SUSTAINABLE ARCHITECTURAL DESIGN

JOSH DYGERT, AIA

EDWARD TUCKER ARCHITECTS, INC.

Edward Tucker
ARCHITECTS, INC.

1401 Sixth Avenue
Huntington, West Virginia 25701
304.697.4990 telephone
304.697.4991 facsimile
etarch.com

SUSTAINABLE ARCHITECTURAL DESIGN

WHAT DOES IT MEAN TO BE GREEN?

- **Sustainable** – of, or relating to, or being a method of harvesting or using a resource so that the resource is not depleted or permanently damaged (Merriam Webster)

- **Green** – tending to preserve environmental quality (as by being recyclable, biodegradable, or nonpolluting (Merriam Webster)

SUSTAINABLE ARCHITECTURAL DESIGN

ESTABLISHED SUSTAINABLE DESIGN INITIATIVES

- **USGBC** – US Green Building Council
- **LEED** – Leadership in Energy & Environmental Design
- **Sustainable Sites**
- **Energy Star**
- **& More**

WHAT ARE WE ULTIMATELY TRYING TO DO?

- Minimize the negative effects of our built environments on the natural environment.

2 PRIMARY STRATEGIES TO ADDRESS SUSTAINABLE ARCHITECTURAL DESIGN

- Respond responsibly to our natural environments
- Increase energy efficiency

SUSTAINABLE ARCHITECTURAL DESIGN

RESPOND RESPONSIBLY TO OUR NATRUAL ENVIRONMENT

1. Building siting/orientation
2. Utilize natural daylighting techniques
    1. Exterior sunshade devices
    2. Interior light shelves
3. Utilize passive conditioning techniques
    1. Cross ventilation
    2. Building mass heat sinks
    3. Appropriate exterior finishes for solar heat gain/loss
4. Storm water management

SUSTAINABLE ARCHITECTURAL DESIGN

INCREASE ENERGY EFFICIENCY

1. Design efficiently sized spaces.
2. Utilize improved building envelope systems
    1. Siding material/systems
    2. Insulation systems
    3. Moisture & vapor barriers
3. Install energy efficient mechanical systems
    1. HVAC equipment & controls
    2. Domestic hot water delivery
    3. Lighting & electrical fixtures

SUSTAINABLE ARCHITECTURAL DESIGN

BASIC DESIGN CONSIDERATIONS

1. Site Selection
2. Building Layout & Massing
3. Materials Selection
4. Mechanical & Plumbing Systems Design
5. Finishes
6. Material Waste Management

SUSTAINABLE ARCHITECTURAL DESIGN

BASIC DESIGN CONSIDERATIONS

1. Site Selection
    1. Availability of utilities
    2. Availability of nearby services
    3. Previously developed site vs. untouched site
        1. Existing utilities
        2. Inherent non-sustainable qualities of disturbing existing nature
        3. Embodied energy

SUSTAINABLE ARCHITECTURAL DESIGN

BASIC DESIGN CONSIDERATIONS

2. Building Layout & Massing
    1. Building Orientation
        1. Daylighting
        2. Passive heating/cooling
        3. Storm water management
    2. Efficiency of Space
        1. Efficiency of materials
        2. Ease and efficiency of HVAC systems

SUSTAINABLE ARCHITECTURAL DESIGN

BASIC DESIGN CONSIDERATIONS

3. Materials Selection
    1. Reduce, Reuse, Recycle
    2. Good space design can eliminate unnecessary decoration
    3. Use sustainable materials
        1. Materials high in recycled content (steel)
        2. Sustainably grown, harvested **& DELIVERED** natural materials
        3. Materials that require fewer supplementary pieces, treatments, etc.
        4. Honest materials (my personal issue)
    4. Quality exterior envelope materials
        1. Windows & doors
        2. Insulation systems

