Autism and the built environment – using design to improve outcomes

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Autism Housing Pathways
"Conquering the Cliff"
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Modifying the environment for success

- An environment that accommodates the characteristics of autism will minimize maladaptive behaviors, reduce property damage, and make life easier for residents and staff

"The right physical environment can fundamentally change the relationship between a person and his/her supports."

-- George Braddock

Characteristics of autism

- Difficulties with:
  - Social interactions
  - Communication
  - Sensory and emotional regulation

Social interactions

- “Context blindness” leads to problems with:
  - Appropriate interactions for different contexts
  - Unwritten rules – the “hidden curriculum”
  - Exceptions
- Facial expressions read by the area of the brain that reads objects
- Difficulty reading non-verbal cues
- Devastatingly honest

Communication

- May include any or all of these:
  - receptive language impairment
  - expressive language impairment
  - social language impairment
- ***Literal*** understanding of language

Sensory regulation

- Fluorescent lighting can seem to flicker and buzz
- Reflections off windows can be distracting, empty rooms can echo
- Difficulty knowing where one's body is in space
- Difficulty finding the edges of things, understanding part-to-whole relationships
- Desire to interact with the environment in unusual ways

Sensory regulation, continued

- Pain
  - G/I issues
  - Lack of communication means may not be able to convey when you're in pain
- Sleep disorders
- Under- or over-sensitive to sensory input (sometimes both!)
- Exaggerated fight/flight response
- Single channel processing
  - May not hear/see/feel at the same time

Emotional regulation

- Sensory regulation is connected to emotional regulation; consider the use of music in movies to enhance mood
- Too much emotion (good or bad) can cause emotional overflow if it can’t be regulated
- Anxiety can spill over into a meltdown if not met with equanimity and lack of affect

Characteristics of autism can lead to difficulty making sense of the environment

- Implications:
  - Anxiety
  - Need for sameness, control of the environment
  - Unanticipated use of the environment

Undesirable outcomes can be:

- Danger
- Confrontation
- Support provider burnout
- Property damage
- Wasted money
- Loss of tenancy for those living in rental housing

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CLOCK

A predictable environment, designed with the characteristics of autism in mind, can reduce anxiety and increase independence

(oh, and save money and reduce property damage, too)

Literature on autism-friendly design

- Ahrentzen and Steele:
  - Advancing full spectrum housing: designing for adults with autism spectrum disorders (2009)
- Brand:
  - Living in the community: housing design for adults with autism (2010)
- Braddock and Rowell:
  - Making homes that work: a resource guide for families living with autism spectrum disorder + co-occurring behaviors (2011)

Ahrentzen and Steele

Design Goals

1. Ensure safety and security
2. Maximize familiarity, stability and clarity
3. Minimize sensory overload
4. Allow opportunities for controlling social interaction and privacy
5. Provide adequate choice and independence
6. Foster health and wellness
7. Enhance one's dignity
8. Ensure durability
9. Achieve affordability
10. Ensure accessibility and support in the surrounding neighborhood.

Ahrentzen and Steele, continued

Design guidelines, referencing the goals, address:

1. Neighborhood
2. Floor plan strategies
3. Outdoor spaces
4. Living/community rooms
5. Kitchens
6. Hallways, stairs, and ramps
7. Bedrooms
8. Sensory rooms
9. Bathrooms
9. Laundry room
10. Technology
11. Visual cues
12. Ventilation
13. Lighting
14. Materials
15. Acoustics
16. Appliances and fixtures

Brand

The four design themes were summarised as follows:

Growth and development:

Enhance the motivation, confidence and self-esteem of residents by encouraging exploration of their environment and providing spaces for developing interests and skills

Triggers:

