



Chicago Department of Aviation
**SUSTAINABLE
AIRPORT MANUAL**

Version 4.0





Chicago Department of Aviation **SUSTAINABLE AIRPORT MANUAL**



Message from Commissioner Jamie L. Rhee

The Chicago Department of Aviation (CDA) has a long and established history as a leader in airport sustainability. Chicago is proud to be the first city in the nation to develop sustainable guidelines for design and construction at our airports, and to set the model for green airport development, beginning with the planning for the O'Hare Modernization Program (OMP) in 2003. Today, the CDA continues to advance a wide array of industry-leading sustainability initiatives at O'Hare and Midway International Airports.

Since that time, in all of our efforts, we remain focused on aligning with the City of Chicago's commitment to green initiatives to enhance the quality of life for our residents. Under Mayor Lori E. Lightfoot's leadership, we are working to make Chicago the most sustainable city in the country, and to further enhance the sustainability of our airport operations even as the airports expand and passenger volumes continue to rise.



Through the Sustainable Airport Manual (SAM), we have established guiding principles for integrating sustainability into all aspects of airport planning, administration, design and construction, operations and maintenance, and concessions and tenants at both O'Hare and Midway.

The SAM includes measures and metrics to evaluate compliance, standards and specifications, project evaluation checklists, and a Green Airplane Rating System that gauges each project's ability to meet or exceed contractual obligations to incorporate sustainable initiatives. To-date, more than 290 projects and operations at Chicago's airports have received a Green Airplane Rating. That number will increase as we continue to update, improve, implement, and track SAM adherence. From our ambitious green roof installations, to the cutting-edge Balanced Earthwork Plan for airfield reconfiguration - Chicago remains an industry leader for airport sustainability due to our expanded application of the SAM and Green Airplane Rating System.

This manual is a living document, one that continues to grow and evolve, that includes emerging technologies, state-of-the-art design and thought-provoking principles – along with lessons learned from 15 years of implementation experience. As we plan for the future of Chicago's airports with O'Hare 21, the Terminal Area Plan, and the Midway Modernization Program, we are committed to application of the most environmental, socially, operational and fiscally responsible practices in development through use of the SAM.

The SAM is not possible without the collaborative input from our community, state, federal, airline and other airport stakeholders. It is because of this collaboration and commitment that the SAM has become the model for sustainable implementation at airports across the globe. Working together, we will ensure that Chicago continues to set the standard for environmental stewardship and excellence in aviation as O'Hare and Midway take off for the future.

Sincerely,

Jamie L. Rhee
Commissioner

INTRODUCTION

Chicago Department of Aviation
**SUSTAINABLE
AIRPORT MANUAL**





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ABBREVIATIONS

ANSI	American National Standards Institute
AOA	Air Operations Area
ARFF	Aircraft Rescue & Firefighting
ASHRAE	American Society of Heating, Refrigeration, and Air-Conditioning Engineers
ASTM	American Society for Testing and Materials
ATS	Airport Transit System
BAS	Building Automation System
BEP	Balanced Earthwork Plan
BIPV	Building Integrated Photovoltaic
BMP	Best Management Practices
BOD	Basis of Design
BOD	Biological Oxygen Demand
BTU	British Thermal Unit
C&D	Construction & Demolition
CARB	California Air Resources Board
CBC	Chicago Building Code
CBECS	Commercial Buildings Energy Consumption Survey
CDA	Chicago Department of Aviation
CDCAP	Chicago Department of Construction Administration and Permits
CDOT	Chicago Department of Transportation
CECC	Chicago Energy Conservation Code
CFC	Chlorofluorocarbon
CFL	Compact Fluorescent Light
CGP	Construction General Permit
CIBSE	Chartered Institution of Building Services Engineers
CIP	Capital Improvement Program
CIR	Credit Interpretation Result
CM	Construction Manager
CNG	Compressed Natural Gas
CPVC	Chlorinated Polyvinyl Chloride
CRI	Carpet and Rug Institute
CRS	Center for Resource Solutions
CSI	Construction Specification Institute
CT	Concession & Tenants
CTA	Chicago Transit Authority
CVT	Continuously Variable Transmission
CxA	Commissioning Authority
DC	Design & Construction
DFE	Design for the Environment
DHS	Department of Health Services
DOE	Department of Energy
ECM	Energy Conservation Measure
EDRI	Engineering Document Recycling Initiative
EF	Ecological Footprinting
EPA	Environmental Protection Agency
EPAct	Energy Policy Act
EPEAT	Electronic Product Environmental Assessment Tool
ESC	Erosion and Sedimentation Control
ETS	Environmental Tobacco Smoke
FAA	Federal Aviation Administration
FEMP	Federal Energy Management Program



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FF&E	Fit-out, Furniture and Equipment
FOD	Foreign Object Debris
FSC	Forest Stewardship Council
FTE	Full-Time Equivalent
GHG	Green House Gas
gpf	Gallons per flush
gpm	Gallons per minute
GTR	Ground Tire Rubber
GWP	Global Warming Potential
HCFC	Hydrochlorofluorocarbon
HDPE	High Density Polyethylene
HfC	Halfnium Carbide
HFC	Hydrofluorocarbon
HRES	Harvard Real-Estate Services
HVAC	Heating, Ventilation, Air Conditioning
IAQ	Indoor Air Quality
IECC	International Energy Conservation Code
IEPA	Illinois Environmental Protection Agency
IESNA	Illumination Engineering Society of North America
IMH	Ice Making Head
IPM	Integrated Pest Management
IPMVP	International Performance Measurement and Verification Process
IWTS	Industrial Wastewater Treatment System
LACCD	Los Angeles Community College District
LED	Light Emitting Diode
LEED	Leadership in Energy and Environmental Design
LEED AP	LEED Accredited Professional
LEED-CI	LEED for Commercial Interiors
LEED-EB	LEED for Existing Buildings
LEED-NC	LEED for New Construction
LEV	Low-Emission Vehicle
LCA	Life Cycle Assessment
LCCA	Life Cycle Cost Analysis
LDV	Light Duty Vehicles
LNG	Liquid Natural Gas
MCE	Master Civil Engineer
MDF	Medium Density Fiberboard
MDW	Chicago Midway International Airport
MERV	Minimum Efficiency Reporting Value
MSD	Material Safety Data
M&V	Measurement and Verification
NAVAIDS	Navigational Aids
NC	Noise Criteria
NFR	No Further Recommendation
NIST	National Institute of Standards and Technology
NPDES	National Pollutant Discharge Elimination System
ODP	Ozone Depletion Potential
OM	Operations & Maintenance
OMP	O'Hare Modernization Program
OPR	Owner's Project Requirements
ORD	Chicago O'Hare International Airport
OSB	Oriented Strand Board
PCA	Pre-Conditioned Air
PCC	Portland Concrete Cement



PCH	Phenylcyclohexene
PDD	Project Definition Document
PDP	Project Development Process
PMO	Project Management Office
PV	Photovoltaic
PVC	Polyvinyl Chloride
PZEV	Partial Zero Emissions Vehicle
RCU	Remote Compressor Unit
RE	Resident Engineer
REC	Renewable Energy Certificates
RFP	Request for Proposal
RPU	Remote Processing Unit
SAGA	Sustainable Airport Guidance Alliance
SAM	Sustainable Airport Manual
SCAQMD	South Coast Air Quality Management District
SCU	Self Contained Unit
SDM	Sustainable Design Manual
SEI	Stockholm Environmental Institute
SIP	State Improvement Plan
SMACNA	Sheet Metal and Air Conditioning National Contractors Association
SMS	Sustainability Management System
SOP	Standard Operating Procedure
SRI	Solar Reflectance Index
SRP	Sustainable Review Panel
STAR	Stewards of Tomorrow's Airport Resources
STC	Sound Transmission Class
SWPPP	Stormwater Pollution Prevention Plan
TARP	Technology Acceptance Reciprocity Partnership
TLC	Total Lighting Control
TRC	Tradable Renewable Certificates
TSS	Total Suspended Solids
TVOC	Total Volatile Organic Compounds
ULSD	Ultra-Low Sulfur Diesel Fuel
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USGBC	United States Green Building Council
UV	Ultraviolet
VAV	Variable Air Volume
VFD	Variable Frequency Drive
VCT	Vinyl Composition Tile
VOC	Volatile Organic Compounds
WAN	Wide-Area Network
WBCSD	World Business Council Sustainable Development
WDF	Wood Derived Fuel
WRI	World Resources Institute
ZEV	Zero-Emissions Vehicle



INTRODUCTION

Chicago was the first in the nation to develop sustainability guidance for airports when the original edition of this manual was unveiled as the Sustainable Design Manual (SDM) in December 2003. In 2009, the SDM evolved into the Sustainable Airport Manual (SAM), and has been kept up to date since. Starting in 2003, numerous, wide-ranging airport projects have been reviewed and rated according to the standards established by the SAM (and SDM), resulting in the evolution of a unique process and many industry firsts:

- Development of a rating system
- Development of a green airplane certification award system
- Recognition of designers and contractors for sustainability accomplishments

VISION STATEMENT

The Chicago Department of Aviation (CDA) is embracing the best possible environmental, social, fiscally-responsible, and operational practices to complement the overall mission and goals of the City of Chicago. It is our vision that the Sustainable Airport Manual (SAM) will become the global industry standard for sustainability planning, development, and everyday functions at airports around the world.

TIMELINE OF UPDATES

- 2003 - Sustainable Design Manual (SDM) was unveiled. The 2003 SDM used the LEED-NC 2.1 rating system as a basis.
- 2009 - The SDM was updated based on LEED® 2009 (also known as LEED v3), as well as lessons-learned from implementation of the previous manual, and the availability of newer technologies. The SDM became the Design & Construction Chapter of the new Sustainable Airport Manual (SAM) that was unveiled in August 2009.
- 2010 - In November 2010, SAM v2.0, which incorporates the new Planning, Operations & Maintenance, and Concessions & Tenants chapters, was released.
- 2011 - In November 2011, SAM v2.1 was released, featuring updated standards and regulations, additional case studies, a Green Airplane rating system for Concessions & Tenants – Design & Construction projects, and other various document upgrades.
- 2012 - SAM v3.0 was released in November 2012. Version 3.0 featured additional credit guidance, new credits, revised rating systems, and updated case studies.
- 2013 -2014 – SAM v3.1 and v3.2 were released in November 2013 and November 2014 respectively. Each update included additional revisions to credits and updated case studies based on lessons-learned over the previous year.
- 2018 - In 2018 SAM was again updated to version 3.3 to simplify the reporting requirements for the Concessions & Tenants – Operations & Maintenance chapter.



- **2020 – SAM v4.0 is released.** This latest version of SAM includes enhancements and updates with an emphasis on terminal design. New credits and revisions to existing credits drew upon LEEDv4 and various other rating systems where applicable and were incorporated into this document. In some cases, especially for the Design & Construction chapter, some SAM credits based on LEED v3 were replaced with the current LEED v4 versions. Other entirely new SAM credits used reference language from other rating systems, including ParkSmart, SITES, Green Globes, Fitwel, and Living Building Challenge.

PURPOSE

The Sustainable Airport Manual (SAM) is an integral part of Chicago's ongoing efforts toward implementing more environmentally sustainable buildings and civil infrastructure, incorporating best practice guidance for planning, operations and maintenance of all City airport facilities and functions, and those of its tenants.

The purpose of the SAM is to integrate *airport-specific* sustainability planning and practices early in the design process, through planning, construction, operations, maintenance and all airport functions with minimal impact to schedule or budget. To achieve greater success, the SAM should be considered in every step of a project.

While certain elements of the SAM are specific to the Chicago Department of Aviation, they can easily be customized and interpreted for any airport's unique environment. The vast majority of the SAM's guidance is already applicable to any airport.

Sustainable practices can potentially reduce the environmental impact of the built environment while at the same time creating financial and operational benefits for a project, and social benefits for the community at large. Together, these aspects of sustainability are commonly referred to as the "triple bottom line."

The SAM provides direction and is a guideline for incorporation of as many sustainable elements into a project as are feasible, beyond those elements that are required through an individual project's contract specifications and design standards.

The **Planning** chapter is intended to address the conceptual planning of the airport's physical environment to facilitate implementation of design, construction, and/or operation and maintenance in a sustainable manner.

The **Design & Construction** chapter continues the process of incorporating sustainability into major renovations, demolitions, and construction projects.



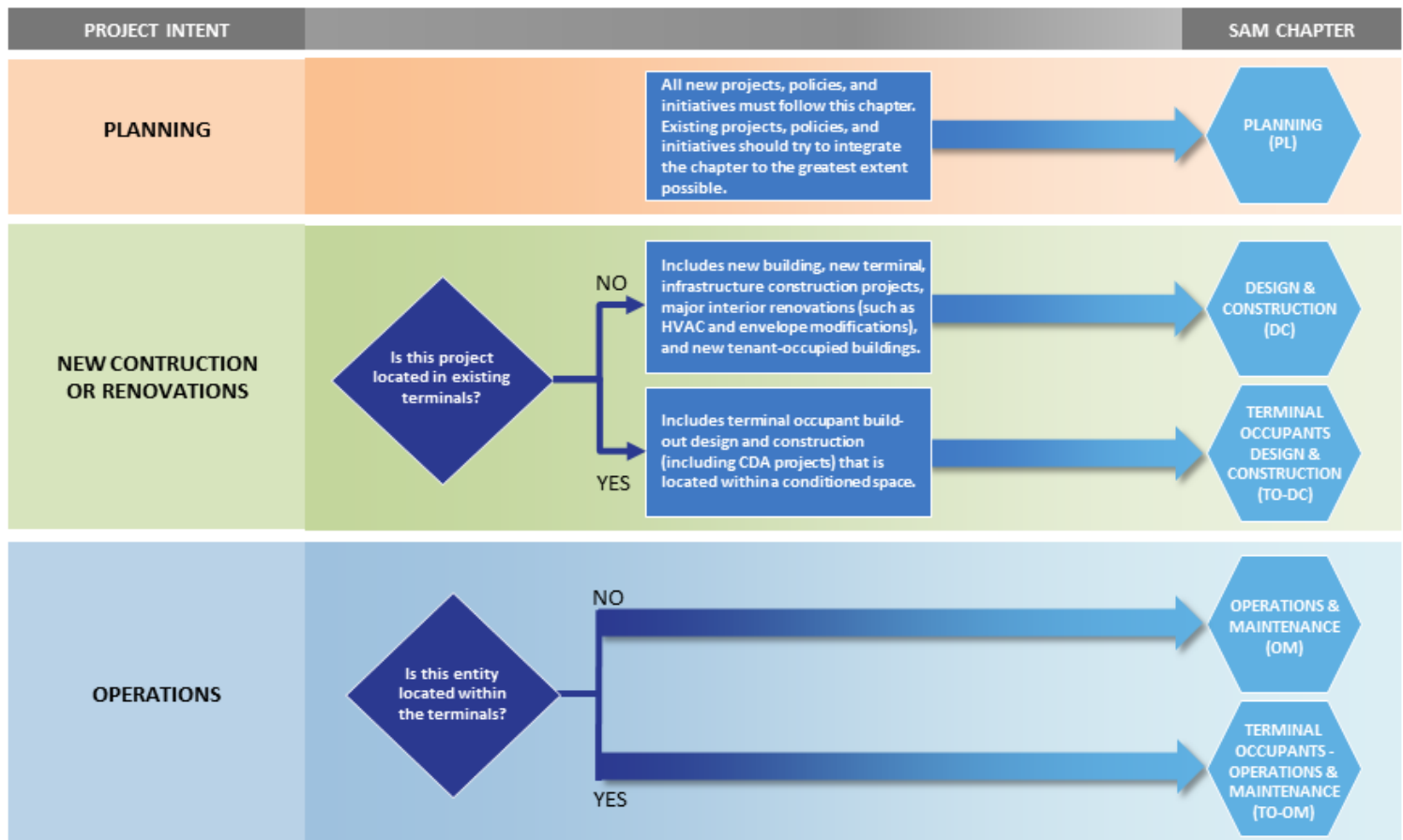
The **Operations & Maintenance** chapter is designed to certify the sustainability of ongoing operation of building operations, operational and maintenance procedures, system upgrades, minor space-use changes, and minor facility alterations or additions, and training and educational programs.

The **Terminal Occupants** chapter is designed to certify the sustainability of activities, including daily operations, as well as design and construction of tenant spaces within the terminals.

Users of this Manual can reference the following flow chart to determine the chapters that apply.

How to use this chart to determine which SAM Chapter applies:

1. Determine the intent of your sustainability evaluation, e.g. the evaluation is for the new construction of a tenant building, therefore start in with the New Construction or Renovation 'Project Intent' section.
2. Using the flow chart in the appropriate section, follow the descriptions to select the correct SAM Chapter.





SUBMITTAL AND REVIEW PROCESS

The Planner, Designer, or Contractor shall submit the appropriate SAM checklist and supporting documentation to SAMdocs@cityofchicago.org at milestones determined by each contract. Please refer to each individual chapter for the specific Implementation & Review Process.

LEED STANDARD

The SAM has been drawn in large part from the Leadership in Energy and Environmental Design Green Building Rating System™ (LEED®) of the U.S. Green Building Council (USGBC). All rights reserved. Hereinafter, the SAM will refer to this source document as LEED® or LEED® 2009 or LEED v4. The content of LEED® incorporated in the SAM is used with the permission of and under license with USGBC.

LEED® is the nationally accepted benchmark for the design, construction, and operation of high performance green buildings.

Copyrights in the Leadership in Energy and Environmental Design Green Building Rating System (LEED®) and the 2009 Edition and v4 Reference Guides, including the Green Building Design and Construction Reference Guide, the Green Interior Design and Construction Reference Guide, the Green Building Operations & Maintenance Reference Guide, and the marks LEED®, U.S. Green Building Council® and USGBC® are the property of the U.S. Green Building Council, Inc. USGBC makes no warranty of habitability, merchantability, fitness for a particular purpose, or anything else concerning any of its rating systems. Neither the LEED® rating system nor LEED® certification means or implies that a project is or will be structurally sound or safe, constructed in accordance with application laws, regulations or codes, free of mold or mildew or free of volatile organic compounds or allergens. While USGBC applauds the efforts made in the SAM to address sustainable airport design and construction, USGBC has not approved or endorsed the SAM.

The City of Chicago Department of Aviation strongly encourages all applicable airport projects to seek individual LEED® certification in addition to incorporating sustainable elements described in this Manual to the greatest extent possible and practicable.

The SAM is based on existing federal, state, and local regulatory requirements with additional sustainable and best practice environmental strategies and considerations. The guidance provided within does not supersede, but is intended to supplement such regulatory requirements. In Chicago, the existing federal, state, and local regulators and requirements include, but are not limited to:

- Federal Aviation Administration
- U.S. Environmental Protection Agency
- Illinois Environmental Protection Agency
- U.S. Department of Agriculture



Chicago Department of Aviation
SUSTAINABLE AIRPORT MANUAL



- Illinois Department of Transportation
- City of Chicago Codes and Ordinances
- City of Chicago 2003 Water Agenda
- O'Hare Modernization Program Balanced Earthwork Plan

Where a standard or specification is referenced in the Manual, it is assumed that it refers to the most current version unless otherwise noted.

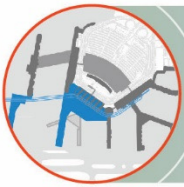


For comments, case studies, lessons-learned, new technologies or for any and all project submittal forms, please email:

SAMdocs@cityofchicago.org

Chicago Department of Aviation
**SUSTAINABLE
AIRPORT MANUAL**





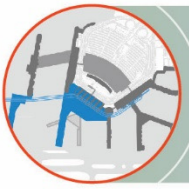
PLANNING

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APPENDICES

Appendix PL-A – Planning Checklist



INTRODUCTION

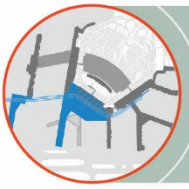
The Sustainable Airport Manual (SAM) Planning Chapter is intended to address the conceptual planning of the airport's physical environment to facilitate implementation of design, construction, and/or operation and maintenance in a sustainable manner. The Planning chapter also addresses operational guidance by outlining procedures for the airport's compliance with federal, state, and local standards, codes, and mandates, as well as daily operational best management practices. Planning is an ongoing pursuit that establishes qualitative and quantitative goals for all projects of all sizes and scopes at the earliest stage based on stakeholder input, collaboration and commitment.

Planning begins at the earliest stages of a project and thereby becomes part of the sustainable fabric and vision that influences later stages of design, construction, and operation for all projects, large and small. With the integration of sustainability into every aspect of airport functions, the consideration of sustainability will become more routine. Moreover, the inclusion of sustainability considerations at the planning stage will result in greater benefits and lower costs than the addition of sustainability features at a later date. Understanding the needs and limitations of airport stakeholders and system conditions is also an important part of planning in order to achieve long term effectiveness.

The Planning chapter outlines a broad integrated approach, customizable to organizational and system conditions and shaped by input from stakeholders. Once system conditions (and options) are defined and understood, the airport can then look to one or more sustainability strategies for inspiration and development of specific goals. The Chapter provides guidance and support in developing, maintaining, or increasing the performance of sustainable initiatives within the overall framework of each airport planning project. It considers sustainable design concepts throughout the planning of airport development projects and programs from inception, thereby increasing the ability of each project to meet and to hopefully exceed various initiatives based on each airport's optimal conditions.

The approach to sustainability planning outlined in this chapter strives to collectively elevate everyday planning to proactively address environmental issues beyond minimum standards and embrace sustainability as an important achievement. Many airports often struggle with the daily reality of their economic and social concerns, like balancing limited budgets or satisfying customer demands, where sustainability opportunities can be overlooked. Through this process, all the required elements of the standard planning process can be achieved, while embracing sustainable practices that can potentially reduce the environmental impact of the built environment while at the same time creating financial and operational benefits for a project, and social benefits for the community at large.

The sustainable planning path outlined here will help to define the airport's sustainability goals and objectives for each project based on system conditions and unique situations. From there, the key stakeholders collectively develop the project's "Sustainability Schematic," which is an overall plan outlining the measurable sustainability targets and goals for the project that, when finalized, will become part of the official plan for the project, such as a Project Definition Document (PDD) and/or Capital Improvement Program (CIP) Application, or other applicable planning documentation.

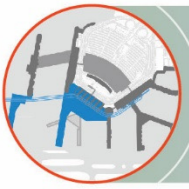


APPLICABILITY

All projects begin with the development of a plan. That plan may be a major program, such as an airport master plan, or it may be a relatively small improvement, such as the addition of a new jet bridge or an update to an airport's Stormwater Pollution Prevention Plan. Just like cost estimates and schedules, sustainability considerations and goals need to be integrated into the planning process for all projects, regardless of size and scope. Integration of sustainability considerations into the planning process sets the groundwork for inclusion of sustainability features as a project proceeds through the design, implementation, and operational stages.

Planning projects that would be applicable to this SAM Planning Chapter include, but are not limited to the following:

- Master Plan
- Maintenance Plan
- Utilities Plan
- Operations Plan
- Construction Plan
- Deconstruction Plan
- Asset Maximization Plan
- Facilities Plan
- Existing Facility Optimization Plan
- Terminal Renewal/Improvement Plan
- Facility Re-Use Analysis
- Land Use Plan
- Noise Compatibility Plan
- Regulatory/Code Requirements
 - Title V Permit Application or Update
 - Air Quality State Implementation Plan (SIP) Update
 - NPDES Permit Application or Update
 - Stormwater Pollution Prevention Plan (SWPPP) Update
 - USACE 404 Permit Application
- Other Projects or Strategic Initiatives
 - Demand Driven Projects
 - Customer Service Projects
 - Revenue Opportunities



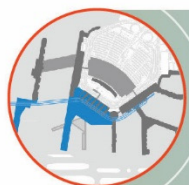
PROCESS

The process of sustainable airport planning as described in this SAM Planning Chapter involves the creation of an overall plan outlining the measurable sustainability targets and goals for the project that, when finalized, will become part of the official plan for that project, function, or activity. This is to be accomplished primarily through the development of a “Sustainability Schematic.” The sustainable airport planning process can be summarized by reviewing an outline of the credits included in the Chapter:

1. **Define Sustainability Vision Statement** (*SAM Credit PL.2.1 Prerequisite 1*)
2. **Determine Key Stakeholders and hold Initial Project Meeting to Discuss Sustainability Goals** (*SAM Credit PL.2.2 Prerequisite 2*)
3. **Sustainability Baseline Assessment and Cost/Benefit Analysis** (*SAM Credit PL.2.3 Prerequisite 3*) Requires the completion of a preliminary sustainability baseline assessment and the completion of a preliminary cost/benefit analysis for all project alternatives, including the no-project alternative. The cost/benefit analysis enables a comparison of initial versus longer term operational and maintenance costs, while also considering the potential environmental and social impacts that may occur as a result of the project.
4. **Develop a Draft Sustainability Schematic** (*SAM Credit PL.2.4 Prerequisite 4*)
Requires the development of a Sustainability Schematic which outlines the steps for sustainability considerations in planning any project or activity, and addresses the following major considerations:
 - a. Identify and establish sustainability objectives, target goals, and minimum thresholds
 - b. Identify sources of funding
 - c. Provide for and conduct education and public outreach initiatives
 - d. Plan for the integration of SAM guidelines into the specific project elements, as appropriate to the size and scope of each project
 - e. Plan for sustainable operation and maintenance of completed projects/programs/facilities
 - f. Establish plan to close the feedback loop
5. **Project Meeting to Finalize Sustainability Schematic** (*SAM Credit PL.2.5 Prerequisite 5*)
6. **Close the Feedback Loop at Project Completion** (*SAM Credit PL.2.6 Prerequisite 6*)

Within the Chapter’s main body, each sustainable planning “Credit” has five subsections: Intent, Requirements, Submittals, Technology/Strategy, and Case Studies, as described below:

- **Intent:** The primary motivations for any sustainable practice.
- **Requirements:** Specifies institutional, operational, and functional elements that satisfy the intent. The prerequisites must be achieved; other credits are optional, but contribute to the overall sustainable planning process for the project.



- **Submittals:** Required and supporting documentation and/or information required to achieve applicable prerequisites or credits. This documentation indicates how the requirements are being met.
- **Technology/Strategy:** Highlights specific ways of meeting the recommendations within the scope of each specific credit. Case studies where available, are presented to help guide the application of sustainable credits to planning projects and efforts.
- **Case Study:** Examples of credit intent “in action” at airports and/or other industry facilities.

While not all strategies will be applicable to every project, planners are highly encouraged to think creatively and to consider the intent of each issue throughout the decision process. In all cases, it is the responsibility of the planning team to evaluate and review with the appropriate CDA managers any anticipated cost or schedule impact.

THRESHOLDS AND GUIDANCE

For all planning projects involving CDA owned, operated, or leased facilities and for all planning projects involving resources for which CDA has regulatory responsibilities, CDA encourages the targets or goals listed in the following table, as appropriate and applicable to the size and scope of each project. Although the targets or goals included in the following table might be above and beyond the thresholds established by the other chapters of this Manual, the CDA strives for them to be attainable and therefore, encourages innovation and forward-thinking in order for their achievement.

Topic	Description and/or Example Measure(s)	Encouraged Target or Goal
Site Selection	Locate near mass transit (bus, CTA rail lines, Metra, etc.) and carpooling. Protect and restore site, while minimizing wildlife attractants.	Encourage employees and visitors to utilize mass transit Protect natural resources Minimize attraction of wildlife
Stormwater	Minimize impervious surfaces, incorporate vegetated roofs, curb breaks and bioswales. Harvest rainwater for reuse.	Slow, intercept and encourage infiltration (landside only), reuse, protect and treat stormwater whenever possible to minimize contamination and runoff Recover and recycle deicing fluid



Topic	Description and/or Example Measure(s)	Encouraged Target or Goal
Reduction of Heat Islands, roof and non-roof	Examples include, but are not limited to green roofs, green walls, white roofs, and shading. Minimize paved surfaces. Use light colored/high-albedo materials for pavements, roadways, parking lots, sidewalks and plazas.	Integrate into all projects involving structures (occupied and unoccupied) and extensive pavements
Water Efficiency	Use low-flow, high-efficiency plumbing fixtures (USEPA WaterSense). Recycle vehicle washwater and reclaim water from cooling towers. Use native, drought tolerant landscaping to minimize maintenance and irrigation needs.	Reduce use of potable water resources by 40%
Energy Efficiency	Improve airfield and landside – design for efficiency. Provide pre-conditioned air and 400 Hz power at aircraft gates, and hydrant fueling. Utilize natural daylighting, heat, absorption cooling and ventilation. Minimize building energy loss. Incorporate efficient lighting, HVAC, and human-demand controls, such as occupancy sensors	Reduce total project energy use by 50%
Equipment and Appliances	Optimize energy performance, provide high efficiency ,motors, pumps, systems and equipment	100% ENERGY STAR compliant
Generation and/or Integration of Renewable Energy	Examples include, but are not limited to solar applications, wind turbines, geothermal.	Consideration of onsite renewable energy options for at least 5% of total energy usage – dependent upon life cycle costs and benefits achieved
Green Power	Utilization of green resources such as biomass, solar, wind, and water to generate electricity.	Encourage development and use of grid-source, renewable energy technologies on a net zero pollution basis, as applicable and appropriate



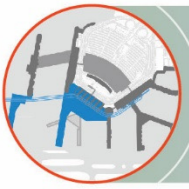
Topic	Description and/or Example Measure(s)	Encouraged Target or Goal
Materials and Resources	Utilize pre-existing buildings and resources. Use low-embodied carbon materials	Reuse and salvage existing resources and materials whenever possible Use low-embodied carbon materials wherever possible and in support of Life Cycle Analysis
Waste Management and Recycling	Divert waste from landfill disposal	100% diversion of recyclable, reusable, or compostable waste from landfill disposal 100% of soils kept onsite (Balanced Earthwork Plan)
Recycled Content of Materials	Use materials and products that incorporate recycled content materials, therefore reducing impacts resulting from extraction and processing of new virgin materials	All products contain some percentage of recycled content where applicable
Use of Local/Regional Materials	Use materials and products that are extracted and manufactured within the region, thereby supporting the regional economy and reducing the environmental impacts resulting from transportation	100% usage of materials and products that are extracted and manufactured within in a 250 mile radius from the site
Alternative Fuels/Vehicles	Examples include, but are not limited to electric, hybrids, CNG, Biodiesel, Propane	100% usage of alternative fuels/alternatively fueled vehicles in all vehicles used on airport property unless no reasonable alternatively fueled vehicle option exists

SUBMITTALS

Incorporation of sustainable elements into planning efforts is tracked using the SAM checklist provided in **Appendix PL-A – Planning Checklist** along with any paperwork and documentation required for each SAM Credit.

IMPLEMENTATION AND REVIEW PROCESS

The SAM and its supporting documentation are administered by the Sustainable Review Panel (SRP), which currently consists of representatives of the CDA Management Staff and Airport Planners actively



involved in CDA projects. The composition of the SRP is intended to be dynamic depending on each project's unique needs.

The SRP is responsible for the review of submittals with respect to sustainability and provides technical support to the each project in relation appropriate to sustainable practices. The SRP is responsible for review of every checklist and for the awarding of "Green Airplane Certification" ratings based on the extent of incorporation of sustainable practices as outlined in this Manual and as documented on the submitted SAM Checklist(s).

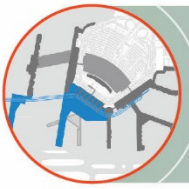
Other responsibilities of the SRP include preparation and review of sustainable design related specifications, technical memoranda, and miscellaneous documents, as necessary. In addition, the SRP is responsible for presentations and training to project team members with respect to the application of this Manual. The primary tasks of the SRP are to oversee the application of the Manual and review submittals for their compliance with the Manual.

All projects conducted by or under management of the CDA will follow these procedures. For any and all sustainability-related questions and/or submittals, please use the following email address to submit forms electronically (preferred method): SAMdocs@cityofchicago.org.



For comments, case studies, lessons-learned, new technologies or for any and all project submittal forms, please email:

SAMdocs@cityofchicago.org



1.0 ADMINISTRATIVE POLICY & PROCUREMENT

1.1 Prerequisite 1 – Green Meetings

Required

INTENT

Green meeting practices are intended to guide meeting hosts, planners, and attendees toward more eco-friendly meetings. A few extra efforts to incorporate environmental considerations into planning and conducting meetings will help to minimize the negative impact on the environment and educate all participants regarding sustainable meetings.

Green meeting practices are intended to:

- Conserve resources
- Reduce environmental impacts
- Save money
- Support Chicago's commitment to environmental stewardship

REQUIREMENTS

Whenever applicable, follow the green meeting practices outlined below, or your existing corporate sustainability policy, whichever is more stringent.

SUBMITTALS

Include descriptive narrative on the SAM Checklist and if following your own corporate sustainability policy, please include with submittal for this section.

TECHNOLOGY/STRATEGY

Meeting Planning

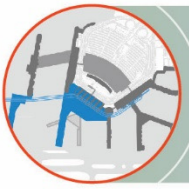
Meeting hosts should consider the following when planning for a meeting:

Reduce the number of copies produced by:

- Sharing meeting materials
- Digitizing materials and distributing presentations via email prior to meetings
- Placing materials on the wall (one large print or presented with projector equipment)

If handouts are needed at the meeting, produce handouts:

- Locally
- Double-sided
- Using high post-consumer recycled content paper



Exhibits and presentation materials:

- Same suggestions as handouts above
- Reuse display boards, utilize both front and back sides
- Use low-emitting materials for exhibit displays
- Recycle cardboard and other packaging materials

For participants not in the building: can they participate by internet/phone?

- Contact the expected meeting participants ahead of time and present them with the option of a video/phone conference via the internet/phone, if appropriate. Costs associated with technical support may still be less than travel/fuel costs in some cases.

What if travel cannot be avoided?

- Can attendees carpool/carshare?
- Provide attendees with mass transit options, such as CTA or Pace Bus, including directions.
- Encourage walking and biking by selecting accessible venues, including directions.
- If overnight stays are involved, suggest hotels nearest the meeting venue that are the most environmentally friendly (www.greenhotels.com). Consider moving the meeting to the hotel if majority of participants are staying at the same hotel, reducing the need for transportation to and from the hotel.

If the meeting is all day or multiple days in a row, how can it be catered in an environmentally friendly way?

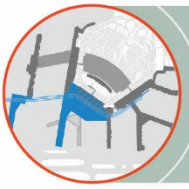
- Serve drinks from pitchers, reusable utensils and dishes, and request local produce to cut down on waste when catering for large groups.
- Utilize condiments in bulk dispensers to reduce waste.
- Plan for the pick-up and compost or donation of leftover food to reduce waste.

What if the meeting is held annually?

- Plan for annual meetings at times of the year when temperatures are less extreme to reduce energy consumption due to the use of air conditioning/heat.

Meeting Room

- Use the recycle bins for recyclable items at the end of the meeting.
- Collect reusable business card holders/name tags in a bin after last meeting.
- Collect presentation materials that are not needed by the attendees that can be donated to local schools, reused or recycled.
- Have attendees fill out an online survey allowing for feedback about the meeting and vendors for future reference and improvement.
- Follow up after the meeting with participants to share green success stories and lessons-learned including statistics from the meeting, such as quantities of recycled materials. Also include a summary document that provides details of the green meeting.
- Help to ensure the lights are turned off as attendees leave the meeting room.

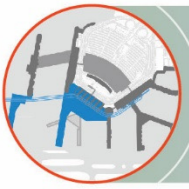


Additional details if conducting off-site meetings, such as a conference or workshop...

- Ensure that off-site meeting locations accommodate opportunities for recycling.
- Recycle newspapers, cans, and glass, including those from your guest room, in marked containers in the conference area.
- Participate in the hotel's water, energy, and detergent conservation efforts by following the instructions posted in your room.
- Note the conference's efforts to reduce the use of paper by limiting conference handouts at registration, using folders or handouts printed on high post-consumer recycled content paper, using vegetable-based ink, and encouraging presenters to limit handouts.
- Thank the hotel or off-site location host for providing recycling opportunities, reusable utensils and dishes for breaks, etc.

IMPLEMENTATION

1. Make certain that all appropriate recycling bins are located in public meeting areas and conference rooms.
2. Develop message boards for conference rooms, meeting areas, and copy/production areas. (see following pages)
3. Provide routine reminders of green meeting practices and during annual team meetings.



1.0 ADMINISTRATIVE POLICY & PROCUREMENT

1.2 Corporate Sustainability Policy

1 Point

INTENT

In keeping with the spirit and intent of this Manual, it is strongly encouraged that companies working in support of CDA on any project establish and adopt their own corporate policy on sustainable practices.

REQUIREMENTS

The company providing the design services for the project shall establish and adopt a Corporate Sustainability Policy.

SUBMITTALS

Provide an electronic copy or website link to the company's Corporate Sustainability Policy.

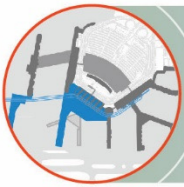
NOTE: If available, please provide an electronic copy of your annual sustainability report documenting any new measures and results.

CASE STUDY

Starbucks Global Social Impact Starbucks

The corporation has undertaken actions to reduce their environmental impact and share in their customer's commitment to the environment. An annual environmental stewardship report is produced to highlight the company's efforts and successes. At the store level, energy and water conservation and other green building strategies are key priorities. Starbucks strives to elevate their partners, customers, suppliers and neighbors to create positive change. This is being accomplished by offering high-quality, ethically purchased and responsibly produced products; investing in paths to opportunity through education, training and employment; minimizing their environmental footprint and inspiring others to do the same; while offering Starbucks as a place for public conversation and elevating civic engagement through service and promoting voter registration.

<https://www.starbucks.com/responsibility>



1.0 ADMINISTRATIVE POLICY & PROCUREMENT

1.3 Green Procurement Policy

1 to 4 points

INTENT

Reduce the environmental impact of products and services by developing a Green Purchasing Program.

REQUIREMENTS

Purchase green products meeting third-party environmental and sustainability standards. Refer to the U.S. EPA Greener Products and Services listing at www.epa.gov/greenerproducts/identify-greener-products-and-services for more information. Some common product certifications include:

- UL EcoLogo
- Electronic Product Environmental Assessment Tool (EPEAT)
- Green Seal®
- EPA Safer Choice.

Points for this credit will be awarded based on the number of green products, procured for general day-to-day office use by the designer of record of the project. The party completing the checklist should only count green products procured for the local office, as opposed to a global level corporate policy.

Points are awarded as follows:

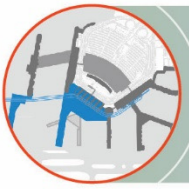
<u>Number of Green Products Procured</u>	<u>Points</u>
1-2	1
3-5	2
6-11	3
12+	4

Example: An firm responsible for the planning of a terminal space uses, *in their own office*, 100% recycled fiber bathroom tissue and toilet paper that are both EcoLogo certified and glass cleaner meeting the GreenSeal certification. These three items meet the requirements of the credit, therefore, two points would be achieved for this credit based on the table above.

SUBMITTALS

Include descriptive narrative in the SAM Checklist of items purchased and used.

NOTE: If available, please provide an electronic copy of your green procurement policy.



TECHNOLOGY/STRATEGY

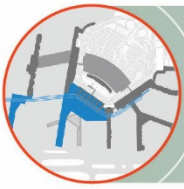
Introduce environmentally conscious purchasing into company practices. The policy needs to clearly define an objective and establish a sustainability claims verification procedure that can be replicated as necessary. Verification procedures may rely on product certifications such as Green Seal and ENERGY STAR. Evaluate the items that are purchased, identify more environmentally friendly alternatives, and establish a policy to purchase these alternatives when economically feasible. Work with suppliers to identify sustainable products that meet the company's needs.

Standard Practice

None

Recommended Practice

- Purchase items with the minimum content levels specified in the U.S. EPA Greener Products and Services listing at www.epa.gov/greenerproducts/identify-greener-products-and-services
- Purchase items in bulk to reduce packaging, transportation impacts and costs
- When using a company-developed policy, the following resources can be used to create a Procurement Policy. Resources include but are not limited to:
 - U.S. Environmental Protection Agency's Comprehensive Procurement Guidelines (CPG) – The CPG includes an index of products and their recommended recycled content. More information can be found on the associated website: www.epa.gov/smm/comprehensive-procurement-guideline-cpg-program
 - U.S. Environmental Protection Agency's Water Sense – The partnership program by promoting water efficiency and enhancing the market for water-efficient products, programs and practices. More information can be found on the associated website: www.epa.gov/WaterSense/
 - DOE's Alternative Fuels and Advanced Vehicles Data Center – The data center provides a wide range of information and resources to enable the use of alternative fuels, in addition to other petroleum reduction options such as advanced vehicles, fuel blends, idle reduction and fuel economy. More information can be found on the website: www.afdc.energy.gov/afdc/
 - Fair Trade Products – Purchase fair trade products instead of regular products in order to build equitable and sustainable trading partnerships. Examples of some fair trade products include; coffee, bags, boxes, artwork, chocolate, sugar, etc. More information can be found on the Fair Trade Federation's website: www.fairtradefederation.org
 - USDA's BioPreferred Designated Products – The program aims to increase the purchase and use of renewable, environmentally friendly biobased products while providing "green" jobs and new markets for farmers, manufacturers and vendors. More information can be found on the associated website: www.biopreferred.gov/BioPreferred/



○

Best Available Practice

None

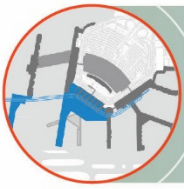
CASE STUDY

Sustainable Purchasing Policy

Vancouver International Airport – Vancouver, British Columbia, Canada

Sustainability is a corporate priority for the Vancouver Airport Authority. One of their goals is to embed sustainability into our purchasing decisions and ensure meaningful consideration of social and environmental criteria when selecting suppliers, products, and services. Their purchasing decisions will drive innovation, improve workplace and environmental outcomes, and support their commitment to be accountable to the communities that they serve. In evaluating suppliers and their subcontractors, the Airport Authority will include sustainability as a weighted component of the evaluation criteria, to address sustainability risks and capitalize on opportunities. In the procurement of goods and services, for both operating and capital spending, their consideration of sustainability gives priority focus to issues pertaining to their four pillars of sustainability; environment, social, economic, and governance.

<http://www.yvr.ca/en/business/work-with-yvr/airport-suppliers/sustainable-purchasing-policy>



1.0 ADMINISTRATIVE POLICY & PROCUREMENT

1.4 Recycled Content Paper

1 to 3 points

INTENT

Reduce the need for virgin materials, energy, and waste associated with the production of paper by promoting the use of recycled content paper.

REQUIREMENTS

For all office paper purchased for routine daily business administration and operations of the company providing planning services,, point values will be assigned based on the recycled content of the paper. Up to 3 points are available by using paper with the following attributes:

<u>SAM Credit</u>	<u>Post-consumer recycled content</u>	<u>Points</u>
1.4.1	30%	1
1.4.2	50%	2
1.4.3	100%	3

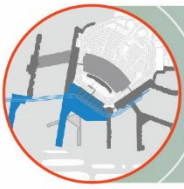
Calculate post-consumer recycled content of office paper using a weighted average based on estimated usage. If the paper is chlorine-bleached, for the purposes of the calculation, it shall be assumed that the post-consumer recycled content is 0% regardless of what it actually is.

Example: Annually, an office uses 50 boxes of chlorine-free paper with a post-consumer recycled content of 30%, 50 boxes of chlorine-free paper with a post-consumer recycled content of 90%, and 20 boxes of chlorine-bleached paper with a post-consumer recycled content of 100%. The weighted average of all the paper used is 50% and therefore 2 points would be awarded for this credit. Note that the 20 boxes of chlorine-bleached paper are assumed to have 0% recycled content for the purposes of the calculation.

$$(50/120)(30\%) + (50/120)(90\%) + (20/120)(0\%) = 50\% \text{ recycled content}$$

SUBMITTALS

Include descriptive narrative on the SAM Checklist.



TECHNOLOGY/STRATEGY

The purchase and use of recycled paper assist in closing the recycling loop by utilizing paper that is made from recovered waste paper.

This credit is intended to:

- Conserve natural resources
- Save energy
- Reduce environmental impacts
- Reduce pollution
- Reduce paper waste

Standard Practice

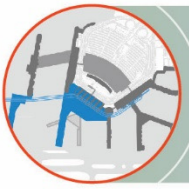
None

Recommended Practice

- Whenever applicable, purchase and utilize recycled office paper in daily business administration and operations.

Best Available Practice

None



PL PLANNING

2.1 Prerequisite 1 – Define Sustainability Vision Statement

Required

INTENT

The Project Manager shall define in writing, a project description and sustainability vision statement for the project.

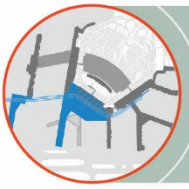
REQUIREMENTS

Regardless of project size, scope, or scale, create a project description outlining what is to be improved, retrofit, upgraded, replaced, enhanced, or corrected as a result of the project completion. The description of the project should be as comprehensive as possible, and include as appropriate, regulatory, guidance, and operational documents.

Define in writing, the vision statement, which at a minimum, clearly states the project's sustainability goals, objectives and opportunities. Whenever possible, specific measures should be listed (e.g., incorporation of solar) including goals and targets (e.g., 50% energy use reduction over standard practices). The vision statement will be unique to every project and situation. It can be simple and goal oriented, or more detailed with thoughts on achieving both goals and specific measures (e.g., to be LEED certified).

SUBMITTALS

1. Project Description
2. Sustainability Vision Statement



PL PLANNING

2.2 Prerequisite 2 – Determine Key Stakeholders and Hold Initial Project Meeting to Discuss Sustainability Goals

Required

INTENT

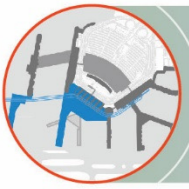
Determine key stakeholders for the planning project and hold an Initial Project Meeting to discuss project sustainability goals. The meeting with key stakeholders will provide a forum for discussion regarding the overall sustainability goals for the project as initially defined in the Sustainability Vision Statement for the project, while capturing innovative ideas and concepts, and resolving any potential conflicts. As a result of the meeting, it is anticipated that the method and required inputs for the cost/benefit analysis will be determined (see SAM Credit PL.3 Prerequisite 3 – Sustainability Baseline Assessment and Cost/Benefit Analysis), as well as the necessary environmental approvals, permitting requirements, and any other additional approvals that would be needed as part of the project. All of this information will factor into the development of the project's Sustainability Schematic as described in SAM Credit PL.4 Prerequisite 4 – Develop a Sustainability Schematic. In addition, as a result of this meeting, the project vision statement (SAM Credit PL.1 Prerequisite 1 – Define Sustainability Vision Statement) may require modification pursuant to the sustainability targets and goals identified for the project.

REQUIREMENTS

Early in the project, hold an initial project meeting with CDA Project Manager, SRP, and all additional key stakeholders involved in planning, design, construction, and daily operation/maintenance, as well as local sustainability leaders, community leaders, schools, and businesses that could potentially be affected by the end result of the overall project effort. Each project is unique and therefore, each stakeholder group will have a unique composition. The intent is to include members who may have an interest in the outcome of the project. Enable members to utilize conference calls, net-meetings, webinars, etc. when unable to attend in person. The purpose of the meeting with key stakeholders is to determine the overall sustainability goals for the project, capture innovative ideas and concepts, resolve any potential conflicts (to the greatest extent possible), determine the method and required inputs for cost/benefit analysis, and to determine the necessary environmental approvals, permitting requirements, and any other additional approvals that would be needed as part of the project.

SUBMITTALS

1. Include a descriptive narrative in the SAM Checklist
2. List of stakeholders, including name, title, and role and/or special interest in project – noting key stakeholders who did not attend and provide evidence that a separate meeting(s) was held for those who were unable to attend initial meeting
3. Meeting Agenda
4. Meeting sign-in sheet including name, company, title, contact information, and role on project
5. Meeting Minutes and Meeting materials (presentations, handouts, etc.)



CASE STUDY

Sustainable Master Plan Ithaca Tompkins Regional Airport – Ithaca, New York

Ithaca Airport has designed its latest master plan update with sustainability in mind. The Federal Aviation Administration agreed to fund this sustainable master plan as the first in the U.S. The project was the first to integrate sustainability directly into the entire master planning process, instead of having a stand-alone sustainability plan. This approach was chosen so that there would be consistency and alignment between projects and policies arising from the traditional aspects of a master plan as well as the sustainability considerations.

Significant changes to a traditional master plan included performing baseline assessments of 12 sustainability categories and developing goals and targets for improvement. Because the most sustainable projects are the ones that are never built, the project team looked to meet identified facility needs by maximizing existing infrastructure instead of immediately resorting to new construction. When new construction was deemed necessary, policies were put in place to ensure projects are built as sustainably as possible.



The project commenced with an advisory committee kickoff meeting in September 2009 and progressed through the phases of the project with frequent input from committee members.



The project commenced with an advisory committee kickoff meeting in September 2009 and progressed through the phases of the project with frequent input from committee members

A concerted effort was made to increase the diversity of viewpoints on the advisory committee beyond the traditional makeup.



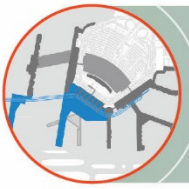
The project team reached out to leaders of local sustainability not-for-profits as well as academic experts from nearby Cornell University and Ithaca College. Public outreach efforts also included a project website with downloadable documents and project updates, online passengers, business, and pilot surveys, and involvement with students at both local universities.



Innovative efforts to increase participation in project-related online surveys included using a donation to the Tompkins County Society for the Prevention of Cruelty to Animals (SPCA), which is a neighbor to Ithaca Tompkins Regional Airport and is the first LEED-Certified animal shelter in the country.

Source: Case Study text and photos provided by, and used with the permission of, C&S Companies and Ithaca Tompkins Regional Airport.

<https://flyithaca.com/wp-content/uploads/ITH-Summary.pdf>



PL PLANNING

2.3 Prerequisite 3 – Sustainability Baseline Assessment and Cost/Benefit Analysis

Required

INTENT

Perform a preliminary sustainability baseline assessment to represent the no-project alternative for comparison purposes. Perform a preliminary cost/benefit analysis for all project alternatives, including the no-project alternative, in order to compare life cycle costs with the range of potential environmental and social impacts as a result of the project, in order to be able to select the alternative that is the most desirable as measured by the appropriate balance of environmental, social, and financial impacts of the project.

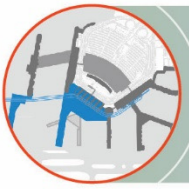
REQUIREMENTS

Complete a preliminary sustainability baseline assessment to represent the no-project alternative. The sustainability baseline assessment could include the following, at a minimum, as appropriate to the size and scope of the project; with the level of analysis within each appropriately tailored to the size and scope of the project:

- Emissions inventory
- Greenhouse gas inventory
- Electrical usage
- Water usage
- Stormwater discharges
- Waste disposal volumes and destinations
- Recycling programs
- Indoor environmental quality
- Cleaning and maintenance programs

Because every project is different, the specific methods of conducting the analysis are not specified here, but left open for definition and refinement based on the nature of the project. The end result of the analysis is intended to inform decisions on the manner in which the project will or will not proceed, particularly relative to sustainability measures. Some examples of considerations that may be helpful to inform the decision making process may include, but are not limited to the following:

- Comparison of initial project costs with and without sustainability initiatives
- Comparison of longer-term costs for operation and maintenance, with and without sustainability initiatives (i.e., utilities, staffing, cleaning, replacing)
- Any other associated cost benefit received not in O&M (i.e., less fees paid, reduced permitting costs)
- Selection of the lowest embodied carbon alternative
- Anticipated environmental benefits to be realized
- Consideration of applicable grant incentives, rebates and tax credits that may be available



Using a method, model and/or software deemed appropriate by the key stakeholders and project planning team, perform a preliminary cost/benefit analysis of all project alternatives, including the no-project alternative.

As part of this assessment, it is required to research and identify the potential sources of funding for the project. In addition to airport fund sources, there are many opportunities for grants, rebates, tax incentives and credits available from Federal, State and private sources. For example, www.dsireusa.org is a comprehensive source of information on state, local, utility and federal incentives and policies that promote renewable energy and energy efficiency. eCivis® Grants Network™ (www.ecivis.com) provides grants management software for accurate grants information, reporting, and management used by governments and community organizations.

SUBMITTALS

- Results of the sustainability baseline assessment, representing the no-project alternative
- A copy of the cost/benefit analysis calculations or the report produced by the selected method software
- A brief narrative describing the results of the cost/benefit analysis for each project alternative considered
- Recommendations of the preferred alternative and the principal reasons for selecting it, based on the results of the cost/benefit analysis

TECHNOLOGY/STRATEGY

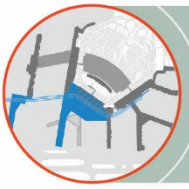
Each project is unique, and therefore a particular method of conducting the cost/benefit analysis is not prescribed. The details of the analysis are defined as part of the planning process by the stakeholder group and the project planning team. Examples for cost/benefit analyses include, but are not limited to the following:

- California Department of Transportation Guide to Benefit-Cost Analysis: http://www.dot.ca.gov/hq/tpp/offices/eab/LCBC_Analysis_Model.html
- The Environmental Valuation and Cost Benefit Analysis web site: www.costbenefitanalysis.org/
- Life Cycle Cost Analysis (LCCA) of project alternatives considered in accordance with the method described by the following, or similar.

Federal Energy Management Program (FEMP): www.energy.gov/eere/femp/federal-energy-management-program

National Institute of Building Sciences, Whole Building Design Guide: www.wbdg.org/resources/lcca.php

Federal Highway Administration: www.fhwa.dot.gov/infrastructure/asstmgmt/lcca.cfm



- Life Cycle Assessment (LCA) of project alternatives considered in accordance with the method described by the following, or similar.

ISO 14040, Environmental Management Life Cycle Assessment Principles and Framework:

www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=37456

EPA National Risk Management Research Laboratory: www.epa.gov/aboutepa/about-national-risk-management-research-laboratory-nrmrl

- If applicable, provide analysis of Greenhouse Gas (GHG) Emissions, Global Warming Potential (GWP) or Ozone Depleting Potential (ODP) of project alternatives, using metrics or indices as described by the following, or similar.

EPA GHG Site: www.epa.gov/ghgemissions

EPA GWP Site: www.epa.gov/ghgemissions/understanding-global-warming-potentials

EPA ODP Site: www.epa.gov/ozone-layer-protection

Stockholm Environment Institute (SEI):

www.co2offsetresearch.org/aviation/MetricsIntro.html

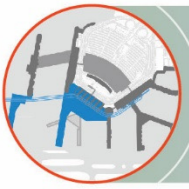
CASE STUDY

Sustainability Baseline Assessment

Albuquerque International Sunport – Albuquerque, New Mexico

The Baseline Assessment provides an inventory and review of Albuquerque International Sunport's current sustainability performance as determined by its related activities, policies, and procedures. This evaluation is an important first step in the development of the Sunport's long-term sustainability strategy that will support the economic vitality of the Sunport, ensure the efficient use of limited resources, reduce negative environmental impacts, and enhance the social well-being of the community. It will also enable the Sunport to measure, through existing and new metrics, its overall sustainability performance over time as well as the impact of individual initiatives.

<http://thesunport.airportstudy.com/files/2012/12/ABQ-chpt-3-07022015.pdf>



PL PLANNING

2.4 Prerequisite 4 – Develop a Sustainability Schematic

Required

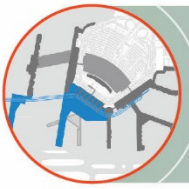
INTENT

Integrate sustainability into the earliest possible stage of a project. By using a sustainability schematic, the CDA can utilize or organize various internal and external processes to work together toward the same goal of sustainability. A process or processes may be applicable to different organizations at different times for different projects, but when used within a sustainability schematic, synergies are more easily identified and realized. When finalized, the Sustainability Schematic will become part of the official plan for the project, such as the Project Definition Document (PDD) and/or Capital Improvement Program (CIP) Application, or other planning parameter documentation depending on the type of project.

REQUIREMENTS

For all projects, develop a sustainability schematic that addresses the following major principles:

- I. Identify and establish sustainability objectives, target goals, and minimum thresholds
 - a. Project Alternatives (including no-project) and innovations
 - a. Procedures and incentives for Stakeholder involvement
 - b. Sustainability baseline assessment results
 - c. Cost/Benefit Analysis results for each project alternative (including the no-project alternative)
 - d. Environmental Approvals required as part of the project
 - e. Permits required as part of the project
 - f. All other additional approvals required as part of the project
 - g. Use of additional tools and resources to provide supplemental information, as deemed appropriate
 - i. Examples tools and resources may include, but are not limited to:
 1. Design for the Environment (DFE)
 2. Ecological Footprinting (EF)
 3. Sustainability Management Systems (SMS)
 4. Sustainable Airport Guidance Alliance (SAGA)
 5. ACRP Sustainability reporting and guidance
 - h. Establish measurable sustainability goals, targets, and quantifiable metrics for the project, as appropriate as a way of tracking and reporting the success/failure of the project.
 - i. Examples include, but are not limited to:
 1. Percent reduction in energy use per square foot of facilities or on a per passenger or customer basis
 2. Percent increase of renewable energy
 3. Percent reduction in water use



4. Reduce number of pollutant exceedances and concentration of pollutants at the “end of the pipe” (e.g. SADF, pH, TDS, petroleum sheens)
5. Identify and reduce sources of pollutants
6. Reduce percentage of failed BMPs
7. Reduce number of noise complaints received and incompatible land uses authorized in adjacent cities
8. Reduce the volume of solid waste generated from sources airport-wide
9. Increase volume of recycled waste generated from sources airport-wide
10. Reduce volume of hazardous waste generated
11. Increase procurement of environmentally-friendly products

II. Identification of Funding Sources

- i. Grants
- ii. Rebates
- iii. Tax Credits
- iv. Other

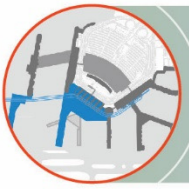
III. Provide for and conduct Education and Public Outreach Initiatives

i. Examples include, but are not limited to:

- i. Environmental Stewardship Training (“Eco-Training”) for employees, contractors, tenants, concessionaires
- ii. Implement or require training programs as part of tenant leasehold
- iii. Provide educational materials to passengers and visitors in public terminal areas, gate holdrooms, parking areas, vehicle roadways/ toll plazas
- iv. Use kiosks and informational displays to inform and generate interest
- v. Develop short educational videos for passengers to watch on ATS and/or shuttle buses to/from remote parking area

IV. Plan for the integration of SAM guidelines into the following specific project elements, as appropriate to the size and scope of each project:

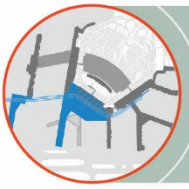
- a. Energy use and carbon emissions inventory
- b. Air quality enhancement strategies
- c. Fleet and vehicle operations
- d. Material and resource use
- e. Heating and cooling systems
- f. Lighting systems
- g. Construction and administrative procedures
- h. Indoor quality of life
- i. Waste management and recycling
- j. Landscape and natural resource management
- k. Noise abatement
- l. Surface transportation management



- m. Water efficiency, quality, and conservation
 - n. Green building and asset management
- V. Plan for sustainable operation and maintenance of completed projects, programs or facilities (see Operations and Maintenance Chapter and Concessions and Tenants Chapter of SAM)
- VI. Feedback Loop
 - a. Plan for original project team and key stakeholders to meet upon full project completion in order to gauge and/or determine:
 - i. Was the Sustainability Schematic useful? Why or why not?
 - ii. Was the Sustainability Schematic accurate? Why or why not?
 - iii. Was the Sustainability Schematic reasonable? Why or why not?
 - iv. Were the sustainability measures planned implemented? Why or why not?
 - v. Were additional sustainability measures implemented that were not originally identified?
 - vi. Were sustainability goals and targets met? Why or why not?
 - vii. Were the anticipated benefits achieved? Why or why not?
 - viii. Describe tracking and reporting of results.
 - ix. Provide overall “lessons learned” through the project
 - x. Recommend improvements to the process for enhancements to SAM Planning Chapter for future planning projects

SUBMITTALS

- Present Sustainability Schematic to CDA Project Manager and Sustainable Review Panel (SRP) for review and comment.
- Descriptive narrative in the SAM Checklist.



PL PLANNING

2.5 Prerequisite 5 – Project Meeting to Finalize Sustainability Schematic

Required

INTENT

Upon completion of the Sustainability Schematic, hold a project meeting to finalize the document and prepare it for inclusion in the official Project Definition Document (PDD) and/or Capital Improvement Program (CIP) Application, or other planning documentation as may be applicable.

REQUIREMENTS

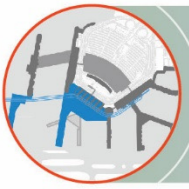
Upon completion of the Sustainability Schematic, hold a project meeting(s) with CDA Project Manager, SRP, and all additional key stakeholders involved in planning, design, construction, and daily operation/maintenance of facility, as appropriate and applicable. Enable members to utilize conference calls, net-meetings, webinars, etc. when unable to attend in person. The meeting(s) purpose is to finalize the project's Sustainability Schematic and prepare it for inclusion in the official Project Definition Document (PDD) and/or Capital Improvement Program (CIP) Application, or other applicable planning documentation.

SUBMITTALS

1. Descriptive narrative in the SAM Checklist
2. Sustainability Schematic
3. Meeting Agenda
4. Meeting sign-in sheet including name, company, title, contact information, and role on project
5. Meeting Minutes
6. Meeting Materials (presentations, handouts, etc.)
7. If revisions are made to the Sustainability Schematic as a result of this meeting, provide the revised Final Sustainability Schematic (complete document), a summary of changes made, and a signature sheet for key stake-holders affirming agreement and acceptance of changes.
8. If subsequent follow-up meetings are held, provide items 2-7 for each additional meeting

TECHNOLOGY/STRATEGY

Provide the Sustainability Schematic to CDA Project Manager, SRP, and additional key stakeholders well in advance of the meeting. Request that all parties review and bring comments to the meeting. It is anticipated that one meeting would be held to finalize the Sustainability Schematic. However, if revisions are made to the Sustainability Schematic as a result of this meeting, subsequent follow-up meetings may be warranted. If that is the case, allow stake-holders ample review time of revised Sustainability Schematic in advance of each meeting.



PL PLANNING

2.6 Prerequisite 6 – Close the Feedback Loop at Project Completion

Required

INTENT

Due to the dynamic nature of the aviation industry, airport projects lend themselves to continual planning and renewal. The intent of this Prerequisite is to effectively close the feedback loop at project completion in order to determine if key performance indicators, targets, and goals were met as planned, exceeded plan, or were under plan, and the reasons why or why not. This “lessons learned” information can then be compiled and used as valuable background information on future projects. This information can also be used to inform similar project analyses, enhance, and improve the SAM Planning Chapter.

REQUIREMENTS

Examples of the types of information, analyses and comparisons suggested to review as part of the informative process for closing the feedback loop are included in Section VI. Feedback Loop of the Sustainability Schematic described in PL.4 Prerequisite 4 – Develop a Draft Sustainability Schematic.

Create a plan for as many of the key stakeholders as possible to meet upon final project completion, or at a point when the information outlined in the Sustainability Schematic (see Prerequisite 5 – Project Meeting to Finalize Sustainability Schematic) can be reasonably evaluated and measured with actual data. The purpose of the meeting will be to close the feedback loop by determining whether key performance indicators, targets, and goals were met as planned, exceeded plan, or were under plan, and the reasons why or why not. This “lessons learned” information can then be compiled and used as valuable background information on future projects, and ultimately to improve the overall process.

SUBMITTALS

1. Descriptive narrative in the SAM Checklist
2. Meeting Agenda
3. Names, titles, contact information, and role on project for key stakeholders and others involved in development of the Sustainability Schematic
4. Name, title, contact information and role on project for designated person and back-up person who will be responsible for keeping an up-to-date list of contact information for all key stakeholders and others involved in the development of the Sustainability Schematic (see Prerequisite 5).
5. Detailed descriptions of lessons-learned relative to the overall process and the Sustainability Schematic, as well as recommendations for enhancements to this SAM Planning Chapter.



DESIGN & CONSTRUCTION

Chicago Department of Aviation
**SUSTAINABLE
AIRPORT MANUAL**





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Appendix DC-C – Referenced City of Chicago Specifications and Standards (on www.flychicago.com/SAM)

Appendix DC-D – Chicago Department of Aviation Best Management Practices (on www.flychicago.com/SAM)



INTRODUCTION

After the planning process, projects that move forward enter the design and (usually) the construction phase. This chapter continues the process of incorporating sustainability into major renovations and construction projects. At this point, the details of the project are beginning to take shape. By integrating sustainable design elements into the design process as early as possible, it is expected that the effectiveness of enhancing a project's sustainability is maximized while costs due to design and construction changes are minimized. Although sustainable guidance and rating systems for buildings (vertical construction) are prevalent, the civil/infrastructure environment (horizontal construction) guidance is less common. The Design & Construction (DC) Chapter of the Sustainable Airport Manual (SAM) joins these elements, civil/infrastructure and buildings, and applies them within the realm of an airport environment.

Implementation of sustainable design elements can reduce operational costs and increase occupant productivity. The on-site recycling and reuse of construction waste and materials, for example, reduces transportation cost and the use of regionally obtainable materials benefits the local economy and reduces life-cycle emissions. With an appropriate level of investment in sustainable design and construction techniques, regardless of the scale and scope of a project, it is anticipated that all parties including owners, occupants, contractors, and the general public can experience environmental and economic benefits. In many cases, there is little or no impact on the project budget and schedule in the implementation of these sustainable elements.

The five general project categories that relevant to airport design and construction projects are defined below:

- **Civil – Airside:** Projects located inside of the Air Operations Area (AOA) that do not include normally occupied structures and consist mainly of horizontal structures such as subsurface utilities, earthwork, pavement, roadways, bridges, tunnels, and water conveyances. Projects may include but are not limited to runways, taxiways and shoulders, airside roads and perimeter roads, stormwater conveyance systems, stormwater detention facilities, electrical lighting systems, navigational aids, airport utility systems, vehicle parking facilities, and fencing.
- **Civil – Landside:** Projects located outside of the AOA that do not include normally occupied structures and consist mainly of horizontal structures such as subsurface utilities, earthwork, pavement, roadways, bridges, tunnels, and water conveyances. Projects may include but are not limited to guard post relocation, roads, tunnels and bridges, perimeter roads, stormwater conveyance systems, stormwater detention facilities, creek relocations, electrical lighting systems, airport utility systems, vehicle parking facilities and fencing, and railroad relocation.
- **Occupied Buildings:** Projects consisting of facilities and associated surroundings that, when construction is complete, will be normally occupied by employees and passengers. These facilities may include but are not limited to terminals, concourses, access guard posts, airport communications building, air rescue and firefighting facilities, cargo facilities, and air traffic control towers.



- **Unoccupied Buildings:** Projects consisting of facilities and associated surroundings that, when construction is complete, will be unoccupied. These may include but are not limited to pump stations, lighting vaults, and fuel stations.
- **Remodeling/Renovations:** Projects consisting of renovation of existing facilities or terminal areas where the focus of the work is on the exterior. This work may include but is not limited to exterior site work, building envelope modifications, roofing replacement, or combinations thereof.

APPLICABILITY

SAM Design & Construction (DC) certification encourages airport designers and contractors to implement sustainable practices to reduce the environmental impacts of, not only the design features of a given project, but also construction activities, and the operational aspects of the building or infrastructure project. Specifically, the rating system addresses site issues, water and energy usage, materials and resources used for building the project, waste management, and indoor/outdoor environmental quality.

The DC chapter is applicable to all construction activities requiring design services that include the categories above. Major renovations that primarily include exterior site work, building envelope modifications, roofing replacement, or combinations thereof, though not necessarily new construction, will fall under this chapter.

Major interior renovations at the terminals that include demolition and replacement of walls, floors, finishes, HVAC replacement, other mechanical, electrical, or plumbing work, should be completed using the SAM Terminal Occupants – Design & Construction chapter. It is intended that the designers and contractors of these types of projects will be evaluated throughout this process.

DESIGN & CONSTRUCTION SECTIONS

Projects are rated on the achievement of credits depending on the appropriate stage of the project and based on sustainable elements from the following categories:

- 1.0 **Administrative Policy & Procurement**
- 2.0 **Sustainable Sites**
- 3.0 **Water Efficiency**
- 4.0 **Energy & Atmosphere**
- 5.0 **Materials & Resources**
- 6.0 **Indoor Environmental Quality**
- 7.0 **Construction Practices**
- 8.0 **Innovation in Design & Construction**
- 9.0 **Regional Priority**

To determine a project's earned points, each project is evaluated against a specific number of credits within each category. The number of earned points is then translated into a rating. There are specific weighted point thresholds (i.e. applicable credits) for each of the five project categories – Civil-Airside,



Civil-Landside, Occupied Buildings, Unoccupied Buildings, and Remodeling/Renovations – so as to not inadvertently penalize a project for failing to achieve points that are not applicable. The list of credits and point thresholds applicable to each project type are summarized in **Appendix DC-A – Sustainable Airport Manual Green Airplane Rating System**.

PROCESS

Within the Manual's main body, each sustainable design credit has five subsections: Intent, Requirements, Submittals, Technology/Strategy, and Case Studies, as described below:

- **Intent:** The primary motivations for any sustainable practice.
- **Requirements:** Specifies institutional, operational, and mechanical design or construction elements that satisfy the intent. The prerequisites must be achieved; the credits are optional but contribute to the overall project rating.
- **Submittals:** Required and supporting documentation and/or information required to achieve applicable prerequisites or credits. This documentation may include calculations, data, short narratives, policies, documents or references to specification sections or design drawings indicating how the requirements are being met.
- **Technology/Strategy:** Highlights specific ways of meeting the recommendations within the scope for each specific credit. Case studies where available, are presented to help guide the application of sustainable credits to design and construction projects. To aid with consideration of applicable strategies and technologies, they are organized into the following three categories; "Standard Practice," "Recommended Practice," and "Best Available Practice."
 - **Standard Practice:** These are requirements that may be due to standards, specifications, codes, general best management or construction practices. They are practices already in place, and in many cases SAM prerequisites, which also serve to meet sustainable goals.
 - **Recommended Practice:** These include recommendations that are expected to have insignificant impacts to cost and are therefore, encouraged to be incorporated into the design process.
 - **Best Available Practice:** These are strategies and practices that are expected to enhance the environmental design efforts of the Chicago Department of Aviation (CDA) but are anticipated to potentially have an impact on the cost and/or schedule. A simple cost benefit analysis can be conducted to determine the practicality of implementation.
- **Case Study:** Examples of credit intent "in action" at airports and/or other industry facilities.

While not all strategies will be applicable to every project category, design and construction teams are highly encouraged to think creatively and consider the intent of each issue throughout the decision process. In all cases, it is the responsibility of the design and construction teams to evaluate and review any anticipated costs or scheduled impacts with the Chicago Department of Aviation.

IMPLEMENTATION AND REVIEW PROCESS

The SAM and its supporting documentation are administered by the Sustainable Review Panel (SRP), which currently consists of representatives of the CDA Management Staff and Airport Planners actively



involved in CDA projects. The composition of the SRP is intended to be dynamic depending on project needs.

