

# Academy Journal

No. 20



Academy of  
Architecture for Health  

---

an **AIA** Knowledge Community

# 2018

No.

20

---

# Contents

---

**3**

Letter from the editor

**4**

Design and Construction:  
A Key Component in Hospitals Credit Ratings

**10**

Road to Recovery:  
Person-Centered Design  
BEHAVIORAL HEALTH  
Trempealeau County Health Care Center

**24**

Call for papers

## **Mission of the *Academy Journal***

As the official journal of the AIA Academy of Architecture for Health (AAH), this publication explores subjects of interest to AAH members and others involved in the fields of healthcare architecture, planning, design, and construction. The goal is to promote awareness, educational exchange, and advancement of the overall project delivery process, building products, and medical progress that affect all involved in those fields.

## **About AAH**

AAH is one of 21 member communities of The American Institute of Architects (AIA). AAH is unique in the depth of its collaboration with professionals from all sectors of the healthcare community including physicians, nurses, hospital administrators, facility planners, engineers, managers, healthcare educators, industry and government representatives, product manufacturers, healthcare contractors, specialty subcontractors, allied design professionals, and healthcare consultants.

AAH currently consists of approximately 7,000 members. Its mission is to improve both the quality of healthcare design and the design of healthy communities by developing, documenting, and disseminating knowledge; educating design practitioners and other related constituencies; advancing the practice of architecture; and affiliating and advocating with others that share these priorities.

Please visit our website at [aia.org/aah](http://aia.org/aah) for more about our activities. Please direct any inquiries to [aah@aia.org](mailto:aah@aia.org).

## ***Academy Journal* editor**

Orlando T. Maione, FAIA, FACHA, NCARB

## **AAH 2018 board of directors**

### **President/outreach**

Vincent Della Donna, AIA, ACHA

### **President-elect/strategy**

Tushar Gupta, AIA, NCARB

### **Past president/operations**

Tom Clark, FAIA, EDAC

### **Education**

Brenna Costello, AIA, ACHA, EDAC

### **Communications**

Todd Robinson, FAIA, EDAC

### **Codes and standards**

Kirsten Waltz, AIA, ACHA, EDAC, LEED AP

### **Conferences**

Rebecca Lewis, FAIA, FACHA

### **Visibility**

Larry Staples, AIA



# Letter from the editor

---

As we start the 21<sup>st</sup> year of the *Academy Journal*, published by the AAH Knowledge Community, this edition includes two articles that support the enhancement of the built environment for healthcare.

As the official publication of the Academy, the *Journal* publishes articles of particular interest to AIA members and the public involved in the fields of health care architecture, planning, design, research, and construction. The goal has always been to expand and promote awareness, educational exchange, and advancement of the overall project delivery process, building products, and medical progress that affects all involved in those fields.

Articles are submitted to, and reviewed by, an experienced, nationally diverse editorial review committee (ERC) of medical and architectural professionals. Over the years, the committee has reviewed hundreds of submissions, responded to writers' inquiries, and encouraged and assisted writers in achieving publication. In its over 20-year history, the *Journal* has provided valuable opportunities for new and seasoned authors from the architecture and health care professions, including architects, physicians, nurses, other health care providers, academics, research scientists, and students from the US and foreign countries.

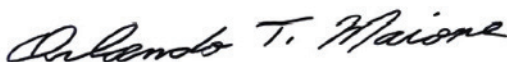
Published articles have explored a broad range of medical topics, including research trends and the future of health care architecture, cardiac care, future and evolving technology, patient rooms and patient safety, lighting design for health care, psychology, workplace design, cancer care environments, emergency care, women's and children's care, and various health care project delivery methods.

We encourage graduates who have received health care research scholarships and others involved with research within the health care architecture field to submit their research to the *Journal* for publication consideration. We'll continue to develop a cross-referenced article index and a broader base of writers and readers. The deadline for the 2019 call for papers is May 31, 2019.

Since the late 1990s, this free publication has expanded to include worldwide distribution. And we are proud to report that as our readership continues to grow, it also expands internationally. Readers have viewed the *Journal* online from the US, Canada, Europe, the Caribbean, Asia, Africa, India, and Saudi Arabia, just to name a few. The *Journal* is available to the 90,000 AIA members and the public on the AIA website at [aia.org/aah](http://aia.org/aah).

My special thanks to AIA for its continued support and hard-working staff and to the many volunteers who have contributed to our growing and continued success. I would especially like to thank the other members of the 2018 ERC: John Sealander, AIA, ACHA, NCARB, LEED AP (CA); Janice Stanton, RN, MBA, EDAC (IL); Donald L. Myers, AIA, NCARB (VA); Angela Mazzi, AIA, ACHA, EDAC (OH); Sharon Woodworth, FAIA, FACHA (CA) and Regan Henry, RA, PhD, LEED AP, LSSBB (OH).

As always, we appreciate your feedback, comments and suggestions by emailing [aah@aia.org](mailto:aah@aia.org) or calling me at (631) 246-5660.



