**COVER**

This Master Specification Section contains:

.1 This Cover Page

.2 Data Sheet – Editing Instructions

.3 Specification Section Text

1.1 Related Requirements

1.2 Reference Documents

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1.5 Project Coordination

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2.1 Salvaged and Refurbished Materials

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3.3 Construction Waste Management

3.4 Construction Indoor Air Quality Management

Headings are included for convenience only, to provide a standard structure and framework for the identification of requirements.

Headings should be added if requirements noted in the LEED v4 for Building Design and Construction reference guides identify additional options beneficial to the project.

**END OF COVER SHEET**

**LEED REQUIREMENTS**

This specification is for LEED v4, Verify when the project was registered under which rating system. All registrations after November 1, 2016 must be LEED v4. Registrations prior to November 1, 2016 may be LEED 2009 or LEED v4.

Use this Section to specify those LEED (Leadership in Energy and Environmental Design) requirements and procedures that are required by the Canada Green Building Council (CaGBC) for the attainment of prerequisites and credits for LEED v4 certification. Silver rating is mandatory; confirm additional requirements with project manager.

The primary purpose of this Section is to assist in the timely and accurate collection of information required for the certification level of LEED v4 for Building Design and Construction: New Construction and Major Renovation.

Review CaGBC LEED Rating System: LEED v4 for Building Design and Construction: New Construction and Major Renovation. <https://www.usgbc.org/resources/leed-v4-building-design-and-construction-current-version>

Note: that some LEED credits are optional, and some are mandatory, requirements for credits not sought should be deleted. All prerequisites are required.

**END OF LEED REQUIREMENTS SHEET**

SPEC NOTE DESCRIPTION: This Section specifies requirements and procedures defined by LEED v4 for Building Design and Construction: New Construction and Major Renovation prerequisites and credits required for LEED Project certification.

1. General

1.1 RELATED Requirements

SPEC NOTE: List to only those sections containing specific information that would directly affect the work of this section.

.1 Project Coordination Section 01 31 13

.2 Project Meetings Section 01 31 19

.3 Construction Schedules Section 01 32 16

.4 Submittal Procedures Section 01 33 00

.5 Environmental Procedures Section 01 35 20

.6 Quality Control Section 01 45 00

.7 Waste Management and Disposal Section 01 74 19

1.2 REFERENCE Documents

.1 American National Standards Institute (ANSI):

 Website: [www.ansi.org/](http://www.ansi.org/)

|  |  |  |
| --- | --- | --- |
| .1 | ANSI/ASHRAE/IESNA 90.1-2010, Appendix G with Errata | The Performance Rating Method |
| .2 | ANSI/ASHRAE 52.2-2007 | Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size |
| .3 | ANSI Standard S12.60-2010 | Acoustical Performance Criteria, Design Requirements and Guidelines for Schools |

.2 American Society of Heating Refrigeration and Air-Conditioning (ASHRAE):

Website: [www.ashrae.org](http://www.ashrae.org):

|  |  |  |
| --- | --- | --- |
| .1 | ASHRAE 0 - 2005 | The Commissioning Process |
| .2 | ASHRAE 1.1 - 2007 | HVAC&R Technical Requirements for the Commissioning Process |
| .3 | ASHRAE 55 - 2010 | Thermal Comfort Conditions for Human Occupancy |
| .4 | ASHRAE 62.1 - 2010 | Ventilation for Acceptable Indoor Air Quality |
| .5 | ASHRAE Standard 170 - 2008 | Ventilation of Health Care Facilities |

.3 Canada Green Building Council (CaGBC):

Website: [www.cagbc.org](http://www.cagbc.org/)

|  |  |  |
| --- | --- | --- |
| .1 | LEED v4 BD+C | LEED v4 for Building Design and Construction: New Construction and Major Renovation. |

.4 Carpet and Rug Institute (CRI):

Website: <http://carpet-rug.org/>

|  |  |
| --- | --- |
| .1 | CRI Green Label Indoor Air Quality Test Program - Green Label Testing Program |

.5 Green Seal Environmental Standards:
Website: <http://greenseal.org/>

|  |  |  |
| --- | --- | --- |
| .1 | Standard GC-03-97 | Anti-Corrosive Paints |
| .2 | Standard GS-11-93 | Architectural Paints |

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

Website: https://www.smacna.org/

|  |  |
| --- | --- |
| .1 | IAQ Guideline for Occupied Buildings Under Construction, Chapter 3, 1995 |

.7 SCAQMD South Coast Air Quality Management District, California State (SCAQMD):

Website: [www.aqmd.gov](http://www.aqmd.gov)

|  |  |  |
| --- | --- | --- |
| .1 | SCAQMD Rule 1113-2011 | Architectural Coatings |
| .2 | SCAQMD Rule 1168-05 | Adhesives and Sealants Applications. |

.8 United States Federal Trade Commission (US Federal Trade Commission):

Website: <http://www.ftc.gov/>

|  |  |  |
| --- | --- | --- |
| .1 | 16 CFR 260.7 | Trade Commission Guidelines for the Use of Environmental Marketing Claims |

.9 Forest Stewardship Council:

Website: <https://fsc.org/en>

|  |  |
| --- | --- |
| .1 | Principles and Criteria for Forest Stewardship |

1.3 Definitions

.1 Definitions as written below are supplementary to all laws, statutes, and regulations effective in Alberta. Where definitions conflict, laws, statutes, and regulations take precedent over the definitions below.