SUSTAINABLE ARCHITECTURAL DESIGN

BASIC DESIGN CONSIDERATIONS

4. Mechanical & Plumbing Systems
    1. System type selection
        1. Plumbing
            1. Well vs city water
        2. Power Generation
            1. Grid vs photovoltaic
            2. Supplementary power
        3. Mechanical (HVAC)
            1. Geothermal, etc. vs coolant based
    2. System Sizing
    3. Ceiling Fans
    4. Operable Window Unit Layout

BASIC DESIGN CONSIDERATIONS

5. Finishes
    1. Exterior finishes
        1. Long lasting, sustainably produced exterior envelope materials
        2. Exterior finish systems that work with the building mechanical systems
            1. Rain screen systems
            2. Window treatments
    2. Interior finishes
        1. Healthy products
        2. Long lasting, easy to maintain

BASIC DESIGN CONSIDERATIONS

6. Material Waste Management
    1. Reduce
        1. Minimize material that leaves the site
    2. Reuse
        1. Reuse salvaged material in the new work
        2. Divert useful materials to systems like Habitat for Humanity's ReStore
    3. Recycle

BASIC DESIGN CONSIDERATIONS

7. Building Pollution Management
    1. Storm water runoff management
    2. Light pollution management

SUSTAINABLE ARCHITECTURAL DESIGN

EDWARD TUCKER ARCHITECTS, INC.

1401 6TH AVENUE
HUNTINGTON, WV

SUSTAINABLE ARCHITECTURAL DESIGN

EDWARD TUCKER ARCHITECTS, INC.
1401 6TH AVENUE
HUNTINGTON, WV

1. SITE SELECTION/PROPERTY ACQUISITION
    1. Looked at multiple properties
    2. Developed at least 3 schematic plans
    3. Were able to reuse 99.57% of the existing building structure

SUSTAINABLE ARCHITECTURAL DESIGN

EDWARD TUCKER ARCHITECTS, INC.
1401 6TH AVENUE
HUNTINGTON, WV

2. ABATEMENT / DEMOLITION

SUSTAINABLE ARCHITECTURAL DESIGN

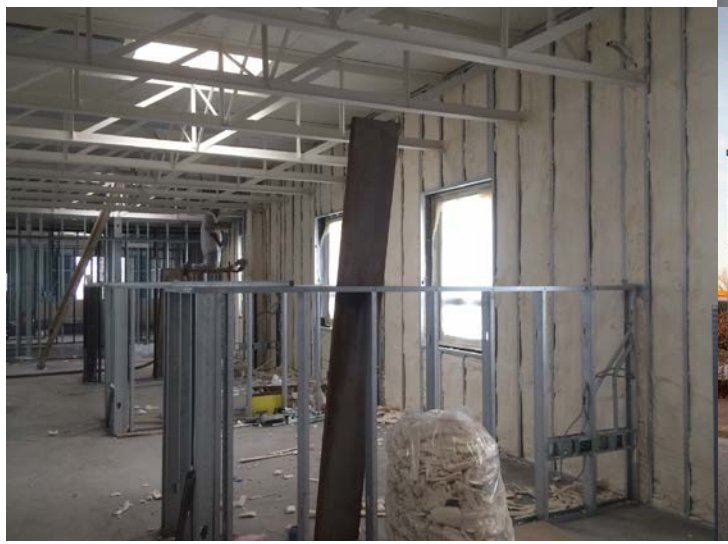
EDWARD TUCKER ARCHITECTS, INC.
1401 6TH AVENUE
HUNTINGTON, WV

2. ABATEMENT / DEMOLITION
    1. Hazardous material testing
    2. Hazardous material abatement & disposal
    3. Typical demolition material disposal
        1. Clean fill sites vs land fill
        2. Recycling
            1. 78.4% construction debris by weight was diverted from landfill
        3. ReStore
        4. Reuse (table tops/base)
    4. Indoor air quality
        1. Filters on HVAC system during demo
        2. No smoking for laborers in the building at any point