Orlando T. Maione, FAIA, FACHA, NCARB  
Editor, *Academy Journal*  
November 2018

# **Road to Recovery: Person-Centered Design BEHAVIORAL HEALTH Trempealeau County Health Care Center**

---

David Kimball, AIA, CCS, CDT, Principal at Wendel ADG, LLC

## ABSTRACT

Trempealeau County Health Care Center (TCHCC) is a county-owned facility that has existed since 1898. It is one of three licensed IMDs in the State of Wisconsin. Due to its operational model, the facility is truly one-of-a-kind and serves 69 of the total 72 counties in the state. The planning and design of the facility emphasizes appropriate separation of risk level and age within five medical neighborhoods. The nursing home and institution for mental diseases recovery-based neighborhoods are arranged into multiple households to reduce scale and density. Thoughtful design accommodates decentralized clinical and support services to create a person-centered environment throughout which caregivers are immersed in the lives of their clients.

Research and immersion led to a practical application of biophilic design (Harris and Augustin, 2014) and neuro-focused architecture through meaningful penetration of natural light; private internal courtyards for each neighborhood and household; a Towne Centre with healing and teaching gardens; educational and vocational spaces; and quality staff respite areas. The design team worked in collaboration with TCHCC to create a forward-thinking environment, leaving old paradigms behind and striving to eliminate stigma, while allowing an environment of care that matches the vision and delivery of the caregivers at TCHCC.

FIGURE 1



Architect's rendering of the facility prior to construction.  
Image credit: Wendel (formerly ADG)

## Terms

### IMD

Institution for mental diseases as defined under Federal Register 42 CFR 435.1009

### TCHCC

Trempealeau County Health Care Center

### SNF

Skilled nursing facility as defined and licensed by Wisconsin DHS 132

### DON

Director of Nursing

## Project information

### Construction delivery method

Construction Manager at Risk with preconstruction services

### Project location

W20298 State Road 121, Whitehall, WI 54773

### Type of facility

Skilled nursing facility licensed by the state of WI as an IMD (Institution for Mental Diseases)

### Size of facility

126,000 square feet

### Number of beds

146 beds including, 100 recovery-based IMDs, 12 gero-psych, 34 nursing homes

### Budget (initial)

\$25,500,000

### Budget (actual)

\$27,000,000

### Completion time

Wendel (formerly ADG) (hired on reputation): 9/10/2013

Predesign/Study deliverable: 6/18/2014

Schematic deliverable: 8/19/2014

Design development deliverable: 11/18/2014

Construction documents issued: 3/05/2015

### Date of completion

Construction start: 4/20/2015

### Construction complete

11/30/2016

FIGURE 2



Comfortable reception area for both clients and their visitors.  
Image credit: Terry Bowe



## History & context

In the late 1800's and early 1900's, Wisconsin chose to develop a series of county hospitals and two state hospitals. In 1898, Trempealeau County officials decided to build a county "asylum" and start a farm to provide service to people who were mentally ill, possessed intellectual disabilities, and dependent on alcohol and drugs. This was the beginning of what is known today as the TCHCC system.

New facility composition is licensed by the state as 112 IMD beds and 34 SNF beds.

## Initial project requirements

The initial project requirements included a Master Planning Study to consider the existing healthcare facility in terms of operation redefinition and expansion, as compared to a replacement facility. It became evident early on that the existing facility had significant infrastructure issues that would require attention at significant cost, even before addressing client and staff needs. Further, logistics of remodel and construction in an occupied environment were a significant concern for the design team, given the client population.

## Person-centered elements

To be a success, the replacement facility needed to be an environment dynamically different from what clients, guests, and staff had been accustomed to for several decades. The new facility includes the following elements:

1. A decided focus on person-centered design strategies was identified as paramount at the onset. This concept includes a focus on the experience of clients, guests, staff, as well as family and community.
2. Safety was carefully addressed as a critically overt design requirement. The design distinctively addresses personal safety of all persons based on clinically specific needs of a client but also guests and staff.
3. Separation of community, based on age and risk level in a managed progression is geared specifically to rehabilitation and recovery.
4. Operational flow relationships are articulated for efficient, LEAN delivery of care and support services. This innately defined the IMD neighborhood adjacencies as opposed to a progression from high, to medium to low risk neighborhoods.
5. No nurse stations. The design fosters, with purpose, an environment that encourages staff to be continuously engaged with clients at all risk levels. This enhances interactivity as much as possible from the perspectives of care, dining, social, and education.
6. Spatial arrangement of key care delivery elements elevate personal dignity and de-escalate sensitive situations, including monitored bathing, seclusion, medication distribution, clinical consultation, and cool down times.
7. Recovery-based support is carefully placed to allow access for clients to gain critical skills, confidence, and merit within work-based programs provided in the town centre's bank, general store, and in once common staff-only spaces such as the main kitchen and materials management. Clients are rewarded with greater responsibility and freedoms as they demonstrate their ability to grow.
8. The town center also features an event center and a game room, vocational training center with classroom and ag-lab, and physical therapy/exercise gym to build a sense of community and give clients opportunities to develop skills.
9. Natural light and connection to the exterior are physiologically critical to the program. Maximum natural light penetration is realized for both clients and staff throughout. All occupied spaces have natural light.
10. Courtyards are designed with thoughtful paths, pause destinations with inspirational monuments, and recovery-based program support elements such as vegetable gardening.
11. A campus walking path surrounds the facility and connects to an adjacent park.
12. A relatively large facility, the building orientation and façade arrangement purposefully minimizes the apparent scale for a more comfortable and less intimidating facility on approach.
13. Staff respite areas, located off the care neighborhoods and within the administrative suite, allow decompression by way of connection to the exterior, dining, gymnasium, showers, and lounge.
14. Apartment-like suites in the aged client neighborhoods provide for family to be near loved ones during critical times. Clients have their own private living rooms to share with guests.

