

MHC Environmentally Responsible Green Building Design and Construction Guidelines Worksheet

October 2005

II. Environmentally Responsible Green Building Design Guidelines

| II.A. Site Selection and Stewardship | Implement Y, N, N/A | Comments |
|---|------------------------|----------|
| A.1.0 Site Selection | | |
| 1.1 Development Area | | |
| a. Avoid sensitive natural features/restricted land use | | |
| b. Choose developed area | | |
| c. Choose area with existing infrastructure | | |
| d. Orient to existing trees/plantings to block sun/wind | | |
| A.2.0 Site Analysis and Development | | |
| 2.1 Resource Conservation | | |
| a. Inventories Needed/Completed | | |
| b. Map Sun/Shade, Wind | | |
| c. Conserve natural areas for habitat/diversity | | |
| d. Minimize impact on hydrology | | |
| 2.2 Site Access and Transportation and Parking | | |
| a. Provide safe bike and walking routes | | |
| b. Provide bike racks/changing rooms if not available | | |
| c. Locate convenient to bus stop | | |
| d. Mimimize parking and avoid new spaces | | |
| 2.3 Building Footprint and Utility Placement | | |
| a. Minimize building footprint | | |
| b. Cluster underground utilities | | |
| c. Locate underground utilities in roadways/firelanes | | |
| 2.4 Stormwater (SW) Runoff Generation and Management | | |
| a. Maintain natural SW flows promoting infiltration | | |
| b. Minimize need for paved surfaces | | |
| c. Mimimize runoff from paved surfaces | | |
| d. Use natural runoff control/treatment systems | | |
| e. Reuse storm water for non-potable uses | | |
| f. Hold slopes in place with biotechnical controls | | |
| g. Use greenwall technology | | |
| h. Use planted buffers to direct drainage | | |
| 2.5 Reducing Heat Island Effects | | |
| a. Design planting to maximize shade | | |
| b. Utilize technology to reduce heat absorption | | |

| II.A. Site Selection and Stewardship | Implement Y, N, N/A | Comments |
|--|------------------------|----------|
| 2.6 Utilize Sustainable Landscape Practices | | |
| a. Use native/adapted plants w/ diversity | | |
| b. Avoid high maintenance plants/pest problems | | |
| c. Orient plants in same direction as growth | | |
| d. Use plants not requiring irrigation | | |
| 2.7 Improve Soil Quality | | |
| a. Analyze/improve planting soil | | |
| b. Implement soil remediation as needed | | |
| c. Mulch plant beds | | |
| d. Use compost from on-campus, avoid peat moss | | |
| e. Compost green waste from site | | |
| 2.8 Select Appropriate Materials for Landscape Features | | |
| a. Use local/recycled/renewable materials | | |
| b. Use rapidly renewable materials | | |
| c. Use wood with natural rot-resistance | | |
| d. Use wood free from chromated copper arsenate | | |
| | | |
| II.B. Building Orientation / Design Characteristics | Implement Y, N, N/A | Comments |
| B.1.0 Topography | | |
| a. Limit cut and infill by using existing contours | | |
| b. Utilize/modify topography to use earth insulation | | |
| | | |
| B.2.0 Building Orientation | | |
| a. Optimize placement to reduce energy loads | | |
| b. Minimize/maximize prevailing wind impact | | |
| c. Maximize passive solar opportunities | | |
| | | |
| B.3.0 Use of Natural Light | | |
| a. Optimize use of daylight | | |
| b. Reduce electric lighting; Daylight harvesting | | |
| c. Strive for line of sight to vision glazing | | |
| d. Avoid use of large glass atria | | |
| e. Maximize daylight w. windows/skylights/glazing | | |
| f. Consider high clerestory windows | | |