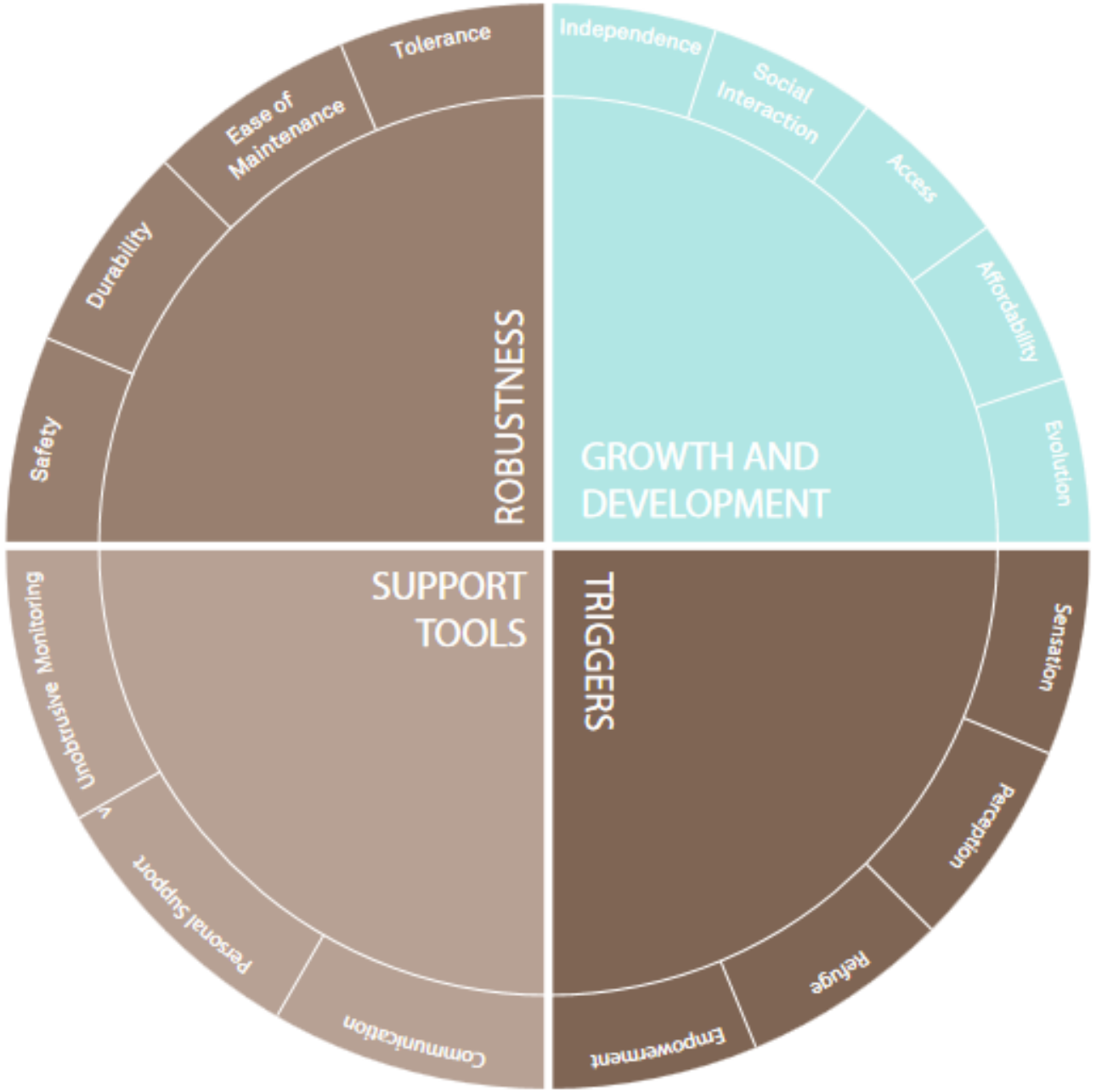
Reduce the triggers of agitation and anxiety, by providing comprehensible, coherent spaces that meet the sensory needs of individuals

Robustness:

Keep residents and staff safe in a robust environment that is tolerant of unintended use

Support tools:

Give staff the tools to deliver people-centred care and support



Brand, p. 15

Brand, continued

- Design guide, divided into 5 “layers”:
  - Planning
  - Massing and layout
  - Mechanical and electrical
  - Furniture, fabric and finishes
  - Fixtures and fittings