FIGURE 3



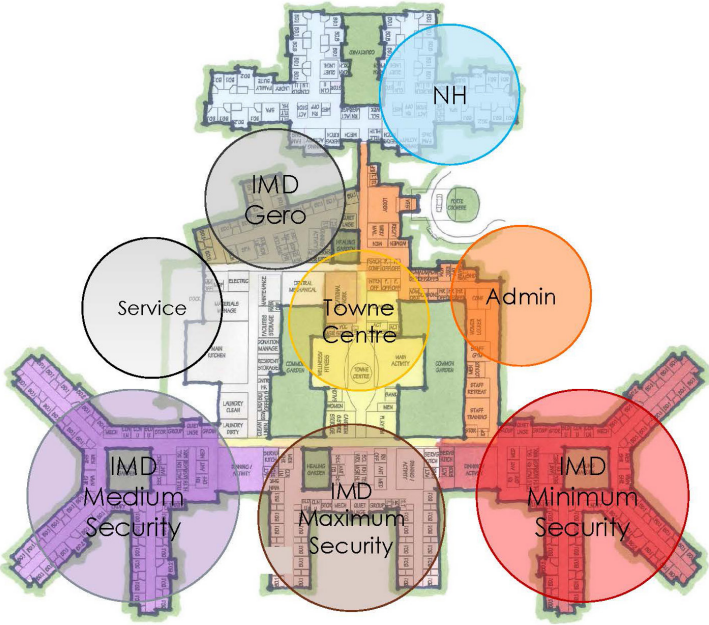
Uplifting natural light to penetrate deep into the interior of the building.  
Image credit: Wendel (formerly ADG)

Tools & methods

Information gathering comes in a variety of forms but there is no substitute for empathy. Spending time in the existing facility to observe was the start, followed by days of purposeful conversations with clients, family members, community, and every staff group. Getting to know how each person experiences their time at the facility, as well as what they hoped for in the future was imperative in predesign.

Time logged to shadow staff and monitor activities is of utmost importance to be actually immersed in the lives of those we serve. This afforded the design team an understanding of the current state of staff flow, client activities, family access, and a multitude of relationship pieces. Upon visual observation several challenges related to clinical operations became apparent specific to seclusion (both continuous and isolation), bathing, and pharmacotherapy. Supportive spaces and arrangement lacked the fortitude for privacy, dignity, and the inherent nature to provide for a stress-free environment.

FIGURE 4



Conceptual building relationships.  
Image credit: Wendel (formerly ADG)

## Focus group session results

Focus group sessions were held and guided by a predetermined set of questions, unaltered for each group. In order to solicit as unbiased a response as possible, management was not allowed in staff sessions even as an observer. Further, client and family groups were engaged without the presence of staff or security. Focus questions were developed to provoke responses specific to current state as well as future state. Results of these sessions were compiled and represented in a report that identified top recurring themes of issue and expectation. What became readily apparent was that the current facility was seriously deficient regarding quality space, staff work flow, and staff work environment. Visionary expectations of future state revealed the need for individualized care spaces with quality staff space and an emphasis on safety, connectivity, and supportive environments that enhance recovery and autonomy.

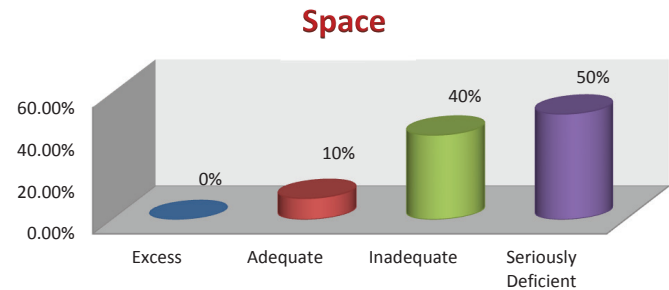
Risk level assessment and analysis were performed on both a macro- and micro-level to determine elements of personal safety. Macro-level focuses on staffing models and operational philosophies, space group arrangement, and adjacencies; addressing gender, age, and acuity level. Micro-level analysis focuses on the details of environment for ligature, impact resistance, security, and other safety challenges.