| II.B. Building Orientation / Design Characteristics | Implement Y, N, N/A | Comments |
|---|------------------------|----------|
| B.4.0 Building Envelope | | |
| 4.1 Window Frame and Glazing Performance | | |
| a. Use thermal break with metal frames | | |
| b. Control solar heat gain w. glass selection | | |
| c. Consider fritted/select glazing on south/east/west | | |
| d. Minimize infiltration w. hp weather stripping | | |
| e. Consider shading to exclude heat and glare | | |
| 4.2 Effective Insulation | | |
| a. Optimally insulate building shell | | |
| b. Avoid thermal bridging | | |
| c. Use sufficient thermal mass when storing heat | | |
| 4.3 Air and Moisture Control in the Building Envelope | | |
| a. Detail envelope to minimize infiltration/moisture | | |
| b. Examine all potential moisture condensation points | | |
| c. Ensure internal humidity is properly ventilated | | |
| 4.4 Heat Island Control | | |
| a. Install/replace with Energy Star roofing | | |
| b. Consider vegetated roofs | | |
| 4.5 Heat Loss through Stack Effect Control | | |
| a. Seal bldg areas to reduce convective heat loss | | |
| b. Plan air pressure relationships between rooms | | |
| c. Detail ductwork/fireplaces to reduce heat loss | | |
| | | |
| II.C. Building Mechanical Systems | Implement Y, N, N/A | Comments |
| C.1.0 Alternative Energy Sources | | |
| a. Passive solar | | |
| b. Solar hot water | | |
| c. Ground heat pump systems | | |
| d. Daylight as alternative to electric light | | |
| e. Expanded cogeneration operations | | |
| f. Energy conserving devices | | |
| C.2.0 Heating Ventilation and Air Conditioning Systems | | |
| 2.1 Heating | | |
| a. Engineer systems to meet actual heating loads | | |
| b. Use existing ems to control heating equipment | | |
| c. Design for specific occupancy | | |

| II.C. Building Mechanical Systems | Implement | Comments |
|--|-----------|----------|
| | Y, N, N/A | |
| 2.1 Heating [continued] | | |
| d. Use zoned heating distribution systems | | |
| 2.2 Equipment | | |
| a. Use air handling eqpmt w. low infiltration-high effic | | |
| b. Use high efficiency boilers | | |
| c. Use high efficiency hot water heating equipt | | |
| d. Use heating equipment that resets on outside air | | |
| e. Use VAV systems where appropriate | | |
| f. Use VFD for fans/pumps | | |
| g. Use quality thermal system insulation practices | | |
| 2.3 Cooling | | |
| a. Connect to chilled water system | | |
| b. Use energy efficient cooling equipment | | |
| c. Engineer systems to meet actual cooling loads | | |
| d. Design for specific occupancy | | |
| e. Use refrigerants with low environmental impact | | |
| 2.4 Ventilation | | |
| a. Install CO2 sensors | | |
| b. Meet/exceed inst. rate for outdoor air ventilation | | |
| c. Systems to comply w/Ashrae 90.1 and 129-1997 | | |
| d. Systems to prevent mold/moisture | | |
| C.3.0 Domestic Hot Water | | |
| a. Use energy star hot water heaters | | |
| b. Hot water heaters not oversized | | |
| c. Locate hot water heaters close to use | | |
| d. Insulate hot water piping | | |
| e. Use low flow shower heads | | |
| C.4.0 Energy Management | | |
| a. Energy controls to College EMS | | |
| b. Local controls user friendly | | |
| II.D. Electrical Power and Lighting Systems | | |
| | Implement | Comments |
| | Y, N, N/A | |
| D.1.0 Interior and Exterior Lighting | | |
| 1.1 Interior Light Levels | | |
| a. Use energy efficient electrical fixtures | | |

| II.D. Electrical Power and Lighting Systems | Implement Y, N, N/A | Comments |
|---|------------------------|----------|
| D.1.0 Interior and Exterior Lighting | | |
| 1.1 Interior Light Levels [continued] | | |
| b. Use fluorescent lights | | |
| c. Use LED exit lights | | |
| 1.2 Energy Conservation Interior Lighting | | |
| a. Connect light controls to building energy system | | |
| b. Use multi-level switching thinking of end user | | |
| c. Use occupancy sensors | | |
| 1.3 Exterior Lighting Levels | | |
| a. Use std Kim light fixtures for pedestrian/roadways | | |
| b. Use EMS to control timing | | |
| | | |
| D.2.0 Efficient Power Distribution | | |
| a. Use voltage at 13,800 volts or 4,160 volts | | |
| b. Check electrical equipment w/infrared scanning | | |
| c. Avoid electric resistance heating equipment | | |
| d. Expand cogeneration | | |
| e. Replace transformers with K rated | | |
| f. Use VFD for motors over 10 hp | | |
| g. Replace electric motors w/super E motors | | |
| | | |
| II.E. Water Use and Efficiency | Implement Y, N, N/A | Comments |
| E.1.0 Water Conservation | | |
| a. Use low flow toilets/urinals | | |
| b. Use spring return water faucets or proximity sensors | | |
| c. Reclaim ground, gray, and storm water runoff | | |
| d. Meter potable water use | | |
| e. Composting toilets | | |
| | | |
| II.F. Materials and Resources | Implement Y, N, N/A | Comments |
| F.1.0 Waste Prevention | | |
| 1.1 Use of Existing Structures | | |
| a. Renovate existing buildings | | |
| b. Reuse existing structural components/furishings | | |