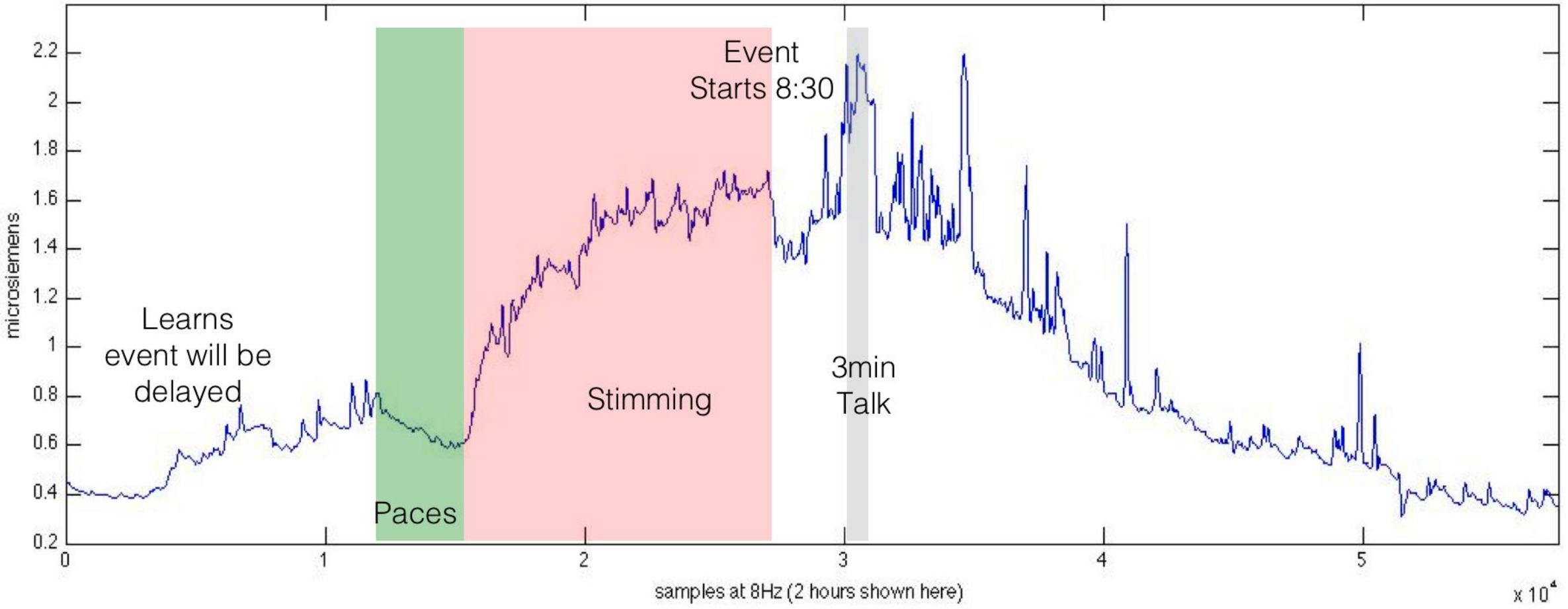
Braddock and Rowell

- Focused on those for whom conventional housing doesn't work
  - "You cannot fix a problem behavior in a broken environment"
  - "Modifications to the home can often reduce the cost of supports"
- 5 step Environmental Assessment and Action Plan:
  - Identify the challenges the caregiver faces every day.
  - Involve the individual (may be based on observation in some cases).
  - Assess the home and identify what isn't working.
  - Learn about common home modifications and strategies for specific challenges.
  - Make an Action Plan that is appropriate to the unique situation and circumstances.

Braddock and Rowell, continued

- 6 most common home modifications:
  - The Autism Friendly Home
  - The Connected Home
  - The Essential Bathroom
  - Walking Loop
  - Places of Control & Layers of Freedom
  - Tools for Housekeeping
- Specific challenges

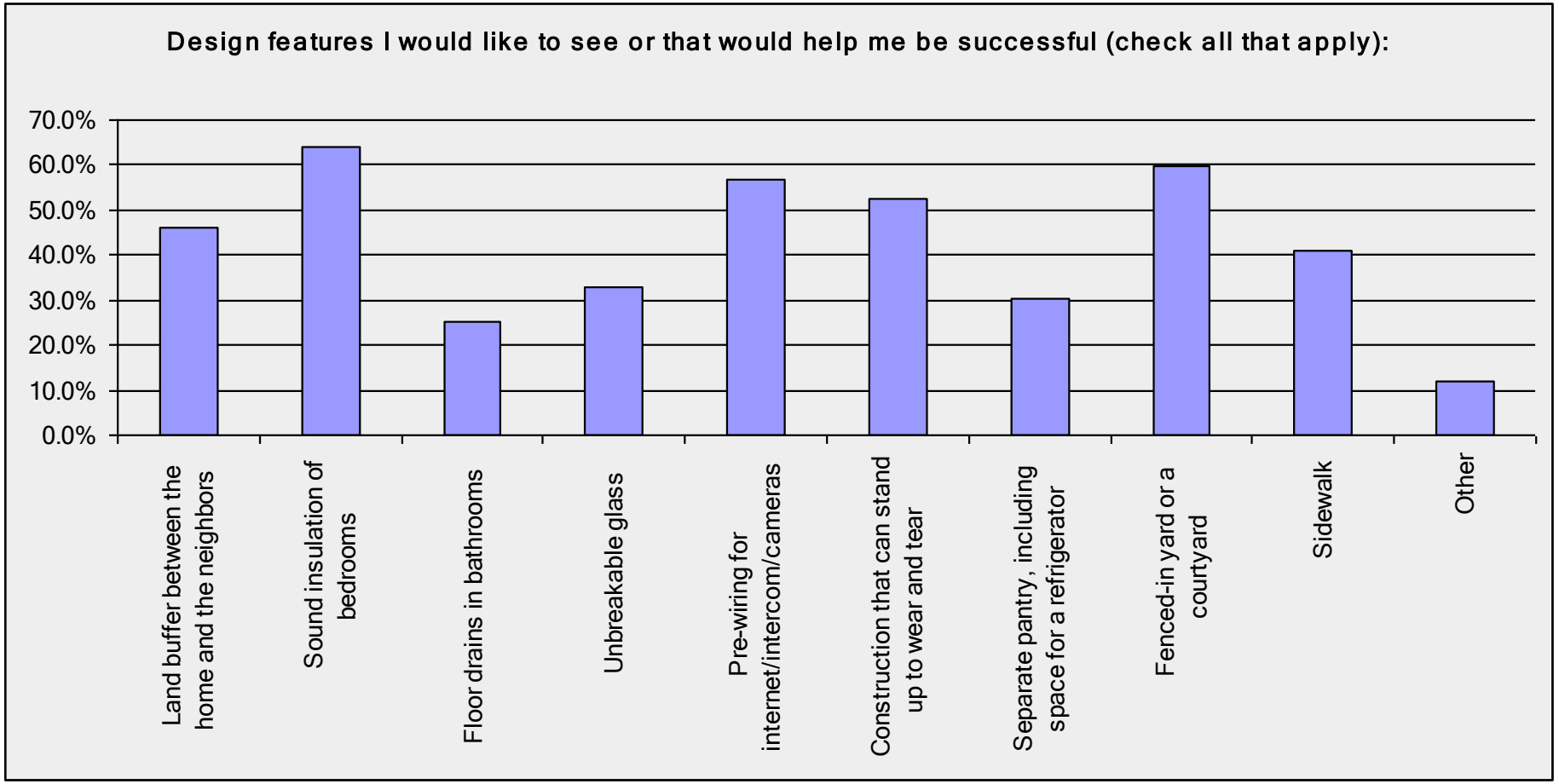
Objective data: Behavior change



R. W. Picard, *IEEE Trans. on Affective Computing*, Vol 1., No. 1, 2010.

Specific challenge: head-banging and throwing

Results from AHP housing survey



General features

- Quiet street, established neighborhood, near stores, mass transit; “by-right” property
- Clear lines of sight (consider cutouts in walls)
- Transitional spaces that allow individuals to preview activity
- Quiet spaces that provide a place to be alone; some may also allow observation of a common area
- Layout that clearly defines the function of a space
- Multiple common areas allow individuals to separate
- No fluorescent lights
- Walking loop
- Common areas and at least one bedroom have abuse resistant drywall or bead board
- Solid core doors
- Recessed lighting