.2 CFC: Chlorofluorocarbon. CFC’s are halogenated substances that have a significant impact on the Earth’s atmosphere as they are ozone depleting and contribute to global warming.

.3 Chain-of-Custody Certification - certificates signed by manufacturers certifying that wood used to make products was obtained from FSC certified forests. Certificates include evidence that mill is certified for chain-of-custody by FSC-accredited certification body.

.4 Carbon Dioxide Monitoring: A method for determining indoor air quality by using the concentration of carbon dioxide as an indicator. Although the level of CO2 is a good general indicator of air quality, it is reliant on the presence of certain conditions and must be applied accordingly.

.5 Commissioning (Building): The process of ensuring installed systems function as specified, performed by a third party Commissioning Authority. Elements to be commissioned are identified, installation is observed, sampling is conducted, test procedures are devised and executed, staff training is verified, and operations and maintenance manuals are reviewed.

.6 Construction and Demolition Waste: Waste building materials, dredging materials, treestumps, and rubble resulting from construction, remodeling, repair, and demolition of homes, commercial buildings and other structures and pavements. May contain lead, asbestos, or other hazardous substances.

.7 Construction Indoor Air Quality Management Plan: A systematic plan for addressing construction practices that can impact air quality during construction and continuing on to occupation.

.8 Construction Site Recycling: See Construction Waste Management

.9 Construction Waste Management: General term for strategies employed during construction and demolition to reduce the amount of waste and maximize reuse and recycling. Construction waste management is a sustainable building strategy in that it reduces the disposal of valuable resources, provides materials for reuse and recycling, and can promote community industries.

.10 Energy Star: Program administered by the Environmental Protection Agency that evaluates products based on energy efficiency.

.11 Environmental Product Declaration (EPD): An Environmental Product Declaration is an independently verified and registered document that communicates transparent and comparable information about the life-cycle environmental impact of products.

.12 Fluorocarbons (FCs): Any of a number of organic compounds analogous to hydrocarbons in which one or more hydrogen atoms are replaced by fluorine. Once used in the United States as a propellant for domestic aerosols, they are now found mainly in coolants and some industrial processes. FCs containing chlorine are called chlorofluorocarbons (CFCs). They are believed to be modifying the ozone layer in the stratosphere, thereby allowing more harmful solar radiation to reach the Earth's surface. 1

.13 Flush-Out: A period after finish work and prior to occupation that allows the building’s materials to cure and release volatile compounds and other toxins. A building flush-out procedure is normally followed, with specified time periods, ventilation rate, and other criteria.

.14 Forest Stewardship Council (FSC): A third-party certification organization, evaluating the sustainability of forest products. FSC-certified wood products have met specific criteria in areas such as forest management, labor conditions, and fair trade.

.15 Global Warming: An increase in the near surface temperature of the earth. Global warming has occurred in the distant past as the result of natural influences, but the term is most often used to refer to the warming predicted to occur as a result of increased emissions of greenhouse gases. Scientists generally agree that the earth's surface has warmed by about 1 degree Fahrenheit in the past 140 years. The Intergovernmental Panel on Climate Change (IPCC) recently concluded that increased concentrations of greenhouse gases are causing an increase in the earth's surface temperature and that increased concentrations of sulfate aerosols have led to relative cooling in some regions, generally over and downwind of heavily industrialized areas.

.16 Green Label: A certification program by the Carpet and Rug Institute for carpet and adhesives meeting specified criteria for release of volatile compounds.

.17 Halon: Bromine-containing compounds with long atmospheric lifetimes whose breakdown in the stratosphere causes depletion of ozone. Halons are used in firefighting.

.18 Health Product Declaration (HPD): Created using the Health Product Declaration Open Standard, sponsored by the Health Product Declaration Collaborative (HPDC), HPD documents conform to a specific format, contain material content and health information about products.

.19 Heat Island Effect: A "dome" of elevated temperatures over an urban area caused by structural and pavement heat fluxes, and pollutant emissions.

.20 HCFC - Hydrochlorofluorocarbon: HCFCs are generally less environmentally detrimental to depletion of stratospheric ozone than CFCs (chlorofluorocarbons). HCFCs are generally used to replace CFC’s where mandates require CFC’s to be eliminated. A total ban on all CFC’s and HCFCs is scheduled, effective 2030.

.21 HVAC: Heating Ventilation and Air Conditioning to provide thermal comfort and ventilation to building.