## Data analysis

Macro-level requirements were derived from several process-oriented activities and resources. Assessment and categorization of the client demographic, then acuity, were the highest-level activities in identifying macro-level criteria. Data collected first for age range and sex. On-site observations and TCHCC reports clearly indicated a significant impediment to recovery many age groups were combined, as had been the practice. The design team initially sought to define sex as a significant impediment as well. Review and discussion about specific recovery goals and therapeutic programs lead to complete integration of the sexes. The design team then needed to understand the diverse acuity of the client base. Through multiple listening sessions, we found that acuity plays an important role within the recovery-based environment but further that it is a multiplier within the more aged demographic.

To augment the macro level picture and the design team's first hand shadowing experiences were the sorting and making sense of data collected through focus group sessions. There were 10 separate groups assigned with sessions conducted over a two-day period. These groups

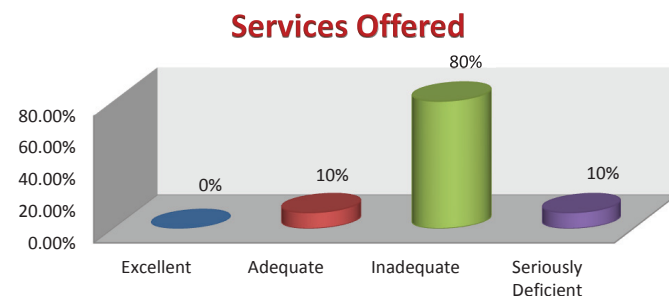
FIGURE 5



Facilities amount of space.

Image credit: Wendel (formerly ADG)

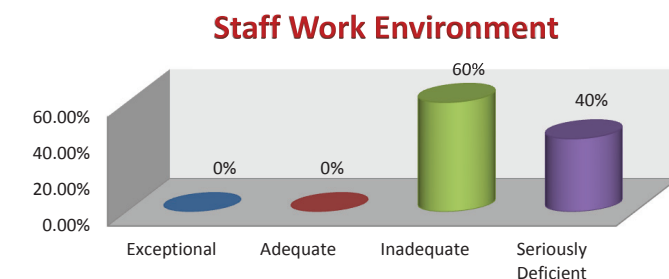
FIGURE 6



Services offered for area served.

Image credit: Wendel (formerly ADG)

FIGURE 7



Staff work environment. \*Percentages are rounded values

Image credit: Wendel (formerly ADG)

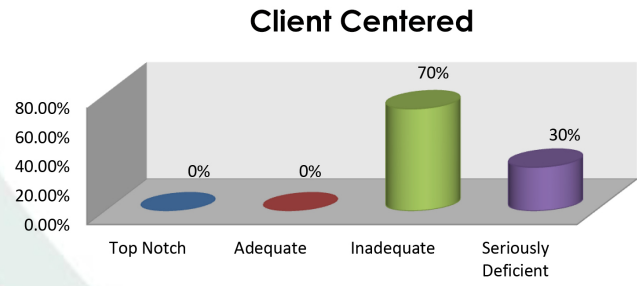


were deliberately selected from maintenance, housekeeping, laundry, activity, vocational, occupational, therapy, clients, families, office staff, CNAs, dietary, community administration, DON, unit directors, licensed nurses, and the psychology clinical care team. Group conversations were recorded and categorized for both commonality and anomaly. Results were organized and published into both narrative and graphical chart format for further discussion and determination of direction. Data indicated spatial deficiencies as previously noted but a common theme from clients and their families was how that translated to stigma, lack of privacy, and institutional environment.

Micro-level requirement analysis progressed with the advent of design phase and more detailed risk level analysis ensued. Micro-level requirements begin with the identification of appropriate personal space. TCHCC was presented with multiple client living space arrangements in a matrix-style format.

These living spaces were formally rated on a 1-5 scale in seven categories and applied to each identified neighborhood derived from the demographic and client acuity analysis. Categories included square footage, privacy, personal safety risk, staff visibility/room, staff visibility/household, client comfort, and an overall space flow. Scores numerical indicated the appropriate client living space concepts to be developed.

