

**SECTION 01 81 11**  
**SUSTAINABLE DESIGN REQUIREMENTS**

SPEC WRITER NOTES:

1. Use this section only for NCA projects.

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. This Section describes general requirements and procedures to comply with various federal mandates and U.S. Department of Veterans Affairs (VA) policies for sustainable design, including the Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings required by Executive Orders 13423 and 13514; Energy Policy Act of 2005 (EPA 2005); and the Energy Independence and Security Act of 2007 (EISA 2007).

**1.2 OBJECTIVES**

- A. General:
  1. Maximize resource efficiency and reduce the environmental impacts of construction and operation.
  2. Select products that minimize consumption of energy, water and non-renewable resources, while minimizing the amounts of pollution resulting from the production and employment of building technologies.
  3. Include environmental considerations as part of the normal purchasing process.
  4. Emphasize pollution prevention early in the purchasing process.
  5. Examine multiple environmental attributes throughout a product's or service's life cycle.
  6. Compare relevant environmental impacts when selecting products and services.
  7. Collect and base purchasing decisions on accurate and meaningful information about environmental performance.
  8. Control sources of potential Indoor Air Quality (IAQ) pollutants and decrease toxicity levels, by controlled selection of materials and processes used in project construction, in order to attain superior IAQ. Manage construction site and storage of materials to ensure no negative impact on the indoor environmental quality of the building.
  9. Use building practices that ensure construction debris and particulates do not contaminate or enter duct work prior to system startup and turn over.

10. Preserve and restore the site ecosystem and biodiversity; avoid site degradation and erosion. Minimize offsite environmental impact.
11. Reduce construction waste through reuse, recycling, and supplier take-back.
12. Optimize operational performance (through commissioning efforts) in order to ensure equipment operates as intended.
13. Consider the durability, maintainability, and flexibility of building systems.

## SPEC WRITER NOTES:

1. EO13423 directs Federal agencies to "use products meeting or exceeding EPA's recycled content recommendations" for EPA-designated products and for other products to "use materials with recycled content such that the sum of post-consumer recycled content plus one-half of the pre-consumer content constitutes at least 10% (based on cost) of the total value of the materials in the project."
  2. Federal agencies must use products meeting or exceeding USDA's biobased content recommendations; and for other products, biobased products made from rapidly renewable resources.
  3. EO13423 directs Federal agencies to use "materials and products with low pollutant emissions, including adhesives, sealants, paints, carpet systems, and furnishings."
- B. Conform to the Federal Guiding Principles for Federal Leadership in High Performance and Sustainable Building as per the Memorandum of Understanding, as follows:
1. Employing integrated design: As specified and as follows:
    - a. ASTM E2348, Standard Guide for Framework for a Consensus-based Environmental Decision making Process.
    - b. ASTM E2432 Standard Guide for General Principles of Sustainability Relative to Buildings.
  2. Optimizing energy performance: As specified and as follows:
    - a. Energy Efficiency: EO 13423, EO 13514 and Energy Policy Act of 2005; 10 CFR 435 - Energy Performance Standards for New Buildings; and, FAR Part 23, 48 CFR 23 - building equipment and lighting.
    - b. ENERGY STAR.

- c. Federal Energy Management Program (FEMP).
- 3. Protecting and conserving water: As specified and as follows:
  - a. Water stewardship: EPA WaterSense, and FEMP Best Management Practices for Water Conservation.
- 4. Enhancing indoor environmental quality: As specified and as follows:
  - a. Sheet Metal and Air Conditioning Contractor's National Association Indoor Air Quality Guidelines for Occupied Buildings under Construction.
- 5. Reducing the environmental impact of materials: As specified and as follows:
  - a. Recycled Content Products: EPA Comprehensive Procurement guidelines.
  - b. Biobased Content Products: USDA Biopreferred.
  - c. Electronics stewardship: Federal Electronics Challenge; Electronic Product Environmental Assessment Tool (EPEAT).
  - d. Environmental Management System protocols: ISO 14001 or equivalent.
- C. The Design Professional has selected materials and utilized design processes that achieve the above objectives to the extent currently possible and practical. The Contractor is responsible to maintain and support these objectives in developing means and methods for performing the work and in proposing product substitutions and/or changes to specified processes. By submitting a change or substitution of materials or processes, the Contractor must demonstrate its diligence in performing the level of investigation and comparison encouraged under the Federal mandates and VA policies.

### **1.3 RELATED DOCUMENTS**

- A. Section 01 74 19, CONSTRUCTION WASTE MANAGEMENT.

SPEC WRITER NOTES:

- 1. Following two sections are in development.

- B. Section 01 81 09, TESTING FOR INDOOR AIR QUALITY.

- C. Section 01 91 00, GENERAL COMMISSIONING REQUIREMENTS.

### **1.4 DEFINITIONS**

- A. Agrifiber Products: Composite panel products derived from agricultural fiber.
- B. Biobased Product: As defined in the Farm Security and Rural Investment Act, a product determined by the Secretary to be a commercial or

industrial product (other than food or feed) that is composed, in whole or in significant part, of biological products or renewable domestic agricultural materials (including plant, animal, and marine materials) or forestry materials.

