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Zhao Weihuan
Faculty Advisor
MISSION STATEMENT

The mission of Eagles Nest is to reimagine the built environment, keeping sustainability at our forefront and the design of an Eagle’s Nest as our touchstone. Eagles Nest is a response to the high carbon emissions from residential buildings and the crucial need for on-campus graduate student housing at UNT.

PROJECT GOALS

Tackle head on the high carbon footprint of residential buildings by **reducing power consumption** by 40%.

Meet the crucial need for on-campus graduate **student housing** at the University of North Texas.

Provide **accommodation** for graduate students at UNT at a reasonable cost.

Immerse students in the **cutting-edge sustainable living**, surrounded by active renewable research.

Create a **community** among students that encourages innovation, social action, and excitement towards a more sustainable future.

Facilitate **relationships between University Students** and the local community through an open and green environment for community gatherings.

*Discovery Park - Denton, TX - Target Market*
DENTON
TEXAS
33.214°N / 97.133°W

SITE LOCATION

ENERGY EFFICIENT

76207 UNIVERSITY OF NORTH TEXAS DISCOVERY PARK

AVERAGE DAY AND NIGHT TEMPERATURE IN FORT WORTH (TEXAS) - IN CELSIUS
- March, April, May and October have a nice average temperature.
- Hot season / summer is in May, June, July, August and September.
- The average annual maximum temperature is: 24.5°C (76.1°F Fahrenheit)
- The average annual minimum temperature is: 13.0°C (55.4°F Fahrenheit)

AVERAGE MONTHLY HOURS OF SUNSHINE IN FORT WORTH (TEXAS)
- On average, July is the most sunny month with 342 hours of sunshine.
- February has on average the lowest amount of sunshine with 171 hours.
- The average annual amount of sunhours is: 2850 hours

AVERAGE MONTHLY SNOW AND RAINFALL IN FORT WORTH (TEXAS) - IN MILLIMETER
- Most rainfall (rainy season) is seen in May and October.
- On average, May is the wettest month with 135.0 mm (5.31 inch) of precipitation.
- On average, January is the driest month with 51.0 mm (2.01 inch) of precipitation.
- The average amount of annual precipitation is: 890.0 mm (35.04 inch)
1. ARTERIAL ROAD
2. INTERIOR CIRCULATION
3. NEIGHBORING RESIDENTIAL

Base Map - Site Location

Sun Path - Latitude 33

Wind Rose

Views Inside - Outside
MARKET ANALYSIS

DENTON RENT PRICES HAVE INCREASED 9% SINCE 2019 AND ARE NOT SHOWING ANY RATE OF SLOWING DOWN. THE CLOSEST APARTMENTS TO DISCOVERY PARK HAVE 1 BEDROOMS FOR AS HIGH AS $1,500. THE NEST WILL TARGET STUDENTS WHO WANT A SAFER AND CLOSER PLACE TO WHERE THEY ARE LEARNING, WHILE ALSO BEING AFFORDABLE AND SUSTAINABLE.

APARTMENTS NEARBY:
1. DENTON NORTH (4 MIN DRIVE) $800/MONTH +
2. GARDENS OF DENTON (7 MIN DRIVE) $1100/MONTH +
3. CORONADO OAKS (9 MIN DRIVE) $850/MONTH +

GETTING AROUND:
- FREE UNT BUS
- DCTA BUSS PASS $69/MONTH
- CAR: $5 INSURANCE/REGISTRATION/GAS
- TRAVEL TIME APPROX 19 MIN
  (M-F) 7:00AM - 9:40PM
  5 BUSES/HOUR
  (SAT/SUN) 8:00AM-9:30PM
  3 BUSES/HOUR

1. UNT MAIN CAMPUS
2. DISCOVERY PARK CAMPUS
MARKET ANALYSIS

COST OF LIVING (DENTON, TX):
AVERAGE APARTMENT (915 SF) $1,000/month
AVERAGE UTILITY BILL $120/month
INTERNET $55/month
CELL PHONE $100/month
GROCERIES $250/month
TOTAL EXPENSES $1525/month (minimum)

FULL-TIME INCOME (STUDENT JOBS):
$37,904/year - 16% lower than national average ~(+/-) $15/hr
*International students can work no more than 20hrs/week pursuant to the terms of the student visa and have to be on a qualifying on-campus job min $7.25/hr

International students at UNT are only earning $1200/month ($15/hr @ 20 hrs/wk) and yet, they make up 82% of enrolment at Discovery Park. This is not enough to cover expenses based on geographical averages.

