

A.E.R.O. Therapeutic Center

A Research Based Approach to Neurodiverse Education

February 28, 2024

Agenda:

- Introduce the A.E.R.O. Therapeutic Center project
- Review the research strategies conducted by the Design Team
- Understand how integrating the research strategies helped accommodate a neurodiverse student population
- Discussion about lessons learned and how the built environment can support mentally safe spaces

DIVERSITY IN LEARNING

INFORMATION SCIENCE AND TECHNOLOGY RESOURCE CENTER (IST)



Linguistic



Visual



Logical



Interpersonal



Musical



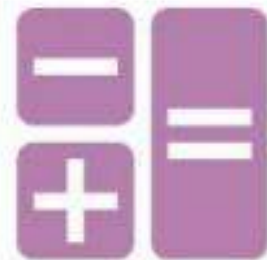
Body Kinesthetic



Intrapersonal



Naturalistic



Existential

Listening to multiple viewpoints and customizing environments for diverse learning styles leads to unique solutions. When learning spaces include diversity such as variety of scale, shape, color, and texture, students can gravitate toward their most conducive learning environment. When the place matches the strategy, optimal learning results happen. Using Howard Gardner's Multiple Intelligences, we can customize environments that can support each learning strategy.





examples that have the potential to engage neural mechanisms to create architectural embodiment will be considered in ways to demonstrate how buildings can teach kindness. Essential to this social emotional learning is that we “feel” or project ourselves emotionally into the actions of other people and empathize with the forms of our built environment.

As architects, we observe that buildings can teach and be part of the curriculum inspiring learning across generations, that the environment can influence the way we feel, think, and learn. **So how do buildings teach kindness? What does kindness look like in architectural space?**

The built environment embodies the connection between space, time, and pedagogy. We will present a consideration of five attributes of an architecture that teaches:



EXPOSURE

Relating to the visibility of architectural elements within a building and in nature, the corporeality of the body's time and space is engaged when in the midst of learning.



DIVERSITY

Across different learning styles and learning space typologies, architecture is an assemblage of mind, brain, and body.



ADAPTABILITY

Design must allow for flexibility, re-imagining of space, a flow of ideas, technologies, and ever-changing needs.



INTERACTIVE

Design relates to how we alter our environments to create the mysterious and curious, to extend the boundaries of space into the interior and exterior, the public and private, the active and focused worlds of learning.



IMMERSION

In space is intentional through the qualities and sequence at which spaces are revealed; immersion allows the inhabitant to fully engage and embody social emotional learning.

Neuroscience data shows that social emotional learning and relationship building is the core to healthy and happy learning for all generations. Research from the neurosciences has greatly improved our understanding of how architecture shapes behavior, how multisensory experiences create meaning essential for learning, and how architectural space and form express emotions that can enhance or impede social interaction. Educator and author Patricia Wolfe discusses how the brain encodes and stores information and why meaning is essential for social emotional learning. Because a building is multi-sensory in its perception, involving all



of our senses over a temporal span through our movements within and around three-dimensional space, scholar and architect Harry Mallgrave describes architecture as an embodied experience in which we perceive, feel and sense. This experience engages neural mechanisms creating the embodied simulation of materials, forms, spatial relationships, sounds, smells, tactile qualities, scales, textures, patterns, and atmosphere that impact social emotional learning.

Linking neuroscience and architecture, we will identify the precepts of social emotional learning in and explore how early learners and elderly interactions benefit both



1 Laraway Elementary School 2 Hamilton Elementary School 3 Hamilton Elementary School 4 Laraway Elementary School 5 CCSD59 Early Learning Center

What is the
A.E.R.O. Therapeutic Center ?



A.E.R.O.
Special Education Cooperative

A.E.R.O. Special Education Cooperative District 806

- 11 Illinois public school district members
- Serving seven southwest Chicago suburban communities
- Administrators & Staff: 375
- Student population: 400
- Located in 2 permanent buildings and 15 'outlying' locations



A.E.R.O. Students

- **Early Childhood**

Delays in physical, intellectual, communications, and/or adaptive development (Ages 3-5)

- **F.A.L.P. Program**

Functional Academic Learning Program

Mild-moderate Autism, cognitive, physical, behavioral, and/or health impairments (K-12)

- **S.T.A.R. Program**

Students and Teachers Achieving Results

Autism, intellectual and other related impairments (K-12)



A.E.R.O.

Special Education Cooperative

A.E.R.O. Students

- **Multi-Needs**

Severe and profound intellectual disabilities, physical & health impairments

- **Transitions**

Pre-Vocational and Vocational training (Ages 14-21)

- **Connect**

Transition goals for employment, education, training, and independent living

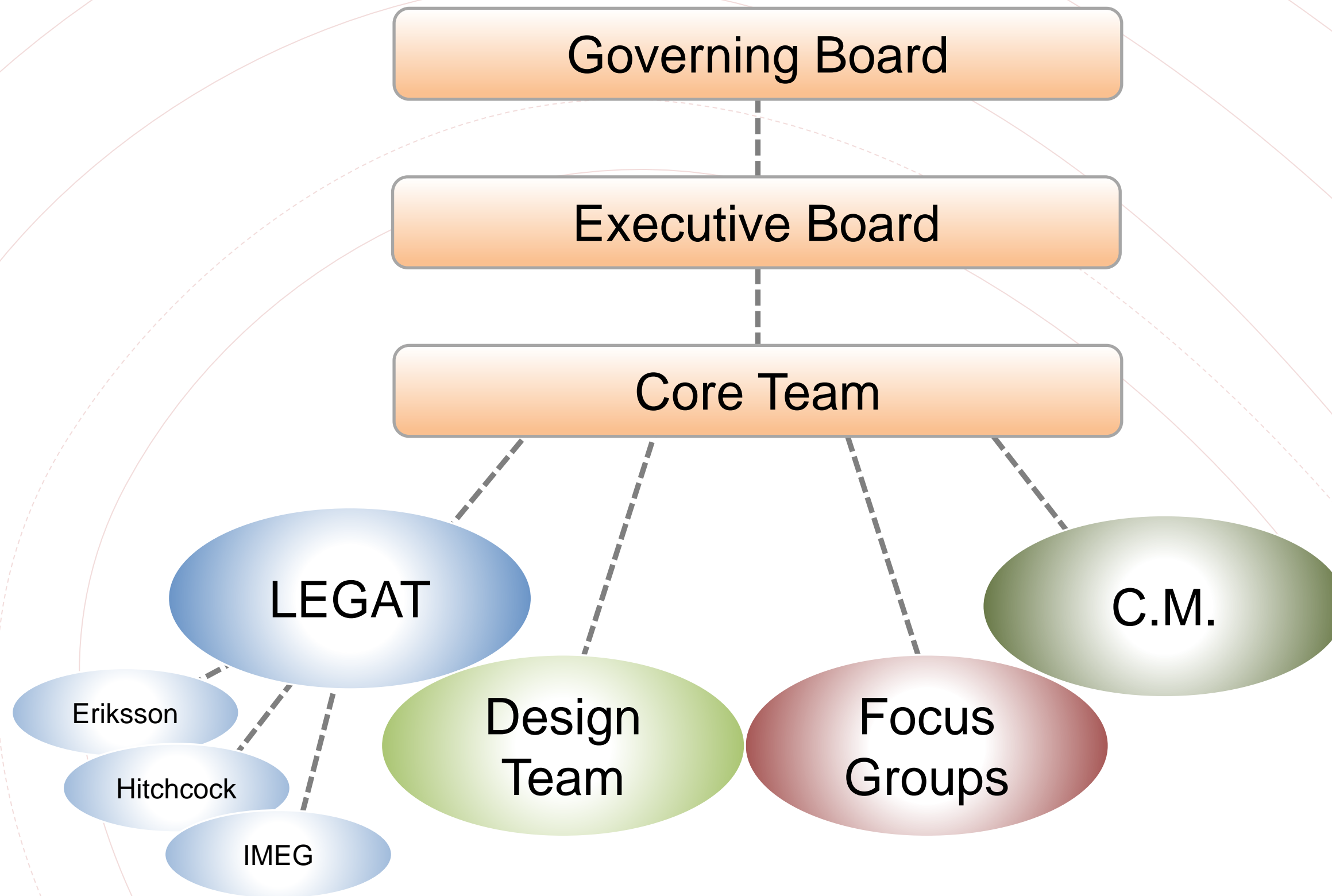
- **P.R.I.D.E. Alternative School**

Personal Responsibility through Independence and Developmental Education
Behavioral and Emotional disorders (K-12)



A.E.R.O.
Special Education Cooperative

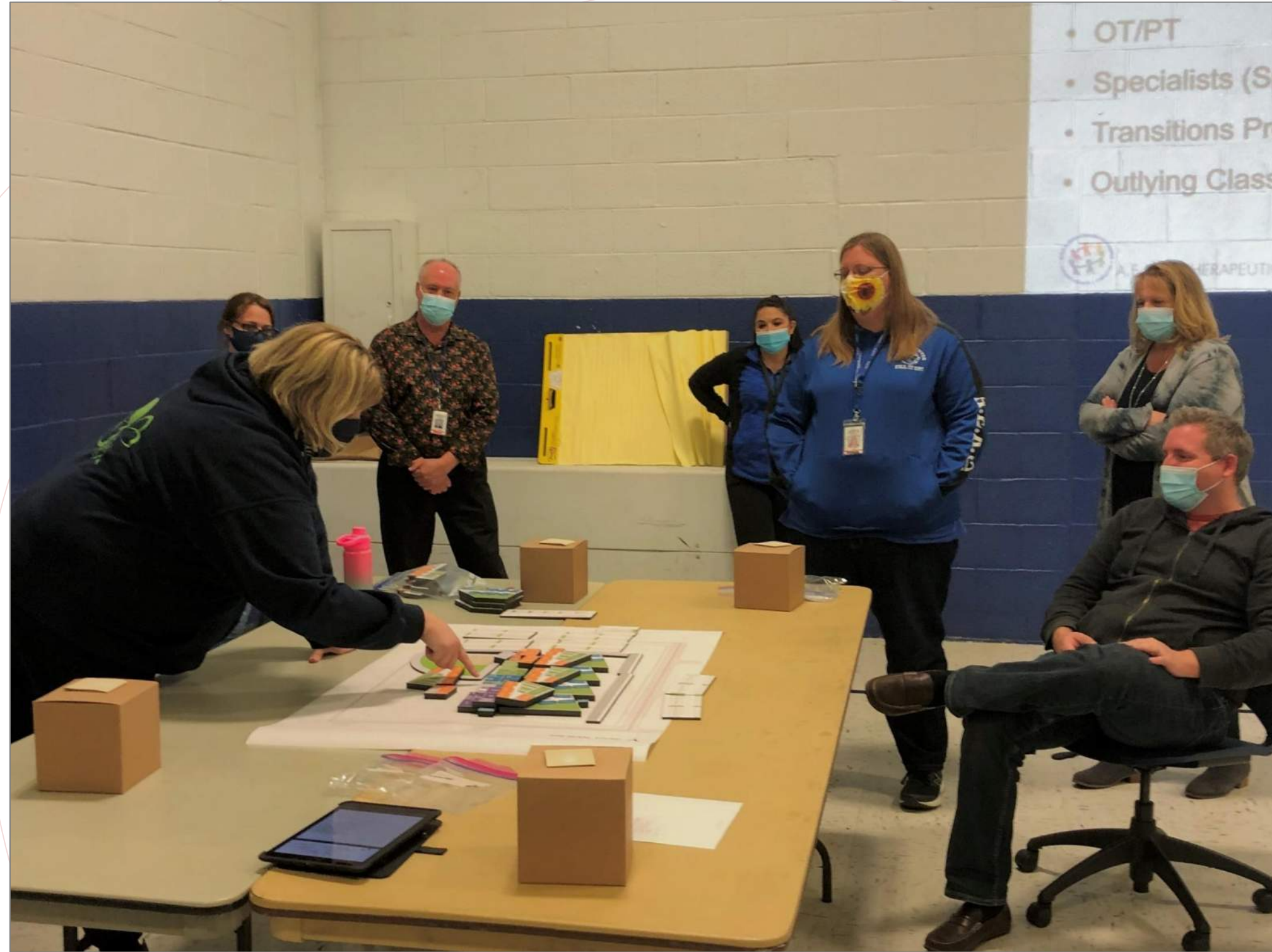
A.E.R.O. Therapeutic Center Project Structure



PROJECT GOALS...