- C. Biobased Content: The weight of the biobased material divided by the total weight of the product and expressed as a percentage by weight.
- D. Certification(s) for Sustainable Forestry: Certificates signed by manufacturers certifying that wood used to make products has been tracked through its extraction and fabrication to ensure that it was obtained from forests certified by an approved sustainable forest certification program.
- E. Composite Wood: A product consisting of wood fiber or other plant particles bonded together by a resin or binder.
- F. Construction and Demolition (C&D) Waste: Includes solid wastes, such as building materials, packaging, rubbish, debris, and rubble resulting from construction, remodeling, repair and demolition operations. A construction waste management plan is to be provided by the Contractor as defined in Section 01 74 19.

SPEC WRITER NOTES:

- 1. The paragraph below applies to a project pursuing LEED or Green Globes.
- 2. Identify level of certification applied in Design.
- 3. LEED Silver or Two Green Globes are the minimum accepted certifications; projects may attempt higher levels as set forth during early design.

- G. Third Party Certification: Certification of levels of environmental achievement by nationally recognized sustainability rating system.
  - 1. The Project must achieve // LEED // Green Globes // certification at the // LEED Silver // LEED Gold // LEED Platinum // Two Green Globes // Three Green Globes // level.

SPEC WRITER NOTES:

- 1. It is preferable to replace following paragraph with reference to a project-specific checklist prepared by the Designer, as an attachment to this Section.
- 2. Refer to the VA Sustainable Design and Energy Reduction Manual for the mandatory certification credits that must be achieved within the designated third party certification process.

- H. Light Pollution: Light that extends beyond its source such that the additional light is wasted in an unwanted area or in an area where it inhibits view of the night sky.
- I. Recycled Content Materials: Products that contain pre-consumer or post-consumer materials as all or part of their feedstock.
- J. Post-Consumer Recycled Content: The percentage by weight of constituent materials that have been recovered or otherwise diverted from the solid-waste stream after consumer use.
- K. Pre-Consumer Recycled Content: Materials that have been recovered or otherwise diverted from the solid-waste stream during the manufacturing process. Pre-consumer content must be material that would not have otherwise entered the waste stream as per Section 5 of the FTC Act, Part 260 "Guidelines for the Use of Environmental Marketing Claims": [www.ftc.gov/bcp/grnrule/guides980427](http://www.ftc.gov/bcp/grnrule/guides980427).

## SPEC WRITER NOTES:

1. Following paragraph applies to projects seeking LEED certification.

- L. Regional Materials: Materials that are extracted, harvested, recovered, and manufactured within a radius of 500 miles (800 km) from the Project site.
- M. Salvaged or Reused Materials: Materials extracted from existing buildings in order to be reused in other buildings without being manufactured.
- N. Sealant: Any material that fills and seals gaps between other materials.

## SPEC WRITER NOTES:

1. Type 1 finishes or may be adversely affected by particulates.
2. These materials become "sinks" for deleterious substances which may be released much later, or collectors of contaminants that may promote subsequent bacterial growth.

- O. Type 1 Finishes: Materials and finishes which have a potential for short-term levels of off-gassing from chemicals inherent in their manufacturing process, or which are applied in a form requiring vehicles or carriers for spreading which release a high level of particulate matter in the process of installation and/or curing.
- P. Type 2 Finishes: "Fuzzy" materials and finishes which are woven, fibrous, or porous in nature and tend to adsorb off-gas chemicals.

- Q. Volatile Organic Compounds (VOCs): Any compound of carbon, excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate, which participates in atmospheric photochemical reactions. Compounds that have negligible photochemical reactivity, listed in EPA 40 CFR 51.100(s), are also excluded from this regulatory definition.

## 1.5 SUBMITTALS

### SPEC WRITER NOTES:

1. EPA's Office of Compliance publishes the Managing Your Environmental Responsibilities: A Planning Guide for Construction and Development (the MYER Guide). This assistance tool reflects significant input from stakeholders and is a product of joint effort by the industry, states, other federal agencies, non-governmental organizations and EPA.
2. The MYER Guide contains self-audit checklists and detailed discussion/case studies on major environmental areas affecting the construction industry. It is designed to help the construction industry understand which environmental regulations apply to them, and it can be used during different phases of a construction project.

### A. Sustainability Action Plan:

1. Within 30 days of after Preconstruction Meeting, the General Contractor must provide a narrative plan for complying with the objectives, product requirements and construction operations' environmental controls stipulated within this section.
2. The plan must make reference to the following sustainable design submittals defined by this section and either attached to report or provided within time periods allowed:
  - a. Project Materials Cost Data spreadsheet.
  - b. Construction Waste Management Plan.
  - c. Construction IAQ Management Plan.

### B. Sustainable Design Submittals:

1. Alternative Transportation:
  - a. Provide manufacturer's cut sheets for all bike racks installed on site, including the total number of bicycle storage slots provided.

- b. Provide manufacturer's cut sheets for any alternative-fuel refueling stations installed on site, including fueling capacity information for an 8-hour period.
2. Heat Island Effect:
- a. Site Paving: Provide manufacturer's cut sheets for all impervious paving materials, highlighting the Solar Reflectance Index (SRI) of the material; provide cut sheets for all pervious paving materials.

