2017

Sinatra Living: SD 2017 Project Proposal

University of Nevada, Las Vegas. Solar Decathlon Team.

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The vision of a house that can mediate the disparity between the realms of a comfortable age-in-place home and the harsh desert climate of Southern Nevada is a central theme that has been the driving force in every design decision for this project.

Team Las Vegas’ conceptual proposal offers a unique condition of merging of technology and architecture, while maintaining an environment of comfort and serenity. A spacious circulatory path is welcoming and easy to maneuver, providing railed and guided assistance with seating along the way. It offers clear lines of sight between destinations which adds to the openness of the space and assists in navigation. The surrounding colors and materials have been purposely selected to promote a sense of warmth and a feeling of home. Sensible use of native vegetation and careful placement of screening affords a pleasing balance between privacy and outdoor connection, which promotes a sense of well-being.

These spatial characteristics, integrated with technology and sustainable design systems, serve to create a home that is not just livable and health-promoting, but a joy to experience.
Plan A

Project Program

01. Entry 61 SF
02. Living 179 SF
03. Dining 176 SF
04. Kitchen 154 SF
05. Hall 141 SF
06. Bath 82 SF
07. Bed 167 SF
08. Mechanical 29 SF

Integrated Systems

01. Automated drip irrigation
   - maximizes water efficiency
   - ease of plant care

02. Master security system
   - centralized hub for smart lock control

03. Automated smart locks
   - added security
   - ease of nightly lock up

04. Learning thermostat
   - central location
   - adjusts to user patterns

05. Floor & roof sensors
   - sense activity & heart rate
   - Fall detection

06. Health monitoring systems
   - additional devices as required

07. Smart TV
   - displays collected data

08. Smart appliances
   - increased level of efficiency

09. Biometric sample analysis
   - health monitored by retrieval of samples

10. Sleep monitoring sensor
    - track respiration & sleep cycle

= 964 SF
In the effort of sustainability, Team Las Vegas plans to use passive strategies in correlation with innovative mechanical systems. Passive strategies employed include attention to orientation and shading, separation of “shell” from “core” which for natural ventilation, operable overhangs which control direct solar exposure.
Energy analysis will be used as an iterative modeling tool throughout the project to evaluate designs and identify cost-optimal efficiency packages at various stages of the development. Detailed simulation-based analysis based on material characteristics, envelope design, electrical and mechanical systems and components selection, and target energy-savings level will be developed.
Concept 1

1/4" = 1'-0"

Advantages
- Circulation route ideal for exhibition
- Open floor plan for social spaces
- Clear division between social/private
- Easy constructibility

Disadvantages
- Exceeds required square footage
- Bathroom not directly adjacent to bedroom
- Minimal daylight in bedroom
- Distance of hot water travel
“Wet” and “dry” mechanical systems are consolidated into centralized modules, reducing the energy requirements of distribution. The structural design will satisfy a mobile and modular approach, as well as maximize energy efficiency. The plumbing systems and mechanical systems will be low-maintenance, cost-effective and durable. It is the hope of Team Las Vegas that the successful application of these principles in a residence will serve as a model of sustainable living in the Mojave Desert.
plan B
circulation

Circulation
- primary
- secondary
- tertiary
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Principles of aging-in-place design

The design of the interior environment and architecture consists of several principles in which evidence-based design research comes to fruition. Environments which integrate proper orientation for the user, behave autonomously in daily activities, provide intellectual and sensory stimulation, security, and balance private and social spaces are ideal for the aging individual. These principles create interior environments for true independent living and successful aging.

1. **Facilitating orientation** Priming the user with appropriate visibility through fenestrations of the building is a primary component to facilitate orientation.

2. **Autonomy** The project allows for autonomy in spaces where mobility may be most difficult for an older person, such as the kitchen, bath, and living space.

3. **Providing a safe and secure environment** The interior environment is nestled within a sequence of transparent and opaque partitions to create a comfortable enclosure for privacy and security. These partitions are rhythmic in material to allow for transparency and privacy in
4 balance between private and social spaces The home is divided into social and private modules. Both modules allow for generous outdoor exposure and semi-visibility to the adjacent spaces to retain way-finding abilities.

5 intellectual + sensory-stimulation The design provides spaces for multipurpose activities and consequently a sense of novelty and variety throughout the day. It is a high priority to create variety in multipurpose spaces, as it is a form of intellectual and sensory stimulation.
planA
exhibition route
elevation
north/east
axonB
interior
plan A
exhibition route
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elevation A
north/east
axon exterior
**Plan Analysis**

**Advantages**
- Open floor plan for social spaces
- Bathroom directly adjacent to bedroom
- Wandering route
- Double multi-function decks

**Disadvantages**
- South facade minimal glazing due to kitchen location
- Office space is non-private
- Distance of hot water travel
- Poor circulation from social to public
modules configuration
### Plan Analysis

#### Advantages
- Mechanical room best proximity
- Under required square footage
- Largest kitchen configuration
- Private office

#### Disadvantages
- Poor circulation between private and social
- Smaller social space
- Laundry inside of the private office
- Tight circulation in social spaces

**sd**

**2017**

**Concept 3**

**Scale: 1/4" = 1'0"**
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plan A
exhibition route
axonB
interior
modules
configuration