THEORETICAL PREMISES

1 OPERATIONS

The waste management industry and local material business supply chains set the foundation for how a community considers and implements waste management practices. Research facilities that improve upon today's material industry can transform disregarded bi-products into usable resources. These resources may include waste from design, construction and demolition practices as well as operations that negate wasteful energy usage.

2 MATERIALS

Due to the recent growth and diversity of community involvement in the Fargo-Moorhead area, material management practices need to be redeveloped and implemented. New sustainable research and material practices currently exist but these resources have yet to reach their full potential. Continuing to facilitate the exponential growth of the communities' waste will require innovative material research, design and education integration.

3 INTERACTIONS

With the increasing amount of waste, alongside the vast amount of advanced technology and sustainable strategies; design and awareness can encourage the coexistence between humans and the waste we produce. The interaction of materials and collaborative methods will sustain a community for future growth. This interaction between material waste management and educational research can increase productivity and community wide involvement.

3rd FLOOR

MATERIAL TESTING LAB

Located along the two main corridors, research labs serve students, professors, and local businesses the opportunity for material testing and innovative development. The labs accommodate various class and business sizes and seek the collaboration among all researchers.

2nd FLOOR

BREAKOUT SPACES

Designated breakout spaces located around the main atrium and research offices allow for researchers to meet, discuss, and collaborate.

1st FLOOR

CENTER ATRIUM

As a center focal point to the buildings design, the center atrium allows for various activities to occur that may include lunch meetings, large gatherings, seminars, and several other social events.

1st FLOOR

ENTRYWAY

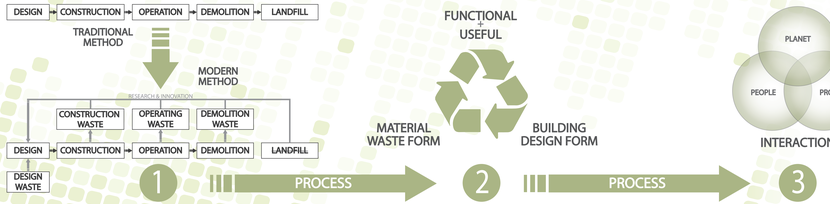
While entering the facility, a reception area followed by two corridors of material display allow for visitors and employees to learn about the innovative product emerging in the facility.

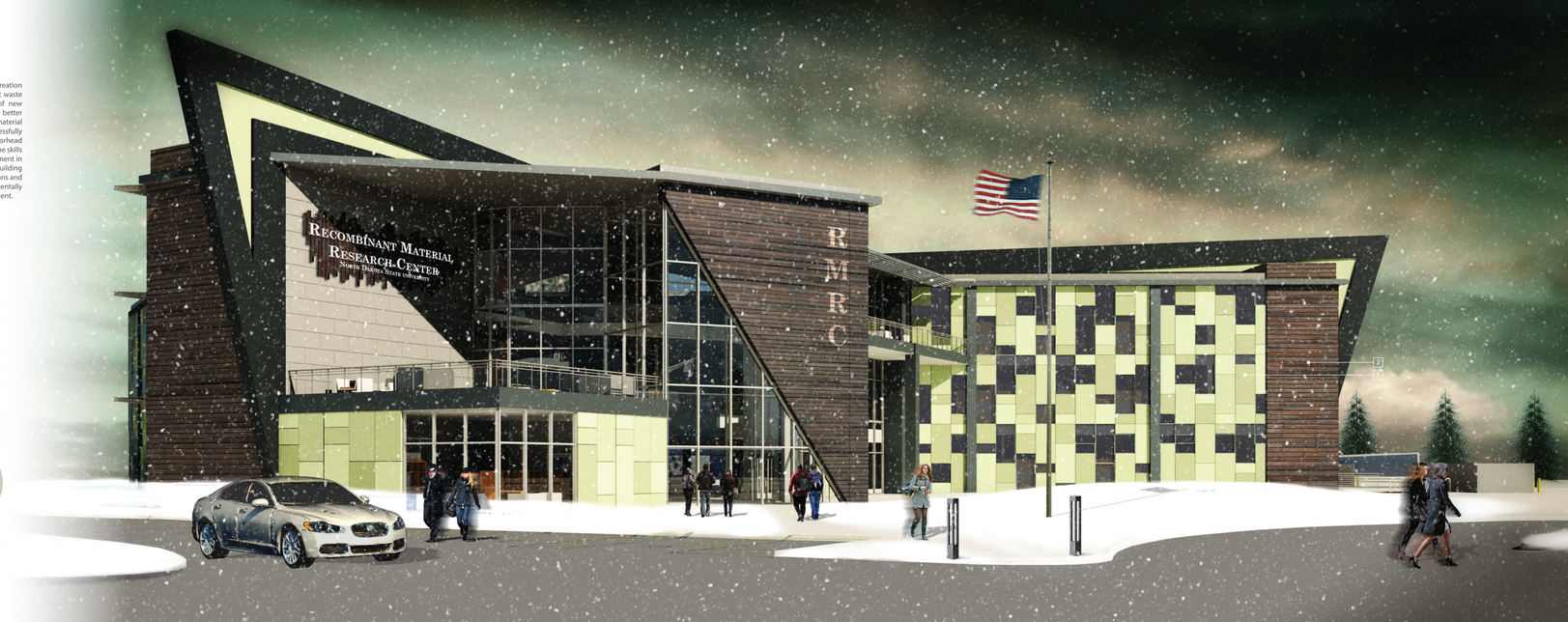
143-NDSU-8390 ARCH 772 Design Thesis - Spring Semester 2014
MATTHEW J PEICK | GANAPATHY MAHALINGAM
Revit | AutoCAD | Autodesk 360 | Sketchup Pro | Illustrator | Photoshop