TRYING TO BALANCE:
RESEARCH/COURSES/COMMUTE TIME/LIFE + WORK

GRADUATE STUDENT ENROLLMENT - SPRING 2022

<table>
<thead>
<tr>
<th>GRADUATE STUDENT ENROLLMENT</th>
<th>STUDENT AGE GROUP</th>
<th>STUDENT GENDER GROUP</th>
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<tr>
<td>UNDERGRAD 1,183</td>
<td>20-21 265</td>
<td>FEMALE 780</td>
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<td>MASTERS 1,094</td>
<td>22-23 1,152</td>
<td>MALE 1,638</td>
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<td>DOCTORAL 140</td>
<td>24-25 576</td>
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<td>26-30 96</td>
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<td>31-40 302</td>
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<td>41-50 20</td>
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<td>50+ 7</td>
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**FINANCE AND PROJECTION TIMELINE**

**CONSTRUCTION BUDGET OVERVIEW**

- **Total Building Area = 125,000 sqft**
- **Projected Project Life = 31 years**
- **Excess Energy Incentives**
  - Net-metering
  - $84,410/year income

**1 Bedroom x 38 units**
- $920 Monthly Rent
- All inclusive
- $419,500/year income

**2 Bedroom x 57 units**
- $1,320 Monthly Rent
- All inclusive
- $903,000/year income

-$350/sqft Construction Cost
-$43.75M Total Building Cost

**UNT - THE EAGLES NEST**

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**Preconstruction**
- Design & Contract Documents
- Utilities Planning, Permitting
- Bid / Negotiation / Procurement

**Construction - Building**
- Site Work
- Sub-Structure / Super-Structure
- Envelope
- Buildout

**Construction - Energy and Renewables**
- PV and Wind Installation
- Geothermal connection
- Methane system installation
- Rainwater collection tanks and filtration
- Intergrated Building Controls

**Commissioning**
- Building comissioning
- Systems comissioning and interconnection

**Market Analysis**
CONCEPT
A Net Zero Energy building featuring:

Renewables:
PV, Wind walls, Advanced wind walls, Biofuel

Sustainability:
Rain harvesting, Greenhouse, water maximization

HVAC Reductions:
Passive ventilation, Geothermal systems, P.C.M Insulation, VRF systems

DESIGN GOALS
1. Architecture
   Unique construction featuring heavy timbers
2. Engineering
   High efficiency building systems designed for scalability
3. Market Analysis
   Specialized low-cost housing option for Discovery Park graduate students
4. Durability and Resilience
   Water collection, green houses, overbuilt structure, redundant building systems
5. Embodied Environmental Impact
   Locally sourced construction material. Located on campus with public transit to popular city destinations
6. Integrated Performance
   Integral systems controls incorporated with occupant experience to control building and minimize environmental impact
7. Occupant Experience
   Phone app-controlled housing units, with intelligent control systems for common spaces
8. Comfort and Environmental Quality
   Sensors and controls that will show metrics like thermal, electrical, wind, to reach comfort levels
9. Energy Performance
   Less energy usage, increasing efficiency, and using renewable energy sources to meet energy requirements
   target EUI is 74 kBtu/ft².hr

ARCHITECTURAL DESIGN - CONCEPT DESIGN
1. URBAN EDGE - EXISTING ROADS HELP DEFINE FACADES
2. ROTATE BAR - OPTIMUM FOR PREVAILING WINDS
3. EXTERIOR CIRCULATION - SHADES FACADE FOR PASSIVE COOLING
4. REMOVE UNITS - OUTDOOR GATHERING WITH VIEWS
5. TURBINE WALL - UNT DESIGN LABS FOR ENERGY PRODUCTION
6. LANDSCAPING - HEAT ISLAND MITIGATION
NOTES:
1. 5 LEVELS TYPE IV CONSTRUCTION [HEAVY TIMBER]
   67,636 SF RESIDENTIAL SPACE [93 UNITS - 152 BEDS]
   OVER 13,485 SF OF SHARED AMENITY SPACE
   TOTAL BUILDING HEIGHT [+-77'] - 100’ MAX ALLOWABLE
2. GREENHOUSES AND COMMUNITY GARDEN
3. WATER COLLECTION TOWER
4. SKY BRIDGE CONNECTOR (LEVEL 3)
5. EXPOSED EGRESS STAIR
6. POOL/PASSIVE COOLING
7. HIKE AND BIKE TRAIL (+/- 1/2 MILE)
8. ON-SITE PARKING (1.25 SPACES/UNIT) +/- 150 SPOTS
   PERMABLE PAVING WITH UNDERGROUND CATCHMENT
9. PF - ZONING (PUBLIC FACILITIES)
   PARCEL SET BACKS (5'-0" SIDE, 10'-0" REAR, 0'-0" FRONT)
10. PROPOSED PARCEL LINE (+/- 7.5 ACRES)
11. EXISTING STRUCTURE
12. PRIVATE DRIVE
13. FIRE DEPARTMENT ACCESS
14. TRASH SERVICE ACCESS
15. SOLAR PANELS
16. ADVANCED WIND WALL
17. GEOTHERMAL WELLS
18. SUBTERRANEAN METHANE PRODUCTION
TOTAL SITE AREA
+/− 7.5 ACRES