General features (2)

- Built-in shelving and storage
- Floors should be impervious to water;
- Non-toxic furnishings and products
- Durable furniture that is easily cleanable, does not have crevices that can harbor mold
- High ceilings to accommodate jumping
- Sensory area
- Space for exercise
- Fence
- Breakaway curtains
- Neutral color schemes

General features (3)

- Smart home/technology
  - Wired for internet (or wireless network)
  - House server
  - Tablets, low tech visuals, or rubrics in each room can provide cueing to increase independence
  - Intercom/apps/phone can allow individuals or staff to ask for help

- May be crucial for ***some*** individuals:
  - Unbreakable glass (window film or tempered glass)
  - Alarms

Bathrooms

"It is safe to say that the more significant the Autism experience, the more pressure and stress builds up around bathroom mechanics." (Braddock and Rowell).

- En suite where possible, plus in common areas
- Floor drains (ideal) or waterproof membrane under floor
- Fully tile walls and ceiling
- Water sensor shut-off device
- Water shutoffs in adjacent room
- Wall-hung toilet with concealed cistern, inspection chamber, and push button flushing
- Faucets must be held down for water to flow
- Adjust water temperature to prevent scalding
- Use only standard size toilet paper rolls to prevent clogging or use a wall mounted dispenser of individual sheets
- Wall-mounted dispensers for soap, shampoo, etc.
- Replace towel rods with weight-bearing grab bars
- Non-skid flooring
- Space for staff to assist

Bedrooms

- Sound-proof bedrooms for individuals with sleep disorders
- ***Large*** bedrooms to retreat into, with personal sensory items and entertainment systems
- Built in shelving and drawers in closets maximizes floor space and prevents dressers from being pulled over
- Dust-mite barriers for mattresses and pillows
- Some individuals need platform beds with very thin mattresses or they may choose to sleep on the floor
- Bedrooms on ground floor for people who jump up and down to minimize damage to ceilings underneath
- En suite bathrooms where possible

Kitchen

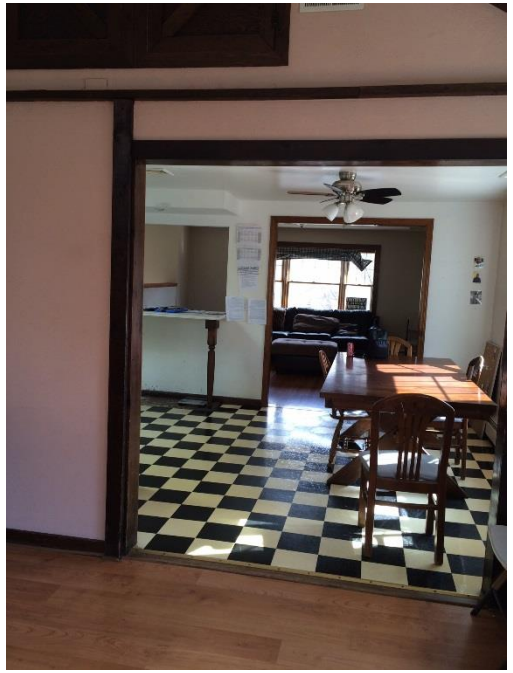
- Reserve space for individuals to store their personal snacks for the day, including a second refrigerator; reserve other cabinets and the main refrigerator for meal preparation and storage
- Magnetic induction cooktops to prevent burns
- Countertops with integral backsplashes that are resistant to scratching, burning, cutting or staining
- Make sure there is no space to wedge materials behind the stove.
- Visual supports for meal preparation and cleanup

