gift would complete the women and children's center in an even bigger way. The change would bear his name and become the Women's and Children's Pavilion and a destination for a special kind of healing.***

***"I hope it will be impressive and feel like a person has arrived at a place of healing once they step off the elevator," he said.***

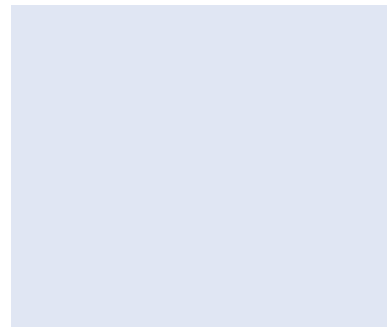
***Our hopes exactly.***

### ***We Have a Few Words to Say***

***The momentum for this project was incredible. During the NICU building phase, our teams continued to search for ways to articulate the theme of a peaceful and healing garden. We started out with a desire to turn an incredibly difficult space into a functional space and to design it with a great theme, and we ended up with so much more. Our enthusiasm and confidence to build a NICU of excellence took on a life of its own.***

***Working under a design-build structure allowed us to continue attending to details up to the moment we turned the project over to the owner. Even a few weeks ago, months after the NICU project was completed, our project manager walked down the long, narrow hall going away from the NICU. He noticed that an old fire reel in a glass cabinet was taking up the entire end of the hallway, and he knew this equipment was outdated because the hospital uses a sprinkler system. He arranged to have the reel removed and a beautiful piece of artwork put in its place.***

***In August 2004, the hospital hosted an open house for the community to see the new NICU, and we attended. Perhaps the greatest joy for us was to see people walk in, look around, and gasp. The reaction from the community was truly a proud moment for our firm.***



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