- Therapeutic center
- Build for students & student ownership
- Students, staff, and parents
- Flexible spaces
- Social and emotional support
- Sensory needs
- Transitions and crisis management
- Space for movement breaks
- Integrated indoor/outdoor environments
- Adaptive playground
- Enhanced opportunities for students
- Three buildings in one
- Accessibility for everyone
- Opportunities for everyone
- Aesthetically pleasing
- Community pride
- Desirable facility – reputation
- Functional spaces to meet AERO needs
- Future maintenance needs/costs
- Accommodate growth

A.E.R.O. Therapeutic Center Conceptual Planning



A.E.R.O. Therapeutic Center Conceptual Planning

TREE

TREE

ACORN

FLOWER

BRANCH

SEED

SPROUT

BLOOM



A.E.R.O. Therapeutic Center Conceptual Planning



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Project Facts

- Site Area: 12.75 acres
- Building Area: 149,856 square feet
- Population: 550 students, 400 staff
- Project Budget: \$54.5 million (\$363.68 per sf)
- Occupancy: September 1, 2023



Project Facts

- 55 Classrooms
- Art & Music Therapy Classrooms
- Quiet Rooms & Sensory Rooms
- Gymnasium & Exercise Room
- OT/PT Rooms & Movement Areas
- Intervention Room
- Multi-Purpose Rooms
- Commercial & Home Life Skills Rooms
- Staff Offices & Break Rooms
- 444 Parking Spaces