.22 Hydrocarbons (HC): Chemical compounds that consist entirely of carbon and hydrogen.

.23 Indoor Air Quality (IAQ): ASHRAE defines acceptable indoor air quality as air in which there are no known contaminants at harmful concentrations as determined by cognizant authorities and with which 80% or more people exposed do not express dissatisfaction.

.24 LEED: Leadership in Energy and Environmental Design. A voluntary, consensus-based, standard, measurement system designed for rating new and existing buildings based on accepted energy and environmental principles, striking a balance between knowledge, established practices, and emerging concepts. A performance-oriented system where points are earned for satisfying criterion in each of five categories: Sustainable Sites, Water Efficiency, Energy & Atmosphere, Materials & Resources, and Indoor Environmental Quality. LEED promotes integrated and sustainable design practices. LEED® isa trademarked name.

.25 LEED Accredited Professional (LAP): A professional who has successfully passed the LEED Accreditation exam and is knowledgeable in green building design practices.

.26 Low VOC: Building materials and finishes that exhibit low levels of "off gassing," the process by which VOCs (Volatile Organic Compounds) are released from the material, impacting health and comfort indoors and producing smog outdoors. Low (or zero) VOC is an attribute to look for in an environmentally preferable building material or finish. See "Volatile Organic Compound (VOC)" for more information.

.27 Organic Compound: Vast array of substances typically characterized as principally carbon and hydrogen, but that may also contain oxygen, nitrogen and a variety of other elements as structural building blocks.

.28 Ozone Depletion: Destruction of the earth's ozone layer, which can be caused by the photolytic breakdown of certain chlorine- and/or bromine-containing compounds (e.g., chlorofluorocarbons), which catalytically decompose ozone molecules.

.29 Post-Consumer Recycling: Use of materials generated from residential and consumer waste, raw material or feedstock, for new product or similar purposes; e.g. converting wastepaper from offices into corrugated boxes or newsprint.

.30 Post-Consumer Recycle Content: A product composition that contains some percentage of material that has been reclaimed from the same or another end use at the end of its former, useful life.

.31 Post-Industrial Material: Industrial manufacturing process scrap or waste; also called pre-consumer material.

.32 Post-Industrial Recycle Content: A product composition that contains some percentage of manufacturing waste material that has been reclaimed from a process generating the same or a similar product. Also called pre-consumer recycle content.

.33 Pre-Consumer Materials/Waste: Materials generated in manufacturing and converting processes such as manufacturing scrap and trimmings and cuttings. Includes print overruns, over issue publications, and obsolete inventories.

.34 Rapidly Renewable Materials - materials made from agricultural products that are typically harvested within a ten-year or shorter cycle. Rapidly renewable materials include but are not limited to products made from bamboo, cotton, flax, jute, straw, sunflower seed hulls, vegetable oils, and wool.

.35 Recycled Content - percentage by weight of constituents that have been recovered or otherwise diverted from solid waste stream, either pre-consumer or post-consumer.

.1 Wastes and scraps from manufacturing process that are combined with other materials after minimal amount of reprocessing for use in further production of same product are not recycled materials.

.2 Discarded materials from one manufacturing process that are used as materials in another manufacturing process are pre-consumer recycled materials.

.36 Reuse: Using a product or component of municipal solid waste in its original form more than once. (e.g., refilling a glass bottle that has been returned or using a coffee can to hold nuts and bolts.)

.1 Reuse is a sustainable building strategy in that it:

.1 Reduces the strain on both renewable and nonrenewable resources.

.2 When materials are reused on or near the site of salvage, they reduce transportation-related environmental impacts.

.37 VOC: (Volatile Organic Compound). Organic substances capable of entering the gas phase from either a liquid or solid form. VOCs are volatile enough to evaporate from material surfaces into indoor air at normal room temperatures (referred to as off-gassing). These substances are generally thought of to be harmful to both humans and the environment. They are common in and emitted by many building products over time through out-gassing:

.1 Solvents in paints and other coatings;

.2 Wood preservatives; strippers and household cleaners;

.3 Adhesives in particleboard, fiberboard, and some plywood; and foam insulation.

.4 When released, VOC’s can contribute to the formation of smog and can cause respiratory tract problems, headaches, eye irritations, nausea, damage to the liver, kidneys, and central nervous system, and possibly cancer.

.38 Wastewater: The spent or used water from a home, community, farm, or industry that contains dissolved or suspended matter.

.39 Waste Management Plan: See Construction Waste Management

1.4 LEED ADMINISTRATION REQUIREMENTS

.1 The Consultant will apply for LEED Certification for the building.

.2 The certification process will be conducted through the CaGBC (Canada Green Building Council) based LEED.

.3 Submission criteria, and support documentation will be provided by the Consultant and the Contractor and assembled by the Consultant.

.4 Contractor and Subcontractors shall assist the Consultant, to assemble complete and accurate information, as part of the contract requirements and as their portion of work is undertaken.