BUILDING TOTAL BUILD-UP AREA
+/− 125,000 SF

NUMBER OF BEDROOMS
1BD - 1BA / 38
2BD - 1BA / 57

TOTAL AREA OF BEDROOMS
67,636 SF

AREA OF SHARED FACILITIES
13,485 SF

OUTDOOR PAVED TRAIL
0.4 MILES

PARKING
+/− 150 SPOTS

ARCHITECTURAL DESIGN
LEVEL - 01 [GROUND FLOOR]
1. ENTRY
2. CO-WORKING/STUDY [6884 SF]
3. CAFE + POP-UP RETAIL [2021 SF]
4. RESTROOMS
5. GAME ROOM [3214 SF]
6. LAUNDRY [1337 SF]
7. POOL
8. COMMUNITY GARDEN
9. SHARED GREENHOUSE(S)
10. RESIDENTIAL UNITS
11. LEASING OFFICE
12. MECHANICAL/ELECTRICAL
13. FIRE RISER ROOM
14. GREY WATER COLLECTION TANK
15. TRASH/RECYCLING

LEVEL - 02
1. ELEVATED OUTDOOR ROOM [1383 SF]
2. VERTICAL CIRCULATION
3. OUTDOOR CIRCULATION
4. RESIDENTIAL UNITS [15168 SF]
5. ELEVATED BRIDGE ABOVE
6. GREEN ROOFS BELOW
LEVEL - 03
1. ELEVATED OUTDOOR ROOM [3039 SF]
2. VERTICAL CIRCULATION
3. OUTDOOR CIRCULATION
4. RESIDENTIAL UNITS [14540 SF]
5. ELEVATED BRIDGE

LEVEL - 04
1. ELEVATED OUTDOOR ROOM [1379 SF]
2. VERTICAL CIRCULATION
3. OUTDOOR CIRCULATION

LEVEL - 05
1. ELEVATED OUTDOOR ROOM [1572 SF]
2. VERTICAL CIRCULATION
3. OUTDOOR CIRCULATION
4. RESIDENTIAL UNITS [15027 SF]
5. ELEVATED BRIDGE BELOW

LEVEL - 06 [ROOT]
1. OBSERVATION DECK + PLANTER [740 SF]
2. VERTICAL CIRCULATION
3. RTU - VRV SYSTEM CONDENSER
4. SOLAR ARRAY [8070 SF = 414 PANELS]
5. RAIN WATER COLLECTION [16980 SF]
6. ELEVATED BRIDGE BELOW
SECTION A - SOUTH WING + COURTYARD

SECTION B - EAST WING

1. RESIDENTIAL UNITS
2. ELEVATED COMMUNITY SPACE
3. GROUND FLOOR AMENITY
4. POOL
5. ROOFTOP VIEW
ARCHITECTURAL DESIGN
RECEPTION & COMMUNITY STUDY AREA

- This area will give future Residents a first look on what to expect when living here.
- With Sustainable materials all throughout, the Green vision of the building is thought about in every space.
- Different seating options gives people a chance to work alone or collaborate when working on Projects.
The Game Room is designed to be a waiting area and also a Play area while your Laundry is washing.

There are many options for Residents to be able to enjoy themselves while waiting.