A.E.R.O.
Special Education Cooperative



Linder Avenue

Long Avenue

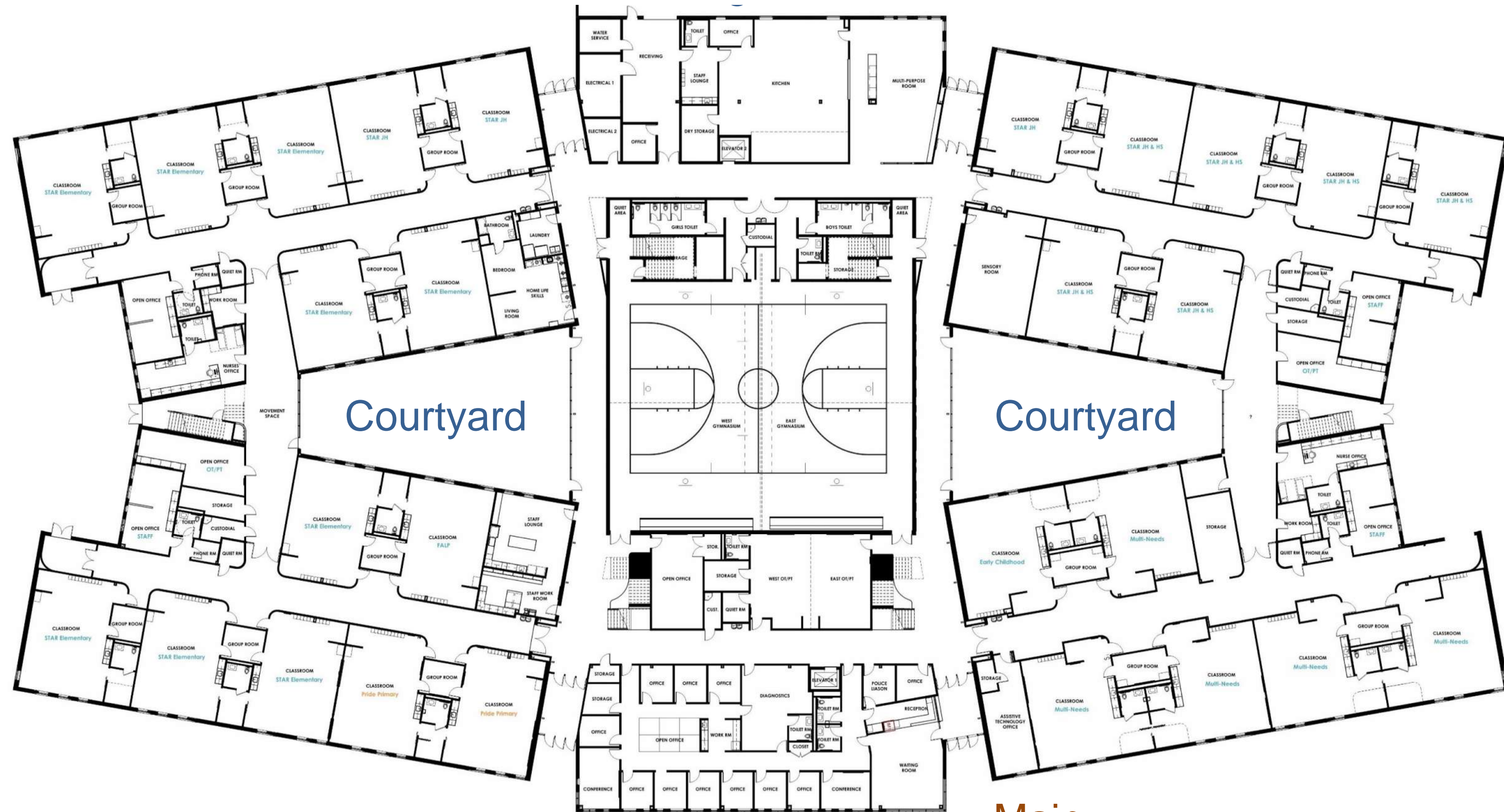
Lorel Avenue

76th Street

76th Place

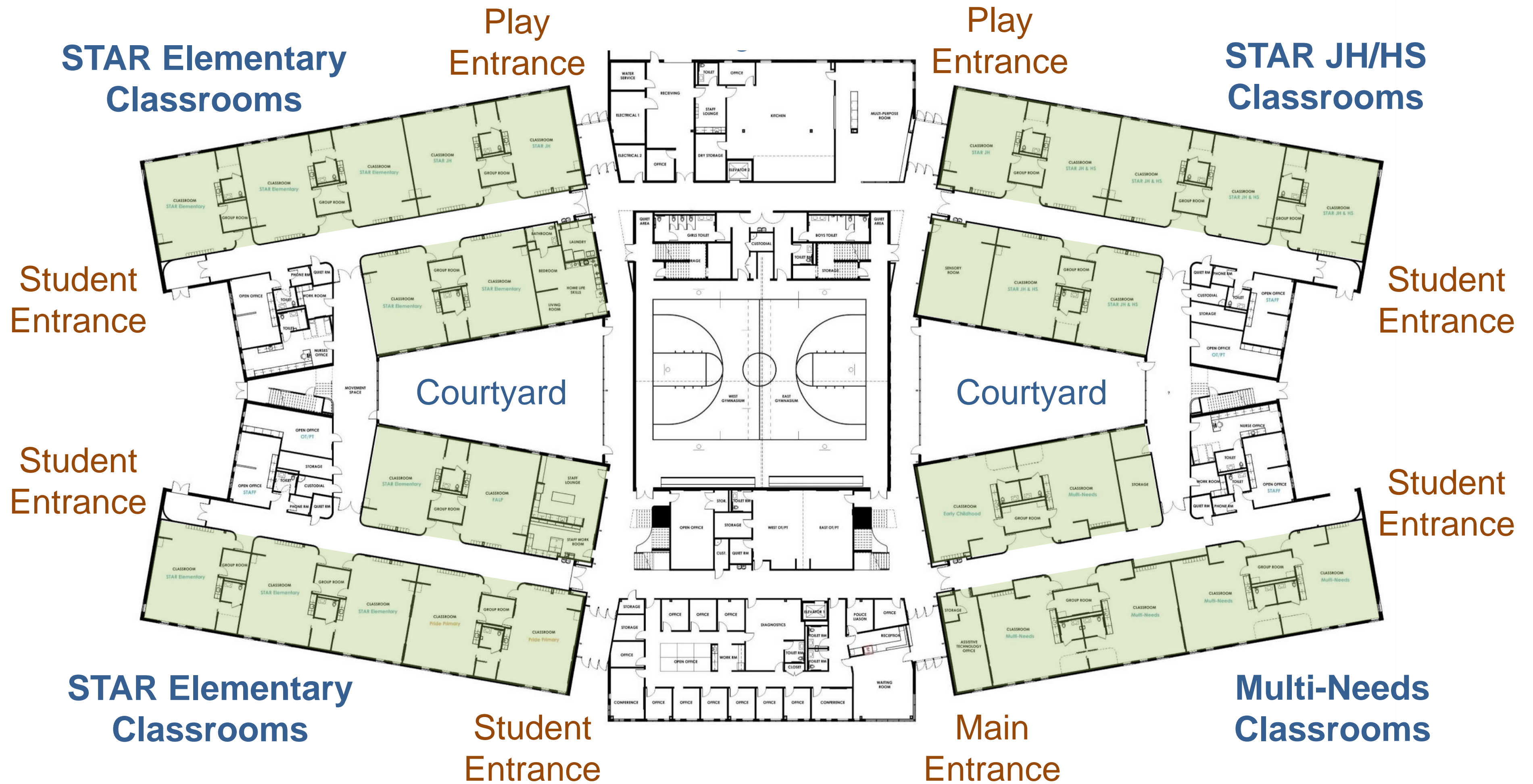
77th Street

A.E.R.O. Therapeutic Center Design Solution – First Floor Plan

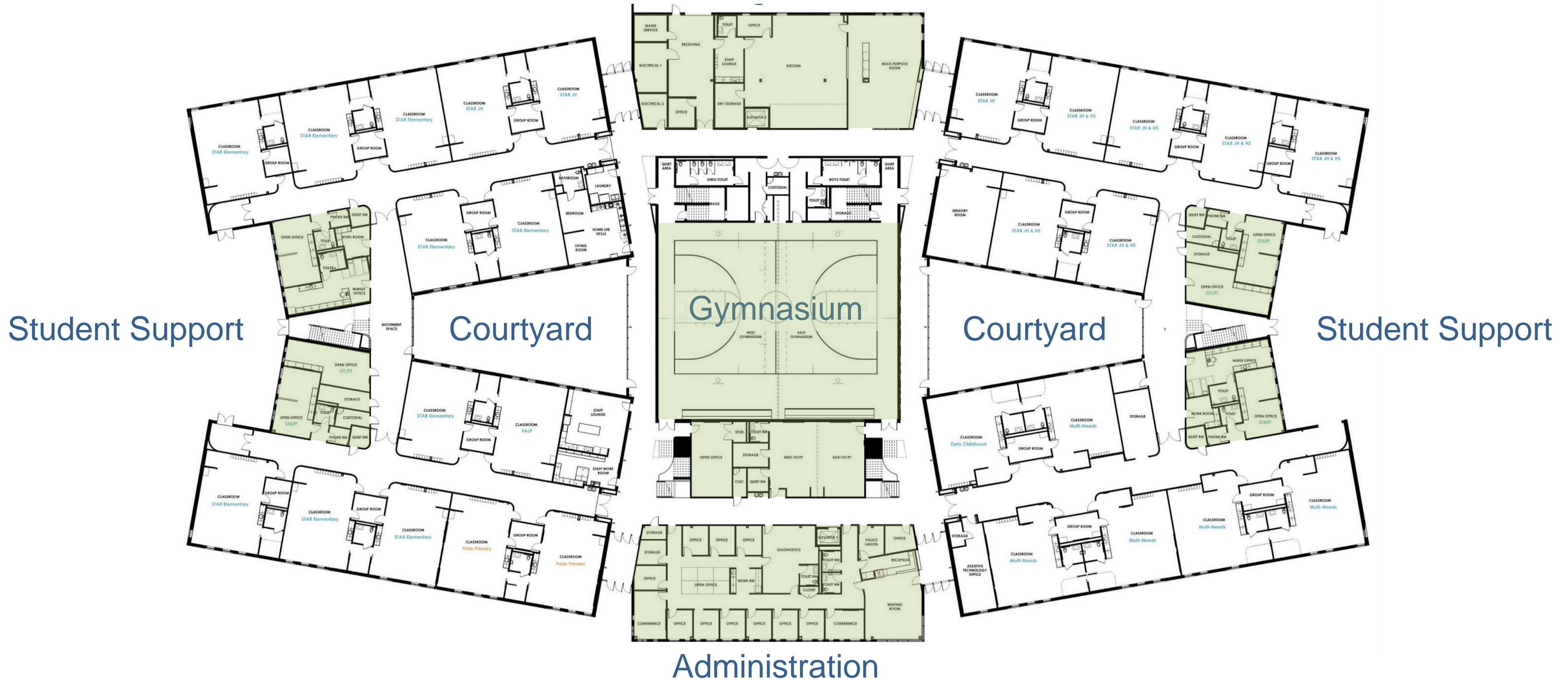


Main Entrance

A.E.R.O. Therapeutic Center Design Solution – First Floor Plan



A.E.R.O. Therapeutic Center Design Solution – First Floor Plan



A.E.R.O. Therapeutic Center Design Solution – Second Floor Plan

**PRIDE Program
Classrooms**

Building Services

**Connect & STAR HS
Classrooms**

Student Support

Exercise Room

Student Support

**PRIDE Program
Classrooms**

Administration

**FALP
Classrooms**

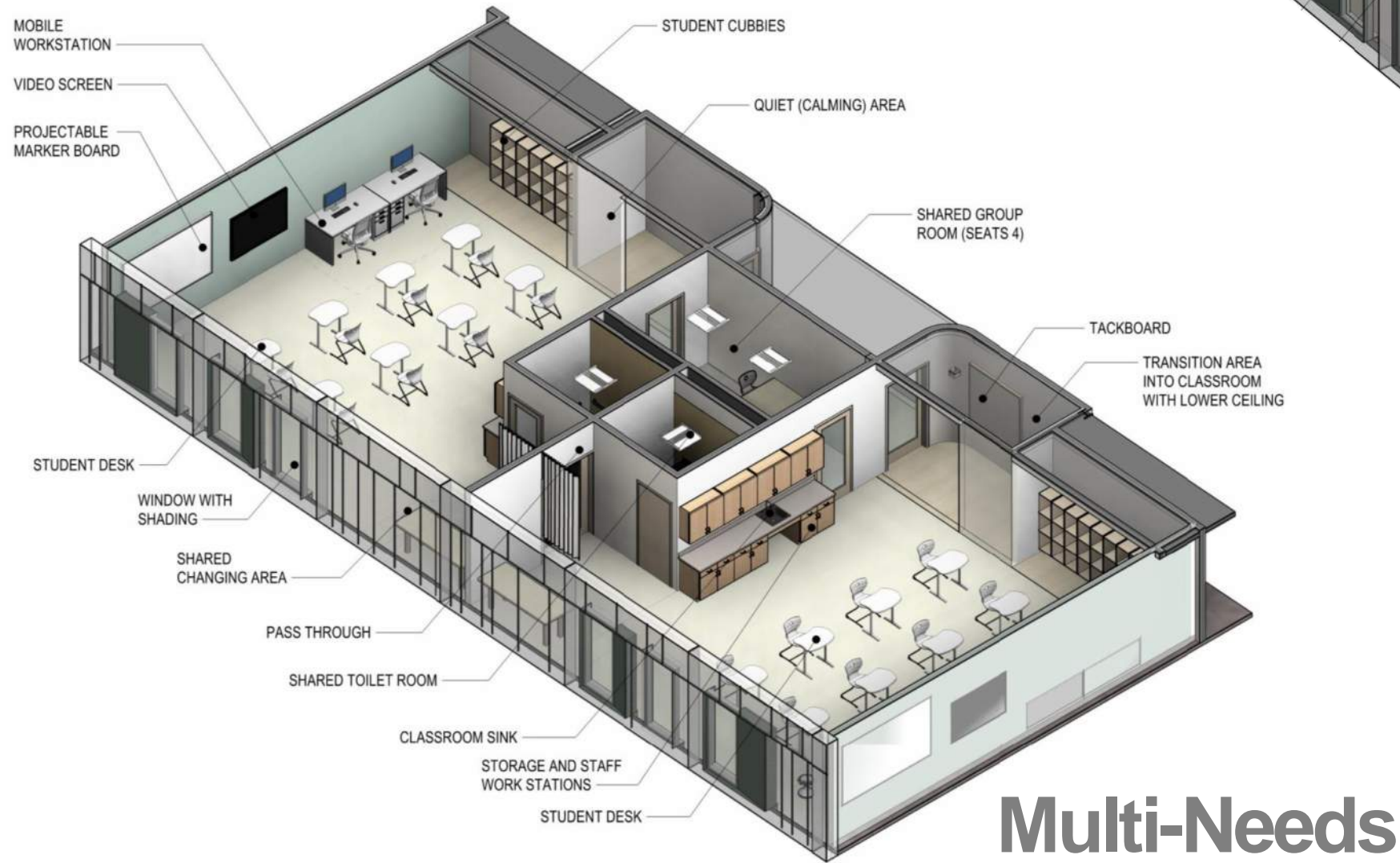
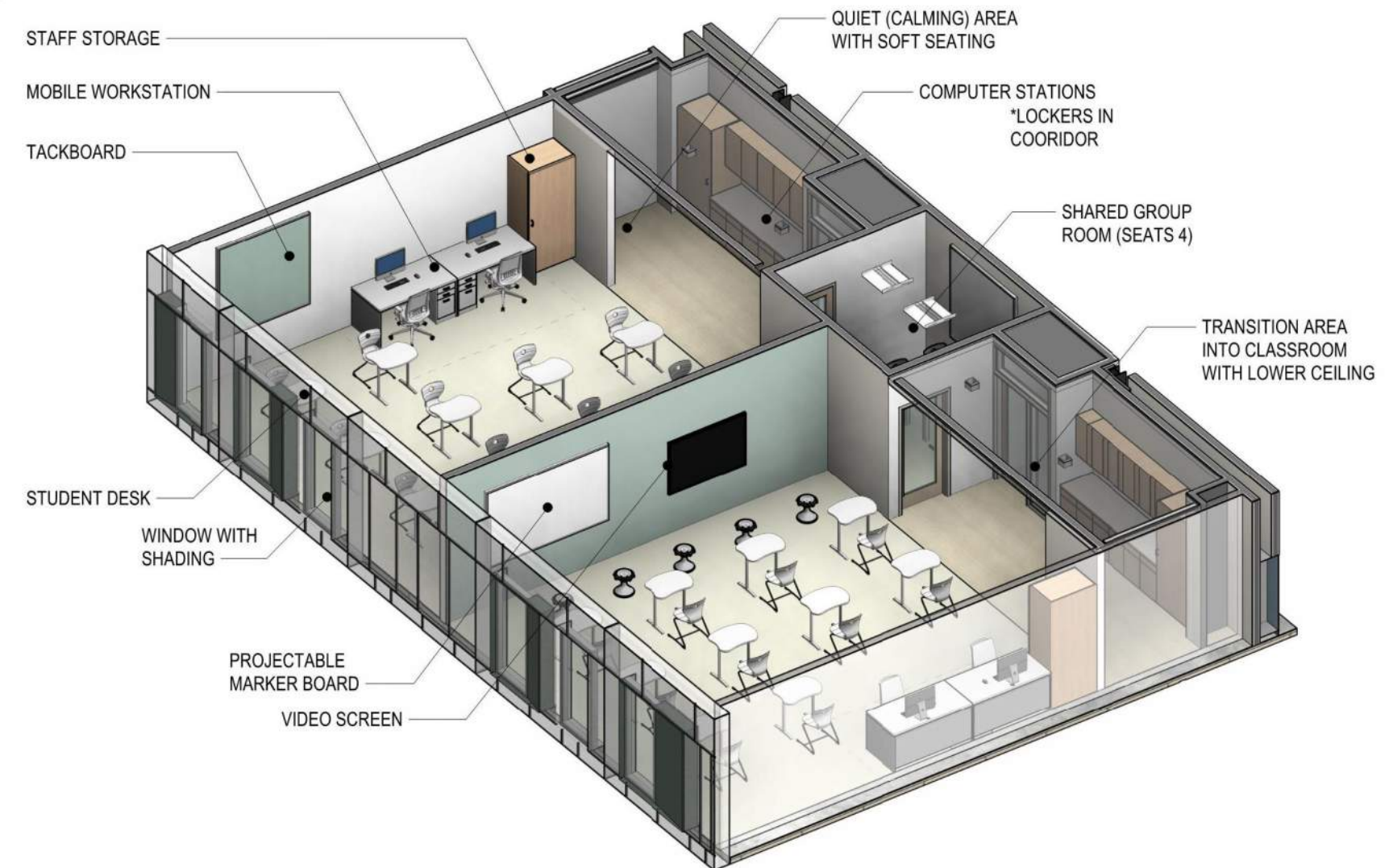