.5 The Province has established, with the design team, the general sustainable goals for design and for construction of the Project. The Contractor, Subcontractors, suppliers, and manufacturers shall assist the Consultant by making the required submissions and performing the required procedures to realize the Province’s sustainable goals.

1.5 project coordination

.1 Provide coordination associated with LEED Certification.

.2 Refer to Section 01 31 13 Project Coordination.

1.6 project meetings

.1 Provide LEED program meetings, pre-construction and progress meetings, associated with monitoring the progress of LEED requirements.

.2 Refer to Section 01 31 19 Project Meetings.

1.7 construction schedules

.1 Provide schedule of LEED submittals as a sub-schedule in the construction schedule.

.2 Refer to Section 01 32 16 Construction Schedules.

1.8 QUALITY ASSURANCE

.1 Contractor shall assign one person responsible for sustainable issues compliance and co-ordination and fulfill the requirements of this Section, a LEED Accredited Professional (LAP).

.2 LEED Accredited Professional shall not be the Site Superintendent nor the Project Manager but a knowledgeable employee who will assemble the required documentation and screen it for adherence to the criteria stated in the Contract Documents prior to submitting it for review to the Consultant.

1.9 submittals

.1 Provide submittals in accordance with Section [01 33 00 - Submittal Procedures] [                ].

.2 Submit shop drawings and product data in accordance with Section [01 33 00 - Submittal Procedures] [01 33 23 – Shop Drawings, Product Data and Samples].

.1 Shop drawings: stamped and signed by professional engineer, licensed in the province of Alberta.

.3 Submit required letters, calculations, spreadsheets and templates for submittal to CaGBC.

.4 Submit additional LEED submittal requirements included in other sections in accordance with Section [01 33 00 - Submittal Procedures] [            ].

.1 Submit in multiple copies when required, as separate submittals for compliance with LEED requirements.

.5 Submit Project Materials and Cost Data: provide statement for total cost for building materials used for Project. Include statement indicating total cost of mechanical and electrical components.

SPEC NOTE: Paragraphs below require Contractor to make early submittals indicating how certain LEED requirements will be met.

.6 Submit: LEED Action Plan: provide preliminary submittals within [14] [21] [30] days of date for Award of contract indicating how the following requirements will be met.

.1 Materials and Resources:

.1 MR Credit: Construction and Demolition Waste Management

.1 Prepare Construction Waste Management plan in accordance with Section 01 74 19 - Waste Management and Disposal. [01 74 19B-A - Waste Management Plan Construction and Demolition Projects and 01 74 19B-B - Cost/Revenue Analysis Workplan Construction and Demolition Projects]

.2 Achieve one of the options for a minimum of one credit point: Waste Management goal for the project is [50%] [75%].

.1 Option 1: Diversion (1-2 points)

.2 Option 2: Reduction of Total Waste Material: (2 points) Do not generate more than 2.5 pounds of construction waste per square foot (12.2 kilograms of waste per square meter) of the building’s floor area.

.2 MR Credit: Building Product Disclosure and Optimization – Environmental Product Declarations.

.1 Achieve one of the options for a minimum of one credit point: .

.1 Option 1: Environmental Product Declaration (EPD). (1 point)

.2 Option 2: Multi-Attribute Optimization. (1 point).

.3 MR Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials].

.1 Achieve one of the options for a minimum of one credit point:

.1 Option 1: Raw Material Source and Extraction Reporting. (1 point)

.2 Option 2: Leadership Extraction Practices. (1 point)

.4 MR Credit: Building Product Disclosure and Optimization – Material Ingredients.

.1 Achieve one of the options for a minimum of one credit point:

.1 Option 1: Material Ingredient Reporting. (1 point)

.2 Option 2: Material Ingredient Optimization.

.3 Option 3: Product Manufacturer Supply Chain Optimization (1 point)

.2 Indoor Environment Quality:

.1 EQ Credit: Construction Indoor Air Quality Management Plan.

.1 Achieve one credit point

.2 Submit Construction indoor air quality management plan prior to construction start on site.

.7 LEED Progress Reports: Submit with Applications for Progress Payments, submit reports comparing actual construction and purchasing activities with LEED action plans for the following:

SPEC NOTE: Edit the following paragraphs to suit project.

.1 MR Credit Construction and Demolition Waste Management Planning. Submit Waste reduction progress reports in accordance with Section 01 74 19 Waste Management and Disposal [01 74 19B-A - Waste Management Plan Construction and Demolition Projects and 01 74 19B-B -  Cost/Revenue Analysis Workplan Construction and Demolition Projects]

.2 MR Credit: Building Product Disclosure and Optimization – Environmental Product Declarations. Submit listing of products and materials that meet credit intent for the project and calculations to attain the credit point.

.3 MR Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Submit listing of products and materials that meet credit intent for the project and calculations to attain the credit point.