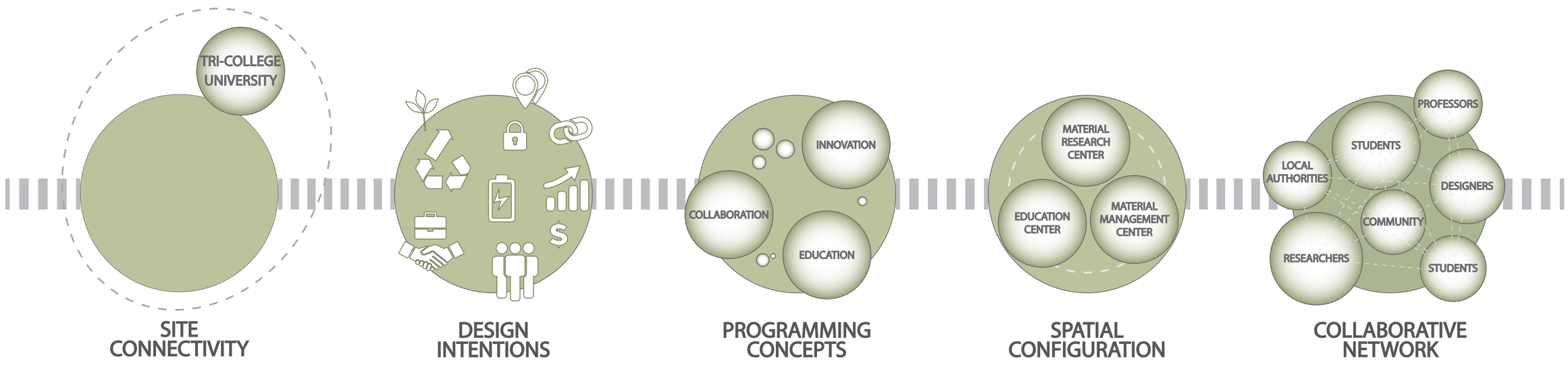
Material Interactions

A Center for Recombinant Waste

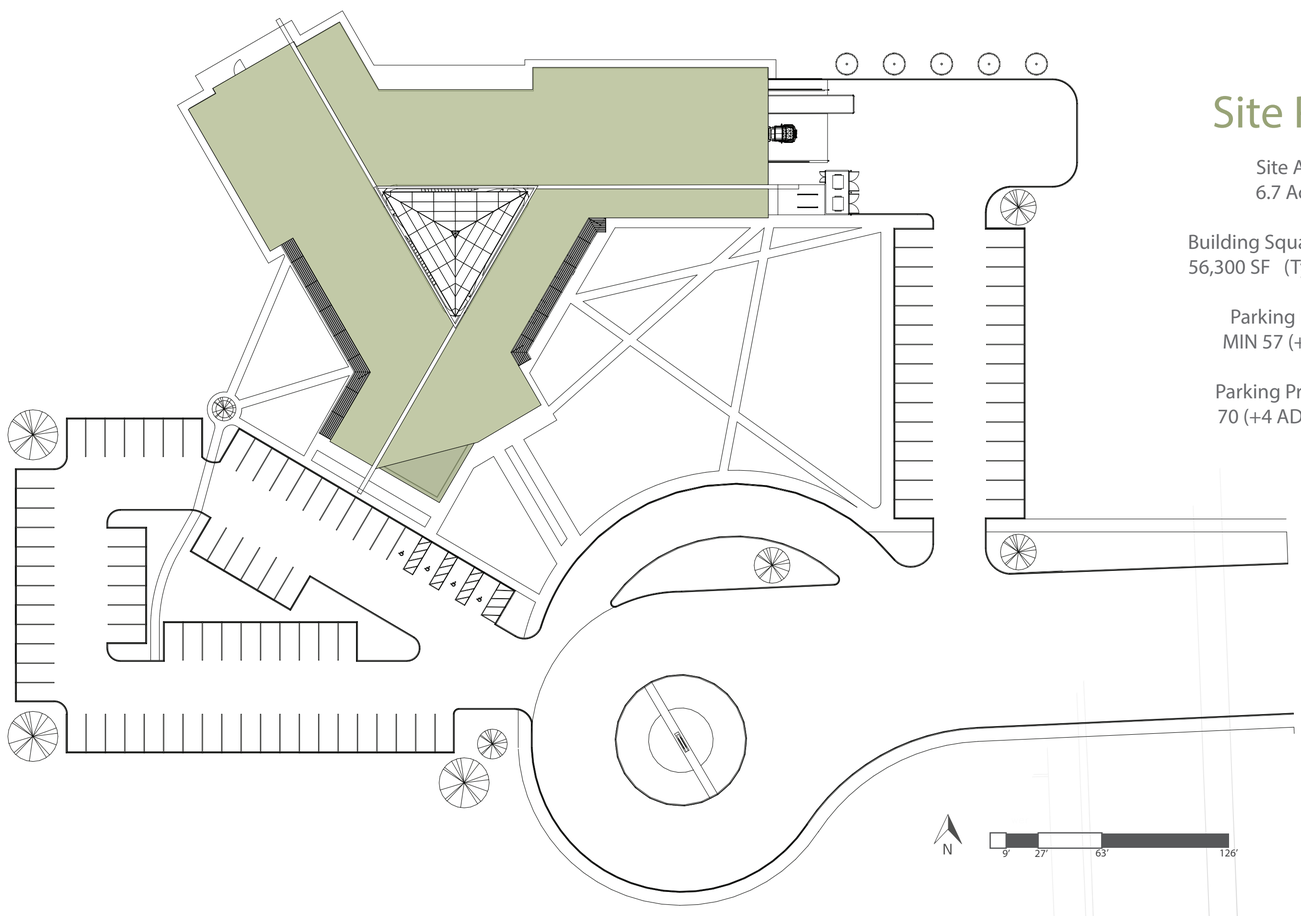
Issues relating to solid waste management and human interaction thrive as a current and future challenge for human existence. Due to the abundance of waste produced within our community, utilizing our advancements in new technology will enable a more sustainable environment. The abundance of waste produced around the world has negatively impacted our health, safety, and welfare for our current generation and those to come. A shift is required in our environmental understanding, social interactions, and economical practices in order to increase the use of bi-products and other disregarded resources. This thesis project aims to define the community's current and future relationship with material waste through the creation of a sustainable and educational recombinant waste research facility. Through the innovation of new materials, the proposed facility would allow a better understanding of the collaboration and material management required in order to successfully manage solid waste in the Fargo-Moorhead Community. Architectural design along with the skills of a diverse set of occupations is a key component in the realization of material innovation and building design. These traits will guide future generations and myself towards a more cyclical and environmentally receptive process for material waste management.







SITE CONNECTIVITY | DESIGN INTENTIONS | PROGRAMMING CONCEPTS | SPATIAL CONFIGURATION | COLLABORATIVE NETWORK



Site Plan

Site Area
6.7 Acres

Building Square Footage
56,300 SF (Type 'B' Occ.)