FIGURE 9



Client-centered care.  
Image credit: Wendel (formerly ADG)

FIGURE 8



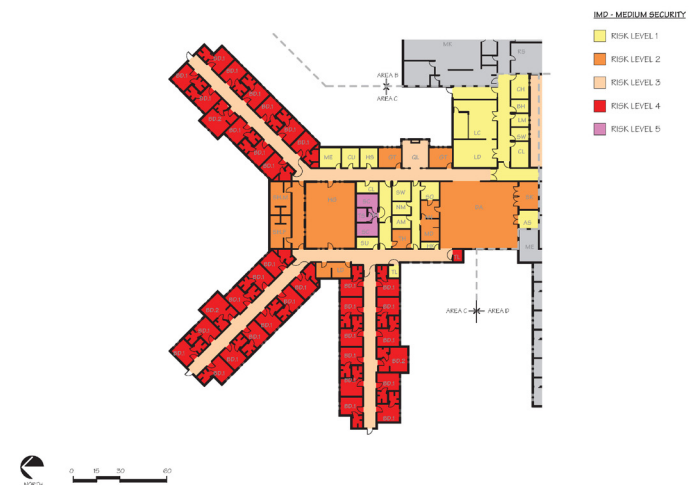
Conceptual site relationships.  
Image credit: Wendel (formerly ADG)



## Risk assessment analysis

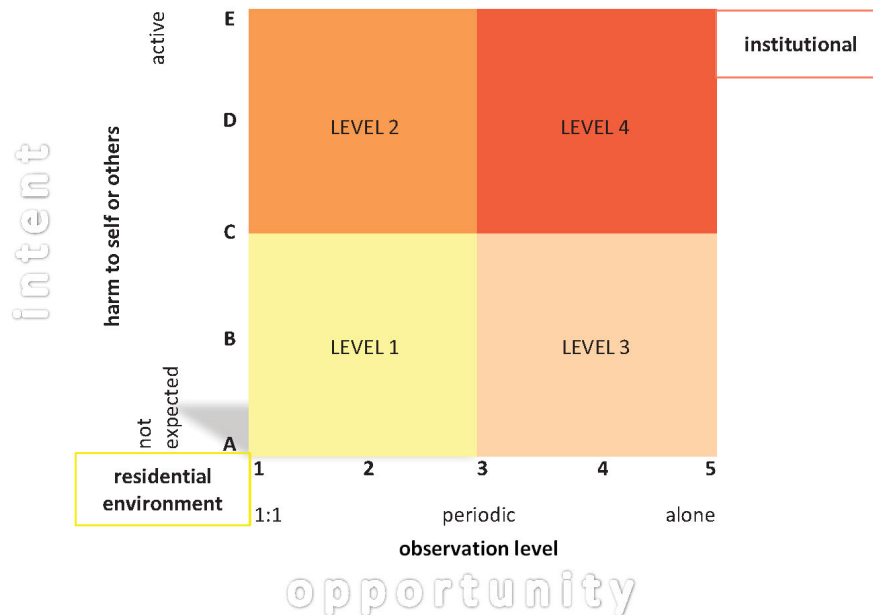
Still deeper micro-level risk analysis and assessment was performed during subsequent but early design phases. The design team charted intent over opportunity for this level of detail as it corresponds directly to space accessible to clients. Common analysis is filtered by observation levels and, ultimately, impact on spatial design details. Detailed listing of elements was compiled to address performance meeting categories from wall construction to finishes, fixtures, furniture, windows, wall plates, and so on. Color-coded graphics overlaid the floor plan that addressed each of five neighborhoods based on their population and spatial elements. Set criteria were established for each of five risk level categories represented by the chart. Categories were identified for each risk level and remained consistent for each risk level although requirements vary widely. Categories and their requirements included identifying specific details for furniture, doors, casework, walls, finishes, ceilings, windows, lighting, plumbing, power outlets, and overall ligature risk.

FIGURE 11



Schematic design risk level assessment plan - Area C - IMD Medium Security.  
Image credit: Wendel (formerly ADG)

FIGURE 10



- Level 1: Residents are not allowed or under constant supervision.
- Level 2: Residents are highly supervised and not left alone.
- Level 3: Residents may have minimal supervision.
- Level 4: Residents are alone; minimal or no supervision.
- Level 5: Special consideration; new residents, unknowns, unpredictable.

- i.e. staff and service areas.
- i.e. corridors, counseling rooms, activity rooms.
- i.e. lounges, gardens.
- i.e. resident's room, toilets, showers.
- i.e. seclusion, exams, intake.

Risk assessment analysis.

Adapted from Hunt/Sine: Patient Safety Risk Assessment Matrix, Design Guide for the Built Environment of Behavioral Health Facilities

## Details of person-centric design

1. Person-centered means that the built environment is created for each person that experiences it in a way that is, simply put, empathetic. For clients, the determined neighborhoods are autonomous in that they have all necessary functional elements at their disposal—including clinical care, dietary, laundry, activity, and the like. By definition then, the services are where the client is. Each neighborhood is common to the town centre where large group functions and daily life events happen. This is inclusive of a private outpatient clinical suite intentionally placed for near lobby access and connectivity to the town centre. Family is accommodated by way of secure and navigable access to loved ones, private visiting alternatives within and outside the building itself, and stay options. Staff have both a difficult and rewarding career with a need to perform in an efficient environment. The autonomy of each neighborhood allows LEAN clinical operations. Off-neighborhood space with quality connection to nature and the opportunity for peer interaction is imperative and provided within the administrative suite. Community members access the town centre and main courtyard for events and learning opportunities. Local businesses are supported through partnership with TCHCC and work therapy where clients develop skills, independence, and earn money within the vocational spaces of the town centre.
2. Safety is all too often considered as and limited to the idea of ligature. There are macro level design concepts to employ prior to detailed considerations of construction and accessories that we will unpack in this section. But for the purposes of getting into the notion of “clinically specific” needs as related to safety, consider entrance arrangement, hardware, access, and application to a recovery-based program. Listening sessions were held to discuss this topic and resulted in card-access control points that, on the surface, make sense for safety (over key-access) in this facility but the real benefit resulted from a clinical program that rewards individuals with a card, rights, and privileges to access certain areas at certain times of day. This included work programs in the kitchen and town centre.