.4 MR Credit: Building Product Disclosure and Optimization – Material Ingredients. Submit listing of products and materials that meet credit intent for the project and calculations to attain the credit point.

.8 LEED Documentation Submittals:

SPEC NOTE: See Division 07 Roofing Sections for information about Energy Star compliant roofing. Energy Star compliant roofing requires a highly reflective roof surface, a light color material, which is ideal in a climate with more cooling days than heating days.

.1 Submit product data for roofing materials for Sustainable Sites Credit: Heat Island Reduction: Nonroof and Roof - indicating [Energy Star compliance] [green vegetated roof system] [emissivity rating to ASTM E408] [minimum initial reflectance and minimum 3‑year‑aged reflectance].

.2 Submit product data for lighting fixtures for Sustainable Sites Credit: Light Pollution Reduction. Submit data for interior and exterior lighting fixtures that stop direct-beam illumination from leaving the building site. Submit photos per credit requirements.

.3 Submit product data for plumbing fixture for Water Efficiency: Prereq: Indoor Water Use Reduction, WE Prereq: Building –Level Water Metering, Prereq: Outdoor Water Use Reduction [WE Credit: Outdoor Water Use Reduction][WE Credit: Indoor Water Use Reduction][WE Credit: Cooling Tower Water Use][WE Credit: Water Metering]. Submit Data for plumbing fixtures indicating water consumption.

SPEC NOTE: Retain option in subparagraph below if Contractor is required to establish the phase-out plan.

.4 Submit product data for Energy and Atmosphere Prerequisite Prereq: Fundamental Refrigerant Management. Include product data for new HVAC equipment indicating absence of CFC refrigerants [and] [Phase-out plan to replace CFC refrigerants in HVAC&R systems with CFC-free refrigerants within the Construction Period].

SPEC NOTE: Edit the following paragraphs below for the specific project.

.5 Submit product data for Energy and Atmosphere Credit Credit: Enhanced Refrigerant Management. Submit product data for new equipment indicating low-impact refrigerants, or absence of refrigerants.

.6 Submit product data for Energy and Atmosphere Prereq: Building-Level Energy Metering. Submit product data and wiring diagrams for sensors and data collection systems for metering of building energy consumption performance.

.7 Submit waste diversion documentation for Materials and Resources Credit: Construction and Demolition Waste Management Planning. Submit Waste reduction progress reports in accordance with Section 01 74 19 Waste Management and Disposal [01 74 19B-A - Waste Management Plan Construction and Demolition Projects and 01 74 19B-B - Cost/Revenue Analysis Work plan Construction and Demolition Projects]. Include the following submittals:

.8 Submit product data for Materials and Resources Credit: Building Product Disclosure and Optimization – Environmental Product Declarations. Submit listing of products and materials that meet credit intent for the project and calculations to attain the credit point.

.9 Submit product data for Materials and Resources Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials. Submit listing of products and materials that meet credit intent for the project and calculations to attain the credit point.

.10 Submit product data for Materials and Resources Credit: Building Product Disclosure and Optimization – Material Ingredients. Submit listing of products and materials that meet credit intent for the project and calculations to attain the credit point.

.11 Submit product data and shop drawings for Indoor Environmental Quality Prereq: Minimum Indoor Air Quality Performance. Submit product data and shop drawings for requirements of [ASHRAE 62.1-2010][CEN Standard EN 15251-2007 and EN 13779-2007].

.12 Provide submittals for Indoor Environmental Quality Credit Construction Indoor Air Quality Management Plan. Include the following:

.1 Construction indoor air quality management plan.

.2 Product data for temporary filtration media.

.3 Product data for filtration media used during occupancy.

.4 Construction documentation submit description of utilized IAQ measures in accordance with Sheet Metal and Air Conditioning National Contractors Association (SMACNA), IAQ Guidelines for Occupied Buildings under Construction, 2nd edition, 2007, ANSI/SMACNA 008-2008, Chapter 3.

.13 Submit product data for Indoor Environmental Quality Credit: Low-Emitting Materials: Submit product data for products used for compliance with [Product Category Calculations][Budget Calculation Method].

.14 Submit product data and shop drawing for Indoor Environmental Quality Credit : Interior Lighting. Submit product data and shop drawings for lighting system controls for minimum 90% of the building occupants.

.15 Submit product data and shop drawing for Indoor Environmental Quality Credit : Thermal Comfort. Submit design compliance to [ASHRAE 55-2010][ISO 7730:2005 and CEN EN 15251:2007]. Submit product data and shop drawings for sensors and control systems used for individual airflow and temperature for minimum 50% of the building occupants.

1.10 LEED submittal forms

.1 LEED submittal forms are available to LEED members from the Canada Green Building Council website at <http://www.cagbc.org>.

2. Products

2.1 SALVAGED AND RE-FURBISHED MATERIALS

.1 MR Credit: Building Life-Cycle Impact Reduction

.1 Provide documentation of which option[s] will be followed, and a narrative on how the proponent will attain the credit points.