## SPEC WRITER NOTES:

- 1. Roofing selection for cold climate projects may negate following requirement.

- b. Roofing Materials: Submittals for roofing materials must include manufacturer's cut sheets or product data highlighting the Solar Reflectance Index (SRI) of the material.
- SPEC WRITER NOTES:
- 1. "Nadir" of a luminaire is defined as the angle that points directly downward, or 0, from the luminaire.
3. Exterior Lighting Fixtures: Submittals must include cut sheets with manufacturer's data on initial fixture lumens above 90° from nadir for all exterior lighting fixtures, and, for parking lot lighting, verification that the fixtures are classified by the Illuminating Engineering Society of North America (IESNA) as "full cutoff" (FCO); OR provide documentation that exterior luminaires are IDA-Approved as Dark-Sky Friendly by the International Dark Sky Association (IDA) Fixture Seal of Approval Program.
4. Irrigation Systems: Provide manufacturer's cut sheets for all permanent landscape irrigation system components and for any rainwater harvesting system components, such as cisterns.
5. Water Conserving Fixtures: Submittals must include manufacturer's cut sheets for all water-consuming plumbing fixtures and fittings (toilets, urinals, faucets, showerheads, etc.) highlighting maximum flow rates and/or flush rates.
- a. Include cut sheets for any automatic faucet-control devices.
  - b. Provide copy of certification for any WaterSense-labeled products.
6. Process Water Use: Provide manufacturer's cut sheets for all water-consuming commercial equipment (clothes washers, dishwashers, ice machines, etc.), highlighting water consumption performance. Include

- manufacturer's cut sheets or product data for any cooling towers, highlighting water consumption estimates, water use reduction measures, and corrosion inhibitors.
7. Elimination of CFCs/HCFCs and Reduction of HFCs: Provide manufacturer's cut sheets for all cooling equipment with manufacturer's product data, highlighting refrigerants; provide manufacturer's cut sheets for all fire-suppression equipment, highlighting fire-suppression agents; provide manufacturer's cut-sheets for all polystyrene insulation (XPS) and closed-cell spray foam polyurethane insulation, highlighting the blowing agent(s).
  8. Appliances and Equipment: Provide copies of manufacturer's product data for all ENERGY STAR qualified equipment and appliances, including office equipment, computers and printers, electronics, and commercial food service equipment (excluding HVAC and lighting components), verifying compliance with EPA's ENERGY STAR program.
  9. //On-Site Renewable Energy Systems: Provide cut sheets and manufacturer's product data for all on-site renewable energy generating components and equipment, including documentation of output capacity.//
  10. Measurement and Verification Systems: Provide cut sheets and manufacturer's product data for all controls systems, highlighting electrical metering and trending capability components.

## SPEC WRITER NOTES:

1. LEED and Green Globes rating systems include credit for sustainably harvested wood. Edit following paragraph to project-specific goals.
2. LEED requires a minimum of 50 percent of wood-based materials and products incorporated into the Project must be certified in accordance with the Forest Stewardship Council Guidelines.
3. Green Globes US also provides points for wood products that originate from certified sources, such as, Forest Stewardship Council, Sustainable Forestry Initiative, and the CSA Sustainable Forest Management Program.
4. Either select the contents of // // below to allow the requirement to remain ambiguous or select the appropriate certifying board for the rating system applied to the project.

11. Letter of Certification(s) for Sustainable Forestry: // Provide materials and submittals complying with any of the following standards: //
- a. Forest Stewardship Council (FSC): Provide letter of certification signed by lumber supplier. Indicate compliance with FSC "Principles for Natural Forest Management" and identify certifying organization.
    - 1) Submit FSC certification numbers; identify each certified product on a line-item basis.
    - 2) Submit copies of invoices bearing the FSC certification numbers.
  - b. Sustainable Forestry Board: Provide letter of certification signed by lumber supplier. Indicate compliance with the Sustainable Forestry Board's "Sustainable Forestry Initiative" (SFI) and identify certifying organization.
    - 1) Submit SFI certification numbers; identify each certified product on a line-item basis.
    - 2) Submit copies of invoices bearing the SFI certification numbers.
  - c. Canadian Standards Association (CSA): Provide letter of certification signed by lumber supplier. Indicate compliance with the CSA and identify certifying organization.
    - 1) Submit CSA certification numbers; identify each certified product on a line-item basis.
    - 2) Submit copies of invoices bearing the CSA certification numbers.
12. //Salvaged or Reused Materials: Provide documentation that lists each salvaged or reused material, the source or vendor of the material, the purchase price, and the replacement cost if greater than the purchase price.//
13. Recycled Content: Submittals for all materials with recycled content (excluding MEP systems equipment and components) must include the following documentation: Manufacturer's product data, product literature, or a letter from the manufacturer verifying the percentage of post-consumer and pre-consumer recycled content (by weight) of each material or product.

## SPEC WRITER NOTES:

- 1. The submittal frequency suggestion of every third month should be reviewed

and revised to reflect the needs of the specific Project.