FIGURE 12



More private dining area enhancing a therapeutic experience. The previous facility had one large shared dining room for all clients.

Image credit: Terry Bowe

FIGURE 13

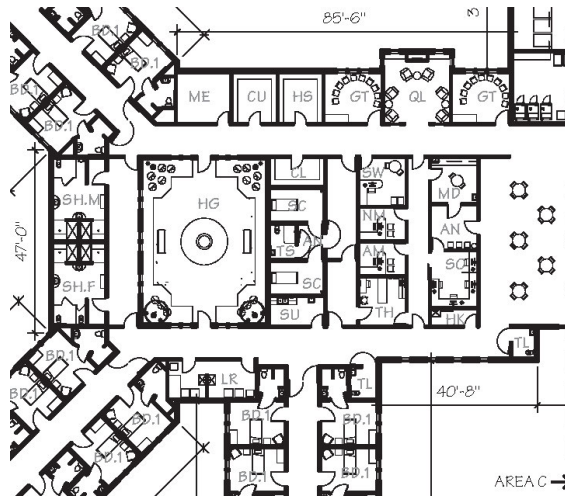


The new dining area also was less loud and chaotic without long lines, encouraging fewer peer to peer altercations.

Image credit: Terry Bowe

3. Analysis indicated the need for separation of both age and clinical acuity as previously addressed. This was identified as a critical element for recovery and thus produced the 3 IMD neighborhoods to separate clinical acuity. The gero-psych neighborhood separates the 70-year old age group from the t20-somethings residing in the three IMD neighborhoods. The fifth neighborhood is more of a traditional SNF with some need for behavioral care.
4. Recovery is essentially a linear process for clients in the IMD: high to medium to low. The design, however, places the high risk IMD central to the low and medium risk IMD neighborhoods. This directly address the potential need for quick reaction from additional adjacent staff to a crisis situation in the high risk IMD.
5. No nurse stations means “no nurse stations.” The nurse station in a typical behavioral health institute represents a control point and defines “us” and “them.” While ideas have come and gone within the design community related to nurse station size, relative scale, and even elevation, the purpose of this concept is to have staff integrated in the daily lives of clients. This goes a long way towards removing the idea of control and gives way to a sense of being in it together, building trust.
6. There are staff-specific spaces within each neighborhood for private documentation and collaboration. Arranged in a suite and centrally located, they house staff work and supervisory office space. Careful attention is given to flow and access for staff in relation to clients for specific care tasks.
7. Spatial arrangement related to an environment that elevates personal dignity and specifically de-escalates sensitive situations is addressed by isolating key programmatic elements. For example, pharmacotherapy is often distributed in a way that manifests embarrassment and tension. What works for the client and allows for a dignified process? Not all clients that come through need medication as part of their therapy. Thus, the process can be broken down into a more private setting. Each IMD neighborhood’s staff-specific space suite has a controlled entrance and ante space specifically for controlling the distribution of medications. A reduced environmental scale and privacy is akin to a small physician’s practice when compared to a large health system. Similarly, client hygiene is a monitored function in the high-risk IMD, and these are often found right off a common corridor. Planning for safety, privacy, and dignity leads to the conclusion that this is more appropriately developed as a suite

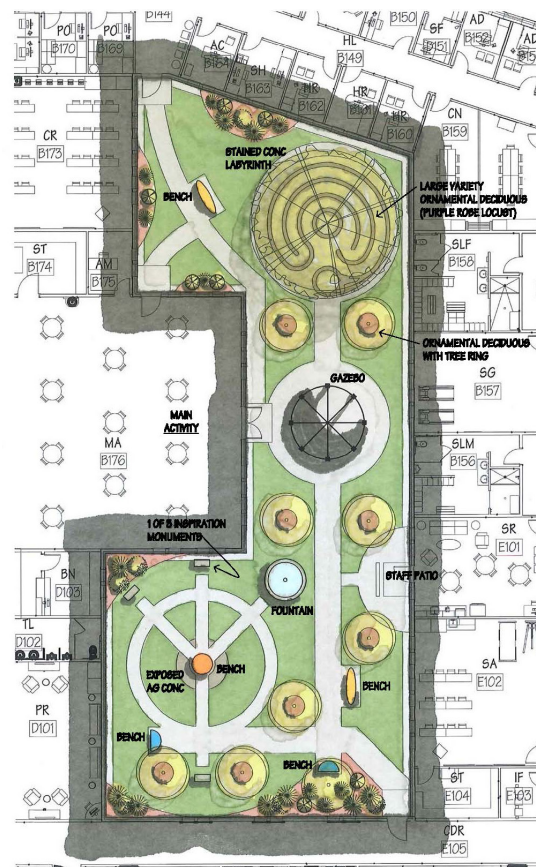
FIGURE 14



Schematic design floor plan – Area C.