A Large ‘Pit for Movies is also available, being able to hang out with friends in a Common area is something everyone enjoys.
ENERGY CAFE

- Large picture windows provide **Natural light** that enhances focus and promotes a positive mood.
- Different seating Options are provided for Everyone.
- Plants help filter and enhance the air quality while simultaneously reducing stress.
1. **Moss** is an Acoustic sound absorber while also being maintenance free. It helps Purify the air and is also really good looking. Qualify for LEED credits.

2. Interfaces **Carpet tile** are Certified Carbon neutral Floor and can also be Recycled through their Carpet to Carpet Recycling program. The life cycle impacts of modular carpets are driven by the Product Stage and the impacts

3. **Terrazzo** reduces waste sent to landfills and creates a healthier and safer environment for the building occupants. Greenguard Gold and Greenguard Certified Contributes to LEED Credits

4. Any **Wood** used in the Interiors is Certified by the Sustainable Forestry Initiative and Forest Stewardship Council and can count Towards LEED credits
LIVING WALLS - INDOOR AND OUTDOOR

Living Walls have been a Popular choice for many Years now.

Benefits:
- Purify the Air
- Reduce VOCs
- Humidify the air
- Easy to maintain

They also promote a healthier and happier resident

LIVING WALL - IN THE COMMUNITY STUDY AREA

LIVING WALL - IN THE CAFE

CARE AND TYPES OF PLANTS

With the Natural lighting provided by the big windows, there won’t be much supplemental lighting needed to keep the plants alive.

There is Broad variety of Plants that can be chosen to create a Living plant wall, even Vegetables, Herbs and Strawberries.
1. Bedroom
2. Bathroom
3. Kitchen
4. Juliet Balcony
5. Closet
6. Water Heater
7. Operable Window
8. Sliding Glass Door
9. Line of Dropped Ceiling
UNIT FEATURES:
1. EXTERIOR CIRCULATION/PASSIVE COOLING
2. PLANTED HANDRAILS
3. EXPOSED CLT (CROSS LAMINATED TIMBER) CEILING
4. LIGHTWEIGHT CONCRETE TOPPING FINISHED FLOOR
5. JULIET BALCONY
6. DROPPED CEILING/HVAC
7. OPERABLE GLAZING WINDOW SHADOW BOX
8. EXPOSED SPIRAL DUCT
9. SURFACE MOUNTED LED TRACK LIGHT
10. EXPOSED HEAVY TIMBER CONSTRUCTION
11. ENERGY STAR RATED APPLIANCE PACKAGE
PASSIVE VENTILATION:
1. EXTERIOR CIRCULATION SHADES THE UNIT FACADE FROM DIRECT SOLAR GAIN
2. OPERABLE GLAZING ON BOTH SIDES OFFERS CROSS VENTILATION + NATURAL DAYLIGHT
3. LIGHTWEIGHT CONCRETE TOPPING FINISHED FLOOR - INCREASED DURABILITY
4. PLANTED VERTICAL SURFACES OFFER SHADE AND PASSIVE COOLING
5. RECESSED JULIET BALCONY OFFERS SHADING FOR GLAZED SURFACE
6. LED LIGHTING WITH OCCUPANCY SENSORS TO REDUCE ENERGY CONSUMPTION
1. Line of 8’-0” Ceiling
2. ERV
3. Supply Duct
4. Outside Air Intake
5. Return Duct
6. Exhaust Fan

1 BD
608 SF

2 BD
786 SF
ACTIVE VENTILATION:
1. VRF SYSTEM - EVAPORATOR UNIT IN CEILING PLENUM
2. OUTSIDE AIR INTAKE DUCTED TO SHADED EXTERIOR
3. SUPPLY AIR TO OCCUPIED SPACE - HEATING/COOLING
4. FILTERED RETURN AIR
5. REFRIGERANT PIPING TO ROOF TOP CONDENSING UNIT

KEY FEATURES:
• RADIANT FLOOR SLAB
• GEOTHERMAL HEAT PUMP FOR COMMON AREAS
• VRF SYSTEMS WITH CAPACITY FOR SIMULTANEOUS HEATING AND COOLING
• INTERGRATED PCM THERMAL STORAGE SYSTEM
ENERGY MODEL SUMMARY

- PHIUS+ 2021 requirements meet or exceed all IECC codes for Denton
- Ventilation meets IAQ standards in a post-COVID 19 world
- LED lights and EnergyStar appliances reduce energy consumption
- The Eagle’s Nest will be code compliant for the foreseeable future
- Occupancy sensors controlling HVAC systems will minimize heating and cooling demand
NET-ZERO STRATEGIES