The SRP is responsible for the review of submittals with respect to sustainability and provides technical support to each project in relation appropriate to sustainable practices. The SRP is responsible for review of every checklist and for the awarding of “Green Airplane Certification” ratings based on the extent of incorporation of sustainable practices as outlined in this Manual and as documented on the submitted SAM Checklist(s).

The primary tasks of the SRP are to oversee the application of the Manual and review submittals for their compliance with the Manual. The review process is outlined in **Figure 1** below:

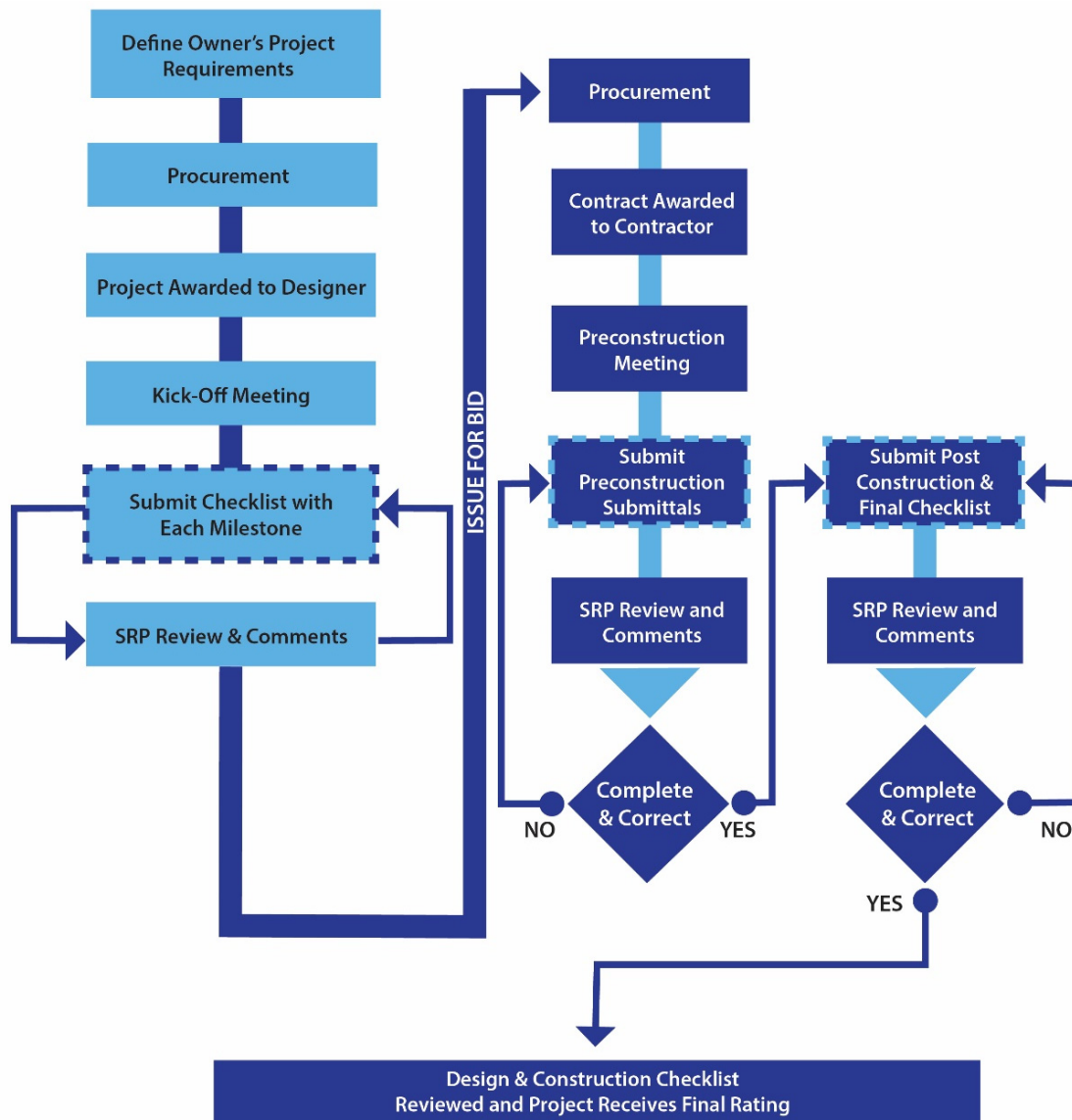


Figure 1 - Sustainable Review Process during Design and Construction



Just as any airport can easily customize the Chicago-specific guidance elements within the SAM, the composition of an SRP can also be tailored to an airport's unique needs.

Current CDA Requests for Proposals (RFPs) for design services include language indicating that requirements of this Manual must be incorporated as part of the design process for all projects. The designer is to incorporate language regarding all supporting specifications and requirements in the Contract Documents consistent with the requirements described in this Manual. After a project is awarded to a Design Team, SRP representatives will meet with the designers during the kick-off meeting to outline project goals for sustainability. Contract documents require that each design team include at least one LEED Accredited Professional. It is encouraged that the LEED Accredited Professional be present at all sustainability-related meetings, including the project kick-off meeting. The SAM Design Checklist is discussed in detail at the kick-off meeting, as it is one of the primary deliverables from the Design Team, as well as the supporting documents and specifications that must accompany the submittal. At this meeting, the designer is given an electronic copy of the Manual and electronic copies of all relevant specifications, checklists, calculations spreadsheets, and templates, including instructions for completion of each form. Certain credits pertain to specifications and standards that are included in every contract (e.g. 01111 – Construction Air Quality or 01524 – Waste Management). In most cases, the specification indicates the submittal requirements. The credit descriptions in this Manual describe the submittal requirements that must be satisfied in order to meet the credit.

As part of the standard design review process, the SAM Design Checklist and supporting documents are reviewed at each milestone (typically 30%, 60%, 90%, and 100% design submittals) against the goals set forth by the Manual. Review comments on the Checklist are submitted along with the design-related review comments.

The Manual is referenced in the General Conditions of the project's Contract Documents. **The contractor is obligated to meet all the requirements of the Manual and the supporting specifications and submittals.** Submittals should be sent to SAMdocs@cityofchicago.org and must include the CDA Project Number and CDA Project Name in the subject line. Compliance with these requirements is verified by the Resident Engineer (RE) prior to project closeout. As the project continues through Bid Issue and then Construction phase, the SRP will meet with the RE and contractor at the pre-construction meeting to discuss the process and the deliverables with emphasis on what is required by the contractor and the RE. At this time, additional opportunities and goals are identified for the construction phase and the contractor and RE are encouraged to raise awareness of sustainable design and construction issues with the remaining staff. The SRP works with the RE as the main point of contact. The RE is required to obtain the required documentation from the Contractor, although in some cases, information may be received directly from the Contractor (e.g., the fuel usage logs).

For the construction phase, some up-front submittals are required (e.g., Construction Waste Plan, preconstruction estimates on regional and recycled material quantities that are reviewed at the beginning of the project). Fuel usage is tracked monthly throughout the project's duration. The SAM Construction Checklist is reviewed and finalized when the project reaches substantial completion.



After substantial completion, the SRP will determine whether all items proposed in the Design Checklist were completed and are reflected in the SAM Construction Checklist or discuss/identify variances. At completion, the SRP will determine and award the Green Airplane Certification for Sustainable Design & Construction.

Commissioning

Whenever applicable, project commissioning is encouraged. Commissioning can provide long-term benefits for the project/building owner, as well as its users and occupants. Commissioning is covered in the Energy & Atmosphere section.

SUBMITTALS

Sustainable Airport Manual (SAM) Design & Construction Checklists

Incorporation of sustainable elements into the design and construction of a project is tracked using a checklist in order to determine the number of applicable credits described in this Manual. The SAM *Design & Construction* Checklist is completed by the designer with the assistance of the contractor/CM where applicable. The purpose of the SAM *Design & Construction* Checklist is to indicate proposed sustainable design elements during the design phase, and to allow verification and finalization of actual data related to the project's construction phase. The checklist is provided in **Appendix DC-B – Design & Construction Checklist**.

NOTE:

When submitting electronic files, include the name of the project and CDA project number in the file name for ease of processing. Submittal dates, milestones, and/or contractor names may also be included in file names. Submitting a filename such as “SAM Checklist” is not acceptable. An example of an appropriate file name is:

SAM Checklist_CT-DC_JDesignInc_TH0000.00_T3 Retail Renovation_100%_20181102.xls
SAM Checklist_[SAM Chapter]_[Contractor]_[Project Number]_[Project Name]_[Milestone]_[Submittal Date]

Submittals should be sent to SAMdocs@cityofchicago.org and must include the CDA Project Number and CDA Project Name in the subject line.

In order to achieve points, certain requirements outlined in each credit must be met. The design team must demonstrate how and to what extent these credits will be achieved at periodic review meetings throughout the design process. The means by which this is demonstrated will vary. In some instances, studies and calculations will be appropriate, whereas in others, this will be accomplished through product and material data or through referenced standards or specifications.



For some credits, the responsibility to meet the intent of the credit will be primarily that of the contractor. In these cases, specifications are to be developed by the designer to clearly detail the execution and submittal requirements that must be followed by the contractor. In addition to reviewing the checklist, the Sustainable Review Panel (SRP) will review any supporting documentation including calculations, specifications, and contractor submittals as needed to support the achievement of the credit(s). See Section titled *Implementation and Review Process* for detailed information about the SRP.

NOTE:

All design teams must have a LEED Accredited Professional. Their responsibility is to complete or oversee the completion of the SAM Checklist and their implementation – this includes the Design AND Construction portions of the Checklist.

SAM GREEN AIRPLANE RATING SYSTEM

The SAM Green Airplane Rating System for Design and Construction uses a five-tier approach to rating projects based on the five project types. “Green Airplane Certification” symbols designate the various achievement levels.

The thresholds for each project type are summarized in the table below:

DC GREEN AIRPLANE RATING SYSTEM					
Green Airplanes	Civil-Airside	Civil-Landside	Occupied Buildings	Unoccupied Buildings	Renovations/Remodeling
Prerequisites	9	9	17	15	12
	2-19	2-22	2-43	2-33	2-20
	20-24	23-27	44-54	34-41	21-25
	25-30	28-33	55-66	42-50	26-31
	31-40	34-44	67-88	51-67	32-41
	41-56	45-62	89-122	68-93	42-58
MAXIMUM	56	62	122	93	58



Chicago Department of Aviation
SUSTAINABLE AIRPORT MANUAL



For comments, case studies, lessons-learned, new technologies or for any and all project submittal forms, please email:

SAMdocs@cityofchicago.org



1.0 ADMINISTRATIVE POLICY & PROCUREMENT

1.1 Prerequisite 1 – Green Meetings

Required

INTENT

Green meeting practices are intended to guide meeting hosts, planners, and attendees toward more eco-friendly meetings. A few extra efforts to incorporate environmental considerations into planning and conducting meetings will help to minimize the negative impact on the environment and educate all participants regarding sustainable meetings.

Green meeting practices are intended to:

- Conserve resources
- Reduce environmental impacts
- Save money
- Support Chicago's commitment to environmental stewardship

REQUIREMENTS

Whenever applicable, follow the green meeting practices outlined below, or your existing corporate sustainability policy, whichever is more stringent.

SUBMITTALS

Include descriptive narrative on the SAM Checklist and if following your own corporate sustainability policy, please include with submittal for this section.

TECHNOLOGY/STRATEGY

Meeting Planning

Meeting hosts should consider the following when planning for a meeting:

Reduce the number of copies produced by:

- Sharing meeting materials
- Digitizing materials and distributing presentations via email prior to meetings
- Placing materials on the wall (one large print or presented with projector equipment)

If handouts are needed at the meeting, produce handouts:

- Locally
- Double-sided
- Using high post-consumer recycled content paper



Exhibits and presentation materials:

- Same suggestions as handouts above
- Reuse display boards, utilize both front and back sides
- Use low-emitting materials for exhibit displays
- Recycle cardboard and other packaging materials

For participants not in the building: can they participate by internet/phone?

- Contact the expected meeting participants ahead of time and present them with the option of a video/phone conference via the internet/phone, if appropriate. Costs associated with technical support may still be less than travel/fuel costs in some cases.

What if travel cannot be avoided?

- Can attendees carpool/carshare?
- Provide attendees with mass transit options, such as CTA or Pace Bus, including directions.
- Encourage walking and biking by selecting accessible venues, including directions.
- If overnight stays are involved, suggest hotels nearest the meeting venue that are the most environmentally friendly (www.greenhotels.com). Consider moving the meeting to the hotel if majority of participants are staying at the same hotel, reducing the need for transportation to and from the hotel.

If the meeting is all day or multiple days in a row, how can it be catered in an environmentally friendly way?

- Serve drinks from pitchers, reusable utensils and dishes, and request local produce to cut down on waste when catering for large groups.
- Utilize condiments in bulk dispensers to reduce waste.
- Plan for the pick-up and compost or donation of leftover food to reduce waste.

What if the meeting is held annually?

- Plan for annual meetings at times of the year when temperatures are less extreme to reduce energy consumption due to the use of air conditioning/heat.

Meeting Room

- Use the recycle bins for recyclable items at the end of the meeting.
- Collect reusable business card holders/name tags in a bin after last meeting.
- Collect presentation materials that are not needed by the attendees that can be donated to local schools, reused or recycled.
- Have attendees fill out an online survey allowing for feedback about the meeting and vendors for future reference and improvement.
- Follow up after the meeting with participants to share green success stories and lessons-learned including statistics from the meeting, such as quantities of recycled materials. Also include a summary document that provides details of the green meeting.
- Help to ensure the lights are turned off as attendees leave the meeting room.



Additional details if conducting off-site meetings, such as a conference or workshop...

- Ensure that off-site meeting locations accommodate opportunities for recycling.
- Recycle newspapers, cans, and glass, including those from your guest room, in marked containers in the conference area.
- Participate in the hotel's water, energy, and detergent conservation efforts by following the instructions posted in your room.
- Note the conference's efforts to reduce the use of paper by limiting conference handouts at registration, using folders or handouts printed on high post-consumer recycled content paper, using vegetable-based ink, and encouraging presenters to limit handouts.
- Thank the hotel or off-site location host for providing recycling opportunities, reusable utensils and dishes for breaks, etc.

IMPLEMENTATION

1. Make certain that all appropriate recycling bins are located in public meeting areas and conference rooms.
2. Develop message boards for conference rooms, meeting areas, and copy/production areas. (see following pages)
3. Provide routine reminders of green meeting practices and during annual team meetings.



1.0 ADMINISTRATIVE POLICY & PROCUREMENT

1.2 Prerequisite 2 – Integrated Design Process

Required

INTENT

Enhance project design by planning for and identifying sustainable elements across multiple disciplines and stakeholders that maximize the sustainable performance of the final project.

REQUIREMENTS

Use a multi-discipline approach to planning, design, and construction phases that includes the following:

- Formation of an integrated team including the Owner, design and construction professionals, operations & maintenance staff, and a sustainability expert (e.g. LEED Accredited Professional)
- Develop sustainability goals that meet or exceed the Owner's level of expected SAM certification
- Conduct a design charrette, early in the design process, with the team above and the Owner's sustainability goals with the intent of optimizing the performance of the sustainable project elements across all disciplines and with all applicable stakeholders

SUBMITTALS

Include descriptive narrative in SAM Checklist with a list of the project team members and roles, the Owner's sustainability goals, and meeting minutes of the design charrette.

TECHNOLOGY/STRATEGY

The team member roles listed in the requirements should be considered as a minimum requirement. There may be other stakeholders that could be included, if necessary and depending on the nature of the project.

Based on input from the owner, project sustainability goals should be developed that are quantifiable and/or verifiable. The goals developed in the plan should serve as the sustainability guidelines for the project and should be reviewed at each major design and construction milestone.

The design charrette should serve as the vehicle for communicating the goals to the team allowing for a final review prior to implementation but understanding that some changes in scope and flexibility may be required.



Standard Practice

None

Recommended Practice

None

Best Available Practice

None



1.0 ADMINISTRATIVE POLICY & PROCUREMENT

1.3 Corporate Sustainability Policy

1 Point

INTENT

In keeping with the spirit and intent of this Manual, it is strongly encouraged that companies working in support of CDA on any project establish and adopt their own corporate policy on sustainable practices.

REQUIREMENTS

Establish and adopt a Corporate Sustainability Policy.

This credit applies to the lead designer and/or contractor, not including subcontractors. For joint venture partnerships, the credit shall apply to the entity with the highest stake in the partnership.

SUBMITTALS

Provide an electronic copy or website link to the company's Corporate Sustainability Policy.

NOTE: If available, please provide an electronic copy of your annual sustainability report documenting any new measures and results.

CASE STUDY

Starbucks Global Social Impact Starbucks

The corporation has undertaken actions to reduce their environmental impact and share in their customer's commitment to the environment. An annual environmental stewardship report is produced to highlight the company's efforts and successes. At the store level, energy and water conservation and other green building strategies are key priorities. Starbucks strives to elevate their partners, customers, suppliers and neighbors to create positive change. This is being accomplished by offering high-quality, ethically purchased and responsibly produced products; investing in paths to opportunity through education, training and employment; minimizing their environmental footprint and inspiring others to do the same; while offering Starbucks as a place for public conversation and elevating civic engagement through service and promoting voter registration.

<https://www.starbucks.com/responsibility>



1.0 ADMINISTRATIVE POLICY & PROCUREMENT

1.4 Green Procurement Policy

1 to 4 points

INTENT

Reduce the environmental impact of products and services by developing a Green Purchasing Program.

REQUIREMENTS

Purchase green products meeting third-party environmental and sustainability standards. Refer to the U.S. EPA Greener Products and Services listing at www.epa.gov/greenerproducts/identify-greener-products-and-services for more information. Some common product certifications include:

- UL EcoLogo
- Electronic Product Environmental Assessment Tool (EPEAT)
- Green Seal®
- EPA Safer Choice.

Points for this credit will be awarded based on the number of green products, procured for general day-to-day office use. The party completing the checklist should only count green products procured for the local office, as opposed to a global level policy.

Points are awarded as follows:

<u>Number of Green Products Procured</u>	<u>Points</u>
1-2	1
3-5	2
6-11	3
12+	4

Example: An A/E firm responsible for the design of a terminal tenant space office uses, *in their own office*, 100% recycled fiber bathroom tissue and toilet paper that are both EcoLogo certified and glass cleaner meeting the GreenSeal certification. These three items meet the requirements of the credit, therefore, two points would be achieved for this credit based on the table above.

SUBMITTALS

Include descriptive narrative in the SAM Checklist of items purchased and used.

NOTE: If available, please provide an electronic copy of your green procurement policy.



TECHNOLOGY/STRATEGY

Introduce environmentally conscious purchasing into company practices. The policy needs to clearly define an objective and establish a sustainability claims verification procedure that can be replicated as necessary. Verification procedures may rely on product certifications such as Green Seal and ENERGY STAR. Evaluate the items that are purchased, identify more environmentally friendly alternatives, and establish a policy to purchase these alternatives when economically feasible. Work with suppliers to identify sustainable products that meet the company's needs.

Standard Practice

None

Recommended Practice

- Purchase items with the minimum content levels specified in the U.S. EPA Greener Products and Services listing at www.epa.gov/greenerproducts/identify-greener-products-and-services
- Purchase items in bulk to reduce packaging, transportation impacts and costs
- When using a company-developed policy, the following resources can be used to create a Procurement Policy. Resources include but are not limited to:
 - U.S. Environmental Protection Agency's Comprehensive Procurement Guidelines (CPG) – The CPG includes an index of products and their recommended recycled content. More information can be found on the associated website: www.epa.gov/smm/comprehensive-procurement-guideline-cpg-program
 - U.S. Environmental Protection Agency's Water Sense – The partnership program by promoting water efficiency and enhancing the market for water-efficient products, programs and practices. More information can be found on the associated website: www.epa.gov/WaterSense/
 - DOE's Alternative Fuels and Advanced Vehicles Data Center – The data center provides a wide range of information and resources to enable the use of alternative fuels, in addition to other petroleum reduction options such as advanced vehicles, fuel blends, idle reduction and fuel economy. More information can be found on the website: www.afdc.energy.gov/afdc/
 - Fair Trade Products – Purchase fair trade products instead of regular products in order to build equitable and sustainable trading partnerships. Examples of some fair trade products include; coffee, bags, boxes, artwork, chocolate, sugar, etc. More information can be found on the Fair Trade Federation's website: www.fairtradefederation.org
 - USDA's BioPreferred Designated Products – The program aims to increase the purchase and use of renewable, environmentally friendly biobased products while providing "green" jobs and new markets for farmers, manufacturers and vendors. More information can be found on the associated website: www.biopreferred.gov/BioPreferred/

Best Available Practice

None



CASE STUDY

Sustainable Purchasing Policy

Vancouver International Airport – Vancouver, British Columbia, Canada

Sustainability is a corporate priority for the Vancouver Airport Authority. One of their goals is to embed sustainability into our purchasing decisions and ensure meaningful consideration of social and environmental criteria when selecting suppliers, products, and services. Their purchasing decisions will drive innovation, improve workplace and environmental outcomes, and support their commitment to be accountable to the communities that they serve. In evaluating suppliers and their subcontractors, the Airport Authority will include sustainability as a weighted component of the evaluation criteria, to address sustainability risks and capitalize on opportunities. In the procurement of goods and services, for both operating and capital spending, their consideration of sustainability gives priority focus to issues pertaining to their four pillars of sustainability; environment, social, economic, and governance.

<http://www.yvr.ca/en/business/work-with-yvr/airport-suppliers/sustainable-purchasing-policy>



1.0 ADMINISTRATIVE POLICY & PROCUREMENT

1.5 Recycled Content Paper

1 to 3 points

INTENT

Reduce the need for virgin materials, energy, and waste associated with the production of paper by promoting the use of recycled content paper.

REQUIREMENTS

For all office paper purchased for routine daily business administration and operations, point values will be assigned based on the recycled content of the paper. Up to 3 points are available by using paper with the following attributes:

<u>SAM Credit</u>	<u>Post-consumer recycled content</u>	<u>Points</u>
1.5.1	30%	1
1.5.2	50%	2
1.5.3	100%	3

Calculate post-consumer recycled content of office paper using a weighted average based on estimated usage. If the paper is chlorine-bleached, for the purposes of the calculation, it shall be assumed that the post-consumer recycled content is 0% regardless of what it actually is.

Example: Annually, an office uses 50 boxes of chlorine-free paper with a post-consumer recycled content of 30%, 50 boxes of chlorine-free paper with a post-consumer recycled content of 90%, and 20 boxes of chlorine-bleached paper with a post-consumer recycled content of 100%. The weighted average of all the paper used is 50% and therefore 2 points would be awarded for this credit. Note that the 20 boxes of chlorine-bleached paper are assumed to have 0% recycled content for the purposes of the calculation.

$$(50/120)(30\%) + (50/120)(90\%) + (20/120)(0\%) = 50\% \text{ recycled content}$$

SUBMITTALS

Include descriptive narrative on the SAM Checklist.



TECHNOLOGY/STRATEGY

The purchase and use of recycled paper assist in closing the recycling loop by utilizing paper that is made from recovered waste paper.

This credit is intended to:

- Conserve natural resources
- Save energy
- Reduce environmental impacts
- Reduce pollution
- Reduce paper waste

Standard Practice

None

Recommended Practice

- Whenever applicable, purchase and utilize recycled office paper in daily business administration and operations.

Best Available Practice

None



2.0 SUSTAINABLE SITES

2.1 Prerequisite 1 – Construction Activity Pollution Prevention

Required

INTENT

Reduce pollution from construction activities by controlling soil erosion, waterway sedimentation and airborne dust generation.

REQUIREMENTS

Create and implement an Erosion and Sedimentation Control (ESC) Plan for all construction activities. The ESC Plan shall conform to the erosion and sedimentation requirements of the 2012 EPA Construction General Permit OR local erosion and sedimentation control standards and codes, whichever is more stringent. The Plan shall describe the measures implemented to accomplish the following objectives:

- Prevent loss of soil during construction by stormwater runoff and/or wind erosion, including protecting topsoil by stockpiling for reuse
- Prevent sedimentation of storm sewer or receiving streams
- Prevent pollution of the air with dust and particulate matter using BMPs

(See SAM Credit 2.2 Prerequisite 2 – Equipment Maintenance)

The Construction General Permit (CGP) outlines the provisions necessary to comply with Phase I and Phase II of the National Pollutant Discharge Elimination System (NPDES) program. While the CGP only applies to construction sites greater than 1 acre, the requirements are applied to all projects for the purposes of this prerequisite. Information on the EPA CGP is available at:

<https://www.epa.gov/npdes/epas-2017-construction-general-permit-cgp-and-related-documents>.

SUBMITTALS

Include descriptive narrative in SAM Checklist.

TECHNOLOGY/STRATEGY

Create an Erosion and Sedimentation Control Plan during the design phase of the project. Consider employing strategies such as temporary and permanent seeding, mulching, earth dikes, silt fencing, sediment traps and sediment basins.



Standard Practice

CDA's current construction activities meet the basic requirements of this strategy:

- Develop an erosion and sediment control strategy plan to be implemented by stages and phases to control erosion at the source and retain sediment on the construction site
- Incorporate temporary sedimentation basins, temporary ditch checks, diversion dikes, temporary ditches, pipe slope drains into the construction plans
- For dust control: tarp truckloads, sweep streets as needed, stabilize construction entrances, spray site as necessary to minimize fugitive dust
- Establish temporary and permanent seeding plans consistent with the following CDA Specifications:
 - CDA Specification T-901 – Seeding
 - CDA Specification P-156 – Temporary Air and Water Pollution, Soil Erosion, and Sediment Control
 - CDA Specification 02905 – Sustainable Airport Landscaping
- For any proposed plant species not listed, consult an FAA certified airport biologist to ensure the plants will not attract wildlife

Recommended Practice

None

Best Available Practice

- Monitor water quality impacts before and during construction
- Develop an inventory of topsoil for potential re-use
- Develop a policy to chip or compost all vegetation for re-use on site



2.0 SUSTAINABLE SITES

2.2 Prerequisite 2 – Equipment Maintenance

Required

INTENT

Minimize the environmental impact of construction and maintenance equipment and associated maintenance activities.

REQUIREMENTS

Follow the requirements of the City of Chicago Department of Aviation's (CDA) Best Management Practices (BMP) Manual.

SUBMITTALS

Include a location in the contract documents where the BMP Manual is required.

TECHNOLOGY/STRATEGY

By requiring the City of Chicago divisions, tenants and their contractors to comply with the CDA BMP Manual, it is anticipated that the impacts due to equipment maintenance activities will be reduced. The BMPs include procedures for vehicle washing, maintenance, fueling, chemical storage, and spill control.

Standard Practice

Follow the preferred practices per the BMPs below:

- 001 – Equipment Vehicle Washing Restrictions
- 002 – Equipment Vehicle Fueling Controls
- 003 – Equipment Vehicle Maintenance Requirements
- 011 – Above Ground Storage Tank Equipment Requirements/Spills
- 012 – Mobile Tank Trucks (petroleum) Requirements
- 013 – Chemical Handling/Storage Requirements
- 014 – Drum Storage Procedures
- 015 – Battery Storage Procedures
- 017 – Truck Loading/Unloading Procedures/Spill Control
- 018 – Spill Control Kits and Spill Response
- 019 – Good Housekeeping Procedures/Waste Storage
- 020 – Storm Drain Protection/Identification



Recommended Practice

None

Best Available Practice

None



2.0 SUSTAINABLE SITES

2.3 Prerequisite 3 – Electric Vehicle Charging Station Requirements

Required

INTENT

To reduce pollution by promoting alternatives to conventionally fueled automobiles.

REQUIREMENTS

Install electrical vehicle supply equipment (EVSE) in 2% of all parking spaces created by the project. Clearly identify and reserve these spaces for the sole use by plug-in electric vehicles. EVSE parking spaces must be provided in addition to preferred parking spaces for green vehicles.

This prerequisite does not apply if the total parking spaces for the project/facility number less than 10 spaces.

The EVSE must:

- Provide a Level 2 charging capacity (208 – 240 volts) or greater.
- Comply with the relevant regional or local standard for electrical connectors, such as SAE Surface Vehicle Recommended Practice J1772, SAE Electric Vehicle Conductive Charge Coupler or IEC 62196 of the International Electrotechnical Commission for projects outside the U.S.
- Be networked or internet addressable and be capable of participating in a demand-response program or time-of-use pricing to encourage off-peak charging.

SUBMITTALS

Include descriptive narrative in SAM Checklist.

TECHNOLOGY/STRATEGY

Consider legal, technical, and safety issues associated with electric vehicle supply equipment (EVSE).

Learn about the safety and maintenance issues associated with alternative fuels. Building personnel need to be trained to operate and maintain the fueling stations.

Review local codes and standards for fueling facilities to determine whether other requirements must be met.

- Only Level 2 and 3 chargers qualify for this credit.



- The SAE J1772 standard is common among US-based EVSE manufacturers. IEC 62196 of the international Electrotechnical commission is an equivalent standard that is common outside the US.
- The EVSE must have a wi-fi, ethernet, cellular modem, or other internet communication mechanism that allows the device to send usage data to a server. This enables participation in demand response programs (e.g., SmartGrid) or time-of-use pricing. Specifications must demonstrate, at minimum, that the product is IP-addressable.
- A direct connection between the EVSE and on-site renewable energy is acceptable in lieu of network capability if the EVSE will draw solely from that energy source. Documentation must be provided.

On the site plan, identify the location of each station. EVSE for plug-in electric vehicles or battery switching stations may be located in any area of the parking facility. Parking spaces reserved for EVSE may not contribute toward preferred parking spaces for green vehicles.

Standard Practice

None

Recommended Practice

- Use Level 2 or higher charging stations.

Best Available Practice

- Use DC fast charging stations.



2.0 SUSTAINABLE SITES

2.4 Brownfield Redevelopment

1 Point

INTENT

Rehabilitate damaged sites where development is complicated by environmental contamination, reducing pressure on undeveloped land.

REQUIREMENTS

Develop on a site documented as contaminated (by means of an ASTM E1903-97 Phase II Environmental Site Assessment or a local Voluntary Cleanup Program).

OR

Develop on a site defined as a brownfield by a local, state or federal government agency.

SUBMITTALS

Include descriptive narrative in SAM Checklist.

TECHNOLOGY/STRATEGY

During the site selection process, give preference to brownfield sites. Identify tax incentives and property cost savings. Coordinate site development plans with remediation activity, as appropriate.

Standard Practice

The following strategies are required by IEPA* for any development in a brownfield:

- Develop and implement a site remediation plan using strategies such as pump-and-treat, bioreactors, land forming and on-site remediation. Remediation would meet the standards identified in the Illinois Tiered Approach to Corrective Action (TACO).
- Opportunity to enter into the Illinois Site Remediation Program (voluntary cleanup program) that offers a No Further Remediation (NFR) Letter

*or relevant state agency



Recommended Practice

- Any recommendations are dependent upon site characteristics. Monitoring is suggested as site conditions warrant

Best Available Practice

- Cleanup requirements will be dependent on-site conditions, applicable remediation standards, and timing requirements



2.0 SUSTAINABLE SITES

2.5.1 Alternative Transportation: Public Transportation Access

6 Points

INTENT

Reduce pollution and land development impacts from automobile use.

REQUIREMENTS

Locate project within one half-mile walking distance (measured from any functional building entrance) of an existing or planned and funded commuter rail, light rail, or subway station (measured from the building entrance).

OR

Locate project within one quarter-mile walking distance (measured from any functional building entrance) of one or more stops for two or more public, campus, or private bus lines usable by building occupants.

SUBMITTALS

Include descriptive narrative in SAM Checklist.

TECHNOLOGY/STRATEGY

Perform a transportation survey of future building occupants to identify transportation needs and share results to encourage knowledge and use of mass transit. Whenever possible, co-locate buildings and mass transit and provide clear directional signage.

Standard Practice

- CDA's current transportation plan meets the basic requirements of this strategy
- Shuttle buses and ATS transportation are currently available

Recommended Practice

- Work with CDA to plan for and implement strategies aimed at the following goals:
- Improve and/or increase public transportation access from the City and suburbs
- Reduce parking needs
- Improve efficiency of access



Best Available Practice

Below are additional suggestions that could further support an inter-modal public transportation network. Teams should consider impact of future implementation.

- Provide incentives to employees to use public transportation and shuttles
- Consolidate rental car facilities and mini-bus transportation to minimize congestion on terminal roads. Consider the use of an alternate fuel mini-bus fleet to reduce vehicle emissions and carbon footprint.
- Operate satellite 'check-in' facilities (downtown and suburban locations) to minimize congestion on terminal access roads and encourage use of public transportation
- Construct airport to airport (O'Hare-Midway) high-speed rail connection
- Develop Airport-Downtown express connection, including satellite check-in facilities
- Develop additional train/mass transit service to/from the suburbs
- To ease in local understanding of available modes of alternative transportation, airports can include mass-transit routes on an airport area map



2.0 SUSTAINABLE SITES

2.5.2 Alternative Transportation: Bicycle Access, Storage and Changing Rooms

1 Point

INTENT

Reduce pollution and land development impacts from automobile use.

REQUIREMENTS

For commercial or institutional buildings, provide secure bicycle racks and/or storage (within 200 yards of a building entrance) for 5% or more of all building users (measured at peak periods).

AND

Provide shower and changing facilities in the building, or within 200 yards of a building entrance, for 0.5% of Full-Time Equivalent (FTE) occupants.

SUBMITTALS

Include descriptive narrative in SAM Checklist.

TECHNOLOGY/STRATEGY

- Design the building with transportation amenities such as bicycle racks and showering/changing facilities such that employees are encouraged to use bicycles, therefore reducing parking needs
- Bicycle access may require coordination with airport security

Standard Practice

- Although bicycle access to secured areas may be limited, perimeter facilities often have bicycle access and shower rooms available.

Recommended Practice

- Include bicycle storage facilities and changing rooms where possible. Locate perimeter facilities in areas that provide a continuity of safe bicycle access from the adjoining community.



Best Available Practice

- Provide safe bicycle lanes/paths.
- Provide a centralized facility(s) for secure bicycle storage with convenient changing/shower areas.
- Provide incentives to employees to bike to work.
- Develop a bicycle-access master plan.



2.0 SUSTAINABLE SITES

2.5.3 Alternative Transportation: Green Vehicles (Non-Construction)

3 Points

INTENT

Reduce pollution and land development impacts from automobile use.

REQUIREMENTS

Designate 5% of all parking spaces used by the project as preferred parking for green vehicles. Clearly identify and enforce for sole use by green vehicles. Distribute preferred parking spaces proportionally among various parking sections (e.g. between short-term and long-term spaces).

Note: The 5% threshold required by this credit should not include the 2% of spaces required for electric vehicle charging stations per Prerequisite 3 (SAM Credit 2.3).

Green vehicles must achieve a minimum green score of 45 on the American Council for an Energy Efficient Economy (ACEEE) annual vehicle rating guide (or local equivalent for projects outside the U.S.).

A discounted parking rate of at least 20% for green vehicles is an acceptable substitute for preferred parking spaces. The discounted rate must be publicly posted at the entrance of the parking area and permanently available to every qualifying vehicle.

SUBMITTALS

Include descriptive narrative in SAM Checklist.

TECHNOLOGY/STRATEGY

Provide transportation amenities such as alternative fuel refueling stations. Consider sharing the costs and benefits of refueling stations with neighboring communities and the airport's policy on alternative fuel options and preferences.

Standard Practice

- CDA already has programs for alternative fuel vehicles within the airport operations. Design so that these programs are enhanced and supported



Recommended Practice

- Consider local policies and preferences when considering new alternative fueling infrastructure development.

Best Available Practice

- Increase use of alternative fuel vehicles for airport operations particularly indoor cargo operations
- Provide preferred parking for staff and public alternative fuel vehicles
- Install alternative fuel refueling stations for public use
- Plan for the development of preferred parking and/or lot locations for rental fleets, which offer alternative fuel rental vehicles
- Encourage electrical receptacle in public parking garages for charging of electric vehicles



2.0 SUSTAINABLE SITES

2.5.4 Alternative Transportation: Parking Capacity

2 Points

INTENT

Reduce pollution and land development impacts from single occupancy vehicle use for employees.

REQUIREMENTS

OPTION 1 — NON-RESIDENTIAL

Size parking capacity to meet, but not exceed, minimum local zoning requirements.

AND

Provide preferred parking for carpools or vanpools for 5% of the total provided parking spaces.

OR

OPTION 2 — NON-RESIDENTIAL

For projects that provide parking for less than 5% of FTE building occupants:

Provide preferred parking for carpools or vanpools, marked as such, for 5% of total provided parking spaces.

OR

OPTION 3 — ALL

Provide parking capacity that is a 20% reduction below the base ratios recommended by the Parking Consultants Council, as shown in the Institute of Transportation Engineers' Transportation Planning Handbook, 4th edition, Table 11-12.

SUBMITTALS

Include descriptive narrative in SAM Checklist.



TECHNOLOGY/STRATEGY

Minimize employee parking lot/garage size. Consider sharing parking facilities with adjacent buildings. Consider alternatives that will limit the use of single occupancy vehicles.

Standard Practice

None

Recommended Practice

None

Best Available Practice

- Provide preferred parking for vanpools and carpools for staff
 - Preferred Parking refers to the parking spots that are closest to the main entrance of the project, exclusive of spaces designated for handicapped, or spaces designated for specific users
- Parking garages can reduce the overall footprint while providing needed capacity



2.0 SUSTAINABLE SITES

2.6 Electric Vehicle Charging Stations

1 to 3 Points

INTENT

To reduce pollution by promoting alternatives to conventionally fueled automobiles.

REQUIREMENTS

Install electrical vehicle supply equipment (EVSE) in at least 5% of parking spaces created by the project. Clearly identify and reserve these spaces for the sole use by plug-in electric vehicles. EVSE parking spaces must be provided in addition to preferred parking spaces for green vehicles.

This prerequisite does not apply if the total parking spaces for the project/facility number less than 10 spaces.

The EVSE must:

- Provide a Level 2 charging capacity (208 – 240 volts) or greater.
- Comply with the relevant regional or local standard for electrical connectors, such as SAE Surface Vehicle Recommended Practice J1772, SAE Electric Vehicle Conductive Charge Coupler or IEC 62196 of the International Electrotechnical Commission for projects outside the U.S.
- Be networked or internet addressable and be capable of participating in a demand-response program or time-of-use pricing to encourage off-peak charging.

Points for this credit will be awarded based on the percentage of total site parking spaces that are designated as electric vehicle charging stations with EVSE according to the following table:

<u>SAM Credit</u>	<u>Percent of Parking Spaces</u>	<u>Points</u>
2.6.1	5%	1
2.6.2	10%	2
2.6.3	20%	3

OR



(2 Points)

Provide EVSE-ready infrastructure for the future installation of EVSE meeting the above requirements. EVSE-ready infrastructure includes installation of appropriate conduit/raceways, wiring, electrical panels and other appurtenances that supports the immediate and convenient installation of EVSE with minimal disruptions in operations and minimal capital cost impacts. The EVSE-ready infrastructure should be designed to accommodate at least 20% of existing parking spaces.

OR

(1 Point)

Provide EVSE-capable infrastructure for the future installation of EVSE meeting the above requirements. To be EVSE-capable the electrical panel capacity shall be sufficient for additional 40-Amp 208 or 240-volts branch circuits multiplied by minimum of 20% of the number of parking spaces.

NOTE: Points will only be awarded for providing EV charging stations or for providing EV infrastructure, not both. It is conceivable that a project may install EV charging stations for 5% of the parking spaces (1 point) but have an additional 15% of spaces EVSE-ready (2 points). The points are not additive. In this case, the designer should claim the higher of the two cases, therefore 2 points.

SUBMITTALS

Include descriptive narrative in SAM Checklist.

TECHNOLOGY/STRATEGY

Consider legal, technical, and safety issues associated with electric vehicle supply equipment (EVSE).

Learn about the safety and maintenance issues associated with alternative fuels. Building personnel need to be trained to operate and maintain the fueling stations.

Review local codes and standards for fueling facilities to determine whether other requirements must be met.

- Only Level 2 and 3 chargers qualify for this credit.
- The SAE J1772 standard is common among US-based EVSE manufacturers. IEC 62196 of the international Electrotechnical commission is an equivalent standard that is common outside the US.
- The EVSE must have a wi-fi, ethernet, cellular modem, or other internet communication mechanism that allows the device to send usage data to a server. This enables participation in



demand response programs (e.g., SmartGrid) or time-of-use pricing. Specifications must demonstrate, at minimum, that the product is IP-addressable.

- A direct connection between the EVSE and on-site renewable energy is acceptable in lieu of network capability if the EVSE will draw solely from that energy source. Documentation must be provided.

On the site plan, identify the location of each station. EVSE for plug-in electric vehicles or battery switching stations may be located in any area of the parking facility. Parking spaces reserved for EVSE may not contribute toward preferred parking spaces for green vehicles.

Standard Practice

None

Recommended Practice

- Use Level 2 or higher charging stations.
- Consider providing EVSE-capable infrastructure in lieu of charging stations when applicable.

Best Available Practice

- Use DC fast charging stations.
- Consider providing EVSE-ready infrastructure in lieu of charging stations when applicable.



2.0 SUSTAINABLE SITES

2.7 Stormwater Management

1-3 Points

INTENT

To reduce runoff volume and improve water quality by replicating the natural hydrology and water balance of the site, based on historical conditions and undeveloped ecosystems in the region.

REQUIREMENTS

In a manner best replicating natural site hydrology processes, retain (i.e. infiltrate, evapotranspirate, or collect and reuse) on site the runoff from the developed site for, at minimum, the 80th percentile of regional or local rainfall events using low-impact development (LID) and green infrastructure (GI) practices. GI and LID strategies can be either structural or non-structural. Points are awarded according to the table below:

<u>SAM Credit</u>	<u>Percentile of Rainfall Retained*</u>	<u>Points</u>
2.7.1	80 th	1
2.7.2	85 th	2
2.7.3	90 th	3

*Use daily rainfall data and the methodology in the U.S. Environmental Protection Agency (EPA) Technical Guidance on Implementing the Stormwater Runoff Requirements for Federal Projects under Section 438 of the Energy Independence and Security Act to determine the percentile amount to be retained.

SUBMITTALS

Include descriptive narrative and calculations in SAM Checklist.

TECHNOLOGY/STRATEGY

For all projects, the use of coal tar sealants shall be prohibited in any application exposed to stormwater, wash waters, condensates, irrigation water, snowmelt, or icemelt.

Examples of acceptable techniques include the following:

- planting rain gardens with native or adapted plant material (e.g. trees shrubs);
- installing a vegetated roof;



- using permeable paving, consisting of porous above-ground materials (e.g., open pavers, engineered products), a base layer designed to drain water away from the building, and (often) a 6-inch-deep (150 millimeters) subbase; and
- installing permanent infiltration or collection features (e.g., vegetated swale, rain garden, rainwater cistern) that can retain 100% of the runoff from at minimum, the 80th percentile of regional or local rainfall events.

A combination of LID approaches are recommended (but not required) as they are holistic measures which maximize benefits. In contrast to LID, conventional stormwater techniques include grey infrastructure, such as detention or retention ponds, pipes, and vaults. Conventional grey infrastructure devices may be accepted only if integrated within a holistic LID system (ie. a combination of LID techniques).

Standard Practice

- Because many airside pavements have the potential for deicing fluid and jet fuel contamination, technologies that increase infiltration to the subsurface are not used. For landside projects, or for areas not subject to aviation-related contaminants, these methods are encouraged. A number of green vegetated roofs and permeable pavements have already contributed toward this goal.

Recommended Practice

- Evaluate pervious pavements for roadways, shoulders, non-traffic pavements, maintenance roads, utility yards, airside and landside parking facilities, and pedestrian areas. Peak storm water runoff rates could be reduced. Storm sewer conveyance systems could be designed with reduced diameter pipes and fewer inlets.
- Install landscape to reduce runoff (See SAM Credit 3.4 Water Efficient Landscaping)
- Evaluate curb breaks and drainage ditches, and/or bioswales.
- Install salt-tolerant plants near roadways and parking lots
- Develop a policy for optimal road salt usage balancing environmental and safety concerns

Best Available Practice

- Encourage installation of systems that are flexible to allow use of graywater
- Use of “extensive” green roof systems encourages filtration and treatment of rainwater, evaporation of rainfall to the atmosphere and storm water retention. Use plantings consistent with CDA Specification 02905 – Sustainable Airport Landscaping. For any proposed plant species not listed, consult an FAA certified airport biologist to ensure the plants will not attract wildlife.



- Use rainwater cisterns for landside irrigation during the plant growth season. Storm water runoff from the collection systems would be directed into the cisterns for storage. Collected water would be utilized for irrigation during dry periods. Cisterns would attenuate peak storm water runoff flows to the downstream storm sewer systems. Cisterns improve water quality by the removal of sediments due to the reduced velocities of flow in the system. (Sediment must be periodically removed.)
- Encourage extensive use of permeable pavement, where applicable
- Use of “extensive” green roof systems encourages filtration and treatment of rainwater, evaporation of rainfall to the atmosphere and storm water retention



2.0 SUSTAINABLE SITES

2.8 Heat Island Reduction

1-2 Points

INTENT

Reduce heat islands (thermal gradient differences between developed and undeveloped areas) to minimize impact on microclimate and human and wildlife habitat.

REQUIREMENTS

OPTION 1 Nonroof and Roof (2 points)

Meet the following criterion:

$$\frac{\text{Area of Nonroof Measures}}{0.5} + \frac{\text{Area of High-Reflectance Roof}}{0.75} + \frac{\text{Area of Vegetated Roof}}{0.75} \geq \frac{\text{Total Site Paving Area}}{0.5} + \frac{\text{Total Roof Area}}{0.75}$$

Alternatively, a solar reflectance index (SRI) and solar reflectance (SR) weighted average approach may be used to calculate compliance.

Use any combination of the following strategies.

Nonroof Measures

- Use the existing plant material or install plants that provide shade over paving areas (including playgrounds) on the site within 10 years of planting. Install vegetated planters. Plants must be in place at the time of occupancy permit and cannot include artificial turf.
- Provide shade with structures covered by energy generation systems, such as solar thermal collectors, photovoltaics, and wind turbines.
- Provide shade with architectural devices or structures. If the device or structure is a roof, it shall have an aged SR value of at least 0.28 as measured in accordance with ANSI/CRRC S100. If the device or structure is not a roof, or if aged solar reflectance information is not available, it shall have at installation an initial SR of at least 0.33, as measured in accordance with ANSI/CRRC S100.
 - Provide shade with vegetated structures.
 - Use paving materials with an initial SR value of at least 0.33.
 - Use an open-grid pavement system (at least 50% unbound).



High-Reflectance Roof: Use roofing materials that have an aged SRI equal to or greater than the values in the table below. If aged SRI is not available, the roofing material shall have an initial SRI equal to or greater than the values in the table.

	<u>Slope</u>	<u>Initial SRI</u>	<u>Aged SRI</u>
Low-Sloped Roof	≤ 2:12	82	64
Steep-Sloped Roof	> 2:12	39	32

Roof area that consists of functional, usable spaces (such as helipads, recreation courts, and similar amenity areas) may meet the requirements of nonroof measures. Applicable roof area excludes roof area covered by mechanical equipment, solar energy panels, skylights, and any other appurtenances.

Vegetated Roof: Install a vegetated roof using plant species in accordance with the airport landscaping standard (CDA Specification Section 02905 – Sustainable Airport Landscaping).

OR

OPTION 2 Parking under Cover (1 point)

Place a minimum of 75% of parking spaces under cover (defined as underground, under deck, under roof, or under a building). Any roof used to shade or cover parking must (1) have a three-year aged SRI of at least 32 (if three-year aged value information is not available, use materials with an initial SRI of at least 39 at installation), (2) be a vegetated roof, or (3) be covered by energy generation systems, such as solar thermal collectors, photovoltaics, and wind turbines.

The credit calculations must include all existing and new off-street parking spaces that are leased or owned by the project, including parking that is outside the project boundary but is used by the project. On-street parking in public rights-of-way is excluded from these calculations.

SUBMITTALS

Include descriptive narrative and calculations in SAM Checklist.

TECHNOLOGY/STRATEGY

Employ strategies, materials and landscaping techniques that reduce heat absorption of exterior materials. Use shade (calculated on June 21, noon solar time) from native or adapted trees and large shrubs, vegetated trellises or other exterior structures supporting vegetation (consistent with CDA Specification 02905 – Sustainable Airport Landscaping, and for any proposed plant species not listed, consult an FAA certified airport biologist to ensure the plants will not attract wildlife.) Consider the use of new coatings and integral colorants for asphalt to achieve light-colored surfaces instead of blacktop. Position photovoltaic cells to shade impervious surfaces.

Consider installing high-albedo and vegetated roofs to reduce heat absorption. SRI is calculated according to ASTM E 1980. Reflectance is measured according to ASTM E 903, ASTM E 1918, or



ASTM C 1549. Emittance is measured according to ASTM E 408 or ASTM C 1371. Product information is available from the Cool Roof Rating Council website, at www.coolroofs.org. Also, visit the ENERGY STAR website, www.energystar.gov, to research compliant products.

Standard Practice

- Unless the reflectance is determined directly through in-situ testing, the following default SRI values are to be used:

<u>Material</u>	<u>SRI</u>
New asphalt	0
Old (weathered) asphalt	6
New conventional “gray” concrete	35
Old (weathered) “gray” concrete	19
New “white” concrete	86
Old (weathered) “white” concrete	45

- White roofs are currently the standard for new construction on airport property. These are acceptable; however, SRI decreases with the age of the roof. Unless a cleaning program is in place, the benefits of white roofs diminish over time. For this reason, along with the benefits of stormwater management, the construction of green roofs is encouraged.

Recommended Practice

- Maximize light colored/high albedo pavement, such as portland cement concrete, for roadways, parking lots, sidewalks and plaza areas. Reflectance must be a minimum of 0.3. [‘White’ portland cement – 0.7 to 0.8, typical portland cement – 0.35 to 0.5, typical asphalt pavement – 0.05 (new) to 0.15 (over 5 years)].
- Evaluate and utilize an ENERGY STAR compliant roofing system, such as aluminum coating and light-colored coatings. Thermoplastic and white PVC roofing systems meet these standards.

Best Available Practice

- For Landside projects only, install trees consistent with CDA Specification Section 02905 – Sustainable Airport Landscaping, and for any proposed plant species not listed, consult an FAA certified airport biologist to ensure the plants will not attract wildlife
- A creative combination of the above strategies to reach this goal is encouraged. For example, a task/project can provide 5% shading of dark colored impervious surfaces and 25% light colored/high albedo pavement to achieve this goal.
- Evaluate structured parking in lieu of asphalt paved surface lots. This provides additional ‘green’ areas and reduces stormwater runoff from roofs and potentially the size of storm sewer systems.



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SUSTAINABLE AIRPORT MANUAL



- Evaluate open grid pavement for surface lots and site pavement
- Evaluate light-colored permeable pavers and concrete
- Evaluate “green walls” for building façade
- Install a “green” vegetated roof on all or portions of new and existing buildings



2.0 SUSTAINABLE SITES

2.9 Light Pollution Reduction

1 Point

INTENT

Minimize light trespass from the building and site, reduce sky-glow to increase night sky access, improve nighttime visibility through glare reduction, and reduce development impact on nocturnal environments.

REQUIREMENTS

Meet uplight and light trespass requirements, using either the backlight-uplight-glare (BUG) method (Option 1) or the calculation method (Option 2). Projects may use different options for uplight and light trespass.

Meet these requirements for all exterior luminaires located inside the project boundary (except those listed under “Exemptions”), based on the following:

- the photometric characteristics of each luminaire when mounted in the same orientation and tilt as specified in the project design; and
- the lighting zone of the project property (at the time construction begins). Classify the project under one lighting zone using the lighting zones definitions provided in the Illuminating Engineering Society and International Dark Sky Association (IES/IDA) Model Lighting Ordinance (MLO) User Guide.

Additionally, meet the internally illuminated signage requirement.

UPLIGHT

OPTION 1 – BUG RATING METHOD

Do not exceed the following luminaire uplight ratings, based on the specific light source installed in the luminaire, as defined in IES TM-15-11, Addendum A.



Maximum Uplight Ratings for Luminaires

<u>MLO Lighting Zone</u>	<u>Luminaire Uplight Rating</u>
LZ0	U0
LZ1	U1
LZ2	U2
LZ3	U3
LZ4	U4

OR

OPTION 2 – CALCULATION METHOD

Do not exceed the following percentages of total lumens emitted above horizontal.

<u>MLO Lighting Zone</u>	<u>Maximum Allowed Percentage of Total Luminaire Lumens Emitted Above Horizontal</u>
LZ0	0%
LZ1	0%
LZ2	1.5%
LZ3	3%
LZ4	6%

AND

LIGHT TRESPASS

OPTION 1 – BUG RATING METHOD

Do not exceed the following luminaire backlight and glare ratings (based on the specific light source installed in the luminaire), as defined in IES TM-15-11, Addendum A, based on the mounting location and distance from the lighting boundary.



Maximum backlight and glare ratings:

	MLO Lighting Zone				
Luminaire Mounting	LZ0	LZ1	LZ2	LZ3	LZ4
	Allowed Backlight Ratings				
> 2 mounting heights from lighting boundary	B1	B3	B4	B5	B5
1 to 2 mounting heights from lighting boundary and properly oriented	B1	B2	B3	B4	B4
0.5 to 1 mounting height to lighting boundary and properly oriented	B0	B1	B2	B3	B3
< 0.5 mounting height to lighting boundary and properly oriented	B0	B0	B0	B1	B2
	Allowed Glare Ratings				
Building-mounted > 2 mounting heights from any lighting boundary	G0	G1	G2	G3	G4
Building-mounted 1–2 mounting heights from any lighting boundary	G0	G0	G1	G1	G2
Building-mounted 0.5 to 1 mounting heights from any lighting boundary	G0	G0	G0	G1	G1
Building-mounted < 0.5 mounting heights from any lighting boundary	G0	G0	G0	G0	G1
All other luminaires	G0	G1	G2	G3	G4

The lighting boundary is located at the property lines of the property, or properties, that the LEED project occupies. The lighting boundary can be modified under the following conditions:

- When the property line is adjacent to a public area that is a walkway, bikeway, plaza, or parking lot, the lighting boundary may be moved to 5 feet (1.5 meters) beyond the property line.
- When the property line is adjacent to a public street, alley, or transit corridor, the lighting boundary may be moved to the center line of that street, alley, or corridor.
- When there are additional properties owned by the same entity that are contiguous to the property, or properties, that the LEED project is within and have the same or higher MLO lighting zone designation as the LEED project, the lighting boundary may be expanded to include those properties.

Orient all luminaires less than two mounting heights from the lighting boundary such that the backlight points toward the nearest lighting boundary line. Building-mounted luminaires with the backlight oriented toward the building are exempt from the backlight rating requirement.

OR

OPTION 2 – CALCULATION METHOD

Do not exceed the following vertical illuminances at the lighting boundary (use the definition of lighting boundary in Option 1). Calculation points may be no more than 5 feet (1.5 meters) apart. Vertical



illuminances must be calculated on vertical planes running parallel to the lighting boundary, with the normal to each plane oriented toward the property and perpendicular to the lighting boundary, extending from grade level to 33 feet (10 meters) above the height of the highest luminaire.

<u>MLO Lighting Zone</u>	<u>Vertical Illuminance</u>
LZ0	0.05 FC (0.5 LUX)
LZ1	0.05 FC (0.5 LUX)
LZ2	0.10 FC (1 LUX)
LZ3	0.20 FC (2 LUX)
LZ4	0.60 FC (6 LUX)

FC = footcandle

AND

INTERNALLY ILLUMINATED EXTERIOR SIGNAGE

Do not exceed a luminance of 200 cd/m² (nits) during nighttime hours and 2000 cd/m² (nits) during daytime hours.

EXEMPTIONS FROM UPLIGHT AND TRESPASS REQUIREMENTS

The following exterior lighting is exempt from the requirements, provided it is controlled separately from the nonexempt lighting:

- specialized signal, directional, and marker lighting for transportation;
- lighting that is used solely for façade and landscape lighting in MLO lighting zones 3 and 4, and is automatically turned off from midnight until 6 a.m.;
- lighting for theatrical purposes for stage, film, and video performances;
- government-mandated roadway lighting;
- hospital emergency departments, including associated helipads;
- lighting for the national flag in MLO lighting zones 2, 3, or 4; and
- internally illuminated signage.

SUBMITTALS

Include descriptive narrative and calculations in SAM Checklist.

TECHNOLOGY/STRATEGY

Adopt site lighting criteria to maintain safe light levels while avoiding off-site lighting and night sky pollution. Minimize site lighting where possible and model the site lighting using a computer model. Technologies to reduce light pollution include full cutoff luminaires, low-reflectance surfaces and low-angle spotlights.



Standard Practice

- Use standard cutoffs on exterior lighting, wherever possible and appropriate.

Recommended Practice

- Use manufacturer's luminaire data or IES files to obtain the necessary information for determining compliance with this credit
- Adopt site lighting criteria in accordance with IES standards to maintain safe light levels while avoiding off-site lighting and night sky pollution
- Determine the BUG ratings or calculations for each unique combination of luminaire and its angular position in the lighting design
- Minimize site lighting where possible
- The maximum candela value of all interior lighting shall fall within the building (not out through windows) and the maximum candela value of all exterior lighting shall fall within the property
- Consider a parking lot design which allows for a reduction of the available parking areas and the associated exterior lighting during non-use or low use hours
- Evaluate smart-lighting control systems and LED light technologies

Best Available Practice

- Model the site lighting using a computer model
- Consider full cutoff luminaires, low-reflectance, non-specular surfaces and low-angle spotlights for roadway and building lighting



2.0 SUSTAINABLE SITES

2.10 Dynamic Wayfinding Signage/Systems

1 Point

INTENT

Minimize traffic congestion and time spent looking for parking thereby reducing fuel consumption and air pollution.

REQUIREMENTS

Use any or all of the following systems:

- Dynamic signage that provides updates regarding traffic and parking vacancy information including navigation and price.
- Reservation system that allows drivers to prepay and reserve parking at airport facilities.
- Messaging or lighting directing drivers to open spaces, showing parking availability on what levels, and directions.

SUBMITTALS

Include descriptive narrative in SAM Checklist.

TECHNOLOGY/STRATEGY

Use electronic dynamic signage to direct traffic to appropriate parking areas. The signage should be located at approaches to the airport and give adequate direction and time for a driver to find the parking facility.

A reservation system, e.g. a web or mobile phone application, should also provide, pricing, location, and navigation. One that works in tandem with a dynamic signage system would also be beneficial.

Once directed to the parking facility, additional wayfinding in the form of parking level or section vacancy displays and parking space sensors that display vacancy information should be included.

Standard Practice

None



Recommended Practice

- Use dynamic signage to direct traffic to parking facilities.
- Use a reservation system for parking.
- Use parking section counters and displays and parking space sensors.

Best Available Practice

None



3.0 Water Efficiency

3.1 Prerequisite 1 – Building-Level Water Metering

Required

INTENT

To support water management and help identify opportunities for additional water savings by monitoring consumption.

REQUIREMENTS

Install permanent water meters that measure the total potable water use for the building and associated grounds. Meter data must be compiled into monthly and annual summaries; meter readings can be manual or automated.

Meters must be Automated Meter Reading (AMR) and Advanced Meter Infrastructure (AMI) compliant.

If applicable, install meters for future tenant spaces so that tenants will be capable of independently metering water consumption dedicated to their space. Provide a sufficient number of meters to capture total tenant water use with a minimum of one meter per water source per floor.

SUBMITTALS

Include descriptive narrative in SAM Checklist including locations of water meters.

TECHNOLOGY/STRATEGY

Determine all end uses of potable water in the project building and on the grounds. These could include water consumption for plumbing fixtures, cooling towers and evaporative condensers, laundering, dishwashing, indoor and outdoor water features, irrigation, exterior cleaning, and manufacturing processes.

Prepare a narrative describing the location of the building level water meter(s) serving the project and site, as applicable. If nonpotable water is included in the metered water volume, note this in the narrative and describe how volumes can be managed and tracked separately.

Standard Practice

None



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Recommended Practice

None

Best Available Practice

- Remote sensing meters integrated into building system management



3.0 Water Efficiency

3.2 Prerequisite 2 – Water Use Reduction: 20% Reduction

Required

INTENT

Increase water efficiency within buildings to reduce the burden on municipal water supply and wastewater systems.

REQUIREMENTS

For the fixtures and fittings listed in the table below, as applicable to the project scope, reduce aggregate water consumption by 20% from the baseline. Base calculations on the volumes and flow rates shown in the table.

All newly installed toilets, urinals, private lavatory faucets, and showerheads that are eligible for labeling must be WaterSense™ labeled (or a local equivalent for projects outside the U.S.).

Commercial Fixtures, Fittings, Appliances, and Processes	Current Baseline
Toilets*	1.6 gallons per flush (gpf) Except blow-out fixtures: 3.5 (gpf)
Urinals*	1.0 (gpf)
Fixture or Fitting	
Public lavatory (restroom) faucets	0.5 (gpm) at 60 (psi) all others except private applications
Private lavatory faucets	2.2 gpm at 60 psi
Kitchen faucet (excluding faucets exclusively used for filling operations)	2.2 gpm at 60 psi
Showerhead*	2.5 gpm at 80 psi per shower stall
Commercial prerinse spray valves (for food service applications)	Flow rate ≤ 1.3 (gpm) (no pressure specified; no performance requirement)
Appliance	
Residential clothes washers	ENERGY STAR or performance equivalent
Commercial clothes washers	ENERGY STAR or performance equivalent
Residential dishwashers	ENERGY STAR or performance equivalent
Ice machine	ENERGY STAR or performance equivalent and use either air-cooled or closed-loop cooling, such as chilled or condenser water system



Commercial Fixtures, Fittings, Appliances, and Processes	Current Baseline
Process	
Heat rejection and cooling	No once-through cooling with potable water for any equipment or appliances that reject heat
Cooling towers and evaporative condensers	Equip with • makeup water meters • conductivity controllers and overflow alarms • efficient drift eliminators that reduce drift to maximum of 0.002% of recirculated water volume for counterflow towers and 0.005% of recirculated water flow for cross-flow towers

* WaterSense™ label available for this product type

SUBMITTALS

Include descriptive narrative and calculations in SAM Checklist.

TECHNOLOGY/STRATEGY

WaterSense™-certified fixtures and fixture fittings should be used where available. Use high-efficiency fixtures (water closets and urinals) and dry fixtures such as composting toilet systems to reduce the potable water demand. Consider the use of alternate on-site sources of water, such as rainwater, stormwater, or air conditioner condensate, and graywater for non-potable applications such as toilet and urinal flushing, as approved by the manufacturer, and for custodial uses.

Special consideration should be used to distinguish applicability of these technologies in high-volume passenger terminal areas versus office facilities, especially with respect to maintenance.

Standard Practice

- Chicago Building Code (CBC) meets the Energy Policy Act of 1992 (EPAAct 1992).

Recommended Practice

- Must exceed CBC (EPAAct 1992) by 20% to meet prerequisite
- Use local generation of domestic hot water, as much as possible, to eliminate long piping runs associated with recirculation piping. Unless connecting to an existing hot water recirculating system
- Domestic hot water for general plumbing fixtures should be designed for a temperature of 140° F. maximum, but not less than 120° F



Best Available Practice

- Install dry fixtures such as composting toilets and waterless urinals to reduce wastewater volumes
- Use instantaneous hot water heating systems (i.e., tankless, on-demand hot water heating)
- Use zones or sub-meters to measure and audit water consumption rates at points of use
- Use reclaimed water for cooling tower makeup
- Evaluate pulsed-power electromagnetic water treatment, ultraviolet treatment, or ozone treatment for cooling tower water
- Establish a water supply system that supports vehicle maintenance without the use of potable water by using recycled water or diverted stormwater for vehicle and aircraft washing



3.0 Water Efficiency

3.3 Water Use Reduction: 25% - 50% Reduction

1 to 6 Points

INTENT

Further increase water efficiency within buildings to reduce the burden on municipal water supply and wastewater systems.

REQUIREMENTS

Employ strategies that in aggregate further reduce the water than the water use baseline calculated for the building (not including irrigation) in the prerequisite. The minimum water savings percentage for each point threshold is as follows:

<u>SAM Credit</u>	<u>Water Reduction</u>	<u>Points</u>
3.3.1	25%	1
3.3.2	30%	2
3.3.3	35%	3
3.3.4	40%	4
3.3.5	45%	5
3.3.6	50%	6

Calculate the baseline according to the commercial and/or residential baselines outlined below¹. Calculations are based on estimated occupant usage and must include only the following fixtures and fixture fittings (as applicable to the project scope): water closets, urinals, lavatory faucets, showers, kitchen sink faucets and pre-rinse spray valves.

¹ Tables adapted from information developed and summarized by the U.S. Environmental Protection Agency (EPA) Office of Water based on requirements of the Energy Policy Act (EPA) of 1992 and subsequent rulings by the Department of Energy, requirements of the EPA of 2005, and the plumbing code requirements as stated in the 2006 editions of the Uniform Plumbing Code or International Plumbing Code pertaining to fixture performance.



Commercial Fixtures, Fittings, Appliances, and Processes	Current Baseline
Toilets	1.6 gallons per flush (gpf) Except blow-out fixtures: 3.5 (gpf)
Urinals	1.0 (gpf)
Fixture or Fitting	
Public lavatory (restroom) faucets	0.5 (gpm) at 60 (psi) all others except private applications
Private lavatory faucets	2.2 gpm at 60 psi
Kitchen faucet (excluding faucets exclusively used for filling operations)	2.2 gpm at 60 psi
Showerhead	2.5 gpm at 80 psi per shower stall
Commercial prerinse spray valves (for food service applications)	Flow rate ≤ 1.3 (gpm) (no pressure specified; no performance requirement)
Appliance	
Residential clothes washers	ENERGY STAR or performance equivalent
Commercial clothes washers	ENERGY STAR or performance equivalent
Residential dishwashers	ENERGY STAR or performance equivalent
Ice machine	ENERGY STAR or performance equivalent and use either air-cooled or closed-loop cooling, such as chilled or condenser water system
Process	
Heat rejection and cooling	No once-through cooling with potable water for any equipment or appliances that reject heat
Cooling towers and evaporative condensers	Equip with • makeup water meters • conductivity controllers and overflow alarms • efficient drift eliminators that reduce drift to maximum of 0.002% of recirculated water volume for counterflow towers and 0.005% of recirculated water flow for cross-flow towers

* WaterSense™ label available for this product type

SUBMITTALS

Include descriptive narrative and calculations in SAM Checklist.

TECHNOLOGY/STRATEGY

WaterSense™-certified fixtures and fixture fittings should be used where available. Use high-efficiency fixtures (water dispensers, water closets and urinals) and dry fixtures such as composting toilet systems to reduce the potable water demand. Consider the use of alternate on-site sources of water, such as



rainwater, stormwater, or air conditioner condensate, and graywater for non-potable applications such as toilet and urinal flushing, as approved by the manufacturer, and custodial uses.

Standard Practice

None

Recommended Practice

- Use high-efficiency fixtures and valves, such as automatic sensors, aerators on lavatories and dual-flush toilets

Best Available Practice

- Dry fixtures such as composting toilets and waterless urinals to reduce wastewater volumes
- Use reclaimed water for cooling tower makeup
- Evaluate pulsed-power electromagnetic water treatment, ultraviolet treatment, or ozone treatment for cooling tower water
- Establish a water supply system that supports vehicle maintenance without the use of potable water by using recycled water or diverted stormwater for vehicle and aircraft washing



3.0 Water Efficiency

3.4.1 Water Efficient Landscaping

2 Points

INTENT

Limit or eliminate the use of potable water, or other natural surface or subsurface water resources available on or near the project site, for landscape irrigation.

REQUIREMENTS

Reduce potable water consumption for irrigation by 50% from a calculated mid-summer baseline case.

Reductions shall be attributed to any combination of the following items:

- Plant species, density and microclimate factor
- Irrigation efficiency
- Use of captured rainwater
- Use of recycled wastewater
- Use of water treated and conveyed by a public agency specifically for non-potable uses

If the percent reduction of Potable Water is equal to or greater than 50%, credit for SAM Credit 3.3.1 Water Efficient Landscaping, Reduce by 50% is earned. If the percent reduction of Potable Water is 100% AND the percent reduction of Total Water is equal to or greater than 50%, credit for SAM Credit 3.3.2 Water Efficient Landscaping, No Potable Water Use or No Irrigation is earned in addition to credit for SAM Credit 3.3.1 Water Efficient Landscaping, Reduce by 50%.

SUBMITTALS

Include descriptive narrative and calculations in SAM Checklist.

TECHNOLOGY/STRATEGY

Perform a soil/climate analysis to determine appropriate plant material and design the landscape with native or adapted plants to reduce or eliminate irrigation requirements. Where irrigation is required, use high-efficiency equipment and/or climate-based controllers.

Note that these landscaping strategies provide benefits for the following:

- SAM Credit 2.7 Stormwater Management
- SAM Credits 2.8 Heat Island Reduction



- SAM Credits 4.2 Prerequisite 2 – Minimum Energy Performance and 4.5 Optimize Energy Performance

Groundwater seepage that is pumped away from the immediate vicinity of buildings slabs and foundations can be used for landscape irrigation and meet the intent of this credit. However, it must be demonstrated that doing so does not affect site stormwater management systems.

Standard Practice

- Irrigation systems are not typically installed airside and the lower maintenance tall fescue is used for all projects per the following CDA Specifications:
 - CDA Specification T-901 – Seeding
 - CDA Specification 02931 – Seeding and Hydro-mulching
 - CDA Specification 02905 – Sustainable Airport Landscaping, is the airport landscaping specification that deals with other plants and landscaping requirements.

Recommended Practice

- Do not install an irrigation system
- Do not install plants that will require irrigation
- Utilize vegetation which may be acceptable for site use (native and/or low maintenance), with special consideration for vegetated green roofs. Utilize vegetation to reduce or eliminate irrigation requirements for landside areas.
- Minimize the use of high maintenance lawns and annual plants
- Establish areas of high and low landscape maintenance areas. Group plants with similar water-use needs by determining which areas of the site should receive a higher level of care than others and, during drought periods, more irrigation. Coordinate these areas with the irrigation plan. Higher maintenance areas should be located around the major building entries and high traffic areas. Lower maintenance areas should be located on low traffic areas, buffer zones and service areas.

Best Available Practice

- Perform a soil and climate analysis to determine the appropriate landscape strategy
- Evaluate stormwater and/or graywater cisterns for capturing rainwater from all new roofs for irrigation
- If irrigation system must be installed, provide for soil moisture monitoring to reduce reliance on manual control and timed devices, as well as for detecting leaks



3.0 Water Efficiency

3.4.2 Water Efficient Landscaping, No Potable Water Use or No Irrigation

2 Points (in addition to credit earned towards SAM Credit 3.4.1)

INTENT

Eliminate the use of potable water, or other natural surface or subsurface water resources available on or near the project site, for landscape irrigation.