Image credit: Wendel (formerly ADG)

FIGURE 15



Courtyard designed with thoughtful paths, pause destinations with inspirational monuments, and recovery-based program support elements such as vegetable gardening. Image credit: Wendel (formerly ADG)

with dual access. Isolation seclusion mimics these principals and is addressed in a similar manner.

8. The town centre is an important part of therapy and allows social activities as well as key daily living opportunities related to personal finance, education, and work opportunities. These opportunities include commonly staff-only areas with access controlled and monitored as described in paragraph one. The arrangement and adjacency of vocational, classroom, and courtyard space allows for client interaction with materials management and local business delivery of materials for assembly and packaging.
9. This facility is home—albeit temporary—for clients. Activities that include games and physical fitness are within the town centre to ensure a holistic rehabilitation program.
10. Penetration of natural light is an inherent part of biophilic design vernacular. The conceptual planning of this facility maintained interior depth dimensions to ensure each occupied space has natural light. Functionally necessary courtyards and the programmatic need for individualized neighborhoods took form to maximize building perimeter. Not exclusive to this population, although apropos, is the application of biophilic design theory and elements of what is now referred to as neuro-architecture. Connectivity to nature through visual connection as well as material was applied by way of five individual and secure courtyards in tandem with exterior fenestration to provide access to nature, light therapy, and the meaningful penetration of light.
11. Courtyards are secure and synonymous with each of the five neighborhoods. The two main courtyards differentiate themselves from the others as being educational, civic-minded, and therapy focused. A courtyard adjacent to the vocational space includes raised beds for clients to garden for both education and food that will be used in their meals. The main courtyard is communal in that it accommodates staff, clients, families, and community events. A labyrinth, long associated with calming and focus, creates a “relaxation response” (Benson and Proctor, 2011). This is the opposite of stress and anxiety, and more than 30 years of research shows that the relaxation response brings slower breathing, a slower heart rate, and lower blood pressure. It is appropriate for client, staff, and family alike.

12. The campus walking path is used by clients and staff. It connects to the main entrance where the new facility approach was chosen to allow integration of an existing park and pond. The pond now has a working fountain that enhances the biophilic pattern upon entry to the site.

The building is relatively large. Building orientation hides materials management, directs the main entrance, and faces the least visible amount of perimeter to the entrance. Design vernacular was determined primarily through interactive charrette with executive level management at TCHCC. Exterior details and elements of the façade were studied in a manner to reduce apparent scale while the overall structure height is intentionally low with more mass at the entry. Stone, residential siding, and glass are primary materials with the intent of representing indigenous architecture. In general, aesthetics of the facility have a homelike warmth and scale that feature essential contemporary prairie elements.