1. RAIN WATER - COLLECTION
2. WIND ENERGY - UNT DESIGN LAB
3. FOOD PRODUCTION - ON SITE
4. GEOTHERMAL WELLS - CHILLED WATER
5. SOLAR ARRAY - ENERGY COLLECTION
6. METHANE PLANT - HOT WATER OFFSET
Stage-1 Renewables
Total Demand of 720,500 kWh/year

Biofuel
1 Biogas Plant
18 MWh/year
8 tons of CO2
$0 Cost (UNT Research)

Wind
32 Wind-walls
20 MWh/year
9 tons of CO2/year
$80,000 Cost

PV On-site
1,088 Modules
1,178 MWh/year
501 tons of CO2/year
$744,000 Cost

PV Lot#93 (50%)
1,588 Modules
1,720 MWh/year
731 tons of CO2/year
$1,086,000 Cost

8.4 years Overall Payback Period

2.2 GWh Excess Energy Production/year

$84.4K Excess Energy Return/year

NET-ZERO STRATEGIES
RAIN WATER HARVESTING

The Nest is harvesting rain-water to fulfill its various water needs. It uses different rainwater collection techniques:

**Roof Collection:** The roof features gutters at the sides of the roof with vertical downspout to tank.

**Permeable pavement/concrete:** Permeable pavements are made of porous materials that allow water to flow through. Permeable pavements are used in the nest to collect rain and storm water for irrigation.

**Level based Tanks:** Rainwater is filtered and stored at all floors for use by residents. Once the water storage is full at all levels, it is pumped to the water tower. Hydrostatic pressure driven by gravity forces the water down through the filtration system to end-users when needed.
ANNUAL WATER COLLECTION

771,500 GALLONS
Rain water collected

WATER CYCLE SYSTEM SAVINGS

54%
Water would be saved per Person per Day

WATERSENSE TOILET
13,000 GALLONS
Saved Yearly

WATERSENSE SHOWER
27,000 GALLONS
Saved Yearly

NET-ZERO STRATEGIES
TWO METHODS TO HARVEST WIND

Wind is very abundant in Texas and we are going to use that to our advantage.

Stage 1

- **Windwall**
  - Rotors: 5" x 8.25" (26 count)
  - Frame: 4" x 4" Weather-resistant Timber Frame
  - Inverter Assembly: Produces AC power for end-use

Stage 2

- **Advanced Windwall**
  - Self-powering weather station
  - Advanced Ducting
  - Biomass rotate base

Far east field by the pedestrian walkway
Four Units
- (L x W x H) - 78in x 82in x 24in
- Max Output - 18KW @ 22mph

Average Wind Speed in Denton
As part of integrated systems, the water system will use unfiltered rainwater to keep the crops healthy.

Drain off can collect in a sump and be reused with passive siphon pumps.

Students that volunteer to work the facility will have an allowance for weekly produce.

Other residents will be able to pay a small fee less than a supermarket and get the freshest produce available, from the garden to the kitchen.

This space serves as another talking point on community development encouraging gardening as a part of daily lives.

Scheduled public access for volunteering, info sessions, and purchasing of produce.

Gardening is an introduction to a lifestyle and hopefully a change.

Provide a rewarding outlet to be active instead of being sedentary.

Encourage and teach sustainable gardening to lessen dependency on supermarkets.
THREE LOCATIONS TO HARVEST SOLAR

Stage 1
Roof-top PV
On-site Lot
Half of existing Lot#93

Stage 2
Remaining of existing Lot#93

289.8 MWH/YEAR

2021-2022

Stage 3
Lot#93 Stage-1

172 MWH/YEAR

NET-ZERO STRATEGIES
**Biogas from Waste**

To produce 1 kWh of electricity at 28% conversion efficiency takes approximately 12.0 ft³ methane.

**US Waste Produce**
1,642 pounds/person per year

**Solid Waste**
30%

**Volatile Solids**
88.5%

**Food waste**
21.9%

That's 359 lbs per person

**Biogas produced for each pound of volatile solids destroyed**

**15 ft**

Yearly, the Nest at 100% occupancy (152 residents) produces 54,570 lb of food waste, which is 217,200 ft³ of biogas, equating to 18.1 MWh of electricity.