REQUIREMENTS

Achieve credit towards SAM Credit 3.4.1 Water Efficient Landscaping, Reduce by 50% and:

Use only captured rainwater, recycled wastewater, recycled graywater, or water treated and conveyed by a public agency specifically for non-potable uses for irrigation.

OR

Install landscaping that does not require permanent irrigation systems. Temporary irrigation systems used for plant establishment are allowed only if removed within one year of installation.

SUBMITTALS

Include descriptive narrative and calculations in SAM Checklist.

TECHNOLOGY/STRATEGY

Perform a soil/climate analysis to determine appropriate landscape types and design the landscape with indigenous plants to reduce or eliminate irrigation requirements. Consider using stormwater, graywater, and/or condensate water for irrigation.

Note that these landscaping strategies provide benefits for the following:

- SAM Credit 2.7 Stormwater Management
- SAM Credits 2.8 Heat Island Reduction
- SAM Credits 4.2 Prerequisite 2 – Minimum Energy Performance and 4.5 Optimize Energy Performance

Standard Practice

- Irrigation systems are not typically installed airside and the lower maintenance tall fescue is used for all projects per the following CDA Specifications:



- CDA Specification T-901 – Seeding
- CDA Specification 02931 – Seeding and Hydro-mulching
- CDA Specification 02905 – Sustainable Airport Landscaping, is the airport landscaping specification that deals with other plants and landscaping requirements.

Recommended Practice

- Do not install an irrigation system
- Do not install plants that will require irrigation
- Utilize vegetation which may be acceptable for site use (native and/or low maintenance), with special consideration for vegetated green roofs. Utilize vegetation to reduce or eliminate irrigation requirements for landside areas.

Best Available Practice

- Perform a soil and climate analysis to determine the appropriate landscape strategy
- Evaluate stormwater and/or graywater cisterns for capturing rainwater from all new roofs for irrigation



3.0 Water Efficiency

3.5 Innovative Wastewater Technologies

2 Points

INTENT

Reduce wastewater generation and potable water demand while increasing the local aquifer recharge.

REQUIREMENTS

OPTION 1

Reduce potable water use for building sewage conveyance by 50% using water-conserving fixtures (water closets, urinals) or non-potable water (captured rainwater, recycled graywater, and on-site or municipally treated wastewater).

OR

OPTION 2

Treat 50% of wastewater on-site to tertiary standards. Treated water must be infiltrated or used on-site.

SUBMITTALS

Include descriptive narrative and calculations in SAM Checklist.

TECHNOLOGY/STRATEGY

Specify high-efficiency fixtures and fittings and dry fixtures such as composting toilet systems and non-water using urinals to reduce wastewater volumes. Consider reusing stormwater or graywater for sewage conveyance or on-site mechanical and/or natural wastewater treatment systems. Options for on-site wastewater treatment include packaged biological nutrient removal systems and high-efficiency filtration systems.

Standard Practice

None

Recommended Practice

- Use high-efficiency fixtures and valves
- Utilize fixtures such as dual flush toilets and waterless urinals to reduce wastewater volumes



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- Evaluate reusing stormwater for non-potable uses

Best Available Practice

- Capture graywater from lavatories, showers and institutional dishwashing facilities for sewage conveyance or on-site wastewater treatment systems



4.0 ENERGY & ATMOSPHERE

4.1 Prerequisite 1 – Fundamental Building Systems Commissioning

Required

INTENT

For occupied buildings, verify that the project's energy related systems are installed, calibrated and perform according to the owner's project requirements, basis of design, and construction documents.

REQUIREMENTS

COMMISSIONING PROCESS SCOPE

Complete the following commissioning (Cx) process activities for mechanical, electrical, plumbing, and renewable energy systems and assemblies, in accordance with ASHRAE Guideline 0-2013 and ASHRAE Guideline 1.1–2007 for HVAC&R Systems, as they relate to energy, water, indoor environmental quality, and durability.

- Develop the owner's project requirements (OPR).
- Develop a basis of design (BOD).

The commissioning authority (CxA) must do the following:

- Review the OPR, BOD, and project design.
- Develop and implement a Cx plan.
- Confirm incorporation of Cx requirements into the construction documents.
- Develop construction checklists.
- Develop a system test procedure.
- Verify system test execution.
- Maintain an issues and benefits log throughout the Cx process.
- Prepare a final Cx process report.
- Document all findings and recommendations and report directly to the owner throughout the process.

Requirements for exterior enclosures are limited to inclusion in the owner's project requirements (OPR) and basis of design (BOD), as well as the review of the OPR, BOD and project design. ASTM E2947-16: Standard Guide for Building Enclosure Commissioning provides additional guidance.

The review of the exterior enclosure design may be performed by a qualified independent member of the design or construction team (or an employee of that firm) who is not directly responsible for design of the building enclosure for the project.



COMMISSIONING AUTHORITY

By the end of the design development phase, engage a commissioning authority with the following qualifications.

- The CxA must have documented commissioning process experience on at least two building projects with a similar scope of work. The experience must extend from early design phase through at least 10 months of occupancy;
- The CxA may be a qualified employee of the owner, an independent consultant, or an employee of the design or construction firm who is not part of the project's design or construction team, or a disinterested subcontractor of the design or construction team.
 - For projects smaller than 20,000 square feet (1 860 square meters), the CxA may be a qualified member of the design or construction team. In all cases, the CxA must report his or her findings directly to the owner.

Project teams that intend to pursue EA Credit Enhanced Commissioning should note a difference in the CxA qualifications: for the credit, the CxA may not be an employee of the design or construction firm nor a subcontractor to the construction firm.

CURRENT FACILITIES REQUIREMENTS AND OPERATIONS & MAINTENANCE PLAN

Prepare and maintain a current facilities requirements and operations and maintenance plan that contains the information necessary to operate the building efficiently. The plan must include the following:

- a sequence of operations for the building;
- the building occupancy schedule;
- equipment run-time schedules;
- setpoints for all HVAC equipment;
- set lighting levels throughout the building;
- minimum outside air requirements;
- any changes in schedules or setpoints for different seasons, days of the week, and times of day;
- a systems narrative describing the mechanical and electrical systems and equipment;
- a preventive maintenance plan for building equipment described in the systems narrative;
- and a commissioning program that includes periodic commissioning requirements, ongoing commissioning tasks, and continuous tasks for critical facilities.

SUBMITTALS

Include descriptive narrative in SAM Checklist.



TECHNOLOGY/STRATEGY

Engage a CxA as early as possible in the design process. Determine the owner's project requirements, develop and maintain a commissioning plan for use during design and construction and incorporate commissioning requirements in bid documents. Assemble the commissioning team, and prior to occupancy verify the performance of energy consuming systems. Complete the commissioning reports with recommendations prior to accepting the commissioned systems. Owners are encouraged to seek out qualified individuals to lead the commissioning process. Qualified individuals are identified as those who possess a high level of experience in the following areas:

- Energy systems design, installation and operation
- Commissioning planning and process management
- Hands-on field experience with energy systems performance, interaction, start-up, balancing, testing, troubleshooting, operation, and maintenance procedures
- Energy systems automation control knowledge

Standard Practice

- Commissioning Agents are typically engaged to conduct fundamental commissioning for buildings.

Recommended Practice

- Engage a Commissioning agent as early in the design process as possible; at least prior to the completion of Design Development
- Review the design intent and the basis of design documentation
- Incorporate commissioning requirements into the construction documents
- Develop and utilize a commissioning plan
- Verify installation, functional performance, training, operations and maintenance documentation
- Complete a commissioning report
- Provide the owner with a single manual that contains the information required for re-commissioning systems
- Engage a commissioning team that does not include individuals directly responsible for project design or construction management to evaluate both building and site systems as part of the commissioning plan
- Priority Systems – high energy consuming systems
 - Central Building Automation system
 - All HVAC system equipment
 - Lighting controls and sensors
 - Site Lighting
 - Refrigeration systems
 - Vertical Transport
 - Building Envelope



- Baggage handling systems (included in process loads: to promote energy savings, use the exceptional calculation method described in ANSI/ASHRAE/IESNA 90.1-2010 G2.5)
- Information Technology Systems – IT (included in process loads: to promote energy savings, use the exceptional calculation method described in ANSI/ASHRAE/IESNA 90.1-2010 G2.5)
- Lower Priority Systems – low energy consuming system.
 - Emergency Power Generators and Automatic Transfer Switching
 - Uninterruptible Power Supply systems
 - Life Safety systems; Fire protection Fire alarm, Egress pressurization
 - Lightning Protection
 - Domestic and Process water pumping and mixing systems
 - Equipment sound control systems
 - Data and Communication systems
 - Paging systems
 - Security systems
 - Irrigation systems
 - Plumbing
 - Illuminated guidance signage
- For Runways, Civil/Stormwater and Roadways/Rail projects this scope should include the following project components.
 - For support and ancillary buildings include all of the applicable systems and assemblies noted above
 - Runway lighting and illuminated signage
 - Runway NAVAIDS
 - Site lighting systems
 - Traffic signals
 - Stations (e.g., pump stations, lift stations, drainage pumps)
 - Heating/Deicing systems
 - Oil/water separators



4.0 ENERGY & ATMOSPHERE

4.2 Prerequisite 2 – Minimum Energy Performance

Required

INTENT

Establish the minimum level of energy efficiency for the proposed building and civil infrastructure systems to reduce environmental and economic impacts associated with excessive energy use.

REQUIREMENTS

The requirements for this credit will vary based on the type of project: building versus civil.

Select one of the five compliance path options described below. Options 1, 2, and 3 pertain to buildings; 4 and 5 pertain to civil/infrastructure projects.

OPTION 1 — WHOLE BUILDING ENERGY SIMULATION

Demonstrate an improvement of 5% for new construction, 3% for major renovations, or 2% for core and shell projects in the proposed building performance rating compared with the baseline building performance rating. Calculate the baseline building performance according to ANSI/ASHRAE/IESNA Standard 90.1–2010, Appendix G, with errata, using a simulation model.

Projects must meet the minimum percentage savings before taking credit for renewable energy systems. The proposed design must meet the following criteria:

- compliance with the mandatory provisions of ANSI/ASHRAE/IESNA Standard 90.1–2010, with errata (or a USGBC-approved equivalent standard for projects outside the U.S.);
- inclusion of all energy consumption and costs within and associated with the building project; and
- comparison against a baseline building that complies with Standard 90.1–2010, Appendix G, with errata.

Document the energy modeling input assumptions for unregulated loads. Unregulated loads should be modeled accurately to reflect the actual expected energy consumption of the building.

If unregulated loads are not identical for both the baseline and the proposed building performance rating, and the simulation program cannot accurately model the savings, follow the exceptional calculation method (ANSI/ASHRAE/IESNA Standard 90.1–2010, G2.5). Alternatively, use the COMNET Modeling Guidelines and Procedures to document measures that reduce unregulated loads.

OR



OPTION 2 — PRESCRIPTIVE COMPLIANCE PATH: ASHRAE Advanced Energy Design Guide

Comply with the mandatory and prescriptive provisions of ANSI/ASHRAE/IESNA Standard 90.1–2010, with errata.

Comply with the HVAC and service water heating requirements, including equipment efficiency, economizers, ventilation, and ducts and dampers, in Chapter 4, Design Strategies and Recommendations by Climate Zone, for the appropriate ASHRAE 50% Advanced Energy Design Guide and climate zone:

- ASHRAE 50% Advanced Energy Design Guide for Small to Medium Office Buildings, for office buildings smaller than 100,000 square feet;
- ASHRAE 50% Advanced Energy Design Guide for Medium to Large Box Retail Buildings, for retail buildings with 20,000 to 100,000 square feet;
- ASHRAE 50% Advanced Energy Design Guide for K–12 School Buildings; or
- ASHRAE 50% Advanced Energy Design Guide for Large Hospitals. Over 100,000 square feet

OR

OPTION 3 — PRESCRIPTIVE COMPLIANCE PATH: Advanced Buildings™ Core Performance™ Guide

Comply with the mandatory and prescriptive provisions of ANSI/ASHRAE/IESNA Standard 90.1-2010, with errata.

Comply with Section 1: Design Process Strategies, Section 2: Core Performance Requirements, and the following three strategies from Section 3: Enhanced Performance Strategies, as applicable. Where standards conflict, follow the more stringent of the two. For projects outside the U.S., consult ASHRAE/ASHRAE/IESNA Standard 90.1-2010, Appendixes B and D, to determine the appropriate climate zone.

3.5 Supply Air Temperature Reset (VAV)

3.9 Premium Economizer Performance

3.10 Variable Speed Control

To be eligible for Option 3, the project must be less than 100,000 square feet.

OR

OPTION 4 — CIVIL/INFRASTRUCTURE PROJECTS

Comply with the following measures based on the type of civil infrastructure project:



Exterior lighting applications (non-aviation related), such as roadways, surface parking lots, and covered parking garages, must meet the minimum illumination requirements of Tables 6-07-1 and 6-07-2 of Section 6-07 of the CDA Design and Construction Standards, Vol. II. For the purposes of establishing a baseline energy use, a conventional 400-watt lamp shall be assumed for each fixture, except for low-mast applications or covered areas where a 250-watt lamp is applicable. The benchmark standard shall assume that the lamps are run without lighting controls such as timers and motion sensors. Light sensors, however, should be taken into account.

Pumping systems not directly associated with buildings, which includes but is not limited to storm water conveyance pumps, sanitary pump stations, irrigation systems must be designed so that the operating design point (system curve intersect) shall be 60% to 120% of flow rate at the point of maximum operating efficiency. Pump motors must meet the minimum full-load efficiency requirements in ASHRAE/IESNA Standard 90.1-2016, Table 10.8, for 4-pole, enclosed motors at 1800 rpm.

The minimum standards for all aviation facilities and systems including navigation aids and runway/taxiway lighting shall be in accordance with FAA specifications and standards.

SUBMITTALS

Include descriptive narrative and calculations in SAM Checklist.

TECHNOLOGY/STRATEGY

Design the building envelope and systems and any powered civil infrastructure systems to meet baseline requirements. Use a computer simulation model, where applicable, to assess the energy performance and identify the most cost-effective energy efficiency measures. Quantify energy performance as compared to a baseline building or civil project.

If a local code has demonstrated quantitative and textual equivalence following, at a minimum, the U.S. Department of Energy (DOE) standard process for commercial energy code determination, then the results of that analysis may be used to correlate local code performance with ASHRAE 90.1-2010. Details on the DOE process for commercial energy code determination can be found at: <http://www.energycodes.gov/regulations/determinations>

Standard Practice

- The Chicago Energy Conservation Code (CECC 2019, Title 14D) currently requires that buildings meet the 2018 International Energy Conservation Code (IECC) with an alternate compliance path of ASHRAE/IESNA 90.1-2016 standard with some exceptions.
- Most exterior lighting, especially those used for roadway lighting, include the use of high pressure sodium or metal halide lamps with power ranging from 250W to 400W although pedestrian and alley applications may include lamps as low as 50W to 150 W. Induction lighting is used at the ramp areas and the South Cargo Tunnel.
- Pre-Conditioned Air (PCA), 400 Hertz power, hydrant fueling, and energy-efficient mobile loading bridges should be included with any new gates or gate retrofits.



Recommended Practice

- Design buildings using the more current ASHRAE/IESNA 90.1-2010 standard.

Best Available Practice

None

RESOURCES

Illinois Coalition for Responsible Outdoor Lighting. “Chicago: A Study in Outdoor Lighting Practices and Costs”, 2008. www.illinoislighting.org

American National Standards Institute/Hydraulic Institute (ANSI/HI), “Pump Systems Matter”, March 2005. www.pumps.org

CDA Design and Construction Standards, Vol. II, Rev. 7 (April 30, 2012), §6-07 Lighting



4.0 ENERGY & ATMOSPHERE

4.3 Prerequisite 3 – Fundamental Refrigerant Management

Required

INTENT

Move towards using zero ozone depleting products and global warming potential refrigerants.

REQUIREMENTS

Do not use CFC-based refrigerants in new base building HVAC&R systems. When reusing existing base building HVAC equipment, complete a comprehensive CFC phase-out conversion prior to project completion. Phase-out plans extending beyond the project completion date will be considered on their merits.

SUBMITTALS

Include descriptive narrative in SAM Checklist.

TECHNOLOGY/STRATEGY

When reusing existing HVAC systems, conduct an inventory to identify equipment that uses CFC-based refrigerants and provide a replacement schedule for these refrigerants. For new buildings, specify new HVAC equipment in the base building that uses no CFC refrigerants.

Standard Practice

- Only HCFC and HFC refrigerants have been used for CDA projects where refrigerants were required (typically R-410a, which is an HFC)
- In accordance with the Montreal Protocol, HFCs are to be phased out in 2019.

Recommended Practice

None

Best Available Practice

- Although HCFCs and HFCs have ozone depletion potentials (ODP) that are nearly zero, consideration should also be given to their global warming potentials (GWP) (see SAM Credit 4.7 Enhanced Refrigerant Management). Alternative refrigerants that minimize ODP and GWP compared to HCFCs and HFCs include natural refrigerants such as carbon dioxide, ammonia,



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and propane. These compounds have an ODP of zero and GWPs which are three orders of magnitude less than most HCFCs and HFCs



4.0 ENERGY & ATMOSPHERE

4.4 Prerequisite 4 – Building-Level Energy Metering

Required

INTENT

Support energy management and identify opportunities for additional energy savings by tracking building-level energy use.

REQUIREMENTS

Install new or use existing building-level energy meters, or submeters that can be aggregated to provide building-level data representing total building energy consumption (electricity, natural gas, chilled water, steam, fuel oil, propane, biomass, etc.) and total water consumption.

If applicable, install meters for future tenant spaces so that tenants will be capable of independently metering energy consumption (electricity, chilled water, etc.) for all systems dedicated to their space. Provide a sufficient number of meters to capture total tenant energy use with a minimum of one meter per energy source per floor.

SUBMITTALS

Include descriptive narrative in SAM Checklist including location of meter(s).

TECHNOLOGY/STRATEGY

Identify all sources of energy and water delivered to the building. sources of energy and water that must be metered include all energy supplied by a utility company or campus central plant, such as the following:

- Electricity
- Natural gas, synthetic natural gas, propane, fuel oil, diesel fuel, other fossil fuels
- Biofuels
- District chilled water, steam, and hot/cold water
- General potable water service

This prerequisite does not require metering of locally generated sources of energy that are dedicated to the project building or tenant space, such as the following:

- Solar photovoltaic-generated electricity
- Wind-generated electricity



- Solar hot water generation for domestic hot water or heating hot water

If all energy provided to the building is supplied by one or more utility companies and the utility meters provide monthly consumption data, those meters meet the prerequisite requirements. However, the project team may have little influence on the location and function of utility company meters, so the building owner should confirm the following with the utility company:

- Location: where the meter will be located (e.g., inside the building, or under or above ground outside)
- Accessibility: how the building manager will reach the meter
- Reporting: how the meter will be read (e.g., manually or via remote transmission)

If the utility company restricts access to the meter or uses proprietary remote reporting technology, the project team may meet the prerequisite requirements by tracking energy usage through monthly billing. To collect more frequent or accurate data, the team may elect to install a private meter downstream of the utility company meter.

If the project is not served by a utility company, or if the project uses multiple sources of energy, additional meters may be required. Identify the location of primary building-level meters for each energy source. If the project shares utility meters with other buildings or includes energy sources that are not metered by the supplier, install submeters that will provide the required data.

- Projects may use a single meter at the utility entrance or multiple submeters that account for whole building energy use in aggregate (see Further Explanation, Examples).
- Areas within the project boundary that are served by separate utility feeds, such as parking garages, must also be metered.
- Some projects may elect to use multiple submeters to gain more insight into energy uses.
- Select locations with easy access for reading and maintenance.
- There are no requirements for the type of meters except that they be permanent (see Further Explanation, Meter Selection).
- Meters installed by the owner must be maintained and calibrated per the manufacturer's recommendations.

Standard Practice

None

Recommended Practice

None

Best Available Practice

- Remote sensing meters integrated into building system management



4.0 ENERGY & ATMOSPHERE

4.5 Optimize Energy Performance

1 to 18 Points

INTENT

Achieve increasing levels of energy performance beyond the prerequisite standard to reduce environmental and economic impacts associated with excessive energy use.

REQUIREMENTS

The requirements for this credit will vary based on the type of project: building versus civil.

For Occupied and Unoccupied Building projects, the requirements will follow the compliance path options as identified in LEED. There are three compliance options, Options 1 to 3, that apply to buildings as described below. Civil projects will adhere to a compliance path, Option 4, that is similar to Option 1 except that the maximum achievable points will be 6, based on the threshold limits in the table below, or the prescriptive compliance path in Option 5. It is assumed that for any project type or compliance option SAM Credit 4.2 Prerequisite 2 – Minimum Energy Performance has been met.

OPTION 1 – WHOLE BUILDING ENERGY SIMULATION (1 to 18 points)

Analyze efficiency measures during the design process and account for the results in design decision making. Use energy simulation of efficiency opportunities, past energy simulation analyses for similar buildings, or published data (e.g., Advanced Energy Design Guides) from analyses for similar buildings.

Analyze efficiency measures, focusing on load reduction and HVAC-related strategies (passive measures are acceptable) appropriate for the facility. Project potential energy savings and holistic project cost implications related to all affected systems.

Project teams pursuing the Integrative Process credit must complete the basic energy analysis for that credit before conducting the energy simulation.

Follow the criteria in Prerequisite 2 Minimum Energy Performance to demonstrate a percentage improvement in the proposed building performance rating compared with the baseline. Points are awarded according to the table on the next page.



SAM Credit	% Energy Reduction Over Baseline*			Points
	New Buildings	Major Renovations	Civil**	
4.5.1	6%	4%	8%	1
4.5.2	8%	6%	16%	2
4.5.3	10%	8%	24%	3
4.5.4	12%	10%	32%	4
4.5.5	14%	12%	40%	5
4.5.6	16%	14%	48%	6
4.5.7	18%	16%	-	7
4.5.8	20%	18%	-	8
4.5.9	22%	20%	-	9
4.5.10	24%	22%	-	10
4.5.11	26%	24%	-	11
4.5.12	29%	27%	-	12
4.5.13	32%	30%	-	13
4.5.14	35%	33%	-	14
4.5.15	38%	36%	-	15
4.5.16	42%	40%	-	16
4.5.17	46%	44%	-	17
4.5.18	50%	48%	-	18

* Beyond baseline calculated in SAM Credit 4.2 – Prerequisite 2 – Minimum Energy Performance.

** Maximum available points for civil projects are 6. The rationale for this is that according to “2003 Commercial Buildings Energy Consumption Survey” by the Energy Information Administration approximately 30% of overall energy use is due to exterior sources, primarily exterior lighting. Therefore, the SAM makes only 6 of the 18 points available to non-building, i.e. civil projects.

Example: An energy simulation indicated that the proposed energy savings for the new air traffic control tower (new building) was 17% over the ASHRAE/IESNA 90.1-2010 standard. The project would then achieve 6 points under this credit.

OR



OPTION 2 — PRESCRIPTIVE COMPLIANCE PATH: ASHRAE Advanced Energy Design Guide (1-6 Points)

To be eligible for Option 2, projects must use Option 2 in Prerequisite 2 Minimum Energy Performance. Implement and document compliance with the applicable recommendations and standards in Chapter 4, Design Strategies and Recommendations by Climate Zone, for the appropriate ASHRAE 50% Advanced Energy Design Guide and climate zone. For example:

ASHRAE 50% Advanced Energy Design Guide for Small to Medium Office Buildings

- Building envelope, opaque: roofs, walls, floors, slabs, doors, and continuous air barriers (1 point)
- Building envelope, glazing: vertical fenestration (1 point)
- Interior lighting, including daylighting and interior finishes (1 point)
- Exterior lighting (1 point)
- Plug loads, including equipment and controls (1 point)

OR, if applicable (to a warehouse type setting):

ASHRAE 50% Advanced Energy Design Guide for Medium to Large Box Retail Buildings

- Building envelope, opaque: roofs, walls, floors, slabs, doors, and vestibules (1 point)
- Building envelope, glazing: fenestration - all orientations (1 point)
- Interior lighting, excluding lighting power density for sales floor (1 point)
- Additional interior lighting for sales floor (1 point)
- Exterior lighting (1 point)
- Plug loads, including equipment choices and controls (1 point)

OR

OPTION 3 — PRESCRIPTIVE COMPLIANCE PATH: Advanced Buildings™ Core Performance™ Guide (1-3 Points)

Comply with the prescriptive measures identified in the Advanced Buildings™ Core Performance™ Guide developed by the New Buildings Institute. The building must meet the following requirements:

- Less than 100,000 square feet
- Comply with Section 1: Design Process Strategies, and Section 2: Core Performance Requirements
- Health care, warehouse or laboratory projects are ineligible for this path

Points achieved under Option 3 (1 point):

- 1 point is available for all office, school, public assembly, and retail projects less than 100,000 square feet that comply with Sections 1 and 2 of the Core Performance Guide



- Up to 2 additional points may be awarded to projects that implement performance strategies listed in Section 3, Enhanced Performance. For every three strategies implemented from this section, one point is available.
- The following strategies are not eligible for additional points under this Credit:
 - 3.1-Cool Roofs
 - 3.8-Night Venting
 - 3.13-Additional Commissioning

OR

OPTION 4 —COMPLIANCE PATH: CIVIL/INFRASTRUCTURE PROJECTS (1 – 6 Points)

Up to 6 points may be awarded to Civil/Infrastructure projects. To obtain points in this credit, the energy usage of the respective infrastructure elements must exceed the benchmark requirements in SAM Credit 4.2 Prerequisite 2 – Minimum Energy Performance, Option 4, by the levels shown below:

Exterior Lighting (non-aviation related)

Exterior lighting applications (non-aviation related), such as roadways, surface parking lots and covered parking garages, the benchmark standard shall be equal to the energy use if all the fixtures on a project used 400-watt or 250-watt lamps, depending on the appropriate application (see also SAM Credit 4.2). Points are awarded when the proposed design reduces the energy use over the benchmark standard by the following levels:

- 1 point = 8% improvement over benchmark standard
- 2 points = 16% improvement over benchmark standard
- 3 points = 24% improvement over benchmark standard
- 4 points = 32% improvement over benchmark standard
- 5 points = 40% improvement over benchmark standard
- 6 points = 48% improvement over benchmark standard

NOTE: For parking lots associated with buildings, the parking lighting should be considered a part of the building's electrical usage and therefore Options 1, 2, or 3 should be used. This option is to be used only for stand-alone parking areas or structures not directly associated with a building.

Example: The proposed design of a parking lot includes five high-mast light standards with two fixtures each and four lower level pedestrian lighting fixtures. The design calls for LED lighting to be used for all fixtures. The benchmark standard would be calculated such that there are 10 – 400-watt lamps for the parking lighting and 4 – 250-watt lamps for



the pedestrian lighting. The benchmark standard is calculated to be 5,000 watts ($10 \times 400 + 4 \times 250$). The proposed LED lights are rated for 100 watts and 75 watts, respectively, for the parking and pedestrian lighting. Therefore, assuming no special lighting controls, the proposed energy rating for the project is 1,300 watts ($10 \times 100 + 4 \times 75$), a 74% reduction compared to the benchmark standard. This project would earn 6 points under this credit.

Pumping Systems

Pumping systems not directly associated with buildings, must exceed the minimum full-load efficiency requirements in ASHRAE/IESNA Standard 90.1-2016, Table 10.8, for 4-pole, enclosed motors at 1800 rpm by the following levels:

- 1 point = 8% improvement over benchmark standard
- 2 points = 16% improvement over benchmark standard
- 3 points = 24% improvement over benchmark standard
- 4 points = 32% improvement over benchmark standard
- 5 points = 40% improvement over benchmark standard
- 6 points = 48% improvement over benchmark standard

Airfield Lighting

For runway/taxiway lighting, exceed the minimum FAA specifications by the levels below. Note that the benchmark calculation shall assume that conventional lights are used throughout the project and that the calculation must be based on annual energy consumption and use seasonal climate data for the region, where applicable.

- 1 point = 8% improvement over benchmark standard
- 2 points = 16% improvement over benchmark standard
- 3 points = 24% improvement over benchmark standard
- 4 points = 32% improvement over benchmark standard
- 5 points = 40% improvement over benchmark standard
- 6 points = 48% improvement over benchmark standard



For projects that include multiple infrastructure elements such as those listed above, a weighted average based on the annual energy usage shall apply.

Example: A roadway project that includes a lift station realizes an annual energy savings of 65% over the benchmark standard for roadway lighting and 15% over the benchmark standard for pump systems. If the annual energy usage of the roadway lighting and the lift station is 40,000 kWh and 60,000 kWh, respectively, then the overall annual energy savings for the project is 35%. Therefore, 4 points are earned for this credit.

Example Calculation:

$$\frac{(65\%)(40,000 \text{ kWh}) + (15\%)(60,000 \text{ kWh})}{100,000 \text{ kWh}} = 35\%$$

= 35% overall energy savings for entire project

Therefore 4 points earned for SAM Credit 4.5

In some cases, there may be powered infrastructure elements that do not appear in the categories above for Option 4. In those cases, the designer may choose to demonstrate the energy savings based on an appropriate benchmark and submit for SRP review.

OR

OPTION 5 – PRESCRIPTIVE COMPLIANCE PATH: CIVIL/INFRASTRUCTURE PROJECTS (1 – 3 Points)

For civil/infrastructure projects, in lieu of performing a detailed energy usage calculation, a prescriptive compliance path is available. To earn points using this method, the project must meet SAM Credit 4.2 Prerequisite 2 – Minimum Energy Performance, Option 4, where applicable, and use any of the energy saving technologies or strategies listed in the table below.

A point is awarded for each of the following technologies up to a maximum of 3 points for this credit.

<u>Technology/Strategy</u>	<u>Points</u>
LED lighting for roadways, parking areas, or pedestrian areas	1
LED runway lights or taxiway lights	1
Nighttime/motion sensor or electronically-controlled ballast activation for roadway, parking, or pedestrian lighting, as applicable, with special consideration for safety.	1



<u>Technology/Strategy</u>	<u>Points</u>
High efficiency motors, >92% at full load for all motor horsepower ratings	1
Variable speed drive for pump motors	1
Solar powered signage, lighting, or equipment	1
The SRP will consider other proposed strategies or technologies proposed by the designer provided they meet the intent of this credit.	1

NOTE: The awarding of points will be at the discretion of the SRP.

Example: A service road that meets the requirements of SAM Credit 4.2 Prerequisite 2 – Minimum Energy Performance also uses LED fixtures for the roadway lighting (1 point) and uses light sensors to turn these lights on/off automatically depending on ambient light levels (additional 1 point). This project would earn 2 points overall for this credit using this option.

SUBMITTALS

Include descriptive narrative and calculations in SAM Checklist.

TECHNOLOGY/STRATEGY

Design the building envelopes, infrastructure, and powered systems to maximize energy performance. Use a computer simulation models or engineering design calculations to assess the energy performance and identify the most cost-effective energy efficiency measures. Quantify energy performance compared with a baseline building or infrastructure system.

Standard Practice

- For Buildings: The Chicago Energy Conservation Code (CECC 2019, Title 14D) currently requires that buildings meet the 2018 International Energy Conservation Code (IECC) which has an alternate compliance path of following ASHRAE/IESNA 90.1-2016 standard with some exceptions. LEED 2009 and the SAM require the more current ASHRAE/IESNA 90.1-2010 standard.
- For Civil/Infrastructure: Exterior lighting is typically high-pressure sodium or metal halide lamps. Larger pump systems use variable frequency drives and efficient motors. LED lights are standard practice for all taxiways. Newer pump stations have installed variable speed drives and high efficiency motors.



Recommended Practice

Consider the following for buildings and structures:

- Install electrochromic glass, smart glass/switchable glass where possible
- Use a computer simulation model to assess energy performance and identify the most cost-effective energy measures
- Provide high-efficiency motors and variable-speed pumping systems
- Provide energy efficient lighting systems including LED, fluorescent lighting, solar lighting and the use of lighting sensors or timers
- Organize circuiting of lighting and building systems so that individual areas may be separately controlled relative to daylight and heating/cooling zones
- Orient building to optimize passive solar and/or daylight penetration
- Optimize architectural features for daylighting and glare control. Consider light shelves, ceiling design, window placement, and window treatments
- Provide motion sensors in stairs, toilet rooms, storage rooms and equipment rooms unless life safety is compromised
- Provide “Energy Star” compliant equipment and appliances
- Control air infiltration through all exterior openings including loading docks
- Use LED lighting, wherever applicable
- Optimize lighting controls for energy savings and function
- Provide daylight harvesting control systems
- Use high performance glazing (double glazed, low-e) and window systems
- Evaluate appropriate levels of insulation and for building envelope
- Consider the following for all civil and infrastructure projects:
 - Use LED lighting wherever applicable and approved for:
 - Runways, as approved
 - Taxiways
 - Distance remaining signs
 - In-surface fixtures
 - Obstruction lighting
 - NAVAIDS and windsocks
 - Ramp area lighting
 - Traffic signals/Stop signs
 - Directional signs
 - Other areas, as approved
 - LED lighting for roadways, parking areas, or pedestrian areas
- Nighttime/motion sensor or electronically controlled ballast activation for roadway, parking, or pedestrian lighting, as applicable, with special consideration for safety
- High efficiency motors, generators and pumps
- Variable speed drives for pump motors
- Solar powered signage, lighting, or equipment



Best Available Practice

- Consider the following for buildings and structures:
 - Evaluate cogeneration for new terminals and concourses
 - Integrate lighting systems with Building Automation System
 - Use spectrally selective glazing
 - Evaluate underfloor air distribution systems in office-type spaces
 - Evaluate thermal mass for building envelope
 - Evaluate “green walls” for building façade
 - Utilize premium efficiency motors where applicable
 - Ground-source heat pumps for pre-heating/pre-cooling of water systems
 - For in-terminal seating – integrated power stations
- Consider the following for civil and infrastructure projects:
 - Use induction lighting
 - Comprehensive “smart” systems for lighting and signage
 - Reduce energy transmission loss
 - Proximity of power sources/on-site generation
 - Nanotechnologies and biomimicry



4.0 ENERGY & ATMOSPHERE

4.6 On-Site Renewable Energy

1 to 7 Points

INTENT

Encourage and recognize increasing levels of on-site renewable energy self-supply in order to reduce environmental and economic impacts associated with fossil fuel energy use.

REQUIREMENTS

Use on-site renewable energy systems to offset building energy cost. Calculate project performance by expressing the energy produced by the renewable systems as a percentage of the building annual energy cost and using the table below to determine the number of points achieved.

Determine the percentage of energy derived from renewable energy equipment against the proposed energy cost calculated for SAM Credit 4.5 Optimize Energy Performance. If no energy model was prepared for SAM Credit 4.5 Optimize Energy Performance, use the Department of Energy (DOE) Commercial Buildings Energy Consumption Survey (CBECS) database to determine the estimated electricity use in the case of a building project. For civil projects, the portion of energy derived from renewable energy systems will be based on the fraction of the total energy replaced with on-site generated renewable energy assuming the project used conventional energy supplies (utility supplied electricity and gas).

SAM Credit 8.4 Menu Items address the use of lesser amounts renewable energy on a project, amounts that do not meet the 1% threshold in this credit.

<u>SAM Credit</u>	<u>Percentage of Renewable Energy</u>	<u>Points</u>
4.6.1	1%	1
4.6.2	3%	2
4.6.3	5%	3
4.6.4	7%	4
4.6.5	9%	5
4.6.6	11%	6
4.6.7	13%	7

Example: A civil project, for example a pumping station, with a proposed energy consumption calculated at 100,000 kWh per year assuming all its energy was supplied by utility electricity, installed a wind turbine that can generate 6,000 kWh per year or 6% of the



total proposed energy consumption. The project would then achieve 3 points under this credit.

SUBMITTALS

Include descriptive narrative and calculations in SAM Checklist.

TECHNOLOGY/STRATEGY

Assess the project for non-polluting and renewable energy potential including solar, wind, geothermal, low-impact hydro, biomass and bio-gas strategies. When applying these strategies, take advantage of net metering with the local utility. Energy systems which are not eligible for this credit (but may be applicable under another credit) include architectural features such as daylighting and passive solar techniques, ground source heat pumps using small quantities of deep earth heat and vapor compression systems, and renewable energy from off-site sources.

Standard Practice

The following are Standard Practice:

- Solar powered signage
- Solar powered RPU for weather sensors
- Solar powered obstruction and barricade lighting
- Solar thermal water heating has been used at a number of locations, such as the ARFF Station #2, which has a system that provides hot water for up to 18 full time occupants

Recommended Practice

None

Best Available Practice

The following technologies should be considered for any applicable projects:

- Roof-mounted or building integrated photovoltaic panels
- Electricity generation using bio-fuels (untreated wood waste, agricultural crops or waste, landfill gas)
- Solar-thermal water or air heating
- Geothermal heating systems
- Geothermal electrical systems



4.0 ENERGY & ATMOSPHERE

4.7 Enhanced Commissioning

2 Points

INTENT

Begin the commissioning process early in the design process and execute additional activities after systems performance verification is completed.

REQUIREMENTS

Implement, or have in place a contract to implement, the following commissioning process activities in addition to those required under EA Prerequisite Fundamental Commissioning and Verification.

Commissioning Authority (CxA):

- The CxA must have documented commissioning process experience on at least two building projects with a similar scope of work. The experience must extend from early design phase through at least 10 months of occupancy;
- The CxA may be a qualified employee of the owner, an independent consultant, or a disinterested subcontractor of the design team.

OPTION 1 – ENHANCED SYSTEMS COMMISSIONING (3-4 POINTS)

Path 1: Enhanced Commissioning (3 points)

Complete the following commissioning process (CxP) activities for mechanical, electrical, plumbing, and renewable energy systems and assemblies in accordance with ASHRAE Guideline 0–2005 and ASHRAE Guideline 1.1–2007 for HVAC&R systems, as they relate to energy, water, indoor environmental quality, and durability.

The commissioning authority must do the following:

- Review contractor submittals.
- Verify inclusion of systems manual requirements in construction documents.
- Verify inclusion of operator and occupant training requirements in construction documents.
- Verify systems manual updates and delivery.
- Verify operator and occupant training delivery and effectiveness.
- Verify seasonal testing.
- Review building operations 10 months after substantial completion.
- Develop an on-going commissioning plan.



Include all enhanced commissioning tasks in the OPR and BOD.

OR

Path 2: Enhanced and Monitoring-Based Commissioning (4 points)

Achieve Path 1.

AND

Develop monitoring-based procedures and identify points to be measured and evaluated to assess performance of energy- and water-consuming systems.

Include the procedures and measurement points in the commissioning plan. Address the following:

- roles and responsibilities;
- measurement requirements (meters, points, metering systems, data access);
- the points to be tracked, with frequency and duration for trend monitoring;
- the limits of acceptable values for tracked points and metered values (where appropriate, predictive algorithms may be used to compare ideal values with actual values);
- the elements used to evaluate performance, including conflict between systems, out-of-sequence operation of systems components, and energy and water usage profiles;
- an action plan for identifying and correcting operational errors and deficiencies;
- training to prevent errors;
- planning for repairs needed to maintain performance; and
- the frequency of analyses in the first year of occupancy (at least quarterly).

Update the systems manual with any modifications or new settings and give the reason for any modifications from the original design.

AND/OR

OPTION 2 – ENVELOPE COMMISSIONING (2 POINTS)

Fulfill the requirements in EA Prerequisite Fundamental Commissioning and Verification as they apply to the building's thermal envelope in addition to mechanical and electrical systems and assemblies.

Complete the following commissioning process (CxP) activities for the building's thermal envelope in accordance with ASHRAE Guideline 0–2005 and the National Institute of Building Sciences (NIBS) Guideline 3–2012, Exterior Enclosure Technical Requirements for the Commissioning Process, as they relate to energy, water, indoor environmental quality, and durability.

Commissioning authority must complete the following:



- Review contractor submittals.
- Verify inclusion of systems manual requirements in construction documents.
- Verify inclusion of operator and occupant training requirements in construction documents.
- Verify systems manual updates and delivery.
- Verify operator and occupant training delivery and effectiveness.
- Verify seasonal testing.
- Review building operations 10 months after substantial completion.
- Develop an on-going commissioning plan.

For projects with peak cooling loads 2,000,000 Btu/h (600 kW) or more, or a total computer room peak cooling load 600,000 Btu/h (175 kW) or more, the CxA must conduct at least three verification reviews of the basis of design:

- One verification review of design documents before the start of design development;
- One verification review of design documents before mid-construction documents; and
- One final verification review of 100% complete design documents, verifying achievement of the owner's project requirements and adjudication of previous review comments.

SUBMITTALS

Include descriptive narrative in SAM Checklist.

TECHNOLOGY/STRATEGY

Although it is preferable that the CxA be contracted by the Owner, for the enhanced commissioning credit, the CxA may also be contracted through the design firms or construction management firms not holding construction contracts. The LEED Reference Guide provides detailed guidance on the rigor expected for following process activities:

- Commissioning design review
- Commissioning submittal review
- Systems manual

Though the commissioning process should start as early in the design process as possible, it is allowable to engage a CxA agent to conduct the design review required after construction has started, so long as the project team agrees to implement any requested changes both to the documents and to construction that may have already occurred.

Standard Practice

None



Recommended Practice

- Review the design intent and the basis of design documentation
- Incorporate commissioning requirements into the construction documents
- Develop and utilize a commissioning plan
- Verify installation, functional performance, training, operations and maintenance documentation
- Complete a commissioning report
- Provide the owner with a single manual that contains the information required for re-commissioning systems
- Engage a commissioning team that does not include individuals directly responsible for project design or construction management to evaluate both building and site systems as part of the commissioning plan
- Priority Systems - high energy consuming systems.
 - Central Building Automation system
 - All HVAC system equipment
 - Lighting controls and sensors
 - Site Lighting
 - Refrigeration systems
 - Vertical Transport
 - Building Envelope
 - Baggage handling systems (included in process loads: to promote energy savings, use the exceptional calculation method described in ANSI/ASHRAE/IESNA 90.1-2010 G2.5)
 - Information Technology Systems - IT (included in process loads: to promote energy savings, use the exceptional calculation method described in ANSI/ASHRAE/IESNA 90.1-2010 G2.5)
- Lower Priority Systems – low energy consuming system.
 - Emergency Power Generators and Automatic Transfer Switching
 - Uninterruptible Power Supply systems
 - Life Safety systems; Fire protection Fire alarm, Egress pressurization
 - Lightning Protection
 - Domestic and Process water pumping and mixing systems
 - Equipment sound control systems
 - Data and Communication systems
 - Paging systems
 - Security systems
 - Irrigation systems
 - Plumbing
 - Illuminated guidance signage
- For Runways, Civil/Stormwater and Roadways/Rail projects this scope should include the following project components.
 - For support and ancillary buildings include all of the applicable systems and assemblies noted above
 - Runway lighting and illuminated signage
 - Runway NAVAIDS



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- Site lighting systems
- Traffic signals
- Stations (e.g., pump stations, lift stations, drainage pumps)
- Heating/Deicing systems
- Oil/water separators

Best Available Practice

None



4.0 ENERGY & ATMOSPHERE

4.8 Enhanced Refrigerant Management

2 Points

INTENT

Reduce ozone depletion and support early compliance with the Montreal Protocol while minimizing direct contributions to global warming and move towards using non-ozone depleting and low global warming potential refrigerants.

REQUIREMENTS

OPTION 1

Do not use refrigerants, or use only refrigerants (naturally occurring or synthetic) that have an ozone depletion potential (ODP) of zero and a global warming potential (GWP) of less than 50.

OR

OPTION 2

Complete both of the following:

Select refrigerants and HVAC&R that minimize or eliminate the emission of compounds that contribute to ozone depletion and global warming. The base building HVAC&R equipment shall comply with the following formula, which sets a maximum threshold for the combined contributions to ozone depletion and global warming potential:

$$LCGWP + LCODP \times 10^5 \leq 100$$

Where:

$$LCODP = [ODP_r \times (L_r \times Life + M_r) \times R_c] / Life$$

$$LCGWP = [GWP_r \times (L_r \times Life + M_r) \times R_c] / Life$$

LCODP: Lifecycle Ozone Depletion Potential (lb CFC11/ton-Year)

LCGWP: Lifecycle Direct Global Warming Potential (lb CO₂/ton-Year)

GWP_r: Global Warming Potential of Refrigerant (0 to 12,000 lb CO₂/lb_r)



ODP_r: Ozone Depletion Potential of Refrigerant (0 to 0.2 lb CFC11/lb_r)

L_r: Refrigerant Leakage Rate (0.5% to 2.0%; default of 2% unless otherwise demonstrated)

M_r: End-of-life Refrigerant Loss (2% to 10%; default of 10% unless otherwise demonstrated)

R_c: Refrigerant Charge (0.5 to 5.0 lbs of refrigerant per ton of cooling capacity)

Life: Equipment Life (10 years; default based on equipment type, unless otherwise demonstrated)

For multiple types of equipment, a weighted average of all base building level HVAC&R equipment shall be applied using the following formula:

$$[\sum (LCGWP + LCODP \times 10^5) \times Q_{\text{unit}}] / Q_{\text{total}} \leq 100$$

Where:

Q_{unit} = Cooling capacity of an individual HVAC or refrigeration unit (tons)

Q_{total} = Total cooling capacity of all HVAC or refrigeration

Small HVAC units (defined as containing less than 0.5 lbs of refrigerant), and other equipment such as standard refrigerators, small water coolers, and any other cooling equipment that contains less than 0.5 lbs of refrigerant, are not considered part of the “base building” system and are not subject to the requirements of this credit.

AND

Do not install fire suppression systems that contain ozone-depleting substances (CFCs, HCFCs, PFAS or Halons).

SUBMITTALS

Include descriptive narrative in SAM Checklist.

TECHNOLOGY/STRATEGY

Design and operate the facility without mechanical cooling and refrigeration equipment. Where mechanical cooling is used, utilize base building HVAC and refrigeration systems for the refrigeration cycle that minimize direct impact on ozone depletion and global warming. Select HVAC&R equipment with reduced refrigerant charge and increased equipment life. Maintain equipment to prevent leakage of refrigerant to the atmosphere. Utilize fire suppression systems that do not contain HCFCs or Halons.



Standard Practice

None

Recommended Practice

None

Best Available Practice

- Use natural refrigerants (carbon dioxide, ammonia, propane) where possible, in order to minimize ODPs and GWPs



4.0 ENERGY & ATMOSPHERE

4.9 Green Power

1-2 Points

INTENT

Encourage the development and use of grid-source, renewable energy technologies on a net zero pollution basis.

REQUIREMENTS

Engage in a contract for qualified resources that have come online since January 1, 2005, for a minimum of five years, to be delivered at least annually. The contract must specify the provision of at least 50% or 100% of the project's energy from green power, carbon offsets, or renewable energy certificates (RECs).

Green power and RECs must be Green-e Energy certified or the equivalent. RECs can only be used to mitigate the effects of Scope 2, electricity use.

Carbon offsets may be used to mitigate Scope 1 or Scope 2 emissions on a metric ton of carbon dioxide–equivalent basis and must be Green-e Climate certified, or the equivalent.

The offsets must be from greenhouse gas emissions reduction projects within the U.S.

Determine the percentage of green power or offsets based on the quantity of energy consumed, not the cost. Points are awarded according to table below.

<u>SAM Credit</u>	<u>Percentage of total energy addressed by green power, RECs and/or offsets</u>	<u>Points</u>
4.9.1	50%	1
4.9.2	100%	2

Use the project's annual energy consumption, calculated in SAM Credit 4.2 Minimum Energy Performance, if Option 1 was pursued; otherwise use the U.S. Department of Energy's Commercial Buildings Energy Consumption Survey (CBECS) database to estimate energy use.

SUBMITTALS

Include descriptive narrative in SAM Checklist.



TECHNOLOGY/STRATEGY

The options for green power, RECs, and offsets will vary with the project's location and energy types. Consider the costs of various options.

- Green power and RECs must be Green-e Energy certified or the equivalent. Direct or local green power may be available through local utility providers; review their websites for green power cost premiums.
- Green power and RECs can be used only toward the electric energy use portion of the project's annual energy use (scope 2, electricity). They cannot be applied toward nonelectric energy uses.
- Carbon offsets must be Green-e climate certified or the equivalent. Unlike RECs and purchased green power, carbon offsets can be used toward both electric and nonelectric energy use.

Determine the energy needs of the building and investigate opportunities to engage in a green power contract. Green power is derived from solar, wind, geothermal, biomass or low-impact hydro sources. Visit www.green-e.org/energy for details about the Green-e program. The power product purchased to comply with credit requirements need not be Green-e certified. Other sources of green power are eligible if they satisfy the Green-e program's technical requirements. Renewable energy certificates (RECs), tradable renewable certificates (TRCs), green tags and other forms of green power that comply with Green-e's technical requirements can be used to document compliance with this section.

Standard Practice

None

Recommended Practice

- Determine the City of Chicago's Green Power requirements for the task/project and investigate opportunities to engage in a green power contract with the utility
- Visit www.green-e.org for details about the Green-e program

Best Available Practice

None



4.0 ENERGY & ATMOSPHERE

4.10 Minimize Solar Heat Gain

2 Points

INTENT

Minimize cooling requirements of interior spaces due to solar heat gain.

REQUIREMENTS

Meet the prescriptive requirements for fenestration from Chapter 4, Section C402.4, of the 2018 International Energy Conservation Code. Design fenestration systems in accordance with Table C402.4, specifically with thermal transmittance (U-factor) and solar heat gain coefficient (SHGC) less than or equal to the values in the table below (from IECC 2018):

Climate Zone	1	2	3	4 except Marine	5 and Marine 4	6	7	8
Vertical Fenestration								
U-Factor								
Fixed Fenestration	0.50	0.50	0.46	0.38	0.38	0.36	0.29	0.29
Operable Fenestration	0.65	0.65	0.60	0.45	0.45	0.43	0.37	0.37
Entrance Doors	1.10	0.83	0.77	0.77	0.77	0.77	0.77	0.77
SHGC								
Orientation^a	SEW	N	SEW	N	SEW	N	SEW	N
PF < 0.2	0.25	0.33	0.25	0.33	0.25	0.33	0.36	0.48
0.2 ≤ PF < 0.5	0.30	0.37	0.30	0.37	0.30	0.37	0.43	0.53
PF ≥ 0.5	0.40	0.40	0.40	0.40	0.40	0.40	0.58	0.58
Skylights								
U-Factor	0.75	0.65	0.55	0.50	0.50	0.50	0.50	0.50
SHGC	0.35	0.35	0.35	0.40	0.40	0.40	NR	NR

NR = No Requirement, PF = Projection Factor

a. "N" indicates vertical fenestration oriented within 45 degrees of true north. "SEW" indicates orientations other than "N". For buildings in the southern hemisphere, reverse south and north. Buildings located at less than 23.5 degrees latitude shall use SEW for all orientations.



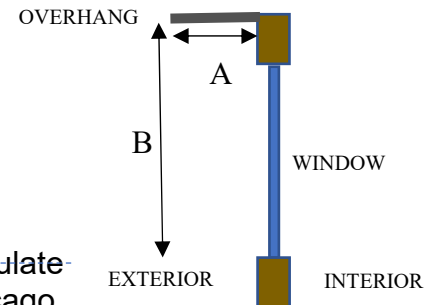
Projection Factor (PF) is the overhang/shade depth divided by the vertical distance from the bottom of the window to the overhang. PF can be calculated using the following formula:

$PF = A/B$, where

A = depth of overhang

B = vertical distance between bottom of glazing to overhang

Use weighted averages based on the area of the assemblies to calculate the overall values for U-factor and SHGC. Use Climate Zone 5 for Chicago. Refer to map in IECC 2018 for other US locations.



Example:

For a 60-inch tall, north-facing window in Climate Zone 5 with an 18-inch deep awning installed six inches above the top of window, the required SHGC would be calculated as follows:

$PF = 18 / (60 + 6) = 0.27$, therefore, for Climate Zone 5, the maximum allowable SHGC for north-facing (N) windows in this example is 0.58.

SUBMITTALS

Include descriptive narrative in SAM Checklist and calculations.

TECHNOLOGY/STRATEGY

Values are based on the International Energy Conservation Code (IECC) for 2018.

Standard Practice

- Current Illinois building code uses IECC 2015.

Recommended Practice

- Use glazing and window materials and construction that meets or exceeds the performance values above for IECC 2018.

Best Available Practice

- Photochromic glass changes its transparency in response to light intensity. Photochromics may block out excess sunlight that overloads the cooling system but still allow enough light for lighting purposes.



- Thermochromic glass is similar to photochromic glass but uses temperature differences due to the sun's intensity to regulate the transmission of light thereby changing sunlight intensity to reduce heat load in buildings.
- Electrochromic windows use a system of conductive coatings that when a voltage is applied the glazing switches between a clear and tinted state, similar in appearance to photochromic glass.
- Gasochromic windows provide a tinting effect as the technologies above, but the tint is produced via reversible chemical reactions, typically between hydrogen and oxygen (below combustion limits) and a tungsten oxide film in the cavity of the insulated glass unit.
- Suspended Particle Device (SPD) or Liquid Crystal Device (LCD) uses a very thin layer of liquid particles between two transparent electrical conductors laminated between two layers of glass. In an unpowered state, the particles are in a random orientation, blocking transmittance. When a current is applied, the particles align, and the transmittance increases.



5.0 MATERIALS & RESOURCES

5.1 Prerequisite 1 – Storage and Collection of Recyclables

Required

INTENT

Facilitate the reduction of waste generated by building occupants and for civil/infrastructure projects within the airport environment that is hauled to and disposed of in landfills.

REQUIREMENTS

Provide an easily accessible dedicated area or areas that serve the entire building and for the airport environment for the collection and storage of materials for recycling, including (at a minimum) paper, corrugated cardboard, glass, plastics and metals.

An area should also be dedicated to collection and storage of organics including plant-based landscaping debris (trimmings), unless the site has no landscaping, or kitchen/food waste for composting.

NOTE: For construction waste, see SAM Credits 5.3 Construction Waste Management and 5.5 Aggregate Reuse.

SUBMITTALS

Include descriptive narrative in SAM Checklist.

TECHNOLOGY/STRATEGY

Designate an area for recyclable collection and storage that is appropriately sized and located in a convenient area. These areas would likely be designed and sized differently depending on the ultimate use and waste stream of the facility (e.g., terminal, airfield, office, airlines, concessionaires, cargo, hangar, etc.) Identify local waste handlers and buyers for glass, plastic, office paper, e-waste, newspaper, cardboard, metals, fluids, fixtures, and organic wastes. Instruct occupants, employees and contractors on the recycling procedures. Consider employing cardboard balers, aluminum can crushers, recycling chutes and other waste strategies to further enhance the recycling program.

Standard Practice

- These items are addressed in varying degrees utilizing appropriate strategies within an airport environment. For additional details, see CDA Best Management Practices (BMPs) Manual. Designate an area for recyclable collection and storage that is appropriately sized and located in a convenient area.



- Investigate and incorporate collection rooms for recycling streams that make sense for each facility

Recommended Practice

- Coordinate recyclable waste collection with hauler capability
- Recycle the following waste, whenever feasible:
 - Aluminum
 - Glass
 - Paper, newspapers, magazines and cardboard
 - Carpet
 - Wood (pallets/crates, etc.)
 - Food waste/grease and compostables
 - Organic waste and compostables
 - Gas & oil filters
 - Motor oil and Anti-freeze
 - Scrap metal
 - Batteries
 - Light bulbs
 - Toner cartridges
 - Tires
 - Electrical wiring
 - Electronics including monitors
 - Deicing fluid
 - “Foreign Object Debris” (FOD)
- Instruct employees, users and occupants on recycling procedures

Best Available Practice

- Employ cardboard balers, aluminum can crushers, recycling chutes and other technologies to enhance the recycling program
- Reduce use of water bottles by enabling provisions for water dispensers for refills
- Reduce use of water bottles by providing area and collection capability on non-secured side of terminal to allow for the dumping of liquids and refill opportunity post security



5.0 MATERIALS & RESOURCES

5.2 Building and Infrastructure Reuse

1 to 4 Points

INTENT

Extend the life cycle of existing building stock and infrastructure, conserve resources, retain cultural resources, reduce waste and reduce environmental impacts of new buildings and infrastructure as they relate to materials manufacturing and transport.

REQUIREMENTS

Maintain the existing building structure (including structural floor and roof decking) and envelope (the exterior skin and framing, excluding window assemblies and non-structural roofing material) and infrastructure components (pavement, piping, etc.). The minimum percentage building and infrastructure reuse for each point threshold is shown in the table below.

Hazardous materials that are remediated as a part of the project must be excluded from the calculation of the percentage maintained. If the project includes an addition that is more than two (2) times the square footage of the existing building, this credit is not applicable.

AND/OR

Use existing interior nonstructural elements (e.g., interior walls, doors, floor coverings and ceiling systems) in at least 50% (by surface area) of the completed building, including additions.

If the project includes an addition with square footage more than two times the square footage of the existing building, this credit is not applicable.

<u>SAM Credit</u>	<u>Requirement</u>	<u>Points</u>
5.2.1	Maintain 55% Existing Walls, Floors, and Roof or Infrastructure	1
5.2.2	Maintain 75% Existing Walls, Floors, and Roof or Infrastructure	2
5.2.3	Maintain 95% Existing Walls, Floors, and Roof or Infrastructure	3
5.2.4	Maintain 50% Interior Non-Structural Elements	1

Note: Only up to three points are available for infrastructure projects. For projects with both building and infrastructure elements, it is at the discretion of the designer to choose which reuse opportunity will be used to calculate the reuse percentage.



SUBMITTALS

Include descriptive narrative and calculations in SAM Checklist.

TECHNOLOGY/STRATEGY

Consider reuse of existing, previously occupied buildings, including structure, envelope and elements and infrastructure. Remove elements that pose contamination risk and upgrade components that would improve energy and water efficiency such as windows, mechanical systems and plumbing fixtures.

Standard Practice

- Evaluate relocation of existing structures for reuse (with special consideration of historical components)
- Consider adaptive reuse of building(s) / structure(s) and potential relocation for the same program use
- Evaluate maximizing reuse of existing runway and other infrastructure (e.g., utilities, lighting, etc.)
- Quantify the extent of reuse

Recommended Practice

- Remove elements that pose contamination risk
- Upgrade outdated components
- Seek opportunities to improve the indoor/outdoor and structure sustainability elements (e.g., increasing daylighting, energy efficiency, low VOC finishes, etc. – see other SAM credits)
- Evaluate opportunities for application of deconstruction techniques

Best Available Practice

None



5.0 MATERIALS & RESOURCES

5.3 Construction Waste Management

2 to 3 Points

INTENT

Divert construction and demolition debris from disposal in landfills and incineration facilities. Redirect recyclable recovered resources back to the manufacturing process and reusable materials to appropriate sites.

REQUIREMENTS

Recycle and/or salvage non-hazardous construction and demolition debris. Develop and implement a construction waste management plan that, at a minimum, identifies the materials to be diverted from disposal and whether the materials will be sorted on-site. Excavated soil and land-clearing debris do contribute to this credit. Calculations must be done by weight (conversion may be necessary) and must be consistent throughout. The minimum percentage debris to be recycled or salvaged for each point threshold is as follows:

<u>SAM Credit</u>	<u>Recycled or Salvaged</u>	<u>Points</u>
5.3.1	50%	Required
5.3.2	75%	2
5.3.3	90%	3

Section 11-4-1905 of the Chicago City Code, includes applicability requirements. For CDA purposes, all airport projects are applicable regardless of Section 11-4-1905.

SUBMITTALS

Include descriptive narrative on the SAM Checklist indicating the name of the project that will utilize the material, if other than current project or temporary storage locations, and the following:

- A design estimate using the construction waste management form in CDA Specification 01524 – Construction Waste Management, to be provided by the designer with the SAM Design Checklist.
- A Waste Management Plan as outlined in CDA Specification 01524 to be provided by the Contractor no later than 30 days prior to start of construction.
- Monthly construction waste management forms provided by the Contractor during construction.



- A final construction waste total provided by the Contractor prior to final payment.

The submittal requirements follow the City of Chicago waste ordinance (Chicago Code Section 11-4-1905) with the following exceptions:

- All airport projects, including those not subject to Section 11-4-1905 of the Chicago Code, shall be subject to the submittal requirements of this credit.
- Submit documentation to CDA for tracking purposes in addition to documentation required by the ordinance.

Note that the requirements of this credit are very similar to the Chicago construction waste ordinance and CDA Specification 01524 with the exceptions as noted above. The specification follows the City ordinance with additional provisions for submittal requirements and project applicability.

TECHNOLOGY/STRATEGY

Note that the City of Chicago waste ordinance mandates that a minimum of 50% of construction and demolition (C&D) waste produced on-site (as measured by weight) is diverted from landfill.

It is expected that these practices may lead to savings in material costs due to resource coordination and income generation from recycled/salvaged materials. Due to the large nature of various CDA construction programs, many opportunities exist for on-site material recycling, especially for the aggregate and paving materials.

Standard Practice

Utilize designated areas for recycling construction debris on-site, primarily concrete, asphalt, and aggregates. Other materials are typically handled on a site-and-material-specific basis.

Recommended Practice

- Thoroughly evaluate cut-and-fill needs to develop a balanced earthwork plan to reduce hauling off-site
- Establish goals for diversion from disposal in landfills and incineration facilities and adopt a construction waste management plan to achieve these goals
- Consider recycling cardboard, metal, brick, mineral fiber panel, concrete, plastic, wood, glass, gypsum wallboard, carpet and insulation
- Construction debris processed into a recycled content commodity that has an open market value (e.g., wood derived fuel [WDF], alternative daily cover material, etc.) may be applied to the construction waste calculation
- Designate a specific area(s) on the construction site for segregated collection and labeling of recyclable materials, and track recycling efforts throughout the construction process



- Identify construction haulers and recyclers to handle the designated materials. Note that diversion may include donation of materials to charitable organizations and salvage of materials on-site.
- Implement deconstruction planning and techniques into all demolition activities. Careful and planned deconstruction of a facility can provide sustainable benefits related to disposal, reuse of materials, etc.
- Ensure that employees are aware of waste management and recycling procedures

Best Available Practice

- Evaluate use, as appropriate, of pre-cast or pre-fabricated units whenever possible, to reduce on-site waste generation during construction



5.0 MATERIALS & RESOURCES

5.4 Balanced Earthwork

1 to 2 Points

INTENT

Divert soils from landfills, reduce transportation of soil to off-site locations, and maintain or make soil available for reuse on other on-airport projects.

REQUIREMENTS

Reuse or stockpile for later use, at least 75% of excavation and earthwork soils on airport property and use GPS systems during large-scale grading and earthwork operations. Please count these earthwork quantities under SAM Credit 5.3 Construction Waste Management. Calculations must be done by volume and must be consistent throughout. Hazardous or special waste soils should not be included in the calculation.

All balanced earthwork activities must be conducted in accordance with SAM Credit 2.1 Prerequisite 1 – Construction Activity Pollution Prevention.

<u>SAM Credit</u>	<u>Managed On-Airport</u>	<u>Points</u>
5.4.1	75%	1
5.4.2	95%	2

SUBMITTALS

Use form similar to submittal for SAM Credit 5.3 Construction Waste Management.

TECHNOLOGY/STRATEGY

Due to the large project limits of many airport infrastructure projects, earthwork can be a significant portion of the scope of work. By maintaining a balanced earthwork policy, the amount of transportation and disposal costs, both financial and environmental, can be reduced.

Standard Practice

- The O'Hare Modernization Program has so far to date managed all earthwork soils on-airport through careful planning and design
- Evaluate opportunities for on-site soil management which may include infrastructure elevation changes, development of noise berms, considerations for landscaping needs, etc.



Recommended Practice

- Use GPS systems during large-scale grading and earthwork operations
- Identify stockpile areas, as well as the potential reuse on concurrent projects

Best Available Practice

None



5.0 MATERIALS & RESOURCES

5.5 Aggregate Reuse

1 Point

INTENT

Promote the reuse of aggregate from on-airport property sources.

REQUIREMENTS

Reuse aggregates, including sand, gravel, crushed concrete, and recycled asphalt for at least 10% by weight of all aggregates used for permanent structures and pavement. This does not include aggregates used for temporary structures such as haul roads or check dams. The source of the aggregates must be from on-airport property demolition activities or other on-airport projects. When reusing on-site aggregates, these may not be counted under the recycled content of materials, SAM Credit 5.7 Recycled Content, and should only be counted under this credit. When recycled aggregates from off-airport sources are used, then this would count toward SAM Credit 5.7 Recycled Content.

Exemplary Performance

If a project achieves an aggregate reuse rate greater than 90% by weight of all aggregates used for permanent structures, then an additional point may be claimed under SAM Credit 8.1 Innovation in Design & Construction.

Example: To build a new sidewalk, a project used 100 tons of aggregate in total. Of this amount, 10 tons was recovered from on-airport stockpiles, 20 tons was recovered from a nearby non-airport construction project, and the remainder was virgin material purchased from a quarry. In this case, only the 10 tons recovered from the airport stockpiles would count toward this credit, which would translate to a 10% aggregate reuse rate (10 tons/100 tons total) and therefore the point is achieved. The 20 tons of recovered material from the non-airport source (but not the 10 tons from on-airport source) would be counted under SAM Credit 5.7 Recycled Content.

SUBMITTALS

Include descriptive narrative and calculations in SAM Checklist.

TECHNOLOGY/STRATEGY

None



Standard Practice

- Concrete crushing is currently employed at the airport and aggregate stockpiles are usually available. It will be important to identify the appropriate gradation(s) to maximize the reuse potential of aggregates.
- Asphalt grindings are also stored on-site and reused as appropriate
- To further facilitate aggregate reuse, in addition to reusing on-site aggregates, identify stockpile areas and make aggregates available to other on-airport projects

Recommended Practice

- Identify aggregates present on-site that can be incorporated into the final development
- Identify possible uses of recycled aggregates within each project

Best Available Practice

- Where approved and appropriate, consider the use of Warm Mix Asphalt (WMA) for paving, which allows for the use of higher quantities of recycled asphalt pavement (RAP, also known as asphalt grindings). Also see SAM Credit 5.7 Recycled Content.



5.0 MATERIALS & RESOURCES

5.6 Material Reuse

1 to 2 Points

INTENT

Reuse building materials and products to reduce demand for virgin materials and reduce waste, thereby lessening impacts associated with the extraction and processing of virgin resources.

REQUIREMENTS

Use salvaged, refurbished or reused materials, the sum of which constitutes at least 5% or 10%, based on cost, of the total value of materials on the project. The minimum percentage materials reused for each point threshold is as follows:

<u>SAM Credit</u>	<u>Reused Materials</u>	<u>Points</u>
5.6.1	5%	1
5.6.2	10%	2

Only include materials in Construction Specification Institute (CSI) MasterFormat 1995 Divisions 2-10 in the calculations.

Mechanical, electrical and plumbing components and specialty items such as elevators and equipment cannot be included in this calculation. Include only materials permanently installed in the project. Furniture may be included if it is included consistently in SAM Credit 5.6 Materials Reuse through SAM Credit 5.10 Certified Wood.

SUBMITTALS

Include descriptive narrative and calculations in SAM Checklist.

Indicate the name of the project that will utilize the material, if other than current project and temporary storage locations if known.

TECHNOLOGY/STRATEGY

Identify opportunities to incorporate salvaged materials into the building design, and research potential material suppliers. Consider salvaged materials such as beams and posts, flooring, paneling, doors and frames, masonry, fencing, metal railing, manhole frames, lids, and catch basins inlets (CSI Divisions 2 through 10, note: CSI Divisions 11 through 16 are counted in SAM Credit 5.11 Furniture and Equipment).



Use a “virtual warehouse” to maintain a current listing of materials available for reuse on other projects.

Standard Practice

- To date, many items have been reused, such as fencing, light standards, and fixtures
- Prior to the demolition and removal of existing building materials and equipment within a project area, notify the Chicago Department of Aviation to allow for the harvesting of used building materials and equipment for potential reuse

Recommended Practice

None

Best Available Practice

None



5.0 MATERIALS & RESOURCES

5.7 Recycled Content

1 to 2 Points

INTENT

Increase demand for building products that incorporate recycled content materials, thereby reducing impacts resulting from extraction and processing of virgin materials.

REQUIREMENTS

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 20% or 30%, based on cost, of the total value of the materials in the project. The minimum percentage materials recycled for each point threshold is as follows:

<u>SAM Credit</u>	<u>Recycled Content</u>	<u>Points</u>
5.7.1	20%	1
5.7.2	30%	2

The recycled content value of a material assembly is determined by weight. The recycled fraction of the assembly is then multiplied by the cost of assembly to determine the recycled content value. If specific material cost is not available, assume 45% of total cost (inclusive of materials, labor and equipment) is representative of the material cost.

Only include materials in CSI MasterFormat 1995 Divisions 2-10 in the calculations.

Mechanical, electrical and plumbing components and specialty items such as elevators cannot be included in this calculation. Include only materials permanently installed in the project. Furniture may be included if it is included consistently in SAM Credit 5.6 Materials Reuse through SAM Credit 5.11 Furniture and Equipment.

SUBMITTALS

Include descriptive narrative and calculations in SAM Checklist.

The submittals include the following:

- A design estimate using the recycled content form in CDA Specification 01356 – Recycled Content – to be provided by the designer with the SAM Design Checklist



- A pre-construction estimate using the recycled content form in CDA Standard Specification 01356 – Recycled Content to be provided by the contractor
- A final construction estimate using the recycled content form in CDA Standard Specification 01356 – Recycled Content, to be provided by the contractor with the SAM Construction Checklist

TECHNOLOGY/STRATEGY

Establish a project goal for recycled content materials and identify material suppliers that can achieve this goal. During construction, ensure that the specified recycled content materials are installed. Consider a range of environmental, economic and performance attributes when selecting products and materials.

Standard Practice

The CDA uses and generates large amounts of recycled content materials particularly for the infrastructure projects which contain large amounts of paving materials and reinforcing steel. Where manufacturer information does not exist or cannot be obtained, CDA allows the use of the following recycled content percentages as a default for some of the common construction materials:

<u>Material</u>	<u>Post-consumer</u>	<u>Pre-consumer</u>
Steel	25%	-
Copper	65%	-
Aluminum	80%	-
Gypsum board (drywall) ²	2%	5%
Reinforced concrete pipe	2%	-
Asphaltic paving materials, conventional	45%	45%
Asphaltic paving materials, with roof shingles	67%	45%

Post-consumer Recycled Content is derived from materials that can no longer be used for their original purpose.

Pre-consumer Recycled Content consists of raw material diverted from the waste stream during the manufacturing process.

NOTE: The values in the table above are typically very conservative. For example, depending on the process used to make the steel, the recycled content can be anywhere from 25% to 35% for steel produced in a basic oxygen furnace to almost 100% in an electric arc furnace.³ For this reason, the

² Default values for Post-/Pre-consumer % content based on the following manufacturers' specs for standard gypsum drywall sourced in Midwestern states: CertainTeed (IA) – 2%/3%; American Gypsum (OK) – 5%/0%; USG (IA) – 6%/1%; USG (IN) – 5%/38%

³ Steel Recycling Institute



designers and contractors are encouraged to determine this information directly from the manufacturers and to not rely on these default values whenever possible.