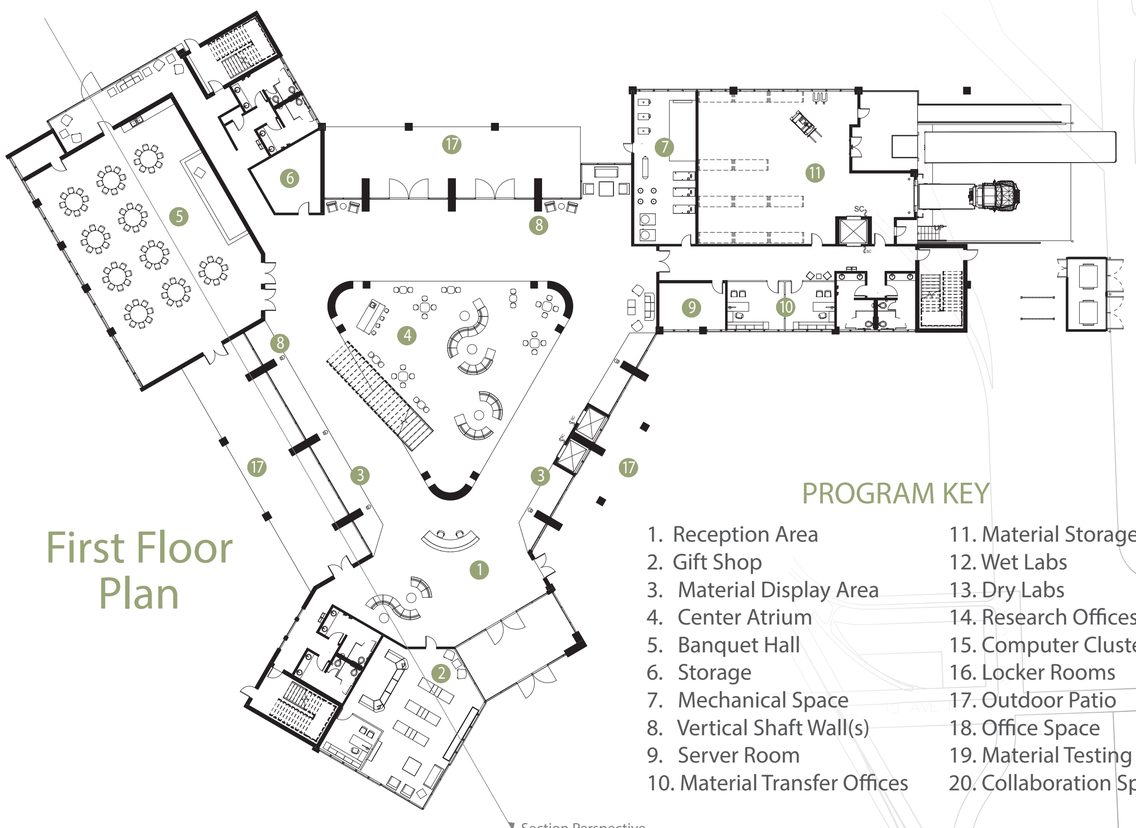
Parking Req'd -
MIN 57 (+3 ADA)

Parking Provided -
70 (+4 ADA Stalls)

"Local uniqueness matters...Spatial differentiation, geographical variety, is not just an outcome; it is integral to the reproduction of society and its dominant social relations. The challenge is to hold the two sides together; to understand the general underlying causes while at the same time recognizing and appreciating the importance of the specific and unique" (Burns & Kahn, 2005).

Site is often defined by its physical and visual characteristics offset by roads, trees and nearby structures. The relationship between a site and its society is a crucial aspect to understand. Measuring these interactions and the extent to which a site or material will effect the local community can play a critical role in sustaining the present and future life of the area.

The proposed site for the Recombinant Material Research Facility is within North Dakota State University's Research Park. This location has a huge influence in the design, success and community involvement within the proposed research facility in its connection to the Tri-college University system and local professionals. With a design philosophy of reducing, reusing and recycling the current waste stream, the proposed site allows for the current processes, systems and communication to remain in a close proximity.