SUSTAINABLE ARCHITECTURAL DESIGN

EDWARD TUCKER ARCHITECTS, INC.
1401 6TH AVENUE
HUNTINGTON, WV

3. Exterior Envelope Improvements
    1. New Roof
    2. New windows
    3. Spray Insulation



SUSTAINABLE ARCHITECTURAL DESIGN

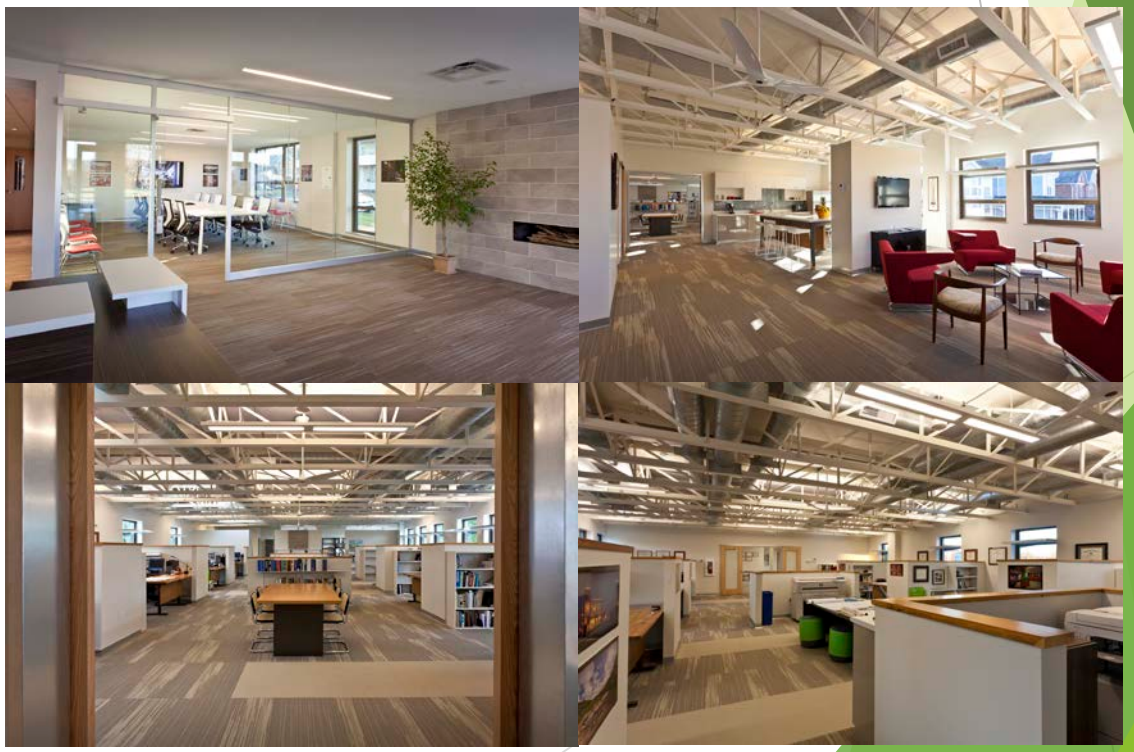
EDWARD TUCKER ARCHITECTS, INC.
1401 6TH AVENUE
HUNTINGTON, WV

4. Systems Improvements
    1. Plumbing
        1. Have reduced water use by 38%
    2. Mechanical
        1. Ultra efficient split HVAC systems
        2. Ceiling Fans
    3. Electrical
        1. LED & fluorescent light fixtures
        2. Lighting control system
    4. Sound Masking System