Recommended Practice

- Establish a project goal for recycled content materials and identify material suppliers that can achieve this goal
- Consider the following major building components for specifying maximum recycled content:
 - Aggregate in cast in place concrete
 - Fly-ash in cast in place concrete
 - Aggregate in pre-cast concrete including site work and infrastructure piping
 - Fly-ash in pre-cast concrete including site work and infrastructure piping
 - Bituminous concrete pavement
 - Unit pavers
 - Steel reinforcement
 - Structural steel
 - Miscellaneous steel
 - Steel fencing and furnishings
 - Unit masonry
 - Ductile iron pipe
 - Aluminum products
 - Site generated broken concrete for gabions
 - Railroad rails
 - Railroad ties
 - Railroad track base material
 - Steel doors and frames
 - Aluminum doors and windows
 - Plaster
 - Terrazzo
 - Acoustical ceilings
 - Drywall
 - Finish flooring including carpet, resilient flooring and terrazzo
 - Toilet and shower compartments
 - Special finishes
- During construction, ensure that the specified recycled content materials are installed and quantify the total percentage of recycled content materials installed

Additionally, the following websites are provided for guidance only:

U.S. General Services Administration - Environmental Products Overview

<http://www.gsa.gov/portal/content/104543>

Architectural Record – Green Product Guide

www.archrecord.construction.com/products/green/



Chicago Department of Aviation
SUSTAINABLE AIRPORT MANUAL



Best Available Practice

- Encourage aggressive use of permeable pavement with high recycled content, where applicable, such as recycled ground tire rubber (GTR) for permeable asphalt.



5.0 MATERIALS & RESOURCES

5.8 Local/Regional Materials

1 to 3 Points

INTENT

Increase demand for building and all other materials and products that are extracted, harvested or recovered, as well as manufactured within the region, thereby supporting the use of indigenous resources and reducing the environmental impacts resulting from transportation.

REQUIREMENTS

Use building and all other materials or products that have been extracted, harvested or recovered, as well as manufactured, within 500 miles of the project site for a minimum of 20% or 20% (based on cost) of the total materials value. If only a fraction of a product or material is extracted/harvested/recovered and manufactured locally, then only that percentage (by weight) shall contribute to the regional value. An additional point can be achieved if 50% of the materials are extracted, harvested, or recovered, as well as manufactured, within 250 miles of the project site. The minimum percentage of local/regional materials for each point threshold is as follows:

<u>SAM Credit</u>	<u>Local/Regional Materials</u>	<u>Points</u>
5.8.1	20%	1
5.8.2	30%	2
5.8.3	50% within 250 miles	3

If specific material cost is not available, assume 45% of total cost (inclusive of materials, labor and equipment) is representative of the material cost.

Only include materials in CSI MasterFormat 1995 Divisions 2-10 in the calculations.

Mechanical, electrical and plumbing components and specialty items such as elevators and FAA equipment shall not be included in this calculation. Only include materials permanently installed in the project. Furniture may be included if it is included consistently in SAM Credit 5.6 Materials Reuse through SAM Credit 5.11 Furniture and Equipment.

NOTE: Materials reused and salvaged that satisfy the requirements of SAM Credit 5.6 Material Reuse may also contribute to this credit.



SUBMITTALS

Include descriptive narrative and calculations in SAM Checklist, as well as:

- A design estimate using the local/regional material form in CDA Specification 01355 – Regional Materials, to be provided by the designer with SAM Design Checklist
- A pre-construction estimate using the local/regional material form in CDA Specification 01355 – Regional Materials, to be provided by the contractor
- A final construction estimate using the local/regional material form in CDA Specification 01355 – Regional Materials, to be provided by the contractor with the SAM Construction Checklist

TECHNOLOGY/STRATEGY

Establish a project goal for locally sourced materials and identify materials and material suppliers that can achieve this goal. During construction, ensure that the specified local materials are installed and quantify the total percentage of local materials installed. Consider a range of environmental, economic and performance attributes when selecting products and materials.

Standard Practice

- The central location of Chicago makes many materials readily available, especially for infrastructure projects
- Due to sole sourcing and limited availability, FAA equipment and specialty items sometimes cannot meet the 500-mile criterion.

Recommended Practice

- Identify and specify materials that are extracted, processed, or manufactured within 500 miles of Chicago. Materials that may contribute toward this goal include, but are not limited to: concrete, aggregate, asphaltic products, structural steel, masonry, gypsum wallboard, utility structures (manholes, conduit, catch basins, culverts, sewer piping, stormwater piping, etc.), gas and water piping, landscaping materials. NOTE: Piping used indoors for building systems should not be included. Reused and salvaged materials also qualify.

Best Available Practice

None



5.0 MATERIALS & RESOURCES

5.9 Rapidly Renewable Materials

1 Point

INTENT

Reduce the use and depletion of finite raw materials and long-cycle renewable materials by replacing them with rapidly renewable materials.

REQUIREMENTS

Use rapidly renewable building materials and products for 2.5% of the total value of all building materials and products used in the project, based on cost. Rapidly renewable building materials and products are made from plants that are typically harvested within a ten-year or shorter cycle.

Only include materials in CSI MasterFormat 1995 Divisions 2-10 in the calculations. Only permanently installed materials should be counted in this credit. Temporary construction materials are counted in SAM Credit 7.7 Sustainable Temporary Construction Materials.

SUBMITTALS

Include descriptive narrative and calculations in SAM Checklist.

TECHNOLOGY/STRATEGY

Establish a project goal for rapidly renewable materials and identify products and suppliers that can support achievement of this goal. Consider materials such as bamboo, cotton insulation, agrifiber, linoleum, wheatboard, strawboard and cork. Although not a plant material, also consider wool.

Standard Practice

None

Recommended Practice

- Identify materials and suppliers that can achieve this goal
- Consider materials such as:
 - Poplar OSB
 - Straw board or “agriboard”
 - Bamboo flooring
 - Cork
 - Wool carpets and fabrics



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- Cotton-batt insulation
- Linoleum flooring
- Sunflower seed board
- Wheat grass or Straw board cabinetry and others.
- Rice husks for concrete

Best Available Practice

None



5.0 MATERIALS & RESOURCES

5.10 Certified Wood

1 Point

INTENT

Encourage environmentally responsible forest management.

REQUIREMENTS

Use a minimum of 50% (based on cost) of wood-based materials and products, which are certified in accordance with the Forest Stewardship Council's principles and criteria, for wood building components. These components include, but are not limited to, structural framing and general dimensional framing, flooring, sub-flooring, wood doors and finishes. Only include materials permanently installed in the project. Furniture may be included, providing it is included consistently in activities concerning SAM Credit 5.10 Certified Wood.

Only permanently installed materials should be counted in this credit. Sustainable temporary construction materials are counted in SAM Credit 7.7 Sustainable Temporary Construction Materials. Furniture may be included if it is included consistently in SAM Credit 5.6 Materials Reuse through SAM Credit 5.11 Furniture and Equipment.

SUBMITTALS

Include descriptive narrative and calculations in SAM Checklist.

TECHNOLOGY/STRATEGY

Establish a project goal for FSC-certified wood products and identify suppliers that can achieve this goal. During construction, ensure that the FSC-certified wood products are installed and quantify the total percentage of FSC-certified wood products installed.

Standard Practice

None

Recommended Practice

- Identify suppliers that can achieve this goal during construction
- Ensure that the FSC-certified wood products are installed and quantify the total percentage of FSC-certified wood products installed

Best Available Practice

None



5.0 MATERIALS & RESOURCES

5.11 Furniture and Equipment

1 Point

INTENT

Reduce the environmental and indoor air quality impacts of the furniture and equipment acquired for use in a building.

REQUIREMENTS

A point is awarded to projects that purchase durable goods (i.e., goods that are replaced infrequently or require capital program outlays to purchase) that meet any of the following sustainable requirements:

- **Electric-Powered Equipment:** Examples include, but are not limited to, office equipment (computers, monitors, copiers, faxes, scanners, and printers), appliances (refrigerators, dishwashers, and water coolers), external power adapters, and televisions and other audiovisual equipment. To achieve a point, 40% of the total purchases of electric-powered equipment (by cost) meet one of the following criteria:
 - The equipment is ENERGY STAR labeled (for product categories with developed specifications)
 - The equipment (either battery or corded) replaces conventional gas-powered equipment. Examples include, but are not limited to, maintenance equipment and vehicles, landscaping equipment and cleaning equipment.
- **Furniture:** To achieve a point, 40% of the total purchases of furniture (by cost) meet one of the following criteria:
 - Purchased furniture contains at least 10% post-consumer or 20% pre-consumer material
 - Purchased furniture contains at least 70% material salvaged from off-site sources or outside the airport boundary
 - Purchased furniture contains at least 70% material salvaged from on-site sources, such as an equipment reuse program or internal reorganization
 - Purchased furniture contains at least 50% rapidly renewable material
 - Purchased furniture contains at least 50% FSC-certified wood
 - Purchased furniture contains at least 50% material harvested and processed or extracted and processed within 500 miles of the project



Each furniture purchase can receive credit for each sustainable criterion met (i.e., a \$100 purchase that contains both 10% post-consumer recycled content and 50% content harvested within 500 miles of the project counts twice in the calculation, for a total of \$200 in sustainable purchasing.

To avoid double counting, furniture materials and electric equipment loads should not be counted in previous SAM categories, such as SAM Credit 5.8 Local/Regional Materials or Credit 4.4 Optimize Energy.

SUBMITTALS

Include descriptive narrative and calculations in SAM Checklist.

TECHNOLOGY/STRATEGY

Designers are encouraged to specify items that help achieve the requirements of this credit whenever possible. A continuously updated list of ENERGY STAR labeled equipment can be found on www.energystar.gov. Sustainable furniture can be found from various sources. GREENGUARD Environmental Institute certifies products, including furniture. See www.greenguard.org for a listing of GREENGUARD certified furniture.

Standard Practice

None

Recommended Practice

- Specify ENERGY STAR electric equipment and/or sustainable furniture systems, such as GREENGUARD certified furniture

Best Available Practice

None



5.0 MATERIALS & RESOURCES

5.12 Equipment Salvage and Reuse

1 Point

INTENT

Promote the reuse of equipment and products to reduce demand for virgin materials and reduce waste, thereby lessening impacts associated with the extraction and processing of virgin resources.

REQUIREMENTS

Use salvaged, refurbished or reused equipment and materials, in any appreciable amount on the project or make available for reuse equipment and materials for other projects.

Mechanical, electrical, and plumbing components and specialty items such as pumps and equipment (CSI Divisions 11 through 16, note: CSI Divisions 2 through 10 are counted in SAM Credit 5.6 Material Reuse) can be included. Include only materials permanently installed in the project. Furniture may be included if it is included consistently in SAM Credit 5.6 Material Reuse through SAM Credit 5.10 Certified Wood.

SUBMITTALS

Include descriptive narrative and calculations in SAM Checklist. Indicate the name of the project that will utilize the material, if other than current project or temporary storage locations.

TECHNOLOGY/STRATEGY

The purpose of this credit is to recognize the reuse of items not covered by SAM Credit 5.6 Material Reuse.

Identify opportunities to incorporate salvaged materials into the design, and research potential material suppliers. Consider salvaged materials such as cabinetry and furniture, pumps, motors, electrical panels, fixtures and tanks.

Explore and encourage the development of a virtual warehouse for salvaged and reusable items.

Standard Practice

- In the process of demolition, many projects have reused or made available for reuse old fencing and guard rails. Guard post structures and kiosks are routinely moved around the airport.
- To date, many items have been reused, such as fencing and fixtures

Recommended Practice

None



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Best Available Practice

None



6.0 INDOOR ENVIRONMENTAL QUALITY

6.1 Prerequisite 1 – Minimum Indoor Air Quality (IAQ) Performance

Required

INTENT

Establish minimum indoor air quality (IAQ) performance to enhance indoor air quality in buildings, thus contributing to the comfort and well-being of the occupants.

REQUIREMENTS

Meet the minimum requirements of Sections 4 through 7 of ASHRAE 62.1-2016, Ventilation for Acceptable Indoor Air Quality. Mechanical ventilation systems shall be designed using the Ventilation Rate Procedure or the applicable local code, whichever is more stringent. Naturally ventilated buildings shall comply with ASHRAE 62.1-2016, paragraph 5.1.

SUBMITTALS

Include descriptive narrative and calculations in SAM Checklist.

TECHNOLOGY/STRATEGY

Ventilation systems should meet or exceed the minimum outdoor air ventilation rates as described in the ASHRAE standard. Balance the impacts of ventilation rates on energy use and indoor air quality to optimize for energy efficiency and occupant health. Use the ASHRAE 62 User's Manual for detailed guidance on meeting the referenced requirements.

Standard Practice

- Identify potential IAQ conflicts on the site and locate air intakes away from air contaminant source, which might include loading areas, exhaust fans, and cooling towers
- Locate air intakes in secure areas for protection from potential security breaches

Recommended Practice

- Design HVAC systems to meet ventilation requirements of the referenced standard
- Evaluate carbon or electrostatic filters for use in passenger terminal buildings
- Provide a security monitoring system and restrict access to outdoor air intakes for passenger terminal buildings and any other public gathering areas
- In cases where conflicts with the City of Chicago ventilation code arise, meet the requirements of the more stringent code



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Best Available Practice

None



6.0 INDOOR ENVIRONMENTAL QUALITY

6.2 Prerequisite 2 – Environmental Tobacco Smoke (ETS) Control

Required

INTENT

Prevent or minimize exposure of building occupants, indoor surfaces, and ventilation air distribution systems to Environmental Tobacco Smoke (ETS).

REQUIREMENTS

For this prerequisite smoking includes tobacco smoke, as well as smoke produced from the combustion of cannabis and controlled substances and the emissions produced by electronic smoking devices.

OPTION 1

- Prohibit smoking in the building
- Smoking must be prohibited within 25-feet (or the maximum extent allowable by local codes) of entryways, outdoor air intakes and operable windows. This smoking requirement also applies to any spaces outside the property line that are used for business purposes.
- Provide signage to allow smoking in designated areas, prohibit smoking in designated areas or prohibit smoking on the entire property.

OR

OPTION 2

- Prohibit smoking in the building except in designated smoking areas
- Smoking must be prohibited within 25-feet from entries, outdoor air intakes and operable windows
- Locate designated smoking rooms to effectively contain, capture and remove ETS from the building. At a minimum, the smoking room must be directly exhausted to the outdoors with no re-circulation of ETS-containing air to the non-smoking area of the building, and enclosed with impermeable deck-to-deck partitions. With the doors to the smoking room closed, operate exhaust sufficient to create a negative pressure with respect to the adjacent spaces of at least an average of 5 Pa (0.02 inches of water gauge) and with a minimum of 1 Pa (0.004 inches of water gauge).
- Performance of the smoking room differential air pressures shall be verified by conducting 15 minutes of measurement, with a minimum of one measurement every 10 seconds, of the differential pressure in the smoking room with respect to each adjacent area and in each adjacent vertical chase with the doors to the smoking room closed. The testing will be conducted with each space configured for worst case conditions of transport of air from the smoking rooms to adjacent spaces with the smoking rooms' doors closed to the adjacent spaces.



OR

OPTION 3

- Prohibit smoking in all common areas of the building
- Locate any exterior designated smoking areas including balconies where smoking is permitted, at least 25-feet away from entries, outdoor air intakes and operable windows opening to common areas
- Minimize uncontrolled pathways for ETS transfer between individual residential units by sealing penetrations in walls, ceilings and floors in the residential units, and by sealing vertical chases adjacent to the units
- All doors in the residential units leading to common hallways shall be weather-stripped to minimize air leakage into the hallway
- If the common hallways are pressurized with respect to the residential units then doors in the residential units leading to the common hallways need not be weather-stripped provided that the positive differential pressure is demonstrated as in Option 2 above, considering the residential unit as the smoking room. Acceptable sealing of residential units shall be demonstrated by a blower door test conducted in accordance with ANSI/ASTM-E779-03, Standard Test Method for Determining Air Leakage Rate By Fan Pressurization, AND use the progressive sampling methodology defined in Chapter 4 (Compliance Through Quality Construction) of the Residential Manual for Compliance with California's 2001 Energy Efficiency Standards (<http://www.energy.ca.gov/title24/archive/2001standards/index.html>). Residential units must demonstrate less than 1.25 square inches leakage area per 100 square feet of enclosure area (i.e. sum of all wall, ceiling and floor areas).
- Verification of the performance of smoking rooms may be accomplished through tracer gas testing as an alternative to blower door testing

NOTE: It is acceptable to not designate any smoking areas and to provide signage to indicate the prohibition of smoking on the property to satisfy the prerequisite requirements.

SUBMITTALS

Include descriptive narrative in SAM Checklist.

TECHNOLOGY/STRATEGY

Prohibit smoking in commercial buildings, or effectively control the ventilation air in smoking rooms.

Standard Practice

- Chicago Building Code prohibits smoking within 15-feet of entryways which is less stringent than this credit. The distance must be increased to 25-feet to meet this prerequisite.



Recommended Practice

- Prohibiting smoking in the public areas of buildings and locating any exterior designated smoking areas away from entries and operable windows
- Require all parts of the construction sites to be non-smoking
- Work with labor unions in privately leased tenant spaces to designate these areas as non-smoking

Best Available Practice

- Where applicable, provide a designated smoking room designed to effectively contain, capture and remove ETS from the building. At a minimum, the smoking room must be directly exhausted to the outdoors with no recirculation of ETS-mixed air to the non-smoking area of the building, enclosed with impermeable deck-to-deck partitions and operated at negative pressure.
- Performance of the smoking rooms shall be verified by using tracer gas testing methods as described in the ASHRAE Standard 129-1997. Acceptable exposure in non-smoking areas is defined as less than 1% of the tracer gas concentration in the smoking room detectable in the adjoining non-smoking areas. Smoking room testing as described in ASHRAE Standard 129-1997, Section 8, is required in the contract documents and critical smoking facility systems testing results must be included in the building commissioning plan and report or as a separate document.



6.0 INDOOR ENVIRONMENTAL QUALITY

6.3 Outdoor Air Delivery Monitoring

1 Point

INTENT

Provide capacity for ventilation system monitoring to help sustain occupant comfort and wellbeing.

REQUIREMENTS

Install permanent monitoring systems to ensure that ventilation systems maintain design minimum ventilation requirements. Configure all monitoring equipment to generate an alarm when airflow values or carbon dioxide (CO₂) levels vary by 10% or more from the design values via either a building automation system alarm to the building operator or via a visual or audible alert to the building occupants.

FOR MECHANICALLY VENTILATED SPACES

- Monitor carbon dioxide concentrations within all densely occupied spaces (those with a design occupant density greater than or equal to 25 people per 1000 sq.ft.). CO₂ monitoring locations shall be between 3 feet and 6 feet above the floor
- For each mechanical ventilation system serving non-densely occupied spaces, provide a direct outdoor airflow measurement device capable of measuring the minimum outdoor airflow rate with an accuracy of plus or minus 15% of the design minimum outdoor air rate, as defined by ASHRAE 62.1-2010

FOR NATURALLY VENTILATED SPACES

- Monitor CO₂ concentrations within all naturally ventilated spaces. CO₂ monitoring shall be located within the room between 3 feet and 6 feet above the floor. One CO₂ sensor may be used to represent multiple spaces if the natural ventilation design uses passive stack(s) or other means to induce airflow through those spaces equally and simultaneously without intervention by building occupants.

SUBMITTALS

Include descriptive narrative in SAM Checklist.



TECHNOLOGY/STRATEGY

Install carbon dioxide and airflow measurement equipment and interface with the HVAC system and/or Building Automation System (BAS) to trigger corrective action, if applicable. If such automatic controls are not feasible with the building systems, use the measurement equipment to trigger alarms that inform building operators or occupants in the event of a possible deficiency in outdoor air delivery.

Provide audible feedback to building occupants, who in turn know to inform the building's engineer, as a satisfactory means of meeting this aspect of the credit requirement for both the densely occupied areas and the other areas with mechanical ventilation systems.

Standard Practice

None

Recommended Practice

- Design HVAC systems for passenger terminal and other public assembly and buildings with carbon dioxide monitoring sensors in each space and integrate these sensors with the building automation system (BAS)
- Provide real-time control of terminal unit (VAV box) flow rates and total outdoor air flow rates based on carbon dioxide levels

Best Available Practice

None



6.0 INDOOR ENVIRONMENTAL QUALITY

6.4 Increased Ventilation

1 Point

INTENT

Provide additional outdoor air ventilation to improve indoor air quality for improved occupant comfort, well-being and productivity.

REQUIREMENTS

FOR MECHANICALLY VENTILATED SPACES

- Increase breathing zone outdoor air ventilation rates to all occupied spaces by at least 30% above the minimum rates required by ASHRAE Standard 62.1-2016 as determined by SAM Credit 6.1 Prerequisite 1 – Minimum Indoor Air Quality Performance

FOR NATURALLY VENTILATED SPACES

- Design natural ventilation systems for occupied spaces to meet the recommendations set forth in the Carbon Trust “Good Practice Guide 237” [1998]. Determine that natural ventilation is an effective strategy for the project by following the flow diagram process shown in Figure 1.18 of the Chartered Institution of Building Services Engineers (CIBSE) Applications Manual 10: 2005, Natural ventilation in non-domestic buildings.

AND

- Use diagrams and calculations to show that the design of the natural ventilation systems meets the recommendations set forth in the CIBSE Applications Manual 10: 2005, Natural ventilation in non-domestic buildings

OR

- Use a macroscopic, multi-zone, analytic model to predict that room-by-room airflows will effectively naturally ventilate, defined as providing the minimum ventilation rates required by ASHRAE 62.1-2016 Chapter 6, for at least 90% of occupied spaces

SUBMITTALS

Include descriptive narrative and calculations in SAM Checklist.



TECHNOLOGY/STRATEGY

For mechanically ventilated spaces: Use heat recovery, where appropriate, to minimize the additional energy consumption associated with higher ventilation rates.

For naturally ventilated spaces: Follow the eight design steps described in the Carbon Trust Good Practice Guide 237 – 1) Develop design requirements, 2) Plan airflow paths, 3) Identify building uses and features that might require special attention, 4) Determine ventilation requirements, 5) Estimate external driving pressures, 6) Select types of ventilation devices, 7) Size ventilation devices, 8) Analyze the design.

Use public domain software such as NIST's CONTAM, Multizone Modeling Software, along with LoopDA, Natural Ventilation Sizing Tool, to analytically predict room-by-room airflows.

Standard Practice

None

Recommended Practice

- Select and place air diffusers for all mechanically ventilated spaces, particularly office and passenger terminal spaces, following the recommended design approaches in the ASHRAE 2001 Fundamentals, Chapter 32, Space Air Diffusion
- Section 6 of ASHRAE 62.1-2016 outlines guidelines for determining ventilation rates for various applications of mechanical ventilation systems

Best Available Practice

- Increase air change effectiveness using the following strategies:
 - Displacement ventilation in passenger terminal areas
 - Underfloor air distribution in office areas
 - Operable windows and skylights in cargo buildings
- Increase air movement in cargo facilities with ceiling fans
- Install trickle ventilators in cargo facilities to provide natural winter ventilation
- Install relief vents or operable skylights in cargo facilities to provide stack effect natural ventilation



6.0 INDOOR ENVIRONMENTAL QUALITY

6.5.1 Construction IAQ Management Plan: During Construction

1 Point

INTENT

Reduce indoor air quality problems resulting from the construction/renovation process in order to help sustain the comfort and well-being of construction workers and building occupants.

REQUIREMENTS

Develop and implement an Indoor Air Quality (IAQ) Management Plan for the construction and pre-occupancy phases of the building as follows:

- During construction meet or exceed the recommended Control Measures of the Sheet Metal and Air Conditioning National Contractors Association (SMACNA) IAQ Guidelines for Occupied Buildings under Construction, 2007, Chapter 3
- Protect stored on-site or installed absorptive materials from moisture damage

If permanently installed air handlers are used during construction, filtration media with a Minimum Efficiency Reporting Value (MERV) of 8 shall be used at each return air grille, as determined by ASHRAE 52.2-2017. Replace all filtration media immediately prior to occupancy.

SUBMITTALS

Include descriptive narrative in SAM Checklist including IAQ Management Plan and detailed photographic evidence.

TECHNOLOGY/STRATEGY

Adopt an IAQ management plan to protect the HVAC system during construction, control pollutant sources and interrupt contamination pathways. Sequence the installation of materials to avoid contamination of absorptive materials such as insulation, carpeting, ceiling tile and gypsum wallboard. Coordinate SAM Credits 6.5 Construction IAQ Management Plan and 6.7 Indoor Chemical and Source Pollutant Control to determine the appropriate specifications and schedules for filtration media.

If possible, avoid using permanently installed air handlers for temporary heating/cooling during construction. Consult the LEED 2009 Green Building and Construction Reference Guide for more detailed information on how to ensure the well-being of construction workers and building occupants if permanently installed air handlers must be used during construction.



Standard Practice

None

Recommended Practice

- During construction meet or exceed the recommended Design Approaches of the Sheet Metal and Air Conditioning National Contractors Association (SMACNA) IAQ Guideline for Occupied Buildings under Construction, 1995, Chapter 3
- Protect stored on-site or installed absorptive materials from moisture damage
- Do not operate air-handling equipment during construction
- Sequence the installation of materials to avoid contamination of absorptive materials such as insulation, carpeting, ceiling tile and gypsum wallboard
- Minimize the use of air handlers during construction. If air handlers are used during construction, filtration media with a Minimum Efficiency Reporting Value (MERV) of 8 must be used at each return air grill, as determined by ASHRAE 52.2-1999.

Best Available Practice

None



6.0 INDOOR ENVIRONMENTAL QUALITY

6.5.2 Construction IAQ Management Plan: Before Occupancy

1-2 Points

INTENT

Reduce indoor air quality problems resulting from the construction/renovation process in order to help sustain the comfort and well-being of construction workers and building occupants.

REQUIREMENTS

OPTION 1 — Flush-Out (1 point)

After construction ends, prior to occupancy and with all interior finishes installed, perform a building flush-out by supplying a total air volume of 14,000 cu.ft. of outdoor air per sq.ft. of floor area while maintaining an internal temperature of at least 60 degrees F and relative humidity no higher than 60%.

OR

If occupancy is desired prior to completion of the flush-out, the space may be occupied following delivery of a minimum of 3,500 cu. ft. of outdoor air per sq. ft. of floor area to the space. Once a space is occupied, it shall be ventilated at a minimum rate of 0.30 cfm/sq. ft. of outside air or the design minimum outside air rate determined in SAM Credit 6.1, whichever is greater. During each day of the flush-out period, ventilation shall begin a minimum of three hours prior to occupancy and continue during occupancy. These conditions shall be maintained until a total of 14,000 cu. ft./sq. ft. of outside air has been delivered to the space.

NOTE: All finishes must be installed prior to flush-out.

OR

OPTION 2 — Air Testing (1-2 Points)

After construction ends and before occupancy, but under ventilation conditions typical for occupancy, conduct baseline IAQ testing in occupied spaces for the contaminants listed in Path 1. Particulate matter and inorganic gases (for 1 point) and/or Path 2. Volatile organic compounds (for 1 point). Retail projects may conduct the testing within 14 days of occupancy.

Path 1. Particulate Matter and Inorganic Gases (1 point)

Test for the particulate matter (PM) and inorganic gases listed in Table 1, using an allowed test method, and demonstrate the contaminants do not exceed the concentration limits listed in the table.



Table 1. Particulate Matter and Inorganic Gases

Contaminant	Concentration Limit	Allowed Test Methods
Carbon monoxide (CO)	9 ppm; no more than 2 ppm above outdoor levels	ISO 4224 EPA Compendium Method IP-3 Direct calibrated electrochemical instrument with accuracy of ($\pm 2\%$ ppm <50 ppm minimum accuracy).
PM 10	ISO 14644-1:2015, cleanroom class of 8 or lower 50 $\mu\text{g}/\text{m}^3$ Healthcare only: 20 $\mu\text{g}/\text{m}^3$	Particulate monitoring device with accuracy greater of 5 $\mu\text{g}/\text{m}^3$ or 20% of reading and resolution (5 min average data) $\pm 5 \mu\text{g}/\text{m}^3$
PM 2.5	12 $\mu\text{g}/\text{m}^3$ or 35 $\mu\text{g}/\text{m}^3$ **	
Ozone	0.07 ppm	Monitoring device with accuracy greater of 5 ppb or 20% of reading and resolution (5 min average data) ± 5 ppb ISO 13964 ASTM D5149 - 02 EPA designated methods for Ozone

**Projects in areas with high ambient levels of PM2.5 (known EPA nonattainment areas for PM2.5, or local equivalent) must meet the 35 $\mu\text{g}/\text{m}^3$ limit, all other projects should meet the 12 $\mu\text{g}/\text{m}^3$ limit.

AND/OR

Path 2. Volatile Organic Compounds (1 point)

Perform a screening test for Total Volatile Organic Compounds (TVOC). Use ISO 16000-6, EPA TO-17, or EPA TO-15 to collect and analyze the air sample. Calculate the TVOC value per EN 16516:2017, CDPH Standard Method v1.2 2017 section 3.9.4, or alternative calculation method as long as full method description is included in test report. If the TVOC levels exceed 500 $\mu\text{g}/\text{m}^3$, investigate for potential issues by comparing the individual VOC levels from the GC/MS results to associated cognizant authority health-based limits. Correct any identified issues and re-test if necessary.



Additionally, test for the individual volatile organic compounds listed in Table 2 using an allowed test method and demonstrate the contaminants do not exceed the concentration limits listed in the table. Laboratories that conduct the tests must be accredited under ISO/IEC 17025 for the test methods they use.

Exemplary performance is available for projects that test for the additional target volatile organic compounds specified in CDPH Standard Method v1.2-2017, Table 4-1 and do not exceed the full CREL levels for these compounds adopted by Cal/EPA OEHHA in effect on June 2016.

Table 2. Volatile Organic Compounds

<u>Contaminant (CAS#)</u>	<u>Concentration Limit (µg/m³)</u>	<u>Allowed Test Methods</u>
Formaldehyde (50-00-0)	20 (16 ppb)	ISO 16000-3, 4
Acetaldehyde (75-07-0)	140	EPA TO-11a EPA comp. IP-6A ASTM D5197-16
Benzene (71-43-2)	3	ISO 16000-6
n-Hexane (110-54-3)	7,000	EPA IP-1
Naphthalene (91-20-3)	9	EPA TO-17
Phenol (108-95-2)	200	EPA TO-15
Styrene (100-42-5)	900	ISO 16017-1, 2
Tetrachloroethylene (127-18-4)	35	ASTM D6196-15
Toluene (108-88-3)	30	
Vinyl acetate (108-05-4)	200	
1,4-Dichlorobenzene (106-46-7)	800	
Xylenes-total (108-38-3, 95-47-6, and 106-42-3)	700	



SUBMITTALS

Include descriptive narrative in SAM Checklist including IAQ Management Plan and detailed photographic evidence.

TECHNOLOGY/STRATEGY

Prior to occupancy, perform a building flush-out or test the air contaminant levels in the building. The flush-out is often used where occupancy is not required immediately upon substantial completion of construction. IAQ testing can minimize schedule impacts but may be more costly. Coordinate SAM Credits 6.5 Construction IAQ Management Plan and 6.7 Indoor Chemical and Source Pollutant Control to determine the appropriate specifications and schedules for filtration media.

The intent of this credit is to eliminate indoor air quality problems that occur as a result of construction. Architectural finishes used in tenant build-outs constitute a significant source of air pollutants and must be addressed in order to qualify for this credit.

Standard Practice

None

Recommended Practice

- Replace all filtration media immediately prior to occupancy. Filtration media shall have a Minimum Efficiency Reporting Value (MERV) of 13, as determined by ASHRAE 52.2-2017 for media installed at the end of construction.

Best Available Practice

- After construction ends and prior to occupancy, conduct a two-week building flush out with 100% fresh air



6.0 INDOOR ENVIRONMENTAL QUALITY

6.6.1 Low-Emitting Materials: Adhesives and Sealants

1 Point

INTENT

Reduce the quantity of indoor air contaminants that are odorous, irritating and/or harmful to the comfort and well-being of installers and occupants.

REQUIREMENTS

All adhesives and sealants used on the interior of the building (i.e., inside of the weatherproofing system and applied on-site) must comply with the following requirements as applicable to the project scope:

- Adhesives, Sealants and Sealant Primers: South Coast Air Quality Management District (SCAQMD) Rule #1168. VOC limits are listed in the table below and correspond to an effective date of July 1, 2005 and rule amendment date of October 6, 2017.

	<u>VOC Limit</u> <u>[g/L less</u>		<u>VOC Limit</u> <u>[g/L less</u>
<u>Architectural Applications</u>	<u>water]</u>	<u>Specialty Applications</u>	<u>water]</u>
Indoor Carpet Adhesives	50	PVC Welding	510
Carpet Pad Adhesives	50	CPVC Welding	490
Wood Flooring Adhesives	100	ABS Welding	325
Rubber Floor Adhesives	60	Plastic Cement Welding	250
Subfloor Adhesives	50	Adhesive Primer for Plastic	550
Ceramic, Porcelain, Stone Tile Adhesives	65	Contact Adhesives	80
VCT & Asphalt Adhesives	50	Special Purpose Contact Adhesive	250
Drywall & Panel Adhesives	50	Structural Wood Member Adhesive	140
Cove Base Adhesives	50	Sheet Applied Rubber Lining Operations	850
Multipurpose Construction Adhesives	70	Top & Trim Adhesive	250
Structural Glazing Adhesives	100		
Structural Wood Member Adhesive	140	<u>Sealants VOC Limit</u>	
Building Envelope Membrane Adhesive	250	Architectural	250
Roofing Adhesives	250	Nonmembrane Roof	300
Rubber Floor Adhesive	60	Roadway	250
Subfloor Adhesive	50	Single-Ply Roof Membrane	450
Other Indoor Floor Covering Adhesives	50	Other	420
Other Outdoor Floor Covering Adhesives	150		
		<u>Sealant Primers</u>	
<u>Substrate Specific Applications</u>		Architectural Non Porous	250
Metal to Metal	30	Architectural Porous	775
Plastic Foams	50	Other	750
Porous Material (except wood)	50		
Wood	30		
Fiberglass	80		
Reinforced Plastic Composite	250		



- Aerosol Adhesives: Green Seal Standard for Commercial Adhesives GS-36 requirements in effect on July 12, 2013.

Aerosol Adhesives:

VOC weight [g/L minus water]

General purpose mist spray

65% VOCs by weight

General purpose web spray

55% VOCs by weight

Special purpose aerosol adhesives (all types)

70% VOCs by weight

SUBMITTALS

Include descriptive narrative in SAM Checklist.

TECHNOLOGY/STRATEGY

Specify low-VOC materials in construction documents. Ensure that VOC limits are clearly stated in each section of the specifications where adhesives and sealants are addressed. Common products to evaluate include: general construction adhesives, flooring adhesives, fire-stopping sealants, caulking, duct sealants, plumbing adhesives, and cove base adhesives. Review product cut sheets, material safety data sheets (MSDS), signed attestations or other official literature from the manufacturer clearly identifying the VOC contents or compliance with referenced standards.

Standard Practice

- Low-VOC materials are becoming more common in the market place

Recommended Practice

- Specify Low-VOC adhesives and sealants
- Consider the use of air scrubbers during the installation and curing of adhesives and sealers when used inside the passenger terminal or other public spaces

Best Available Practice

- Specify that all shop finished material meet the VOC emission requirements. Materials to consider are:
 - Primed steel
 - Finished metals including aluminum
 - Finished millwork
 - Finished steel and wood doors and windows



6.0 INDOOR ENVIRONMENTAL QUALITY

6.6.2 Low-Emitting Materials: Paints and Coatings

1 Point

INTENT

Reduce the quantity of indoor air contaminants that are odorous, irritating and/or harmful to the comfort and well-being of installers and occupants.

REQUIREMENTS

- Paints and coatings used on the interior of the building (i.e., inside of the weatherproofing system and applied on-site) must comply with the following criteria as applicable to the project scope:
- Architectural paints, coatings and primers applied to interior walls and ceilings must not exceed the VOC content limits established in Green Seal Standard GS-11, Paints, *Edition 3.2, October 26, 2015*.
 - Flats: 50 g/L
 - Non-Flats: 150 g/L
- Anti-corrosive and anti-rust paints applied to interior ferrous metal substrates must not exceed the VOC content limit of 250 g/L established in Green Seal Standard GC-03, Anti-Corrosive Paints, Second Edition, January 7, 1997.
- Clear wood finishes, floor coatings, stains, and shellacs applied to interior elements must not exceed the VOC content limits established in South Coast Air Quality Management District (SCAQMD) Rule 1113, Architectural Coatings, amended February 5, 2016.
 - Clear wood finishes: varnish 275 g/L; lacquer 275 g/L
 - Floor coatings: 50 g/L
 - Sealers: waterproofing sealers 100 g/L; sanding sealers 275 g/L; tile and stone sealers 100 g/L; all other sealers 200 g/L
 - Shellacs: Clear 730 g/L; pigmented 550 g/L
 - Stains: 250 g/L

SUBMITTALS

Include descriptive narrative in SAM Checklist.



TECHNOLOGY/STRATEGY

Specify low-VOC paints and coatings in construction documents. Ensure that VOC limits are clearly stated in each section of the specifications where paints and coatings are addressed. Track the VOC content of all interior paints and coatings during construction.

Standard Practice

None

Recommended Practice

- Specify Low-VOC field applied paints and coating
- Consider the use of air scrubbers during the installation and curing of paints and coatings when used inside the terminal or other public spaces

Best Available Practice

- Specify that all shop finished material meet the VOC emission requirements. Materials to consider are:
 - Primed steel
 - Finished metals including aluminum
 - Finished millwork
 - Finished steel and wood doors and windows



6.0 INDOOR ENVIRONMENTAL QUALITY

6.6.3 Low-Emitting Materials: Flooring Systems

1 Point

INTENT

Reduce the quantity of indoor air contaminants that are odorous, irritating and/or harmful to the comfort and well-being of installers and occupants.

REQUIREMENTS

All flooring must comply with the following as applicable to the project scope:

- All carpet installed in the building interior shall meet the testing and product requirements of the Carpet and Rug Institute's Green Label Plus program
- All carpet cushion installed in the building interior shall meet the requirements of the Carpet and Rug Institute Green Label program
- All carpet adhesive shall meet the requirements of SAM Credit 6.6.1 Low-Emitting Materials: Adhesives and Sealants: VOC limit of 50 g/L
- All of the hard surface flooring must be certified as compliant with the FloorScore® standard (current as of the date of this Rating System, or more stringent version) by an independent third party. Flooring products covered by FloorScore® include vinyl, linoleum, laminate flooring, wood flooring, ceramic flooring, rubber flooring, wall base, and associated sundries.
- An alternative compliance path using FloorScore® is acceptable for credit achievement according to the following stipulations. 100% of the non-carpet finished flooring must be FloorScore® certified, and it must comprise, at minimum, at least 25% of the finished floor area. Potential examples of unfinished flooring include floors in mechanical rooms, electrical rooms, and elevator service rooms.
- Concrete, wood, bamboo, and cork floor finishes such as sealer, stain and finish must meet the requirements of South Coast Air Quality Management District (SCAQMD) Rule 1113, Architectural Coatings, amended February 5, 2016. VOC limits are listed below:
 - Clear wood finishes: varnish 275 g/L; lacquer 275 g/L
 - Floor coatings: 50 g/L
 - Sealers: waterproofing sealers 100 g/L; sanding sealers 275 g/L; tile and stone sealers 100 g/L; all other sealers 200 g/L



- Shellacs: Clear 730 g/L; pigmented 550 g/L
- Stains: 250 g/L
- Tile setting adhesives and grout must meet South Coast Air Quality Management District (SCAQMD) Rule #1168. VOC limits are listed below and correspond to an effective date of July 1, 2005 and rule amendment date of October 6, 2017.
 - Ceramic tile adhesive: 65 g/L
 - Grout and mortar: 250 g/L
- All flooring products will meet the testing and product requirements of the California Department of Public Health (CDPH) Standard Method v1.1–2010, using the applicable exposure scenario..

SUBMITTALS

Include descriptive narrative in SAM Checklist.

TECHNOLOGY/STRATEGY

Clearly specify requirements for product testing and/or certification in the construction documents. Select products that are either certified under the Green Label Plus program or for which testing has been done by qualified independent laboratories in accordance with the appropriate requirements.

The Green Label Plus program for carpets and its associated VOC emission criteria in micrograms per square meter per hour, along with information on testing method and sample collection developed by the Carpet & Rug Institute (CRI) in coordination with California's Sustainable Building Task Force and the California Department of Health Services (DHS), are described in Section 9, Acceptable Emissions Testing for Carpet, DHS Standard Practice CA/DHS/EHLB/R-174, dated 07/15/04. This document is published as Section 01350 Section 9 [dated 2004] by the Collaborative for High Performance Schools [<http://www.chps.net/dev/Drupal/node/>]).

FloorScore® is a voluntary, independent certification program that tests and certifies hard surface flooring and associated products for compliance with criteria adopted in California for indoor air emissions of Volatile Organic Compounds (VOCs) with potential health effects. The program uses a small-scale chamber test protocol and incorporates VOC emissions criteria developed by the California Department of Health Services, which are widely known as Section 1350.

Standard Practice

None



Recommended Practice

- Specify Low-VOC carpet systems. Ensure that VOC limits are clearly stated where carpet systems are addressed. Be attentive to carpet installation requirements.
- Consider the use of air scrubbers during the installation and curing of carpet or hard surface floor system adhesives and sealers when used inside the terminal or other public spaces

Best Available Practice

- Specify that all shop finished material meet the VOC emission requirements. Materials to consider are:
 - Primed steel
 - Finished metals including aluminum
 - Finished millwork



6.0 INDOOR ENVIRONMENTAL QUALITY

6.6.4 Low-Emitting Materials: Composite Wood and Agrifiber Products

1 Point

INTENT

Reduce the quantity of indoor air contaminants that are odorous, irritating and/or harmful to the comfort and well-being of installers and occupants.

REQUIREMENTS

Composite wood and agrifiber products used on the interior of the building (defined as inside of the weatherproofing system) shall contain no added urea-formaldehyde resins. Laminating adhesives used to fabricate on-site and shop-applied composite wood and agrifiber assemblies shall contain no added urea-formaldehyde resins.

Composite wood and agrifiber products are defined as: particleboard, medium density fiberboard (MDF), plywood, wheatboard, strawboard, panel substrates and door cores. Materials considered fit-out, furniture, and equipment (FF&E) are not considered base building elements and are not included.

SUBMITTALS

Include descriptive narrative in SAM Checklist.

TECHNOLOGY/STRATEGY

Specify wood and agrifiber products that contain no added urea-formaldehyde resins. Specify laminating adhesives for field and shop applied assemblies that contain no added urea/formaldehyde resins. Review product cut sheets, MSD sheets, signed attestations or other official literature from the manufacturer.

Standard Practice

None

Recommended Practice

- Specify wood and agrifiber products with no added urea-formaldehyde resins.



Best Available Practice

- Specify that all shop finished material meet the VOC emission requirements. Materials to consider are:
 - Finished millwork
 - Finished steel and wood doors and windows



6.0 INDOOR ENVIRONMENTAL QUALITY

6.7 Indoor Chemical and Pollutant Source Control

1 Point

INTENT

Minimize exposure of building occupants to potentially hazardous particulates and chemical pollutants.

REQUIREMENTS

Design to minimize and control pollutant entry into buildings and later cross-contamination of regularly occupied areas:

- Employ permanent entryway systems at least 10-feet long in the primary direction of travel to capture dirt and particulates from entering the building at all entryways that are directly connected to the outdoors. Acceptable entryway systems include permanently installed grates, grilles, or slotted systems that allow for cleaning underneath. Roll-out mats are only acceptable when maintained on a weekly basis by a contracted service organization.
- Sufficiently exhaust each space where hazardous gases or chemicals may be present or used (including garages, housekeeping/laundry areas and copying/printing rooms) to create negative pressure with respect to adjacent spaces with the doors to the room closed. For each of these spaces, provide self-closing doors and deck to deck partitions or a hard lid ceiling. The exhaust rate shall be at least 0.50 cfm/sq.ft., with no air recirculation. The pressure differential with the surrounding spaces shall be at least 5 Pa (0.02 inches of water gauge) on average and 1 Pa (0.004 inches of water) at a minimum when the doors to the rooms are closed.
- In mechanically ventilated buildings, provide regularly occupied areas of the building with new air filtration media prior to occupancy that provides a Minimum Efficiency Reporting Value (MERV) of 13 or better. Filtration should be applied to process both return and outside air that is to be delivered as supply air.
- Provide containment drains plumbed for appropriate disposal of hazardous liquid wastes in places where water and chemical concentrate mixing occurs for laboratory purposes.

SUBMITTALS

Include descriptive narrative in SAM Checklist.

TECHNOLOGY/STRATEGY

Design facility cleaning and maintenance areas with isolated exhaust systems for contaminants. Maintain physical isolation from the rest of the regularly occupied areas of the building. Install



permanent architectural entryway systems such as grills or grates to prevent occupant-borne contaminants from entering the building. Install high-level filtration systems in air handling units processing both return air and outside supply air. Ensure that air handling units can accommodate required filter sizes and pressure drops.

Standard Practice

None

Recommended Practice

- Employ permanent entryway systems (e.g., grills, grates, etc.) to capture dirt, particulates, etc. from entering the building at all high volume entryways
- Where chemical use occurs (including housekeeping areas and copying/printing rooms), provide segregated areas with deck to deck partitions with separate outside exhaust at a rate of at least 0.50 cubic feet per minute per square foot, no air re-circulation and maintaining a negative pressure
- Provide drains plumbed for appropriate disposal of liquid waste in spaces where water and chemical concentrate mixing occurs
- Select finish materials and assemblies that resist mold growth
- Designate central locations in terminal and office buildings for storage of concentrated cleaning chemicals and other pollutant sources
- Install permanent architectural entryway systems such as grills or grates to prevent occupant-borne contaminants from entering the building

Best Available Practice

- Design separate exhaust and plumbing systems for rooms or areas with contaminants to achieve physical isolation from the rest of the building
- Encourage the use of electric vehicle uses in indoor cargo facilities



6.0 INDOOR ENVIRONMENTAL QUALITY

6.8.1 Controllability of Systems: Lighting

1 Point

INTENT

Provide a high level of lighting system control by individual occupants or by specific groups in multi-occupant spaces (e.g., classrooms and conference areas) to promote productivity, comfort and well-being.

REQUIREMENTS

Provide individual lighting controls for 90% (minimum) of the building occupants to enable adjustments to suit individual task needs and preferences.

AND

Provide lighting system controls for all shared multi-occupant spaces to enable lighting adjustment that meets group needs and preferences.

SUBMITTALS

Include descriptive narrative and calculations in SAM Checklist.

TECHNOLOGY/STRATEGY

Design the building with occupant controls for lighting. Strategies to consider include lighting controls and task lighting. Integrate lighting systems controllability into the overall lighting design, providing ambient and task lighting while managing the overall energy use of the building.

Standard Practice

None

Recommended Practice

- Tie lighting in public areas of passenger terminals to flight schedules or use motion-activated lighting
- Design lighting control systems to take advantage of daylight harvesting to reduce artificial lighting when adequate daylight is available
- Design terminal areas to provide a variety of levels of light and sound in different areas simultaneously



Chicago Department of Aviation
SUSTAINABLE AIRPORT MANUAL



- Provide operable windows in areas that are not noise-sensitive, such as cargo buildings
- Provide task lighting or more light switching zones in office areas

Best Available Practice

None



6.0 INDOOR ENVIRONMENTAL QUALITY

6.8.2 Controllability of Systems: Thermal Comfort

1 Point

INTENT

Provide a high level of thermal comfort system control by individual occupants or by specific groups in multi-occupant spaces (i.e., classrooms or conference areas) to promote the productivity, comfort and well-being of building occupants.

REQUIREMENTS

Provide individual comfort controls for 50% (minimum) of the building occupants to enable adjustments to suit individual task needs and preferences. Operable windows can be used in lieu of comfort controls for occupants of areas that are 20-feet inside of and 10-feet to either side of the operable part of the window. The areas of operable window must meet the requirements of ASHRAE 62.1-2010 paragraph 5.1 Natural Ventilation.

AND

Provide comfort system controls for all shared multi-occupant spaces to enable adjustments to suit group needs and preferences.

Conditions for thermal comfort are described in ASHRAE Standard 55-2010 to include the primary factors of air temperature, radiant temperature, air speed and humidity.

SUBMITTALS

Include descriptive narrative in SAM Checklist.

TECHNOLOGY/STRATEGY

Design the building and systems with comfort controls to allow adjustments to suit individual needs or those of groups in shared spaces. ASHRAE Standard 55-2010 identifies the factors of thermal comfort and a process for developing comfort criteria for building spaces that suit the needs of the occupants involved in their daily activities. Control strategies can be developed to expand on the comfort criteria to allow adjustments to suit individual needs and preferences.

These strategies may involve system designs incorporating operable windows, hybrid systems integrating operable windows and mechanical systems, or mechanical systems alone. Individual adjustments may involve individual thermostat controls, local diffusers at floor, desk or overhead levels, or control of individual radiant panels, or other means integrated into the overall building,



thermal comfort systems, and energy systems design. In addition, designers should evaluate the closely tied interactions between thermal comfort (as required by ASHRAE Standard 55-2010) and acceptable indoor air quality (as required by ASHRAE Standard 62.1-2010, whether natural or mechanical ventilation).

Standard Practice

None

Recommended Practice

None

Best Available Practice

- Provide under floor air distribution systems with individual diffusers for office spaces



6.0 INDOOR ENVIRONMENTAL QUALITY

6.9.1 Thermal Comfort: Design

1 Point

INTENT

Provide a comfortable thermal environment that supports the productivity and well-being of building occupants.

REQUIREMENTS

Design HVAC systems and the building envelope to meet the requirements of ASHRAE Standard 55-2004, Thermal Comfort Conditions for Human Occupancy.

SUBMITTALS

Include descriptive narrative in SAM Checklist.

TECHNOLOGY/STRATEGY

Establish comfort criteria per ASHRAE Standard 55-2004 that support the desired quality and occupant satisfaction with building performance. Design building envelope and systems with the capability to deliver performance to the comfort criteria under expected environmental and use conditions. Evaluate air temperature, radiant temperature, air speed, and relative humidity in an integrated fashion and coordinate these criteria with SAM Credits 6.1 Minimum Indoor Air Quality Performance, 6.3 Outdoor Air Delivery Monitoring and 6.4 Increase Ventilation.

Standard Practice

None

Recommended Practice

None

Best Available Practice

- Provide ceiling fans or natural ventilation to increase air movement in cargo spaces
- Provide humidification in HVAC systems serving office and terminal areas
- For spaces with humidification, install humidistats in addition to thermostats



6.0 INDOOR ENVIRONMENTAL QUALITY

6.9.2 Thermal Comfort: Verification

1 Point (awarded only if credit is earned toward SAM Credit 6.9.1)

INTENT

Provide for the assessment of building thermal comfort over time.

REQUIREMENTS

Provide a permanent monitoring system to ensure building performance to the desired comfort criteria as determined by SAM Credit 6.9.1 Thermal Comfort: Design.

Agree to implement a thermal comfort survey of building occupants within a period of six to 18 months after occupancy. This survey should collect anonymous responses about thermal comfort in the building including an assessment of overall satisfaction with thermal performance and identification of thermal comfort-related problems. Agree to develop a plan for corrective action if the survey results indicate that more than 20% of occupants are dissatisfied with thermal comfort in the building. This plan should include measurement of relevant environmental variables in problem areas in accordance with ASHRAE Standard 55-2004.

Thermal Comfort: Verification, is contingent on the successful completion and award of the credit - Thermal Comfort: Design.

SUBMITTALS

Include descriptive narrative in SAM Checklist.

TECHNOLOGY/STRATEGY

ASHRAE Standard 55-2004 provides guidance for establishing thermal comfort criteria and the documentation and validation of building performance to the criteria. While the standard is not intended for purposes of continuous monitoring and maintenance of the thermal environment, the principles expressed in the standard provide a basis for design of monitoring and corrective action systems.

Standard Practice

None

Recommended Practice

None



Best Available Practice

None



6.0 INDOOR ENVIRONMENTAL QUALITY

6.10.1 Daylight and Views: Daylight for 75% of Spaces

1 Point

INTENT

Provide for the building occupants a connection between indoor spaces and the outdoors through the introduction of daylight and views into the regularly occupied areas of the building.

REQUIREMENTS

OPTION 1 — CALCULATION

Achieve a minimum glazing factor of 2% in a minimum of 75% of all regularly occupied areas.

The glazing factor is calculated as follows:

$$\text{Glazing Factor} = \frac{\text{Window Area (SF)}}{\text{Floor Area (SF)}} \times \frac{\text{Window Geometry Factor}}{\text{Window Height Factor}} \times \frac{\text{Actual } T_{\text{vis}}}{\text{Minimum } T_{\text{vis}}}$$

OR

OPTION 2 — SIMULATION

Demonstrate, through computer simulation, that a minimum daylight illumination level of 25 foot-candles has been achieved in a minimum of 75% of all regularly occupied areas. Modeling must demonstrate 25 horizontal foot-candles under clear sky conditions, at noon, on the equinox, at 30 inches above the floor.

OR

OPTION 3 — MEASUREMENT

Demonstrate, through records of indoor light measurements, that a minimum daylight illumination level of 25 foot-candles has been achieved in at least 75% of all regularly occupied areas. Measurements must be taken on a 10-foot grid for all occupied spaces and must be recorded on building floor plans. Measurements must be taken under clear sky conditions, at 30" above the floor, on or about solar noon on the equinox.

OR



OPTION 4

Any of the above calculation methods may be combined to document the minimum daylight illumination in at least 75% of all regularly occupied spaces. The different methods used in each space must be clearly recorded on at minimum a 10-foot grid on all building plans.

In all cases, only the square footage associated with the portions of rooms or spaces meeting the minimum illumination requirements can be applied towards the 75% of total area calculation required to qualify for this credit. In all cases, provide daylight redirection and/or glare control devices to avoid high-contrast situations that could impede visual tasks. Exceptions for areas where tasks would be hindered by the use of daylight will be considered on their merits.

SUBMITTALS

Include descriptive narrative and calculations in SAM Checklist.

TECHNOLOGY/STRATEGY

Design the building to maximize interior daylighting. Strategies to consider include building orientation, shallow floor plates, increased building perimeter, exterior and interior permanent shading devices, high performance glazing and automatic photocell-based controls. Predict daylight factors via manual calculations or model daylighting strategies with a physical or computer model to assess foot-candle levels and daylight factors achieved.

Modeling must demonstrate 25 horizontal foot-candles under clear sky conditions, at noon, on the equinox, at 30 in. above the floor. Any portion of a room achieving the requirements can qualify for this credit.

Standard Practice

- Evaluate building design to maximize interior daylight. Consider:
- Building orientation
- Shallow floor plates
- Increased building perimeter
- Floor-to-ceiling heights
- Ceiling configurations
- Design the building to maximize view opportunities.

Recommended Practice

- Provide sky or clerestory lighting as appropriate in cargo and passenger terminal facilities
- Coordinate daylight strategy with BAS and lighting control system



Best Available Practice

- Provide exterior and interior permanent shading devices
- Provide spectrally selective glazing to maximize daylight while minimizing heat gain
- Provide photo-integrated light sensors to dim artificial lights
- Predict daylighting via calculations or model daylighting strategies to assess foot-candle levels and daylight factors achieved



6.0 INDOOR ENVIRONMENTAL QUALITY

6.10.2 Daylight and Views: Views for 90% of Spaces

1 Point

INTENT

Provide for the building occupants a connection between indoor spaces and the outdoors through the introduction of daylight and views into the regularly occupied areas of the building.

REQUIREMENTS

Achieve direct line of sight to the outdoor environment via vision glazing between 30-inches and 90-inches above finish floor for building occupants in 90% of all regularly occupied areas. Determine the area with direct line of sight by totaling the regularly occupied square footage that meets the following criteria:

- In plan view, the area is within sight lines drawn from perimeter vision glazing
- In section view, a direct sight line can be drawn from the area to perimeter vision glazing

The line of sight may be drawn through interior glazing. For private offices, the entire square footage of the office can be counted if 75% or more of the area has direct line of sight to perimeter vision glazing. For multi-occupant spaces, the actual square footage with direct line of sight to perimeter vision glazing is counted.

SUBMITTALS

Include descriptive narrative and calculations in SAM Checklist.

TECHNOLOGY/STRATEGY

Design the space to maximize daylighting and view opportunities. Strategies to consider include lower partition heights, interior shading devices, interior glazing, and automatic photocell-based controls.

Standard Practice

- Evaluate building design to maximize interior daylight. Consider:
 - Building orientation
 - Shallow floor plates
 - Increased building perimeter
 - Floor-to-ceiling heights
 - Ceiling configurations
- Design the building to maximize view opportunities



Recommended Practice

- Provide sky or clerestory lighting as appropriate in cargo and passengers terminal facilities
- Coordinate daylight strategy with BAS and lighting control system

Best Available Practice

None



6.0 INDOOR ENVIRONMENTAL QUALITY

6.11 Acoustic Performance

1 Point

INTENT

To provide workspaces and classrooms that promote occupants' well-being, productivity, and communications through effective acoustic design.

REQUIREMENTS

For all occupied spaces, meet two of the following options: HVAC background noise, sound transmission, and/or reverberation time. Meet all three for an exemplary performance point.

Confirm compliance via calculations or measurements in representative rooms, and/or design documentation from a person experienced in the field of acoustics.

Option 1 - HVAC Background Noise

Achieve maximum background noise levels from heating, ventilating, and air conditioning (HVAC) systems per 2015 ASHRAE Handbook-- HVAC Applications, Chapter 48, Table 1; AHRI Standard 885-2008, Table 15; or a local equivalent.

If confirming compliance via measurements, use a sound level meter that conforms to ANSI S1.4 for type 1 (precision) or type 2 (general purpose) sound measurement instrumentation, the International Electrotechnical Commission (2013) IEC 61672-1:2013 Electroacoustics – Sound Level Meters – Part 1: Specifications, or a local equivalent.

Comply with design criteria for HVAC noise levels resulting from the sound transmission paths listed in 2015 ASHRAE Handbook—HVAC Applications, Chapter 48, Table 6; or a local equivalent.

OR

Option 2 - Sound Transmission

Categorize all occupied spaces by use and desired level of acoustic privacy.

Meet the composite sound transmission class (STC_C) ratings or noise isolation class (NIC) listed in the table below. For NIC measurements, use ASTM E336-17a or Annex A.3 of ANSI S12.60-2010.



Adjacency combinations		STC _c **	NIC**
Retail	Retail	50	45
Collaborative / multi-use	Hallway, stairway	25	20
Private	Hallway, stairway	35	30
Confidential	Hallway, stairway	40	35
Collaborative / multi-use	Collaborative / multi-use	35	30
Collaborative / multi-use	Private	45	40
Collaborative / multi-use	Confidential	50	45
Private	Private	45	40
Private	Confidential	50	45
Confidential	Confidential	50	45
Conference room	Conference room	50	45
Mechanical equipment room*	Hallway, stairway	50	45
Mechanical equipment room*	Occupied area	60	55

*Minimum STC_c or NIC has to be met unless proven that the equipment noise in conjunction with the sound isolation performance of the partitions and doors will not exceed the maximum background noise requirements of the adjacent space.

**If a sound masking system is implemented at a minimum level of 40 dBA, the STC_c ratings or NIC values in the table above may be lowered by 5 points. This applies to all space types except mechanical equipment rooms. The sound masking system must be designed by an acoustical professional and meet the following criteria:

- The overall level for sound masking must be set by an acoustical professional and must not exceed 48 dBA in open offices, libraries, cafeterias, corridors/hallways, 45 dBA in enclosed offices, and 42 dBA in conference rooms, and wellness rooms. The combined level of masking and HVAC background noise must not exceed these limits.
- The system design and commissioning must provide overall level uniformity of ± 1 dBA and one-third octave band uniformity of ± 2 dB from at least 100 to 5,000 Hz when tested according to ASTM E1573-18.
- The sound masking spectrum must conform to the National Research Council of Canada COPE Optimum Masking Spectrum or an alternate spectrum if specified by an acoustical engineer.

OR

Option 3 - Reverberation Time

Meet the reverberation time requirements in the table below (adapted from Table 9.1 in the Performance Measurement Protocols for Commercial Buildings – adapted from ASHRAE 2007d, ASA 2008, ANSI 2007, and CEN 2007).



<u>Room type</u>	<u>Application</u>	<u>T₆₀ (sec).</u>
		at 500 Hz, 1000 Hz, and 2000 Hz
Hotel/motel	Individual room or suite	< 0.6
	Meeting or banquet room	< 0.8
Office building	Executive or private office	< 0.6
	Conference room	< 0.6
	Teleconference room	< 0.6
	Open-plan office without sound masking	< 0.8
	Open-plan office with sound masking	0.8
Courtroom	Unamplified speech	< 0.7
	Amplified speech	< 1.0
Performing arts space	Drama theaters, concert and recital halls	Varies by application
Laboratories	Testing or research with minimal speech communication	< 1.0
	Extensive phone use and speech communication	< 0.6
Church, mosque, synagogue	General assembly with critical music program	Varies by application
Library		< 1.0
Indoor stadium, gymnasium	Gymnasium and natatorium	< 2.0
	Large-capacity space with speech amplification	< 1.5
Airport terminal/concourse*	Large-capacity open space with speech amplification	< 1.5

* From ACRP Research Report 175, "Improving Intelligibility of Airport Terminal Public Address Systems" by Wilson Ihrig (2017).

SUBMITTALS

Include descriptive narrative in SAM Checklist and show calculations, manufacturer's data, etc. indicating that the levels above are met in all critical areas.

TECHNOLOGY/STRATEGY

There are several design techniques that can influence the acoustical quality of indoor spaces. Generally, these can include improved glazing and partitions or less costly design practices such as building and furniture orientation.

Standard Practice

- Design spaces in such a way as to orient noise sensitive areas away from major noise sources



- Use sound dampening glazing and wall partitions
- Locate copy machines and printers in separate rooms

Recommended Practice

- For office environments, specify acoustical ceiling with an appropriate noise reduction coefficient to meet the requirements of this credit
- Choose cubicle partitions that are at least 5 feet tall to provide a sound barrier to workstation occupants
- Insulate wall cavities for noise sensitive spaces and extension of partition walls to the structural deck
- Use mechanical or other means to reduce HVAC noise per ASHRAE, ANSI, and/or IEC standards

Best Available Practice

- Specify laminated glazing to reduce noise transmission for normally occupied spaces

RESOURCES

“Silence is Golden: Controlling Sound in Non-Residential Structures” AIA/Architectural Record, Continuing Education Series, May 2007.

www.archrecord.construction.com/resources/conteduc/archives/0507marvin-1.asp

Paradis, Richard. “Acoustic Comfort” Whole Building Design Guide, October 27, 2008.

www.wbdg.org/resources/acoustic.php

Ihrig, Wilson. “Improving Intelligibility of Airport Terminal Public Address Systems”, ACRP Research Report 175, 2017.



6.0 INDOOR ENVIRONMENTAL QUALITY

6.12 Occupant Well-Being Amenities

1-3 Points

INTENT

Provide well-being spaces that improve occupant productivity and reduce absenteeism.

REQUIREMENTS

Provide one or more of the following dedicated well-being spaces (one point each, up to 3 points):

- **Exercise/Fitness Room:** Provide a dedicated room for exercise that includes strength and cardio fitness equipment, water fountain/filling station, access to showers and lockers.
- **Quiet Room:** Provide a dedicated space, minimum 80 square foot floor area, for private meditation, prayer, or mental decompression with a lockable door, occupancy signage, that ensures the user's privacy.
- **Lactation Room:** Provide a dedicated private room with lockable door and occupancy signage that includes a seating area, table, refrigerator, sink, and spare outlet. The room should have a minimum floor area of 60 square feet.
- **Water Bottle Refilling Stations:** Provide water bottle refilling stations for at least 50% of all water fountains.
- **Active Work Stations:** Provide employees with workstations that promote movement, e.g. standing desks/desktop platforms.

All spaces/amenities must meet applicable standards for ADA accessibility.

SUBMITTALS

Include descriptive narrative in SAM Checklist and indicate locations of the well-being spaces in the plans.

TECHNOLOGY/STRATEGY

Whether for passengers or employees, well-being spaces enhance the experience for the travelling public and promote health and well-being of the employers' staff. Exercise and Lactation Rooms may require additional plumbing and space requirements. Lockers and showers will be necessary for an Exercise Room. Lactation Rooms should have a sink and refrigerator. A Quiet Room can be simple, e.g. a private room with a comfortable seat.



For Lactation Rooms, guidance per the National Institute of health guidelines suggests:

<u>Number of Female Employees</u>	<u>Suggested Number of Stations Needed</u>
Fewer than 100	1
Approximately 250	2
Approximately 500	3
Approximately 750	4
Approximately 1,000	6
For every additional 1,000 employees	6 additional stations

For more information see <https://www.womenshealth.gov/supporting-nursing-moms-work/break-time-and-private-space/location-breaks>.

Standard Practice

The presence of Exercise and Quiet Rooms are not regulated by any local, state, or federal statute. Because of this, there is no standard that applies. Lactation statutes do exist, however. Per Illinois Public Act 92-0068:

- An employer shall make reasonable efforts to provide a room or other location, in close proximity to the work area, other than a toilet stall, where an employee can express her milk in privacy.

Recommended Practice

If space allows, an Exercise Room should include, at a minimum, barbells or other small weights, a treadmill and/or stationary bicycle, water fountain or water bottle filling station, lockers, and a shower room.

Given the minimal space and no need for extra plumbing, storage space, etc., a Quiet Room set aside for employee meditation/relaxation should be easily accommodated if there is an available spare room. A private room with a comfortable chair or sofa is the minimum requirement.

For Lactation Rooms, the space does not need to be a dedicated Lactation Room and can be used for other purposes as well. It is recommended that, at a minimum, employers provide a safe and private space with a chair and a small table or shelf. An ideal space would include an electrical outlet, a door that can be locked from the inside, a sink, and/or a refrigerator located near the pumping space. Though not required, these additions can help shorten the break time because travel to another area to wash hands, clean pump parts, and store milk is eliminated.



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Best Available Practice

None



7.0 CONSTRUCTION PRACTICES

7.1 Prerequisite 1 – Clean Fuel Construction Equipment

Required

INTENT

Minimize air quality impacts during construction.

REQUIREMENTS

All projects must comply with the City of Chicago Code Section 2-92-595 – Clean Diesel Contracting and CDA Specification 01111 – Air Quality – Equipment Emissions. For additional detail, refer to the City Municipal Code and CDA Specification.

SUBMITTALS

The submittal requirements for compliance with CDA Specification 01111 –Air Quality – Equipment Emissions and this prerequisite are the Diesel Equipment Compliance Form, which can be found on www.flychicago.com/SAM.

The form is to be submitted monthly and a final form submitted upon completion of the project as part of the SAM final checklist submittal.

TECHNOLOGY/STRATEGY

Standard Practice

- The CDA currently requires that all off-road construction vehicles over 50 hp use ultra-low sulfur diesel (ULSD) fuel and restrict idling times. All projects are required to include CDA Specification 01111 – Air Quality – Equipment Emissions in their contract documents.

Recommended Practice

- Contractors are encouraged to identify and incorporate any other measures that may assist in reducing air quality emissions as a result of construction. For example, many cleaner vehicle options now exist for employee shuttle buses and Light Duty Vehicles (LDVs) including compressed natural gas (CNG), hybrid (fuel/electric), flex fuel, and demand on displacement. Depending on the equipment model year, the equipment must meet USEPA Tier 4 Non-Road Diesel Standards or better, or be retrofitted with Level 2 controls or better. The availability of cleaner vehicle options is anticipated to expand over time and over the course of the Project. Contractors working on the Project are strongly encouraged to consider these options when making purchase decisions.



Best Available Practice

- Utilize heavy duty off road diesel equipment with an engine model year of 2010 or later, or any heavy duty alternative fuel vehicle with engine model year of 2010 or later, or any equipment retrofitted with Level 3 controls such that the emissions are equal to an engine model year of 2010 or later.



7.0 CONSTRUCTION PRACTICES

7.2 Prerequisite 2 – Construction Equipment Maintenance

Required

INTENT

Minimize the environmental impact of construction equipment maintenance activities.

REQUIREMENTS

Follow the requirements of the CDA BMP Manual.

SUBMITTALS

- For the SAM Design Checklist, indicate the required location in the contract documents
- For the SAM Construction Checklist, the contractor must indicate relevant BMPs applied

TECHNOLOGY/STRATEGY

By requiring contractors to comply with the CDA BMP Manual, it is anticipated that the impacts due to construction equipment maintenance activities will be reduced. The BMPs include procedures for vehicle washing, maintenance, fueling, chemical storage, and spill control.

Standard Practice

Relevant BMPs (from CDA BMP Manual):

- 001 – Equipment Vehicle Washing Restrictions
- 002 – Equipment Vehicle Fueling Controls
- 003 – Equipment Vehicle Maintenance Requirements
- 011 – Above Ground Storage Tank Equipment Requirements/Spills
- 012 – Mobile Tank Trucks (petroleum) Requirements
- 013 – Chemical Handling/Storage Requirements
- 014 – Drum Storage Procedures
- 015 – Battery Storage Procedures
- 017 – Truck Loading/Unloading Procedures/Spill Control
- 018 – Spill Control Kits and Spill Response
- 019 – Good Housekeeping Procedures/Waste Storage
- 020 – Storm Drain Protection/Identification



Recommended Practice

None

Best Available Practice

None



7.0 CONSTRUCTION PRACTICES

7.3 Low-Emission Construction Vehicles

1 Point

INTENT

Minimize air quality impacts during construction.

REQUIREMENTS

In addition to complying with the prerequisite SAM Credit 7.1 Prerequisite 1 – Clean Fuel Construction Equipment, a point is earned if 50% of all off-road vehicles over 50 hp on the project site for more than 14 consecutive days are EPA Tier 4 compliant or better.

Exemplary Performance

An additional point may be claimed under 8.1 Innovation in Design & Construction if 75% of the off-road vehicles over 50 hp that are on the project site for more than 14 consecutive days are EPA Tier 4 compliant.

SUBMITTALS

Submittal requirements are per CDA Specification 01111 – Air Quality - Equipment Emissions.

TECHNOLOGY/STRATEGY

Standard Practice

- See Standard Practice under SAM Credit 7.1 Prerequisite 1 – Clean Fuel Construction Equipment

Recommended Practice

- In addition to the recommendations in SAM Credit 7.1 Prerequisite 1 – Clean Fuel Construction Equipment, the contractor is encouraged to use equipment in its existing fleet that meets these guidelines

Best Available Practice

- In addition to the recommendations in SAM Credit 7.1 Prerequisite 1 – Clean Fuel Construction Equipment, the contractor is encouraged to purchase new equipment or retrofit existing equipment to meet these guidelines. Consider use of:



- Biodiesel (use regionally derived biofuels)
- Other regionally preferred alternative fuels
- Diesel-electric hybrid vehicles
- Where approved and appropriate, consider the use of Warm Mix Asphalt (WMA) for paving, which reduces energy usage and emissions. Also see SAM Credit 5.5 Aggregate Reuse.
- GPS for optimizing haul routes and work activities.
- Stricter idling controls, including use of idling restrictors.
- Newest technology equipment and retrofits.