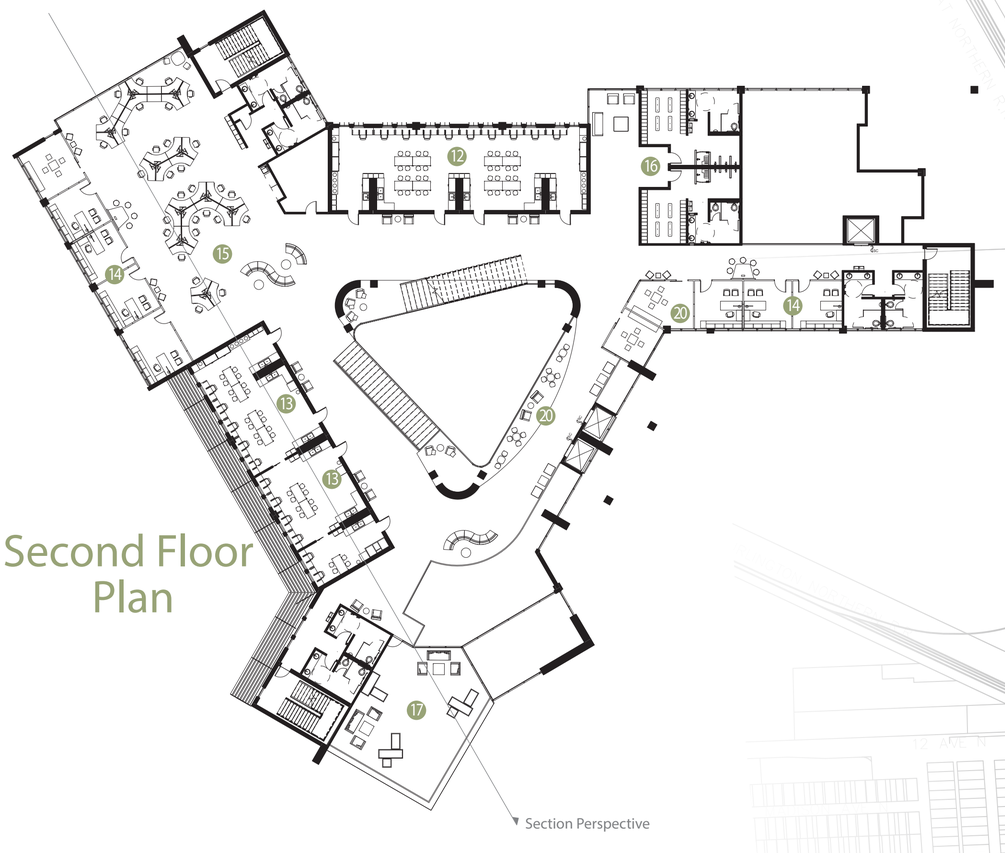


First Floor Plan

PROGRAM KEY

1. Reception Area
2. Gift Shop
3. Material Display Area
4. Center Atrium
5. Banquet Hall
6. Storage
7. Mechanical Space
8. Vertical Shaft Wall(s)
9. Server Room
10. Material Transfer Offices
11. Material Storage
12. Wet Labs
13. Dry Labs
14. Research Offices
15. Computer Cluster
16. Locker Rooms
17. Outdoor Patio
18. Office Space
19. Material Testing Lab
20. Collaboration Space

Section Perspective

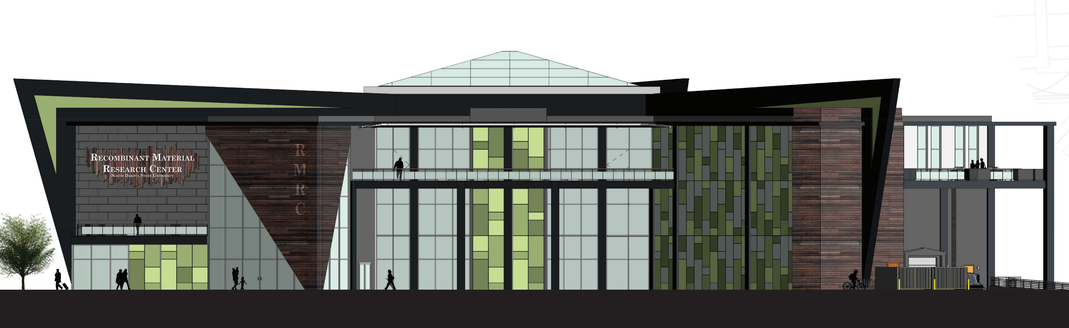


Second Floor Plan

Section Perspective

Third Floor Plan

Section Perspective



SOUTH EAST ELEVATION

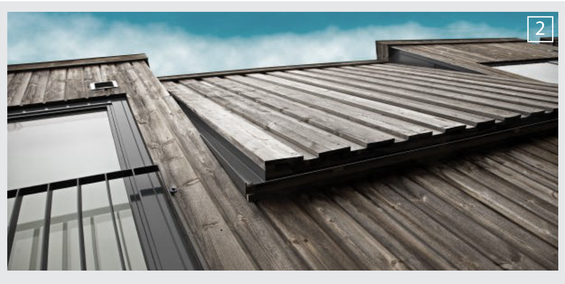
NORTH ELEVATION

PROBLEM STATEMENT

How do material interactions impact future relations between humans and solid waste management?