.2 Option 1. Historic Building Reuse: Maintain the existing building structure, envelope, and interior non-structural elements of a historic building or contributing building in a historic district.

.3 Option 2. Renovation of Abandoned or Blighted Building: Maintain at least 50%, by surface area, of the existing building structure, enclosure, and interior structural elements for buildings that meet local criteria of abandoned or are considered blight.

.4 Option 3. Building and Material Reuse: Reuse or salvage building materials from off site or on site as a percentage of the surface area, as listed in Table 1. Include structural elements (e.g., floors, roof decking), enclosure materials (e.g., skin, framing), and permanently installed interior elements (e.g., walls, doors, floor coverings, ceiling systems).

.5 Option 4. Whole-Building Life-Cycle Assessment: For new construction (buildings or portions of buildings), conduct a life-cycle assessment of the project’s structure and enclosure that demonstrates a minimum of 10% reduction, compared with a baseline building.

SPEC NOTE: Delete paragraph above or below. Retain above if Contractor is given the option to determine how requirement for salvaged or refurbished materials will be met. Retain below to specify materials that are required to be salvaged or refurbished materials.

.2 MR Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials;

 The following materials shall be salvaged, refurbished or reused materials:

SPEC NOTE: Retain list below with either paragraph above. Insert list of applicable materials.

.1 [                                                                                           ].

.2 [                                                                                           ].

.3 [                                                                                           ].

2.2 Sourcing OF Raw MATERIALS

.1 MR Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials;

.1 Provide appropriate documentation to meet the option[s] for the credit point[s]:

.1 Option 1. Raw Material Source and Extraction Reporting: Use at least 20 different permanently installed products from at least five different manufacturers that have publicly released a report from their raw material suppliers which include raw material supplier extraction locations, a commitment to long-term ecologically responsible land use, a commitment to reducing environmental harms from extraction and/or manufacturing processes, and a commitment to meeting applicable standards or programs voluntarily that address responsible sourcing criteria.

.2 Option 2. Leadership Extraction Practices: Use products that meet at least one of the responsible extraction criteria below for at least 25%, by cost, of the total value of permanently installed building products in the project.

.1 Extended producer responsibility. Products purchased from a manufacturer (producer) that participates in an extended producer responsibility program or is directly responsible for extended producer responsibility.

.2 Bio-based materials. Bio-based products must meet the Sustainable Agriculture Network’s Sustainable Agriculture Standard.

.3 Wood products. Wood products must be certified by the Forest Stewardship Council or USGBC-approved equivalent.

.4 Materials reuse. Reuse includes salvaged, refurbished, or reused products.

.5 Recycled content. Recycled content is the sum of postconsumer recycled content plus one-half the preconsumer recycled content, based on cost.

.6 USGBC approved program. Other USGBC approved programs meeting leadership extraction criteria.

2.3 REGIONAL MATERIALS

SPEC NOTE: If retaining either paragraph in this article, be sure to select materials for the Project that can comply.

.1 MR Credit: Building Product Disclosure and Optimization – Material Ingredients

.1 Provide appropriate documentation to meet the credit intent for [Option 1. Environmental Product Declaration] [and][or] [Option 2. Multi-Attribute Optimization]

.2 MR Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials:

.1 Provide appropriate documentation to meet the credit intent for [Option 1. Raw Material Source and Extraction Reporting] [and][or] [Option 2. Leadership Extraction Practices]

.3 MR Credit: Building Product Disclosure and Optimization – Sourcing of Raw

.1 Provide appropriate documentation to meet the credit intent for [Option 1. Material Ingredient Reporting] [and][or] [Option 2. Material Ingredient Optimization] [and][or] [Option 3. Product Manufacturer Supply Chain Optimization]

.4 For each MR credit: credit achievement calculation, products sourced (extracted, manufactured, purchased) within 100 miles (160 km) of the project site are to be valued at 200% of their base contributing cost.

2.4 LOW EMITTING MATERIALS

SPEC NOTE: Adhesives and sealants are required for various products where they may be specified only by the requirement to install according to manufacturer's written instructions.

.1 EQ Credit: Indoor Environmental Quality; Low Emitting Materials:

.1 Provide documentation to meet the option[s] for the credit point[s]:

.1 Option 1. Product Category Calculations: Achieve the threshold level of compliance with emissions and content standards to achieve the credit points utilizing the seven product categories listed:

.1 Interior paints and coatings applied on site.

.2 Interior adhesives and sealants applied on site (including flooring adhesive).

.3 Flooring.

.4 Composite Wood.

.5 Ceilings, walls, thermal, and acoustic insulation.

.6 Furniture (include in calculations if part of scope of work).

.7 Healthcare and Schools projects only: Exterior applied products.