7.0 CONSTRUCTION PRACTICES

7.4.1 Alternative Transportation during Construction: Staging Area

1 Point

INTENT

Reduce emissions due to construction vehicles by minimizing the amount of traffic to the construction site.

REQUIREMENTS

To meet this credit each project must have a staging area where employees congregate prior to entering the project site.

AND

Use multiple occupancy vehicles to access the project site from the centralized staging area.

SUBMITTALS

Although not required for the SAM Design Checklist, a staging area, with contractor trailer, should be included in the design drawings.

For the SAM Construction Checklist, the contractor must state that the staging area, with contractor trailer, was present and list or describe how employees accessed the project site (e.g., pooled in trucks or shuttle bus).

TECHNOLOGY/STRATEGY

Standard Practice

- Most projects typically use heavier duty vehicles such as pick-up trucks or SUVs to provide workers with access to the project site. In some cases, for larger projects, buses are used

Recommended Practice

- Establish procedures and make vehicles available for employee car pooling to the project site. For maximum benefit, shuttle buses or vans are preferred over lower occupancy vehicles such as pick-up trucks.



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Best Available Practice

- Use fuel-efficient vehicles for car-pooling employees to the project site



7.0 CONSTRUCTION PRACTICES

7.4.2 Alternative Transportation during Construction: Low-Emitting and Fuel-Efficient Vehicles, 10%

1 Point

INTENT

Reduce emissions from on-road construction vehicles (e.g., foreman pickups or shuttle buses).

REQUIREMENTS

The contractor must use fuel efficient and low-emitting vehicles for at least 10% of all on-road, contractor-owned construction vehicles that access the project site more than five calendar days per month. To meet this requirement, the vehicles must be listed as SmartWay certified vehicles according to the EPA Green Vehicle Guide. The listing of SmartWay certified vehicles can be found at: <https://www.fueleconomy.gov/feg/SmartWay.do>

SUBMITTALS

For the sustainable construction checklist, the contractor must submit a list of its on-road vehicles and identify those which meet the EPA's SmartWay certification as described above.

TECHNOLOGY/STRATEGY

Each model year, EPA rates every new car, truck, and SUV for greenhouse gas and smog-forming emissions on scales of 1-10. To earn the SmartWay designation, a vehicle must receive a combined score from **both** scales that is much better than the average vehicle. SmartWay Elite certification is given to only those vehicles that attain the highest scores on both scales. The thresholds for the combined scores needed to achieve a SmartWay certification vary by vehicle model year. The Air Pollution (or Smog) Score is based on the government emission standards for which the vehicle was certified to comply with and reflects vehicle tailpipe emissions that contribute to local and regional air pollution, creating problems such as haze, and health issues. The Greenhouse Gas score reflects fuel lifecycle emissions of carbon dioxide (CO₂) and other greenhouse gases. A partial list of heavier duty vehicles (pick-ups and SUVs) that meet these requirements are shown below for reference:



Year/Vehicle Make/Model (Type)	Engine/Transmission/Fuel	Air Pollution Score	Greenhouse Gas Score
2014 Toyota Highlander Hybrid (SUV)	3.5L/Auto 4WD/Gasoline	7	7
2014 Chevrolet Equinox (SUV)	2.4L/Auto 2WD/E85-Gasoline	6 (E85)	7 (E85)
2014 GMC Terrain (SUV)	2.4L/Auto 2WD/Gasoline	6	7
2016 Buick Encore	1.4L/Auto AWD/Gasoline	7	6
2017 Honda CR-V AWD	1.5L/Auto AWD/Gasoline	7	7
2019 Toyota RAV4 Hybrid	2.5L/Auto AWD/Gasoline	9	7
2020 Ford Escape	1.5L/Auto FWD/Gasoline	7	7

Standard Practice

- Utilize hybrid and flex fuel vehicles

Recommended Practice

- Promote the use of vehicles that meet the requirements above for EPA SmartWay certified vehicles.

Best Available Practice

- Operate compressed natural gas (CNG), electric, fuel cell, biodiesel vehicles



7.0 CONSTRUCTION PRACTICES

7.4.3 Alternative Transportation During Construction: Low-Emitting and Fuel-Efficient Vehicles, 50%

1 Point

INTENT

Reduce emissions from on-road construction vehicles.

REQUIREMENTS

The contractor must use fuel efficient and low-emitting vehicles for at least 50% of all on-road, contractor-owned construction vehicles that access the project site more than five calendar days per month. To meet this requirement, the vehicles must be listed as SmartWay certified vehicles according to the EPA Green Vehicle Guide. The listing of SmartWay certified vehicles can be found at: <https://www.epa.gov/greenvehicles/consider-smartway-vehicle>

SUBMITTALS

For the sustainable construction checklist, the contractor must submit a list of its on-road vehicles and identify those which meet the EPA's SmartWay certification as described above.

TECHNOLOGY/STRATEGY

Each model year, EPA rates every new car, truck, and SUV for greenhouse gas and smog-forming emissions on scales of 1-10. To earn the SmartWay designation, a vehicle must receive a combined score from **both** scales that is much better than the average vehicle. SmartWay Elite certification is given to only those vehicles that attain the highest scores on both scales. The thresholds for the combined scores needed to achieve a SmartWay certification vary by vehicle model year. The Air Pollution (or Smog) Score is based on the government emission standards for which the vehicle was certified to comply with and reflects vehicle tailpipe emissions that contribute to local and regional air pollution, creating problems such as haze, and health issues. The Greenhouse Gas score reflects fuel lifecycle emissions of carbon dioxide (CO₂) and other greenhouse gases. A partial list of heavier duty vehicles (pick-ups and SUVs) that meet these requirements are shown below for reference:



Year/Vehicle Make/Model (Type)	Engine/Transmission/Fuel	Air Pollution Score	Greenhouse Gas Score
2014 Toyota Highlander Hybrid (SUV)	3.5L/Auto 4WD/Gasoline	7	7
2014 Chevrolet Equinox (SUV)	2.4L/Auto 2WD/E85-Gasoline	6 (E85)	7 (E85)
2014 GMC Terrain (SUV)	2.4L/Auto 2WD/Gasoline	6	7
2016 Buick Encore	1.4L/Auto AWD/Gasoline	7	6
2017 Honda CR-V AWD	1.5L/Auto AWD/Gasoline	7	7
2019 Toyota RAV4 Hybrid	2.5L/Auto AWD/Gasoline	9	7
2020 Ford Escape	1.5L/Auto FWD/Gasoline	7	7

Standard Practice

- Utilize hybrid and flex fuel vehicles

Recommended Practice

- Promote the use of vehicles that meet the requirements above for EPA SmartWay certified vehicles.

Best Available Practice

- Operate compressed natural gas (CNG), electric, fuel cell, biodiesel vehicles



7.0 CONSTRUCTION PRACTICES

7.5 Construction Noise and Acoustical Quality

1 Point

INTENT

Improve the exterior noise quality during construction affecting residential areas or other noise sensitive areas.

REQUIREMENTS

Although the City of Chicago has an environmental noise ordinance (Article XXI – Environmental Noise and Vibration Control), it does not apply to construction or demolition work on public improvements authorized by a government body or agency (City Ordinance 11-4-2835).

The requirements of this credit will only apply to noise disturbances that are adjacent to noise sensitive areas, such as residential or institutional (hospitals, schools, libraries, nursing homes) areas. Noise disturbances are defined as any sound which is audible at a distance of 600 feet from its source or any sound which generates a sound pressure level in the public way exceeding 70 dB(A) when measured 10-feet from the source (City Ordinance 11-4-2710).

To achieve a point under this credit, the following requirements must be met during construction for those sites that are near noise sensitive areas as defined by the Chicago City Ordinance:

Meet the noise restrictions listed in the Chicago City Ordinance (Article XXI, Part B) which include, but are not limited to, noise from mechanical stationary sources (11-4-2810), loading and unloading operations (11-4-2830), and construction equipment (11-4-2835) during nighttime hours.

OR

Implement a noise abatement or noise mitigation plan that identifies site specific, mechanical, structural or operational measures to reduce noise disturbances in noise sensitive areas adjacent to the project site.

SUBMITTALS

Although not required for the sustainable design checklist, indicate noise sensitive areas on plans to aid contractor in determining the best noise mitigation strategies.

For the sustainable construction checklist, the contractor must indicate that the requirements of the Chicago Environmental Noise Ordinance have been met or submit a noise mitigation plan identifying the measures taken to reduce noise disturbances in the affected areas.



TECHNOLOGY/STRATEGY

The primary paragraph related to construction activities is Chicago City Ordinance 11-4-2835 which basically states that no fuel or electric powered mechanical equipment may be used during the hours of 8:00 p.m. and 8:00 a.m. within 600 feet of any residential areas or hospitals. The ordinance further states that public improvements authorized by a government agency, like the OMP, are not subject to this ordinance, however, a point will be given under this credit for those projects that choose to comply with the ordinance.

There are numerous noise mitigation methods that can be employed some of which are site or equipment specific. The easiest method of noise mitigation is to locate the noise source in an area that is not noise sensitive and to conduct that work during daytime hours, 8:00am to 8:00pm. Where this is not possible, temporary barriers can be erected to mitigate the noise emanating from a source.

Standard Practice

None

Recommended Practice

None

Best Available Practice

None



7.0 CONSTRUCTION PRACTICES

7.6 Sustainable Temporary Construction Materials

1 Point

INTENT

Reduce the use and depletion of finite raw materials and long-cycle renewable materials by replacing them with high recycled content, rapidly renewable materials and FSC certified wood products for temporary uses during construction.

REQUIREMENTS

Temporary construction materials include, but are not limited to, any materials that are used for construction that are not incorporated into the final development such as, erosion control materials, temporary haul roads, shoring materials, formwork, temporary carpentry, and traffic control devices and signage. For the purposes of this calculation, only the material cost, excluding labor and equipment, shall be used. In order to meet the requirements of this credit, one of the following requirements must be met:

Using a recycled content calculation similar to SAM Credit 5.7 Recycled Content, determine the percentage of recycled content in the temporary construction materials based on overall temporary construction material cost. To achieve a point in this credit, the overall recycled content of the temporary construction materials must be 30% or greater by cost.

OR

Using a rapidly renewable content calculation similar to SAM Credit 5.9 Rapidly Renewable Materials, determine the percentage of the rapidly renewable materials based on overall temporary construction material cost. To achieve a point in this credit, the overall recycled content of the temporary construction materials must be 10% or greater by cost.

OR

Using a certified wood calculation similar to SAM Credit 5.10 Certified Wood, determine the percentage of certified wood materials based on the total wood-based material cost. To achieve a point in this credit, the overall recycled content of the temporary construction materials must be 60% or greater by cost.

Do not count temporary construction materials under any of the credits in Section 5.0 - Materials & Resources. Materials such as aggregates may be counted either under SAM Credit 5.5 Aggregate Reuse or this credit but should only be counted once.



SUBMITTALS

The submittals include the following:

- A pre-construction estimate using the form in CDA Standard Specification 01360 – Sustainable Temporary Construction Materials, to be provided by the contractor
- A final construction estimate using the form in CDA Standard Specification 01360 – Sustainable Temporary Construction Materials, to be provided by the contractor

TECHNOLOGY/STRATEGY

Many temporary construction materials can help achieve the requirements of this credit. Although not tracked by LEED, CDA has added this credit to promote the use of such materials during construction, as well as for final development stages of a project.

Standard Practice

- Although many temporary construction materials meet the requirements of this credit, their use is typically not tracked or promoted. The designer is encouraged to specify sustainable materials in construction wherever possible. The contractor is further encouraged to use these types of materials in the cases where they may not be explicitly specified.

Recommended Practice

- Materials that may have high recycled content include, but are not limited to:
 - Temporary steel structures or materials
 - Fencing or metal barricades
 - Plastic traffic control devices (barricades, cones)
 - Temporary piping (HDPE, ductile iron)
 - Steel formwork
 - Plastic erosion control materials (e.g. silt fence)
- Materials that have rapidly renewable materials include, but are not limited to:
 - Poplar oriented strand board (OSB) for formwork or temporary carpentry
 - Coir or jute fabric erosion control blankets and meshes
 - Plant-based cladding and insulation materials
 - Contractor trailer materials such as flooring and finishes
- FSC certified wood products for temporary construction materials may include:
 - Wood formwork
 - Temporary wood structures or scaffolding

Best Available Practice

None



8.0 INNOVATION IN DESIGN & CONSTRUCTION

8.1 – 8.3 Innovation in Design & Construction

1 to 3 Points

INTENT

Provide design teams and projects the opportunity to achieve exceptional performance above the requirements set by the Sustainable Airport Manual Green Airplane Rating System and/or innovative performance not specifically addressed by the Sustainable Airport Manual.

REQUIREMENTS

In writing, identify the intent of the proposed innovation credit, the proposed requirement for compliance, the proposed submittals to demonstrate compliance, and the approach (strategies) that might be used to meet the requirements.

Up to 3 points may be awarded for this credit:

<u>SAM Credit</u>	<u>Points</u>
8.1	1
8.2	1
8.3	1

SUBMITTALS

Include descriptive narrative in the SAM Checklist following the criteria in the Requirements section above.

TECHNOLOGY/STRATEGY

Substantially exceed a SAM performance credit such as energy performance or water efficiency and/or apply strategies or measures that demonstrate a comprehensive approach and quantifiable environment and/or health benefits.

Refer to LEED Pilot Credit Library, LEED Credit Interpretation Results (CIRs) or the Innovation in the LEED Design Credit Catalog for potential strategies that may be considered for innovation. Most will pertain to building related innovations; however, the SRP will review proposed innovations by the designer or contractor on a case by case basis. Some examples include green cleaning programs for buildings, educational programs for building occupants related to sustainability, and innovative construction practices that reduce waste such as travelling formwork.



8.0 INNOVATION IN DESIGN & CONSTRUCTION

8.4 Menu Items (Photovoltaics, Geothermal Heating/Cooling, Wind Power, Rainwater Harvesting, Permeable Pavement, Trombe or Solar Walls, Green Walls, or Alternative Water Heating)

1 to 3 Points

INTENT

Promote specific technologies and additional strategies considered to be important to the sustainability of the airport environment.

REQUIREMENTS

A point will be awarded for each of the technologies or strategies listed below that are used on a project up to a maximum of 3 points:

- Photovoltaics – Use photovoltaic systems to generate electricity. System must generate 0.5 kW or greater
- Geothermal Heating/Cooling – Any geothermal or ground-source heat pump (GSHP) system to provide heating and cooling is acceptable
- Wind Power – Generate on-site electricity using wind turbines, horizontal or vertical. System must generate 0.5 kW or greater
- Rainwater Harvesting – Use cisterns, rain barrels, or other vessels to store rain water for other uses including, but not limited to, irrigation, vehicle washing, and other general, non-potable uses. The harvested rainwater must have an intended use. Minimum storage capacity is 200 gallons.
- Permeable Pavement – Use permeable pavement such as concrete, asphalt, or pavers, for at least 5% of the total pavement area of the project not subject to aircraft traffic or 1,000 sq. ft, whichever is greater
- Trombe or Solar Walls – Use passive solar preheating of intake air for space heating using wall systems or other building surfaces
- Green Walls – Use green, vegetated wall systems on exterior of building envelope for at least 25% of the vertical wall surfaces or the entirety of south and/or west facing walls, whichever is greater
- Natural Interior Spaces – Provide accessible/viewable interior areas that contain natural elements such as gardens, natural settings, interior green walls, aquaria, etc. Alternative Hot Water Heating – Use solar thermal for 25% or demand (tankless) hot water heating systems for 100% of the project's hot water demand. Excludes process water demand.



SUBMITTALS

Include descriptive narrative and calculations in SAM Checklist. Indicate in the narrative which of the above technologies and strategies are being included in the project and, where applicable, indicate where these items are shown in the drawings or specifications.

TECHNOLOGY/STRATEGY

Choose any of the following:

- Photovoltaics – Photovoltaic or solar-electric systems may be ground-mounted, roof-mounted, or built into the roof or walls of a building, known as building integrated photovoltaic (BIPV)
- Geothermal heating/cooling systems – Any geothermal or ground-source heat pump (GSHP) system to provide heating and cooling is an acceptable strategy
- Wind power – Generate on-site electricity using wind turbines, horizontal or vertical
- Rainwater harvesting – Collecting rainwater from the many roofs at an airport would provide a large source of clean non-potable water. Although the supply would far exceed the demand, the use of harvested rainwater should be taken on a site-specific case by case basis. Although airport irrigation is limited to ornamental planters, other uses such as vehicle washing may be amenable to this technology.
- Permeable pavement – The amount of pavement at an airport makes permeable pavement an attractive application for the management of stormwater. Although major pavement areas such as runways, taxiways, and apron areas cannot include permeable pavement, there is a significant amount of non-aviation related pavement areas. Using permeable pavement, unit pavers or permeable asphalt or concrete, may also further contribute to the sustainability of a project because these materials can contain high recycled content materials that are locally available, and may reduce heat island effects for non-roof areas, in addition to their stormwater management aspects. All three of these types of pavements have been demonstrated and are being used by the City of Chicago in its Green Alley Program under the direction of Chicago Department of Transportation (CDOT).
- Trombe or Solar walls – These systems use solar energy to heat a thermal mass, usually a concrete wall or an air gap between an interior wall and a dark-colored exterior surface, as means to preheat intake air. On very cold days, the heating system can condition preheated air rather than putting the additional energy in heating cold outside air, thereby realizing an energy savings. In some cases, the wall may also have a photovoltaic component that generates electricity.
- Green Walls – Vegetated green wall systems on exterior of building envelope can reduce wall surface temperatures by as much as 18°F (depending on which direction it is facing), which also results in significant air conditioning savings, while reducing the heat island effect



- **Natural Interior Spaces** - The use of natural elements, especially vegetation, can provide a number of benefits to normally occupied spaces. Exterior vegetated wall systems can provide shading resulting in significant air conditioning savings and heat island impacts. Interior vegetation can help regulate indoor temperatures and humidity and improve air quality.
- **Water heating** – Solar thermal hot water heating technology uses a solar collector which is simply a heat exchanger designed to convert the sun's radiant light energy into thermal energy to be stored for later use. This collector uses optics and parabolic concentration technology to heat the fluid media passing through the selectively coated tubing manifold. The fluid media is circulated, via a pump, through the collector and into a storage tank located within the home/building. Other water heating technologies that are encouraged include demand, instantaneous, or tankless water heaters. Demand water heaters heat water directly without the use of a storage tank thus avoiding the standby heat losses associated with conventional storage tank water heaters. When a hot water tap is turned on, cold water travels through a pipe into the unit. Either a gas burner or an electric element heats the water as it passes through coiled piping within the unit. As a result, demand water heaters deliver a constant supply of hot water not limited by the volume of a storage tank.



8.0 INNOVATION IN DESIGN & CONSTRUCTION

8.5 LEED Accredited Professional

1 Point

INTENT

Support and encourage the design integration required by LEED to streamline the application and certification process.

AND

Facilitate the incorporation of sustainable design and construction elements.

REQUIREMENTS

At least one principal participant of the project team shall be LEED accredited (i.e., LEED Green Associate; LEED Accredited Professional).

SUBMITTALS

Identify the LEED accredited individual(s) in the SAM Checklist and submit proof of their LEED certification.

TECHNOLOGY/STRATEGY

Educate the project team members about green building design and construction, the LEED requirements and application process early in the life of the project. Consider assigning integrated design and construction process facilitation to the LEED accredited individual.

Standard Practice

- The CDA requires that each design consultant and/or design management team include a LEED accredited individual on its staff to oversee the design and assist with construction administration



8.0 INNOVATION IN DESIGN & CONSTRUCTION

8.6 LEED Certified Project

1 – 4 Points

INTENT

Promote the incorporation of environmentally sustainable design in building and infrastructure improvements by registering and certifying a project through the LEED certification process and rating system.

REQUIREMENTS

Achieve certification via the LEED process:

<u>LEED Certification Level</u>	<u>Points</u>
Certified	1
Silver	2
Gold	3
Platinum	4

SUBMITTALS

Include descriptive narrative in SAM Checklist demonstrating that the project has been registered under LEED during the design process. Provide the LEED submittal documentation and final determination. Indicate what level of LEED certification has been achieved after construction.

TECHNOLOGY/STRATEGY

Educate the project team members about green building design & construction and application of the LEED Rating System early in the life of the project. Consider pursuing LEED for any occupied building project.

Standard Practice

- Projects are encouraged to seek LEED certification, where applicable

Recommended Practice

- Encourage LEED Silver or better rating for occupied buildings



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Best Available Practice

- Encourage LEED Platinum rating for occupied buildings



9.0 REGIONAL PRIORITY

9.1 Regional Priority

1 to 4 Points

INTENT

Provide an incentive for the achievement of credits that address geographically-specific environmental priorities.

REQUIREMENTS

Earning one to four of the 6 Regional Priority credits identified by the USGBC regional councils and chapters as having environmental importance for a project's region. A database of Regional Priority credits and their geographic applicability is available on the USGBC website, www.usgbc.org.

The credits are specific to a project's ZIP code. Use the following link to determine which credits are applicable for a given project based on zip code location:

www.usgbc.org/DisplayPage.aspx?CMSPageID=1984

One point is awarded for each Regional Priority credit achieved; no more than four credits identified as Regional Priority credits may be earned. Projects outside the US are not eligible for Regional Priority credits.

For example, the majority of ORD lies within the 60666 zip code. The following credits are identified as Regional Priority credits for ORD zip code 60666:

- SAM Credit 2.5.1 – Alternative Transportation: Public Transportation Access
- SAM Credit 2.5.3 – Alternative Transportation: Low-Emitting Vehicles
- SAM Credit 2.5.4 – Alternative Transportation: Parking Capacity
- SAM Credit 2.6.2 – Stormwater Management
- LEED 2009 SSc1 – Site Selection
- LEED 2009 SSc2 – Development Density and Community Connectivity

NOTE: Two LEED credits listed above are applicable for this zip code, but are not SAM Credits outlined in this Manual. Meeting any of the four of the SAM Credits would earn one point for each. However, if the project is pursuing LEED certification, all of the credits would be applicable, but the maximum points allowed is still four.

NOTE: Zip Codes present at ORD in order of decreasing area size include 60666 (Cook Co.), 60106 (DuPage Co.), 60018 (NE boundaries, Rosemont), 60007 (NW boundaries, Des Plaines), 60176 (SE boundaries, Schiller Park). The Zip Code at MDW is 60638.



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SUBMITTALS

The submittals for this Credit are the same as for constituent credits; no additional submittals are required.

TECHNOLOGY/STRATEGY

See applicable credits determined by location

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APPENDICES

Appendix OM-A – Green Airplane Rating System for Operations & Maintenance
Appendix OM-B – Operation & Maintenance Checklist



INTRODUCTION

There are almost 20,000 airports in the United States today. The day-to-day operation and maintenance of an airport involves various tasks. Airport operators must handle both routine matters as well as unusual circumstances. Their responsibilities, among many, include:

- Keeping records
- Hiring and training personnel
- Maintaining pavement
- Maintaining markings, signs, and lighting
- Providing snow and ice control
- Overseeing procedures for operation of vehicles on the airfield
- Providing obstruction lighting
- Protecting navigational aids
- Managing emergency preparedness
- Overseeing handling of hazardous materials - including jet fuel
- Vehicle maintenance
- Facility maintenance, from terminals, to office building, to warehouses, trades buildings, etc.
- Conducting airport self-inspections
- Protecting public safety
- Ensuring wildlife control
- Overseeing construction projects

While conducting day-to-day operations and activities, airport operators must comply with regulations protecting the environment. All airport operations must be carried out with consideration for how the environment could be adversely affected. Airport environmental concerns may include many things: noise, land use, social impacts, air quality, endangered and threatened species and wildlife, energy supply and natural resources, light pollution, solid waste impacts, stormwater impacts, or construction impacts.

The Sustainable Airport Manual (SAM) Green Airplane Rating System for Operations & Maintenance (O&M) is designed to certify the sustainability of day-to-day building operations, maintenance procedures, system upgrades, minor space-use changes, and minor facility alterations or additions, and training and educational programs.

APPLICABILITY

SAM Operations & Maintenance (SAM O&M) certification encourages airport operators to implement sustainable practices to reduce the environmental impacts of the day-to-day activities and their buildings functional life cycles. Specifically, the rating system addresses exterior building site maintenance programs, water and energy usage, environmentally preferred products and practices for cleaning and alterations, sustainable purchasing policies, waste management, and ongoing



indoor/outdoor environmental quality, as well as training and education of employees, tenants and the public.

The Sustainable Airport Manual (SAM) Operations & Maintenance chapter is applicable to entities and activities that have no customer/passenger contact and do not require design services. This will typically apply to CDA departments and tenants with operations not in the main terminals. Tenants in the terminals will be rated for Operations & Maintenance in the Terminal Occupants – Operations & Maintenance chapter (TO-OM) of the SAM.

The three main entities are defined below:

1. Chicago Department of Aviation Divisions

The activities of the following CDA divisions and their subgroups and contractors will be evaluated within this chapter:

- Design/Construction (maintenance activities)
- Environmental and Noise
- Facilities
- Safety and Security
- Ground Transportation (Landside)
- Operations (Landside/Airside)
- Parking
- Real Estate/Properties
- Terminal Building/Landside
- Vehicle Services

Contractor activities will be included and evaluated under the CDA division or Tenant based on individual contract. Major renovations (defined as major HVAC renovation, envelope modifications and major interior rehabilitation) will be evaluated under the Design and Construction chapter.

2. Tenants

The following are representative of tenants that can be evaluated within this chapter:

- Airlines
 - Airline non-customer contact
 - Freight handlers non-customer contact
- Flight Service Kitchens
- Landscaping
- Parking Services
- Parking Lots
- Hangars

Tenant entities and activities that have direct customer/passenger contact and/or require design services will be evaluated under the Terminal Occupants chapter.



3. User-Defined

This category includes entities with operations that have clearly defined boundaries that may not exactly fit into the two categories above or that may be combinations of the above, or some derivation thereof. It is intended to encompass entities that may have multiple tenants or CDA divisions but operating under a single O&M regime, e.g. a building having operations large enough to require its own administrative, custodial, and/or landscape operations.

OPERATIONS & MAINTENANCE SECTIONS

The achievement of credits is dependent on the sustainable elements included in the following categories:

Applies to OPERATIONS & MAINTENANCE activities:

- 1.0 Administrative Procedures**
- 2.0 Sustainable Site Management**
- 3.0 Water Efficiency**
- 4.0 Energy & Atmosphere**
- 5.0 Materials & Resources**
- 6.0 Indoor Environmental Quality**
- 7.0 Innovation for Operations & Maintenance**
- 8.0 Education & Training**

Each category contains a specific number of credits, against which each project is evaluated in order to determine that project's earned points. The number of points earned is then translated into a rating. There are specific weighted point thresholds (i.e. applicable credits), so as not to inadvertently penalize a project for not achieving points that would not be applicable. The list of credits and point thresholds applicable to each project type are summarized in **Appendix OM-A – Green Airplane Rating System for Operations & Maintenance**.

PROCESS

Within the Manual's main body, each sustainable credit has five subsections: Intent, Requirements, Submittals, Technology/Strategy, and Case Studies, as described below:

- **Intent:** The primary motivations for any sustainable practice.
- **Requirements:** Specifies institutional, operational, and mechanical elements that satisfy the intent. The prerequisites must be achieved; the credits are optional, but contribute to the overall rating.
- **Submittals:** Required and supporting documentation and/or information required to achieve applicable prerequisites or credits. This documentation may include calculations, data, short



narratives, policies, documents or references to specification sections or design drawings indicating how the requirements are being met.

- **Technology/Strategy:** Highlights specific ways of meeting the recommendations within the scope for each specific project. Case studies where available, are presented to help guide the application of sustainable credits to operations and maintenance activities. To aid with consideration of applicable strategies and technologies, they are organized into the following three categories; “Standard Practice,” “Recommended Practice,” and “Best Available Practice.”
 - **Standard Practice:** These are requirements that may be due to standards, specifications, codes, general best management or construction practices. They are practices already in place, and in many cases SAM prerequisites, which also serve to meet sustainable goals.
 - **Recommended Practice:** These include recommendations that are expected to have insignificant impacts to cost and are therefore, encouraged to be incorporated.
 - **Best Available Practice:** These are strategies and practices that are expected to enhance the environmental efforts of the Chicago Department of Aviation (CDA) but are anticipated to potentially increase costs or effort.
- **Case Study:** Examples of credit intent “in action” at airports and/or other industry facilities.

While not all strategies will be applicable, operations and maintenance teams are highly encouraged to think creatively and to consider the intent of each issue throughout the decision process. In all cases, it is the responsibility of the design and construction teams to evaluate and review with the Chicago Department of Aviation any anticipated cost or schedule impact.

SUBMITTALS

Sustainable Airport Manual (SAM) Checklists

Incorporation of sustainable practices and technologies is tracked using a checklist in order to determine the number of applicable credits described in this Manual. The SAM O&M Checklist is completed by the applicant. The checklist is provided in **Appendix OM-B – Operations & Maintenance Checklist**.

In order to achieve points, certain requirements need to be met, as outlined in each credit. In some instances, studies and calculations would be appropriate. In other instances, this will be accomplished through product and material data or through referenced standards or specifications.

In addition to review of the checklist, the Sustainable Review Panel (SRP) will review any supporting documentation including calculations, specifications, and contractor’s submittals as needed to support the achievement of the credit(s). See Section titled *Implementation and Review Process* for detailed information about the SRP.



SAM GREEN AIRPLANE RATING SYSTEM

The SAM Green Airplane Rating System for OM uses a five-tier approach to rating operations and maintenance activities. Due to the variety of departments, operations, and entities that can be evaluated in this chapter, the rating system is based on the number of Total Applicable Points for each evaluation. The Total Applicable Points are determined on a case-by-case basis. A credit is deemed applicable if it is obtainable by the entity being evaluated. “Green Airplane Certification” statuses are used to designate achievement levels. The levels are:

OM GREEN AIRPLANE RATING SYSTEM	
No. of Green Airplanes	Points Required to Achieve Rating
<i>Total Prerequisites</i>	7
	All Applicable Prerequisites + 6 Points
	20% of Total Applicable Points
	30% of Total Applicable Points
	50% of Total Applicable Points
	80% of Total Applicable Points

IMPLEMENTATION AND REVIEW PROCESS

The SAM and its supporting documentation are administered by the Sustainable Review Panel (SRP), which consists of representatives of the CDA Management Staff and Airport Planners actively involved in CDA projects. The composition of the SRP is intended to be dynamic depending on needs.

The SRP is responsible for the review of submittals with respect to sustainability and provides technical support to the each project in relation appropriate to sustainable practices. The SRP is responsible for review of every checklist and for the awarding of “Green Airplane Certification” ratings based on the extent of incorporation of sustainable practices as outlined in this Manual and as documented on the submitted SAM Checklist(s).

Other responsibilities of the SRP include preparation and review of sustainable design related specifications, technical memoranda, and miscellaneous documents, as necessary. In addition, the SRP is responsible for presentations and training to project team members with respect to the application of this Manual. The primary tasks of the SRP are to oversee the application of the Manual and review submittals for their compliance with the Manual.



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All projects conducted by or under management of the CDA will follow these procedures. For any and all sustainability-related questions and/or submittals, please use the following email address to submit forms electronically (preferred method): SAMdocs@cityofchicago.org.



For comments, case studies, lessons-learned, new technologies or for any and all project submittal forms, please email:

SAMdocs@cityofchicago.org



1.0 ADMINISTRATIVE POLICY & PROCUREMENT

1.1 Prerequisite 1 – Green Meetings

Required

INTENT

Green meeting practices are intended to guide meeting hosts, planners, and attendees toward more eco-friendly meetings. A few extra efforts to incorporate environmental considerations into planning and conducting meetings will help to minimize the negative impact on the environment and educate all participants regarding sustainable meetings.

Green meeting practices are intended to:

- Conserve resources
- Reduce environmental impacts
- Save money
- Support Chicago's commitment to environmental stewardship

REQUIREMENTS

Whenever applicable, follow the green meeting practices outlined below, or your existing corporate sustainability policy, whichever is more stringent.

SUBMITTALS

Include descriptive narrative on the SAM Checklist and if following your own corporate sustainability policy, please include with submittal for this section.

TECHNOLOGY/STRATEGY

Meeting Planning

Meeting hosts should consider the following when planning for a meeting:

Reduce the number of copies produced by:

- Sharing meeting materials
- Digitizing materials and distributing presentations via email prior to meetings
- Placing materials on the wall (one large print or presented with projector equipment)

If handouts are needed at the meeting, produce handouts:

- Locally
- Double-sided
- Using high post-consumer recycled content paper



Exhibits and presentation materials:

- Same suggestions as handouts above
- Reuse display boards, utilize both front and back sides
- Use low-emitting materials for exhibit displays
- Recycle cardboard and other packaging materials

For participants not in the building: can they participate by internet/phone?

- Contact the expected meeting participants ahead of time and present them with the option of a video/phone conference via the internet/phone, if appropriate. Costs associated with technical support may still be less than travel/fuel costs in some cases.

What if travel cannot be avoided?

- Can attendees carpool/carshare?
- Provide attendees with mass transit options, such as CTA or Pace Bus, including directions.
- Encourage walking and biking by selecting accessible venues, including directions.
- If overnight stays are involved, suggest hotels nearest the meeting venue that are the most environmentally friendly (www.greenhotels.com). Consider moving the meeting to the hotel if majority of participants are staying at the same hotel, reducing the need for transportation to and from the hotel.

If the meeting is all day or multiple days in a row, how can it be catered in an environmentally friendly way?

- Serve drinks from pitchers, reusable utensils and dishes, and request local produce to cut down on waste when catering for large groups.
- Utilize condiments in bulk dispensers to reduce waste.
- Plan for the pick-up and compost or donation of leftover food to reduce waste.

What if the meeting is held annually?

- Plan for annual meetings at times of the year when temperatures are less extreme to reduce energy consumption due to the use of air conditioning/heat.

Meeting Room

- Use the recycle bins for recyclable items at the end of the meeting.
- Collect reusable business card holders/name tags in a bin after last meeting.
- Collect presentation materials that are not needed by the attendees that can be donated to local schools, reused or recycled.
- Have attendees fill out an online survey allowing for feedback about the meeting and vendors for future reference and improvement.
- Follow up after the meeting with participants to share green success stories and lessons-learned including statistics from the meeting, such as quantities of recycled materials. Also include a summary document that provides details of the green meeting.
- Help to ensure the lights are turned off as attendees leave the meeting room.



Additional details if conducting off-site meetings, such as a conference or workshop

- Ensure that off-site meeting locations accommodate opportunities for recycling.
- Recycle newspapers, cans, and glass, including those from your guest room, in marked containers in the conference area.
- Participate in the hotel's water, energy, and detergent conservation efforts by following the instructions posted in your room.
- Note the conference's efforts to reduce the use of paper by limiting conference handouts at registration, using folders or handouts printed on high post-consumer recycled content paper, using vegetable-based ink, and encouraging presenters to limit handouts.
- Thank the hotel or off-site location host for providing recycling opportunities, reusable utensils and dishes for breaks, etc.

IMPLEMENTATION

1. Make certain that all appropriate recycling bins are located in public meeting areas and conference rooms.
2. Develop message boards for conference rooms, meeting areas, and copy/production areas. (see following pages)
3. Provide routine reminders of green meeting practices and during annual team meetings.



1.0 ADMINISTRATIVE POLICY & PROCUREMENT

1.2 Sustainability Policy

1 Point

INTENT

In keeping with the spirit and intent of this Manual, it is strongly encouraged that groups working in support of CDA on any project establish and adopt their own corporate policy on sustainable practices.

REQUIREMENTS

Establish and adopt a Sustainability Policy.

SUBMITTALS

Provide an electronic copy or website link to the company's Sustainability Policy.

NOTE: If available, please provide an electronic copy of your annual sustainability report documenting any new measures and results.

CASE STUDY

Starbucks Global Social Impact Starbucks

The corporation has undertaken actions to reduce their environmental impact and share in their customer's commitment to the environment. An annual environmental stewardship report is produced to highlight the company's efforts and successes. At the store level, energy and water conservation and other green building strategies are key priorities. Starbucks strives to elevate their partners, customers, suppliers and neighbors to create positive change. This is being accomplished by offering high-quality, ethically purchased and responsibly produced products; investing in paths to opportunity through education, training and employment; minimizing their environmental footprint and inspiring others to do the same; while offering Starbucks as a place for public conversation and elevating civic engagement through service and promoting voter registration.

<https://www.starbucks.com/responsibility>



1.0 ADMINISTRATIVE POLICY & PROCUREMENT

1.3 Green Procurement Policy

1 to 4 points

INTENT

Reduce the environmental impact of products and services by developing a Green Purchasing Program.

REQUIREMENTS

Purchase green products meeting third-party environmental and sustainability standards. Refer to the U.S. EPA Greener Products and Services listing at www.epa.gov/greenerproducts/identify-greener-products-and-services for more information. Some common product certifications include:

- UL EcoLogo
- Electronic Product Environmental Assessment Tool (EPEAT)
- Green Seal®
- EPA Safer Choice.

Points for this credit will be awarded based on the number of green products, procured for general day-to-day office use by the designer of record of the project. The party completing the checklist should only count green products procured for the local office, as opposed to a global level corporate policy.

Points are awarded as follows:

<u>Number of Green Products Procured</u>	<u>Points</u>
1-2	1
3-5	2
6-11	3
12+	4

Example: An A/E firm responsible for the design of a terminal tenant space office uses, *in their own office*, 100% recycled fiber bathroom tissue and toilet paper that are both EcoLogo certified and glass cleaner meeting the GreenSeal certification. These three items meet the requirements of the credit, therefore, two points would be achieved for this credit based on the table above.

SUBMITTALS

Include descriptive narrative in the SAM Checklist of items purchased and used.

NOTE: If available, please provide an electronic copy of your green procurement policy.



TECHNOLOGY/STRATEGY

Introduce environmentally conscious purchasing into company practices. The policy needs to clearly define an objective and establish a sustainability claims verification procedure that can be replicated as necessary. Verification procedures may rely on product certifications such as Green Seal and ENERGY STAR. Evaluate the items that are purchased, identify more environmentally friendly alternatives, and establish a policy to purchase these alternatives when economically feasible. Work with suppliers to identify sustainable products that meet the company's needs.

Standard Practice

None

Recommended Practice

- Purchase items with the minimum content levels specified in the U.S. EPA Greener Products and Services listing at www.epa.gov/greenerproducts/identify-greener-products-and-services
- Purchase items in bulk to reduce packaging, transportation impacts and costs
- When using a company-developed policy, the following resources can be used to create a Procurement Policy. Resources include but are not limited to:
 - U.S. Environmental Protection Agency's Comprehensive Procurement Guidelines (CPG) – The CPG includes an index of products and their recommended recycled content. More information can be found on the associated website: www.epa.gov/smm/comprehensive-procurement-guideline-cpg-program
 - U.S. Environmental Protection Agency's Water Sense – The partnership program by promoting water efficiency and enhancing the market for water-efficient products, programs and practices. More information can be found on the associated website: www.epa.gov/WaterSense/
 - DOE's Alternative Fuels and Advanced Vehicles Data Center – The data center provides a wide range of information and resources to enable the use of alternative fuels, in addition to other petroleum reduction options such as advanced vehicles, fuel blends, idle reduction and fuel economy. More information can be found on the website: www.afdc.energy.gov/afdc/
 - Fair Trade Products – Purchase fair trade products instead of regular products to build equitable and sustainable trading partnerships. Examples of some fair trade products include; coffee, bags, boxes, artwork, chocolate, sugar, etc. More information can be found on the Fair Trade Federation's website: www.fairtradefederation.org
 - USDA's BioPreferred Designated Products – The program aims to increase the purchase and use of renewable, environmentally friendly biobased products while providing "green" jobs and new markets for farmers, manufacturers and vendors. More information can be found on the associated website: www.biopreferred.gov/BioPreferred/



Best Available Practice

None

CASE STUDY

Sustainable Purchasing Policy

Vancouver International Airport – Vancouver, British Columbia, Canada

Sustainability is a corporate priority for the Vancouver Airport Authority. One of their goals is to embed sustainability into our purchasing decisions and ensure meaningful consideration of social and environmental criteria when selecting suppliers, products, and services. Their purchasing decisions will drive innovation, improve workplace and environmental outcomes, and support their commitment to be accountable to the communities that they serve. In evaluating suppliers and their subcontractors, the Airport Authority will include sustainability as a weighted component of the evaluation criteria, to address sustainability risks and capitalize on opportunities. In the procurement of goods and services, for both operating and capital spending, their consideration of sustainability gives priority focus to issues pertaining to their four pillars of sustainability; environment, social, economic, and governance.

<http://www.yvr.ca/en/business/work-with-yvr/airport-suppliers/sustainable-purchasing-policy>



1.0 ADMINISTRATIVE POLICY & PROCUREMENT

1.4 Recycled Content Paper

1 to 3 points

INTENT

Reduce the need for virgin materials, energy, and waste associated with the production of paper by promoting the use of recycled content paper.

REQUIREMENTS

For all office paper purchased for routine daily business administration and operations, point values will be assigned based on the recycled content of the paper. Up to 3 points are available by using paper with the following attributes:

<u>SAM Credit</u>	<u>Post-consumer recycled content</u>	<u>Points</u>
1.4.1	30%	1
1.4.2	50%	2
1.4.3	100%	3

Calculate post-consumer recycled content of office paper using a weighted average based on estimated usage. If the paper is chlorine-bleached, for the purposes of the calculation, it shall be assumed that the post-consumer recycled content is 0% regardless of what it actually is.

Example: Annually, an office uses 50 boxes of chlorine-free paper with a post-consumer recycled content of 30%, 50 boxes of chlorine-free paper with a post-consumer recycled content of 90%, and 20 boxes of chlorine-bleached paper with a post-consumer recycled content of 100%. The weighted average of all the paper used is 50% and therefore 2 points would be awarded for this credit. Note that the 20 boxes of chlorine-bleached paper are assumed to have 0% recycled content for the purposes of the calculation.

$$(50/120)(30\%) + (50/120)(90\%) + (20/120)(0\%) = 50\% \text{ recycled content}$$

SUBMITTALS

Include descriptive narrative on the SAM Checklist.



TECHNOLOGY/STRATEGY

The purchase and use of recycled paper assist in closing the recycling loop by utilizing paper that is made from recovered waste paper.

This credit is intended to:

- Conserve natural resources
- Save energy
- Reduce environmental impacts
- Reduce pollution
- Reduce paper waste

Standard Practice

None

Recommended Practice

- Whenever applicable, purchase and utilize recycled office paper in daily business administration and operations.

Best Available Practice

None



2.0 SUSTAINABLE SITES

2.1 Prerequisite 1 – Equipment Maintenance

Required

INTENT

Minimize the environmental impact of construction and maintenance equipment and associated maintenance activities.

REQUIREMENTS

Follow the requirements of the City of Chicago Department of Aviation's (CDA) Best Management Practices (BMP) Manual.

SUBMITTALS

Include a location in the contract documents where the BMP Manual is required.

TECHNOLOGY/STRATEGY

By requiring the City of Chicago divisions, tenants and their contractors to comply with the CDA BMP Manual, it is anticipated that the impacts due to equipment maintenance activities will be reduced. The BMPs include procedures for vehicle washing, maintenance, fueling, chemical storage, and spill control.

Standard Practice

Follow the preferred practices per the BMPs below:

- 001 – Equipment Vehicle Washing Restrictions
- 002 – Equipment Vehicle Fueling Controls
- 003 – Equipment Vehicle Maintenance Requirements
- 011 – Above Ground Storage Tank Equipment Requirements/Spills
- 012 – Mobile Tank Trucks (petroleum) Requirements
- 013 – Chemical Handling/Storage Requirements
- 014 – Drum Storage Procedures
- 015 – Battery Storage Procedures
- 017 – Truck Loading/Unloading Procedures/Spill Control
- 018 – Spill Control Kits and Spill Response
- 019 – Good Housekeeping Procedures/Waste Storage
- 020 – Storm Drain Protection/Identification



Recommended Practice

None

Best Available Practice

None



2.0 SUSTAINABLE SITES

2.2 LEED Certified Project

1 point

INTENT

Recognize environmentally sensitive building design and construction by enabling high-performance building operations to be achieved in a more efficient and straightforward manner.

REQUIREMENTS

Show that the principle operations being rated are occurring in a facility that has previously been certified under LEED. This includes all LEED rating systems (e.g., Core and Shell, Building Design and Construction, etc.).

SUBMITTALS

Include descriptive narrative and areas for which LEED certification was applicable (keep on file and understand what the LEED certification was based on/measures added; identify maintenance activities and schedule to adequately maintain the LEED measures; train personnel on proper maintenance/operating requirements (e.g., HVAC systems, etc.)).

TECHNOLOGY/STRATEGY

Pursue and earn LEED certification for new buildings, existing buildings, or major renovations.

Standard Practice

None

Recommended Practice

None

Best Available Practice

None



2.0 SUSTAINABLE SITES

2.3 Exterior Facilities Management

1 point

INTENT

Encourage environmentally sensitive building exterior practices that provide a clean, well-maintained and safe building exterior while supporting high-performance building operations based on its original state.

REQUIREMENTS

If any of the following are met, 1 point may be awarded:

- Utilize green cleaning and maintenance practices and materials (e.g., glass cleaner, blasting agents, corrosion preventers) that minimize environmental impacts to include, but are not limited to, biobased, low-emitting and recycled content materials.
- Use adhesives and sealants on building exterior that meet the South Coast Air Quality Management District (SCAQMD) Rule 1168, where applicable.
- Use cleaning products noted in the U.S. EPA Greener Product and Services listing at www.epa.gov/greenproducts/identigy-greener-products-and-services based on their minimum required content levels.

SUBMITTALS

Include descriptive narrative in SAM Checklist.

TECHNOLOGY/STRATEGY

Employ an environmentally sensitive, low-impact building/facility exterior plan that helps discourage surrounding wildlife habitat while sustaining ecological and environmental integrity. The plan must employ best management practices that significantly reduce harmful chemical use, energy waste, water waste, air pollution, solid waste, and/or chemical runoff (e.g., gasoline, oil, antifreeze, salts) compared with standard practices. The plan must address all the following operational elements that occur on the building and grounds, as applicable:

- Cleaning of building exterior
- Paints and sealants used on building exterior



Standard Practice

None

Recommended Practice

- Clean only as often as needed to maintain building appearance and safety
- Use cleaning products efficiently to make sure cleaning products do not drain into a sewer
- Contractor must administer training on the proper use of green chemicals

Best Available Practice

None



2.0 SUSTAINABLE SITES

2.4 Hardscape Grounds Management

1 point

INTENT

Employ an environmentally sensitive, low-impact hardscape management process for building exterior (e.g., sidewalks, paved surfaces and other hardscape) that sustains ecological and environmental integrity while deterring wildlife and maintaining site appearance and safety.

REQUIREMENTS

Within the performance period, have in place low-impact snow and ice removal methods utilizing chemicals that are innovative and ecologically friendly.

AND

Include green cleaning and maintenance practices and materials that minimize environmental impacts. Refer to the U.S. EPA Greener Products and Services listing at www.epa.gov/greenerproducts/identify-greener-products-and-services.

SUBMITTALS

Include descriptive narrative in the SAM Checklist.

TECHNOLOGY/STRATEGY

Employ an environmentally sensitive, low-impact snow and ice removal method utilizing chemicals that are innovative and ecologically friendly. The process must employ best management practices that significantly reduce harmful chemical use, energy waste, water waste, air pollution, solid waste, and/or chemical runoff (e.g., gasoline, oil, antifreeze, salts) compared with standard practices. The process must address all of the following operational elements that occur on the building and grounds, as applicable:

- Snow and ice removal
- Cleaning of sidewalks, pavement and other hardscape methods

Standard Practice

- Application of road salt (landside)



- Airside ground anti-icing/deicing fluid that are environmentally friendly, such as but not limited to:
 - Solid: Sodium Formate and Sodium Acetate
 - Liquid: Potassium Acetate
 - Biochemical Oxygen Demand (BOD)

Recommended Practice

- Use anti-icing/deicing that are lower in BOD and toxicity
- Develop a landside policy for optimal road salt usage balancing environmental and safety concerns
- Investigate non-electrified snowmelt procedures, including Hydronic runway pavement for snowmelt and Epoxy overcoat with glycol for controlling snow on runways
- Use fossil fueled equipment only as frequently as needed to maintain site appearance and safety, or use low-impact alternatives such as, but not limited to:
 - Electric powered equipment
 - Low-noise equipment
 - Hand raking or sweeping
- Use more environmentally friendly deicing chemicals, such as but not limited to:
 - Magnesium Chloride
 - Potassium Chloride
 - Potassium Acetate
 - Calcium Magnesium Acetate (CAM)
- Contractor must administer eco-training, such as chemical use and eco-driving to their personnel to ensure appropriate use/applications, and to reduce fuel consumption, greenhouse gas emissions, and accident rate

Best Available Practice

- Infrared Radiant Deicing Technology
- Forced air/hybrid deicing which adds deicing fluid to the airstream to aid in removing ice and snow
- Tempered steam technology



2.0 SUSTAINABLE SITES

2.5 Integrated Pest Management and Wildlife Deterrence

1 point

INTENT

Preserve environmental integrity while discouraging the presence of pests/wildlife, to include methods that maintain and encourage high-performance pest management control.

REQUIREMENTS

Use Integrated Pest Management (IPM) Techniques, such as:

- Control dirt, moisture, clutter, foodstuffs, harborage, and building penetrations
- Use baits and traps rather than pesticide sprays where possible
- Avoid pesticide applications for prevention of pests
- Use pesticides only where pests are located
- Use pesticide specifically formulated for targeted pest

AND

Use wildlife deterrent methods in accordance with United States Department of Agriculture - Wildlife Services.

SUBMITTALS

Include descriptive narrative in SAM Checklist.

TECHNOLOGY/STRATEGY

Over the performance period, have in place a wildlife and pest management plan that addresses overall site management, chemicals, and waste. Include such green landscape management practices such as applying integrated pest management and deterring wildlife habitat.

Integrated pest management (IPM), defined as managing pests (plants, fungi, insects, and/or animals) in a way that protects human health and the surrounding environment that improves economic returns through the most effective, least-risk option.

The IPM plan includes preferred use of nonchemical methods, definition of emergency conditions, and universal notification providing advance notice of not less than 72 hours under normal conditions, and, 24 hours in emergencies before a pesticide, (other than a least-toxic pesticide) is applied in a building or on surrounding grounds that the building management maintains.



The USDA outlines wildlife deterrent, mitigation, and control methods for airports. When applicable, obtain the proper animal containment services to trap and relocate wildlife to appropriate off-airport locations.

Vegetated roofs must be designed and maintained to not attract wildlife or provide habitat.

Standard Practice

None

Recommended Practice

- Apply pesticides only during unoccupied hours
- Ventilate building with significant quantities of outside air during and after applications
- Completely flush building prior to occupancy
- Use more than normal outside air ventilation for some period after occupancy
- Notify occupants prior to occupation
- If applying outside keep away from air intake
- Contractor must administer eco-training, such as chemical use, eco-driving, to their personnel to ensure appropriate use/applications, and to reduce fuel consumption, greenhouse gas emissions, and accident rates

Best Available Practice

None



2.0 SUSTAINABLE SITES

2.6 Soil Erosion Control

1 point

INTENT

Address landscape operations while preserving and maintaining ecological integrity and site preservation by minimizing soil loss and preventing water pollution.

REQUIREMENTS

Have in place an environmentally sensitive management plan for the site's natural components pertaining to erosion and sedimentation control for ongoing landscape operations (where applicable). The plan must address both site soil and potential land disturbances. The plan must also include measures that prevent erosion and sedimentation, air and water pollution from dust or particulate matter and restore eroded areas.

SUBMITTALS

Include descriptive narrative in SAM Checklist.

TECHNOLOGY/STRATEGY

Over the maintenance period of the site, have in place a maintenance and best practice plan that addresses overall site management and control. Examples of erosion control methods include, but are not limited to:

- Temporary and permanent seeding (in accordance with CDA Specification 02905 – Sustainable Airport Landscaping, see SAM appendix DC-C Referenced City of Chicago Specifications and Standards)
- Mulching
- Structural control methods (such as: earthen dike, silt fence, sediment traps and sediment basins)
- Use of perennial plants (in accordance with CDA Specification 02905 – Sustainable Airport Landscaping, see SAM appendix DC-C Referenced City of Chicago Specifications and Standards)
- Buffer strips
- Ditch liners
- The use of fertilizer as necessary
- Removing and/or not installing invasive plants



Standard Practice

- Follow the Best Management Practice (BMP) guidelines for erosion control

Recommended Practice

- Identify problems
- Perform periodic checks
- Dispose of loose debris
- Maintain ground cover
- Clean major sediment sources on paved surfaces
- Install rolled mats (organic, biodegradable mulch mats used to reduce erosion) and ensure that they conform to site contours
- Use natural fiber geotextiles (permeable fabrics) that are biodegradable
- Install permeable paving materials to reduce stormwater runoff and allow rain water to infiltrate into the ground and replenish groundwater

Best Available Practice

None



2.0 SUSTAINABLE SITES

2.7 Landscape Management

1 point

INTENT

Maintain the landscape that is aesthetically pleasing and at the same time, low maintenance, ecologically and financially sustainable yet does not compromise Airport security and aircraft safety.

REQUIREMENTS

Follow the requirements of the CDA 02905 “Sustainable Airport Landscaping” specifications

AND

Use non-gasoline powered landscape equipment

OR

Use fertilizer only as needed

OR

Prohibit burning and reuse or compost landscape waste on-site.

SUBMITTALS

Include descriptive narrative in SAM Checklist.

TECHNOLOGY/STRATEGY

Over the performance period, have in place a low-impact plan that addresses overall site management, chemicals, fertilizers, and landscape waste. Include such green landscape management practices such as:

- Provide proper training methods to current employees
- Reduce the use of power equipment
- Discourage wildlife habitat
- Remove or don't install invasive plants
- Use mulching mowers to significantly reduce landscape waste generation, fertilizer needs, and water consumption through retention of organic matter



Standard Practice

- Do not apply pesticides or fertilizers before an expected rainfall (unless specified within the manufactures recommendations)
- Conduct soil testing as necessary to determine the amount of nutrients needed for a healthy landscape
- Never wash spilled chemicals into streets or storm drains
- Do not store in a manner which allows exposure to storm water

Recommended Practice

- Do not apply chemicals within 25-feet (at a minimum) of a body of water
- Use organic and natural products
- Use non-potable hot water for weed control to eliminate vegetation in pavement cracks in place of herbicides
- Mulching and/or electric mowers
- Eliminate fertilizer and herbicide use altogether
- Install rolled mats (organic, biodegradable mulch mats used to reduce erosion) and ensure that they conform to site contours
- Use natural fiber geotextiles (permeable fabrics) that are biodegradable
- Specify non-toxic, non-chemical organic or bio-based materials for landscape planting and fertilization
- Top-dress soil with compost to decrease fertilizer and irrigation needs, to control erosion, and to retain moisture
- When application of landscape fertilizers, pesticides and other chemicals is necessary, specify organic or bio-based fertilizers and pesticides
- Spot treat landscape problem areas instead of chemically treating a larger area than necessary
- Use electric lawn mowers, such as the Neuton™ lawn mower, to reduce the level of noise and air pollution generated by traditional gasoline-powered mowers (<https://www.neutonpower.com>). Electric mowers need no extension cords and have replaceable, rechargeable batteries for extended range.
- Use propane- and/or natural gas-powered string trimmers, blowers, and push mowers
- All diesel-powered equipment to use biodiesel (minimum 20% blend). Since there is little or no cold weather issue with lawn care, high concentration blends (50%-100%) are possible.
- No mowing on Air Pollution Action days
- Install cisterns and other water recycling infrastructure to use stormwater and/or graywater for irrigation
- Install high-efficiency irrigation systems (if irrigation is a necessity) with a slow-drip, sub-soil irrigation and automated linkages to meteorological data
- Contractor must administer eco-training, such as chemical use, eco-driving, to their personnel to ensure appropriate use/applications, and to reduce fuel consumption, greenhouse gas emissions, and accident rates



Chicago Department of Aviation
SUSTAINABLE AIRPORT MANUAL



Best Available Practice

- Establish a centralized landscaping composting facility
- Utilize a solar or propane mower



2.0 SUSTAINABLE SITES

2.8 Alternative Commuting Transportation for Employees

1 to 4 points

INTENT

To reduce pollution and land development impacts from conventional automobile use for commuting trips.

REQUIREMENTS

Within the performance period, reduce the number of commuting round trips made by regular building occupants, or tenant or division employees, using single-occupant, conventionally powered, and conventionally fueled vehicles. For the purposes of this credit, alternative transportation includes, but is not limited to:

- Telecommuting
- Compressed work weeks
- Mass/public transit
- Walking
- Bicycles or other human-powered conveyances
- Carpools
- Vanpools
- Low-emitting, fuel-efficient or alternative-fuel vehicles

Performance calculations are made relative to a baseline case that assumes all regular occupants commute alone in conventional automobiles. The calculations must account for seasonal variations in the use of alternative commuting methods and, where possible, indicate the distribution of commuting trips using each type of alternative transportation.

Points are earned for percentage increase in employees who utilize the alternative commuting transportation methods within the performance period:

<u>SAM Credit</u>	<u>Percentage Increase in Alternative Methods</u>	<u>Points</u>
2.8.1	5%	1
2.8.2	10%	2
2.8.3	20%	3
2.8.4	30%	4



Low-emitting vehicles and fuel-efficient vehicles are defined as vehicles that are classified as zero-emission vehicles (ZEVs) by the California Air Resources Board or SmartWay Certified by the U.S. EPA.

SUBMITTALS

Include descriptive narrative and calculations in SAM Checklist.

TECHNOLOGY/STRATEGY

When developing an alternative transportation program, consider the opportunities and limitations of different options, based on the building's location and community's transportation infrastructure/services.

Provide space and infrastructure features such as, but not limited to:

- Bicycle racks
- Changing facilities
- Preferred parking
- Access to mass transit
- Alternative-fuel refueling stations

Offer employees incentives for using alternative transportation such as, but not limited to:

- Additional vacation days
- Cash rewards or pretax options
- Free or discounted public transportation passes
- Bicycling equipment or telecommuting equipment to individuals committed to using them

Encourage the use of alternative commuting methods by guaranteeing free rides home for employees who must unexpectedly leave work early or late. Utilize organization resources to communicate with building occupants about alternative transportation options and benefits and facilitate communication among building occupants for coordinating ride sharing.

Standard Practice

- Chicago Department of Aviation (CDA) already has programs in place for alternative fuel vehicles within the airport operations department that is designed so that these programs are enhanced and supported.

Recommended Practice

- Develop and provide alternative facilities and areas to encourage alternative commuting



Best Available Practice

- Provide a centralized facility(s) for employees to store/park alternative commuting means as well as include incentives to employees for applying alternative commuting opportunities
- Increase the awareness of alternative fuel vehicles for airport operations – particularly the indoor cargo operations
- Provide preferred parking for staff and public alternative fuel vehicles
- Plan for a development of preferred parking and/or lot locations for rental fleets, which offer alternative fuel rental vehicles



2.0 SUSTAINABLE SITES

2.9.1 Stormwater Management: Landside

1 point

INTENT

Limit disruption of natural water hydrology by reducing impervious cover, increasing on-site infiltration, reducing or eliminating pollution from stormwater runoff, and eliminating contaminants by enhancing the current operating system.

REQUIREMENTS

Reduce impervious surfaces totaling at least 5% of your total site area with permeable surfaces. Those surfaces can include, but are not limited to:

- Permeable asphalt / concrete
- Open grid pavers
- Aggregate materials
- Turf or landscaped areas

OR

Harvest rainwater and develop a use for it;

OR

Nonstructural techniques such as, but not limited to:

- Rain gardens
- Vegetated swales
- Disconnection of imperviousness
- Rainwater recycling

SUBMITTALS

Include descriptive narrative and calculations in SAM Checklist.

TECHNOLOGY/STRATEGY

Because many airside pavements have the potential for deicing fluid and jet fuel contamination, technologies that increase infiltration to the subsurface are not used. On landside projects, or for areas



not subject to aviation-related contaminants, these methods are encouraged; however, other contaminants may be present and need to be addressed.

Maintain natural stormwater flows by promoting infiltration. Maintain procedures that include ongoing monitoring of any installed features that assist in stormwater irrigation, pervious paving, and other measures to minimize impervious surfaces. Any strategies used should discourage wildlife habitat. Reuse stormwater volumes generated for non-potable uses such as landscape irrigation, toilet and urinal flushing and custodial uses.

Standard Practice

- Follow Chicago Department of Aviation's Best Management Practices

Recommended Practice

- Install rain gardens, vegetated swales, disconnection of imperviousness, and rainwater recycling
- Installing cisterns or rain barrels
- Install landscape to reduce runoff. See SAM Credit 3.4 Water Efficient Landscaping
- Evaluate curb breaks and drainage ditches, and/or bioswales
- Install high-efficiency irrigation systems (if irrigation is a necessity) with a slow-drip, sub-soil irrigation
- Install permeable paving materials to reduce stormwater runoff and allow rain water to infiltrate into the ground and replenish groundwater

Best Available Practice

- Encourage use of permeable pavement, where applicable
- Where potential for contamination exists, the use of these technologies must be weighed carefully to prevent larger contaminant issues, such as infiltration of ground water



2.0 SUSTAINABLE SITES

2.9.2 Stormwater Management: Airside

1 to 4 points

INTENT

Reduce airside stormwater pollutants by employing environmentally sensitive maintenance techniques within the current operating system.

REQUIREMENTS

Up to 4 points may be awarded by achieving any of the following measures:

<u>Technology/Strategy</u>	<u>Points</u>
Use sweeper vacuums, glycol recovery vehicles and/or mobile collection units to remove and reuse spent deicing fluid.	1
Develop collection systems for deicing runoff. The proposed runway and taxiway pavements would contain first flush systems along the edge of pavements and Central Deicing Facilities for aircraft. The first flush system could consist of slotted edge drains connected to underground holding tanks. Glycol contaminated snowmelt and minor storm water runoff would be captured in the tanks and removed for treatment, disposal or recycling.	2
Reduce or eliminate deicing chemical contamination by using low Biological Oxygen Demand (BOD), low toxicity, and low corrosivity material (e.g., acetate and urea).	1

SUBMITTALS

Include descriptive narrative in SAM Checklist.

TECHNOLOGY/STRATEGY

Because of the potential for deicing fluid contamination, the use of these technologies must be weighed carefully to prevent larger contaminant issues, such as infiltration of ground water.



Standard Practice

- Follow CDA BMP procedures

Recommended Practice

- Follow Best Management Practices outlined in Chapter 4, Part 2 (Urban Runoff), on the United States Environmental Protection Agency's Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters, January 1993 (document No EPA-840-B-92-002)
- Recover and recycle deicing chemicals at application point (e.g., vacuum truck, or other capturing method)

Best Available Practice

- Incorporate technologies, application techniques and/or designs to minimize glycol residual after application of deicing agents
- Use glycol separation and/or concentration methods to recover spent glycol from storm water or snow melt
- Central Deicing Facilities could also be utilized to capture excess glycol from aircraft deicing operations in underground storage tanks



2.0 SUSTAINABLE SITES

2.10 Heat Island Reduction

1 to 2 points

INTENT

Minimize impacts of existing roofs and pavements that cause the heat island effect (thermal gradient differences between developed and undeveloped areas).

REQUIREMENTS

Use any combination of the following strategies when replacing/renovating or maintaining pavement:

- For 50% of the site's hardscape area (including roads, sidewalks, courtyards, and parking lots) complete the following (1 point):
 - Provide shade from an existing tree canopy or within five years of landscape installation - landscaping (trees) must be in place at the time of certification application
 - Have paving materials with a Solar Reflective Index (SRI) of at least 29 and implement a maintenance program that ensures these surfaces are cleaned at least every two years to maintain good reflectance and minimums
 - Have an open-grid pavement system (that consists of at least 50% open area)

AND/OR

- For 50% of the roof area use roofing materials having one of the following characteristics (1 point):
 - A Solar Reflectance Index (SRI) equal to or greater than the values in the table below for a minimum of 75% of the roof area. Implement a maintenance program that ensures all SRI surfaces are cleaned at least every two years to maintain good reflectance

<u>Roof Type</u>	<u>SRI</u>
Low-Sloped Roof	78
Steep-Sloped Roof	29

- Vegetated green roof per the CDA specifications

SUBMITTALS

Include descriptive narrative and calculations in SAM Checklist



TECHNOLOGY/STRATEGY

Employ strategies, materials and landscaping techniques that reduce heat absorption of exterior materials. Use shade (calculated at 10 a.m., 12 noon, and 3 p.m. on the summer solstice [June 21] that will be used as the effective shaded area) from native or adapted trees and large shrubs, vegetated trellises or other exterior structures supporting vegetation. Consider the use of new coatings and integral colorants for asphalt to achieve light-colored surfaces instead of blacktop. Position photovoltaic cells to shade impervious surfaces.

Consider installing high-albedo roofs to reduce heat absorption. SRI is calculated according to ASTM E 1980. Reflectance is measured according to ASTM E 903, ASTM E 1918 or ASTM C 1549. Emittance is measured according to ASTM E 408 or ASTM C 1371. Product information is available from the Cool Roof Rating Council website, at www.coolroofs.org. Also, visit the ENERGY STAR website, www.energystar.gov to research compliant products.

Unless the reflectance is determined directly through in-site testing, the following default SRI values are to be used:

<u>MATERIAL</u>	<u>SRI</u>
New Conventional “gray” concrete	35
Old (weathered) “gray” concrete	19
New “white” concrete	86
Old (weathered) “white” concrete	45
New Asphalt	0
Old Asphalt	6

Standard Practice

- White roofs are currently the standard for new construction on airport property. These are acceptable; however, SRI decreases with the age of the roof. Unless a cleaning program is in place, the benefits of white roofs diminish over time. For this reason, along with the benefits of stormwater management, the construction of vegetated green roofs is encouraged.

Recommended Practice

- Maximize light colored/high albedo pavement, such as Portland Concrete Cement (PCC), for roadways, parking lots, sidewalks and plaza areas. Reflectance must be a minimum of 0.3 (‘White’ Portland cement – 0.7 to 0.8, typical PCC – 0.35 to 0.5, typical asphalt pavement – 0.05 (new) to 0.15 (over 5 years)). On an annual basis, test the pervious areas to verify the SRI standard is met as well as to depict improvement.
- Install a vegetated green roof



- Evaluate and utilize an ENERGY STAR compliant roofing system, such as aluminum coating and light-colored coatings. Thermoplastic and white Polyvinyl chloride (PVC) roofing systems meet these standards.

Best Available Practice

- For Landside projects only, install trees consistent with CDA Specification 02905 – Sustainable Airport Landscaping, and for any proposed plant species not listed, consult an FAA certified airport biologist to ensure the plants will not attract wildlife
- A creative combination of the above strategies to reach this goal is encouraged. For example, a task/project can provide 5% shading of dark colored impervious surfaces and 25% light colored/high albedo pavement to achieve this goal
- Install open grid pavement for surface lots and site pavement
- Install light-colored permeable pavers and concrete
- Install “green walls” for building façade



2.0 SUSTAINABLE SITES

2.11 Light Pollution Reduction

1 point

INTENT

Eliminate light trespass from the building and site, improve night sky access and reduce development impact on nocturnal environments and upgrade existing lighting specifications to meet new standards.

REQUIREMENTS

Interior Lighting: All non-emergency built-in existing interior/indoor lighting with a direct line of sight to any openings in the envelope (translucent or transparent, wall or ceiling) must be automatically controlled to turn off during all after-hours periods during the performance period. The total duration of all programmed after-hours periods annually must equal or exceed 2,190 hours per year (50% of annual nighttime hours). Manual override capability may be provided for occasional after-hours use.

Implement a program to ensure that the lighting control system is being properly used to adjust lighting levels during all after-hours periods.

Exterior and Site Lighting: Choose one of the following options:

OPTION 1

If the project achieved LEED – NC SS Credit 8 and/or SAM Design & Construction Credit 2.7 Light Pollution Reduction, the point is earned.

OR

OPTION 2

Partially or fully shield all fixtures so that they do not directly emit light to the night sky.

Fully shielded: Exterior light fixtures are shielded or constructed so that light rays emitted by the fixture are projected below the horizontal plane passing through the lowest point on the fixture from which light is emitted.

Partially shielded: Exterior light fixtures are shielded so that the lower edge of the shield is at or below the centerline of the light source or lamp such that light emission above the horizontal plane is minimized.



SUBMITTALS

Include descriptive narrative in the SAM Checklist.

TECHNOLOGY/STRATEGY

Implement site lighting criteria to maintain safe light levels while avoiding off-site lighting and night sky pollution. Technologies to reduce light pollution include full-cutoff luminaires and low-reflectance surfaces.

Standard Practice

- Minimize site lighting where possible and use standard cutoffs for interior and exterior lighting wherever possible and appropriate

Recommended Practice

- Automatic Lighting controls such as motion sensors or timers
- Adopt site lighting criteria to maintain safe light levels while avoiding off-site lighting and night sky pollution
- Low-angle spotlights for roadway and building lighting
- The maximum candela value of all interior lighting shall fall within the building (not out through windows) and the maximum candela value of all exterior lighting shall fall within the property
- Consider a parking lot design which allows for a reduction of the available parking areas and the associated exterior lighting during non-use or low use hours

Best Available Practice

- Fine tune the lighting energy demand while evaluating potential smart-lighting control systems and LED light technologies



3.0 WATER EFFICIENCY

3.1 Prerequisite 1 – Establish a Water Use Baseline

Required

INTENT

Increase water efficiency within CDA Division and tenant spaces to reduce the burden on municipal water supply and wastewater systems.

REQUIREMENTS

Provide water meter data (if available);

OR

Calculate baseline water usage by taking an inventory of plumbing fixtures. Once the inventory has been completed use the table below to determine the aggregate baseline fixture flow rate by multiplying the number of fixtures by their respective baseline flow rates. The sum of all these flow rates will become the baseline for each subsequent review.