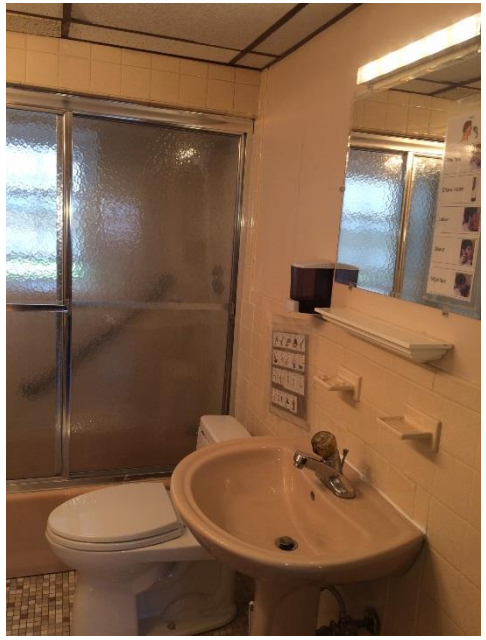
Sensory area ideas

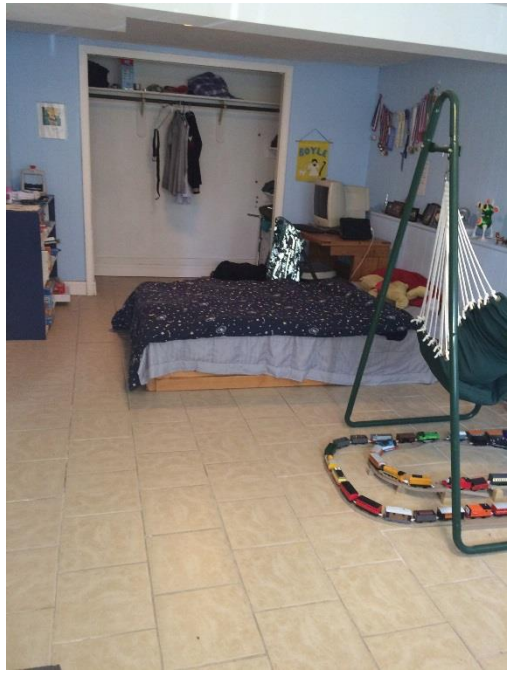
- Suspended swing or swing chair
- Beanbag chair
- Body sock
- Weighted blanket
- Therapy ball
- Mini-trampoline
- Basket of “fidgets” (also good to keep one in the living room)

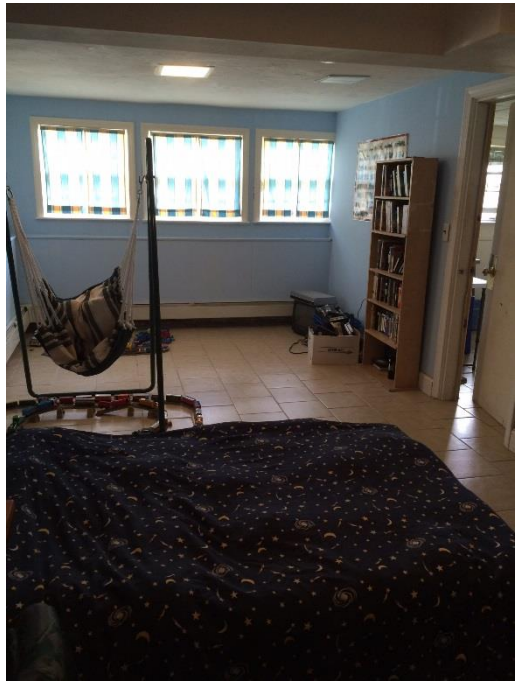
Sensory regulating activities

- MeMoves
- Sensory music from Arcangelos Chamber Ensemble
  - Music to De-stress
  - Music to Relax
- Short, easily learned yoga routine, such as Salute the Sun
- Sa-Ta-Na-Ma mindfulness meditation
- Short, easily learned indoor exercise routine, such as Leslie Sansone’s 3 minute mini-walk (on YouTube)