.2 Option 2. Budget Calculation Method: If some products in a category do not meet the criteria, project teams may use the budget calculation method. Each layer of the assembly, including paints, coatings, adhesives, and sealants, must be evaluated for compliance. The Budget Calculation Method organizes the building interior into six assemblies:

.1 Flooring.

.2 Ceilings.

.3 Walls.

.4 Thermal and acoustic insulation.

.5 Furniture (include in calculations if part of scope of work).

.6. Healthcare and Schools only: Exterior applied products.

.2 Emissions and Content Requirements:

.1 To demonstrate compliance, a product or layer must meet all of the following requirements, as applicable:

.1 Inherently nonemitting sources. Products that are inherently nonemitting sources of VOCs (stone, ceramic, powder-coated metals, plated or anodized metal, glass, concrete, clay brick, and unfinished or untreated solid wood flooring) are considered fully compliant without any VOC emissions testing if they do not include integral organic-based surface coatings, binders, or sealants.

.2 General emissions evaluation. Building products must be tested and determined compliant in accordance with California Department of Public Health (CDPH) Standard Method v1.1–2010, or the German AgBB Testing and Evaluation Scheme (2010) using the applicable exposure scenario.

.3 Additional VOC content requirements for wet-applied products. In addition to meeting the general requirements for VOC emissions within the General emissions evaluation, on-site wet-applied products must not contain excessive levels of VOCs, for the health of the installers and other tradesworkers who are exposed to these products. For projects in Alberta, methylene chloride and perchloroethylene may not be intentionally added in paints, coatings, adhesives, or sealants. To demonstrate compliance, a product or layer must meet the following requirements, as applicable:

.1 All paints and coatings wet-applied on site must meet the applicable VOC limits of the California Air Resources Board (CARB) 2007, Suggested Control Measure (SCM) for Architectural Coatings, or the South Coast Air Quality Management District (SCAQMD) Rule 1113, effective June 3, 2011.

.2 All adhesives and sealants wet-applied on site must meet the applicable chemical content requirements of SCAQMD Rule 1168, July 1, 2005, Adhesive and Sealant Applications, or comply with Canadian VOC Concentration Limits for Architectural Coatings, Regulations (SOR/2009-264).

.3 If the applicable regulation requires subtraction of exempt compounds, any content of intentionally added exempt compounds larger than 1% weight by mass (total exempt compounds) must be disclosed.

.4 If a product cannot reasonably be tested as specified above, testing of VOC content must comply with ASTM D2369-10; ISO 11890, part 1; ASTM D6886-03; or ISO 11890-2.

.4 Composite wood evaluation. Composite wood, as defined by the California Air Resources Board, Airborne Toxic Measure to Reduce Formaldehyde Emissions from Composite Wood Products Regulation, must be documented to have low formaldehyde emissions that meet the California Air Resources Board ATCM for formaldehyde requirements for ultra-low-emitting formaldehyde (ULEF) resins or no added formaldehyde resins. Salvaged and reused architectural millwork more than one year old at the time of occupancy is considered compliant, provided it meets the requirements for any site-applied paints, coatings, adhesives, and sealants.

.5 Furniture evaluation: New furniture and furnishing items must be tested in accordance with ANSI/BIFMA Standard Method M7.1–2011. Comply with ANSI/BIFMA e3-2011 Furniture Sustainability Standard, Sections 7.6.1 (for half credit, by cost) OR 7.6.2 (for full credit, by cost), using either the concentration modeling approach or the emissions factor approach. USGBC-approved equivalent testing methodologies and contaminant thresholds are also acceptable.

.6 Healthcare and Schools only:

.1 Batt insulation products may contain no added formaldehyde, including urea formaldehyde, phenol formaldehyde, and urea-extended phenol formaldehyde.

.2 For classroom furniture evaluation, use the standard school classroom model in CDPH Standard Method v1.1.

.3 Exterior applied products Adhesives, sealants, coatings, roofing, and waterproofing materials applied on site must meet the VOC limits of California Air Resources Board (CARB) 2007 Suggested Control Measure (SCM) for Architectural Coatings, and South Coast Air Quality Management District (SCAQMD), Rule 1168, effective July 1, 2005. Two materials are prohibited and do not count toward total percentage compliance: hot-mopped asphalt for roofing, and coal tar sealants for parking lots and other paved surfaces.

3. Execution

3.1 SITE DISTURBANCE

.1 Sustainable Sites Prerequisite: Construction Activity Pollution Prevention:

.1 Create and implement an erosion and sedimentation control plan for all construction activities associated with the project. The plan must conform to the erosion and sedimentation requirements of the 2012 U.S. Environmental Protection Agency (EPA) Construction General Permit (CGP) or local equivalent, whichever is more stringent.

3.3 CONSTRUCTION WASTE MANAGEMENT

.1 Materials and Resources Credit: Construction and Demolition Waste Management Planning:

.1 Develop and implement a construction and demolition waste management plan. Provide a final report detailing all major waste streams generated, including disposal and diversion rates.