Exceptions from Calculations:

- Those appliances & equipment for which water is used toward human consumption may be excluded. For example, bread misters, soda machines, coffee making machines, misters for produce and fixtures used to fill sinks for washing produce.
- Equipment, appliances, fixtures and fittings not covered by the Energy Policy Act 1992 and that do not contribute toward the retail process and are not commercially rated may also be excluded. For example, a residential dishwasher in an employee break room.
- Fixtures whose flow rates are regulated by health codes may be excluded (e.g., fixtures used for filling sinks in which a certain temperature must be maintained for dishwashing)

Commercial Fixtures, Fittings, and Appliances	Usage Rate	Fixture Flow Rate	Baseline Flow Rate
Commercial Toilet	4 times per day	1.6 gallons/use	6.4 gallons/day
Commercial Urinal	2 times per day	1 gallons/use	2 gallons/day
Commercial Lavatory (restroom) Faucet	6 times per day	0.5 gallons/use	3 gallons/day



Commercial Fixtures, Fittings, and Appliances	Usage Rate	Fixture Flow Rate	Baseline Flow Rate
Kitchen Faucet	2 times per day	1 gallons/use	2 gallons/day
Shower	1 time per day	105 gallons/use	105 gallons/day
Commercial Pre-Rinse Spray Valves (for food service applications)	3 times per day	95 gallons/use	285 gallons/day
Washing Machine	1 time per day	35 gallons/use	35 gallons/day
Dishwasher	1 time per day	8.5 gallons/use	8.5 gallons/day
Dishwasher (for food service applications)	5 times per day	200 gallons/use	1,000 gallons/day
Water Fountain	5 times per day	0.01 gallons/use	0.05 gallons/day
Ice Machines	1 time per day	30 gallons/use	30 gallons/day

* Flow rates have been based on EPA 1992 where available

SUBMITTALS

Include descriptive narrative and calculations in the SAM Checklist.

TECHNOLOGY/STRATEGY

Gather the meter data from one full year. When calculating the aggregate baseline amount only the following fixtures and fixture fittings (as applicable to the space) should be included: toilets, urinals, lavatory faucets, kitchen faucets, showers, and pre-rinse spray valves, washing machines, dishwashers, water fountains and ice machines.

Standard Practice

- Comply with CDA Specification 15410 – Plumbing Fixtures



Recommended Practice

- Track water consumption using whole building metering
- Identify meters and install a separate meter if one is not present

Best Available Practice

- Track water consumption using submetering for one or more of the following:
 - Irrigation
 - Indoor plumbing fixtures
 - Cooling towers
 - Domestic hot water
 - Process water



3.0 WATER EFFICIENCY

3.2 Water Efficiency Measures

1 to 5 points

INTENT

Recognize previous improvements and upgrades that had a positive impact on water efficiency.

REQUIREMENTS

- Create an inventory of all the water improvements and upgrades undertaken to improve their water efficiency prior to the initial performance review.
- This credit is only applicable on the first completed performance review. Subsequent reviews would refer to SAM Credits 3.1 Prerequisite 1 – Establish a Water Baseline and 3.3 Indoor Water Efficiency.

SUBMITTALS

Include descriptive narrative in the SAM Checklist.

TECHNOLOGY/STRATEGY

A point will be awarded for each of the retroactive improvements. Up to 5 points may be awarded by achieving any of the following measures:

<u>Technology/Strategy</u>	<u>Points</u>
Switched to high efficiency toilets	1
Switched to high efficiency urinals	1
Switched to waterless toilets and urinals	1
Installed low flow kitchen faucets	1
Installed low flow lavatory faucets	1
Installed ENERGY STAR dishwasher	1
Installed ENERGY STAR washing machine	1

Standard Practice

None



Recommended Practice

None

Best Available Practice

None



3.0 WATER EFFICIENCY

3.3 Indoor Water Efficiency

1 to 5 points

INTENT

Maximize indoor plumbing fixture and fitting efficiency to reduce the use of potable water and the burden on municipal water supplies and wastewater systems.

REQUIREMENTS

During the performance period have in place strategies and systems that in aggregate produce a reduction in indoor plumbing fixture potable water use from the reported or calculated baseline established in SAM Credit 3.1 Prerequisite 1 – Establish a Water Baseline.

The minimum water savings percentages for each point threshold are as follows:

<u>SAM Credit</u>	<u>Water Reduction</u>	<u>Points</u>
3.3.1	10%	1
3.3.2	20%	2
3.3.3	30%	3
3.3.4	40%	4
3.3.5	50%	5

SUBMITTALS

Include descriptive narrative and calculations in the SAM Checklist.

TECHNOLOGY/STRATEGY

Calculations are based on estimated occupant usage and shall include only the following fixtures and fixture fittings (as applicable to the space): water closets, urinals, lavatory faucets, showers, kitchen sink faucets and pre-rinse spray valves.

WaterSense[™]- certified fixtures and fixture fittings should be used where available. Use high-efficiency fixtures (water closets and urinals) and dry fixtures such as composting toilet systems to reduce the potable water demand. Consider the use of alternate on-site sources of water, such as rainwater,



stormwater, or air conditioner condensate, and graywater for non-potable applications such as toilet and urinal flushing, as approved by the manufacturer, and for custodial uses.

Reduce indoor plumbing fixture and fitting potable water usage through automatic water control systems. Install, where possible, water-conserving indoor plumbing fixtures and fittings that meet or exceed the UPC 2006 or IPG 2006 fixture and fitting requirements in combination with high-efficiency or dry fixture and control technologies.

Special consideration should be used to distinguish applicability of these technologies in high-volume passenger terminal areas versus office facilities, especially with respect to maintenance.

Standard Practice

- Comply with CDA Specification 15410 – Plumbing Fixtures

Recommended Practice

- Exceed Chicago Building Code (CBC) (EPA Act 1992) by 20%
- Use high-efficiency fixtures and valves
- Utilize fixtures such as dual flush toilets and waterless urinals to reduce wastewater volumes
- Evaluate reusing stormwater for non-potable uses
- Use local generation of domestic hot water, as much as possible, to eliminate long piping runs associated with recirculation piping. Unless connecting to an existing hot water recirculating system
- Domestic hot water for general plumbing fixtures should be designed for a temperature of 140°F maximum, but not less than 120°F
- Install water efficient dishwashers and washing machines
- Water efficient dishwashers and washing machines

Best Available Practice

- While regulatory requirements vary by jurisdiction and a permit and/or a variance may be necessary, graywater can be captured from lavatories, showers, and institutional dishwashing facilities and potentially used for irrigation needs, toilet flushing, sewage conveyance or on-site wastewater treatment systems



3.0 WATER EFFICIENCY

3.4 Water Efficient Landscaping

1 to 3 points

INTENT

Limit or eliminate the use of potable water or other natural surface or subsurface resources available on or near the project site for landscape irrigation.

REQUIREMENTS

Reduce potable water or other natural surface or subsurface resource consumption for irrigation compared with current conventional means. If the building does not have separate water metering for irrigation systems, the water-use reduction achievements can be demonstrated through calculations.

Points will be awarded by achieving the following measures:

<u>Technology/Strategy</u>	<u>Points</u>
Irrigation controls (e.g., soil moisture sensors, weather data-based controller)	1
Rain water harvesting and graywater (e.g., rain barrels and cisterns)	2
No irrigation (through plant selection/landscape xeriscaping)	3

Potable water: Water suitable for drinking that meets or exceeds EPA drinking water standards; it is supplied from wells or municipal water systems.

SUBMITTALS

Include descriptive narrative in the SAM Checklist.

TECHNOLOGY/STRATEGY

Specify water-efficient, climate-tolerant native or adapted plantings. Implement or maintain high-efficiency irrigation technologies, such as micro-irrigation, moisture sensors, or weather data-based controllers. Feed irrigation systems with captured rainwater, graywater (on-site or municipal), municipally reclaimed water, or on-site treated wastewater. Consider not operating an irrigation system. Consider use of xeriscaping principles in arid climates.



Standard Practice

- Irrigation systems are not typically installed airside and the lower maintenance tall fescue is used for all projects per the following CDA Master Specifications:
 - CDA Specification T-901 – Seeding
 - CDA Specification 02931 – Seeding Hydro-mulching
 - CDA Specification 02905 – Sustainable Airport Landscaping, is the airport landscaping specification that deals with other plants and landscaping requirements

Recommended Practice

- No irrigation system
- Drought tolerant plants
- Utilize vegetation acceptable for site use (native and/or low-maintenance), with special consideration for vegetated green roofs. Utilize vegetation to reduce or eliminate irrigation requirements for airside/landside areas
- Minimized use of high maintenance grass areas, lawns and annual plants
- Established areas of high and low landscape maintenance areas. Group plants with similar water-use needs by determining which areas of the site should receive a higher level of care than others and, during drought periods, more irrigation. Coordinate these areas with the irrigation plan. Higher maintenance areas should be located around the major building entries and high traffic areas. Lower maintenance areas should be located on low traffic areas, buffer zones and service areas.

Best Available Practice

- Have a soil and climate analysis to determine the appropriate landscape strategy
- Evaluation of stormwater and/or graywater cisterns for capturing rainwater from all new roofs for irrigation
- If an irrigation system is installed, a soil moisture monitoring system is present to reduce reliance on manual control and timed devices, as well as for detecting leaks
- Have incorporated the use of recycled and treated wastewater for the use of irrigation



3.0 WATER EFFICIENCY

3.5 Rain Harvesting for Non-Irrigation Usage

3 Points

INTENT

Decrease the demand for potable water for non-irrigation use.

REQUIREMENTS

The CDA and/or the tenant should implement and maintain a rainwater harvesting system for the following processes to include, but is not limited to:

- Equipment/Vehicle Washing
- Aircraft Washing
- Cooling tower
- Other non-irrigation uses as approved by the SRP

SUBMITTALS

Include descriptive narrative on SAM Checklist detailing the system used.

TECHNOLOGY/STRATEGY

Rain harvesting systems can vary in complexity and sophistication, but in every system must utilize some basic common elements. A catchment area will intercept the rainfall and a cistern will store the collected rainwater. Rooftops provide an idea environment for the catchment and a rain barrel is a simplistic example of a cistern. A downspout running can be used for conveyance between the catchment area and the cistern.

Standard Practice

None



Recommended Practice

- The cleaning of building exteriors and hardscapes
- Install cisterns to collect and store rainwater to be used for landscaping and other purposes
- Install rain barrels at the end of downspouts
- Use swales to collect and guide stormwater to catchment areas

Best Available Practice

None



3.0 WATER EFFICIENCY

3.6 Innovative Wastewater Management

2 points

INTENT

To reduce wastewater generation and potable water demand while increasing the local aquifer recharge.

REQUIREMENTS

Use a system or technology that uses one of the following:

OPTION 1

Reduce potable water use for building sewage conveyance by 50% using water-conserving fixtures (water closets, urinals) non-potable water (captured rainwater, recycled graywater, and on-site or municipally treated wastewater).

OR

OPTION 2

Currently treats 50% of wastewater on-site to tertiary standards. Treated water must be infiltrated or used on-site.

SUBMITTALS

Include descriptive narrative and calculations in the SAM Checklist.

TECHNOLOGY/STRATEGY

Specify high-efficiency fixtures and fittings and dry fixtures such as composting toilet systems and non-water using urinals to reduce wastewater volumes. Consider reusing stormwater or graywater for sewage conveyance or on-site mechanical and/or natural wastewater treatment systems. Options for on-site wastewater treatment include packaged biological nutrient removal systems and high-efficiency filtration systems.

Standard Practice

None



Recommended Practice

- Uses high-efficiency fixtures and valves
- Utilizing fixtures such as dual flush toilets and waterless urinals to reduce wastewater volumes
- Evaluation or reusing stormwater for non-potable uses

Best Available Practice

- Capture graywater from lavatories, showers and institutional dishwashing facilities for sewage conveyance or on-site wastewater treatment systems



3.0 WATER EFFICIENCY

3.7 Water Efficient Vehicle Washing

1 to 4 points

INTENT

To limit or eliminate the use of potable water or other natural surface or subsurface resources available on or near the project site for vehicle washing.

REQUIREMENTS

Up to 4 points may be awarded by achieving any of the following measures:

<u>Technology/Strategy</u>	<u>Points</u>
Install low volume, high pressure sprayer nozzles on water hoses	1
Log vehicle washing and meter vehicle wash systems separately to measure water	1
Recycle more than 20% of wash water during vehicle washing	1
Recycle more than 50% of wash water during vehicle washing	1

Potable water: Water suitable for drinking that meets or exceeds EPA drinking water standards; it is supplied from wells or municipal water systems.

SUBMITTALS

Include descriptive narrative and calculations in the SAM Checklist.

TECHNOLOGY/STRATEGY

Reduce potable water or other natural surface or subsurface resource consumption for vehicle washing compared with current conventional means. If the building does not have separate water metering for vehicle washing systems, the water-use reduction achievements can be demonstrated through calculations.

Standard Practice

- Indoor vehicle washing



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Recommended Practice

- Low volume, high pressure sprayer nozzles on water hoses
- Keep a log of vehicle washing water use
- Capture wash water for re-use (cistern)

Best Available Practice

- Treat wash water for re-use



4.0 ENERGY & ATMOSPHERE

4.1 Prerequisite 1 – Refrigerant Management

Required

INTENT

Reduce stratospheric ozone depletion and move towards using non-ozone depleting and low global warming potential refrigerants.

REQUIREMENTS

Do not use chlorofluorocarbon (CFC)-based refrigerants in HVAC&R base building systems unless system replacement or conversion is not economically feasible or it is demonstrated that a phase-out plan for CFC-based refrigerants is in place.

Small HVAC&R units (defined as containing less than 0.5 pounds of refrigerant), standard refrigerators, small water coolers, and any other cooling equipment that contains less than 0.5 pounds of refrigerant are not considered part of the base building system and are exempt.

SUBMITTALS

Include descriptive narrative in the SAM Checklist.

TECHNOLOGY/STRATEGY

Specify only non-CFC-based refrigerants in all new building HVAC&R systems. Identify all existing CFC based refrigerant uses and upgrade the equipment if economically feasible and/or develop a phase-out plan that identifies a schedule for future replacement.

Standard Practice

- Only HCFC and HFC refrigerants have been used for CDA projects where refrigerants were required (typically R-410a, which is a HFC).
- HFCs have an Ozone Depleting Potential (ODP) of zero, but medium to high Global Warming Potential (GWP) that is still lower than phased-out CFCs. In October 2016, the parties of the Montreal Protocol agreed on a phase down of HFCs, which is scheduled to begin in 2019.

Recommended Practice

None



Best Available Practice

- Although Hydrochlorofluorocarbons (HCFCs) and Hafnium carbide (HfCs) have ozone depletion potentials (ODP) that are nearly zero, consideration should also be given to their global warming potentials (GWP) (see SAM Credit 4.8 – Enhanced Refrigerant Management). Alternative refrigerants that minimize ODP and GWP compared to HCFCs and HFCs include natural refrigerants such as carbon dioxide, ammonia, and propane. These compounds have an ODP of zero and GWPs which are three orders of magnitude less than most HCFCs and HFCs.



4.0 ENERGY & ATMOSPHERE

4.2 Utility Meter Data

1 to 4 points

INTENT

Monitor, track and report utility data to reduce environmental and economic impacts associated with excessive energy use.

REQUIREMENTS

Provide utility meter data (if available). (1 point)

AND/OR

The data collected under the first performance review will become the baseline for each subsequent review.

During the performance period, have in place strategies and systems that in aggregate produce less energy from the reported baseline established under the first performance review.

The minimum energy savings percentages for each point threshold are as follows:

<u>SAM Credit</u>	<u>Energy Reduction</u>	<u>Points</u>
4.2.1	10%	1
4.2.2	20%	2
4.2.3	30%	3

SUBMITTALS

Include descriptive narrative in the SAM Checklist.

TECHNOLOGY/STRATEGY

If a separate utility meter is not in place, it is recommended that one be installed. Meter data should be used to determine where energy consumption can be optimized and areas where submetering may be useful.



Chicago Department of Aviation
SUSTAINABLE AIRPORT MANUAL



Standard Practice

None

Recommended Practice

- Install utility meters where applicable

Best Available Practice

- Install submeters wherever possible



4.0 ENERGY & ATMOSPHERE

4.3 Energy Optimization Measures

1 to 5 points

INTENT

Recognize previous improvements and upgrades that had a positive impact on energy efficiency.

REQUIREMENTS

- Create an inventory of all the energy improvements and upgrades undertaken to improve their energy efficiency prior to the initial performance review.
- This credit is only applicable to the first completed performance review. Subsequent reviews would refer to SAM Credits 4.2 Utility Meter Data and 4.4 Optimize Energy Performance.

SUBMITTALS

Include descriptive narrative in the SAM Checklist.

TECHNOLOGY/STRATEGY

A point will be awarded for each of the retroactive improvements. Up to 5 points may be awarded by achieving any of the following measures:

<u>Technology/Strategy</u>	<u>Points</u>
Switched to LED lighting for up to 50% of lighting load	1
Switched to LED lighting for 100% of lighting load	3
Provided the use of lighting sensors or timers	1
Organized circuiting of lighting and systems so that individual areas were separately controlled relative to daylight and heating/cooling zones	1
Provided high-efficiency motors and variable-speed pumping systems	1
Utilized ENERGY STAR furnaces, exhaust fans, ceiling fans, and air conditioners	1

Standard Practice

None



Recommended Practice

None

Best Available Practice

None



4.0 ENERGY & ATMOSPHERE

4.4.1 Optimize Energy Performance: Lighting Power

1 to 5 Points

INTENT

Achieve increasing levels of energy conservation beyond the referenced standard to reduce environmental and economic impacts associated with excessive energy use.

REQUIREMENTS

For interior facility lighting, reduce connected lighting power density below that allowed by ANSI/ASHRAE/IESNA Standard 90.1-2010 (with errata but without addenda¹) using either the space-by-space method or by applying the lighting power allowance to the project area.

OR

For non-facility/non-aviation exterior lighting applications, a baseline energy use shall be calculated assuming a conventional 400-watt lamp is used for each fixture, except for low-mast applications or covered areas where a 250-watt lamp is applicable. This benchmark standard shall assume that the lamps run without lighting controls such as timers and motion sensors. Light sensors, however, should be considered. To meet the requirements of this credit, reduce lighting power for these applications based on the benchmark standard. Non-facility/non-aviation exterior lighting applications may include the following:

- Roadways
- Surface Parking Lots
- Covered Parking Garages

OR

For aviation lighting, exceed the minimum FAA specifications. The benchmark calculations shall assume that conventional lighting is used throughout the project area and that the calculation must be based on annual energy consumption that takes into account seasonal climate data.

¹ Project teams wishing to use ASHRAE approved addenda for the purposes of this credit may do so at their discretion. Addenda must be applied consistently across all SAM credits.



Any combination of points earned for reducing energy usage below the standards documented above are as follows (may not exceed 5 points in total).

<u>SAM Credit</u>	<u>Lighting Power Density Reduction Below the Standard</u>	<u>Points</u>
4.4.1.1	15%	1
4.4.1.2	20%	2
4.4.1.3	25%	3
4.4.1.4	30%	4
4.4.1.5	35%	5

Examples: A 15% reduction in facilities lighting power (1 point) in addition to a 25% reduction in parking lot lighting power (3 points) would total four points earned for this credit. A 25% reduction in facilities lighting power (3 points) in addition to a 25% reduction in parking lot lighting power (3 points), totaling six points, would earn the maximum five points for this credit.

SUBMITTALS

Include descriptive narrative and calculations in the SAM Checklist.

TECHNOLOGY/STRATEGY

Ensure the connected lighting power maximizes energy performance. Consider a computer simulation model to assess the performance and identify the most cost-effective energy measures.

Standard Practice

- Use CFL lighting, wherever applicable
- Utilize energy saving halogen lamps
- Utilize high efficiency T8s and T5s



Recommended Practice

Consider the following:

- Use a computer simulation model to assess energy performance and identify the most cost effective energy measures
- Provide energy efficient lighting systems including LED, fluorescent lighting, solar lighting and the use of lighting sensors or timers
- Use LED lighting, wherever applicable

Best Available Practice

None



4.0 ENERGY & ATMOSPHERE

4.4.2 Optimize Energy Performance: Lighting Control

1 to 3 Points

INTENT

Achieve increasing levels of energy conservation beyond the referenced standard to reduce environmental and economic impacts associated with excessive energy use.

REQUIREMENTS

Up to 3 points may be awarded by achieving any of the following measures:

Technology/Strategy

Points

Daylight controls for daylight areas: Install daylight responsive controls in all regularly occupied daylit spaces within 15 feet of windows and under skylights. Daylight controls must switch or dim electric lights in response to the presence or absence of daylight illumination in the space

1

Daylight controls for 50% of the lighting load: Install daylight responsive controls for 50% or more of the connected lighting load and demonstrate that 50% of the connected lighting load is daylight responsive. Daylight controls must switch or dim electric lights in response to the presence or absence of daylight illumination in the space.

1

Occupancy Sensors: Install occupancy sensors for 75% of the connected lighting load.

1

SUBMITTALS

Include descriptive narrative and calculations in the SAM Checklist.

TECHNOLOGY/STRATEGY

Ensure the connected lighting power maximizes energy performance.



Standard Practice

None

Recommended Practice

- Provide energy efficient lighting systems including LED, fluorescent lighting, solar lighting and the use of lighting sensors or timers
- Organize circuiting of lighting and systems so that individual areas may be separately controlled relative to daylight and heating/cooling zones
- Provide motion sensors/occupancy sensors in stairs, restrooms, storage rooms, equipment rooms and office space unless life safety is compromised
- Optimize lighting controls for energy savings and function

Best Available Practice

- Integrate lighting systems with Building Automation System



4.0 ENERGY & ATMOSPHERE

4.4.3 Optimize Energy Performance: HVAC

3 to 6 Points

INTENT

Achieve increasing levels of energy conservation beyond the referenced standard to reduce environmental and economic impacts associated with excessive energy use.

REQUIREMENTS

OPTION 1

Implement one or both of the following strategies:

- Equipment Efficiency: (3 pts)

Install heating, ventilation and air conditioning (HVAC) systems that comply with the efficiency requirements outlined in the New Buildings Institute's Advanced Buildings™ Core Performance™ Guide Sections 1.4: Mechanical System Design, 2.9: Mechanical Equipment Efficiency and 3.10: Variable Speed Control.

- Appropriate Zoning and Controls: (3 pts)

Zone spaces to meet the following requirements:

- Every solar exposure must have a separate control zone
- Interior spaces must be separately zoned
- Private offices and special occupancies (conference rooms, kitchens, etc.) must have active controls capable of sensing space use and modulating the HVAC system in response to demand

OR

OPTION 2

Reduce design energy cost compared with the energy cost budget for regulated energy components described in the requirements of ANSI/ASHRAE/IESNA Standard 90.1-2016 (with errata but without addenda).

AND



PATH 1 (3 pts)

Demonstrate that HVAC system component performance criteria used for space are 15% better than a system in minimum compliance with ANSI/ASHRAE/IESNA Standard 90.1-2016 (with errata but without addenda).

OR

PATH 2 (6 pts)

Demonstrate that HVAC system component performance criteria use for space is 30% better than a system that is in minimum compliance with ANSI/ASHRAE/IESNA Standard 90.1-2016 (with errata but without addenda).

SUBMITTALS

Include descriptive narrative and calculations in the SAM Checklist.

TECHNOLOGY/STRATEGY

Ensure the HVAC system components maximize energy performance. Review compliance options to determine the most appropriate approach. Option 1 provides a more prescriptive approach to recognizing energy-efficient HVAC design, while Option 2 is performance based.

Standard Practice

None

Recommended Practice

- Provide high-efficiency motors and variable-speed pumping systems.
- Utilize ENERGY STAR furnaces, exhaust fans, ceiling fans, and air conditioners

Best Available Practice

- Evaluate under floor air distribution systems in office-type spaces
- Evaluate the potential for “green walls”
- Utilize premium efficiency motors where applicable



4.0 ENERGY & ATMOSPHERE

4.4.4 Optimize Energy Performance: Equipment and Appliances

1 to 4 Points

INTENT

Achieve increasing levels of energy conservation beyond the referenced standard to reduce environmental and economic impacts associated with excessive energy use.

REQUIREMENTS

For all ENERGY STAR qualified equipment and appliances installed, achieve one of the following percentages by rated power:

<u>SAM Credit</u>	<u>ENERGY STAR Qualified Equipment*</u>	<u>Points</u>
4.4.4.1	70%	1
4.4.4.2	77%	2
4.4.4.3	84%	3
4.4.4.4	90%	4

*As a percentage of ENERGY STAR eligible equipment
Excluded are HVAC, lighting and building envelope products.

This requirement applies to appliance, office equipment, electronics and commercial food service equipment. Excluded are HVAC, lighting and building envelope products.

SUBMITTALS

Include descriptive narrative and calculations in the SAM Checklist.

TECHNOLOGY/STRATEGY

Select energy-efficient equipment and appliances, as qualified by the EPA's ENERGY STAR Program (www.energystar.gov).

Standard Practice

None



Recommended Practice

- Provide high-efficiency motors and variable-speed pumping systems.
- Provide ENERGY STAR compliant equipment such as:
 - Dishwashers
 - Refrigerators
 - Water Heater
 - Computers
 - Printers
 - Copiers
 - Phones
 - Televisions
 - Ice machines
 - Convection ovens
 - Combination ovens

Best Available Practice

None



4.0 ENERGY & ATMOSPHERE

4.5 Existing Building Commissioning

1 to 6 points

INTENT

Develop and implement an operation of the building's major energy-using systems and implement a no to low cost option(s) for optimizing energy performance and a plan to achieve energy savings.

REQUIREMENTS

Conduct one of the following options below – 1 to 2 points

OPTION 1

Commissioning Process (1 point)

- Develop a retro commissioning or ongoing commissioning plan for the building's major energy-using systems
- Conduct the investigation and analysis phase
- Document the breakdown of energy use in the building
- List the operating problems that affect occupants' comfort and energy use, and develop potential operational changes that will solve them
- List the identified capital improvements that will provide cost-effective energy savings and document the cost-benefit analysis associated with each.

OR

OPTION 2

ASHRAE Level II, Energy Audit (2 points)

- Conduct an energy audit that meets the requirements of ASHRAE Level II, energy survey and analysis
- Document the breakdown of energy use in the building
- Perform a savings and cost analysis of all practical measures that meet the owner's constraints and economic criteria, along with a discussion of any effect on operations and maintenance procedures
- List the identified capital improvements that will provide cost-effective energy savings and document the cost-benefit analysis associated with each.

AND



Implementation (2 Points)

Implement one of the two aforementioned no- or low-cost operational improvements and create a capital plan for major retrofits or upgrades. Provide training for management staff that builds awareness and skills in a broad range of sustainable building operations topics this could include energy efficiency and building, equipment and systems operations, and maintenance.

Demonstrate the observed and/or anticipated financial costs and benefits of measures that have been implemented.

Update the building operating plan as necessary to reflect any changes in the occupancy schedule, equipment run-time schedule, design set-points, and lighting levels.

AND

Ongoing (2 points)

Implement an ongoing commissioning program that includes elements of planning, system testing, performance verification, corrective action response, ongoing measurement, and documentation to proactively address operating problems.

Create a written plan that summarizes the overall commissioning cycle for the building by equipment or building system group. The ongoing commissioning cycle must not exceed 24 months. This plan must include a building equipment list, performance measurement frequency for each equipment item, and steps to respond to deviation from expected performance parameters.

Update the building operating plan and/or systems narrative as necessary to reflect any changes in the occupancy schedule, equipment run-time schedule, design setpoints, lighting levels, or system specifications.

SUBMITTALS

Include descriptive narrative and calculations in SAM Checklist.

TECHNOLOGY/STRATEGY

Based on the building operating plan and systems narrative:

- Confirm that all building systems and equipment are functioning as appropriate according to the equipment schedule
- Conduct testing and analysis to ensure that building systems and equipment are functioning correctly
- Identify opportunities to make no- or low-cost capital improvements to enhance building performance



Implement no- and low-cost operational improvements that will immediately enhance building performance. Develop a capital plan for the completion of any major retrofits identified through the investigation and analysis phase.

Develop an ongoing commissioning program that addresses the ongoing changes and maintenance needs in an existing building.

Standard Practice

- Commissioning Agents are typically engaged to conduct fundamental commissioning for buildings.

Recommended Practice

- Review the design intent and the basis of design documentation Incorporate commissioning requirements into the construction documents
- Develop and utilize a commissioning plan
- Verify installation, functional performance, training, operations and maintenance documentation
- Complete a commissioning report
- Provide the owner with a single manual that contains the information required for re-commissioning systems
- Engage a commissioning team that does not include individuals directly responsible for project design or construction management to evaluate both building and site systems as part of the commissioning plan
- Priority Systems - high energy consuming systems:
 - Central Building Automation system
 - All HVAC system equipment
 - Lighting controls and sensors
 - Site Lighting
 - Refrigeration systems
 - Vertical Transport
 - Building Envelope
 - Baggage handling systems (included in process loads: to promote energy savings, use the exceptional calculation method described in ANSI/ASHRAE/IESNA 90.1-2016 G2.5)
 - Information Technology Systems - IT (included in process loads: to promote energy savings, use the exceptional calculation method described in ANSI/ASHRAE/IESNA 90.1-2016 G2.5)
- Lower Priority Systems – low energy consuming system:
 - Emergency Power Generators and Automatic Transfer Switching
 - Uninterruptible Power Supply systems
 - Life Safety systems Fire protection Fire alarm, Egress pressurization
 - Lightning Protection
 - Domestic and Process water pumping and mixing systems
 - Equipment sound control systems



- Data and Communication systems
- Paging systems
- Security systems
- Irrigation systems
- Plumbing
- Illuminated guidance signage
- For Runways, Civil/Stormwater and Roadways/Rail projects this scope should include the following project components:
 - For support and ancillary buildings include all the applicable systems and assemblies noted above
 - Runway lighting and illuminated signage
 - Runway NAVAIDS
 - Site lighting systems
 - Traffic signals
 - Stations (e.g., pump stations, lift stations, drainage pumps)
 - Oil/water separators

Best Available Practice

None



4.0 ENERGY & ATMOSPHERE

4.6.1 Performance Measurement: Building Automation System

1 point

INTENT

Provide information to support the ongoing accountability and optimization of building energy performance and identify opportunities for additional energy-saving investments.

REQUIREMENTS

Have in place a computer-based building automation system (BAS) or enhance existing BAS that monitors and controls key building systems that include, but are not limited to:

- Heating
- Cooling
- Ventilation
- Lighting

Have a preventive maintenance program in place that ensures BAS components are tested and repaired or replaced according to the manufacturer's recommended interval. Demonstrate that the BAS is being used to inform decisions regarding changes in building operations and energy-saving investments.

SUBMITTALS

Include descriptive narrative in the SAM Checklist.

TECHNOLOGY/STRATEGY

Install and/or maintain a BAS to automatically control key building systems. Ensure that relevant staff is adequately trained to use the system, analyze output, make necessary adjustments, and identify investment opportunities to improve energy performance.

Standard Practice

None

Recommended Practice

- Install a Building Automation System



Best Available Practice

None



4.0 ENERGY & ATMOSPHERE

4.6.2 Performance Measurement: System Level Metering

1 to 2 points

INTENT

Provide accurate energy use information to support energy management and identify opportunities for additional energy-saving improvements.

REQUIREMENTS

Have a developed breakdown of energy use in the building, either through SAM Credits 4.4.1 Optimize Energy Efficiency: Lighting Power, 4.4.2 Optimize Energy Efficiency: Lighting Controls, 4.4.3 Optimize Energy Performance: HVAC or 4.4.4 Optimize Energy Performance: Equipment and Appliances, or by using energy bills, spot metering or other metering to determine the energy consumption of major mechanical systems and other end-use applications. This analysis of major energy use categories must be conducted within two years prior to the date of application for SAM O&M certification.

Based on the energy use breakdown, employ system-level metering covering at least 40% or 80% of the total expected annual energy consumption of the building. Permanent metering and recording are required. All types of submetering are permitted.

Up to 2 points may be awarded by achieving any of the following measures:

<u>Technology/Strategy</u>	<u>Points</u>
Demonstrate that system-level metering is in place covering at least 40% of the total expected annual energy consumption of the building. Further, at least one of the two largest energy use categories from the breakdown report must be covered to the extent of 80% or more (i.e., if energy use in the two largest categories is each 100 BTUs/year, at least 80 BTUs/year in one of them must be metered).	1
Demonstrate that system-level metering is in place covering at least 80% of the total expected annual energy consumption of the building. Further, at least two of the three largest energy use categories from the breakdown report must be covered to the extent of 80% or more.	2



Meters must be calibrated within the manufacturer's recommended interval if the building owner, management organization or tenant owns the meter. Meters owned by third parties (e.g., utilities or governments) are exempt.

SUBMITTALS

Include descriptive narrative in the SAM Checklist.

TECHNOLOGY/STRATEGY

Identify, through an energy audit, building commissioning or some other means, how the building systems are consuming energy. Based on the energy use profile, develop a metering plan to capture the most significant building loads. Use output from the meters to identify any changes in consumption and opportunities for energy- saving improvements. Have a plan for periodically inspecting the data.

Standard Practice

None

Recommended Practice

- Independently meter separate tenants and CDA facilities where applicable
- Sub-meter building systems by process, floor or location

Best Available Practice

None



4.0 ENERGY & ATMOSPHERE

4.7 On-Site and Off-Site Renewable Energy

1 to 6 points

INTENT

Encourage and recognize increasing levels of on-site and off-site renewable energy to reduce environmental impacts associated with fossil fuel energy use.

REQUIREMENTS

OPTION 1

Over the performance period, meet some or all the building's total energy use with on-site or off-site renewable energy systems. Points are earned according to the following table, which shows the percentages of building energy use met by renewable energy over the performance period.

Off-site renewable energy sources are defined by the Center for Resource Solutions (CRS) Green-e-products certification requirements, or the equivalent. Green power must be procured from a Green-e-certified power marketer or a Green-e-accredited utility program, or through Green-e-certified tradable renewable energy certificates (RECs), or the equivalent. For on-site renewable energy that is claimed for this credit, the associated environmental attributes must be retained or retired and cannot be sold.

<u>SAM Credit</u>	<u>On-Site Renewable Energy</u>		<u>Off-Site Renewable Energy</u>	<u>Points</u>
4.7.1	3%	or	25%	1
4.7.2	4.5%	or	37.5%	2
4.7.3	6%	or	50%	3
4.7.4	7.5%	or	62.5%	4
4.7.5	9%	or	75%	5
4.7.6	12%	or	100%	6

Up to the six-point limit, any combinations of individual actions are awarded the sum of the points allocated to those individual actions. For example, one point would be awarded for implementing three 3% of on-site renewable energy, and two additional points would be awarded for meeting 37.5% of the building's energy load with renewable power or certificates over the performance period. Projects must



submit proof of a contract to purchase RECs for a minimum of two years and must also make a commitment to purchase RECs on an ongoing basis beyond that.

OR

OPTION 2 – Prescriptive Method

Install alternative renewable energy technologies on-site by using any of the following technologies for one point each:

- Wind Power:
 - Generate on-site electricity using wind turbines, horizontal or vertical that generate 0.5 kW or greater
- Photovoltaics (solar electric)
 - Use the system to generate electricity that has a capacity of 0.5 kW or greater

SUBMITTALS

Include descriptive narrative and calculation in the SAM Checklist.

TECHNOLOGY/STRATEGY

Maintain the use of on-site nonpolluting renewable technologies to contribute to the total energy requirements of the building. Consider and employ solar, geothermal, wind, biomass (other than unsustainably harvested wood), and biogas technologies.

Purchase renewable energy or tradable renewable energy certificates to meet some or all of the building's energy requirements. Review the building's electrical consumption trend. Research power providers in the area and select a provider that guarantees that a portion of its delivered electric power is derived from net nonpolluting renewable technologies. If the project is in an open-market state, investigate green power and power marketers licensed to provide power in that state. Grid power that qualifies for this credit originates from solar, wind, geothermal, biomass, or low-impact hydro sources.

Standard Practice

- Solar powered signage
- Solar powered RPU for weather sensors
- Solar powered obstruction and barricade lighting
- Solar thermal water heating has been used at several locations, such as the ARFF Station #2, which has a system that provides hot water for up to 18 full-time occupants



Recommended Practice

- Purchase renewable energy or tradable renewable energy certificates to meet some or all of the building's energy requirements

Best Available Practice

The following technologies should be considered for any applicable projects:

- Roof-mounted or building integrated photovoltaic panels
- Electricity generation using bio-fuels (untreated wood waste, agricultural crops or waste, landfill gas)
- Electricity generating wind turbines
- Solar-thermal water or air heating
- Geothermal heating systems
- Geothermal electrical systems



4.0 ENERGY & ATMOSPHERE

4.8 Enhanced Refrigerant Management

1 point

INTENT

Reduce ozone depletion and support early compliance with the Montreal Protocol (an international agreement designed to protect from ozone depletion) while minimizing direct contributions to global warming.

REQUIREMENTS

Do not use conventional refrigerants in HVAC&R systems. Naturally ventilate and/or use natural refrigerants such as:

- Water
- Carbon dioxide
- Propane
- Ammonia

Small HVAC units (defined as containing less than 0.5 lbs of refrigerant), and other equipment such as standard refrigerators, small water coolers, and any other cooling equipment that contains less than 0.5 lbs of refrigerant, are not subject to the requirements of this credit.

AND

Do not install fire suppression systems that contain ozone-depleting substances (CFCs, HCFCs or Halons).

SUBMITTALS

Include descriptive narrative in SAM Checklist.

TECHNOLOGY/STRATEGY

Operate the Facility without mechanical cooling and refrigeration equipment. Where mechanical cooling is needed, use for the refrigeration cycle base building HVAC and refrigeration systems that minimize direct impact on ozone depletion and global warming. Select HVAC&R replacement equipment with reduced refrigerant charge and increased equipment life. Maintain equipment to prevent leakage of refrigerant to the atmosphere. Use fire-suppression systems that do not contain HCFCs or halons.



Standard Practice

None

Recommended Practice

- Use only Hydrofluorocarbons (HFC)

Best Available Practice

- Use natural refrigerants (water, carbon dioxide, ammonia, propane) where possible, in order to minimize ODPs and GWPs



4.0 ENERGY & ATMOSPHERE

4.9 Emissions Reduction Reporting

1 to 4 Points

INTENT

Document the emissions reduction benefits of building efficiency measures to better track CDA's achievements in climate-altering fossil fuel consumption and resultant emissions.

REQUIREMENTS

Identify building performance parameters that reduce conventional energy use and emissions, quantify those reductions, and report them to a formal tracking program:

- Track and record emissions reductions delivered by energy efficiency measures, operational improvements, renewable energy and other building emissions reduction measures, including reductions from the purchase of renewable energy credits
- Report emissions reductions using a third-party voluntary reporting or certification program (e.g., EPA Climate Leaders, ENERGY STAR or World Resources Institute (WRI)/World Business Council Sustainable Development (WBCSD) protocols)
- Report emissions based on the international framework used to describe greenhouse gas emissions. The World Resources Institute's Greenhouse Gas Reporting Protocol divides emissions into three categories:
 - Emissions are those Green House Gas' (GHG) that are directly released on-site, such as combustion of fuels and the application of fertilizers on-airport. (1 point)
 - Emissions result from energy purchased from off-site sources where fuels are burned. (1 point)
 - Emissions include all other GHG-producing activities associated with the activities of an institution, including (2 points):
 - Commuting
 - Air travel for aviation management activities
 - Waste disposal
 - Embodied emissions from the extraction, production, and manufacturing of purchased goods

SUBMITTALS

Include descriptive narrative in SAM Checklist.



TECHNOLOGY/STRATEGY

CDA encourages tracking all project achievements to address all significant types of pollutants reduced by energy efficiency. Measure the following for:

SAM Credit 4.9.1

- Stationary fuel combustion (natural gas for heating)
- Mobile fuel consumption (vehicle fleet)
- Leakage (refrigeration, air conditioning, etc.)
- Fertilizers

SAM Credit 4.9.2

- Electricity generated off-site.

SAM Credit 4.9.3

- Commuting
- Travel
- Waste disposal
- Embodied emissions (extraction, production, & transportation of consumed goods)
- Food
- Office supplies
- Construction materials
- Miscellaneous (coffee mugs, t-shirts, etc.)

Standard Practice

None

Recommended Practice

- Install continuous metering equipment for the following end-uses:
 - Lighting systems and controls
 - Constant and variable motor loads
 - Variable frequency drive (VFD) operation
 - Chiller efficiency at variable loads (kW/ton)
 - Cooling load
 - Air and water economizer and heat recovery cycles
 - Air distribution static pressures and ventilation air volumes
 - Boiler efficiencies
 - Building-related process energy systems and equipment
 - Indoor water risers and outdoor irrigation



- Develop a Measurement and Verification plan that incorporates the monitoring information from the above end-uses and is consistent with Option B, C or D of the 2001 International Performance Measurement & Verification Protocol (IPMVP) Volume I: Concepts and Options for Determining Energy and Water Savings
- Investigate whether these facilities will be included in the City of Chicago's Global Building Monitoring System
- Consider the recommendations included in the Chicago Climate Action Plan

Best Available Practice

- Draft a Measurement & Verification Plan to apply during building operation that compares predicted savings to those achieved.



5.0 MATERIALS & RESOURCES

5.1.1 Waste Management: Waste Stream Audit

3 Points

INTENT

Facilitate the reduction of ongoing waste and toxins generated by building occupants and building operations that are hauled to and disposed of in landfills or incineration facilities.

REQUIREMENTS

Conduct a waste stream audit of the building's, tenants' and divisions' entire ongoing consumables waste stream (not durable goods or construction waste for facilities alterations and additions). Use the audit's results to establish a baseline that identifies the types of waste making up the waste stream and the amounts of each type by weight or volume. Identify opportunities for increased recycling and waste diversion. The audit must be conducted during the performance period.

SUBMITTALS

Include descriptive narrative and calculations in SAM Checklist.

TECHNOLOGY/STRATEGY

Understanding waste production patterns in a building is an important first step to waste reduction. Work with your waste hauler or service provider to collect and analyze information on the amounts and types of waste generated by the facility.

Standard Practice

None

Recommended Practice

- Use the results of the waste audit as a baseline for evaluating future recycling efforts. Analyze the results of the audit and identify targets for expanding the recycling program. Evaluate the capturing and recycling of specific wastes

Best Available Practice

- Create a Five-Year Action Plan outlining waste reduction methods that will be undertaken in the coming years



5.0 MATERIALS & RESOURCES

5.1.2 Waste Management: Waste Reduction

2 to 6 Points

INTENT

Facilitate the reduction of waste and toxins generated from the use of products by building occupants and building operations that are hauled to and disposed of in landfills or incineration facilities.

REQUIREMENTS

Currently employed strategies that reduce the waste stream compared to baseline calculated in SAM Credit 5.1.1 Waste Management: Waste Stream Audit.

The waste reduction percentages for each point threshold are as follows:

<u>SAM Credit</u>	<u>Waste Reduction</u>	<u>Points</u>
5.1.2.1	10%	2
5.1.2.2	20%	3
5.1.2.3	30%	4
5.1.2.4	40%	5
5.1.2.5	50%	6

SUBMITTALS

Include descriptive narrative and calculations in SAM Checklist.

TECHNOLOGY/STRATEGY

Maintain a waste reduction and recycling program that addresses materials with a low cost per unit that are regularly used and replaced through the course of business and maximize the diversion of materials that are also generated by facility alterations and improvements from disposal of landfills and incineration facilities. These materials include, but are not limited to:

- Paper
- Toner cartridges
- Glass
- Plastics



- Cardboard and old corrugated cardboard
- Food waste
- Metals
- Batteries
- Electronics
- Office equipment (computers, monitors, copiers, printers, scanners, and fax machines)
- Appliances (refrigerators, dishwashers, and water coolers)
- External power adapters
- Televisions
- Other audiovisual equipment

Actual diversion performance must be verified at least annually. Furniture, fixtures, and equipment (FF&E) are not considered base building elements and are excluded from this credit. Mechanical, electrical, and plumbing components and specialty items such as elevators are also excluded.

Maintain waste management policies applicable to any facility alterations and additions occurring on the site. Identify licensed haulers and processors of recyclable materials. Identify markets for salvaged materials. Employ deconstruction, salvage, and recycling strategies and processes. Document the cost for recycling, salvaging, and reusing materials. Make source reduction on the job site an integral part of the plan to reduce solid waste. Investigate salvaging or recycling lighting fixture pans when retrofitting.

Standard Practice

- Recycling of conventional products such as, but not limited to: paper, glass, etc.
- Battery and printer cartridge recycling programs are already in place in various locations.

Recommended Practice

- In addition to the standard practice include, but not limited to: light bulbs, batteries, electronics, landscape waste, automotive fluids, etc.
- Have a reuse or resale program for furniture and electronic goods
- Create a coordinated waste reduction program that makes used goods available to other entities
- Allow private salvage companies to access the site prior to demolition to avoid removal costs
- Establish waste reduction goals and specify construction and demolition waste management policies prior to demolition

Best Available Practice

- Establish a program that diverts waste streams to find an on-site use
- Develop a waste tracking system and have a designated sort area for all waste streams



5.0 MATERIALS & RESOURCES

5.2 Local/Regional Materials

1 to 3 Points

INTENT

Increase demand for materials and products that are extracted, harvested or recovered, as well as manufactured within the region, thereby supporting the local economy and the use of indigenous resources and reducing the environmental impacts resulting from transportation.

REQUIREMENTS

Demonstrate that materials and products purchased within the last year were obtained from local and regional sources.

Using materials or products that have been extracted, harvested or recovered, as well as manufactured, within 500 miles of the project site for a minimum of 10% or 20% (based on cost) of the total materials value. If only a fraction of a product or material is extracted/harvested/recovered and manufactured locally, then only that percentage (by weight) shall contribute to the regional value. An additional point can be achieved if 50% of the materials are extracted, harvested, or recovered, as well as manufactured, within 250 miles of the project site.

The minimum percentages of local/regional materials for each point threshold are as follows:

<u>SAM Credit</u>	<u>Local/Regional Materials</u>	<u>Points</u>
5.2.1	10%	1
5.2.2	20%	2
5.2.3	50% within 250 miles	3

SUBMITTALS

Include descriptive narrative and calculations in SAM Checklist.

TECHNOLOGY/STRATEGY

Establish an ongoing goal for locally sourced materials and identify materials and material suppliers that can achieve this goal. Quantify the total percentage of local materials used by cost within the performance period.



Standard Practice

- The central location of Chicago makes many materials and products readily available
- Due to sole sourcing and limited availability, some specialty items may not meet the 500-mile criterion

Recommended Practice

- Identify all material and product purchases used on an annual basis for daily operations that are extracted, processed, or manufactured within 500 miles of Chicago. Materials that may contribute toward this goal include but are not limited to: plumbing and electrical supplies, landscaping materials, office supplies, automotive supplies, furniture, computers, appliances, cleaning products, etc.

Best Available Practice

None



6.0 INDOOR ENVIRONMENTAL QUALITY

6.1 Prerequisite 1 – Outdoor Air Introduction and Exhaust Systems

Required

INTENT

Establish minimum indoor air quality (IAQ) performance to enhance indoor air quality in buildings, thus contributing to the health and well-being of the occupants.

REQUIREMENTS

Choose one of the following options:

OPTION 1

Modify or maintain each outside air intake, supply air fan, and/or ventilation distribution system to supply at least the outdoor air ventilation rate required by ASHRAE 62.1—2010 Ventilation Rate Procedure under all normal operating conditions.

OR

OPTION 2

If meeting ASHRAE 62.1—2010 ventilation rates are infeasible because of the physical constraints of the existing ventilation system, modify or maintain the system to supply at least ten cubic feet per minute (*cfm*) of outdoor air per person under all normal operating conditions.

Demonstrate through design documentation, measurements, or other evidence that the current system cannot provide the flow rates required by ASHRAE 62.1—2010 under any operating condition even when functioning properly.

Each air-handling unit in the building must comply with either Option 1 or Option 2 above. If some air-handling units can provide the outside airflow required by ASHRAE 62.1—2010 and others cannot, those that can must do so. Buildings that cannot provide at least ten cfm per person of outside air at each air-handling unit under all normal operating conditions cannot earn this prerequisite.

Additionally, meet all the requirements below:

- Show compliance with the applicable requirement above (Option 1 or Option 2) through measurements taken at the system level (i.e., the air-handling unit). For variable air volume systems, the dampers, fan speeds, etc. must be set during the test to the worst-case system



conditions (minimum outside airflow) expected during normal ventilation operations. Each air handler must be measured; sampling of air handlers is prohibited.

- Implement and maintain an HVAC system maintenance program to ensure the proper operations and maintenance of HVAC components as they relate to outdoor air introduction and exhaust.
- Test and maintain the operation of all building exhaust systems, including bathroom, shower, kitchen, and parking exhaust systems.

SUBMITTALS

Include descriptive narrative in SAM Checklist.

TECHNOLOGY/STRATEGY

Conduct a visual inspection of outside air vents and dampers and remove any outside air vent or louver obstructions that restrict full outside air capacity from entering the distribution system. Conduct airflow monitoring to document outside air cubic feet per minute. Compare measured flow with designed flow for each unit.

Standard Practice

None

Recommended Practice

- Conduct airflow monitoring to document outside air cubic feet per minute. Compare measured flow with designed flow for each unit

Best Available Practice

- Monitor and adjust outside air flow using a Building Automation System (BAS)



6.0 INDOOR ENVIRONMENTAL QUALITY

6.2 Prerequisite 2 – Environmental Tobacco Smoke (ETS) Control

Required

INTENT

Prevent or minimize exposure of occupants, indoor surfaces, and ventilation air distribution systems to Environmental Tobacco Smoke (ETS).

REQUIREMENTS

Prohibit smoking in the building and designate exterior smoking areas at least 25 feet from building entries, outdoor air intakes and operable windows.

For this prerequisite smoking includes tobacco smoke, as well as smoke produced from the combustion of cannabis and controlled substances and the emissions produced by electronic smoking devices.

SUBMITTALS

Include descriptive narrative in SAM Checklist.

TECHNOLOGY/STRATEGY

Prohibit smoking in the building or provide negative-pressure smoking rooms

Standard Practice

- The State of Illinois prohibits smoking in almost all public spaces and workspaces
- The Chicago City Code Section 7-32-010 prohibits smoking within 15 feet of entry ways

Recommended Practice

Prohibit smoking from at least 25 feet of entryways, outdoor air intakes, and operable windows

Best Available Practice

None



6.0 INDOOR ENVIRONMENTAL QUALITY

6.3 High Performance Cleaning

2 Points

INTENT

Reduce the exposure of occupants and maintenance personnel to potentially hazardous chemical, biological, and particulate contaminants, which adversely affect air quality, human health, and the environment.

REQUIREMENTS

Points are achieved for doing all the following, as applicable:

Have in place during the performance period a high-performance cleaning program that addresses the following:

- Purchase of sustainable cleaning and hard floor and carpet care products and equipment meeting the sustainability criteria outlined in SAM Credit 6.6 Green Cleaning. At a minimum, the program must cover the green cleaning materials that are within the CDA Division and tenant's control.
- Establishment of standard operating procedures (SOPs) addressing how an effective cleaning and hard floor and carpet maintenance system will be consistently utilized, managed, and audited.
- Development of strategies for promoting and improving hand hygiene, including both hand washing and the use of hand sanitizers.
- Development of guidelines addressing the safe handling and storage of cleaning chemicals used within the space, including a plan for managing hazardous spills or mishandling incidents.
- Development of requirements for staffing and training of maintenance personnel appropriate to the need of the division or tenant. Specifically address the training of maintenance personnel in the hazards of use, disposal, and recycling of cleaning chemicals, dispensing equipment, and packaging.
- Provision for collecting occupant feedback and continuous improvement to evaluate new technologies, procedures, and processes.



SUBMITTALS

Include descriptive narrative in the SAM Checklist outlining details of a written high performance cleaning program.

TECHNOLOGY/STRATEGY

Over the performance period, have in place a high performance cleaning program addressing SOPs, sustainable products and equipment, chemical handling and storage, and staff training. Some additional items to consider include:

- Employ cleaning techniques that promote the most efficient use of products such as training on the proper amount of product to use and proper wiping motion for certain tasks
- Utilize cleaning techniques that promote the most efficient use of electricity such as working through areas and then turning off the lights in those areas and moving to another section instead of having all the lights on throughout the space for the entire shift
- Provide proper training on supply usage such as when to replace paper products and liners as not to throw away usable product. For example, office trash liners that may need emptying but not replacing when possible

Standard Practice

None

Recommended Practice

- For a listing of products, refer to the U.S. EPA Greener Products and Services listing at www.epa.gov/greenerproducts/identify-greener-products-and-services
- Utilize a High-Performance Green Cleaning Program

Best Available Practice

None



6.0 INDOOR ENVIRONMENTAL QUALITY

6.4.1 Indoor Air Quality (IAQ) Best Management Practices: IAQ Management Program

1 to 4 points

INTENT

Enhance indoor air quality by optimizing practices to prevent the development of IAQ problems in indoor spaces, correcting indoor air quality problems when they occur, and maintaining the well-being of the occupants.

REQUIREMENTS

Develop a plan that addresses the following items, where applicable.

Up to 4 points may be awarded by achieving any of the following measures:

<u>Technology/Strategy</u>	<u>Points</u>
Remodeling and Renovation: Use effective strategies for materials selection and installation such as selection of low emitting and microbial resistant materials and isolate construction activity from occupants	1
Painting: Establish a protocol for painting and ensure that protocol is followed by both in-house personnel and contractors that include the use of low VOC, fast drying paints where feasible, painting during unoccupied hours, and keep lids on paint containers when not in use	1
Integrated Pest Management: See SAM Credit 2.5 Integrated Pest Management and Wildlife Deterrence	1
Shipping and Receiving: Establish and enforce a program to prevent vehicle contaminants from entering the building by preventing idling of vehicles at the loading dock (post signs and enforce the ban), pressurizing the receiving area relative to the outside to ensure that contaminants from the loading area do not enter the building while making company supervisors aware of policy	1



SUBMITTALS

Include descriptive narrative in SAM Checklist.

TECHNOLOGY/STRATEGY

The above requirements are based on the EPA Indoor Air Quality Building Education and Assessment Model (I-BEAM), EPA Reference Number 402-C-01-001, December 2002, available at www.epa.gov/iaq/largebldgs/i-beam/index.html.

During the performance period, conduct an IAQ audit of the above requirements, where applicable to determine the IAQ status of a given indoor space. Identify and fix problems associated with poor IAQ. Immediately correct problems that can be addressed at no cost. For the remaining problems establish a plan that diagnoses and corrects the issues.

Standard Practice

None

Recommended Practice

- Control building's relative humidity (below 50%) to limit mold and dust mites
- Exhaust areas of major indoor moisture sources instead of recirculating or dehumidifying the area
- Clean wet areas such as showers
- Remove and dispose of all carpeting, ceiling tiles, and other materials with signs of mold growth
- Provide entryways walk off mats, grates and grilles

Best Available Practice

None



6.0 INDOOR ENVIRONMENTAL QUALITY

6.4.2 Indoor Air Quality Best Management Practices: Outdoor Air Delivery Monitoring

1 point

INTENT

Provide capacity for ventilation system monitoring to help sustain occupants' comfort and well-being.

REQUIREMENTS

Install permanent, continuous monitoring systems that provide feedback on ventilation system performance to ensure that ventilation systems maintain minimum outdoor rates under all operating conditions.

Sensors must be tested and calibrated at least once every five years or per the manufacturer's recommendation, whichever is shorter.

SUBMITTALS

Include descriptive narrative in SAM Checklist.

TECHNOLOGY/STRATEGY

Install and maintain permanent ventilation monitoring systems that provide feedback on system performance to ensure minimum ventilation rates.

Standard Practice

None

Recommended Practice

- At least 80% of the building's total outdoor air intake flow serving occupied spaces is monitored
- Monitoring system provides feedback to adjust outdoor air flow as needed

Best Available Practice

- Outdoor air delivery monitoring is tied to Building Automation System (BAS).



6.0 INDOOR ENVIRONMENTAL QUALITY

6.4.3 Indoor Air Quality (IAQ) Best Management Practices: Increased Ventilation

1 point

INTENT

Provide additional outdoor air ventilation to improve indoor air quality (IAQ) for improved occupant comfort, well-being and productivity.

REQUIREMENTS

Increase outdoor air ventilation rates for all air-handling units serving occupied spaces by at least 30% above the minimum required by ASHRAE Standard 62.1-2010 (with errata but without addenda).

SUBMITTALS

Include descriptive narrative in SAM Checklist.

TECHNOLOGY/STRATEGY

Use heat recovery, where appropriate, to minimize the additional energy consumption associated with higher ventilation rates.

Standard Practice

None

Recommended Practice

- Select and place air diffusers for all mechanically ventilated spaces, particularly office and passenger terminal spaces, following the recommended design approaches in the ASHRAE 2001 Fundamentals, Chapter 32, Space Air Diffusion
- Section 6 of ASHRAE 62.1-2010 outlines guidelines for determining ventilation rates for various applications of mechanical ventilation systems

Best Available Practice

- Increase air change effectiveness using the following strategies:
 - Displacement ventilation in passenger terminal areas.
 - Under floor air distribution in office areas.



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- Operable windows and skylights in cargo buildings
- Increase air movement in cargo facilities with ceiling fans
- Install trickle ventilators in cargo facilities to provide natural winter ventilation
- Install relief vents or operable skylights in cargo facilities to provide stack effect natural ventilation



6.0 INDOOR ENVIRONMENTAL QUALITY

6.4.4 Indoor Air Quality (IAQ) Best Management Practices: Reduce Particulates in Air Distribution

1 point

INTENT

Reduce exposure of building occupants and maintenance personnel to potentially hazardous particulate contaminants, which adversely affect air quality, human health, building systems and the environment.

REQUIREMENTS

Have in place filtration media with a minimum efficiency reporting value (MERV) of 13 or greater for all outside air intakes and inside air recirculation returns during the performance period. Establish and follow a regular schedule for maintenance and replacement of these filtration media according to the manufacturer's recommended interval.

SUBMITTALS

Include descriptive narrative in SAM Checklist.

TECHNOLOGY/STRATEGY

Install and maintain filtration media with a particle removal effectiveness of MERV 13 or greater for all outside air intakes and returns for the recirculation of inside air. Establish and follow a regular schedule for maintenance and replacement of these filters.

Standard Practice

None

Recommended Practice

- Provide MERV 13 filters on all outdoor air intakes
- Create a maintenance schedule and log for filter replacement

Best Available Practice

None



6.0 INDOOR ENVIRONMENTAL QUALITY

6.5.1 Occupant Comfort: Occupant Controlled Lighting

1 point

INTENT

Provide a high level of lighting control by individual occupants or specific groups in multi-occupant spaces (e.g., classrooms or conference areas) to promote the productivity, comfort, and well-being of building occupants.

REQUIREMENTS

Use lighting controls that enable adjustments to suit the task needs and preferences of individuals for at least 50% of individual workstations.

AND

Use lighting controls that enable adjustments for groups sharing a multi-occupant space or working area for at least 50% of multi-occupant space in the building.

SUBMITTALS

Include descriptive narrative in SAM Checklist.

TECHNOLOGY/STRATEGY

Implement system and occupant control of ambient and task lighting to suit individual preferences and the needs of specific tasks.

Standard Practice

None

Recommended Practice

- Tie lighting in public areas of passenger terminals to flight schedules or use motion-activated lighting
- Design lighting control systems to take advantage of daylight harvesting to reduce artificial lighting when adequate daylight is available



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- Design terminal areas to provide a variety of levels of light and sound in different areas simultaneously
- Provide operable windows in areas that are not noise-sensitive, such as cargo buildings
- Provide task lighting or more light switching zones in office areas

Best Available Practice

None



6.0 INDOOR ENVIRONMENTAL QUALITY

6.5.2 Occupant Comfort: Thermal Comfort Monitoring

1 point

INTENT

Support the appropriate operations and maintenance of buildings and building systems so that they continue to meet target building performance goals over the long term and provide a comfortable thermal environment that supports the productivity and well-being of building occupants.

REQUIREMENTS

Have in place a system for continuous tracking and optimization of systems that regulate indoor comfort and conditions (air temperature, humidity, air speed and radiant temperature) in occupied spaces. Have a permanent monitoring system to ensure ongoing building performance to the desired comfort criteria as determined by ASHRAE 55 – 2010, Thermal Comfort Conditions for Human Occupancy.

The building must establish continuous monitoring of, at a minimum, air temperature and humidity in occupied spaces. The sampling interval cannot exceed 15 minutes.

- Require periodic testing of air speed and radiant temperature in occupied spaces. The use of handheld meters is permitted.
- Install alarms for conditions that require system adjustment or repair. Submit a list of the sensors, zone setpoints, and limit values that would trigger an alarm.
- Create procedures that deliver prompt adjustments or repairs in response to problems identified. All monitoring devices must be calibrated within the manufacturer's recommended interval

SUBMITTALS

Include descriptive narrative in SAM Checklist.

TECHNOLOGY/STRATEGY

Implement systematic monitoring of the actual performance of the building to the comfort criteria defined by ASHRAE 55 – 2010.

As appropriate, monitoring may include measurement and trending of temperatures, relative humidity, air speed, and radiant temperatures at locations selected according to their variability and effect on occupants' comfort.



Standard Practice

None

Recommended Practice

- Locate at least one temperature sensor in each HVAC zone
- Locate at least one humidity sensor in each humidity zone

Best Available Practice

- Tie thermal comfort monitoring systems into a Building Automation System (BAS)



6.0 INDOOR ENVIRONMENTAL QUALITY

6.6.1 Green Cleaning: Sustainable Cleaning Equipment

1 point

INTENT

Reduce the exposure of occupants and maintenance personnel to potentially hazardous chemical, biological, and particulate contaminants, which adversely affect air quality, human health, and the environment.

REQUIREMENTS

Implement a program for the use of janitorial equipment that reduces building contaminants and minimizes environmental impact.

- Vacuum cleaners certified by the Carpet and Rug Institute “Green Label” Testing Program for vacuum cleaners and operate with a sound level of less than 70dBA
- Carpet extraction equipment used for restorative deep cleaning certified by the Carpet and Rug Institute’s “Seal of Approval” Testing Program for deep-cleaning extractors
- Powered floor maintenance equipment, including electric and battery-powered floor buffers and burnishers, equipped with vacuums, guards and/or other devices for capturing fine particulates and operates with a sound level of less than 70dBA
- Propane-powered floor equipment with high-efficiency, low-emissions engines with catalytic converters and mufflers that meet the California Air Resources Board (CARB) or Environmental Protection Agency (EPA) standards for the specific engine size and operate with a sound level of less than 90dBA
- Automated scrubbing machines equipped with variable-speed feed pumps and on-board chemical metering to optimize the use of cleaning fluids; alternatively, the scrubbing machines use only tap water with no added cleaning products
- Powered equipment ergonomically designed to minimize vibration, noise, and user fatigue
- Equipment designed with safeguards, such as rollers or rubber bumpers, to reduce potential damage to building surfaces
- Maintain a log for all powered cleaning equipment to document the date of equipment purchase and all repair and maintenance activities and include vendor specification sheets for each type of equipment in use



SUBMITTALS

Include descriptive narrative in SAM Checklist.

TECHNOLOGY/STRATEGY

Develop, implement, and maintain a policy for the use of low-impact powered cleaning equipment. Evaluate the powered cleaning equipment currently being used and make a plan for upgrading to powered cleaning equipment that reduces building contaminants and minimizes environmental impact.

Standard Practice

None

Recommended Practice

- Utilize cleaning equipment that are designed to have a reduced environmental impact while maintaining performance of cleaning

Best Available Practice

- Carpet and Rug Institute approved vacuum and carpet cleaning equipment
- Electric and battery-powered floor buffers and burnishers that operate at less than 70dBA
- Low-emissions fossil fuel powered floor cleaning equipment that meets the California Air Resources Board (CARB) or Environmental Protection Agency (EPA) standards for the specific engine size and operate with a sound level of less than 90 dBA
- Automated scrubbing machines are equipped with variable-speed feed pumps and on-board chemical metering to optimize the use of cleaning fluids
- Battery-powered equipment is equipped with environmentally preferable gel batteries
- Ergonomically designed equipment
- Equipment is designed with safeguards
- Keep a log for all powered cleaning equipment to document the date of equipment purchase and all repair and maintenance activities and include vendor specification sheets for each type of equipment in use



6.0 INDOOR ENVIRONMENTAL QUALITY

6.6.2 Green Cleaning: Entryway Systems

1 point

INTENT

Reduce the exposure of building occupants and maintenance personnel to potentially hazardous chemical, biological, and particulate contaminants, which adversely affect air quality, human health, building finishes, building systems, and the environment.

REQUIREMENTS

Utilize entryway systems (grilles, grates, mats) immediately inside all public entryways within at least ten feet, the mats must be in place immediately inside all public entryways; exclude emergency exits from this requirement.

SUBMITTALS

Include descriptive narrative in SAM Checklist.

TECHNOLOGY/STRATEGY

Use grills, grates or mats to catch and hold dirt particles and prevent contamination of the interior space. Design exterior stone, brick or concrete surfaces to drain away from regularly used entrances.

At entrances, install low-maintenance vegetation consistent with the requirements of SAM Credit 2.7 Landscape Management and avoid plants, including trees and shrubs that produce fruit, flowers or leaves that are likely to be tracked into the building. Select plants based on an integrated pest management (IPM) approach to eliminate pesticide applications that could be tracked into the building.

Provide a water spigot and electrical outlet at each public building entrance for maintenance and cleaning.

Standard Practice

None

Recommended Practice

- Utilize entryway systems (grilles, grates, mats) to reduce the amount of dirt, dust, pollen and other particles entering the building at all public entryways and develop the associated cleaning strategies to maintain those entryway systems as well as exterior walkways. At least 10 feet of



mats must be in place immediately inside all public entryways. Public entryways that are not in use or serve only as emergency exits are excluded from the requirements, as are private offices.

Best Available Practice

- Use grilles, grates, or mats to catch and hold dirt particles and prevent contamination of interior space.
- At public entrances, install low-maintenance vegetation within the landscape design and avoid plants, including trees and shrubs that produce fruit, flowers, or leaves that are likely to be tracked into the space. Base plant selection on an integrated pest management approach to eliminate pesticide applications that could be tracked into the space.
- Provide a water spigot and electrical outlet at each entrance for maintenance and cleaning.



7.0 INNOVATION IN OPERATIONS & MAINTENANCE

7.1 – 7.4 Innovation in Operations & Maintenance

1 to 4 points

INTENT

Provide building operations, maintenance, and upgrade teams with the opportunity to earn points for environmental benefits achieved beyond those already addressed by the SAM Operations & Maintenance Rating System.

REQUIREMENTS

Achieve significant, measurable environmental performance using an operations, maintenance, or system upgrade strategy not addressed in the SAM Operations & Maintenance Rating System.

SAM Credit 7.1. (1 point) Identify the intent of the proposed innovation credit, the additional environmental benefits delivered, the proposed requirements for compliance, and the proposed performance metrics to demonstrate compliance, and the approaches (strategies) that might be used to meet the requirements; meet the proposed requirements during the performance period.

SAM Credit 7.2 (1 point) same as Credit 7.1.

SAM Credit 7.3 (1 point) same as Credit 7.1.

SAM Credit 7.4 (1 point) same as Credit 7.1.

SUBMITTALS

Include descriptive narrative in SAM Checklist.

TECHNOLOGY/STRATEGY

Implement and maintain over performance period actions that provide added environmental benefits. These can be actions that substantially exceed a current SAM O&M credit requirement or actions not addressed in SAM O&M that provide substantial added environmental benefits.



8.0 EDUCATION & TRAINING

8.1 Community Education

1 point

INTENT

Promote awareness of CDA Divisions and tenant environmental and sustainability initiatives.

REQUIREMENTS

Educate consumers/clients/public about the environmental stewardship committed to and results of the efforts.

SUBMITTALS

Include descriptive narrative in SAM Checklist of methods of community education.

TECHNOLOGY/STRATEGY

Provide and promote education through the following means that include, but are not limited to:

- Flyers
- Pamphlets
- Press Releases
- Signage
- Kiosks
- Workshops
- Conferences
- Websites
- CDA alerts (e-mail blasts)
- Public exhibits

Standard Practice

Many of these educational outreach programs are already implemented by the CDA and tenants. The internet is the primary outlet for promoting current programs in place by the tenants and CDA.

Recommended Practice

- Post environmental education information detailing the efforts of the CDA or tenant
- Promote customer participation in identifying initiatives that contribute to the CDA and tenant's environmental goals



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- Solicit suggestions from customers on how to improve CDA's environmental and social programs

Best Available Practice

- Recognize and offer incentives to consumers/clients/public if they contribute to the CDA and tenant's environmental goals



8.0 EDUCATION & TRAINING

8.2 Implement Employee Sustainability Training Program

1 Point

INTENT

In keeping with the spirit and intent of this Manual, it is strongly encouraged that companies working in support of CDA on any project establish and adopt their own employee training program.

REQUIREMENTS

Establish and implement an Employee Sustainability Training Program.

SUBMITTALS

Provide an electronic copy of the company's Employee Sustainability Training Program and provide descriptive narrative on SAM Checklist documenting training sessions and their respective attendance numbers.

TECHNOLOGY/STRATEGY

As part of the Employee Sustainability Training Program, a variety of topics should be covered to provide the employees with an overall understanding of the environmental responsibility that the CDA has committed to and how they can contribute to the organization meeting their sustainability goals. Through the development of a training program, it will allow the CDA to provide consistent training to all employees and address facility specific issues.

Training is critical to the following, but not limited to:

- Missions and policies
- Opportunity to constantly be re-evaluated and improved
- Eco- more complex/more sophisticated systems and software
- Not yet a SOP, often requires a learning curve
- Addresses employee changeover
- Facilitates monitoring, tracking and reporting

Standard Practice

None



Recommended Practice

- Individual programs can be tailored to meet each company's specific environmental goals and can include topics such as:
 - Corporate Sustainability Policy
 - Water Management Plan
 - Waste Reduction
 - Storage and Collection of Recyclables
 - Composting or Re-use Options
 - Managing and Disposing of Waste
 - Systems management, including HVAC and other complex components

Best Available Practice

None



8.0 EDUCATION & TRAINING

8.3 Staff Training

1 point

INTENT

Support and encourage the operations, maintenance, upgrade, and project team integration required for SAM O&M implementation and to streamline the application and certification process.

REQUIREMENTS

At least one principal participant of the project team shall be LEED accredited (i.e., LEED Green Associate; LEED Accredited Professional).

SUBMITTALS

Include descriptive narrative in SAM Checklist.

TECHNOLOGY/STRATEGY

- Have someone in your organization study for and successfully complete the LEED accreditation exam or related program approved by the SRP
- Provide training for staff to handle day-to-day operations and maintenance involving sustainability, as related to this chapter

Standard Practice

None

Recommended Practice

- The Chicago Department of Aviation recommends that any operations and management team include a LEED AP on its staff to assist and oversee the administration of sustainable operations

Best Available Practice

None



For comments, case studies, lessons-learned, new technologies or for any and all project submittal forms, please email:

SAMdocs@cityofchicago.org



TERMINAL OCCUPANTS

(formerly Concessions & Tenants)

Chicago Department of Aviation **SUSTAINABLE AIRPORT MANUAL**





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INTRODUCTION

Many companies have chosen to conduct business at the airport. These companies have a lease to utilize airport infrastructure and services. They are an integral part of any airport's day-to-day functions, and therefore inherently part of the overall service any airport provides to both the travelling and neighboring public.