- a. An electronic spreadsheet that tabulates the Project's total materials cost and combined recycled content value (defined as the sum of the post-consumer recycled content value plus one-half of the pre-consumer recycled content value) expressed as a percentage of total materials cost. Submit this spreadsheet every third month with the Contractor's Certificate and Application for Payment. Indicate, on an ongoing basis, line items for each material, including cost, pre-consumer recycled content, post-consumer recycled content, and combined recycled content value.

SPEC WRITER NOTES:

1. The following subject is related to LEED; delete for projects not seeking this LEED credit.

14. //Regional Materials: Submittals for all products or materials expected to contribute to the regional calculation (excluding MEP systems equipment and components) must include the following documentation://
  - a. //Cost of each material or product, excluding cost of labor and equipment for installation.//
  - b. //Location of product manufacture and distance from point of manufacture to the Project Site.//
  - c. //Location of point of extraction, harvest, or recovery for each raw material in each product and distance from the point of extraction, harvest, or recovery to the Project Site.//
  - d. //Manufacturer's product data, product literature, or a letter from the manufacturer verifying the location and distance from the Project Site to the point of manufacture for each regional material.//
  - e. //Manufacturer's product data, product literature, or a letter from the manufacturer verifying the location and distance from the Project Site to the point of extraction, harvest, or recovery for each regional material or product, including, at a minimum, gravel and fill, planting materials, concrete, masonry, and GWB.//

SPEC WRITER NOTES:

1. The submittal frequency suggestion of every third month should be reviewed and revised to reflect the needs of the specific Project.

- f. //An electronic spreadsheet that tabulates the Project's total materials cost and regional materials value, expressed as a percentage of total materials cost. Submit this spreadsheet every third month with the Contractor's Certificate and Application for Payment. Indicate on an ongoing basis, line items for each material, including cost, location of manufacture, distance from manufacturing plant to the Project Site, location of raw material extraction, and distance from extraction point to the Project Site.//
15. Interior Adhesives and Sealants: Submittals for all field-applied adhesives and sealants, which have a potential impact on indoor air, must include manufacturer's MSDSs or other Product Data highlighting VOC content.
- a. Provide additional manufacturers' documentation verifying all adhesives used to apply laminates, whether shop-applied or field-applied, contain no urea-formaldehyde.
16. Interior Paints and Coatings: Submittals for all field-applied paints and coatings, which have a potential impact on indoor air, must include manufacturer's MSDSs or other Product Data highlighting VOC content.
17. Exterior Paints and Coatings: Submittals for all field-applied paints and coatings, which have a potential impact on ambient air quality, must include manufacturer's MSDSs or other manufacturer's Product Data highlighting VOC content.
18. Composite Wood and Agrifiber Binders: Submittals for all composite wood and agrifiber products (including but not limited to particleboard, wheatboard, strawboard, agriboard products, engineered wood components, solid-core wood doors, OSB, MDF, and plywood products) must include manufacturer's product data verifying that these products contain no urea-formaldehyde resins.
19. //Systems Furniture and Seating: Provide manufacturer's product data verifying that all systems furniture and seating products meet the requirements of one of the following:
- a. Greenguard certification.
- b. SCS Indoor Advantage certification by SCS Global Services;  
<http://www.scsglobalservices.com/certified-indoor-air-quality>.
- c. SCS Indoor Advantage Gold certification by SCS Global Services.

- d. ANSI/BIFMA Standard X7.1-2011, as tested to ANSI/BIFMA method M7.1-2011 and as verified by an independent laboratory.
  - e. Calculated indoor air concentration limits for furniture systems and seating determined by the U.S. EPA's Environmental Technology Verification Large Chamber Test Protocol for Measuring Emissions of VOCs and Aldehydes (September 1999) testing protocol as conducted in an independent air quality testing laboratory.//
20. Air Filtration: Provide manufacturer's cut sheets and product data highlighting the following:
- a. If air handlers must be used during construction, use filtration media with a Minimum Efficiency Reporting Value (MERV) of 8 at each return air grill, as determined by ASHRAE 52.2-2007.
  - b. Replace all filtration media immediately prior to occupancy. Provide filtration media with a Minimum Efficiency Reporting Value (MERV) of 13, as determined by ASHRAE 52.2-2007 for media installed at the end of construction.
21. Duct Acoustical Insulation: Provide manufacturer's cut sheets or product data verifying that mechanical sound insulation materials in air distribution ducts consists of an impervious, non-porous coatings that prevent dust from accumulating in the insulating materials.
22. Green Housekeeping: Provide documentation that all cleaning products and janitorial paper products meet the VOC limits and content requirements of this specification section.
23. Refer to technical specifications for additional submittal requirements related to sustainability goals.
- D. Project Materials Cost Data: Provide a spreadsheet in an electronic file indicating the total cost for the Project and the total cost of building materials used for the Project, as follows:
- 1. Not more than //30 //60// days after the Preconstruction Meeting, provide preliminary schedule of materials cost to the Owner and Architect for all materials used for the Project organized by specification section. Exclude labor costs and all mechanical, electrical, and plumbing (MEP) systems materials and labor costs. Include the following:
    - a. //Identify each reused or salvaged material, its cost, and its replacement value.//