A.E.R.O. Therapeutic Center Design Solution – Classroom Types

First Floor



Second Floor



Multi-Needs

Interior Design

Water WING



Color



Tactile



Visual



Theme

Air WING



Color



Tactile



Visual



Theme

Earth WING



Color



Tactile



Visual



Theme

Sun WING



Color



Tactile



Visual



Theme

View from Southeast
Looking at Main Entrance

Final Design





Final Design

View from Southwest
Looking at West Student Entrance





Research Strategies

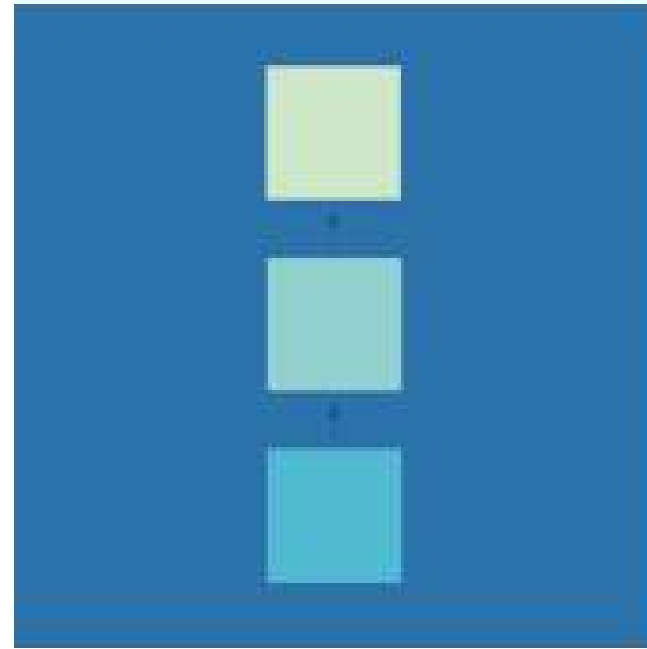


A.E.R.O.
Special Education Cooperative

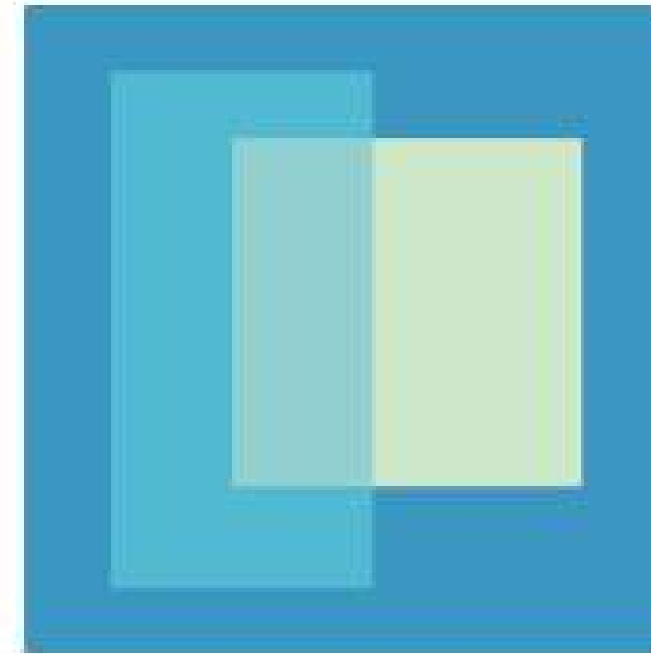
Research: Fundamental Key Factors



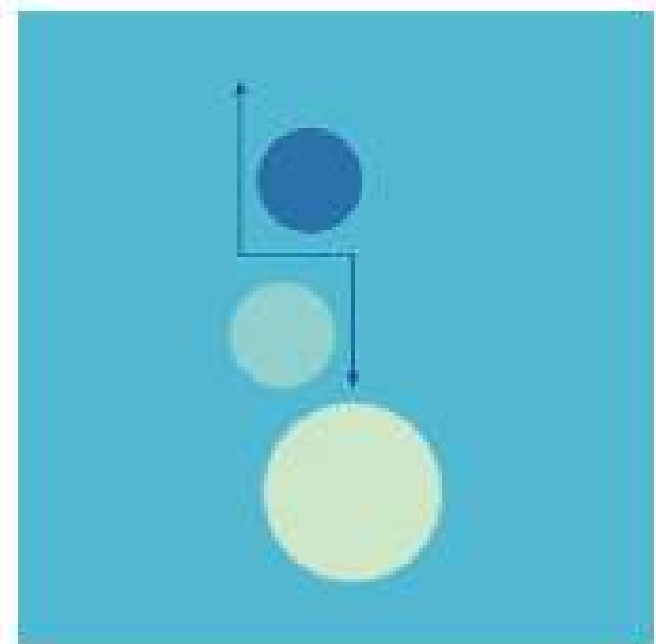
**SENSORY
LOADING**



TRANSITIONS



OVERLAPPING



**GEOGRAPHIC
STRESSORS**



BIOPHILIA



CARE

Research: Fundamental Key Factors **Nine Approaches**



NATURAL LIGHTING



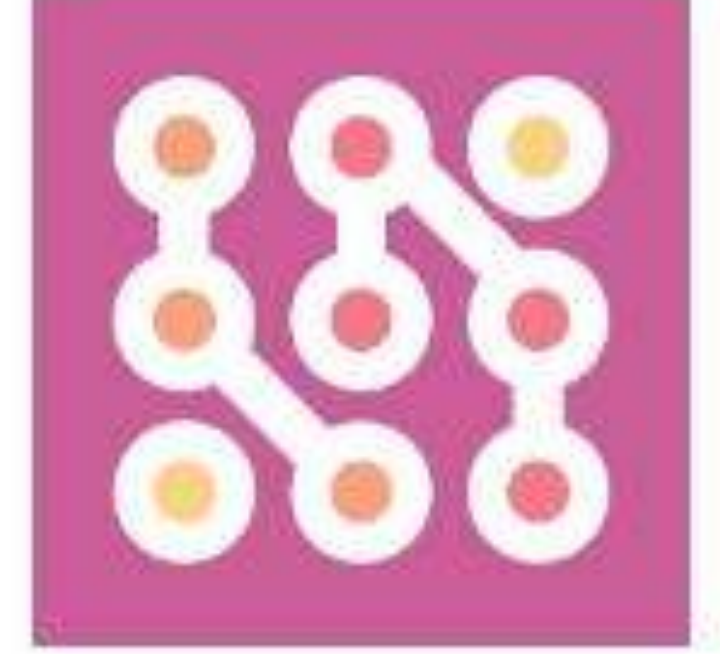
ARTIFICIAL LIGHTING



ACOUSTICS



HEALTH INTELLIGENCE & CONSULTATION



ASSISTIVE TECHNOLOGIES & ADAPTIVE EDUCATION PROCESS



VISUAL CLUTTER



MOVEMENT



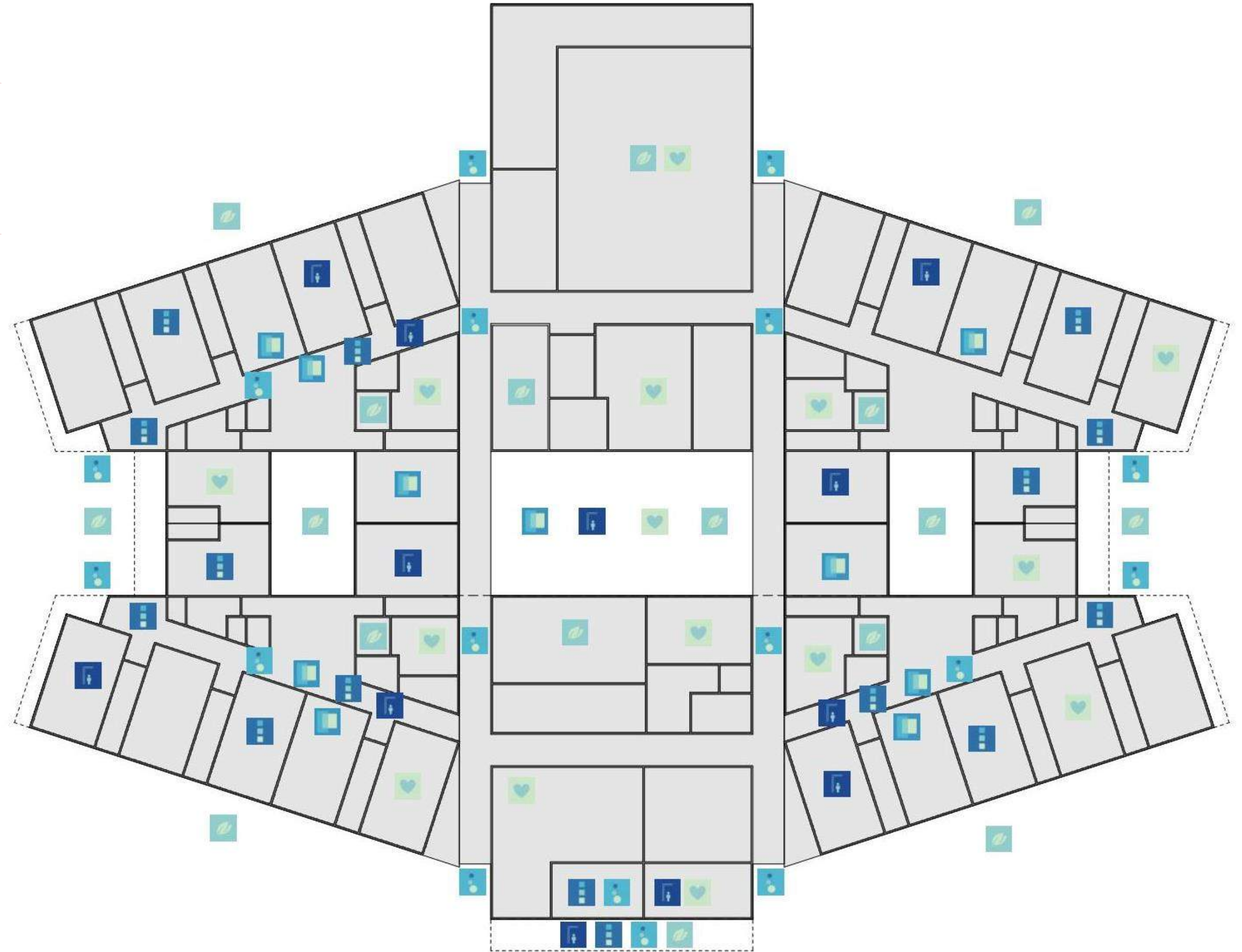
NUTRITION



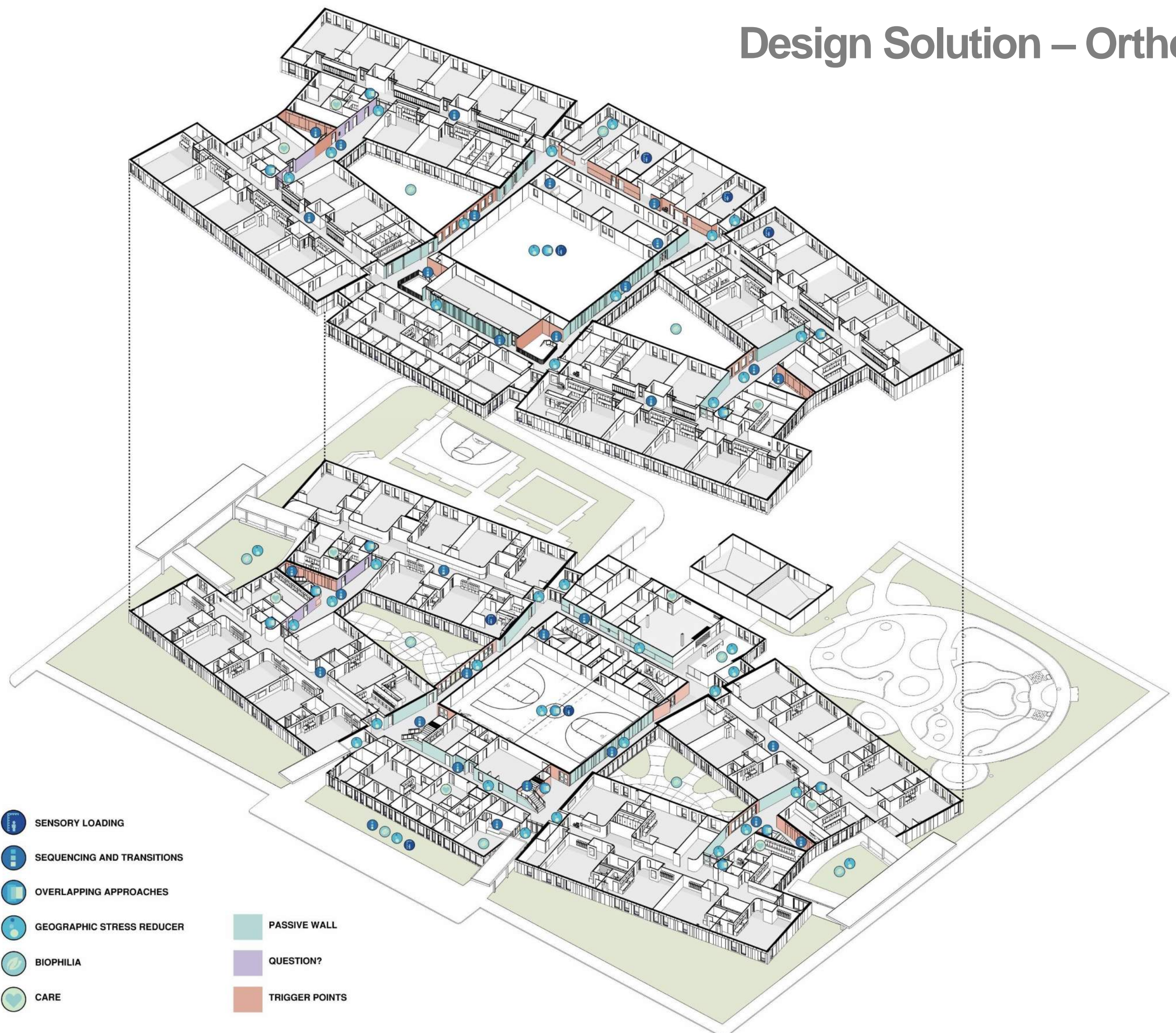
TEACHER & STAFF WELLNESS










A.E.R.O. Therapeutic Center Conceptual Planning

-  SENSORY LOADING
-  SEQUENCING + TRANSITIONS
-  OVERLAPPING APPROACHES
-  GEOGRAPHIC STRESS REDUCERS
-  BIOPHILIA
-  CARE



Design Solution – Orthographic View



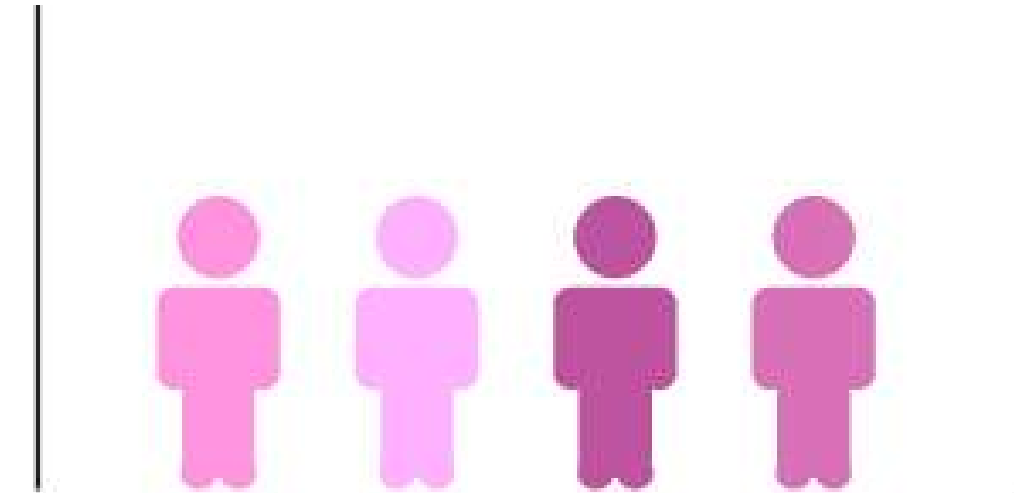
-  SENSORY LOADING
-  SEQUENCING AND TRANSITIONS
-  OVERLAPPING APPROACHES
-  GEOGRAPHIC STRESS REDUCER
-  BIOPHILIA
-  CARE
-  PASSIVE WALL
-  QUESTION?
-  TRIGGER POINTS