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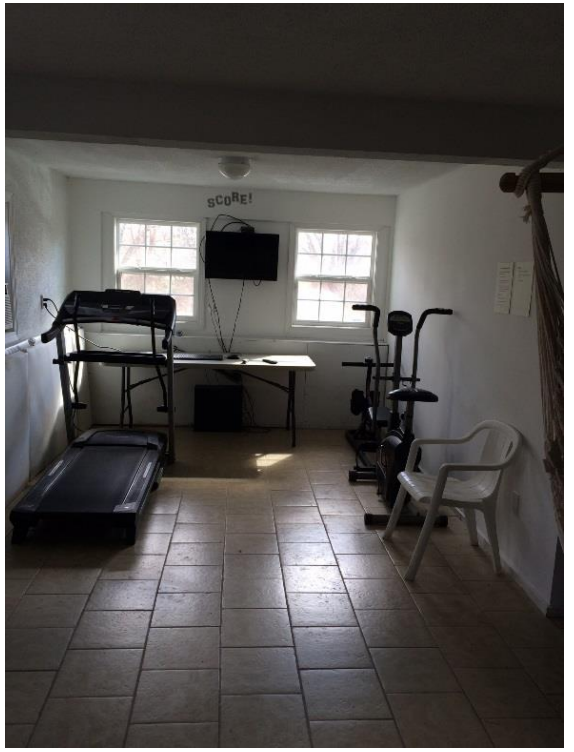
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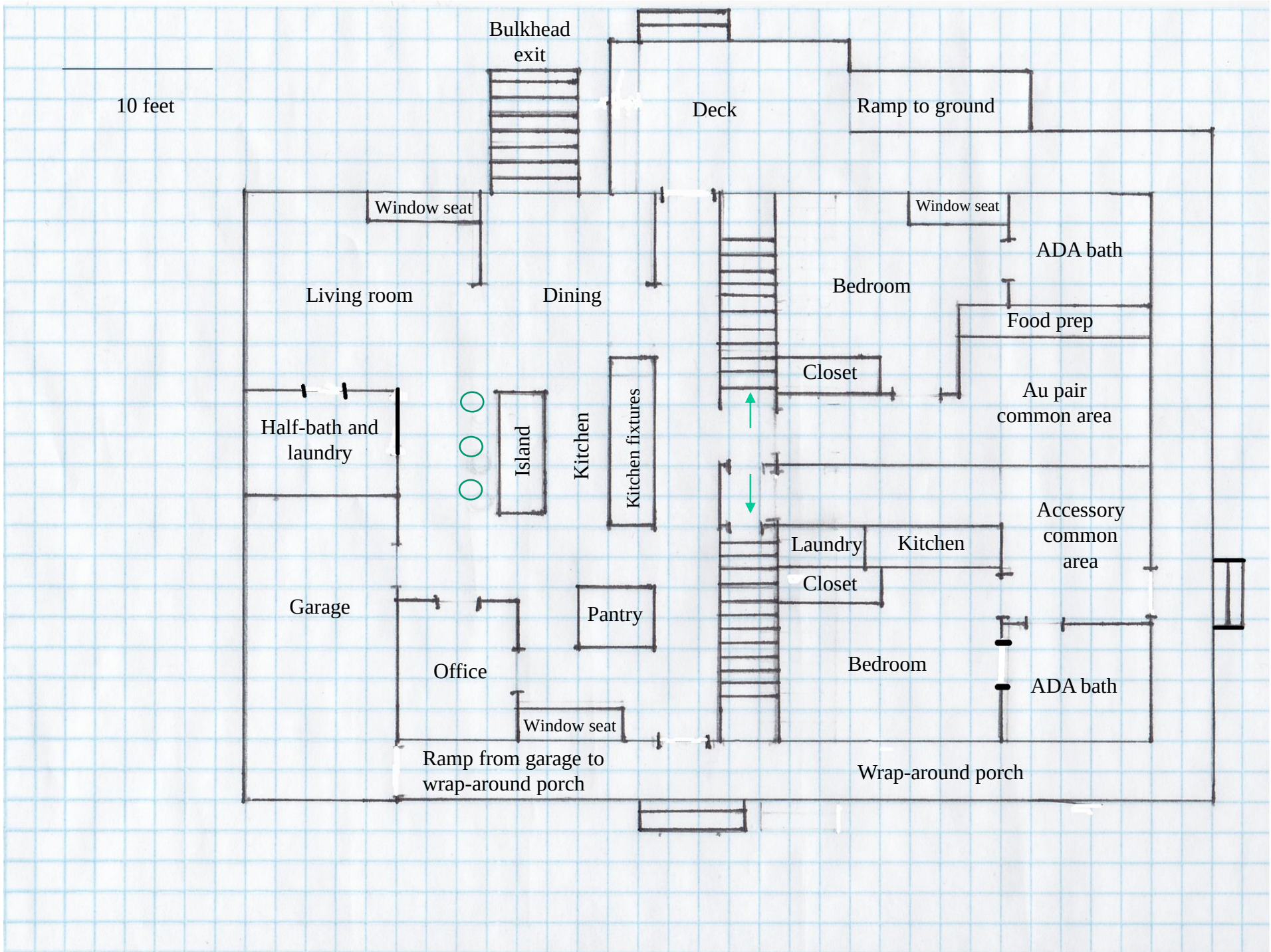

Five bedroom structure -- Main floor

Features:

- A wrap-around porch (which can be enclosed) allows for a walking space.
- A walking loop exists around the kitchen.
- The office has lines of sight in two directions
- The kitchen has a cut-out over the sink, creating a line of sight into the au pair suite when it is connected to the main unit.
- Window seats permit observation of common areas and outside.
- A separate pantry
- The au pair suite and accessory unit have full ADA compliant baths, the main unit has an ADA compliant half-bath; a second pocket door connects the bedroom in the accessory unit to the bath.
- The door from the au pair suite to the main unit can be closed off and the wall from the au pair suite to the accessory unit can be opened up, leaving a central lally column. The resulting unit is 900 square feet. Since no part of it is under the second story, there is an option for skylights in the common areas.
- Bedrooms are soundproof.