- b. Identify each recycled-content material, its post-consumer and pre-consumer recycled content as a percentage the product's weight, its cost, its combined recycled content value (defined as the sum of the post-consumer recycled content value plus one-half of the pre-consumer recycled content value), and the total combined recycled content value for all materials as a percentage of total materials costs.
- SPEC WRITER NOTES:
1. Following paragraph relates specifically to a LEED credit; delete if not pursuing LEED.
- c. //Identify each regional material, its cost, its manufacturing location, the distance of this location from the Project site, the source location for each raw material component of the material, the distance of these extraction locations from the Project site, and the total value of regional materials as a percentage of total materials costs.//
- d. Identify each biobased material, its source, its cost, and the total value of biobased materials as a percentage of total materials costs. Also provide the total value of rapidly renewable materials (materials made from plants that are harvested in less than a 10-year cycle) as a percentage of total materials costs.
- e. Identify each wood-based material, its cost, the total wood-based materials cost, each FSC Certified wood material, its cost, and the total value of Certified wood as a percentage of total wood-based materials costs.
2. Provide final versions of the above spreadsheets to the Owner and Architect not more than 14 days after Substantial Completion.
- E. Construction Waste Management: See Section 01 74 19, CONSTRUCTION WASTE MANAGEMENT for submittal requirements.
- F. Construction Indoor Air Quality (IAQ) Management: Submittals must include the following:
1. Not more than 30 days after the Preconstruction Meeting, prepare and submit for the Architect and Owner's approval, an electronic copy of the draft Construction IAQ Management Plan (CIAQMP) in an electronic file including, but not limited to, descriptions of the following:
  2. Instruction procedures for meeting or exceeding the minimum requirements of the Sheet Metal and Air Conditioning National

Contractors Association (SMACNA) IAQ Guidelines for Occupied Buildings Under Construction, 2008, including procedures for HVAC Protection, Source Control, Pathway Interruption, Housekeeping, and Scheduling.

- a. Instruction procedures for protecting absorptive materials stored on-site or installed from moisture damage.
  - b. Schedule of submission to Architect of photographs of on-site construction IAQ management measures such as protection of ducts and on-site stored oil installed absorptive materials.
  - c. Instruction procedures if air handlers must be used during construction, including a description of filtration media to be used at each return air grille.
  - d. Instruction procedure for replacing all air-filtration media immediately prior to occupancy after completion of construction, including a description of filtration media to be used at each air handling or air supply unit.
3. Not more than 30 days following receipt of the approved draft CIAQMP, submit an electronic copy of the approved CIAQMP in an electronic file, along with the following:
- a. Manufacturer's cut sheets and product data highlighting the Minimum Efficiency Reporting Value (MERV) for all filtration media to be installed at return air grilles during construction if permanently installed AHUs are used during construction.
  - b. Manufacturer's cut sheets and product data highlighting the Minimum Efficiency Reporting Value (MERV) for filtration media in all air handling units (AHUs).
4. Not more than 14 days after Substantial Completion provide the following:
- a. Documentation verifying required replacement of air filtration media in all air handling units (AHUs) after the completion of construction and prior to occupancy and, if applicable, required installation of filtration during construction.
  - b. Minimum of 18 Construction photographs: Six photographs taken on three different occasions during construction of the SMACNA approaches employed, along with a brief description of each approach, documenting implementation of the IAQ management measures, such as protection of ducts and on-site stored or installed absorptive materials.

## SPEC WRITER NOTES:

1. This requirement that the Contractor provide IAQ testing results is only applicable if the Contractor is responsible for getting the IAQ testing done. In some cases it may be more appropriate for the Owner to contract separately for this testing.
- c. A copy of the report from testing and inspecting agency documenting the results of IAQ testing, demonstrating conformance with IAQ testing procedures and requirements defined in Section 01 81 09, TESTING FOR INDOOR AIR QUALITY.
- G. //Commissioning: See Section 01 91 00, GENERAL COMMISSIONING REQUIREMENTS, for submittal requirements.//
- H. Sustainable Design Progress Reports: Concurrent with each Application for Payment, submit reports for the following:
1. Construction Waste Management: Waste reduction progress reports and logs complying with the requirements of Section 01 74 19, CONSTRUCTION WASTE MANAGEMENT.
  2. Construction IAQ Management: Refer to Construction Indoor Air Quality Management for Construction IAQ management progress report requirements.

**1.6 QUALITY ASSURANCE**

- A. Preconstruction Meeting: After award of Contract and prior to the commencement of the Work, schedule and conduct meeting with Owner, Architect, and all Subcontractors to discuss the Sustainability Action Plan content as it applies to Construction Waste Management Plan, the required Construction Indoor Air Quality (IAQ) Management Plan, and all other Sustainable Design Requirements. The purpose of this meeting is to develop a mutual understanding of the Project's Sustainable Design Requirements and coordination of the Contractor's management of these requirements with the Contracting Officer and the Construction Quality Manager.
- B. Construction Job Conferences: The status of compliance with the Sustainable Design Requirements of these specifications will be an agenda item at all regular job meetings conducted during the course of work at the site.