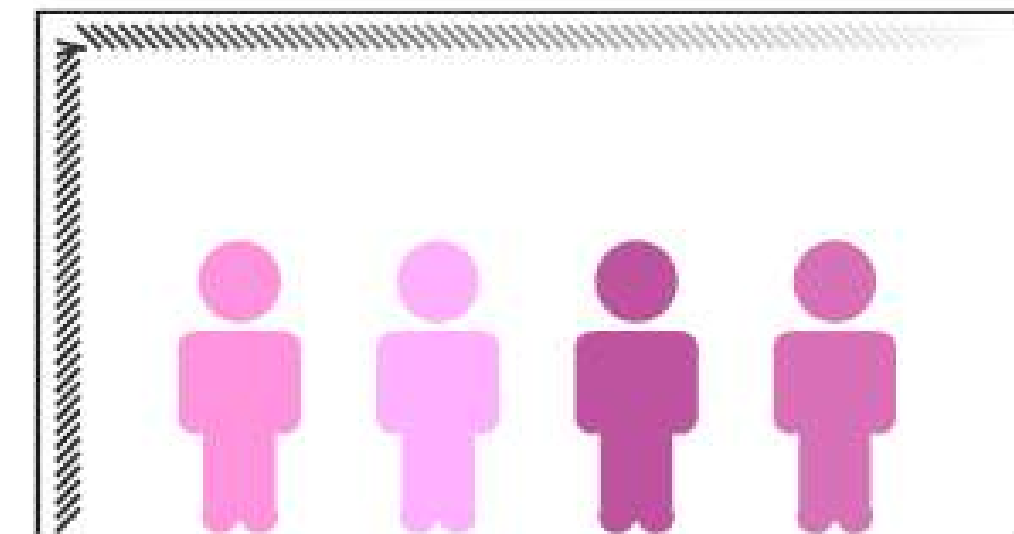
Sensory Loading

Concept:

- **Neuro-typical approach:** Immerse the neuro-atypical students in normative environments in order to encourage adaptation and simulate real-world environments. This is the approach of the original AERO facility.
- **Sensory design approach:** favorably designing the sensory environment can be conducive to positive and constructive behavior. Uses a “graduated” approach of sensory spaces from the highly adapted to the typical to allow for gradual skill development. This is the approach of the new AERO Therapeutic Center.

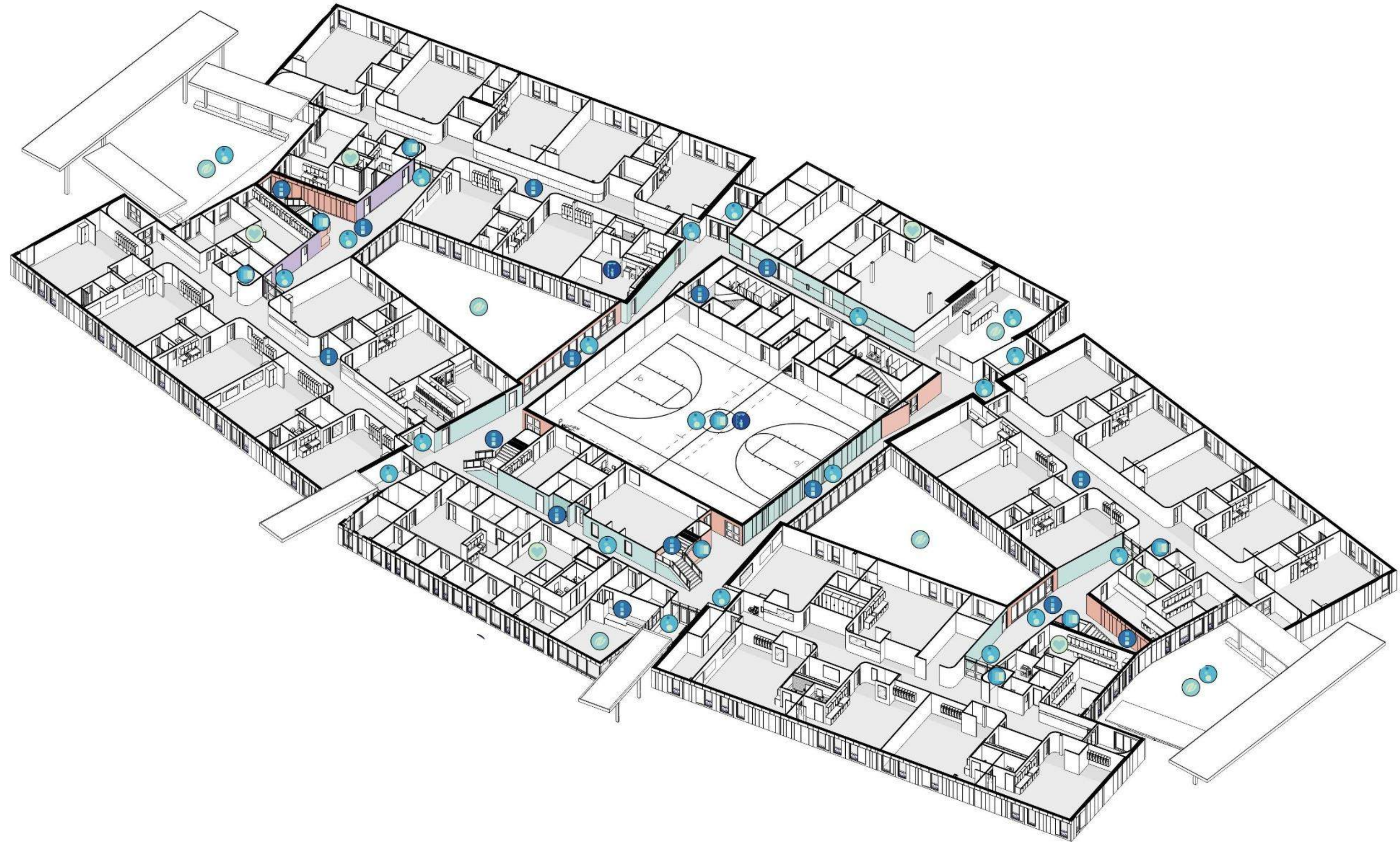


NEURO-TYPICAL APPROACH
All environments are neuro-typical

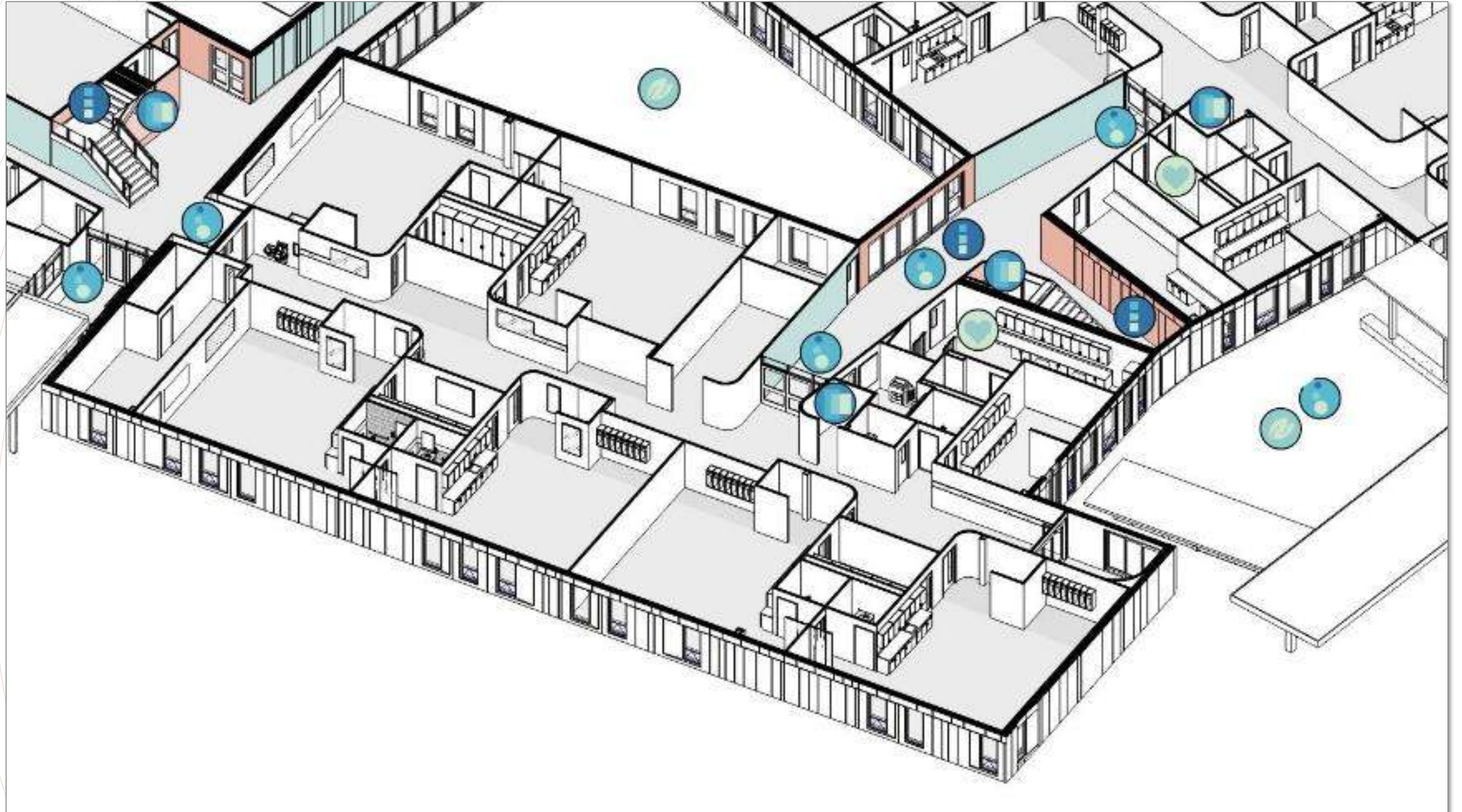


SENSORY DESIGN APPROACH
Environments are on a graduated scale from highly adapted to neuro-typical

Research: Fundamental Key Factors Sensory Loading



Research: Fundamental Key Factors Sensory Loading



Corridor View
Looking at Typical Classroom Entrance

Final Design





BUCKET

LOOK AT OUR

WORK

Handwritten notes and drawings on the wall.