SUSTAINABLE ARCHITECTURAL DESIGN

EDWARD TUCKER ARCHITECTS, INC.
1401 6TH AVENUE
HUNTINGTON, WV

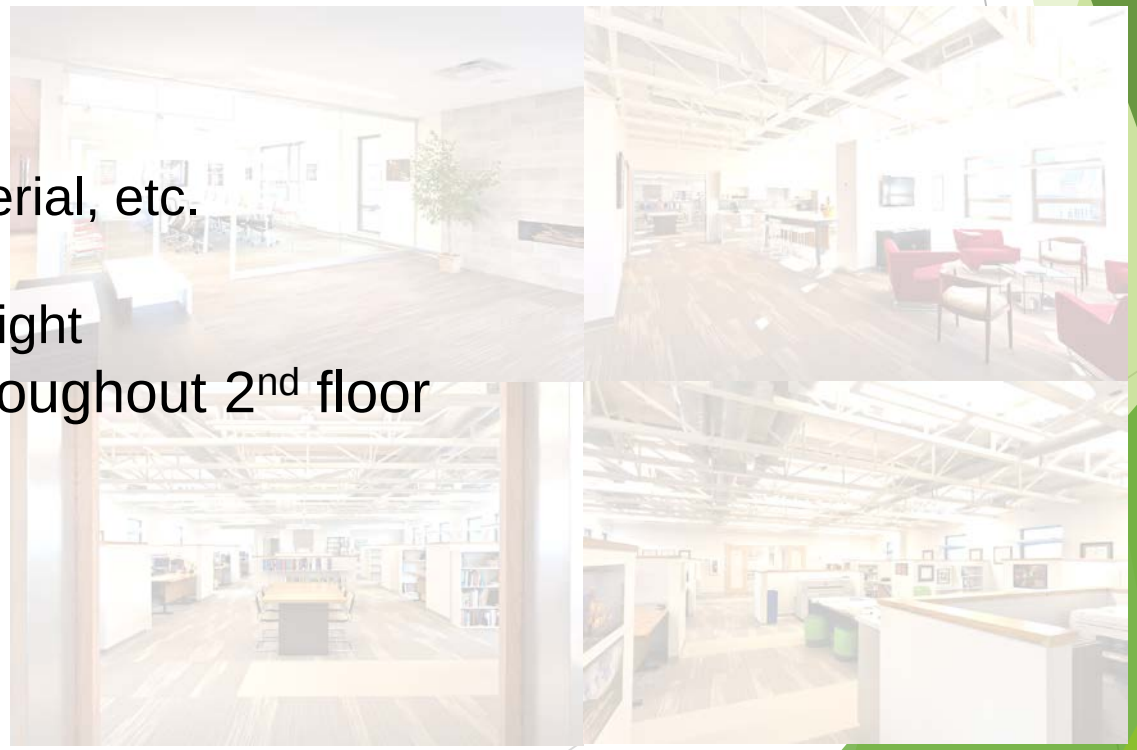
5. Interior Architectural Design



SUSTAINABLE ARCHITECTURAL DESIGN

EDWARD TUCKER ARCHITECTS, INC.
1401 6TH AVENUE
HUNTINGTON, WV

5. Interior Architectural Design
    1. Open floor plan
        1. Fewer partitions, doors, material, etc.
        2. Better air movement
        3. Better access to natural daylight
    2. Communal/shared spaces throughout 2nd floor



EDWARD TUCKER ARCHITECTS, INC.
1401 6TH AVENUE
HUNTINGTON, WV

EDWARD TUCKER ARCHITECTS, INC.
1401 6TH AVENUE
HUNTINGTON, WV

EDWARD TUCKER ARCHITECTS, INC.
1401 6TH AVENUE
HUNTINGTON, WV

EDWARD TUCKER ARCHITECTS, INC.
1401 6TH AVENUE
HUNTINGTON, WV

EDWARD TUCKER ARCHITECTS, INC.
1401 6TH AVENUE
HUNTINGTON, WV

EDWARD TUCKER ARCHITECTS, INC.
1401 6TH AVENUE
HUNTINGTON, WV

EDWARD TUCKER ARCHITECTS, INC.
1401 6TH AVENUE
HUNTINGTON, WV

EDWARD TUCKER ARCHITECTS, INC.
1401 6TH AVENUE
HUNTINGTON, WV

EDWARD TUCKER ARCHITECTS, INC.
1401 6TH AVENUE
HUNTINGTON, WV