**Biogas Cycle**

1. **Waste Chute**
2. **Vent Pipes** for internal pressure control
3. **Mechanical Room**
4. **Domed Chamber** for durability and environmental impact
5. **Collection Pipe** for tubing
6. **Compressor**

**On-site Greenhouse**

**Food Produce**

**Residents**

**Methane System**

**Biogas**

**Cooking**

**Heat**

**Hot-water**

**Waste**
INTEGRATED BUILDING INTELLIGENCE

Our system leverages the Building Controls (BMS) and integrates it with occupants’ cells phone behavior through powerful deep learning and artificial intelligence to achieve the following:

Building Controls (BMS)
- HVAC,
- Lighting
- Doors & Access
- Occupancy Sensors

Cell Phone App:
- Location of occupants
- Preferred Setpoints
- Behavior of each occupant as it relates to the building
- access to occupant calendar

1. ENERGY SAVINGS: Reduced equipment run hours
2. DYNAMIC OPTIMIZATION: (ie, automatically adjusting to the right set points for the right operating conditions. For example: when no one is detected in the apartment, go into unoccupied mode. Or when resident is within 2 miles from the building and is heading home, go into startup mode)
3. RESIDENT EXPERIENCE (RX): dynamic adjustment of the resident’s environment based on his predicted needs (heating shower few minutes before waking up, heat coffee machine few minutes before waking up)
INTEGRATED BUILDING INTELLIGENCE - RESIDENT EXPERIENCE RX

Dynamic adjustment of the resident’s environment based on their predicted needs. Such as: Heating shower few minutes before waking up or turning on the Coffee maker before waking up.

30 minutes before a Resident leaves the Apartment will go into ‘Unoccupied’ mode to reduce energy consumption

The Apartment will start HVAC on moderate comfort when the resident is on his way home Kicks in full comfort to the resident’s preferred set points when he arrives to the apartment

App tracks weather forecast to predict savings needed. For example when the weather forecasts lack of rain for the next couple of days, residents know to minimize water usage

Building systems anticipate the desire/needs of residents based on their data and history:

The entrance unlocks automatically when a resident gets close to the entrance.

The elevator moves down when resident of higher level are approaching the lobby

Hot water for shower, coffee maker, and other morning appliances are tied to the morning alarm settings on the mobile (or tied to prediction of waking time of each resident)
ACKNOWLEDGING THE FUTURE

- The **Culture of Sustainability** on this site inspires students to live differently and spread this lifestyle change to others
- Specific design features allow for easy **site expansions**
- Rain collection systems, and **renewable energy** systems can scale through existing and researched technology to increase power production
- **Geothermal heating** helps keep systems from freezing during abnormally low temperatures

EMBRACING UNCERTAINTY

- **2021 Texas Power crisis:** The power grid had 9 minutes of failure, with exterior temperatures in single digits
- Grid connected to solar, with a disconnect system would allow the building systems to remain operational
- Expansion of battery systems would allow for extended power through these types of circumstances
- The structure of the building can withstand high winds, small **Earthquakes**
- Future expansions would also include a bunker area to be used as a storm cellar should a **Tornado** occur
- Rain collection for independence from the city water supply
POTENTIAL GREEN & SMART BUILDING MATERIALS

- PCM Integrated Insulation
- Low E glass window
- Self healing coating
- Self growing bricks
- Heavy Timber construction, locally sourced within 500-mile radius
- Transplanted site greenery
MASS TIMBER
WARM TO THE TOUCH, THIS ELEGANT MATERIAL IS RAPIDLY RENEWABLE, AND INTRINSICALLY FLEXIBLE MAKING CONSTRUCTION METHODS PRACTICAL AND EFFICIENT. THE EXPOSED CEILING PLANE OFFERS A RICH FINISH WITH LAYERS OF CHARACTER.

* PCM INSULATION
AS AN ALTERNATIVE TO PETROLEUM BASED RIGID INSULATION, PHASE CHANGING INSULATION STORES AND RELEASES THERMAL ENERGY THROUGH THE NATURAL PROCESS OF FREEZING AND THAWING.
THIS IS HOW THE EAGLES NEST WILL PRESERVE SUSTAINABILITY, DRASTICALLY REDUCE CONSUMPTION BUILDING UTILITIES, AND PROVIDE CRUCIAL ON CAMPUS GRADUATE STUDENTS HOUSING AT UNT

Ryan Jensen
Fares Sweidan
Sal Alhelo

Gensler

EOS Labs

THANK YOU!!