W166
QUIET
ROOM



W166
QUIET
ROOM







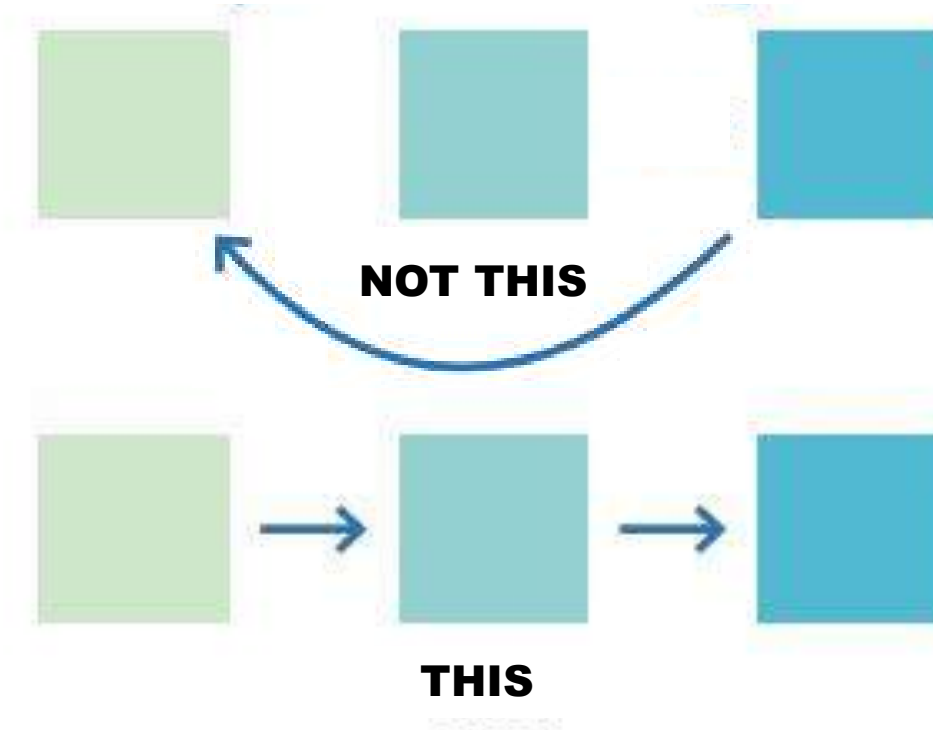


Sequencing and Transitions

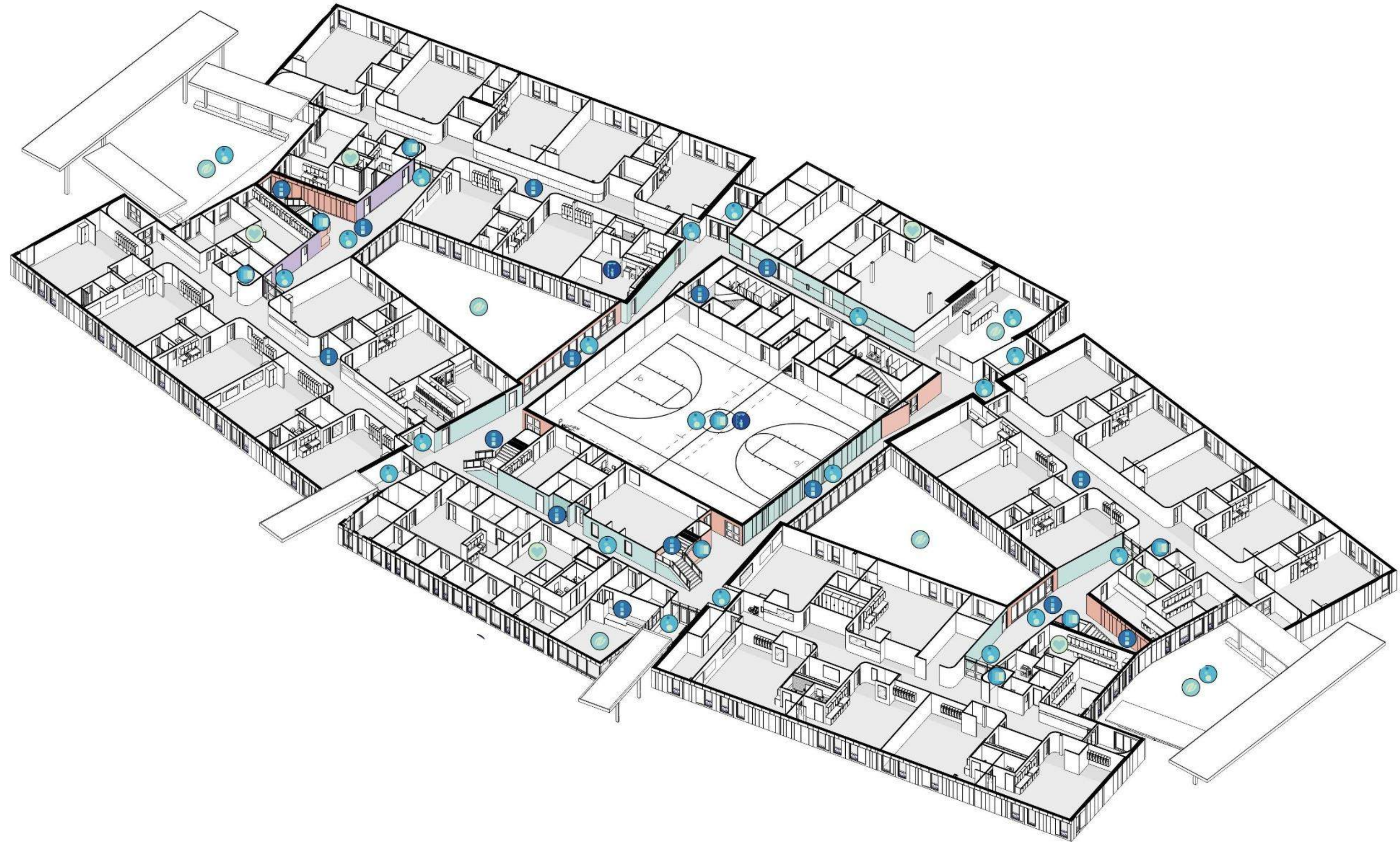
Concept:

To align the daily schedules of students and their affinity for routine with the spatial layout of the building. This can be employed to great effect when combined with effective way-finding and sensory zoning.

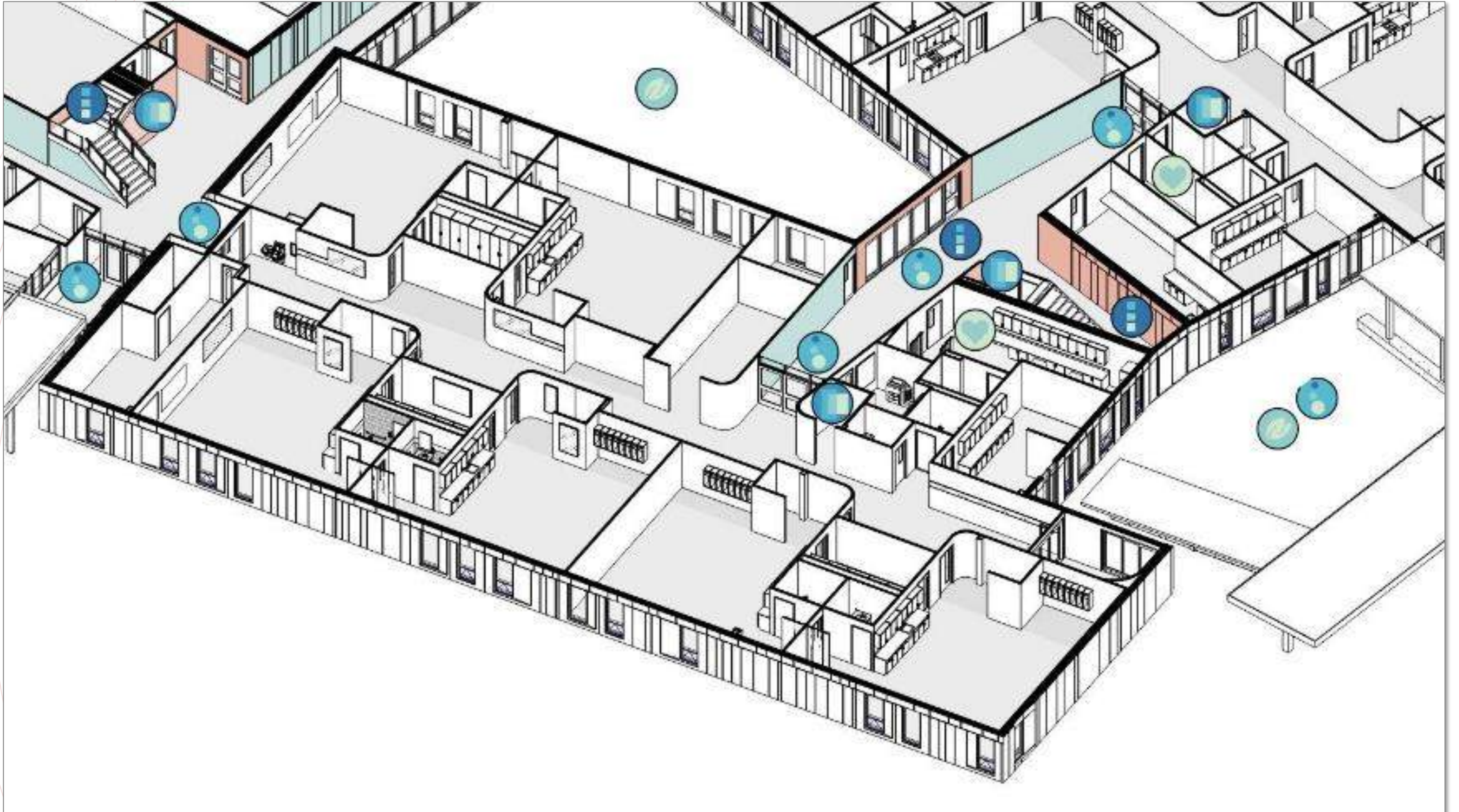
- Group functions for each age group in zones through which children move progressively throughout the day.
- Organize functions in a one-way circulation pattern, such that back-tracking or complex navigation is not required.
- Design these transitions such that students are not exposed to unnecessary distraction or sensory-rich environments.
- Circulation patterns should be logical and clear. Students should be able to "map" their schedules without much difficulty. Returning to central circulation "nodes" can be helpful.
- The architecture should recognize transition points, preferably in similar consistent ways.



Research: Fundamental Key Factors Sequencing and Transitions



Research: Fundamental Key Factors Sequencing and Transitions



Main Entrance View

Looking at Multi-Needs Wing

Final Design



Northeast Entrance View
Looking at Corridor East of Gymnasium

Final Design







EXIT

AUTOMATIC
CAUTION
DOOR

101
WAITING
AREA

Outgoing Mail

A.E.R.O.
Special Education Cooperative

Visitor Gazette





Overlapping Approaches

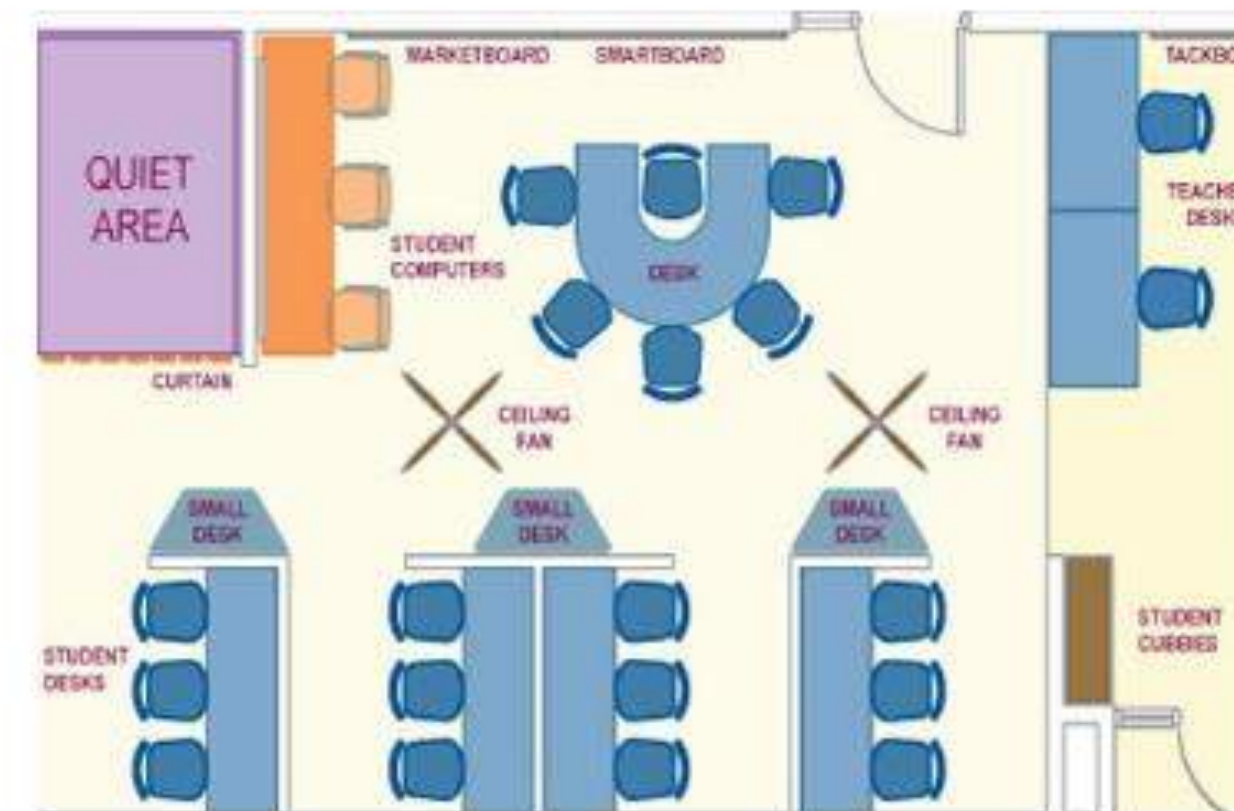
Concept:

The following strategies benefit multiple user types.