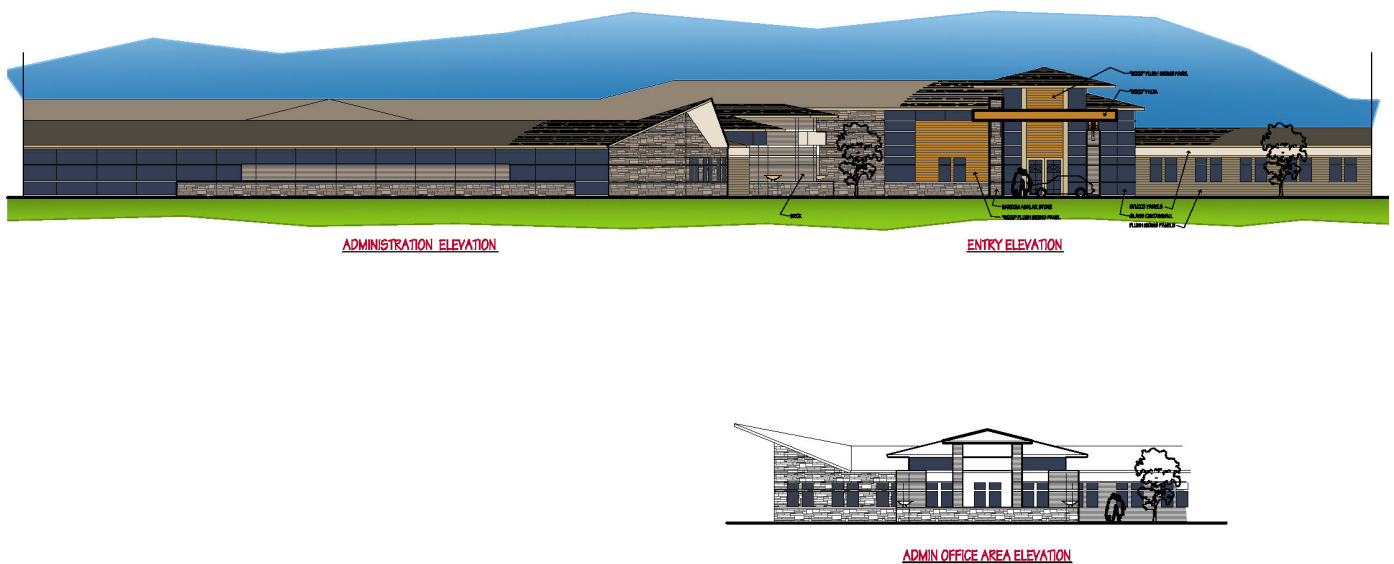


FIGURE 16



Reception area with a homelike warmth and scale that features essential contemporary prairie elements.  
Image credit: Terry Bowe

FIGURE 17



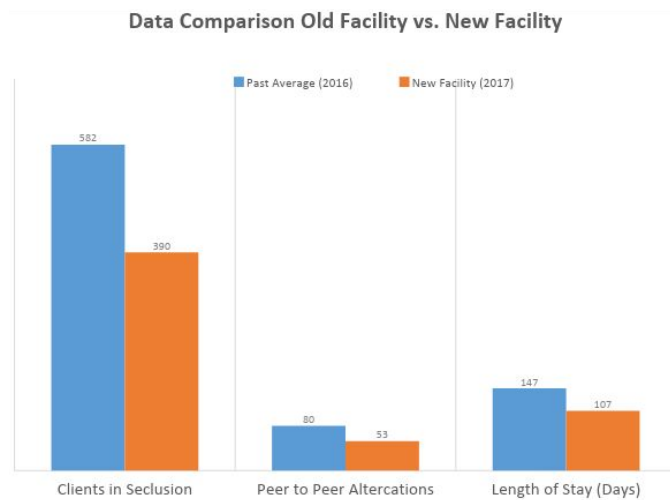
TCHC schematic design exterior elevations.  
Image credit: Wendel (formerly ADG)

## Performance test results

Because the facility is just over a year old, performance results are still being formalized. Preliminary information gathered to date includes:

1. Peer-to-peer altercation is down 34% (Peer-to-peer altercation occurs when two or more clients end up in an altercation due specifically to proximity or layout of areas.)
2. Seclusion overall is down over 33% and continued seclusion is down from 2.1 per day to 1.6 per day on average. (Seclusion occurs when a client becomes so agitated or delusional that they must be placed in a locked space and monitored for their own safety; others are monitored within their own rooms.)
3. Length of stay is also down minimally (although data tends to indicate complexities have gone up). In comparison to the national average length of stay, the stay at Trempealeau is 28% lower.

FIGURE 18



Data comparison.

Image credit: Wendel (formerly ADG)

FIGURE 19



Outside view of the completed facility's entryway.

Image credit: Terry Bowe

## Project team members

David Kimball, AIA, CCS, CDT– Planning and design  
Steve Campbell, CDT – Project manager  
Sean Bohan – Civil  
Laurie Zadra – Interior design  
Paul Mackesey – Kitchen  
Cory Stroh – Electrical  
Tim Coach – Plumbing  
Kris Dubiel – HVAC  
Kris Hahn and Kevin Renley – Construction managers

## Owner's representatives

Mary Gullicksrud: Executive administrator (retired)  
Jerry Deetz: Nursing Administrator (current executive administrator)  
Curt Johnson: Financial administrator

## References

Harris, Debra D. (2014). Return on Investment of a LEED Platinum Hospital: The Influence of Healthcare Facility Environments on Healthcare Employees and Organizational Effectiveness. *World Journal of Education, SCIEDU: Journal of Hospital Administration*. [www.sciedu.ca/journal/index.php/jha/article/view/5161](http://www.sciedu.ca/journal/index.php/jha/article/view/5161).

Augustin, Sally. (2014). 14 Patterns of Biophilic Design. *Terrapin Home – Terrapin Bright Green, Terrapin Bright Green*. [www.terrapinbrightgreen.com/reports/14-patterns/#what-is-good-biophilic-design](http://www.terrapinbrightgreen.com/reports/14-patterns/#what-is-good-biophilic-design).

Benson, Herbert, and Proctor, William. (2011). *Relaxation Revolution: The Science and Genetics of Mind Body Healing*. Scribner.

# Academy of Architecture for Health

---

an **AIA** Knowledge Community



**The American  
Institute  
of Architects**

1735 New York Avenue, NW  
Washington, DC 20006

[aia.org](http://aia.org)

© 2018 American Institute of Architects