**1.7 APPLICABLE PUBLICATIONS**

- A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by the basic

designation only. Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.

SPEC WRITER NOTES:

1. Remove reference citations that do not remain in Part 2 or Part 3 of edited specification.
2. Verify and make dates indicated for remaining citations the most current at date of submittal; determine changes from date indicated on the TIL download of the section and modify requirements impacted by the changes.

B. American Society for Testing and Materials (ASTM):

E2348-06(2010) Framework for a Consensus-based Environmental Decision-making Process

E2432 General Principles of Sustainability Relative to Buildings

C. American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE):

Standard 52.2 - 2007 Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size

D. Business Institutional Furniture Manufacturers Association (BIFMA):

ANSI/Standard X7.1-2011 Standard for Formaldehyde and TVOC Emissions

ANSI/BIFMA method M7.1-2011 Standard Test Method for Determining VOC Emissions

E. Sheet Metal and Air Conditioning Contractors' National Association (SMACNA):

ANSI/SMACNA 008-2008 The SMACNA IAQ Guidelines for Occupied Buildings Under Construction, 2nd Edition

F. South Coast Air Quality Management District (SCAQMD):

SCAQMD Rule 403 (1976; R2005) Fugitive Dust

**PART 2 - PRODUCTS**

**2.1 PRODUCT ENVIRONMENTAL REQUIREMENTS**

SPEC WRITER NOTES:

1. Any ecologically sensitive areas should be identified and addressed via protection and/or mitigation; coordinate with drawings and within specifications.
2. Plant rescue should be carried out if appropriate; expand in documents as necessary.

- A. Site Clearing: Topsoil to be provided by the Contractor from on-site material which has been stockpiled for reuse. Off-site borrow should only be used when on-site sources are exhausted. Chip and/or compost on site all vegetated material identified for removal.
- B. Do not burn rubbish, organic matter, etc. or any material on the site; dispose of such material legally in accordance with Section 01 74 19, CONSTRUCTION WASTE MANAGEMENT.

SPEC WRITER NOTES:

- 1. The following requirements apply to projects incorporating cool roof technologies to meet sustainable design requirements.
- 2. Roofing selection for cold climate projects may not warrant the following requirements due to reduced benefit.

- C. Roofing Materials: Roofing systems //, other than vegetated roof systems, // must comply with the following requirements:

- 1. Low-Sloped roofing less than or equal to 2:12 slope must have an SRI of at least 78.
- 2. Steep-Sloped roofing greater than 2:12 slope must have an SRI of at least 29.

SPEC WRITER NOTES:

- 1. Exterior lighting should be designed in accordance with IESNA RP-33 and RP-20. The International Dark-Sky Association's Fixture Seal-of-Approval program, and a list of approved fixtures, can be found at <http://www.darksky.org>.
- 2. Confirm use of standard with lighting designer before including following paragraph.

- D. Exterior Lighting Fixtures: Exterior luminaires must emit 0 percent of the total initial designed fixture lumens at an angle above 90 degrees from nadir and/or meet the requirements of the Dark Sky certification program; requirement must be confirmed by submitted products.

SPEC WRITER NOTES:

- 1. Herbicides and Pest Control: Herbicides should be avoided because they can have unwanted side-effects and may accumulate in water and soils. Unwanted plants can be removed or managed manually. Biopesticides are usually inherently less toxic than chemical pesticides, are highly targeted, and are not usually persistent. Integrated pest management

provides the effective management of pests using the least-toxic available strategies; for more, see <http://www.epa.gov/pesticides/ipm>.

- E. Herbicides and Pest Control: Herbicides are not permitted; pest control measures must utilize EPA-registered biopesticides only.
- F. Water-Conserving Fixtures: Plumbing fixtures must meet or exceed requirements of the EPA WaterSense program categories.
- G. Reduction of Ozone-Depleting Compounds and Generation of Greenhouse Gases:
1. Ozone Protection and Greenhouse Gas Reduction: Provide base building cooling equipment containing only the following refrigerants: HCFC-123, HFC-134a, HFC-245fa, HFC-407c, or HFC 410a.
  2. Fire suppression systems cannot contain ozone-depleting substances such as halon 1301 and 1211.
- SPEC WRITER NOTES:
1. Some spray foam closed-cell polyurethane insulation products are still blown with HCFC's; open-cell (low density) foams do not use CFC's.
  3. Extruded polystyrene insulation (XPS) and closed-cell spray foam polyurethane insulation cannot be manufactured with hydrochlorofluorocarbon (HCFC) blowing agents.
- H. Appliances and Equipment: All materials and equipment being installed that falls under the ENERGY STAR or FEMP programs must be ENERGY STAR or FEMP-rated. Eligible equipment includes refrigerators, motors, laundry equipment, office equipment and more. Refer to each program's website for a complete list.
- I. HVAC Distribution Efficiency:
1. Construct duct systems of aluminum, stainless steel or galvanized sheet metal, as deemed appropriate based on the application requirements. Fiberglass duct board is not permitted.
  2. Provide medium- and high-pressure ductwork systems that have been pressure-tested in accordance with the current SMACNA standards.
  3. Provide externally-insulated ductwork; interior duct liner is not permitted.
  4. Provide air terminal connections hard-connected with sheet metal ductwork, where possible. If flexible ductwork is used, flexible duct extension cannot exceed 1830 mm (6 feet) in length.