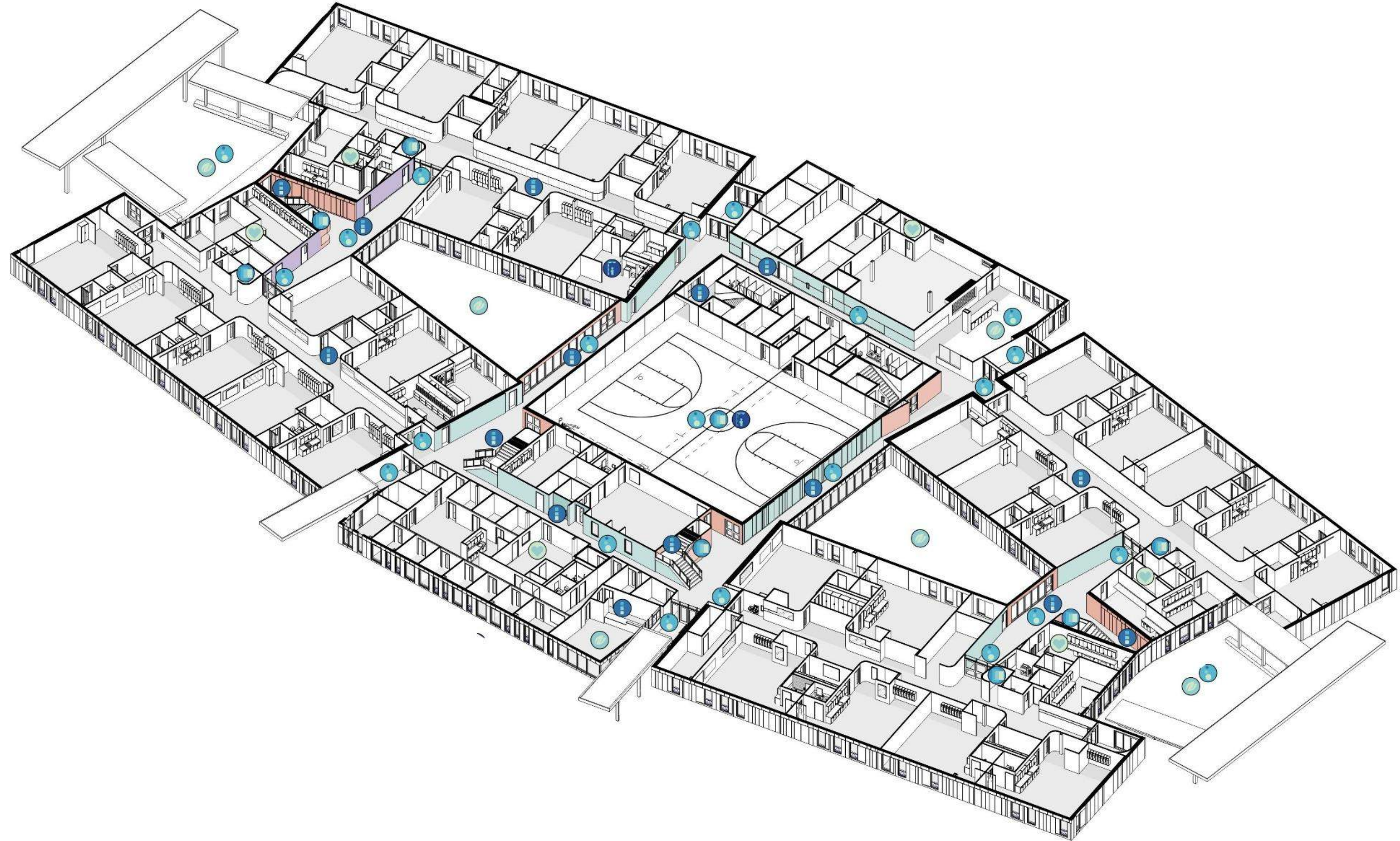
- **Acoustics:** reduce noise levels, echo, mechanical noise. (Benefits to neuro-typical, ADHD, and Autism-spectrum users)
- **Spatial sequencing:** affinity for routine, provide logical entry and access sequence based on scheduled use of spaces. One-way circulation where possible, minimal disruption and distraction.
- **Escape space:** respite from over-stimulation, small partitioned area or "crawl space."
- **Compartmentalization:** provide distinct sensory cues for each type of activity, to clearly define functions and expectations.
- **Transition zones:** recalibration of senses
- **Sensory zoning:** see compartmentalization
- **Safety:** avoid sharp edges and corners, "finger-traps", pay more close attention to furniture, equipment, and danger points



Figure 23



Research: Fundamental Key Factors Overlapping Approaches



Research: Fundamental Key Factors Overlapping Approaches



Main Stair View Looking at Gymnasium

Final Design



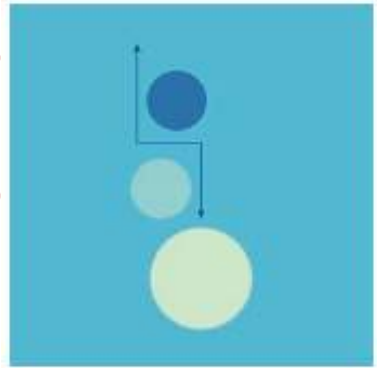
Main Stair View
Looking at Main Entrance

Final Design









Geographic Stressors

Concept:

Physical points in the school building may inherently cause stress in students.

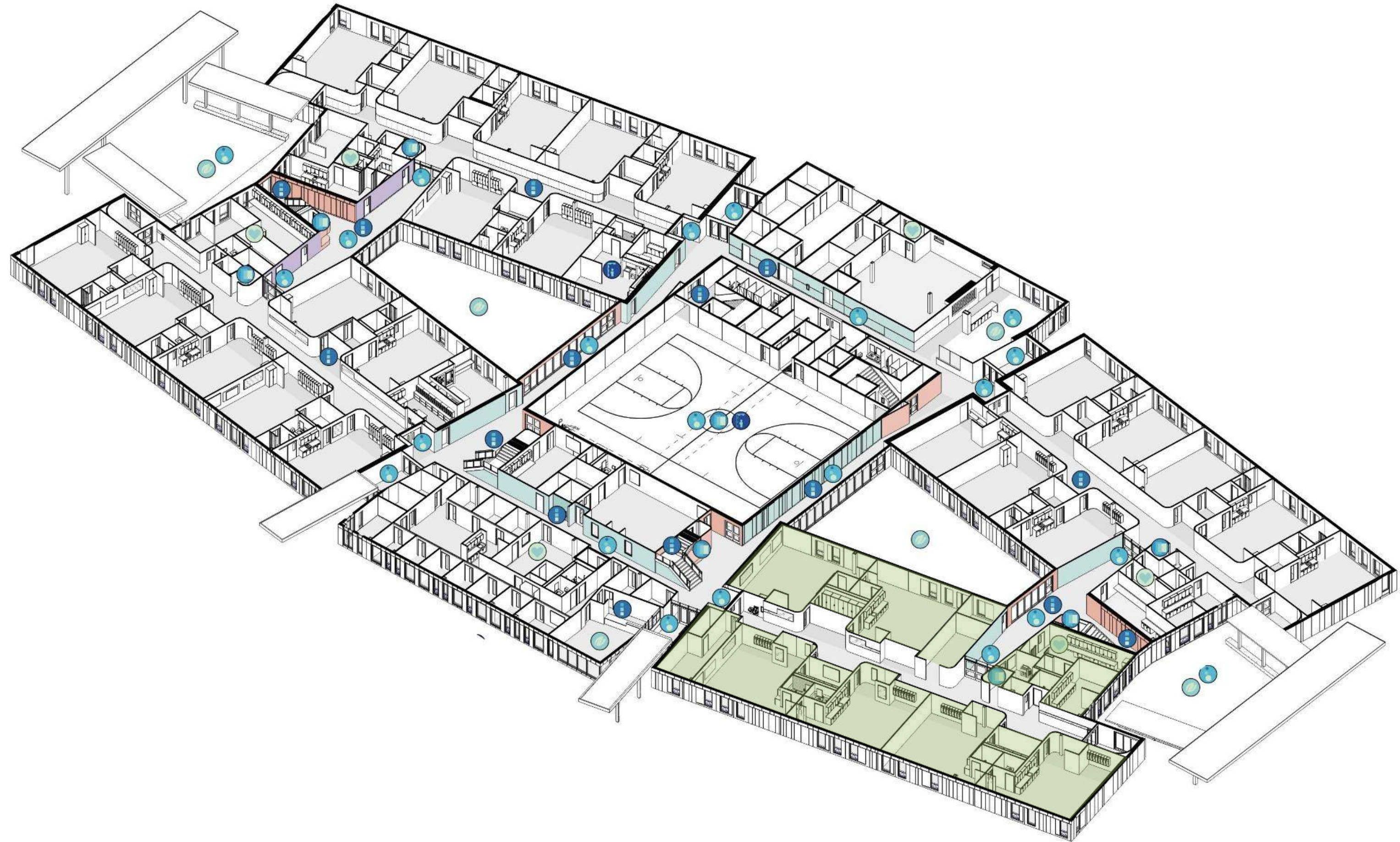
- **Drop off & pick-up:** the transition from car/bus to the school entrance can be an intimidating and stressful experience. Break down to reduce scale and contrast of the entrance. Oppose "monumentality."
- **Corridors:** passing between classes is most often the noisiest and most sensory-rich time in a student's day, so any effort to curtail this experience would be useful to maintaining focus. Offset passing periods, wider hallways, acoustic treatment in the area are strategies to consider.
- **Classroom entrance:** the classroom entrance may induce anxiety as a result of social concerns or performance anxiety.
- **Cafeteria & gym:** Dining rooms and other large spaces can be loud, sensory-overloading situations. There are multiple decision points and social interactions to navigate. This also applies to other large social gatherings like assemblies, beginning of day line-ups, and mass examinations.

- **Avoidance:** For students with OCD or GAD, avoidance of locations of prior anxiety attacks may be common.



Figure 25

Research: Fundamental Key Factors Geographic Stressors



Research: Fundamental Key Factors Sequencing and Transitions







STOP

10

EXIT



E113
CLASSROOM
O. BEST





Biophilia

Concept:

Multiple user types will benefit from access to biophilic moments at strategic points.

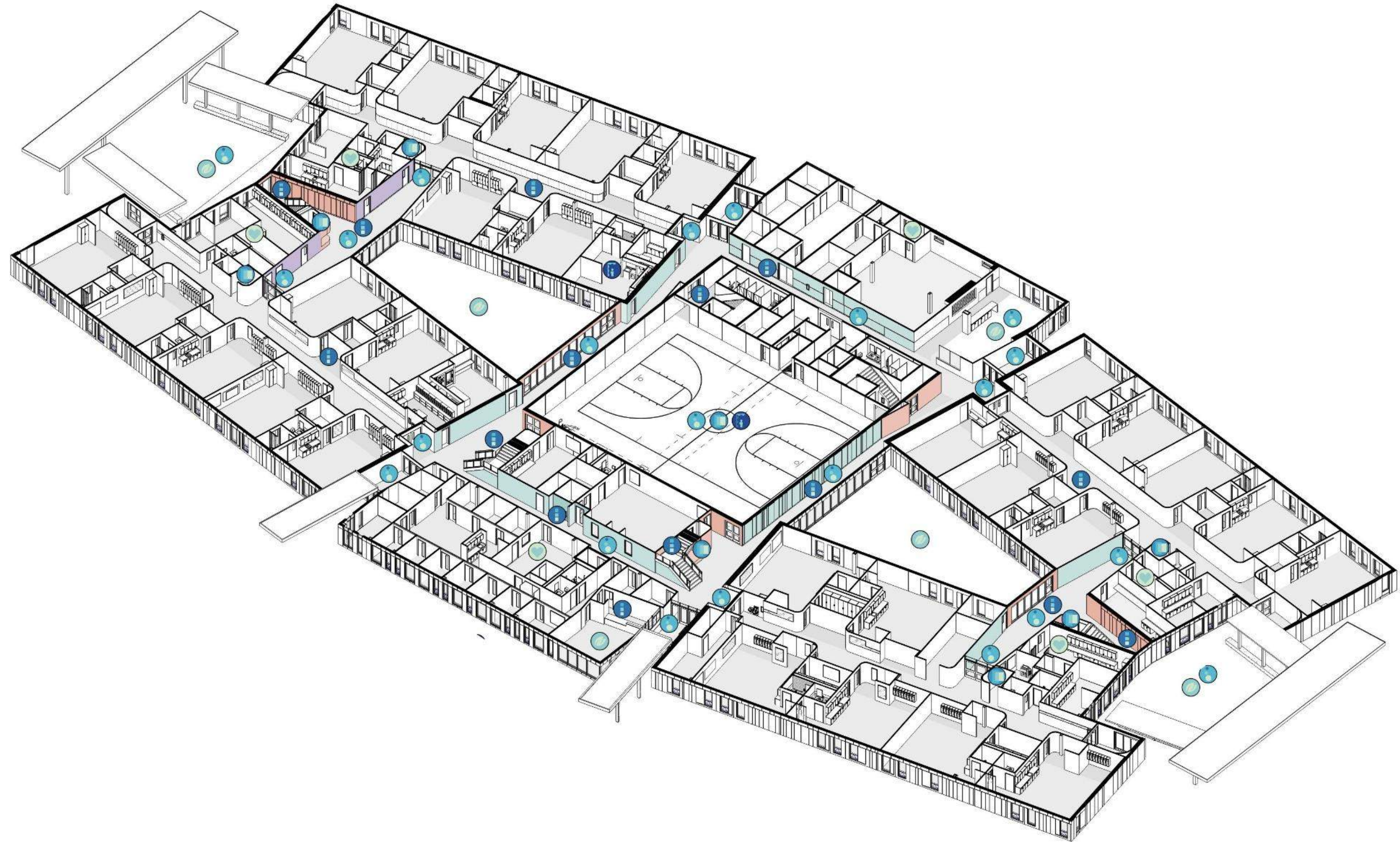
- Biophilia is the idea that humans possess an innate tendency to seek connections with nature.
- Nature is therapeutic for humans.
- **Nature in the space:** sensory exposure/access to nature, non-rhythmic sensory stimuli, access to fresh air, access to water, dynamic lighting, natural forms/patterns/materials.
- **Nature of the space:** prospect (view), refuge (escape space), mystery, risk / peril (sense of adventure).