Airport concessions provide an important passenger service amenity while providing significant financial benefits to the airport. Concessions include news and gifts, specialty retail stores, food and beverage, duty-free shops and many other services. Passengers arrive early for a departing flight or they have time before their connecting flight to shop, grab a bite to eat, or relax in the spa. Many airports have become shopping destinations with retail and food options typical of a shopping mall.

Other terminal tenants include a wide range of organizations and services, ranging from advertising, airlines, government agencies, organizations providing aircraft and aviation services, and often non-aviation businesses as well.

The Sustainable Airport Manual (SAM) Green Airplane Rating System for Terminal Occupants (TO) is designed to certify the sustainability of concession and tenant activities, including daily operations as well as design and construction of new facilities within the terminals.

This chapter is divided into those two types of activities: 1) ***Design & Construction*** and 2) ***Operations & Maintenance***.

Due to the variation in the types of tenants, general Terminal Occupant types have been defined based on their location and general nature of service. These are defined as:

Design & Construction

- **Food Service:** Terminal occupants located within the terminal that provide food services for a majority of their operations to passengers or customers. Examples include but are not limited to restaurants, taverns, snack shops, coffee shops, and bakeries.
- **Non-Food Service:** Terminal occupants that do not provide food services for a majority of their operations to passengers or customers and may be retail or non-retail tenants. Examples include but are not limited to bookstores, gift shops, newspaper stands, other retail merchandise venues, and non-retail tenants such as airline, airport, or tenant offices.



Operations & Maintenance

Food Service: Terminal occupants located within the terminal or other existing conditioned spaces that provide food services for a majority of their operations to passengers or customers. Examples include but are not limited to restaurants, taverns, snack shops, coffee shops, and bakeries.

- **Full Service:** Terminal occupants that have table service (i.e. a restaurant with a wait staff) and have some measure of control over the consumables and waste generated by the customers within their space.
- **Counter Service:** Terminal occupants that provide mainly carry-out service by means of a counter. While tables may be present within/near the space, the tenant does not provide service via wait staff.
- **To-Go, Kiosk:** Terminal occupants that sell food products from a free-standing location, such as a kiosk. All products are prepared off-site and sold pre-packaged.

Non-Food Service: Terminal occupants located within the terminal or other existing conditioned spaces that do not provide food services for a majority of their operations to passengers or customers. Examples include but are not limited to bookstores, gift shops, newspaper stands, other retail merchandise venues, Chicago Department of Aviation (CDA), government entities, banks, airlines, and other airport amenities.

- **Buildout:** Terminal occupants that provide products or services within a space where the occupant has control over layouts, configuration, lighting, etc.
- **Free-Standing, Kiosk:** Terminal occupants that provide products or services in a free-standing area within the terminal corridors and common areas.

APPLICABILITY

SAM Terminal Occupants (TO) focuses on the evaluation of all occupants within the terminals. Tenants who are not located in the terminals should refer to the Design & Construction (DC) and Operations & Maintenance (OM) chapters of the SAM. Examples of non-terminal tenants may include FBO tenants, cargo/freight operations, or other commercial or retail entities. In general, construction of a terminal falls under the DC chapter of SAM while all interior terminal work would fall under this chapter (TO-DC). Given the nature of the construction activities that may go on inside terminal spaces, all tenant build-out projects and minor interior rehabilitation not involving exterior work, regardless of owner, would fall under the TO Design & Construction section. As an example, a Chicago Department of Aviation (CDA) food court renovation would be rated under the TO chapter because it is an interior-focused, terminal project. In the case where a tenant is building a new, stand-alone facility, e.g. a car rental facility, that is not within a terminal, then the tenant should use the Design & Construction (DC) chapter of the SAM. A tenant build-out involving an existing building where the core and shell are reused but the interior requires a major interior rehabilitation including HVAC and envelope modifications and includes exterior civil work would also fall under the Design & Construction (DC) chapter.



TERMINAL OCCUPANTS SECTIONS

This chapter is divided into two sections: the TO-Design & Construction (TO-DC) section and the TO-Operations & Maintenance (TO-OM) section. The TO-Design & Construction section only pertains to the build-out or interior renovations within the terminals. Any construction or major exterior renovations of non-terminal tenant spaces would follow the guidelines of the SAM Design & Construction (DC) chapter. The TO-OM section pertains to all tenants with customer/passenger interaction.

Terminal Occupants are rated on the achievement of credits depending on the appropriate category of the initiative/effort, based on sustainable elements included in the project from the following categories:

TO – Design & Construction

- 1.0 Administrative Policy & Procurement
- 2.0 Water Efficiency
- 3.0 Energy & Atmosphere
- 4.0 Materials & Resources
- 5.0 Indoor Environmental Quality
- 6.0 Innovation for Terminal Occupants in Design & Construction

TO – Operations & Maintenance

- 7.0 Administrative Policy & Procurement
- 8.0 Green Interiors
- 9.0 Water Management
- 10.0 Energy Management
- 11.0 Waste Stream Management
- 12.0 Innovation for Terminal Occupants in Operations & Maintenance

Each category contains a specific number of credits, against which each Terminal Occupant or project is evaluated in order to determine the total number points earned. A list of the applicable credits is summarized in **Appendix TO-A – Green Airplane Rating System for Terminal Occupants**.

PROCESS

Within the Manual's main body, each sustainable credit has five subsections: Intent, Requirements, Submittals, Technology/Strategy, and Case Studies, as described below:

- **Intent:** The primary motivations for any sustainable practice.
- **Requirements:** Specifies institutional, operational, and mechanical design or construction elements that satisfy the intent. The prerequisites must be achieved; the credits are optional but contribute to the overall rating.



- **Submittals:** Required and supporting documentation and/or information required to achieve applicable prerequisites or credits. This documentation may include calculations, data, short narratives, policies, documents or references to specification sections or design drawings indicating how the requirements are being met.
- **Technology/Strategy:** Highlights specific ways of meeting the recommendations within the scope for each specific credit. Case studies where available, are presented to help guide the application of sustainable credits to Terminal Occupant projects and efforts. While the entity may undertake the above Technologies/Strategies at other airports, for the purposes of this credit activities only apply to operations at CDA Airports. To aid with consideration of applicable strategies and technologies, they are organized into the following three categories; “Standard Practice,” “Recommended Practice,” and “Best Available Practice.”
 - **Standard Practice:** These are requirements that may be due to standards, specifications, codes, general best management or construction practices. They are practices already in place, and SAM prerequisites, which also serve to meet sustainable goals.
 - **Recommended Practice:** These include recommendations that are expected to have insignificant impacts to cost and are therefore, encouraged to be incorporated.
 - **Best Available Practice:** These are strategies and practices that are expected to enhance the sustainability efforts of the Chicago Department of Aviation (CDA) but are anticipated to potentially have an impact on the cost and/or schedule. Terminal Occupants are encouraged to explore the cost/environmental benefit ratio for such guidelines to the greatest extent practicable.
- **Case Study:** Examples of credit intent “in action” at airports and/or other industry facilities.

While not all strategies will be applicable, concessionaires and tenants are highly encouraged to think creatively and to consider the intent of each issue throughout the decision process.



SUBMITTALS

Sustainable Airport Manual (SAM) Checklists

Incorporation of sustainable elements into terminal occupant's design and construction are tracked using the SAM *TO-Design & Construction* Checklist. Incorporation of sustainable initiatives and practice into terminal occupants' daily operations are tracked using the SAM *TO-Operations & Maintenance* Checklist. The checklists are provided in **Appendix TO-B – Terminal Occupants Checklist**.

The TO-DC Checklist is completed at the time of the project design. It begins at the project initiation and is finalized by substantial construction completion by the designer. The TO-OM checklist is completed by the tenant, after commencement of operations, typically after at least a period of operation of a year. The TO-OM checklist is to be completed on a periodic basis, such as biannually, by the tenant to showcase the day-to-day sustainability of its operations.

In order to achieve points, certain requirements need to be met, as outlined in each credit. In some instances, studies and calculations would be appropriate. In other instances, this will be accomplished through product and material data or through referenced standards or specifications.

In addition to review of the checklist, the Sustainable Review Panel (SRP) will review any supporting documentation including calculations, specifications, and contractor's submittals as needed to support the achievement of the credit(s). See Section titled *Implementation and Review Process* for detailed information about the SRP.

NOTE:

When submitting electronic files, include the name of the project and CDA project number in the file name for ease of processing. Submittal dates, milestones, and/or contractor names may also be included in file names. Submitting a filename such as “SAM Checklist” is not acceptable. An example of an appropriate file name is:

SAM Checklist_CT-DC_JDesignInc_TH0000.00_T3 Retail Renovation_100%_20181102.xls
SAM Checklist_[SAM Chapter]_[Contractor]_[Project Number]_[Project Name]_[Milestone]_[Submittal Date]

Submittals should be sent to SAMdocs@cityofchicago.org and must include the CDA Project Number and CDA Project Name in the subject line.



SAM GREEN AIRPLANE RATING SYSTEM

TERMINAL OCCUPANTS – DESIGN & CONSTRUCTION

The SAM Green Airplane Rating System for TO – Design & Construction uses a five-tier approach to rate a Terminal Occupant similar to the Design & Construction rating system. “Green Airplane Certification” symbols are used to designate achievement levels. The levels are:

TO-DC GREEN AIRPLANE RATING SYSTEM		
No. of Green Airplanes	Points Required to Achieve Rating	
	Food Service	Non-Food Service
<i>Prerequisites</i>	5	3
	2-15	2-13
	16-20	14-17
	21-24	18-20
	25-32	21-27
	33-41	28-35

TERMINAL OCCUPANTS – OPERATIONS & MAINTENANCE

The SAM Green Airplane Rating System for TO –Operations & Maintenance uses a three-tier approach to rate a terminal occupant. “Green Airplane Certification” levels are used to designate achievements. The levels are:

Achiever: Terminal Occupant has completed the SAM review process and, at a minimum, accomplished all SAM Prerequisites.

Leader: Terminal Occupant has gone beyond the minimum expectations of the SAM Prerequisites and demonstrated a commitment to sustainable initiatives.

Mentor: Terminal Occupant has achieved the highest level of green airplane certification and meets several CDA requirements above and beyond the prerequisite credits. Entity is a resource and a good example to other terminal occupants and regularly promotes, advocates and improves upon their sustainability achievements.



TO-OM GREEN AIRPLANE RATING SYSTEM					
Certification Level	Points Required to Achieve Rating				
	Food Service			Non-Food Service	
	Full Service	Counter Service	To-Go, Kiosk	Buildout	Free-Standing, Kiosk
<i>Prerequisites</i>	8	8	8	8	8
 Achiever	2-28	2-23	2-11	2-21	2-10
 Leader	29-45	24-37	12-18	22-33	11-16
 Mentor	46-57	38-60	19-24	34-43	17-21

IMPLEMENTATION AND REVIEW PROCESS

The SAM and its supporting documentation are administered by the Sustainable Review Panel (SRP), which consists of representatives of the CDA Management Staff and Airport Planners actively involved in CDA projects. The composition of the SRP is intended to be dynamic depending on needs.

The SRP is responsible for the review of submittals with respect to sustainability and provides technical support to each project in relation appropriate to sustainable practices. The SRP is responsible for review of every checklist and for the awarding of “Green Airplane Certification” ratings based on the extent of incorporation of sustainable practices as outlined in this Manual and as documented on the submitted SAM Checklist(s).

Other responsibilities of the SRP include preparation and review of sustainable design related specifications, technical memoranda, and miscellaneous documents, as necessary. In addition, the SRP is responsible for presentations and training to project team members with respect to the application of this Manual. The primary tasks of the SRP are to oversee the application of the Manual and review submittals for their compliance with the Manual.

All projects conducted by or under management of the CDA will follow these procedures. For any and all sustainability-related questions and/or submittals, please use the following email address to submit forms electronically (preferred method): SAMdocs@cityofchicago.org. Submittals must include the Terminal Occupant's name in the subject line.



GREEN CONCESSIONS POLICY

In order to assist Concessions at O'Hare and Midway Airports in their efforts to minimize waste, enhance recycling, generate demand for eco-friendly products, and provide healthier foods for passengers and employees, the Chicago Department of Aviation (CDA) has developed a set of guidance and standards. These exist within the SAM TO – Operations & Maintenance chapter; and these Prerequisites form the Green Concessions Policy. All concessionaires must adhere to the Policy shown below. Compliance with the policy is reviewed with concessionaires on a bi-annual basis. Should a concessionaire not comply with the Policy, they are required to submit a response to CDA indicating why they are not in compliance and what efforts are being undertaken to achieve compliance, including target dates for completion.

- 1) Assign Environmental Liaison (SAM Credit 7.1)
- 2) Eliminate the Use of Polystyrene Foam (Styrofoam) (SAM Credit 7.2)
- 3) Procure sustainable foods and consumer products to a minimum of 10 percent of total costs (SAM Credit 7.3)
- 4) Use only environmentally friendly cleaning and hygiene products (SAM Credit 8.1)
- 5) Source-separate all solid waste refuse into recyclables, compostables, and landfill waste (SAM Credit 11.1)
- 6) Donate surplus food to the greatest extent allowable by food safety regulations (SAM Credit 11.2)
- 7) Ban all petroleum-based plastic bags, plastic disposable consumer containers and utensils (SAM Credit 11.3)
- 8) Utilize biodegradable trash bags (SAM Credit 11.4)



For comments, case studies, lessons-learned, new technologies or for any and all project submittal forms, please email:

SAMdocs@cityofchicago.org



Chicago Department of Aviation

SUSTAINABLE AIRPORT MANUAL

TERMINAL OCCUPANTS

DESIGN & CONSTRUCTION SECTION

NOTE:

Please refer to page TO-5 for introduction and applicability of this section.



1.0 ADMINISTRATIVE POLICY & PROCUREMENT

1.1 Prerequisite 1 – Green Meetings

Required

INTENT

Green meeting practices are intended to guide meeting hosts, planners, and attendees toward more eco-friendly meetings. A few extra efforts to incorporate environmental considerations into planning and conducting meetings will help to minimize the negative impact on the environment and educate all participants regarding sustainable meetings.

Green meeting practices are intended to:

- Conserve resources
- Reduce environmental impacts
- Save money
- Support Chicago's commitment to environmental stewardship

REQUIREMENTS

Whenever applicable, follow the green meeting practices outlined below, or your existing corporate sustainability policy, whichever is more stringent.

SUBMITTALS

Include descriptive narrative on the SAM Checklist and if following your own corporate sustainability policy, please include with submittal for this section.

TECHNOLOGY/STRATEGY

Meeting Planning

Meeting hosts should consider the following when planning for a meeting:

Reduce the number of copies produced by:

- Sharing meeting materials
- Digitizing materials and distributing presentations via email prior to meetings
- Placing materials on the wall (one large print or presented with projector equipment)



If handouts are needed at the meeting, produce handouts:

- Locally
- Double-sided
- Using high post-consumer recycled content paper

Exhibits and presentation materials:

- Same suggestions as handouts above
- Reuse display boards, utilize both front and back sides
- Use low-emitting materials for exhibit displays
- Recycle cardboard and other packaging materials

For participants not in the building: can they participate by internet/phone?

- Contact the expected meeting participants ahead of time and present them with the option of a video/phone conference via the internet/phone, if appropriate. Costs associated with technical support may still be less than travel/fuel costs in some cases.

What if travel cannot be avoided?

- Can attendees carpool/carshare?
- Provide attendees with mass transit options, such as CTA or Pace Bus, including directions.
- Encourage walking and biking by selecting accessible venues, including directions.
- If overnight stays are involved, suggest hotels nearest the meeting venue that are the most environmentally friendly (www.greenhotels.com). Consider moving the meeting to the hotel if majority of participants are staying at the same hotel, reducing the need for transportation to and from the hotel.

If the meeting is all day or multiple days in a row, how can it be catered in an environmentally friendly way?

- Serve drinks from pitchers, reusable utensils and dishes, and request local produce to cut down on waste when catering for large groups.
- Utilize condiments in bulk dispensers to reduce waste.
- Plan for the pick-up and compost or donation of leftover food to reduce waste.

What if the meeting is held annually?

- Plan for annual meetings at times of the year when temperatures are less extreme to reduce energy consumption due to the use of air conditioning/heat.



Meeting Room

- Use the recycle bins for recyclable items at the end of the meeting.
- Collect reusable business card holders/name tags in a bin after last meeting.
- Collect presentation materials that are not needed by the attendees that can be donated to local schools, reused or recycled.
- Have attendees fill out an online survey allowing for feedback about the meeting and vendors for future reference and improvement.
- Follow up after the meeting with participants to share green success stories and lessons-learned including statistics from the meeting, such as quantities of recycled materials. Also include a summary document that provides details of the green meeting.
- Help to ensure the lights are turned off as attendees leave the meeting room.

Additional details if conducting off-site meetings, such as a conference or workshop...

- Ensure that off-site meeting locations accommodate opportunities for recycling.
- Recycle newspapers, cans, and glass, including those from your guest room, in marked containers in the conference area.
- Participate in the hotel's water, energy, and detergent conservation efforts by following the instructions posted in your room.
- Note the conference's efforts to reduce the use of paper by limiting conference handouts at registration, using folders or handouts printed on high post-consumer recycled content paper, using vegetable-based ink, and encouraging presenters to limit handouts.
- Thank the hotel or off-site location host for providing recycling opportunities, reusable utensils and dishes for breaks, etc.

IMPLEMENTATION

- Make certain that all appropriate recycling bins are located in public meeting areas and conference rooms.
- Develop message boards for conference rooms, meeting areas, and copy/production areas. (see following pages)
- Provide routine reminders of green meeting practices and during annual team meetings.



1.0 ADMINISTRATIVE POLICY & PROCUREMENT

1.2 Corporate Sustainability Policy

1 Point

INTENT

In keeping with the spirit and intent of this Manual, it is strongly encouraged that companies working in support of CDA on any project establish and adopt their own corporate policy on sustainable practices.

REQUIREMENTS

The company providing the design services for the project shall establish or have established and adopted a Corporate Sustainability Policy.

SUBMITTALS

Provide an electronic copy or website link to the company's Corporate Sustainability Policy.

NOTE: If available, please provide an electronic copy of your annual sustainability report documenting any new measures and results.

CASE STUDY

Starbucks Global Social Impact Starbucks

The corporation has undertaken actions to reduce their environmental impact and share in their customer's commitment to the environment. An annual environmental stewardship report is produced to highlight the company's efforts and successes. At the store level, energy and water conservation and other green building strategies are key priorities. Starbucks strives to elevate their partners, customers, suppliers and neighbors to create positive change. This is being accomplished by offering high-quality, ethically purchased and responsibly produced products; investing in paths to opportunity through education, training and employment; minimizing their environmental footprint and inspiring others to do the same; while offering Starbucks as a place for public conversation and elevating civic engagement through service and promoting voter registration.

<https://www.starbucks.com/responsibility>



1.0 ADMINISTRATIVE POLICY & PROCUREMENT

1.3 Green Procurement Policy

1 to 4 points

INTENT

Reduce the environmental impact of products and services by developing a Green Purchasing Program.

REQUIREMENTS

Purchase green products meeting third-party environmental and sustainability standards. Refer to the U.S. EPA Greener Products and Services listing at www.epa.gov/greenerproducts/identify-greener-products-and-services for more information. Some common product certifications include:

- UL EcoLogo
- Electronic Product Environmental Assessment Tool (EPEAT)
- Green Seal®
- EPA Safer Choice.

Points for this credit will be awarded based on the number of green products, procured for general day-to-day office use by the designer of record of the project. The party completing the checklist should only count green products procured for the local office, as opposed to a global level corporate policy.

Points are awarded as follows:

<u>Number of Green Products Procured</u>	<u>Points</u>
1-2	1
3-5	2
6-11	3
12+	4

Example: An A/E firm responsible for the design of a terminal tenant space office uses, *in their own office*, 100% recycled fiber bathroom tissue and toilet paper that are both EcoLogo certified and glass cleaner meeting the GreenSeal certification. These three items meet the requirements of the credit, therefore, two points would be achieved for this credit based on the table above. .

SUBMITTALS

Include descriptive narrative in the SAM Checklist of items purchased and used.



NOTE: If available, please provide an electronic copy of your green procurement policy.

TECHNOLOGY/STRATEGY

Introduce environmentally conscious purchasing into company practices. The policy needs to clearly define an objective and establish a sustainability claims verification procedure that can be replicated as necessary. Verification procedures may rely on product certifications such as Green Seal and ENERGY STAR. Evaluate the items that are purchased, identify more environmentally friendly alternatives, and establish a policy to purchase these alternatives when economically feasible. Work with suppliers to identify sustainable products that meet the company's needs.

Standard Practice

None

Recommended Practice

- Purchase items with the minimum content levels specified in the U.S. EPA Greener Products and Services listing at www.epa.gov/greenerproducts/identify-greener-products-and-services
- Purchase items in bulk to reduce packaging, transportation impacts and costs
- When using a company-developed policy, the following resources can be used to create a Procurement Policy. Resources include but are not limited to:
 - U.S. Environmental Protection Agency's Comprehensive Procurement Guidelines (CPG) – The CPG includes an index of products and their recommended recycled content. More information can be found on the associated website: www.epa.gov/smm/comprehensive-procurement-guideline-cpg-program
 - U.S. Environmental Protection Agency's Water Sense – The partnership program by promoting water efficiency and enhancing the market for water-efficient products, programs and practices. More information can be found on the associated website: www.epa.gov/WaterSense/
 - DOE's Alternative Fuels and Advanced Vehicles Data Center – The data center provides a wide range of information and resources to enable the use of alternative fuels, in addition to other petroleum reduction options such as advanced vehicles, fuel blends, idle reduction and fuel economy. More information can be found on the website: www.afdc.energy.gov/afdc/
 - Fair Trade Products – Purchase fair trade products instead of regular products in order to build equitable and sustainable trading partnerships. Examples of some fair trade products include; coffee, bags, boxes, artwork, chocolate, sugar, etc. More information can be found on the Fair Trade Federation's website: www.fairtradefederation.org
 - USDA's BioPreferred Designated Products – The program aims to increase the purchase and use of renewable, environmentally friendly biobased products while providing "green" jobs and new markets for farmers, manufacturers and vendors. More information can be found on the associated website: www.biopreferred.gov/BioPreferred/



Best Available Practice

None

CASE STUDY

Sustainable Purchasing Policy

Vancouver International Airport – Vancouver, British Columbia, Canada

Sustainability is a corporate priority for the Vancouver Airport Authority. One of their goals is to embed sustainability into our purchasing decisions and ensure meaningful consideration of social and environmental criteria when selecting suppliers, products, and services. Their purchasing decisions will drive innovation, improve workplace and environmental outcomes, and support their commitment to be accountable to the communities that they serve. In evaluating suppliers and their subcontractors, the Airport Authority will include sustainability as a weighted component of the evaluation criteria, to address sustainability risks and capitalize on opportunities. In the procurement of goods and services, for both operating and capital spending, their consideration of sustainability gives priority focus to issues pertaining to their four pillars of sustainability; environment, social, economic, and governance.

<http://www.yvr.ca/en/business/work-with-yvr/airport-suppliers/sustainable-purchasing-policy>



1.0 ADMINISTRATIVE POLICY & PROCUREMENT

1.4 Recycled Content Paper

1 to 3 points

INTENT

Reduce the need for virgin materials, energy, and waste associated with the production of paper by promoting the use of recycled content paper.

REQUIREMENTS

For all office paper purchased for routine daily business administration and operations of the company providing design services, point values will be assigned based on the recycled content of the paper. Up to 3 points are available by using paper with the following attributes:

<u>SAM Credit</u>	<u>Post-consumer recycled content</u>	<u>Points</u>
1.4.1	30%	1
1.4.2	50%	2
1.4.3	100%	3

Calculate post-consumer recycled content of office paper using a weighted average based on estimated usage. If the paper is chlorine-bleached, for the purposes of the calculation, it shall be assumed that the post-consumer recycled content is 0% regardless of what it actually is.

Example: Annually, an office uses 50 boxes of chlorine-free paper with a post-consumer recycled content of 30%, 50 boxes of chlorine-free paper with a post-consumer recycled content of 90%, and 20 boxes of chlorine-bleached paper with a post-consumer recycled content of 100%. The weighted average of all the paper used is 50% and therefore 2 points would be awarded for this credit. Note that the 20 boxes of chlorine-bleached paper are assumed to have 0% recycled content for the purposes of the calculation.

$$(50/120)(30\%) + (50/120)(90\%) + (20/120)(0\%) = 50\% \text{ recycled content}$$

SUBMITTALS

Include descriptive narrative on the SAM Checklist.



TECHNOLOGY/STRATEGY

The purchase and use of recycled paper assist in closing the recycling loop by utilizing paper that is made from recovered waste paper.

This credit is intended to:

- Conserve natural resources
- Save energy
- Reduce environmental impacts
- Reduce pollution
- Reduce paper waste

Standard Practice

None

Recommended Practice

- Whenever applicable, purchase and utilize recycled office paper in daily business administration and operations.

Best Available Practice

None



2.0 WATER EFFICIENCY

2.1 Prerequisite 1 – Space Water Metering

Required

INTENT

Provide means for tenants to measure and be aware of their water use to encourage conservation of resources.

REQUIREMENTS

The following requirements would only apply to a tenant or space where potable water is used.

Install an accessible water meter that provides data representing total tenant water consumption.

OR

Install an accessible water meter that provides data representing total water consumption for a defined space as directed by the CDA.

SUBMITTALS

Include descriptive narrative on the SAM Checklist.

TECHNOLOGY/STRATEGY

Tenant should provide the exact location of the meter, its accessibility, and reporting methods.

Depending on the tenant type, tenant locations within the terminal, and other factors, the placement and number of meters may vary. It is ideal if one meter per tenant is installed but this may not be possible if the tenant space is non-contiguous or is shared space, for example. Meter locations will need to be coordinated with CDA. A general guide to some potential scenarios is shown in the following table:



Scenario	Probable Water Meter Requirement
Stand-alone food service concessionaire within the public terminal space	Install single water meter for all incoming potable water to space.
Stand-alone non-food service concessionaire (no potable water use) within the public terminal space	No water meter required.
Tenant with two non-contiguous leased spaces located anywhere in the terminal	Install a water meter for incoming potable water for each space where there are water fixtures, water usage.
Tenant office space within terminal	Install water meter if potable water is used in that space.
CDA-defined space not belonging to a tenant	Install water meter, if applicable, to the defined space, e.g. all public restrooms within a concourse.

Please note that the above table is not intended to be a comprehensive list of all possible scenarios. The CDA will review each project on a case-by-case basis.

Standard Practice

None

Recommended Practice

None

Best Available Practice

- Remote sensing meters integrated to building management system.

CASE STUDY

West Edmonton Mall Edmonton, Alberta

West Edmonton Mall is North America's largest indoor mall and at over 5.3 million square feet. The mall contains over 800 stores and services, nine attractions, two hotels, 100+ dining venues, serving almost 31 million visitors annually.

Installation and implementation of a tenant meter program of electrical, water, and gas meters for every tenant resulted in a meter system of 700+ meter points. In January 2011, West Edmonton Mall began



billing tenants for their electrical, water, and gas consumption. The solution, implemented by an outside consultant, was customized for cost recovery and tenant billing needs. The solution was electronic, eliminating spreadsheets, on-site meter observations by staff, errors in recording, and delays due to staff priorities. The key benefit is all readings could be read electronically and billings could be integrated with existing accounting software. Ownership has realized the importance of the investment and with accuracy of the information, the return on investment was significant.

<https://qmers.com/submetering-for-mall-tenant-billing/>



2.0 WATER EFFICIENCY

2.2 Prerequisite 2 – Water Use Reduction

Required

INTENT

Increase water efficiency within terminal spaces to reduce the burden on municipal water supply and wastewater systems.

REQUIREMENTS

For the fixtures and fittings listed in the table below, as applicable to the project scope, reduce aggregate water consumption by 20% from the baseline. Base calculations on the volumes and flow rates shown in the table.

All newly installed toilets, urinals, private lavatory faucets, and showerheads that are eligible for labeling must be WaterSense™ labeled (or a local equivalent for projects outside the U.S.).

Commercial Fixtures and Fittings	Minimum Requirement
Commercial Toilets*	1.28 gallons per flush (gpf)* Except blow-out fixtures: 3.5 gpf 1.6/1.1 gpf – Dual Flush
Commercial Urinals*	0.8 gpf
Commercial Lavatory (restroom) Faucets	0.5 (gpm) at 60 (psi) all others except private applications
Commercial Pre-Rinse Spray Valves (for food service applications)	Flow rate ≤ 1.6 gpm (no pressure specified; no performance requirement)
Appliance	
Residential clothes washers	ENERGY STAR or performance equivalent
Commercial clothes washers	ENERGY STAR or performance equivalent
Residential dishwashers	ENERGY STAR or performance equivalent
Ice machine	ENERGY STAR or performance equivalent and use either air-cooled or closed-loop cooling, such as chilled or condenser water system
Ice machines once through water cooled	BANNED
Food Steamers	



Commercial Fixtures and Fittings	Minimum Requirement
Steam cooker – batch cooking	815 gallon/hour/plan
Steam cooker – high production/cook to order	84 gallon/hour/plan
Combination Oven	
Countertop or stand mounted	40 gph
Roll-in	60 gph
Other Equipment	Performance baseline based on industry standards

* WaterSense™ label available for this product type

SUBMITTALS

Include descriptive narrative and calculations in the SAM Checklist.

TECHNOLOGY/STRATEGY

WaterSense™-certified fixtures and fixture fittings should be used where available. Use high-efficiency fixtures (water closets and urinals) and dry fixtures such as composting toilet systems to reduce the potable water demand. Consider the use of alternate on-site sources of water, (e.g., rainwater, stormwater, or air conditioner condensate), and graywater for non-potable applications (e.g., toilet and urinal flushing), as approved by the manufacturer, and for custodial uses.

Special consideration should be used to distinguish applicability of these technologies in high-volume passenger terminal areas versus office facilities, especially with respect to maintenance.

Standard Practice

- Chicago Building Code (CBC) meets the Energy Policy Act of 1992 (EPAAct 1992)

Recommended Practice

- Use high-efficiency fixtures and valves, automatic flush sensors, aerators on faucets and dual-flush toilets
- Use local generation of domestic hot water, as much as possible, to eliminate long piping runs associated with recirculation piping. Unless connecting to an existing hot water recirculating system.
- Domestic hot water for general plumbing fixtures should be designed for a temperature of 140°F maximum, but not less than 120°F



Best Available Practice

- Install dry fixtures such as composting toilets and waterless urinals to reduce wastewater volumes
- Use instantaneous hot water heating systems (i.e., tankless, on-demand hot water heating)
- Use zoned or sub-metering to measure and audit water consumption rates at points of use



2.0 WATER EFFICIENCY

2.3 Water Use - Additional Reduction

1 to 3 Points

INTENT

Further increase water efficiency within terminal space to reduce the burden on municipal water supply and wastewater systems.

REQUIREMENTS

Employ strategies that in aggregate use less water than the water use baseline calculated for the terminal occupant's space. All newly installed toilets, urinals, private lavatory faucets, and showerheads that are eligible for labeling must be WaterSense™ labeled.

The minimum water savings percentage for each point threshold is as follows:

<u>SAM Credit</u>	<u>Water Reduction</u>	<u>Points</u>
2.3.1	25%	1
2.3.2	30%	2
2.3.3	35%	3
2.3.4	40%	4
2.3.5	45%	5
2.3.6	50%	6

Calculate the baseline according to the commercial baselines outlined below¹. Calculations are based on estimated occupant usage and must include only the following fixtures and fixture fittings (as applicable to the project scope): water closets, urinals, lavatory faucets, showers, kitchen sink faucets and pre-rinse spray valves.

Commercial Fixtures and Fittings	Minimum Requirement
Commercial Toilets*	1.28 gallons per flush (gpf)* Except blow-out fixtures: 3.5 gpf 1.6/1.1 gpf – Dual Flush

¹ Tables adapted from information developed and summarized by the U.S. Environmental Protection Agency (EPA) Office of Water based on requirements of the Energy Policy Act (EPAct) of 1992 and subsequent rulings by the Department of Energy, requirements of the EPAct of 2005, and the plumbing code requirements as stated in the 2006 editions of the Uniform Plumbing Code or International Plumbing Code pertaining to fixture performance.



Commercial Fixtures and Fittings	Minimum Requirement
Commercial Urinals*	0.8 gpf
Commercial Lavatory (restroom) Faucets	0.5 (gpm) at 60 (psi) all others except private applications
Commercial Pre-Rinse Spray Valves (for food service applications)	Flow rate ≤ 1.6 gpm (no pressure specified; no performance requirement)
Appliance	
Residential clothes washers	ENERGY STAR or performance equivalent
Commercial clothes washers	ENERGY STAR or performance equivalent
Residential dishwashers	ENERGY STAR or performance equivalent
Ice machine	ENERGY STAR or performance equivalent and use either air-cooled or closed-loop cooling, such as chilled or condenser water system
Ice machines once through water cooled	BANNED
Food Steamers	
Steam cooker – batch cooking	815 gallon/hour/plan
Steam cooker – high production/cook to order	84 gallon/hour/plan
Combination Oven	
Countertop or stand mounted	40 gph
Roll-in	60 gph
Other Equipment	Performance baseline based on industry standards

* WaterSense™ label available for this product type

SUBMITTALS

Include descriptive narrative and calculations in the SAM Checklist.

TECHNOLOGY/STRATEGY

For many retail applications, process water (water use related to the product of service provided) far outweighs water used for toilets, sinks and showers. Process water also includes water used in cooling systems or any other equipment not directly related to the Energy Policy Act of 1992 (e.g. faucets, toilets, urinals, and showerheads). In addition to specifying water-efficient fixtures and appliances, consider alternative sources of water for non-potable applications such as toilet and urinal flushing, mechanical systems, cleaning, vehicle washing and other applications that do not require potable water.



WaterSense™-certified fixtures and fixture fittings should be used where available. Use high-efficiency fixtures (water dispensers, water closets and urinals) and dry fixtures such as composting toilet systems to reduce the potable water demand. Consider the use of alternate on-site sources of water, such as rainwater, stormwater, or air conditioner condensate, and graywater for non-potable applications such as toilet and urinal flushing, as approved by the manufacturer, and custodial uses.

Standard Practice

None

Recommended Practice

- Use high-efficiency fixtures and valves, such as automatic sensors, aerators on lavatories and dual-flush toilets

Best Available Practice

- Dry fixtures such as composting toilets and waterless urinals to reduce wastewater volumes



3.0 ENERGY & ATMOSPHERE

3.1 Prerequisite 1 – Utility Metering

Required

INTENT

Provide means for tenants to measure and be aware of their energy use to encourage conservation of resources.

REQUIREMENTS

The following requirements would only apply to a tenant or space where utility-provided energy is used, e.g., electricity, natural gas.

Engage utility provider to install an accessible utility meter that measures usage representing total tenant energy consumption.

OR

Engage utility provider to install an accessible utility meter that measures usage representing total energy consumption for a defined space as directed by the CDA.

SUBMITTALS

Include descriptive narrative on the SAM Checklist.

TECHNOLOGY/STRATEGY

Tenant should provide the exact location of the meter, its accessibility, and reporting methods.

Depending on the tenant type, tenant locations within the terminal, and other factors, the placement and number of meters may vary. It is ideal if one meter per tenant is installed but this may not be possible if the tenant space is non-contiguous or is shared space, for example. Meter locations will need to be coordinated with CDA. A general guide to some potential scenarios is shown in the following table:



Scenario	Probable Utility Meter Requirement
Stand-alone food service concessionaire within the public terminal space that uses natural gas for food preparation	Have the applicable utility providers install an electric meter and gas meter for space.
Stand-alone non-food service concessionaire (no gas use) within the public terminal space	Have the applicable utility provider install an electric meter for space.
Tenant with two non-contiguous leased spaces located anywhere in the terminal	Install a utility meter for incoming utilities for each space and each utility (e.g., electricity and/or gas), as applicable.
Tenant office space within terminal	Install electric meter measuring electric usage in that space.
CDA-defined space not belonging to a tenant	Install utility meter, if applicable, to the defined space, e.g. all gas consumption in a specified concourse.

Please note that the above table is not intended to be a comprehensive list of all possible scenarios. The CDA will review each project on a case-by-case basis.

Standard Practice

None

Recommended Practice

None

Best Available Practice

- Remote sensing meters integrated to building management system.

CASE STUDY

West Edmonton Mall Edmonton, Alberta

West Edmonton Mall is North America's largest indoor mall and at over 5.3 million square feet. The mall contains over 800 stores and services, nine attractions, two hotels, 100+ dining venues, serving almost 31 million visitors annually.

Installation and implementation of a tenant meter program of electrical, water, and gas meters for every tenant resulted in a meter system of 700+ meter points. In January 2011, West Edmonton Mall began billing tenants for their electrical, water, and gas consumption. The solution, implemented by an outside consultant, was customized for cost recovery and tenant billing needs. The solution was electronic, eliminating spreadsheets, on-site meter observations by staff, errors in recording, and delays due to



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staff priorities. The key benefit is all readings could be read electronically and billings could be integrated with existing accounting software. Ownership has realized the importance of the investment and with accuracy of the information, the return on investment was significant.

<https://qmers.com/submetering-for-mall-tenant-billing/>



3.0 ENERGY & ATMOSPHERE

3.2 Prerequisite 2 – Minimum Energy Performance

Required

INTENT

Establish the minimum level of energy efficiency for the terminal space systems to reduce environmental and economic impacts associated with excessive energy use.

REQUIREMENTS

Design portions of the terminal occupant's space to comply with the ANSI/ASHRAE/IESNA Standard 90.1-2016 (with errata but without addenda²) to complete the following:

- Comply with the mandatory provisions (Sections 5.4, 6.4, 7.4, 8.4, 9.4 and 10.4) in Standard 90.1-2016 (with errata but without addenda)
- Achieve the prescriptive requirements (Sections 5.5, 6.5, 7.5 and 9.5) or performance requirements (Section 11) of ANSI/ASHRAE/IESNA Standard 90.1-2016 (with errata but without addenda)
- Reduce connected lighting power density 10% below that allowed by ANSI/ASHRAE/IESNA Standard 90.1-2016 (with errata but without addenda) using either the Space-by-Space Method or by applying the whole lighting power allowance to the entire terminal space
- Install ENERGY STAR equipment for 50% (by rated-power) of ENERGY STAR eligible items. This requirement includes appliances, office equipment, electronics, and commercial food service equipment. Excluded are heating, ventilating and air conditioning (HVAC) and lighting.

SUBMITTALS

Include descriptive narrative in the SAM Checklist.

TECHNOLOGY/STRATEGY

Design the terminal occupant space and systems to meet baseline requirements. Use a computer simulation model, where applicable, to assess the energy performance and identify the most cost-effective energy efficiency measures.

² Project teams wishing to use ASHRAE approved addenda for the purposes of this credit may do so at their discretion. Addenda must be applied consistently across all SAM credits.



If a local code has demonstrated quantitative and textual equivalence following, at a minimum, the U.S. Department of Energy (DOE) standard process for commercial energy code determination, then the results of that analysis may be used to correlate local code performance with ASHRAE 90.1-2016. Details on the DOE process for commercial energy code determination can be found at: <http://www.energycodes.gov/regulations/determinations>.

Standard Practice

- The Chicago Energy Conservation Code (CECC 2019, Title 14D) currently requires that buildings meet the 2018 International Energy Conservation Code (IECC) with an alternate compliance path of ASHRAE/IESNA 90.1-2016 standard with some exceptions.

Recommended Practice

- Design terminal occupant space using the more current ASHRAE/IESNA 90.1-2016 standard
- Avoid natural gas service if possible, but use highest efficiency gas-powered equipment

Best Available Practice

None



3.0 ENERGY & ATMOSPHERE

3.3 Optimize Energy Performance

1 to 6 Points

INTENT

Achieve increasing levels of energy performance beyond the prerequisite standard to reduce environmental and economic impacts associated with excessive energy use.

REQUIREMENTS

Comply with the prescriptive measures identified below. The terminal occupant space must meet the following requirements below. Points will be awarded based on the number of appliance types or technologies implemented from the tables below. Points earned for this credit are as follows:

All Terminal Occupants	<u>Points</u>
<u>Number of Technologies/ Strategies Implemented from Table 1</u>	
1	1
2	2
3-4	3
5-6	4
7-8	5
9+	6

Example: A food service tenant uses LED lighting for 90% of its lighting load, has Energy Star rated reach-in refrigerators, and an Energy Star rated ice machine that meet the requirements of Tables 1 and 2 below. Therefore, for these three item types, 3 points would be earned for this credit.

Table 1 - All Terminal Occupants:

Technology/Strategy	Requirement
LED Lighting	For at least 60% of lighting load
LED Lighting	For 100% of lighting load (2 points)
Light Sensors or Timers	Where applicable



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Motion-Controlled Sensors	Where applicable
ENERGY STAR Rated Appliances and Electronic Equipment	At least one ENERGY STAR item type but must be for all items of that type, e.g. all computers, all printers
ENERGY STAR Rated Ventilation Equipment	Includes exhaust and ceiling fans; at least one ENERGY STAR item type but must be for all items of that type, e.g. all exhaust fans
ENERGY STAR Rated HVAC Equipment	Includes furnaces and air conditioning units; at least one ENERGY STAR item type but must be for all items of that type, e.g. all exhaust fans
Appliances listed in Table 2	1 point per each item in Table 2 (maximum of 5 items)
User-Defined	The SRP will consider other proposed strategies and technologies. Points will be awarded at the discretion of the SRP.

**Table 2 – Food Service Occupants:
Appliances Eligible for Additional Points toward Credit Requirements:**

Appliance Type	Power Source	Minimum Efficiency	Max Idle Rate	Water Use	Energy Star Category
Fryers	elec	80%	1000 W*	n/a	Yes
Large vat fryers	elec	80%	1250 W	n/a	Pending
Steam cooker-batch coating	elec	50%	135 W/pan	2 gph/pan	Yes
Steam cooker- high production/cook to order	elec	50%	275 W/pan	3 gph/pan	Yes
Hot food holding cabinets	elec		20 W/ft ²	n/a	Yes
Solid door reach-in refrigerators	elec	0.06V+1.22 kWh/day	n/a	n/a	Yes
Solid door reach-in freezers	elec	0.29V+0.97 kWh/day	n/a	n/a	Yes
Solid door reach-in refrigerator/freezer	elec	0.27AV-0.71 kWh/day**	n/a	n/a	Yes
Glass door reach-in refrigerators	elec	0.086V+2.39 kWh/day	n/a	n/a	Pending
Ice cream freezer	elec	0.39V+0.82 kWh/day	n/a	n/a	Yes
Undercounter dish machines- high temp	elec	N/a	900 W	1 gal/rack	Yes
Undercounter dish machines- low temp	elec	N/a	500 W	1.7 gal/rack	Yes
Door type dish machine- high temp	elec	N/a	1000 W	0.95 gal/rack	Yes
Door type dish machine- low temp	elec	N/a	600 W	1.18 gal/rack	Yes
Single tank rack conveyor dish machine- high temp	elec	N/a	2000 W	0.7 gal/rack	Yes
Single tank rack conveyor dish machine- low temp	elec	N/a	1600 W	0.79 gal/rack	Yes



Appliance Type	Power Source	Minimum Efficiency	Max Idle Rate	Water Use	Energy Star Category
Multi-tank rack conveyor dish machine- high temp	elec	N/a	2600 kW	0.54 gal/rack	Yes
Multi-tank rack conveyor dish machine- low temp	elec	N/a	2000 W	0.54 gal/rack	Yes
Ice machine [ice making head] IMH H<450 lb/day	elec	9.23-0.0077H kWh/100 lb ice	n/a	20 gal/100 lb ice	Yes [but with lower water use]
Ice machine [ice making head] IMH H ≥ 450 lb/day	elec	6.20-0.0010H kWh/100 lb ice	n/a	20 gal/100 lb ice	Yes [but with lower water use]
Ice machine [w/o remote compressor] H< 1000 lb/day	elec	8.05-0.0035H kWh/100lb ice	n/a	20 gal/100 lb ice	Yes [but with lower water use]
Ice machine [w/o remote compressor] H ≥ 1000 lb/day	elec	4.64 kWh/100lb ice	n/a	20 gal/100 lb ice	Yes [but with lower water use]
Ice machine [w remote compressor] H< 934 lb/day	elec	8.05-0.0035H kWh/100lb ice	n/a	20 gal/100 lb ice	Yes [but with lower water use]
Ice machine [w remote compressor] H≥ 934 lb/day	elec	4.82 kWh/100 lb ice	n/a	20 gal/100 lb ice	Yes [but with lower water use]
Ice machine self-contained unit H< 175 lb/day	elec	16.7-0.0436H kWh/ 100 lb ice	n/a	30 gal/100 lb ice	Yes [but with lower water use]
Ice machine contained unit H≥ 175 lb/day	elec	9.11 kWh/100lb ice	n/a	30 gal/100 lb ice	Yes [but with lower water use]
Ice machine water cooled IMH H<500 lb/day [note: must be on a chilled loop]	elec	7.02-0.005H kWh/100lb ice	n/a	20 gal/100 lb ice	
Ice machine water cooled IMH H≥ 500lb/day <1436 lb/day [note: must be on a chilled loop]	elec	5.13-0.001H kWh/100lb ice	n/a	20 gal/100 lb ice	
Ice machine water cooled IMH H≥ 1436 lb/day [note: must be on a chilled loop]	elec	3.7 kWh/100lb ice	n/a	20 gal/100 lb ice	
Ice machine water cooled SCU H<200 lb/day [note: must be on a chilled loop]	elec	10.6-0.177H kWh/100lb ice	n/a	30 gal/100 lb ice	
Ice machine water cooled SCU H≥200 lb/day [note: must be on a chilled loop]	elec	7.07 kWh/100lb ice	n/a	30 gal/100 lb ice	
Griddles	elec	70%	350 w/ft ²	n/a	Pending
Range	elec	80%			
Convection ovens [full size]	elec	70%	1750 W	n/a	Pending
Combination ovens [countertop or island]	elec	60%	800 W/pan	15 gph	Pending
Combination ovens [roll-in]	elec	60%	800 W/pan	20 gph	Pending
Bread toaster [light duty]	elec		3600 W [8% duty cycle] = 2 pop-ups		
Pre-rinse spray valves	n/a	n/a	n/a	s 1.2 gpm	n/a



Appliance Type	Power Source	Minimum Efficiency	Max Idle Rate	Water Use	Energy Star Category
Kitchen exhaust hood	n/a	35% reduction in design [full speed] ventilation rate [cfm] or demand controlled ventilation	n/a	n/a	n/a
Fryers	gas	50%	9000 BTU/h*	n/a	Yes
Large vat fryers	gas	50%	12000 BTU/h		Pending
Steam cooker- batch coating	gas	38%	2100 BTU/h/pan	2 gph/pan	Yes
Steam cooker- high production/ cook to order	gas	38%	4300 BTU/h/pan	3 gph/pan	Yes
Griddles	gas	38%	2700 BTU/h/ft ²	n/a	Pending
Convection ovens [full size]	gas	43%	13000 BTU/h	n/a	Pending
Combination ovens	gas	40%	2850 BTU/h/pan	15 gph	Pending
Combination ovens	gas	40%	2850 BTU/h/pan	20 gph	Pending
Rack ovens- single	gas	50%	29000 BTU/h	n/a	Pending
Rack ovens- double	gas	50%	35000 BTU/h	n/a	Pending
Broiler [underfired]	gas	35%	12500 BTU/h/ft ² peak input	n/a	No
Conveyor oven [small = < 25 inch bell]	gas	42%	29000 BTU/h	n/a	Pending
Conveyor oven [large = > 25 inch bell]	gas	42%	58000 BTU/h	n/a	Pending
Clothes washer		2.00 MEF		6.0 WF	n/a

*Based on 15 inch fryer

**AV = adjusted volume = (1.63 x freezer volume) + refrigerator volume

SUBMITTALS

Include descriptive narrative and calculations in the SAM Checklist.

TECHNOLOGY/STRATEGY

For some occupants, regulated loads will represent the primary energy use. For others, process loads will be the biggest energy use. In either case, look at the equipment and systems that use energy and identify strategies to reduce energy use. Consider first cost, maintenance, replacement costs, and any potential benefit or detriment to staff or customers when selecting strategies. Design the terminal



occupant space and systems to maximize energy performance. Use a computer simulation model to assess energy performance and identify the most cost-effective energy efficiency measures. Quantify energy performance compared with the baseline benchmark. Install energy efficient equipment, such as retail display lighting, dishwashers and enclosed refrigerator cases. Utilize heat recovery and heat rejection strategies. Work with equipment manufacturers to improve energy efficiency, particularly for volume build applications. Small independent tenants can use historic utility bills from similar stores, generic retail energy data, and data from their local utility or computer modeling. Regardless of the methodology used by any entity in setting their energy budget, the credit narrative should include a description of the methodology used and assumptions made.

Standard Practice

- The Chicago Energy Conservation Code (CECC 2019, Title 14B) currently requires that buildings meet the 2018 International Energy Conservation Code (IECC) which has an alternate compliance path of following ASHRAE/IESNA 90.1-2016 standard with some exceptions.

Recommended Practice

- Use a computer simulation model to assess energy performance and identify the most cost-effective energy measures
- Provide high-efficiency motors and variable-speed pumping systems
- Provide energy efficient lighting systems including LED, solar lighting and the use of lighting sensors or timers
- Organize circuiting of lighting and space systems so that individual areas may be separately controlled relative to daylight and heating/cooling zones
- Optimize architectural features for daylighting and glare control. Consider light shelves, ceiling design, window placement, and window treatments
- Provide motion sensors in stairs, toilet rooms, storage rooms and equipment rooms unless life safety is compromised
- Provide ENERGY STAR compliant equipment and appliances
- Use LED lighting, wherever applicable
- Optimize lighting controls for energy savings and function
- Provide daylight harvesting control systems
- Use high performance glazing (double glazed, low-e) and window systems
- Utilize high efficiency motors, generators and pumps where applicable

Best Available Practice

- Consider the following for terminal occupant spaces:
 - Use spectrally selective glazing
 - Evaluate underfloor air distribution systems in office-type spaces
 - Evaluate “green walls” for useUtilize premium efficiency motors where applicable



4.0 MATERIALS & RESOURCES

4.1 Prerequisite 1 – Storage and Collection of Recyclables/Compostables

Required

INTENT

Facilitate the reduction of waste generated by terminal occupants that is hauled to and disposed of in landfills.

REQUIREMENTS

Provide an easily accessible dedicated area or areas that serve the space for the collection and storage of materials for recycling, including (at a minimum) paper, corrugated cardboard, glass, plastics and metals. An area should also be dedicated to collection and storage of compostable food waste, if applicable.

SUBMITTALS

Include descriptive narrative in the SAM Checklist.

TECHNOLOGY/STRATEGY

Designate an area for recyclable collection and storage that is appropriately sized and located in a convenient area. These areas would likely be designed and sized differently depending on the ultimate use and waste stream of the facility (e.g. office, airlines, concessionaires, etc.) Identify local waste handlers and buyers for glass, plastic, office paper, e-waste, newspaper, cardboard, metals, fluids, fixtures, and organic wastes. Instruct employees, occupants, and contractors on the recycling procedures. Consider employing cardboard balers, aluminum can crushers, recycling chutes and other waste strategies to further enhance the recycling program.

Standard Practice

- Investigate and incorporate collection rooms for recycling streams that make sense for each terminal occupant's space
- Designate an area for recyclable collection and storage that is appropriately sized and located in a convenient area

Recommended Practice

- Coordinate recyclable waste collection with hauler capability
- Recycle the following waste, whenever feasible:
 - Aluminum



- Glass
- Paper, newspapers, magazines and cardboard
- Carpet
- Wood (pallets/crates, etc.)
- Food waste/grease and compostables
- Organic waste and compostables
- Gas & oil filters
- Motor oil and Anti-freeze
- Scrap metal
- Batteries
- Light bulbs
- Toner cartridges
- Tires
- Electrical wiring
- Electronics including monitors
- Deicing fluid
- “Foreign Object Debris” (FOD)
- Instruct employees, users and occupants on recycling procedures

Best Available Practice

- Employ cardboard balers, aluminum can crushers, recycling chutes and other technologies to enhance the recycling program



4.0 MATERIALS & RESOURCES

4.2 Construction Waste Management

2 to 3 Points

INTENT

Divert construction and demolition debris from disposal in landfills and incineration facilities. Redirect recyclable recovered resources back to the manufacturing process and reusable materials to appropriate sites.

REQUIREMENTS

Recycle and/or salvage nonhazardous construction and demolition debris. Develop and implement a construction waste management plan that, at a minimum, identifies the materials to be diverted from disposal and whether the materials will be sorted on-site. Calculations must be done by weight (conversion may be necessary) and must be consistent throughout. The minimum percentage debris to be recycled or salvaged for each point threshold is as follows:

<u>SAM Credit</u>	<u>Recycled or Salvaged</u>	<u>Points</u>
4.2.1	50%	Required
4.2.2	75%	2
4.2.3	100%	3

Section 11-4-1905 of the Chicago City Code, includes applicability requirements. For CDA purposes, all airport projects are applicable regardless of Section 11-4-1905.

SUBMITTALS

Include descriptive narrative on the SAM Checklist indicating the name of the project that will utilize the material, if other than current project or temporary storage locations, and the following:

- A design estimate using the construction waste management form in CDA Specification 01524 – Construction Waste Management, to be provided by the designer with the SAM Design Checklist.
- A Waste Management Plan as outlined in CDA Specification 01524 to be provided by the Contractor no later than 30 days prior to start of construction
- Monthly construction waste management forms provided by the Contractor during construction
- A final construction waste total provided by the Contractor prior to final payment



The submittal requirements follow the City of Chicago waste ordinance (Chicago Code Section 11-4-1905) with the following exceptions:

- All airport projects, including those not subject to Section 11-4-1905 of the Chicago Code, shall be subject to the submittal requirements of this credit
- Submit documentation to CDA for tracking purposes in addition to documentation required by the ordinance

Note that the requirements of this credit are very similar to the Chicago construction waste ordinance and CDA Specification 01524 with the exceptions as noted above. The specification follows the City ordinance with additional provisions for submittal requirements and project applicability.

TECHNOLOGY/STRATEGY

Note that the City of Chicago waste ordinance mandates that a minimum of 50% of construction and demolition (C&D) waste produced on-site (as measured by weight) is recycled.

It is expected that these practices may lead to savings in material costs due to resource coordination and income generation from recycled/salvaged materials.

Standard Practice

- Utilize designated areas for recycling construction debris on-site

Recommended Practice

- Establish goals for diversion from disposal in landfills and incineration facilities and adopt a construction waste management plan to achieve these goals
- Consider recycling cardboard, metal, brick, mineral fiber panel, concrete, plastic, wood, glass, gypsum wallboard, carpet and insulation
- Construction debris processed into a recycled content commodity that has an open market value (e.g., wood derived fuel [WDF], alternative daily cover material, etc.) may be applied to the construction waste calculation
- Designate a specific area(s) on the construction site for segregated collection and labeling of recyclable materials, and track recycling efforts throughout construction
- Identify construction haulers and recyclers to handle the designated materials. Note that diversion may include donation of materials to charitable organizations and salvage of materials on-site
- Implement deconstruction planning and techniques into all demolition activities. Careful and planned deconstruction of a facility can provide sustainable benefits related to disposal, reuse of materials, etc.
- Ensure that employees are aware of waste management and recycling procedures



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Best Available Practice

- Evaluate use, as appropriate, of pre-cast or prefabricated units whenever possible, to reduce on-site waste generation during construction



4.0 MATERIALS & RESOURCES

4.3 Recycled Content

1 to 2 Points

INTENT

Increase demand for building products that incorporate recycled content materials, thereby reducing impacts resulting from extraction and processing of virgin materials.

REQUIREMENTS

Use materials with recycled content such that the sum of post-consumer recycled content plus 1/2 of the pre-consumer content constitutes at least 10% or 20%, based on cost, of the total value of the materials in the project. The minimum percentage materials recycled for each point threshold is as follows:

<u>SAM Credit</u>	<u>Recycled Content</u>	<u>Points</u>
4.3.1	20%	1
4.3.2	30%	2

The recycled content value of a material assembly is determined by weight. The recycled fraction of the assembly is then multiplied by the cost of assembly to determine the recycled content value. If specific material cost is not available, assume 45% of total cost (inclusive of materials, labor and equipment) is representative of the material cost.

Only include materials in CSI MasterFormat 1995 Divisions 2-10 in the calculations.

Mechanical, electrical and plumbing components and specialty items such as elevators cannot be included in this calculation. Include only materials permanently installed in the project. Furniture may be included if it is included consistently in SAM Credit 4.3 Materials Reuse through SAM Credit 4.8 Furniture and Equipment.

SUBMITTALS

Include descriptive narrative and calculations in the SAM Checklist.

The submittals should include the following:

- A design estimate using the recycled content form in CDA Specification 01356 – Recycled Content, to be provided by the designer with the SAM Checklist



- A pre-construction estimate using the recycled content form in CDA Specification 01356 – Recycled Content, to be provided by the contractor
- A final construction estimate using the recycled content form in CDA Specification 01356 – Recycled Content, to be provided by the contractor with the final SAM Checklist

TECHNOLOGY/STRATEGY

Establish a project goal for recycled content materials and identify material suppliers that can achieve this goal. During construction, ensure that the specified recycled content materials are installed. Consider a range of environmental, economic and performance attributes when selecting products and materials.

Standard Practice

It has become commonplace for manufacturers to provide recycled content of their building materials. If the information does not exist or cannot be obtained, CDA allows the use of the following recycled content percentages as a default for some of the common construction materials:

<u>Material</u>	<u>Post-consumer</u>	<u>Pre-consumer</u>
Steel	25%	-
Copper	65%	-
Aluminum	80%	-
Gypsum board (drywall) ³	2%	5%
Reinforced concrete pipe	2%	-
Asphaltic paving materials, conventional	45%	45%
Asphaltic paving materials, with roof shingles	67%	45%

Post-consumer Recycled Content is derived from materials that can no longer be used for their original purpose.

Pre-consumer Recycled Content consists of raw material diverted from the waste stream during the manufacturing process.

NOTE: The values in the table above are typically very conservative. For example, depending on the process used to make the steel, the recycled content can be anywhere from 25% to 35% for steel produced in a basic oxygen furnace to almost 100% in an electric arc furnace.⁴ For this reason, the

³ Default values for Post-/Pre-consumer % content based on the following manufacturers' specs for standard gypsum drywall sourced in Midwestern states: CertainTeed (IA) – 2%/3%; American Gypsum (OK) – 5%/0%; USG (IA) – 6%/1%; USG (IN) – 5%/38%

⁴ Steel Recycling Institute



designers and contractors are encouraged to determine this information directly from the manufacturers and to not rely on these default values whenever possible.

Recommended Practice

- Establish a project goal for recycled content materials and identify material suppliers that can achieve this goal
- Consider the following major building components for specifying maximum recycled content:
 - Wall and partition materials
 - Components of concrete and cement
 - Steel reinforcement
 - Structural steel
 - Miscellaneous steel
 - Steel fencing and furnishings
 - Unit masonry
 - Ductile iron pipe
 - Aluminum products
 - Site generated broken concrete for gabions
 - Railroad rails
 - Railroad ties
 - Railroad track base material
 - Steel doors and frames
 - Aluminum doors and windows
 - Plaster
 - Terrazzo
 - Acoustical ceilings
 - Drywall
 - Finish flooring including carpet, resilient flooring and terrazzo
 - Toilet and shower compartments
 - Special finishes
- During construction, ensure that the specified recycled content materials are installed and quantify the total percentage of recycled content materials installed

Additionally, the following websites are provided for guidance only:

U.S. General Services Administration - Environmental Products Overview

<http://www.gsa.gov/portal/content/104543>

Architectural Record – Green Product Guide

www.archrecord.construction.com/products/green/

Best Available Practice

- Encourage aggressive use of permeable pavement with high recycled content, where applicable, such as recycled ground tire rubber (GTR) for permeable asphalt.



4.0 MATERIALS & RESOURCES

4.4. Local/Regional Materials

1 to 3 Points

INTENT

Increase demand for building and all other materials and products that are extracted, harvested or recovered, as well as manufactured within the region, thereby supporting the use of indigenous resources and reducing the environmental impacts resulting from transportation.

REQUIREMENTS

Use building and all other materials or products that have been extracted, harvested or recovered, as well as manufactured, within 500 miles of the project site for a minimum of 10% or 20% (based on cost) of the total materials value. If only a fraction of a product or material is extracted/harvested/recovered and manufactured locally, then only that percentage (by weight) shall contribute to the regional value. An additional point can be achieved if 50% of the materials are extracted/harvested/recovered, as well as manufactured, within 250 miles of the project site. The minimum percentage of local/regional materials for each point threshold is as follows:

<u>SAM Credit</u>	<u>Local/Regional Materials</u>	<u>Points</u>
4.4.1	20%	1
4.4.2	30%	2
4.4.3	50% within 250 miles	3

If specific material cost is not available, assume 45% of total cost (inclusive of materials, labor and equipment) is representative of the material cost.

Only include materials in CSI MasterFormat 1995 Divisions 2-10 in the calculations.

Mechanical, electrical and plumbing components and specialty items such as elevators and FAA equipment shall not be included in this calculation. Only include materials permanently installed in the project. Furniture may be included if it is included consistently in SAM Credit 4.3 Materials Reuse through SAM Credit 4.8 Furniture and Equipment.

NOTE: Materials reused and salvaged that satisfy the requirements of SAM Credit 4.3 may also contribute to this credit.



SUBMITTALS

Include descriptive narrative and calculations in the SAM Checklist.

The submittals include the following:

- A design estimate using the recycled content form in CDA Specification 01355 – Regional Materials, to be provided by the designer with the SAM Checklist
- A pre-construction estimate using the recycled content form in CDA Specification 01355 – Regional Materials, to be provided by the contractor
- A final construction estimate using the recycled content form in CDA Specification 01355 – Regional Materials, to be provided by the contractor with the final SAM Checklist

TECHNOLOGY/STRATEGY

Establish a project goal for locally sourced materials, and identify materials and material suppliers that can achieve this goal. During construction, ensure that the specified local materials are installed and quantify the total percentage of local materials installed. Consider a range of environmental, economic and performance attributes when selecting products and materials.

Standard Practice

- The central location of Chicago makes many materials readily available

Recommended Practice

- Identify and specify materials that are extracted, processed, or manufactured within 500 miles of Chicago. Materials that may contribute toward this goal include but are not limited to: concrete, aggregate, asphaltic products, structural steel, masonry, gypsum wallboard, utility structures, gas and water piping. Note that piping used indoors for building systems should not be included. Reused and salvaged materials also qualify.

Best Available Practice

None



4.0 MATERIALS & RESOURCES

4.5 Rapidly Renewable Materials

1 Point

INTENT

Reduce the use and depletion of finite raw materials and long-cycle renewable materials by replacing them with rapidly renewable materials.

REQUIREMENTS

Use rapidly renewable building materials and products for 2.5% of the total value of all building materials and products used in the project, based on cost. Rapidly renewable building materials and products are made from plants that are typically harvested within a ten-year or shorter cycle.

Only include materials in CSI MasterFormat 1995 Divisions 2-10 in the calculations. Only permanently installed materials should be counted in this credit. Temporary construction materials are counted in SAM Credit 6.3 Sustainable Temporary Construction Materials.

SUBMITTALS

Include descriptive narrative and calculations in the SAM Checklist.

TECHNOLOGY/STRATEGY

- Establish a project goal for rapidly renewable materials and identify products and suppliers that can support achievement of this goal. Consider materials such as bamboo, cotton insulation, agrifiber, linoleum, wheatboard, strawboard and cork. Although not a plant material, also consider wool.

Standard Practice

None

Recommended Practice

- Identify materials and suppliers that can achieve this goal
- Consider materials such as:
 - Poplar OSB
 - Straw board or “agriboard”
 - Bamboo flooring
 - Cork



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- Wool carpets and fabrics
- Cotton-batt insulation
- Linoleum flooring
- Sunflower seed board
- Wheat grass or Straw board cabinetry and others.
- Rice husks for concrete

Best Available Practice

None



4.0 MATERIALS & RESOURCES

4.6 Certified Wood

1 Point

INTENT

Encourage environmentally responsible forest management.

REQUIREMENTS

Use a minimum of 50% (based on cost) of wood-based materials and products, which are certified in accordance with the Forest Stewardship Council's principles and criteria, for wood building components. These components include, but are not limited to, structural framing and general dimensional framing, flooring, sub-flooring, wood doors and finishes. Only include materials permanently installed in the project. Furniture may be included, providing it is included consistently in activities concerning SAM Credit 4.7 Furniture and Equipment.

SUBMITTALS

Include descriptive narrative and calculations in the SAM Checklist.

TECHNOLOGY/STRATEGY

Establish a project goal for FSC-certified wood products and identify suppliers that can achieve this goal. During construction, ensure that the FSC-certified wood products are installed and quantify the total percentage of FSC-certified wood products installed.

Standard Practice

None

Recommended Practice

- Identify suppliers that can achieve this goal during construction
- Ensure that the FSC-certified wood products are installed and quantify the total percentage of FSC-certified wood products installed

Best Available Practice

None



4.0 MATERIALS & RESOURCES

4.7 Furniture and Equipment

1 Point

INTENT

Reduce the environmental and indoor air quality impacts of the furniture and equipment acquired for use in terminal space.

REQUIREMENTS

- Electric-Powered Equipment: Examples include, but are not limited to, office equipment (computers, monitors, copiers, faxes, scanners, and printers), appliances (refrigerators, dishwashers, and water coolers), external power adapters, and televisions and other audiovisual equipment. To achieve a point, 50% of the total purchases of electric-powered equipment (by cost) meet one of the following criteria:
 - The equipment is ENERGY STAR labeled (for product categories with developed specifications)
 - The equipment (either battery or corded) replaces conventional gas-powered equipment. Examples include, but are not limited to, maintenance equipment and vehicles, landscaping equipment and cleaning equipment.
- Furniture: To achieve a point, 50% of the total purchases of furniture (by cost) meet any one of the following certifications:
 - Business and Institutional Furniture Manufacturers Association (BIFMA) Level
 - Greenguard
 - Materials Analytic Services (MAS) Certified Green
 - Cradle to Cradle Certified
 - Forest Stewardship Council (FSC) Certified
 - Green Seal
 - Underwriters Laboratory (UL) EcoLogo
 - NSF/ANSI 336: Sustainability Assessment for Commercial Furnishings Fabric

For a more comprehensive list of sustainable furniture certifications, see also the EcoLabel Index for furniture at: <http://www.ecolabelindex.com/ecolabels/?st=category,furniture>. Any of the listed ecolabels is acceptable for the purposes of this credit.



SUBMITTALS

Include descriptive narrative and calculations in the SAM Checklist.

TECHNOLOGY/STRATEGY

Designers are encouraged to specify items that help achieve the requirements of this credit whenever possible. A continuously updated list of ENERGY STAR labeled equipment can be found on www.energystar.gov. Sustainable furniture can be found from various sources. GREENGUARD Environmental Institute certifies products, including furniture. See www.greenguard.org for a listing of GREENGUARD certified furniture.

Standard Practice

None

Recommended Practice

- Specify ENERGY STAR electric equipment and/or sustainable furniture systems, such as GREENGUARD certified furniture

Best Available Practice

None



5.0 INDOOR ENVIRONMENTAL QUALITY

5.1.1 Low-Emitting Materials: Adhesives and Sealants

1 Point

INTENT

Reduce the quantity of indoor air contaminants that are odorous, irritating and/or harmful to the comfort and well-being of installers and occupants.

REQUIREMENTS

All adhesives and sealants used within the terminal occupant space (i.e., inside of the weatherproofing system and applied on-site) must comply with the following requirements as applicable to the project scope:

- Adhesives, Sealants and Sealant Primers: South Coast Air Quality Management District (SCAQMD) Rule #1168. VOC limits are listed in the table below and correspond to an effective date of July 1, 2005 and rule amendment date of October 6, 2017.

	<u>VOC Limit</u> <u>[g/L less</u>		<u>VOC Limit</u> <u>[g/L less</u>
<u>Architectural Applications</u>	<u>water]</u>	<u>Specialty Applications</u>	<u>water]</u>
Indoor Carpet Adhesives	50	PVC Welding	510
Carpet Pad Adhesives	50	CPVC Welding	490
Wood Flooring Adhesives	100	ABS Welding	325
Rubber Floor Adhesives	60	Plastic Cement Welding	250
Subfloor Adhesives	50	Adhesive Primer for Plastic	550
Ceramic, Porcelain, Stone Tile Adhesives	65	Contact Adhesives	80
VCT & Asphalt Adhesives	50	Special Purpose Contact Adhesive	250
Drywall & Panel Adhesives	50	Structural Wood Member Adhesive	140
Cove Base Adhesives	50	Sheet Applied Rubber Lining Operations	850
Multipurpose Construction Adhesives	70	Top & Trim Adhesive	250
Structural Glazing Adhesives	100		
Structural Wood Member Adhesive	140	<u>Sealants VOC Limit</u>	
Building Envelope Membrane Adhesive	250	Architectural	250
Roofing Adhesives	250	Nonmembrane Roof	300
Rubber Floor Adhesive	60	Roadway	250
Subfloor Adhesive	50	Single-Ply Roof Membrane	450
Other Indoor Floor Covering Adhesives	50	Other	420
Other Outdoor Floor Covering Adhesives	150		
		<u>Sealant Primers</u>	
<u>Substrate Specific Applications</u>		Architectural Non-Porous	250
Metal to Metal	30	Architectural Porous	775
Plastic Foams	50	Other	750
Porous Material (except wood)	50		
Wood	30		
Fiberglass	80		
Reinforced Plastic Composite	250		



- Aerosol Adhesives: Green Seal Standard for Commercial Adhesives GS-36 requirements in effect on July 12, 2013.

Aerosol Adhesives:

VOC weight [g/L minus water]

General purpose mist spray

65% VOCs by weight

General purpose web spray

55% VOCs by weight

Special purpose aerosol adhesives (all types)

70% VOCs by weight

SUBMITTALS

Include descriptive narrative in SAM Checklist.

TECHNOLOGY/STRATEGY

Specify low-VOC materials in construction documents. Ensure that VOC limits are clearly stated in each section of the specifications where adhesives and sealants are addressed. Common products to evaluate include: general construction adhesives, flooring adhesives, fire-stopping sealants, caulking, duct sealants, plumbing adhesives, and cove base adhesives. Review product cut sheets, material safety data sheets (MSDS), signed attestations or other official literature from the manufacturer clearly identifying the VOC contents or compliance with referenced standards.

Standard Practice

- Low-VOC materials are becoming more common in the market place

Recommended Practice

- Specify Low-VOC adhesives and sealants
- Consider the use of air scrubbers during the installation and curing of adhesives and sealers when used inside the passenger terminal or other public spaces

Best Available Practice

- Specify that all shop finished material meet the VOC emission requirements. Materials to consider are:
 - Primed steel
 - Finished metals including aluminum
 - Finished millwork
 - Finished steel and wood doors and windows



5.0 INDOOR ENVIRONMENTAL QUALITY

5.1.2 Low-Emitting Materials: Paints and Coatings

1 Point

INTENT

Reduce the quantity of indoor air contaminants that are odorous, irritating and/or harmful to the comfort and well-being of installers and occupants.