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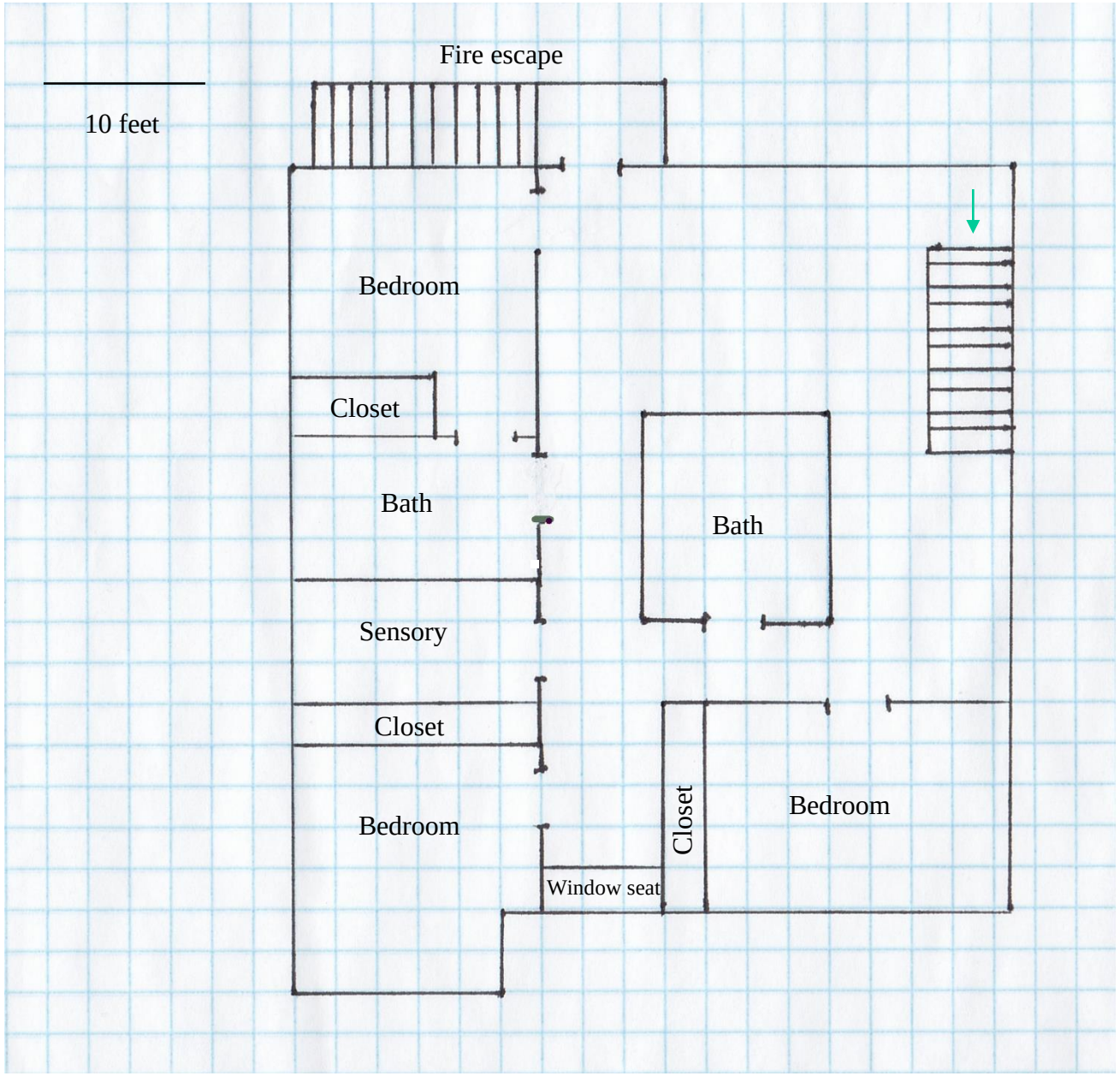

Five bedroom structure -- Second floor

Features:

- The central bath location creates a walking loop.
- No bedrooms share a wall, minimizing sound transmission. One bedroom is soundproof, and optional acoustic paneling could increase sound buffer in other bedrooms.
- Sensory space
- Each bedroom is adjacent to a common space isolated from view of other bedrooms.
- Large bedrooms provide space to retreat.
- A window seat permits observation of the corridor and outside.

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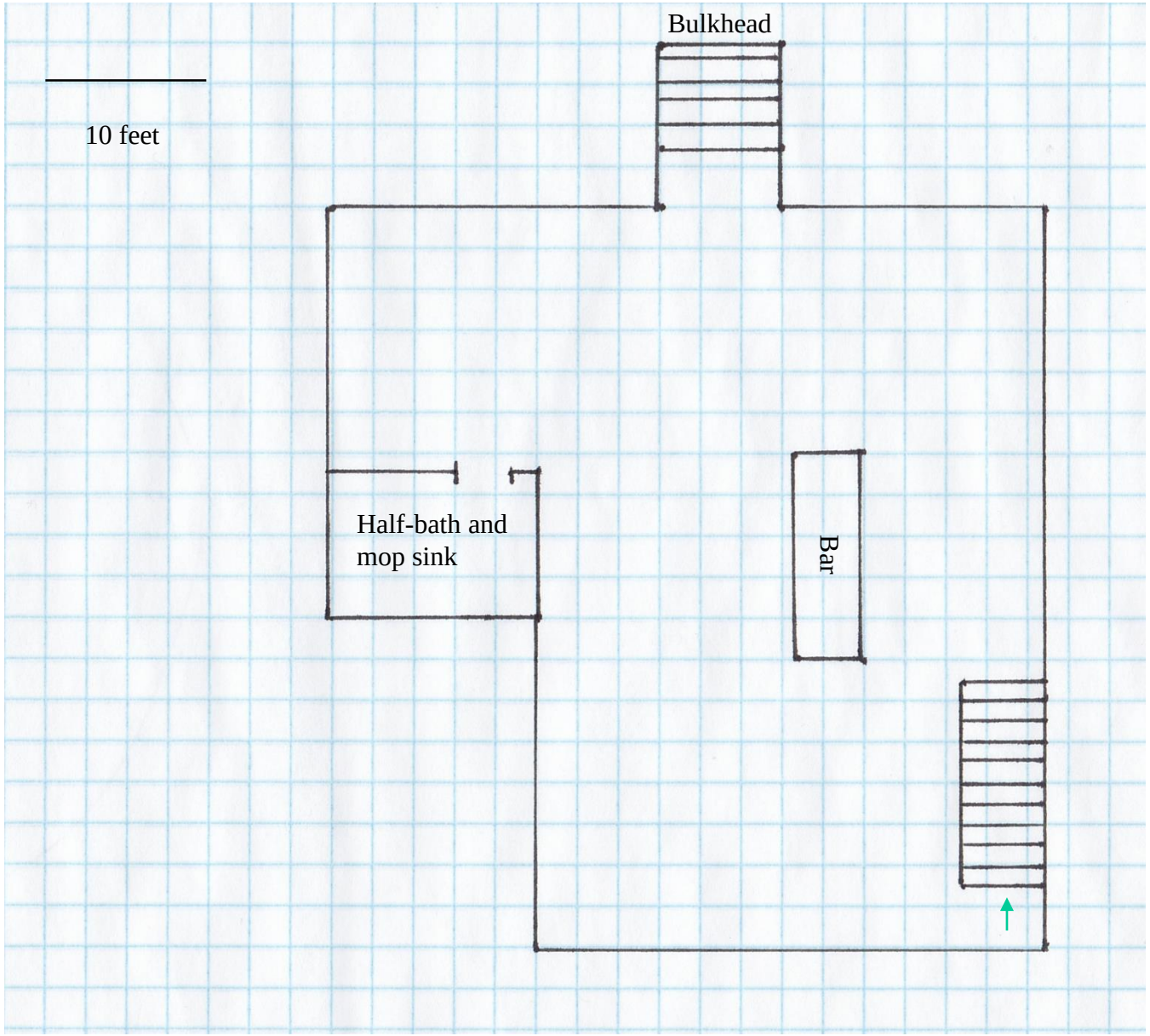