| II.F. Materials and Resources | Implement Y, N, N/A | Comments |
|---|------------------------|----------|
| 1.2 Efficient Materials Use and Waste Prevention | | |
| a. Design spaces efficiently to min. square footage | | |
| b. Reduce material use by structural design | | |
| c. Design to accomodate future needs | | |
| d. Design for disassembly and reuse | | |
| e. Use durable products extending life expectancy | | |
| 1.3 Reuse of Materials | | |
| a. Review existing structure for deconstruction/reuse | | |
| b. Use salvaged materials | | |
| 1.4 Building Operations | | |
| a. Building designed to encourage recycling | | |
| b. Provide recycling areas on each floor | | |
| c. Provide centralized storage/unobstructed access | | |
| d. Clearly label recycling areas/containers | | |
| F.2.0 Environmentally Responsible Materials | | |
| 2.1 Regional Materials | | |
| a. Establish project goals for regional materials | | |
| 2.2 Recycled Content | | |
| a. Establish project goals and specs using LEED | | |
| b. Consider plywood alternatives | | |
| c. Consider recycled composite materials | | |
| 2.3 Certified Wood | | |
| a. Establish project goals/specs using FSC wood | | |
| b. Reduce large timber use | | |
| c. Avoid materials containing toxic preservatives | | |
| 2.4 Rapidly Renewable Building Materials | | |
| a. project goals/specs using LEED std. | | |
| b. Consider rapidly renewable materials | | |
| II.G. Indoor Environmental Quality | | |
| G.1.0 Air Contaminant Source Control | | |
| a. Establish projects goals/specs for low VOC mtl | | |
| b. Collect and review MSDS/mfg certifications | | |
| c. Identify cont./odor sources ventilate appropriately | | |

| II.G. Indoor Environmental Quality | Implement Y, N, N/A | Comments |
|--|------------------------|----------|
| G.2.0 Indoor Air Quality Systems Performance | | |
| a. Natural ventilation strategies | | |
| b. Operable windows | | |
| c. Fan-powered night ventilation in lieu of operable | | |
| d. Design for economizer cooling | | |
| e. Identify heat sources and ventilate | | |
| | | |
| G.3.0 Noise Control | | |
| a. Control noise transmission/acoustical performance | | |
| | | |
| | | |
| III. Environmentally Responsible Green Building Construction Guidelines | | |
| | | |
| III.A. Resource Protection During Construction | Implement Y, N, N/A | Comments |
| A.1.0 Resource Protection Plan (RPP) | | |
| a. Develop Resource Protection Plan | | |
| b. Fence protected areas | | |
| c. Minimize site disturbance | | |
| d. Specify details of restoration site/post construction | | |
| | | |
| A.2.0 Equipment Access and Use | | |
| a. Construction access coincides/existing roadways | | |
| b. Use appropriate construction machinery | | |
| c. Prevent construction traffic from wetlands | | |
| | | |
| A.3.0 Materials Storage, Work Areas and Parking | | |
| a. Avoid soil compaction | | |
| b. Limited areas for cutting/drilling materials | | |
| c. Designate parking/staging/work areas in RPP | | |
| | | |
| A.4.0 Top Soil Preservation | | |
| a. Remove topsoil; store in covered piles | | |
| b. Reuse topsoil as needed/save for future use | | |