5. Isolate HVAC equipment from the ductwork system with flexible duct connectors to minimize the transmittance of vibration.
  6. Include the appropriate style of volume damper with supply and return air branch ducts. Balance air terminal devices such as grilles, registers, and diffusers at duct branch dampers - not at terminal face.
- J. Measurement and Verification: Install controls and monitoring devices as required by MEP divisions in order to comply with International Performance Measurement & Verification Protocol (IPMVP), Volume III: Concepts and Options for Determining Energy Savings in New Construction, April 2003, Option D.
- K. //Salvaged or Reused Materials: No substitutions permitted for specified salvaged and reused materials and products.//
1. //Salvaged Materials: Use of salvaged materials reduces impacts of disposal and manufacturing of replacements.//
- L. Recycled Content of Materials:
1. Provide building materials with recycled content such that post-consumer recycled content value plus half the pre-consumer recycled content value constitutes a minimum of 30 percent of the cost of materials used for the Project, exclusive of all MEP equipment, labor, and delivery costs. Make all attempts to maximize the procurement of materials with recycled content.
    - a. Determine the post-consumer recycled content value of a material by dividing the weight of post-consumer recycled content by the total weight of the material and multiplying by the cost of the material.
    - b. Do not include mechanical and electrical components in the calculations.
    - c. Do not include labor and delivery costs in the calculations.
    - d. Recycled content of materials is defined according to the Federal Trade Commission's "Guide for the Use of Environmental Marketing Claims," 16 CFR 260.7 (e).
    - e. Utilize all on-site existing paving materials that are scheduled for demolition as granulated fill, and include the cost of this material had it been purchased in the calculations for recycled content value.
  2. Contractor is obligated by contract to satisfy Federal mandates for procurement of products and materials meeting recommendations for

post-consumer content and recovered materials content; the list of designated product categories with recommendations has been compiled by the EPA - refer to <http://www.epa.gov/wastes/conserves/tools/cpg/products/>.

- a. Complying with the mandate requirements may exceed the minimum limits set by this section; otherwise, additional product and material selections with recycled content must be provided, as determined by Contractor's Sustainability Action Plan.
- b. The EPA website includes lists prepared for the Federal Comprehensive Procurement Guidelines; the website also provides tools such as a Product Supplier Directory search engine and product resource guides.
- c. EPA Categories include, but not limited to:

SPEC WRITER NOTES:

1. Edit following list appropriately for project.

- 1) Building insulation.
- 2) Carpet (polyester).
- 3) Carpet cushion.
- 4) Cement and concrete.
- 5) Consolidated and reprocessed latex paint.
- 6) Floor tiles.
- 7) Flowable fill.
- 8) Laminated paperboard.
- 9) Modular threshold ramps.
- 10) Nonpressure pipe.
- 11) Patio blocks.
- 12) Railroad grade crossing surfaces.
- 13) Roofing materials.
- 14) Shower and restroom dividers/partitions.
- 15) Structural fiberboard.
- 16) Nylon carpet and nylon carpet backing.
- 17) Compost and fertilizer made from recovered organic materials.
- 18) Hydraulic mulch.
- 19) Lawn and garden edging.
- 20) Plastic lumber landscaping timbers and posts.
- 21) Park benches and picnic tables.
- 22) Plastic fencing.
- 23) Playground equipment.

- 24) Playground surfaces.
- 25) Bike racks.

## SPEC WRITER NOTES:

1. Edit following paragraph to the third-party certification goals established for the project.

## M. Certified Wood:

1. Provide a minimum of 50 percent (by cost) of wood-based materials that are produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001 (current edition), "FSC Principles and Criteria for Forest Stewardship."
2. Wood-based materials include, but are not limited to, the following materials when made from wood, engineered wood products, or wood-based panel products:
  - a. Rough carpentry.
  - b. Miscellaneous carpentry.
  - c. Metal-plate-connected wood trusses.
  - d. Finish carpentry.
  - e. Architectural woodwork.

## N. Biobased Content:

## SPEC WRITER NOTES:

1. The Federal Register includes designations for approximately 60 product types. The requirements for purchasing biobased items apply to those items directly purchased by the federal agency. Under a construction contract, the contractor's use of hydraulic fluid in its bulldozers and backhoes is incidental to the purpose of its contract, so the contractor is not required to use biobased hydraulic fluids; however, Contractors should be encouraged to use these products.
2. Currently designated items that affect construction include:
  - Roof Coatings
  - Water Tank Coatings
  - Adhesive and Mastic Removers
  - Composite Panels
  - Fertilizers
  - Plastic Insulating Foam
  - Carpet and Upholstery Cleaners
  - Carpets
  - Dust Suppressants
  - Packaging Films
  - Glass Cleaners