.2 In accordance with Section 01 74 19 - Waste Management and Disposal.

3.4 CONSTRUCTION INDOOR AIR QUALITY MANAGEMENT

.1 Indoor Environmental Quality Credit: Construction Indoor Air Quality Management Plan:

.1 Develop and implement an indoor air quality (IAQ) management plan for the construction and preoccupancy phases of the building. The plan must address all of the following:

.1 During construction, meet or exceed all applicable recommended control measures of the Sheet Metal and Air Conditioning National Contractors Association (SMACNA) IAQ Guidelines for Occupied Buildings under Construction, 2nd edition, 2007, ANSI/SMACNA 008–2008, Chapter 3.

.2 Protect absorptive materials stored on-site and installed from moisture damage.

.3 Do not operate permanently installed air-handling equipment during construction unless filtration media with a minimum efficiency reporting value (MERV) of 8, (or equivalent) are installed at each return air grille and return or transfer duct inlet opening such that there is no bypass around the filtration media. Immediately before occupancy, replace all filtration media with the final design filtration media, installed in accordance with the manufacturer’s recommendations.

.4 Prohibit the use of tobacco products inside the building and within 25 feet (7.5 meters) of the building entrance during construction.

.5 Additional Healthcare requirements to address:

.1 Moisture: Develop and implement a moisture control plan to protect stored on-site and installed absorptive materials from moisture damage.

.2 Particulates: Do not operate permanently installed air-handling equipment during construction unless filtration media with a minimum efficiency reporting value (MERV) of 8, (or equivalent) are installed at each return air grille and return or transfer duct inlet opening such that there is no bypass around the filtration media. Immediately before occupancy, replace all filtration media with the final design filtration media, installed in accordance with the manufacturer’s recommendations.

.3 VOC’s: Schedule construction procedures to minimize exposure of absorbent materials to VOC emissions.

.4 Outdoor Emissions: Outdoor activities that generate high VOC emissions, develop a plan to manage fumes and avoid infiltration to occupied spaces.

.5 Tobacco: Prohibit the use of tobacco products inside the building and within 25 feet (7.5 meters) of the building entrance during construction.

.6 Noise and vibration: Develop a plan applicable to the credit intent, to reduce noise emissions and vibrations from construction equipment and other nonroad engines.

.7 Infection Control: For projects adjacent to occupied facilities or phased occupancy in new construction, follow the credit intent guidelines and standards to assess risk and to select mitigation procedures for construction activities.

SPEC NOTE: Remove paragraphs below if building air flush out or air testing is not required.

.2 Indoor Environmental Quality Credit: Indoor Air Quality Assessment:

.1 Select one of the following two options, to be implemented after construction ends and the building has been completely cleaned.

SPEC NOTE: Many air handling units are not capable of 100% outdoor air. Only make up air units and replacement air units and those units specified with economizer cycles have duct connections to allow for 100% outdoor air. Units with economizer cycles may not have capacity to do building air flush out during other than moderate outdoor air temperature and humidity conditions. This may limit the time when building air flush out can be performed and, because of limitations in duct connections, it may not be possible to perform a building air flush out in some or all of the building. Temporary provisions must be required to relieve or exhaust outdoor air introduced during building air flush out.

.1 Option 1. Flush Out:

.1 Path 1. Before occupancy: Install new filtration media and perform a building flush-out by supplying a total air volume of 4,267,140 liters of outdoor air per square meter (14,000 cubic feet of outdoor air per square foot) of gross floor area while maintaining an internal temperature of at least 15°C (60°F) and no higher than 27°C (80°F) and relative humidity no higher than 60%.

.2 Path 2. During Occupancy: The space may be occupied only after delivery of a minimum of 1,066,260 liters of outdoor air per square meter (3,500 cubic feet of outdoor air per square foot) of gross floor area while maintaining an internal temperature of at least 15°C (60°F) and no higher than 27°C (80°F and relative humidity no higher than 60%. Once the space is occupied, it must be ventilated at a minimum rate of 1.5 liters per second per square meter of outside air 0 (0.30 cubic foot per minute (cfm) per square foot of outdoor air) or the design minimum outdoor air rate determined in EQ Prerequisite Minimum Indoor Air Quality Performance, whichever is greater. During each day of the flush-out period, ventilation must begin at least three hours before occupancy and continue during occupancy. These conditions must be maintained until a total of 4,267,140 liters of outdoor air per square meter (14,000 cubic feet of outdoor air per square foot) has been delivered to the space.

.1 Option 2. Air Testing: After construction ends and before occupancy, but under ventilation conditions typical for occupancy, conduct baseline IAQ testing following the credit intent requirements for all occupied spaces. Use current versions of ASTM standard methods, EPA compendium methods, or ISO methods, as indicated. Laboratories that conduct the tests for chemical analysis of formaldehyde and volatile organic compounds must be accredited under ISO/IEC 17025 for the test methods they use.

**END OF SECTION**