| III.A. Resource Protection During Construction | Implement Y, N, N/A | Comments |
|---|------------------------|----------|
| A.5.0 Storm Water Management | | |
| 5.1 EPA or Local Standards and Controls | | |
| a. Design site-specific Sediment/Erosion Control Plan | | |
| 5.2 MHC's "Storm Water Mgmt Best Mgmt Practices" | | |
| a. No work in wetland resource areas | | |
| b. Site work > than 1 acre need Storm Water Permit | | |
| c. Schedule work to minimize soil exposure | | |
| d. Cover excavated soil | | |
| e. Install/maintain silt fences around exposed soil | | |
| f. Install/maintain 'sock' in every catch basin | | |
| g. Inspect silt fences/catch basins; Keep log | | |
| h. Avoid soil piles on paved areas | | |
| i. Divert rainwater around soil piles | | |
| j. Hydroseed sloped exposed soil areas | | |
| k. Filter water from excavation | | |
| l. Maintain on-site spill clean-up kit | | |
| m. Report hazardous material releases to FM/PS | | |
| n. Spill costs charged back to contractor | | |
| o. Tarp under generators; disposed as haz waste | | |
| p. Tarp under generators; disposed as haz waste | | |
| q. Storm water runoff back to soil or into collection sys | | |
| | | |
| III.B. Environmental Quality | Implement Y, N, N/A | Comments |
| B.1.0 Site Protection/Health and Safety | | |
| 1.1 Site Protection/ Health and Safety Plan | | |
| a. Develop Site Protection/Health and Safety Plan | | |
| 1.2 Low VOC Materials | | |
| a. Comply with goals/specs for low VOC | | |
| b. Collect/review MSDS or mfg certifications | | |
| 1.3 Hazardous Materials Control | | |
| a. Comply with regs for removal/disposal haz material | | |
| b. No haz materials/chems into storm drains/drainage | | |
| c. Call FM for lead/asbestos/SRM for haz waste | | |
| d. Survey bldg and site for haz materials/chemicals | | |
| 1.4 Noise Control | | |
| a. Work w/FM on consturction noise control | | |
| 1.5 Site Lighting | | |
| a. Work w/FM on site lighting | | |

| | | |
|---|------------------------|----------|
| III.B. Environmental Quality | Implement Y, N, N/A | Comments |
| B.1.0 Site Protection/Health and Safety Plan | | |
| 1.6 Perimeter Control | | |
| a. Plan for securing from unauthorized access | | |
| III.C. Materials and Resources | Implement Y, N, N/A | Comments |
| C.1.0 Recycling and Disposal of C&D Debris | | |
| a. Develop Waste Management Plan | | |
| b. Recycle materials with local market | | |
| c. Recycle materials with regional markets | | |
| C.2.0 Housekeeping | | |
| a. Designate collection sites/recyclables, trash | | |
| b. Clean-up trash/debris daily | | |
| c. No contaminated materials in storm drain system | | |
| d. Washing of concrete only in designated areas | | |
| e. Hazardous materials/waste in accordance w/regs | | |
| IV. Deliverables | | |
| IV.A. Pre-Design | Implement Y, N, N/A | Comments |
| A.1.0 Green Strategies Workshop | | |
| a. Goal setting Workshop; Create road map | | |
| A.2.0 Performance Plan | | |
| a. Narrative of design intent | | |
| b. Checklist of goals/strategies | | |
| IV.B. Design | Implement Y, N, N/A | Comments |
| B.1.0 Performance Plan Updates | | |
| a. Updating Performance Plan | | |

| | | |
|--|------------------------|----------|
| IV.B. Design | Implement Y, N, N/A | Comments |
| B.2.0 Submittals | | |
| a. Environmental Site Analysis | | |
| b. Design Energy Use Targets | | |
| c. HVAC Systems Alternative Plan Narrative | | |
| d. Building Massing Alternative Plan | | |
| e. Green Material Specifications | | |
| f. Resource Protection Plan | | |
| g. Site Protection/Health and Safety Plan | | |
| h. Waste Management Plan | | |
| i. Life Cycle Cost Analysis | | |
| IV.C. Construction | Implement Y, N, N/A | Comments |
| Contractors responsibilities | | |
| IV.D. Systems Review/Commissioning | Implement Y, N, N/A | Comments |
| Enviro performance in bldg commission | | |