eppstein uhen : architects

West Bend Joint School District #1
Badger Middle School

Sustainable Design Features
05.29.09

Sustainable Design Features (General Construction)

- Building /site reuse – Utilizing community assets by renewing an existing site and retaining a portion of the existing building for re-use.
- High-performance insulated cavity-wall wall system for building envelope.
- Insulated low-E tinted glass on east, south, & west elevations to reduce glare and building heat gain.
- Thermally broken window frames to reduce temperature transfer between the interior and exterior spaces during building heating and cooling cycles.
- Insulated low-E clear glass on north elevation maximizes daylight to interior spaces and minimizes building heat loss.
- 10' high ceilings as existing structure allows for daylight to penetrate deeply into classrooms.
- Centrally located mechanical equipment rooms to reduce duct sizes and length of duct runs for HVAC system.
- Operable windows for natural ventilation.
- Clerestory windows in select spaces, introducing daylight to supplement artificial lighting systems. Areas likely for consideration to receive this treatment are:
    - New corridors.
    - Building entry & cafeteria.
- No VOC and low VOC paint, adhesives and flooring promotes healthier indoor air environment.
- Recycled content in carpet tile backing and fiber (PVC free backing & Green Label Plus).
- Recycled content in ceiling tiles (low or no VOC & formaldehyde free).
- Recycled content in porcelain tile (durable & long life cycle).
- Recycled content in high pressure plastic laminate (no urea-formaldehyde).
- Natural rubber wall base and stair treads promotes healthier indoor air environment (Rapidly renewable materials).
- Possible local materials available (within 500 miles) that reduce shipping emissions:
    - Prefinished wood doors (Eggers – Appleton & Algoma)
    - Steel from local fabricators
    - Brick (Belden – Ohio & Glen Gary – Illinois)
    - Precast concrete panels - (Spancrete – Waukesha, JW Peters – Burlington, International Concrete Products - Germantown)
    - Concrete Block (County Materials – Waukesha, Best Block – Menomonee Falls)
    - Drywall (Georgia Pacific – Indiana, USG – several local plants)

Sustainable Design Features (Mechanical**)**

- Provide selected areas with dedicated air conditioning equipment for summer cooling.
- Digitally controlled, web-based HVAC controls system.
- Sensors in regularly occupied and most unoccupied rooms to control heating and cooling.
- Selection of HVAC equipment utilizing R410a refrigerant - which is a non-CFC refrigerant.

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- Provide variable frequency drives for large motor controls. This includes hydronic system pumps and air handling units.
- Use of Energy Recovery Units to pre-temper incoming ventilation air for spaces utilizing large air handling equipment and make-up air units.
- Provide added ventilation air to shower/locker room areas for increased odor and humidity control.
- Provide modular high efficiency condensing boiler.

Sustainable Design Features (Electrical**)**

- Lumen power density (LPD) goal of 1 watt/square foot (maximum).
- Direct/indirect T5HO fluorescent luminaires to reduce glare where possible.
- Dual switched/dimmed, low harmonic, electronic ballasted light fixtures in classrooms to promote energy efficiency in conjunction with ambient light sensors (Calibratable Photocells)
- High lumen, long life linear fluorescent (T5HO) and compact fluorescent lamps throughout in combination with high output, premium ballasts such as the Phillips "Optanium".
- Building wide, low voltage lighting control system for additional "sweep" off control and programmed scheduling.
- Sensors in regularly occupied and most unoccupied rooms to control lighting.
- Photocells and timeclock override for all exterior lighting equipment.
- Parking lot luminaires to utilize "Pulse Start" technology.
- Automatically controlled window shading devices for clerestory windows (Potentially).
- Utilize night light/security lighting as egress lights (generator fed) eliminates need for secondary emergency egress lighting system and associated equipment
- Possible local materials available (within 500 miles) that reduce shipping emissions:
    - Lighting equipment – Visa (Milwaukee), Manning (Sheboygan), Phoenix Products (Milwaukee), Brass Light Galleries (Milwaukee) Cooper Products (Chicago), Focal Point Lighting (Chicago),
    - Distribution equipment – Square D Company (Milwaukee), Eaton/Cutler Hammer (Chicago)
    - Communications Systems – Cornell Electronics (Milwaukee)

Sustainable Design Features (Plumbing)