EcoX Fiber -
100% Recycled-glass precast concrete

Applications:
Furniture, Tiles, Counter tops,
Site Objects, & Wall Panels

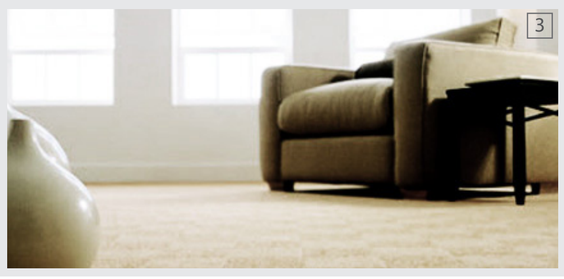


Kebony Wood - Pine, Maple & Beech
Biowaste from the sugar industry

Applications:
Cladding, Decking, Roofing,
Construction, Furniture, & Floors

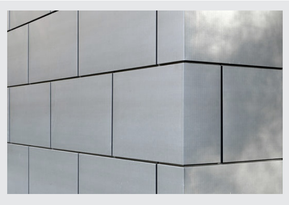
Nylon 6 Carpet Fiber -
Light Series - Visible Tile Carpet

Applications:
Carpet Flooring



3-Form -
High Density Polyethylene

Applications:
Counter Tops / Lab Surfaces



Dri-Design - Alum. Facade
Recycled content & long lasting

Applications:
Wall Panel Facade System

Envirolastech -
Recycled waste & plastic materials

Applications:
Pellets, Siding, Decking, &
Green Treated Replacement

Cotton Denim Insulation -