- Hydraulic Fluids
  - Wood and Concrete Sealers
  - Cleaners
3. The USDA currently has identified about 150 items for which it is collecting test data needed for the additional designations of items that will extend preferred procurement status to include all qualifying biobased products.
1. Subject to conformance with drawings and specifications, provide products designated by the USDA's BioPreferred program; provide other products and material made from biobased materials to the maximum extent possible without jeopardizing the intended end use or detracting from the overall quality delivered to the National Cemetery Administration. Supplies and materials must be of a type and quality that conform to applicable specifications and standards.
  2. Biobased products that are designated for preferred procurement under USDA's BioPreferred program must meet the required minimum biobased content. Refer to [Http://www.biopREFERRED.gov/ProductCategories.aspx](http://www.biopREFERRED.gov/ProductCategories.aspx) for the product categories and <http://www.biopREFERRED.gov/bioPreferredCatalog/faces/jsp/catalogLanding.jsp> for the BioPreferred Catalog. Submit data for the biobased products to include biobased content and source of biobased material; indicating the name of the manufacturer, cost of each material, and the intended use of each of the materials that are to be used in carrying out the requirements of the contract.
  3. Provide biobased products to the greatest extent possible.
- O. Construction Operations' Environmental Aspects, Impacts and Controls: Monitor environmental aspects and impacts of Contractor's operations (including identification and pursuit of controls on and mitigation of adverse impacts) and as follows:

## SPEC WRITER NOTES:

1. The requirements contained under "Climate Change and Air Pollution Control" are beyond requirements of third-party certification; review use of this paragraph with Project Manager.
1. Climate Change and Air Pollution Control: Environmental aspects of and controls on Contractor operations related to climate change include Greenhouse Gas (GHG) emissions associated with construction

equipment. Environmental aspects of and controls on Contractor operations related to criteria air pollutants include particulate matter (PM) and nitrogen oxides (NOx) emissions associated with construction equipment.

a. Documentation: Maintain the following records for review on request basis.

- 1) For diesel powered equipment, indicate number and type of construction equipment that utilizes emission control technologies complying with 2008 pollution requirements for new diesel engines.
- 2) GHG emissions: Document estimated GHG emissions of equipment used on the project. Calculate GHG emissions from mobile combustion in accordance with the EPA Climate Leaders protocols <http://www.epa.gov/climateleaders/resources/> Indicate quantity of fuel by type used and provide estimate for comparison to industry standard.

SPEC WRITER NOTES:

1. The USGBC is developing a draft for a Clean Diesel LEED Credit. The intent of the credit is to reduce particulate matter (PM) and nitrogen oxides (NOx) emissions from diesel construction equipment. The draft requirements include: employing an idle reduction policy, implementing a preventative maintenance plan, utilizing the cleanest diesel fuel available (such as ultra-low sulfur diesel) and either reducing PM from 90% of all diesel engines onsite by an average minimum of 20% (50% for an additional credit) or using equipment meeting EPA's most stringent emissions standards at the time in 50% of all diesel engines onsite.
2. EPA and the California Air Resources Board (CARB) have retrofit technology verification programs that evaluate the emissions performance of advanced emissions control technologies and engine rebuild kits. A list of EPA verified technologies is available at: <http://www.epa.gov/otaq/retrofit/verif-list.htm> . CARB's verification program can be found at: <http://www.arb.ca.gov/diesel/verdev/verdev.htm>.

- 3) Air Pollution Control: Document the current emissions of the equipment. Calculate the emissions reduced with the selected option applied to the equipment in accordance with the Diesel Emissions Quantifier ([www.epa.gov/cleandiesel](http://www.epa.gov/cleandiesel)) protocols. Indicate the change in emissions.
2. Water Stewardship: Environmental aspects of and controls on Contractor operations related to water stewardship include quantity and quality of discharges to surface water and ground water. Refer to soil and erosion control requirements within the drawings and specifications.
3. Noise Control: Perform operations to minimize noise; perform noise-producing work with heavy equipment during less sensitive hours of the day or week.
- a. The noise source cannot exceed 60 dBA from 7:00 a.m. to 6:00 p.m.
  - b. Operations in other times must be performed under the constraints established at the need of each occurrence.
4. Air Resources:
- a. Prevent creation of dust, air pollution, and odors.
  - b. Sequence construction to avoid disturbance to site to the greatest extent possible.
  - c. Use mulch, water sprinkling, temporary enclosures, and other appropriate methods to limit dust and dirt rising and scattering in air to lowest practical level. Do not use water when it may create hazardous or other adverse conditions such as flooding and pollution.
  - d. Store volatile liquids, including fuels and solvents, in closed containers.
  - e. Properly maintain equipment to reduce gaseous pollutant emissions.
  - f. Dust Suppressants:
    - 1) Products formulated to reduce or eliminate the spread of dust associated with gravel roads, dirt parking lots, or similar sources of dust, including products used in equivalent indoor applications.
    - 2) If employing these materials, products must include minimum 85 percent biobased content.

## SPEC WRITER NOTES:

1. The following is a requirement for the State of California; although, it

could be applied to any project in  
addition to third-party certification  
credits.

g. Provide construction dust control to comply with SCAQMD Rule 403.

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