- Use high efficiency water heating equipment.
- Install low flow water closets – 1.6 gpf/0.5 gpf.
- Install 1/8 gpf urinals (use 80% less water).
- Utilize sensor operating faucets that shut-off while a persons hands are not in the active area. (use 70% less water).
- Install faucets with 1/2 gpm aerators (reduce waste water by 80%).
- Possible local materials manufactured with-in 500 miles of project site.
    - Plumbing Fixtures (Kohler – Kohler, WI)
    - Lavatory Stations and Emergency Fixtures (Bradley – Menomonee Falls, WI)
    - Flush Valves and Faucets (Sloan – Franklin Park, IL)
    - Toilet Seats (Bemis – Sheboygan Falls, WI)
    - Stainless Steel Sinks & Electric Water Coolers (Elkay – Oak Brook, IL)
      Valves (Milwaukee Valve Co. – Milwaukee, WI)

Sustainable Design Features (Site**)**

- Stormwater Management Design – Quantity Control
    - Limit the disruption of natural drainage patterns by maintaining existing drainage swales, slopes and ground surface cover to the maximum possible extent.
    - Modify the proposed site plan to reduce the total amount of impervious area on the site, if achievable.
    - Provide on-site storm water facilities (i.e. biofiltration and/or infiltration basins and swales) to control stormwater runoff rates and promote infiltration; therefore reducing the amount of stormwater runoff leaving the property.
- Stormwater Management Design - Quality control
    - Modify the proposed site plan to reduce the total amount of impervious area on the site, if achievable.
    - Provide on-site storm water facilities to control stormwater runoff and promote infiltration; therefore removing pollutants from the stormwater runoff via the use of bioswales/basins, dense vegetated buffers, and infiltration swales/basins.
- Landscaping

  The following will be the guideline used to prepare the landscaping plan. The key to creating a sustainable landscape is an understanding that the design process should be considered first. Plant selection, implementation, and maintenance build on the overall design process, each having sustainability as a major consideration throughout the process. The landscape plan is developed from information collected about the site, people that use the site, and structures located within and adjacent to the site. Base plan information is the starting point in the development of a sustainable landscape design. Information is obtained from several places and can involve communicating with many people and stakeholders with the project. There are five considerations in designing a sustainable landscape. The landscape should be:

    1. Functional

       A functional landscape allows for the easy accomplishment of movement, work, recreation and leisure that occurs in and around the landscape. These functions are related to the actual process or activities associated with a family, a business, or a public place.
    2. Maintainable

       The functional and maintainable considerations are closely related. A functional design has more to do with the users of the landscape while a landscape that is maintainable is easier for landscape managers to take care of. In other words, a landscape should be functional from both a use and maintenance standpoint. A maintainable landscape provides for reduced maintenance at a particular maintenance level or condition. This lowers labor costs and makes maintenance operations easier. A maintainable landscape also reduces the need for inputs such as fertilizers, pesticides, equipment, water and other things. It is important to note that it only reduces the amount of input needed; it does not eliminate it.
    3. Environmentally Sound

       An environmentally sound landscape design must first be functional and maintainable. In addition, the proper design of plants and related hardscaping greatly affects the quality of that landscape over its entire

life. For example, the use of native plants follows the philosophy of "right plant right place" as well as "right plant right purpose" can dictate the amount of environmental, disease, and insect stress that a plant can tolerate. A plant continually in stress will require more maintenance. That means more labor, fertilizer, pesticides, and ultimately cost.

4. Cost Effective
   In a sustainable landscape design, the consideration of cost effectiveness is impacted by the processes, plants and hard-goods used in the implementation of that landscape, and by the quality of each. Cost should not dictate whether the landscape is functional, maintainable, or environmentally sound. These considerations should be met regardless of the budget. In other words a simple low cost landscape should be as sustainable as an extensive high cost landscape. In many cases, the installation cost of a sustainable landscape may be less. Certainly the ongoing maintenance costs of a functional, maintainable, and environmentally sound landscape will be lower, which means considerable savings throughout the life of the landscape.
5. Visually Pleasing
   A visually pleasing landscape is what we all strive for. The considerations of functionality, maintainability, environmental soundness, and cost effectiveness provide the framework needed to create a visually pleasing landscape. Designing a sustainable landscape requires the integration of more variables but should not affect the aesthetic value of the landscape.