100% Recycled

Applications:
Ultratouch Cotton Fiber Insulation

Mycobond - Biocomposite
Agricultural Waste Products, Mycelium

Applications:
Rigid Board Insulation, Protective
Packaging, Acoustic Panels

Material Reuse

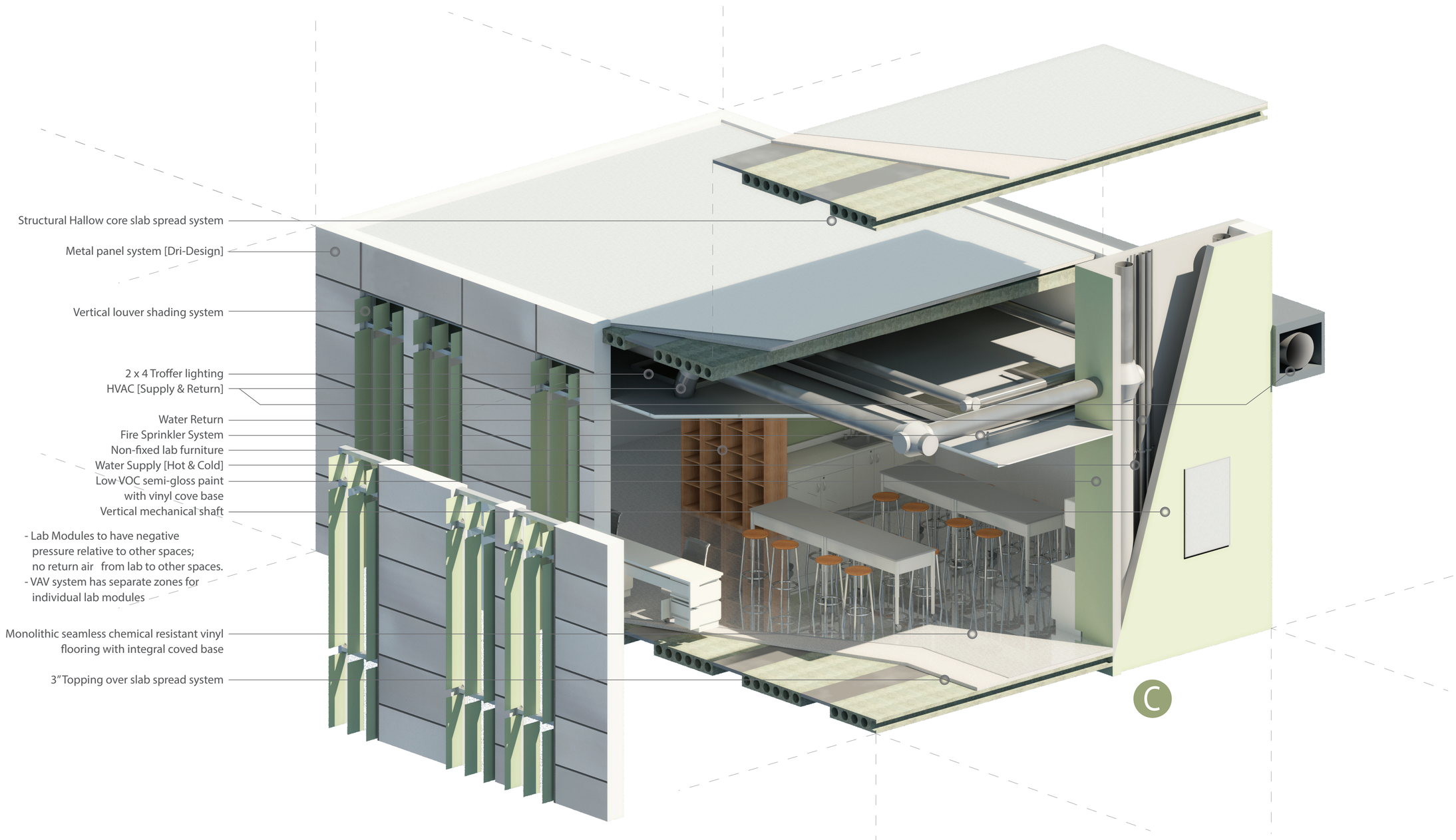
Recycled Content

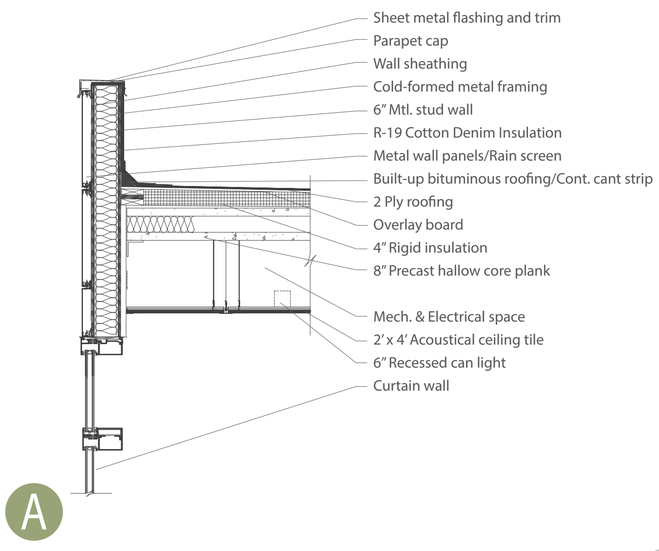
Regional Materials

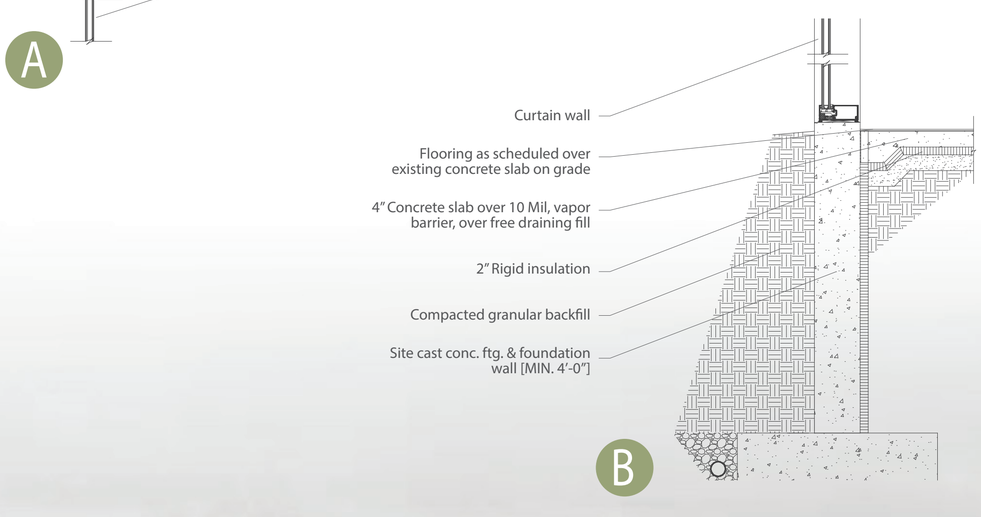
Rapidly Renewable Materials

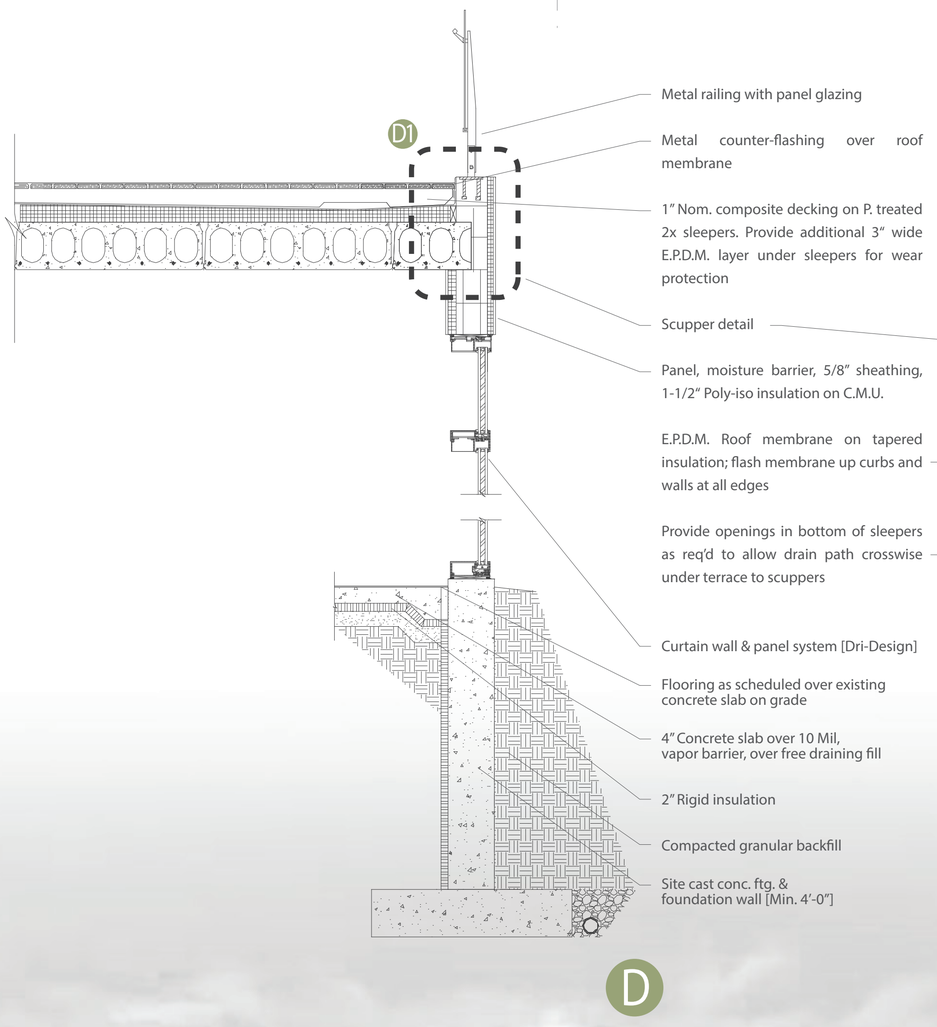
SUSTAINABLE INITIATIVES

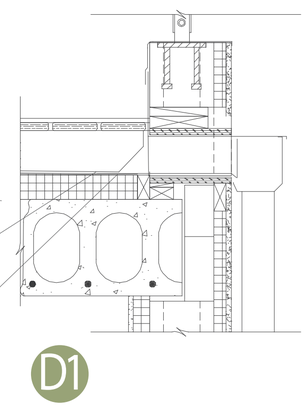
Sustainable design choices can be implemented in a variety of ways. Material selections, site location, energy efficiency and environmental quality are just a few of the sustainable initiatives that stimulate interactions between designers and those who utilize the space. Approaching a new era of environmental design standards, material selection will be an essential step in a holistic design process, rather than an additive element. Understanding the potential of a given material to be recycled or re-used will be a great influence on our community and the buildings we inhabit. Recognizing these initiatives and the benefits they provide allow for a deeper understanding of the specific processes and life cycles that take place in manufacturing, transportation, and installation of these materials. By providing universities and local businesses the opportunity to work in a collaborative and organized process we will have a more cyclical, cradle-to-cradle approach to sustainable living.











SECTION PERSPECTIVE