Five bedroom structure -- Basement

Features:

- Half-bath and mop sink; mop sink facilitates serious cleaning.
- The bar creates a walking loop, or even space for indoor recreation, such as riding a Razor scooter.
- There is space for exercise equipment, a lounge area, and a sensory corner.

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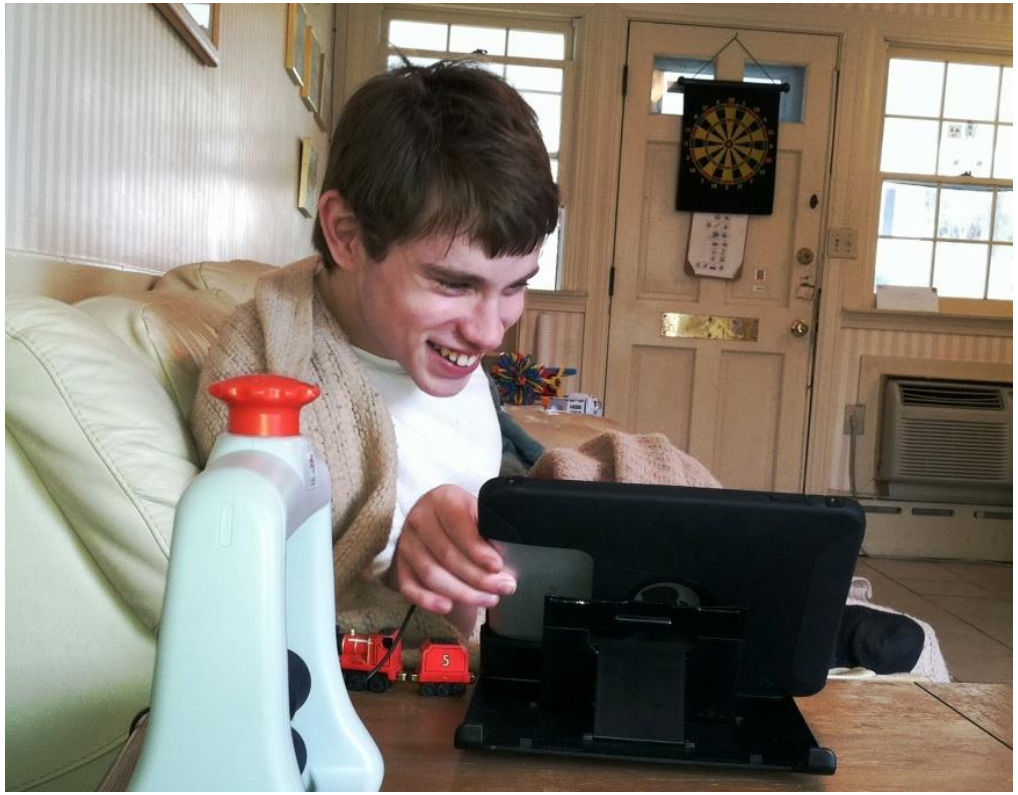
But think principles, not concepts

- Principles can be adapted to a variety of settings:
  - Free-standing homes
  - Multi-family housing, including:
    - In-law
    - Duplexes
    - Three-family
    - Four-family
    - Micro-units
    - Apartment complexes
- New construction is easier and often cheaper, but retro-fitting is possible
- The key point is . . .

Home should be the place where you are comfortable in your own skin



Links

- Ahrentzen and Steele: “Advancing Full Spectrum Housing: Designing for Adults with Autism Spectrum Disorders” (https://sustainability.asu.edu/docs/stardust/advancing-full-spectrum-housing/full-report.pdf)
- Brand: “Living in the Community: Housing Design for Adults with Autism” (http://www.kingwood.org.uk/downloads/research/living-in-the-community-housing-design-for-adults-with-autism.pdf)
- Braddock and Rowell: “Making Homes That Work: A Resource Guide for Families Living with Autism Spectrum Disorder and Co-occurring Behaviors” (http://parenttoparentnys.org/images/uploads/pdfs/Making_Homes_That_Work_A_Resource_Guide_%282%29.pdf)