Figure 26



Research: Fundamental Key Factors Biophilia



Research: Fundamental Key Factors Biophilia



Movement Room View

Looking at East Courtyard

Final Design



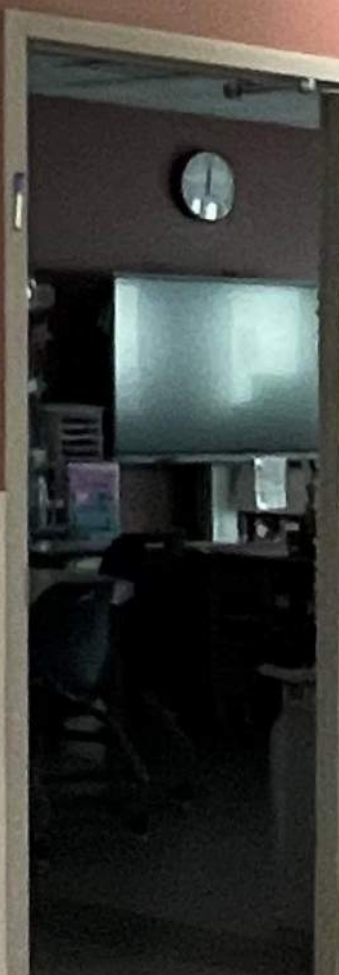








W154













Care

Concept:

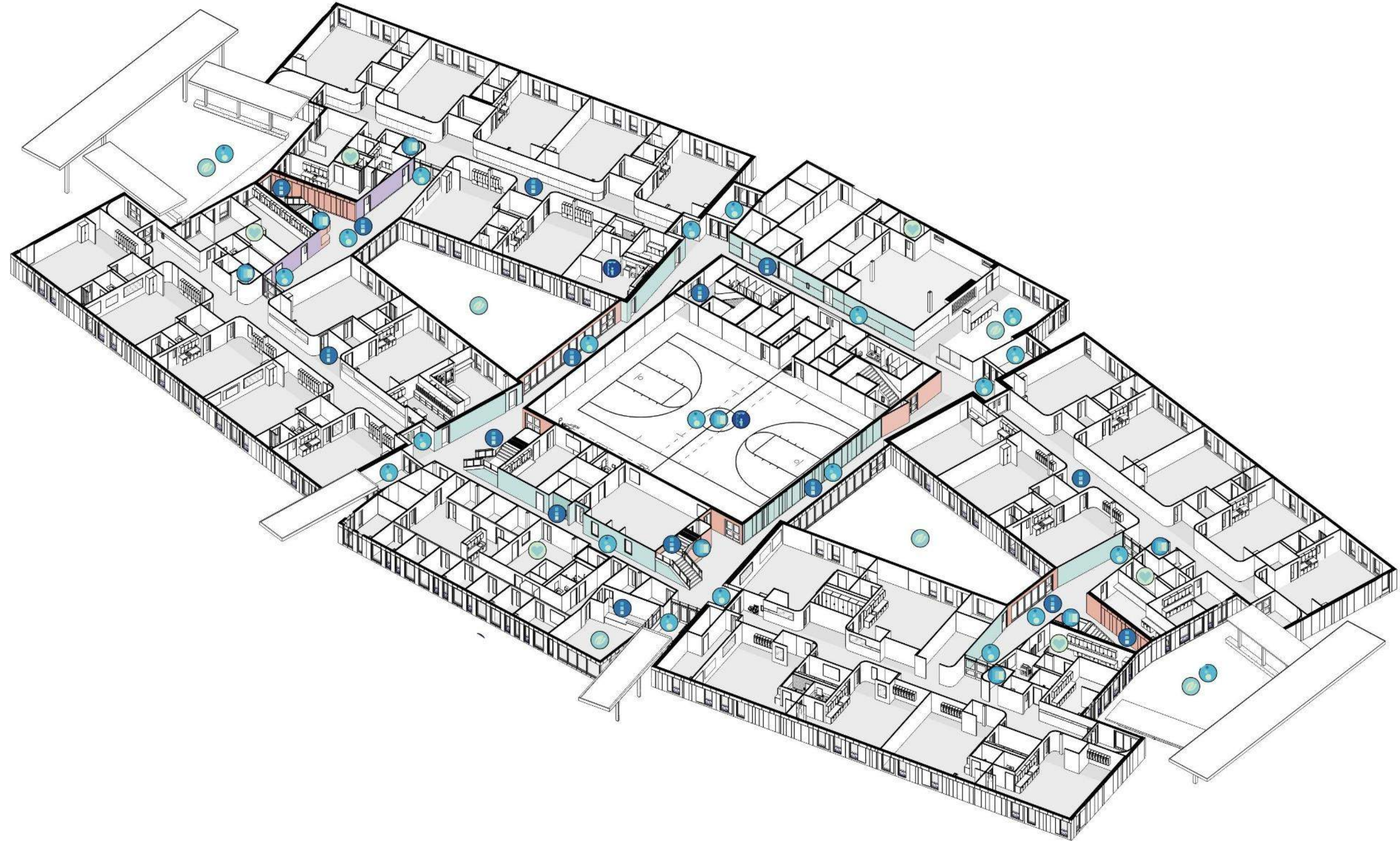
For the students and staff to benefit the most from any intervention there needs to be an effort to address their wellbeing.

- **Engagement:** When educators and staff feel appreciated, they perform better. When educators and staff are provided training on the latest topics and research, they perform better. When educators and staff are able to find time on stressful days to regain their equilibrium, they perform better. Any new facility has to take into account how to take care of their employees and provide flexible spaces.
- **Stress reduction:** Look for opportunities to create spaces and places that allow staff members and educators to be able to rejuvenate. You cannot care for others if you cannot take care of yourself. In combination with other strategies, such as biophilia, there is an opportunity to limit cortisol and norepinephrine reactions and give the ability to allow employees to center themselves.

- **Communication:** An essential part of any program should be messaging and communication. Effective engagement begins with a culture of open dialog grounded in the belief that everyone is working toward a common goal. Spaces should foster and host all forms of communication



Research: Fundamental Key Factors Care



Research: Fundamental Key Factors Care





EXIT

ALERT

NURSING FORMS

Medical Supplies
NURSE
SMALL
SPONS

FACE MASK









EXIT

This is our
happy
place

EVACUATION

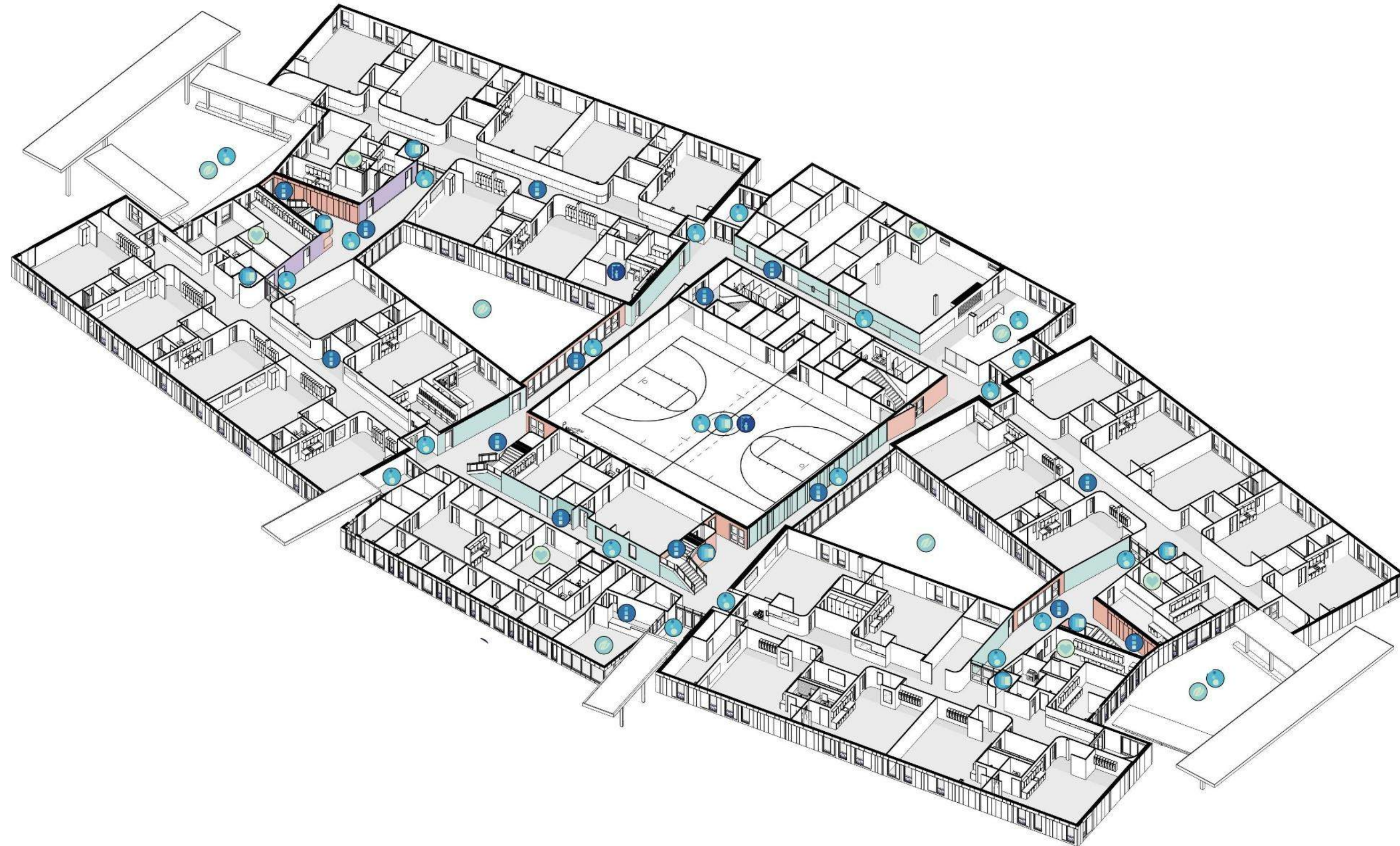
WELCOME
RIGO

ONE WORLD
TWO PEOPLE

g
a
d
e
r
e

RI
G

Other Specialty Spaces



Cafeteria View

Looking at Cafeteria

Final Design







Home Guests
period

2:23 12:00


AERO


A.E.R.O.









Linder Avenue

Long Avenue

Lorel Avenue

76th Street

76th Place

77th Street









A.E.R.O.
SPECIAL EDUCATION COOPERATIVE



RESERVED
PARKING
250 FINE

A.E.R.O.

SPECIAL EDUCATION COOPERATIVE







Thank You!

A.E.R.O. Therapeutic Center

A Research Based Approach to Neurodiverse Education





A.E.R.O. Special Education Cooperative

HOME

WHO WE ARE

BOARD AND GOVERNANCE

PROGRAMS

SERVICES

INFORMATION AND RESOURCES



Learn more about A.E.R.O.'s comprehensive special education programs by selecting a program.



WE ARE CONNECTING AND PARTNERING