REQUIREMENTS

Paints and coatings used within the terminal occupant space (i.e., inside of the weatherproofing system and applied on-site) must comply with the following criteria as applicable to the project scope:

- Architectural paints, coatings and primers applied to interior walls and ceilings must not exceed the VOC content limits established in Green Seal Standard GS-11, *Paints, Edition 3.2, October 26, 2015*.
 - Flats: 50 g/L
 - Non-Flats: 150 g/L
- Anti-corrosive and anti-rust paints applied to interior ferrous metal substrates must not exceed the VOC content limit of 250 g/L established in Green Seal Standard GC-03, *Anti-Corrosive Paints, Second Edition, January 7, 1997*.
- Clear wood finishes, floor coatings, stains, and shellacs applied to interior elements must not exceed the VOC content limits established in South Coast Air Quality Management District (SCAQMD) Rule 1113, *Architectural Coatings*, amended February 5, 2016.
 - Clear wood finishes: varnish 275 g/L; lacquer 275 g/L
 - Floor coatings: 50 g/L
 - Sealers: waterproofing sealers 100 g/L; sanding sealers 275 g/L; tile and stone sealers 100 g/L; all other sealers 200 g/L
 - Shellacs: Clear 730 g/L; pigmented 550 g/L
 - Stains: 250 g/L

SUBMITTALS

Include descriptive narrative in the SAM Checklist.



TECHNOLOGY/STRATEGY

Specify low-VOC paints and coatings in construction documents. Ensure that VOC limits are clearly stated in each section of the specifications where paints and coatings are addressed. Track the VOC content of all interior paints and coatings during construction.

Standard Practice

None

Recommended Practice

- Specify Low-VOC field applied paints and coating
- Consider the use of air scrubbers during the installation and curing of paints and coatings when used inside the terminal or other public spaces

Best Available Practice

- Specify that all shop finished material meet the VOC emission requirements. Materials to consider are:
 - Primed steel
 - Finished metals including aluminum
 - Finished millwork
 - Finished steel and wood doors and windows



5.0 INDOOR ENVIRONMENTAL QUALITY

5.1.3 Low-Emitting Materials: Flooring Systems

1 Point

INTENT

Reduce the quantity of indoor air contaminants that are odorous, irritating and/or harmful to the comfort and well-being of installers and occupants.

REQUIREMENTS

All flooring must comply with the following as applicable to the project scope:

- All carpet installed in the building interior shall meet the testing and product requirements of the Carpet and Rug Institute's Green Label Plus program
- All carpet cushion installed in the building interior shall meet the requirements of the Carpet and Rug Institute Green Label program
- All carpet adhesive shall meet the requirements of SAM Credit 6.6.1 Low-Emitting Materials: Adhesives and Sealants: VOC limit of 50 g/L
- All of the hard surface flooring must be certified as compliant with the FloorScore® standard (current as of the date of this Rating System, or more stringent version) by an independent third party. Flooring products covered by FloorScore® include vinyl, linoleum, laminate flooring, wood flooring, ceramic flooring, rubber flooring, wall base, and associated sundries.
- An alternative compliance path using FloorScore® is acceptable for credit achievement according to the following stipulations. 100% of the non-carpet finished flooring must be FloorScore® certified, and it must comprise, at minimum, at least 25% of the finished floor area. Potential examples of unfinished flooring include floors in mechanical rooms, electrical rooms, and elevator service rooms.
- Concrete, wood, bamboo, and cork floor finishes such as sealer, stain and finish must meet the requirements of South Coast Air Quality Management District (SCAQMD) Rule 1113, Architectural Coatings, amended February 5, 2016. VOC limits are listed below:
 - Clear wood finishes: varnish 275 g/L; lacquer 275 g/L
 - Floor coatings: 50 g/L
 - Sealers: waterproofing sealers 100 g/L; sanding sealers 275 g/L; tile and stone sealers 100 g/L; all other sealers 200 g/L
 - Shellacs: Clear 730 g/L; pigmented 550 g/L
 - Stains: 250 g/L



- Tile setting adhesives and grout must meet South Coast Air Quality Management District (SCAQMD) Rule #1168. VOC limits are listed below and correspond to an effective date of July 1, 2005 and rule amendment date of October 6, 2017.
 - Ceramic tile adhesive: 65 g/L
 - Grout and mortar: 250 g/L
- All flooring products will meet the testing and product requirements of the California Department of Public Health (CDPH) Standard Method v1.1–2010, using the applicable exposure scenario..

SUBMITTALS

Include descriptive narrative in SAM Checklist.

TECHNOLOGY/STRATEGY

Clearly specify requirements for product testing and/or certification in the construction documents. Select products that are either certified under the Green Label Plus program or for which testing has been done by qualified independent laboratories in accordance with the appropriate requirements.

The Green Label Plus program for carpets and its associated VOC emission criteria in micrograms per square meter per hour, along with information on testing method and sample collection developed by the Carpet & Rug Institute (CRI) in coordination with California's Sustainable Building Task Force and the California Department of Health Services (DHS), are described in Section 9, Acceptable Emissions Testing for Carpet, DHS Standard Practice CA/DHS/EHLB/R-174, dated 07/15/04. This document is published as Section 01350 Section 9 [dated 2004] by the Collaborative for High Performance Schools [<http://www.chps.net/dev/Drupal/node>]).

FloorScore® is a voluntary, independent certification program that tests and certifies hard surface flooring and associated products for compliance with criteria adopted in California for indoor air emissions of Volatile Organic Compounds (VOCs) with potential health effects. The program uses a small-scale chamber test protocol and incorporates VOC emissions criteria developed by the California Department of Health Services, which are widely known as Section 1350.

Standard Practice

None

Recommended Practice

- Specify Low-VOC carpet systems. Ensure that VOC limits are clearly stated where carpet systems are addressed. Be attentive to carpet installation requirements.
- Consider the use of air scrubbers during the installation and curing of carpet or hard surface floor system adhesives and sealers when used inside the terminal or other public spaces



Best Available Practice

- Consider the use of air scrubbers during the installation and curing of carpet or hard surface floor system adhesives and sealers when used inside the terminal
- Specify that all shop finished material meet the VOC emission requirements. Materials to consider are:
 - Primed steel
 - Finished metals including aluminum
 - Finished millwork



5.0 INDOOR ENVIRONMENTAL QUALITY

5.1.4 Low-Emitting Materials: Composite Wood and Agrifiber Products

1 Point

INTENT

Reduce the quantity of indoor air contaminants that are odorous, irritating and/or harmful to the comfort and well-being of installers and occupants.

REQUIREMENTS

Composite wood and agrifiber products used on the interior of the building (defined as inside of the weatherproofing system) shall contain no added urea-formaldehyde resins. Laminating adhesives used to fabricate on-site and shop-applied composite wood and agrifiber assemblies shall contain no added urea-formaldehyde resins.

Composite wood and agrifiber products are defined as: particleboard, medium density fiberboard (MDF), plywood, wheatboard, strawboard, panel substrates and door cores. Materials considered fit-out, furniture, and equipment (FF&E) are not considered base building elements and are not included.

SUBMITTALS

Include descriptive narrative in SAM Checklist.

TECHNOLOGY/STRATEGY

Specify wood and agrifiber products that contain no added urea-formaldehyde resins. Specify laminating adhesives for field and shop applied assemblies that contain no added urea/formaldehyde resins. Review product cut sheets, MSD sheets, signed attestations or other official literature from the manufacturer.

Standard Practice

None

Recommended Practice

- Specify wood and agrifiber products with no added urea-formaldehyde resins.



Best Available Practice

- Specify that all shop finished material meet the VOC emission requirements. Materials to consider are:
 - Primed steel
 - Finished metals including aluminum
 - Finished millwork
 - Finished steel and wood doors and windows



5.0 INDOOR ENVIRONMENTAL QUALITY

5.2 Controllability of Systems: Lighting

1 Point

INTENT

Provide a high level of lighting system control by individual occupants or by specific groups in multi-occupant spaces (e.g. classrooms and conference areas) to promote the productivity, comfort and well-being of occupants.

REQUIREMENTS

Provide individual lighting controls for 90% (minimum) of the terminal occupant space occupants to enable adjustments to suit individual task needs and preferences.

AND

Provide lighting system controls for all shared multi-occupant spaces to enable lighting adjustment that meets group needs and preferences.

SUBMITTALS

Include descriptive narrative and calculations in the SAM Checklist.

TECHNOLOGY/STRATEGY

Design the terminal occupant space with occupant controls for lighting. Strategies to consider include lighting controls and task lighting. Integrate lighting systems controllability into the overall lighting design, providing ambient and task lighting while managing the overall energy use of the space.

Standard Practice

None

Recommended Practice

- Use motion-activated lighting
- Design lighting control systems to take advantage of daylight harvesting to reduce artificial lighting when adequate daylight is available
- Design areas to provide a variety of levels of light and sound in different areas simultaneously
- Provide operable windows in areas that are not noise-sensitive, such as cargo buildings
- Provide task lighting or more light switching zones in office areas



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Best Available Practice

None



5.0 INDOOR ENVIRONMENTAL QUALITY

5.3 Acoustic Performance

1 Point

INTENT

To provide workspaces and classrooms that promote occupants' well-being, productivity, and communications through effective acoustic design.

REQUIREMENTS

For all occupied spaces, meet two of the following options: HVAC background noise, sound transmission, and/or reverberation time. Meet all three for an exemplary performance point.

Confirm compliance via calculations or measurements in representative rooms, and/or design documentation from a person experienced in the field of acoustics.

Option 1 - HVAC Background Noise

Achieve maximum background noise levels from heating, ventilating, and air conditioning (HVAC) systems per 2015 ASHRAE Handbook-- HVAC Applications, Chapter 48, Table 1; AHRI Standard 885-2008, Table 15; or a local equivalent.

If confirming compliance via measurements, use a sound level meter that conforms to ANSI S1.4 for type 1 (precision) or type 2 (general purpose) sound measurement instrumentation, the International Electrotechnical Commission (2013) IEC 61672-1:2013 Electroacoustics – Sound Level Meters – Part 1: Specifications, or a local equivalent.

Comply with design criteria for HVAC noise levels resulting from the sound transmission paths listed in 2015 ASHRAE Handbook—HVAC Applications, Chapter 48, Table 6; or a local equivalent.

OR

Option 2 - Sound Transmission

Categorize all occupied spaces by use and desired level of acoustic privacy.

Meet the composite sound transmission class (STC_c) ratings or noise isolation class (NIC) listed in the table below. For NIC measurements, use ASTM E336-17a or Annex A.3 of ANSI S12.60-2010.



Adjacency combinations		STC _c **	NIC**
Retail	Retail	50	45
Collaborative / multi-use	Hallway, stairway	25	20
Private	Hallway, stairway	35	30
Confidential	Hallway, stairway	40	35
Collaborative / multi-use	Collaborative / multi-use	35	30
Collaborative / multi-use	Private	45	40
Collaborative / multi-use	Confidential	50	45
Private	Private	45	40
Private	Confidential	50	45
Confidential	Confidential	50	45
Conference room	Conference room	50	45
Mechanical equipment room*	Hallway, stairway	50	45
Mechanical equipment room*	Occupied area	60	55

*Minimum STC_c or NIC has to be met unless proven that the equipment noise in conjunction with the sound isolation performance of the partitions and doors will not exceed the maximum background noise requirements of the adjacent space.

**If a sound masking system is implemented at a minimum level of 40 dBA, the STC_c ratings or NIC values in the table above may be lowered by 5 points. This applies to all space types except mechanical equipment rooms. The sound masking system must be designed by an acoustical professional and meet the following criteria:

- The overall level for sound masking must be set by an acoustical professional and must not exceed 48 dBA in open offices, libraries, cafeterias, corridors/hallways, 45 dBA in enclosed offices, and 42 dBA in conference rooms, and wellness rooms. The combined level of masking and HVAC background noise must not exceed these limits.
- The system design and commissioning must provide overall level uniformity of ± 1 dBA and one-third octave band uniformity of ± 2 dB from at least 100 to 5,000 Hz when tested according to ASTM E1573-18.
- The sound masking spectrum must conform to the National Research Council of Canada COPE Optimum Masking Spectrum or an alternate spectrum if specified by an acoustical engineer.

OR

Option 3 - Reverberation Time

Meet the reverberation time requirements in the table below (adapted from Table 9.1 in the Performance Measurement Protocols for Commercial Buildings – adapted from ASHRAE 2007d, ASA 2008, ANSI 2007, and CEN 2007).



Room type	Application	T ₆₀ (sec), at 500 Hz, 1000 Hz, and 2000 Hz
Hotel/motel	Individual room or suite	< 0.6
	Meeting or banquet room	< 0.8
Office building	Executive or private office	< 0.6
	Conference room	< 0.6
	Teleconference room	< 0.6
	Open-plan office without sound masking	< 0.8
	Open-plan office with sound masking	0.8
Courtroom	Unamplified speech	< 0.7
	Amplified speech	< 1.0
Performing arts space	Drama theaters, concert and recital halls	Varies by application
Laboratories	Testing or research with minimal speech communication	< 1.0
	Extensive phone use and speech communication	< 0.6
Church, mosque, synagogue	General assembly with critical music program	Varies by application
Library		< 1.0
Indoor stadium, gymnasium	Gymnasium and natatorium	< 2.0
	Large-capacity space with speech amplification	< 1.5
Airport terminal/concourse*	Large-capacity open space with speech amplification	< 1.5

* From ACRP Research Report 175, "Improving Intelligibility of Airport Terminal Public Address Systems" by Wilson Ihrig (2017).

SUBMITTALS

Include descriptive narrative in SAM Checklist and show calculations, manufacturer's data, etc. indicating that the levels above are met in all critical areas.

TECHNOLOGY/STRATEGY

There are a number of design techniques that can influence the acoustical quality of indoor spaces. Generally, these can include improved glazing and partitions or less costly design practices such as building and furniture orientation.

Standard Practice

- Design spaces in such a way as to orient noise sensitive areas away from major noise sources



- Use sound dampening glazing and wall partitions
- Locate copy machines and printers in separate rooms

Recommended Practice

- For office environments, specify acoustical ceiling with an appropriate noise reduction coefficient to meet the requirements of this credit
- Choose cubicle partitions that are at least 5 feet tall to provide a sound barrier to workstation occupants
- Insulate wall cavities for noise sensitive spaces and extension of partition walls to the structural deck
- Use mechanical or other means to reduce HVAC noise per ASHRAE, ANSI, and/or IEC standards

Best Available Practice

- Specify laminated glazing to reduce noise transmission for normally occupied spaces

RESOURCES

“Silence is Golden: Controlling Sound in Non-Residential Structures” AIA/Architectural Record, Continuing Education Series, May 2007.

www.archrecord.construction.com/resources/conteduc/archives/0507marvin-1.asp

Paradis, Richard. “Acoustic Comfort” Whole Building Design Guide, October 27, 2008.

www.wbdg.org/resources/acoustic.php

Ihrig, Wilson. “Improving Intelligibility of Airport Terminal Public Address Systems”, ACRP Research Report 175, 2017.



5.0 INDOOR ENVIRONMENTAL QUALITY

5.4 Occupant Well-Being Amenities

1-3 Points

INTENT

Provide well-being spaces that improve occupant productivity and reduce absenteeism.

REQUIREMENTS

Provide one or more of the following dedicated well-being spaces (one point each, up to 3 points):

- **Exercise/Fitness Room:** Provide a dedicated room for exercise that includes strength and cardio fitness equipment, water fountain/filling station, access to showers and lockers.
- **Quiet Room:** Provide a dedicated space, minimum 80 square foot floor area, for private meditation, prayer, or mental decompression with a lockable door, occupancy signage, that ensures the user's privacy.
- **Lactation Room:** Provide a dedicated private room with lockable door and occupancy signage that includes a seating area, table, refrigerator, sink, and spare outlet. The room should have a minimum floor area of 60 square feet.
- **Water Bottle Refilling Stations:** Provide water bottle refilling stations for at least 50% of all water fountains.
- **Active Work Stations:** Provide employees with workstations that promote movement, e.g. standing desks/desktop platforms.

All spaces/amenities must meet applicable standards for ADA accessibility.

SUBMITTALS

Include descriptive narrative in SAM Checklist and indicate locations of the well-being spaces in the plans.



TECHNOLOGY/STRATEGY

Whether for passengers or employees, well-being spaces enhance the experience for the travelling public and promote health and well-being of the employers' staff. Exercise and Lactation Rooms may require additional plumbing and space requirements. Lockers and showers will be necessary for an Exercise Room. Lactation Rooms should have a sink and refrigerator. A Quiet Room can be simple, e.g. a private room with a comfortable seat.

For Lactation Rooms, guidance per the National Institute of health guidelines suggests:

<u>Number of Female Employees</u>	<u>Suggested Number of Stations Needed</u>
Fewer than 100	1
Approximately 250	2
Approximately 500	3
Approximately 750	4
Approximately 1,000	6
For every additional 1,000 employees	6 additional stations

For more information see <https://www.womenshealth.gov/supporting-nursing-moms-work/break-time-and-private-space/location-breaks>.

Standard Practice

The presence of Exercise and Quiet Rooms are not regulated by any local, state, or federal statute. Because of this, there is no standard that applies. Lactation statutes do exist, however. Per Illinois Public Act 92-0068:

- An employer shall make reasonable efforts to provide a room or other location, in close proximity to the work area, other than a toilet stall, where an employee can express her milk in privacy.

Recommended Practice

If space allows, an Exercise Room should include, at a minimum, barbells or other small weights, a treadmill and/or stationary bicycle, water fountain or water bottle filling station, lockers, and a shower room.

Given the minimal space and no need for extra plumbing, storage space, etc., a Quiet Room set aside for employee meditation/relaxation should be easily accommodated if there is an available spare room. A private room with a comfortable chair or sofa is the minimum requirement.



For Lactation Rooms, the space does not need to be a dedicated Lactation Room and can be used for other purposes as well. It is recommended that, at a minimum, employers provide a safe and private space with a chair and a small table or shelf. An ideal space would include an electrical outlet, a door that can be locked from the inside, a sink, and/or a refrigerator located near the pumping space. Though not required, these additions can help shorten the break time because travel to another area to wash hands, clean pump parts, and store milk is eliminated.

Best Available Practice

None



6.0 INNOVATION IN TERMINAL OCCUPANTS – DESIGN & CONSTRUCTION

6.1 – 6.3 Innovation in Design & Construction

1 to 3 Points

INTENT

Provide design teams and projects the opportunity to achieve exceptional performance above the requirements set by the Sustainable Airport Manual Green Airplane Rating System and/or innovative performance not specifically addressed by the Sustainable Airport Manual.

REQUIREMENTS

In writing, identify the intent of the proposed innovation credit, the proposed requirement for compliance, the proposed submittals to demonstrate compliance, and the approach (strategies) that go above and beyond existing credit requirements or that meet the intent of this credit.

Up to three points are available for this credit:

<u>SAM Credit</u>	<u>Points</u>
6.1	1
6.2	1
6.3	1

SUBMITTALS

Include descriptive narrative in the SAM Checklist following the criteria in the Requirements section above.

TECHNOLOGY/STRATEGY

Substantially exceed a SAM performance credit such as energy performance or water efficiency and/or apply strategies or measures that demonstrate a comprehensive approach and quantifiable environment and/or health benefits.

Refer to LEED Credit Interpretation Results (CIRs) or the Innovation in the LEED Design Credit Catalog⁵ for potential strategies that may be considered for innovation. Most will pertain to building

⁵ Available at www.usgbc.org.



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related innovations; however the SRP will review proposed innovations by the designer or contractor on a case by case basis.



6.0 INNOVATION IN TERMINAL OCCUPANTS –

DESIGN/CONSTRUCTION

6.4 Menu Items (Green Walls, Recycled Content Finishes, Rapidly Renewable Finishes, Instantaneous Hot Water Heating, Preserve Historic/Cultural Elements)

1 to 3 Points

INTENT

Promote specific technologies and additional strategies considered to be important to the sustainability of the airport environment.

REQUIREMENTS

A point will be awarded for each of the technologies or strategies listed below that are used on a project up to a maximum of 3 points:

- Green Walls – Use green, vegetated wall systems
- Recycled Content Finishes – Use recycled content materials such as recycled glass for floors, countertops, tabletops, walls, shelves, cabinets, tiles or any areas within the terminal occupant space
- Rapidly Renewable Finishes – Use rapidly renewable materials such as bamboo, strawboard, wheatboard, cork, etc. within the terminal occupant space
- Instantaneous Hot Water Heating – Use demand, tankless, instantaneous water heating technology
- Preserve Historic/Cultural Elements – Identify and protect historic buildings, structures, or objects that are designated as one of the following: local/state historic register, US National Register of Historic Places including National Historic Landmarks, and Native American Tribal Register.

SUBMITTALS

Include descriptive narrative and calculations in the SAM Checklist. Indicate in the narrative which of the above technologies and strategies are being included in the project and, where applicable, indicate where these items are shown in the drawings or specifications.



TECHNOLOGY/STRATEGY

Choose any of the following:

- **Green Walls –** Vegetated green wall systems can result in significant air conditioning savings. Green walls fall in to two categories:
 - **Green facades:** Made up of climbing plants growing directly on a wall
 - **Living walls:** Modular panels often made of steel containers, geotextiles, irrigation systems, growing medium and vegetation
- **Recycled Content Finishes –** Recycled content finishes use readily recycled materials like glass, marble, stone, etc. that can be obtained locally and don't require excessive processing like virgin materials
- **Rapidly Renewable Finishes –** Rapidly renewable finishes are natural, non-petroleum-based building materials (petroleum based materials are non-renewable) that have harvest cycles under 10 years. Such materials include bamboo, straw, cork, natural linoleum products (such as Marmoleum), wool, wheatboard, strawboard, etc.
- **Instantaneous Hot Water Heating –** Instantaneous hot water heating technology uses include demand, instantaneous, or tankless water heaters. Demand water heaters heat water directly without the use of a storage tank thus avoiding the standby heat losses associated with conventional storage tank water heaters. When a hot water tap is turned on, cold water travels through a pipe into the unit. Either a gas burner or an electric element heats the water as it passes through coiled piping within the unit. As a result, demand water heaters deliver a constant supply of hot water not limited by the volume of a storage tank.



6.0 INNOVATION IN TERMINAL OCCUPANTS – DESIGN/CONSTRUCTION

6.5 LEED Accredited Professional

1 Point

INTENT

Support and encourage the design integration required by LEED to streamline the application and certification process.

AND

To facilitate the incorporation of sustainable design and construction elements.

REQUIREMENTS

At least one principal participant of the project team shall be LEED accredited (i.e., LEED Green Associate; LEED Accredited Professional).

SUBMITTALS

Identify the LEED accredited individual(s) in the SAM Checklist and submit proof of their LEED certification.

TECHNOLOGY/STRATEGY

Educate the project team members about green building design and construction, the LEED requirements and application process early in the life of the project. Consider assigning integrated design and construction process facilitation to the LEED accredited individual.

Standard Practice

None



Recommended Practice

- The CDA requires that each design consultant and/or design management team include a LEED accredited individual on its staff to oversee the design and assist with construction administration

Best Available Practice

None



6.0 INNOVATION IN TERMINAL OCCUPANTS – DESIGN/CONSTRUCTION

6.6 LEED Certified Project

1 to 4 Points

INTENT

Promote the incorporation of environmentally sustainable design in building and infrastructure improvements by registering and certifying a project through the LEED certification process and rating system.

REQUIREMENTS

Achieve certification via the LEED Retail Commercial Interior (or other applicable LEED category) process – Certified, Silver, Gold, or Platinum. Up to four points are available for this credit:

<u>LEED Certification Level</u>	<u>Points</u>
Certified	1
Silver	2
Gold	3
Platinum	4

SUBMITTALS

Include descriptive narrative in the SAM Checklist demonstrating that the project has been registered under LEED during the design process. Provide the LEED submittal documentation and final determination. Indicate what level of LEED certification has been achieved after construction.

TECHNOLOGY/STRATEGY

Educate the project team members about green building design & construction and application of the LEED Rating System early in the life of the project. Consider pursuing LEED for any occupied building project.

Standard Practice

- Projects are encouraged to seek LEED certification, where applicable



Recommended Practice

- Encourage LEED Silver or better rating for Retail Commercial Interior buildings

Best Available Practice

- Encourage LEED Platinum rating for Retail Commercial Interior buildings



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TERMINAL OCCUPANTS

OPERATIONS & MAINTENANCE SECTION

NOTE:

Please refer to page TO-5 for introduction and applicability of this section.



7.0 ADMINISTRATIVE POLICY & PROCUREMENT

7.1 Prerequisite 1 – Environmental Liaison

Required

INTENT

Facilitate the dissemination of environmental information within the workplace and create a link with CDA staff for environmental issues.

REQUIREMENTS

Designate an employee to serve as the terminal occupant's environmental liaison. Liaison will be expected to attend any CDA Green Meetings and serve as the primary point of contact during the conduct of SAM reviews.

SUBMITTALS

Include the name and contact information of the terminal occupant liaison in the SAM Checklist as well as a descriptive narrative of any environmental/sustainability training the liaison has received.

TECHNOLOGY/STRATEGY

Standard Practice

- Designate one person in the organization to serve as the environmental liaison. Said liaison will be tasked with reviewing the Sustainable Airport Manual and identifying any credits applicable to the terminal occupant.

Recommended Practice

- The environmental liaison will educate co-workers about the environmental policies of the terminal occupant and integrate them into the terminal occupant's Environmental Employee Training Program (See SAM Credit 7.6 Establish and Implement Environmental Employee Sustainability Training Program).

Best Available Practice

- Promote and maintain relationships with external organizations, collaborate with other terminal occupant s to preserve and enhance the environmental quality of the Airport



7.0 ADMINISTRATIVE POLICY & PROCUREMENT

7.2 Prerequisite 2 – Eliminate Use of Polystyrene Foam

Required

INTENT

Reduce the environmental impact of polystyrene production and disposal.

REQUIREMENTS

Eliminate polystyrene foam (also branded as Styrofoam™) in terminal occupant operations.

SUBMITTALS

Include descriptive narrative in the SAM Checklist.

TECHNOLOGY/STRATEGY

Eliminating use of polystyrene foam accomplishes multiple goals because it is a petroleum-based product that uses HCFCs during production, and it does not readily degrade after disposal.

Standard Practice

None

Recommended Practice

- To the greatest extent possible, eliminate the use of polystyrene foam products as part of a responsible procurement practice

Best Available Practice

- Use biodegradable packaging and containers in lieu of polystyrene.



7.0 ADMINISTRATIVE POLICY & PROCUREMENT

7.3 Prerequisite 3 – Sustainable Food and Consumer Product Procurement

Required

INTENT

Reduce the environmental impacts associated with food production and distribution.

REQUIREMENTS

Terminal occupants agree to source organic products and sustainably harvested food for both direct sale and in food preparation for at least 10% of the terminal occupant's total food, clothing, health products, and cosmetic purchases that meet, in any combination, the definition of sustainable foods and products using the list below. Sustainable foods and products are defined as meeting any one or more of the following criteria:

- Non-genetically modified organisms (non-GMO)
- Antibiotic free or no added hormones animal products
- Free-range, cage-free, or grass fed animal products
- USDA National Organic Program Certified
- Food Alliance Certified
- Rainforest Alliance Certified (coffee, tea, chocolate, fruit, wood, and personal care products)
- Protected Harvest Certified
- Fair Trade USA Certified (coffee, tea, chocolate, honey, clothing, nuts, personal care products, wine)
- Marine Stewardship Council's Blue Eco-Label (seafood)
- Blue Ocean Institute Seafood Guide, no "Red" listed species (seafood)
- Monterey Bay Aquarium, "Green" or "Yellow" listed species (seafood)
- International Organic Standard (IOS) 2008 - Natural & Organic Cosmetic Standard
- Cradle to Cradle Certified (textiles, packaging, clothing)
- Demeter Certified Biodynamic (wine, fruit, vegetables, cheese)
- EPEAT (consumer electronics)
- Global Organic Textile Standard (clothing)
- Green Good Housekeeping Seal (personal care products, food, electronics)
- Leaping Bunny Program (cosmetics, personal care)
- Others as approved by CDA, where applicable

See also SAM Credit 7.11 – Sustainable Food and Consumer Products.

Example: Annually, a concessionaire purchases for sale \$50,000 of food products including \$10,000 of fair trade coffee, \$10,000 of Rainforest Alliance Certified bananas, \$10,000



of organic apples, and \$20,000 of conventional strawberries. With the exception of the strawberries, the other food products meet the criteria above, therefore:

$$\frac{\$10,000 + \$10,000 + \$10,000}{\$50,000} = 60\% \text{ of foods meet the requirements}$$

Therefore, this prerequisite is met.

For concessions and tenants not selling food or consumer products, e.g. service providers such as spa services, this prerequisite does not apply.

SUBMITTALS

Include descriptive narrative on SAM Checklist detailing the percentage of organic consumer products and organic and sustainably harvested food sources utilized.

TECHNOLOGY/STRATEGY

Standard Practice

None

Recommended Practice

- Offer certified organic or sustainably harvested products
- Meat served should come from facilities or farms raised without antibiotics. Use of antibiotics on the farm, if practiced, must be minimal. Use of drugs with analogues in human medicine must be non-routine and rare.

Best Available Practice

None



7.0 ADMINISTRATIVE POLICY & PROCUREMENT

7.4 Corporate Sustainability Policy

1 Point

INTENT

In keeping with the spirit and intent of this Manual, it is strongly encouraged that companies working in support of CDA on any project establish and adopt their own corporate policy on sustainable practices.

REQUIREMENTS

Establish and adopt a Corporate Sustainability Policy.

SUBMITTALS

Provide an electronic copy or website link to the company's Corporate Sustainability Policy.

NOTE: If available, please provide an electronic copy of your annual sustainability report documenting any new measures and results.

CASE STUDY

Starbucks Global Social Impact Starbucks

The corporation has undertaken actions to reduce their environmental impact and share in their customer's commitment to the environment. An annual environmental stewardship report is produced to highlight the company's efforts and successes. At the store level, energy and water conservation and other green building strategies are key priorities. Starbucks strives to elevate their partners, customers, suppliers and neighbors to create positive change. This is being accomplished by offering high-quality, ethically purchased and responsibly produced products; investing in paths to opportunity through education, training and employment; minimizing their environmental footprint and inspiring others to do the same; while offering Starbucks as a place for public conversation and elevating civic engagement through service and promoting voter registration.

<https://www.starbucks.com/responsibility>



7.0 ADMINISTRATIVE POLICY & PROCUREMENT

7.5 Green Procurement Policy

1 to 4 points

INTENT

Reduce the environmental impact of products and services by developing a Green Purchasing Program.

REQUIREMENTS

Purchase green products meeting third-party environmental and sustainability standards. Refer to the U.S. EPA Greener Products and Services listing at www.epa.gov/greenerproducts/identify-greener-products-and-services for more information. Some common product certifications include:

- UL EcoLogo
- Electronic Product Environmental Assessment Tool (EPEAT)
- Green Seal®
- EPA Safer Choice.

Points for this credit will be awarded based on the number of green products, procured for general day-to-day office use. The party completing the checklist should only count green products procured for the local office, as opposed to a global level policy.

Points are awarded as follows:

<u>Number of Green Products Procured</u>	<u>Points</u>
1-2	1
3-5	2
6-11	3
12+	4

Example: A terminal tenant uses, in their office, bathroom tissue with a recycled content of 30%, paper towels with a recycled content of 10%, disposable cutlery with a biobased content of 100%, and glass cleaners with a biobased content of 35%. Although there are four items that would earn 2 points according to the table above, two of the items do not meet the minimum requirements of the U.S. EPA Greener Products and Services standards. In this case, the correct number of points to be claimed for the two qualified items is 1 point.



SUBMITTALS

Include descriptive narrative in the SAM Checklist of items purchased and used.

NOTE: If available, please provide an electronic copy of your green procurement policy.

TECHNOLOGY/STRATEGY

Introduce environmentally conscious purchasing into company practices. The policy needs to clearly define an objective and establish a sustainability claims verification procedure that can be replicated as necessary. Verification procedures may rely on product certifications such as Green Seal and ENERGY STAR. Evaluate the items that are purchased, identify more environmentally friendly alternatives, and establish a policy to purchase these alternatives when economically feasible. Work with suppliers to identify sustainable products that meet the company's needs.

Standard Practice

None

Recommended Practice

- Purchase items with the minimum content levels specified in the U.S. EPA Greener Products and Services listing at www.epa.gov/greenerproducts/identify-greener-products-and-services
- Purchase items in bulk to reduce packaging, transportation impacts and costs
- When using a company-developed policy, the following resources can be used to create a Procurement Policy. Resources include but are not limited to:
 - U.S. Environmental Protection Agency's Comprehensive Procurement Guidelines (CPG) – The CPG includes an index of products and their recommended recycled content. More information can be found on the associated website: www.epa.gov/smm/comprehensive-procurement-guideline-cpg-program
 - U.S. Environmental Protection Agency's Water Sense – The partnership program by promoting water efficiency and enhancing the market for water-efficient products, programs and practices. More information can be found on the associated website: www.epa.gov/WaterSense/
 - DOE's Alternative Fuels and Advanced Vehicles Data Center – The data center provides a wide range of information and resources to enable the use of alternative fuels, in addition to other petroleum reduction options such as advanced vehicles, fuel blends, idle reduction and fuel economy. More information can be found on the website: www.afdc.energy.gov/afdc/
 - Fair Trade Products – Purchase fair trade products instead of regular products in order to build equitable and sustainable trading partnerships. Examples of some fair trade products include; coffee, bags, boxes, artwork, chocolate, sugar, etc. More information can be found on the Fair Trade Federation's website: www.fairtradefederation.org
 - USDA's BioPreferred Designated Products – The program aims to increase the purchase and use of renewable, environmentally friendly biobased products while providing "green"



jobs and new markets for farmers, manufacturers and vendors. More information can be found on the associated website: www.biopreferred.gov/BioPreferred/

Best Available Practice

None

CASE STUDY

Sustainable Purchasing Policy

Vancouver International Airport – Vancouver, British Columbia, Canada

Sustainability is a corporate priority for the Vancouver Airport Authority. One of their goals is to embed sustainability into our purchasing decisions and ensure meaningful consideration of social and environmental criteria when selecting suppliers, products, and services. Their purchasing decisions will drive innovation, improve workplace and environmental outcomes, and support their commitment to be accountable to the communities that they serve. In evaluating suppliers and their subcontractors, the Airport Authority will include sustainability as a weighted component of the evaluation criteria, to address sustainability risks and capitalize on opportunities. In the procurement of goods and services, for both operating and capital spending, their consideration of sustainability gives priority focus to issues pertaining to their four pillars of sustainability; environment, social, economic, and governance.

<http://www.yvr.ca/en/business/work-with-yvr/airport-suppliers/sustainable-purchasing-policy>



7.0 ADMINISTRATIVE POLICY & PROCUREMENT

7.6 Establish and Implement Employee Sustainability Training Program

2 Points

INTENT

In keeping with the spirit and intent of this Manual, it is strongly encouraged that companies working in support of CDA on any project establish and adopt their own employee training program.

REQUIREMENTS

Establish and implement an Employee Sustainability Training Program.

SUBMITTALS

Provide an electronic copy of the company's Employee Sustainability Training Program and provide descriptive narrative on SAM Checklist documenting training sessions and their respective attendance numbers.

TECHNOLOGY/STRATEGY

As part of the Employee Sustainability Training Program a variety of topics should be covered to provide the employees with an overall understanding of the environmental, social and fiscal responsibility that the company has committed to and how they can contribute to the organization meeting their sustainability goals. Through the development of a training program it will allow the company to provide consistent training to all employees and address facility specific issues.

Standard Practice

None

Recommended Practice

- Individual programs can be tailored to meet each company's specific sustainability goals and can include topics such as:
 - Corporate Sustainability Policy
 - Water Management Plan
 - Waste Reduction
 - Storage and Collection of Recyclables
 - Composting or Re-use Options
 - Managing and Disposing of Waste
 - CDA's Green Commitment



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Best Available Practice

None



7.0 ADMINISTRATIVE POLICY & PROCUREMENT

7.7.1 Alternative Transportation: Public Transportation Access

1 to 3 Points

INTENT

Reduce pollution and land development impacts from automobile use.

REQUIREMENTS

Demonstrate that a percentage of total employees are using public transportation. Points will be awarded as follows:

<u>SAM Credit</u>	<u>Percentage of Employees</u>	<u>Points</u>
7.7.1.1	50%	1
7.7.1.2	75%	2
7.7.1.3	100%	3

SUBMITTALS

Include descriptive narrative in the SAM Checklist.

TECHNOLOGY/STRATEGY

Perform a transportation survey of employees to identify current usage and encourage knowledge and utilization of mass transit. There are numerous public transportation options in the vicinity of the airport system:

- Chicago Transit Authority (CTA) Blue Line, Orange Line
- Chicago Transit Authority (CTA) Local Bus Routes
- Metra
- Pace Bus Service
- CDA Employee Shuttle bus or ATS in conjunction with any of the above

Standard Practice

None



Recommended Practice

- Supply public transit route information and schedules to employees
- Provide Pre-Tax Deductions from paychecks to cover 115 public transportation needs

Best Available Practice

- Offer incentives to employees to use public transportation, examples may include:
 - Transit pass subsidies
 - Emergency Ride Home Program so that employees are not penalized for not having a vehicle if they or a member of their family needs to leave for an emergency
 - Gift cards or monetary incentives (non-transit related)



7.0 ADMINISTRATIVE POLICY & PROCUREMENT

7.7.2 Alternative Transportation: Low-Emitting and Fuel-Efficient Vehicles

1 to 3 Points

INTENT

Reduce pollution and land development impacts from employees' personal vehicle use.

REQUIREMENTS

Demonstrate that a percentage of total employees are utilizing low-emitting* and fuel-efficient** vehicles for commuting to work. Points will be awarded as follows:

<u>SAM Credit</u>	<u>% of Employees</u>	<u>Points</u>
7.7.2.1	5%	1
7.7.2.2	25%	2
7.7.2.3	50%	3

*Low-emitting vehicles must have an Air Pollution Score or a Greenhouse Gas Score of 6 or greater according to the EPA Green Vehicle Guide.

**Fuel-efficient vehicles are defined as vehicles that have achieved a minimum green score of 40 on the American Council for an Energy Efficient Economy (ACEEE) annual vehicle rating guide

SUBMITTALS

Include descriptive narrative in the SAM Checklist.

TECHNOLOGY/STRATEGY

Perform a transportation survey of employees to identify current usage.

Each model year, EPA rates every new car, truck, and SUV for greenhouse gas and smog-forming emissions on scales of 1-10. To earn the SmartWay designation, a vehicle must receive a combined score from **both** scales that is much better than the average vehicle. SmartWay Elite certification is given to only those vehicles that attain the highest scores on both scales. The thresholds for the combined scores needed to achieve a SmartWay certification vary by vehicle model year. The Air Pollution (or Smog) Score is based on the government emission standards for which the vehicle was certified to comply with and reflects vehicle tailpipe emissions that contribute to local and regional air pollution, creating problems such as haze, and health issues. The Greenhouse Gas score reflects fuel



lifecycle emissions of carbon dioxide (CO₂) and other greenhouse gases. The listing of SmartWay certified vehicles can be found at: <https://www.epa.gov/greenvehicles/consider-smartway-vehicle>.

Standard Practice

None

Recommended Practice

- Provide preferred parking for alternative fuel vehicles

Best Available Practice

- Offer incentives to employees to use low-emitting and fuel-efficient vehicles, examples may include:
 - Fuel gift cards
 - Other monetary incentives
- Install electrical receptacles for charging of electric vehicles



7.0 ADMINISTRATIVE POLICY & PROCUREMENT

7.7.3 Alternative Transportation: Carpooling

1 to 3 Points

INTENT

Reduce pollution and land development impacts from single occupancy vehicle use for employees.

REQUIREMENTS

Demonstrate that a percentage of total employees are carpooling. Points will be awarded as follows:

<u>SAM Credit</u>	<u>% of Employees</u>	<u>Points</u>
7.7.3.1	5%	1
7.7.3.2	25%	2
7.7.3.3	50%	3

SUBMITTALS

Include descriptive narrative in the SAM Checklist.

TECHNOLOGY/STRATEGY

Minimize employee parking lot/garage size. Consider sharing parking facilities with adjacent buildings. Consider alternatives that will limit the use of single occupancy vehicles.

Standard Practice

- Provide preferred parking for carpools or vanpools, marked as such

Recommended Practice

- Offer incentives to employees who participate in carpools or vanpools:
 - Employee preference on work shift scheduling with their carpools/vanpools
 - Emergency Ride Home Program so that employees are not penalized for not having a vehicle if they, a member of their family, or a member of their carpool/vanpool needs to leave for an emergency
 - Fuel gift cards
 - Other monetary incentives



Best Available Practice

None



7.0 ADMINISTRATIVE POLICY & PROCUREMENT

7.8 Community Education

1 Point

INTENT

Promote awareness of environmental and sustainability initiatives to terminal occupants.

REQUIREMENTS

Educate consumers/clients/public about the environmental stewardship to which the terminal occupant has committed, and the results of these efforts.

SUBMITTALS

Include descriptive narrative in the SAM Checklist of methods of community education.

TECHNOLOGY/STRATEGY

Provide and promote education through the following means that include, but are not limited to:

- Flyers
- Pamphlets
- Press Releases
- Signage
- Kiosks
- Workshops
- Conferences
- Website
- Public exhibits

Standard Practice

None

Recommended Practice

- Post environmental education information around terminal occupant space detailing the efforts of the concessionaire or terminal occupant
- Promote customer participation to initiatives that contribute to the terminal occupant's environmental goals



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- Solicit suggestions from customers on how to improve company's environmental and social programs

Best Available Practice

- Offer incentives to consumers/clients/public if they contribute to the terminal occupant's environmental goals



7.0 ADMINISTRATIVE POLICY & PROCUREMENT

7.9.1 Consumer Disposable Products: Bio-Based Content

1 to 3 points

INTENT

Reduce the need for virgin materials and reduce the volume of solid waste generated by terminal occupant activities.

REQUIREMENTS

Whenever applicable, purchase and utilize bio-based organic/plant-based products and containers for customers and in employee break rooms and kitchens to facilitate composting.

Point values will be assigned based on the percentage of total disposable products purchased by overall cost. Up to 3 points are available by calculating items with the following attributes:

<u>SAM Credit</u>	<u>Percentage</u>	<u>Points</u>
7.9.1.1	10%	1
7.9.1.2	25%	2
7.9.1.3	50%	3

Example: A concessionaire calculates that of their \$100,000 total consumer disposable product purchases, \$27,500 are bio-based.

$$\frac{\$27,500}{\$100,000} = 27.5\% \text{ bio-based content}$$

Therefore, 2 points are earned for this credit.

SUBMITTALS

Include descriptive narrative on SAM Checklist detailing the types of products used and calculations.

TECHNOLOGY/STRATEGY

Establish a buying procedure that eliminates the need for virgin paper products and plastic containers. During everyday operations, ensure that the specified organic items are being offered to the public and employees.



Potential items to include in the calculation, but not limited to, are:

- Take-out containers
- Take-out bags
- Cold cups
- Hot cups
- Plates
- Bowls
- Soup/chili cups
- Cutlery and straws
- Plastic bags
- Cup sleeves
- Cup carriers
- Bottles and jars
- Coasters
- Toothpicks

Standard Practice

None

Recommended Practice

None

Best Available Practice

When possible the terminal occupant should use items made from plant based products. A variety of vendors now offer products that are not made of plastic or paper but rather:

- Sugarcane
- Corn
- Wheat
- Plant based fiber
- Potatoes



CASE STUDY

Argo Tea Chicago, Illinois

Argo Tea's sustainable packaging is in line with their goal to reduce their overall footprint. Argo Tea's teapot salad containers, sporks and knives are all made from compostable materials. Their shopping bags and the sleeves on the paper cups are made from 100% recycled material. Argo Tea also encourages customers to take advantage of their "for-here" service to reduce waste.

<https://www.argotea.com/pages/sustainabilitea#:~:text=>



7.0 ADMINISTRATIVE POLICY & PROCUREMENT

7.9.2 Consumer Disposable Products: Post-Consumer Recycled Paper

1 to 3 points –

INTENT

Reduce the need for virgin materials and reduce the volume of solid waste generated by terminal occupant activities.

REQUIREMENTS

Whenever applicable, purchase and utilize recycled products and containers for customers and in employee break rooms and kitchens.

Point values will be assigned based on the percentage of total disposable paper products purchased by overall cost. Up to 3 points are available by calculating items with the following attributes:

<u>SAM Credit</u>	<u>Percentage</u>	<u>Points</u>
7.9.2.1	30%	1
7.9.2.2	60%	2
7.9.2.3	100%	3

Example: A concessionaire uses \$30,000 worth of hot cups, \$10,000 worth of cold cups, \$10,000 worth of paper bags, \$15,000 worth of cup sleeves, \$10,000 worth of cup carriers, \$15,000 worth of paper napkins, \$5,000 worth of paper towels, \$4,000 worth of receipt tape, and \$1,000 worth of office paper, representing all paper items which total \$100,000. Of these items, all contain post-consumer recycled paper with the exception of the receipt tape.

$$\frac{\$96,000}{\$100,000} = 96\% \quad \text{of paper products contain Recycled Paper Content}$$

Therefore, 2 points are earned for this credit.

SUBMITTALS

Include descriptive narrative on SAM Checklist detailing the types of products used and calculations.



TECHNOLOGY/STRATEGY

Establish a buying procedure that eliminates the need for virgin paper products and containers. During everyday operations, ensure that the specified recycled are being offered to the public and employees.

Terminal occupants should use recycled items with high post-consumer content. Post-consumer means that the item's recycled content comes from products that have been previously used and sent for recycling.

Potential items to include in the calculation, but not limited to, are:

- Take-out containers
- Food wrapper
- Cold cups
- Hot cups
- Plates
- Bowls
- Paper bags
- Cup sleeves
- Cup carriers
- Paper napkins
- Paper towels
- Bath tissue
- Facial tissue
- Seat covers
- Placemats
- Office paper
- Receipt tape

- Customer checks

Standard Practice

None

Recommended Practice

- Use post-consumer recycled paper products wherever possible

Best Available Practice

None



CASE STUDY

Sustainable Pulp and Paper Policy Dunkin' Brands – Canton, Massachusetts

Dunkin' Brands Sustainable Pulp and Paper Policy outlines the company's commitment to source pulp and paper that is traceable, respects human rights, and does not threaten High Conservation Value Forests. As of 2018 Dunkin' Brands use only certified paperboard and over 60% of the company's US packaging is certified by the Sustainable Forestry Initiative (SFI).

https://www.dunkinbrands.com/internal_redirect/cms.ipressroom.com.s3.amazonaws.com/226/files/20196/2018%20Sustainability%20Report_Final.pdf



7.0 ADMINISTRATIVE POLICY & PROCUREMENT

7.10 Local/Regional Foods and Products

1 to 3 Points

INTENT

Reduce the environmental and transportation impacts associated with production and distribution.

REQUIREMENTS

Terminal occupants agree to source local/regional products for both direct sale and in food preparation. Note that only those products that are obtainable locally are to be counted in the calculation, e.g. in Chicago, it is not possible to get locally-grown bananas, therefore the cost of the bananas should not be included.

Example: Annually, a Chicago concessionaire purchases for sale \$50,000 of food products including \$10,000 of South American coffee, \$10,000 of Central American bananas, \$10,000 of Michigan apples, and \$20,000 of California strawberries. Of these four items, only the apples and strawberries are obtainable locally (since coffee and bananas are tropical plants), although the concessionaire chose to purchase non-local strawberries (> 250 miles away). In this case, the total locally-obtainable food purchases are \$30,000 (\$10,000 apples + \$20,000 strawberries).

$$\frac{\$10,000}{\$30,000} = 33\% \text{ of products are locally obtained}$$

Therefore, based on the table below, three points are achieved for this credit.

Points are awarded based on the percentage of the terminal occupant's total locally-obtainable food purchases by cost that are obtained within 250 miles using the following table:

<u>SAM Credit</u>	<u>Percentage Within 250 miles</u>	<u>Points</u>
7.10.1	10%	1
7.10.2	20%	2
7.10.3	30%	3



SUBMITTALS

Include descriptive narrative on SAM Checklist detailing the percentage of local/regional food sources utilized.

TECHNOLOGY/STRATEGY

Food grown in local and surrounding areas tends to offer a selection of items that are fresher than produce flown or trucked in from other states and countries. Fresh products retain their nutrients better than frozen or canned options and support local businesses in the process.

Concessionaires can establish a relationship with area farms that sell direct to consumers and incorporate local and seasonal goods into their menu and operations. Produce can be used in the general food offerings and specialty dishes relative to seasonal items can be sold.

Similarly, concessionaires that sell non-food items can also establish relationships with local manufacturers or artists. This effort also promotes a sense of place for the airport as a whole, giving the travelling public a feel for the City's cultural offerings.

Standard Practice

None

Recommended Practice

- Purchases are produced or harvested within a 250-mile radius of the site.
- Purchase products from local farm cooperatives or community supported agriculture (CSA) organizations.
- Purchase products for retail sale that include local art or other cultural items.

Best Available Practice

- Purchases are produced or harvested within a 100-mile radius of the site.



7.0 ADMINISTRATIVE POLICY & PROCUREMENT

7.11 Sustainable Foods and Consumer Products

1 to 2 Points

INTENT

Reduce the environmental impacts associated with food production and distribution.

REQUIREMENTS

Beyond the requirements of SAM Credit 7.3, terminal occupants agree to source organic products and sustainable harvested food for both direct sale and in food preparation. This credit pertains only to health and beauty products (i.e. cosmetics and soaps) and whole, non-processed foods (i.e. produce, meats, and cheeses). Sustainable foods and products are defined as meeting any one or more of the following criteria:

- Antibiotic free, no added hormones, or non-genetically modified organisms (GMO) animals and animal products
- Free-range, cage-free, or grass fed animals or animal products
- USDA National Organic Program Certified
- Food Alliance Certified
- Rainforest Alliance Certified
- Protected Harvest Certified
- Fair Trade USA Certified
- Marine Stewardship Council's Blue Eco-Label (seafood)
- Blue Ocean Institute Seafood Guide, no "Red" listed species (seafood)
- Monterey Bay Aquarium "Green" or "Yellow" listed species (seafood)
- International Organic Standard (IOS) 2008 - Natural & Organic Cosmetic Standard
- Cradle to Cradle Certified (textiles, packaging, clothing)
- Demeter Certified Biodynamic (wine, fruit, vegetables, cheese)
- EPEAT (consumer electronics)
- Global Organic Textile Standard (clothing)
- Green Good Housekeeping Seal (personal care products, food, electronics)
- Leaping Bunny Program (cosmetics, personal care)

Points are awarded based on the percentage of the terminal occupant's total annual product purchases by cost that meet, in any combination, the definition of sustainable foods and products above using the table below:



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<u>SAM Credit</u>	<u>Percentage</u>	<u>Points</u>
7.11.1	15%	1
7.11.2	20%	2

Example: Annually, a concessionaire purchases for sale \$50,000 of food products including \$10,000 of fair trade coffee, \$10,000 of Rainforest Alliance Certified bananas, \$10,000 of organic apples, and \$20,000 of conventional strawberries. With the exception of the strawberries, the other food products meet the criteria above, therefore:

$$\frac{\$10,000 + \$10,000 + \$10,000}{\$50,000} = 60\% \text{ of products meet the requirements}$$

Therefore, 4 points are earned for this credit.

SUBMITTALS

Include descriptive narrative on SAM Checklist detailing the percentage of organic consumer products and organic and sustainably harvested food sources utilized.

TECHNOLOGY/STRATEGY

Standard Practice

None

Recommended Practice

- Offer certified organic or sustainably harvested products.
- Meat served should come from facilities or farms raised without antibiotics. Use of antibiotics on the farm, if practiced, must be minimal. Use of drugs with analogues in human medicine must be non-routine and rare.
- Offer clothing made with organic textiles, e.g. organic cotton.
- Offer electronic products that meet EPEAT or Green Good Housekeeping Seal certifications.

Best Available Practice

None



8.0 GREEN INTERIORS

8.1 Prerequisite 1 – Green Cleaning

Required

INTENT

Reduce the exposure of occupants and maintenance personnel to potentially hazardous chemical, biological, and particulate contaminants, which adversely affect air quality, human health, and the environment.

REQUIREMENTS

Terminal occupant s agree to source green cleaning and hygiene products that are certified by a third-party certifier, such as, but not limited to:

- GREENGUARD Environmental Institute (UL Environment)
- Ecologo (UL Environment)
- Green Seal
- EPA Safer Choice program
- Others as approved by the CDA where applicable

SUBMITTALS

Include descriptive narrative on SAM Checklist listing the products meeting the criteria above.

TECHNOLOGY/STRATEGY

Standard Practice

None

Recommended Practice

- Use only environmentally friendly cleaning and hygiene products.

Best Available Practice

None



8.0 GREEN INTERIORS

8.2 High Performance Cleaning

2 points

INTENT

Reduce the exposure of occupants and maintenance personnel to potentially hazardous chemical, biological, and particulate contaminants, which adversely affect air quality, human health, and the environment.

REQUIREMENTS

In addition to SAM Credit 8.1 – Green Cleaning, have in place during the performance period a high performance cleaning program that addresses the following:

- Establishment of standard operating procedures (SOPs) addressing how an effective cleaning and hard floor and carpet maintenance system will be consistently utilized, managed, and audited
- Development of strategies for promoting and improving hand hygiene, including both hand washing and the use of alcohol-based waterless hand sanitizers
- Development of guidelines addressing the safe handling and storage of cleaning chemicals used within the terminal occupant space, including a plan for managing hazardous spills or mishandling incidents
- Development of requirements for staffing and training of maintenance personnel appropriate to the needs of the terminal occupant. Specifically address the training of maintenance personnel in the hazards of use, disposal, and recycling of cleaning chemicals, dispensing equipment, and packaging.
- Provision for collecting occupant feedback and continuous improvement to evaluate new technologies, procedures, and processes

At a minimum, the policy must cover the green cleaning materials that are within the terminal occupant's control.

SUBMITTALS

Include descriptive narrative in the SAM Checklist outlining details of a written high-performance cleaning program.



TECHNOLOGY/STRATEGY

Over the performance period, have in place a high-performance cleaning program addressing SOPs, sustainable products and equipment, chemical handling and storage, and staff training. Some additional items to consider include:

- Employ cleaning techniques that promote the most efficient use of products such as training on the proper amount of product to use and proper wiping motion for certain tasks.
- Utilize cleaning techniques that promote the most efficient use of electricity such as working through areas and then turning off the lights in those areas and moving to another section instead of having all the lights on throughout the space for the entire shift.
- Provide proper training on supply usage such as when to replace paper products and liners as not to throw away usable product. For example, office trash liners that may need emptying but not replacing when possible.

Standard Practice

None

Recommended Practice

- Utilize a High-Performance Green Cleaning Program

Best Available Practice

None

CASE STUDY

Cleaning Industry Management Standard

University of Georgia Physical Plant Division - Services Department

The University of Georgia's (UGA) Physical Plant Division - Services Department has successfully implemented an innovative process improvement focused on green cleaning, environmental purchasing, and workplace safety, using the Cleaning Industry Management Standard-Green Building program (CIMS-GB) as a guideline. The benefits documented by the University include:

- The number of cleaning service worker injuries decreased from 39 in 2006 to only 17 in 2009, and lost worker hours decreased from 4,474 to 386 over the same time period.
- The expenditure on chemical products decreased from \$1.5 million to \$110,000 annually, due to its new environmental purchasing policy.
- The university estimated a total savings of \$850,000 during the 2008 and 2009 fiscal years.

<https://news.uga.edu/building-excellence-green-cleaning-program-wins-two-national-honors/>



8.0 GREEN INTERIORS

8.3 Integrated Pest Management

1 point

INTENT

Preserve environmental integrity while discouraging the presence of pests/wildlife, in an effort to include methods that maintain and encourage high-performance pest management control.

REQUIREMENTS

Use Integrated Pest Management (IPM) techniques, such as:

- Control dirt, moisture, clutter, foodstuffs, harborage, and building penetrations
- Use baits and traps rather than pesticide sprays where possible
- Avoid pesticide applications for prevention of pests
- Use pesticides only where pests are located
- Use pesticide specifically formulated for targeted pest

SUBMITTALS

Include descriptive narrative in the SAM Checklist.

TECHNOLOGY/STRATEGY

Over the performance period, have in place a wildlife and pest management plan that addresses overall site management, chemicals, and waste. Include such green landscape management practices such as applying integrated pest management and deterring wildlife habitat.

Integrated pest management (IPM), defined as managing pests (plants, fungi, insects, and/or animals) in a way that protects human health and the surrounding environment that improves economic returns through the most effective, least-risk option.

The IPM plan includes preferred use of nonchemical methods, definition of emergency conditions, and universal notification providing advance notice of not less than 72 hours under normal conditions, and, 24 hours in emergencies before a pesticide, (other than a least-toxic pesticide) is applied in a building or on surrounding grounds that the building management maintains.

Standard Practice

None



Recommended Practice

- Apply pesticides only during unoccupied hours
- Ventilate area with significant quantities of outside air during and after applications
- Completely flush space prior to occupancy
- Use more than normal outside air ventilation for some period after occupancy
- Notify occupants prior to occupation
- If applying outside keep away from air intake

Best Available Practice

None



8.0 GREEN INTERIORS

8.4 LEED® Certified Design & Construction

1 to 4 Points

INTENT

Promote the incorporation of environmentally sustainable design in building and infrastructure improvements by registering and certifying a project through the LEED® certification process and rating system.

REQUIREMENTS

Achieved or located within a space that has achieved certification via any LEED® process – Certified, Silver, Gold, or Platinum. Up to 4 points are available for this credit:

<u>SAM Credit</u>	<u>Certification Level</u>	<u>Points</u>
8.4.1	Certified	1
8.4.2	Silver	2
8.4.3	Gold	3
8.4.4	Platinum	4

SUBMITTALS

Include descriptive narrative in the SAM Checklist demonstrating that the project has been registered under LEED® during the design process. Provide the LEED® submittal documentation and final determination. Indicate what level of LEED® certification has been achieved after construction.

TECHNOLOGY/STRATEGY

Terminal occupants should retain the LEED® documentation from previous certifications. Many of the credit requirements offer operational and sustainability benefits that can be integrated into everyday terminal occupant operations.

Standard Practice

None



Recommended Practice

- Encourage practices that maintain the standards set during the LEED® certification process

Best Available Practice

None



9.0 WATER MANAGEMENT

9.1 Utility Meter Data

4 points

INTENT

Increase water efficiency within terminal occupant spaces to reduce the burden on municipal water supply and wastewater systems.

REQUIREMENTS

Provide water meter data (if available). Use water meter data to compile water use and report data on a periodic basis, e.g. annually at a minimum.

SUBMITTALS

Provide numerical data, e.g. annual consumption, for the narrative in the SAM Checklist.

TECHNOLOGY/STRATEGY

Where possible install water meters to measure a terminal occupant space's domestic water use.

Meter data will be used to determine water use reduction in SAM Credit 9.3, Option 1. Gather meter data for one full year. This first year reported will act as the baseline for subsequent years.

Standard Practice

- Comply with CDA Specification 15410 – Plumbing Fixtures

Recommended Practice

- Track water consumption using metering
- Install water meters to track terminal occupant space water use (submetering)



Best Available Practice

- Track water consumption using submetering for one or more of the following:
 - Irrigation
 - Indoor plumbing fixtures
 - Cooling towers
 - Domestic hot water
 - Process water



9.0 WATER MANAGEMENT

9.2 Water Management Plan

2 points

INTENT

To reduce the use of water while promoting continuity of information to ensure that water-efficient operating strategies are maintained and provide a foundation for training employees and continuous improvement.

REQUIREMENTS

At a minimum, use the following form to document the following:

- Develop a systems narrative that briefly describes current practices, the plumbing systems and equipment in the terminal occupant space. The systems narrative must include all the systems using water, including at a minimum; restroom and kitchen plumbing fixtures, food service equipment (e.g. ice makers), other process related water use systems.
- Describe what conservation initiatives have been implemented to reduce the consumption of water.

SUBMITTALS

Include descriptive narrative in the SAM Checklist as well as a copy of the Water Management Plan.

TECHNOLOGY/STRATEGY

For a terminal occupant space to operate successfully, the terminal occupant's staff must understand the space's current performance, critical metrics must be established, and steps to improve performance must be developed.

Inspect all existing fittings or fixtures to ensure they are operating properly. Make any repairs needed to bring all fixtures into good working order or permanently turn off water supply to nonfunctional units.

Implement a fixture and fitting replacement and retrofit policy specifying that all newly installed toilets, urinals, private lavatory faucets, and showerheads that are eligible for labeling be WaterSense labeled. For a listing of WaterSense labeled products visit http://www.epa.gov/watersense/product_search.html.

For building water use, confirm that calculations are up to date. Demonstrate that all applicable purchases meet the requirements of the fixture and fitting replacement and retrofit policy.



Standard Practice

None

Recommended Practice

- Develop a Water Management Plan for the terminal occupant space

Best Available Practice

- Continuously improve upon and require that all employees are trained on the merits and policies contained within the Water Management Plan.



WATER MANAGEMENT PLAN TEMPLATE SAM Credit 9.2

Terminal Occupant Information

Date	
Terminal occupant	
Owner	
Address/Location	
Contact Person	
Phone	
Email	

Water Management Survey

All questions apply to systems under the terminal occupant 's control and/or within the space being evaluated.

1. Does terminal occupant have separately metered water utility?	Yes	No	
2. If yes, what is annual water usage?	Gal/yr		
From _____ / _____ to _____ / _____ Month/Year Month/Year			
3. Fixture Inventory (input quantity of each unit):	Number	Flow rate	Sensor/Time r/Aerator
a. Toilets/Water Closet			
b. Urinals			
c. Lavatories			
d. Faucets			
e. Water Fountains			
3. Fixture Inventory (input quantity of each unit) (cont'd):	Number	Flow rate	Sensor/Time r/Aerator
f. Pre-Rinse Spray Valves			
g. Other (List)			
h. Other (List)			
i. Other (List)			



4. Water Using Appliances and Equipment (List)	Number	ENERGY STAR (Y/N)
a. e.g. Dishwasher, Model ###		
b. e.g. Ice Maker, Model ###		
c.		
d.		
5. Conservation Techniques – e.g. rainwater harvesting, gray water reuse		
6. Education and Training – If yes, please describe	Yes	No
a. Water Conservation Signage		
b. Employee Training - Water Conservation		
c. Customer Education - Water Conservation		
7. Please share any additional information you think is pertinent.		

(Please use additional pages as necessary to complete)



9.0 WATER MANAGEMENT

9.3 Water Use Reduction

1 to 10 points

INTENT

Further increase water efficiency within buildings to reduce the burden on municipal water supply and wastewater systems.

REQUIREMENTS

OPTION 1

Use WaterSense™ labeled fixtures where applicable and employ strategies described in CDA Specification 15410.

AND

Using one year's worth of meter data, calculate reduction compared to baseline data (data from first review).

Additional water reductions beyond the baseline set by the 1st year data water usage will be awarded credits based on the following table:



<u>SAM Credit</u>	<u>Building and Process Water Reduction</u>	<u>Points</u>
9.3.1	5%	1
9.3.2	10%	2
9.3.3	15%	3
9.3.4	20%	4
9.3.5	25%	5
9.3.6	30%	6
9.3.7	35%	7
9.3.8	40%	8
9.3.9	45%	9
9.3.10	50%	10

Example: A terminal occupant collected and recorded water meter data from two years ago and designated this period as the baseline water usage. The annual water use for the baseline year was 100,000 gallons. In the subsequent year, due to water efficiency upgrades and improvements, the terminal occupant was able to lower water usage for this period to 80,000 gallons. This calculates to a 20% improvement over the baseline and therefore 4 points are awarded.

OR

OPTION 2

Create an inventory of all the water use improvements and upgrades that terminal occupant has undertaken to improve their water efficiency prior and during the performance review.

A point will be awarded for each of the improvements. Up to 6 points may be awarded by achieving any of the following measures:

<u>Technology/Strategy</u>	<u>Points</u>
Low-flow toilets (<1.6 gal/flush)	1
Low-flow urinals (<0.5 gal/flush)	1
Waterless toilets and urinals	1
Low-flow kitchen and lavatory faucets (<0.5 gal/min)	1



<u>Technology/Strategy</u>	<u>Points</u>
Low-flow pre-rinse spray valves (<1.6 gal/min)	1
Automatic sensors for faucets and flushing	1
Water meters for submetering	1
Replace potable water for non-potable water applications with collected process water or rainwater (e.g. cisterns, rain barrels)	1
ENERGY STAR dishwasher	1
ENERGY STAR washing machine	1
ENERGY STAR ice machine	1

SUBMITTALS

Include descriptive narrative and calculations in the SAM Checklist.

TECHNOLOGY/STRATEGY

WaterSense™-certified fixtures and fixture fittings should be used where available. Use high-efficiency fixtures (water dispensers, water closets and urinals) and dry fixtures such as composting toilet systems to reduce the potable water demand. Consider the use of alternate on-site sources of water, such as rainwater, stormwater, or air conditioner condensate, and graywater for non-potable applications such as toilet and urinal flushing, as approved by the manufacturer, and custodial uses.

Standard Practice

None

Recommended Practice

- Use high-efficiency fixtures and valves, such as automatic sensors, aerators on lavatories and dual-flush toilets

Best Available Practice

- Dry fixtures such as composting toilets and waterless urinals to reduce wastewater volumes



10.0 ENERGY MANAGEMENT

10.1 Utility Meter Data

4 points

INTENT

Monitor, track and report utility data to reduce environmental and economic impacts associated with excessive energy use.

REQUIREMENTS

Provide energy meter data (if available). Use energy meter data to compile energy use and report data on a periodic basis, e.g. annually at a minimum.

SUBMITTALS

Provide numerical data, e.g. annual consumption, for the narrative in the SAM Checklist.

TECHNOLOGY/STRATEGY

Where possible install electric and/or gas meters to measure a terminal occupant space's energy consumption.

Meter data will be used to determine energy use reduction in SAM Credit 10.3. Gather meter data for one full year. This first year reported will act as the baseline for subsequent years.

Standard Practice

None

Recommended Practice

- Install utility meters where applicable
- Track and record energy usage

Best Available Practice

- Install submeters wherever possible



10.0 ENERGY MANAGEMENT

10.2 Energy Management Plan

2 points

INTENT

To reduce energy use while promoting continuity of information to ensure that energy-efficient operating strategies are maintained and provide a foundation for training employees and continuous improvement.

REQUIREMENTS

The Energy Management Plan should highlight the terminal occupant s' plan for each of the following:

1. Measure - collecting data and analyzing total consumption for establishing an energy usage baseline.
2. Fix the basics - Fixing the basics typically consists of efforts, such as installing low-energy-consumption devices.
3. Automate - Ongoing energy-efficiency improvements can be achieved by automating and regulating building systems. Measures such as schedule-based lighting control and occupancy sensors automatically turn lights on only when they are needed in commercial buildings, while HVAC control regulates heating and cooling at optimal levels, which can change from day to day. More importantly, however, these measures facilitate an active approach to energy management, because they can be adjusted based on new energy-efficiency opportunities that arise in the future.
 - a. Timers
 - b. Sensors
 - c. Occupancy Controls
 - d. HVAC
 - e. Building Information Systems
4. Monitor and control - A strategic energy management plan also helps ensure that initial energy and cost savings don't erode over time. Power meter installations, monitoring services, energy-efficiency analysis, energy bill verification, and implementation of an enterprise energy management (EEM) system can all help achieve this end.

SUBMITTALS

Include descriptive narrative in the SAM Checklist as well as a copy of the Energy Management Plan.



TECHNOLOGY/STRATEGY

For a terminal occupant space to operate successfully, the terminal occupant's staff must understand the space's current performance, critical metrics must be established, and steps to improve performance must be developed.

Inspect all existing devices or fixtures to ensure they are operating properly. Make any repairs needed to bring all fixtures into good working order or permanently turn off electrical supply to nonfunctional units.

Implement a fixture and fitting replacement and retrofit policy specifying that all newly installed devices, equipment and light bulbs are Energy Star or more energy efficient than those they are replacing.

Demonstrate that all applicable purchases meet the requirements of the fixture and fitting replacement and retrofit policy.

Standard Practice

None

Recommended Practice

- Develop an Energy Management Plan for the terminal occupant space

Best Available Practice

- Continuously improve upon and require that all employees are trained on the merits and policies contained within the Energy Management Plan.



ENERGY MANAGEMENT PLAN TEMPLATE

SAM Credit 10.2

Terminal occupant Information

Date	
Terminal occupant	
Owner	
Address/Location	
Contact Person	
Phone	
Email	

Energy Management Survey

All questions apply to systems under the terminal occupant 's control and/or within the space being evaluated.

1. Does terminal occupant have separately metered energy utility?	Yes	No
2. If yes, what is annual energy usage?		
a. Electricity		kWh/yr
From _____ / _____ to _____ / _____ Month/Year Month/Year		
b. Gas		Btu/yr
From _____ / _____ to _____ / _____ Month/Year Month/Year		



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3. Lighting Fixture Inventory (input quantity of each unit):	Number	Wattage	Sensor/Time
a. e.g. T8 fluorescent lamps			
b. e.g. CFL recessed lights			
c. Other (List)			
d. Other (List)			
4. Electrical Appliances (List)	Number	ENERGY STAR (Y/N)	
a. e.g. Dishwasher, Model ###			
b. e.g. Ice Maker, Model ###			
c. Other (List)			
d. Other (List)			
5. Office Equipment (List)	Number	ENERGY STAR (Y/N)	
a. e.g. Printer/Copier, Model ###			
b. e.g. Computer, Model ###			
c. Other (List)			
d. Other (List)			
6. Gas Appliances and Equipment (List)	Number	ENERGY STAR (Y/N)	
a. e.g. Oven/Range, Model ###			
b. e.g. Water Heater, Model ###			
c. Other (List)			
d. Other (List)			
7. Mobile Equipment/Vehicle Fuel Usage (input quantity of each unit):	Number	Fuel Type	Fuel Usage/ Mileage
a. e.g. Lawn Mowers, Model ###			
b. e.g. Forklifts, Model ###			
c. Other (List)			
d. Other (List)			
e. Other (List)			



8. Renewable Energy Sources – e.g. solar hot water heating, photovoltaics

9. Largest Energy User (list system, equipment, etc. with the largest consumption of energy – electric and/or gas)

10. Conservation Techniques – e.g. anti-idling, occupancy sensors, etc.

11. Education and Training – If yes, please describe

a. Energy Conservation Signage

Yes

No

b. Employee Training - Energy Conservation

Yes

No

c. Customer Education - Energy Conservation

Yes

No

12. Please share any additional information you think is pertinent.

(Please use additional pages as necessary to complete)



10.0 ENERGY MANAGEMENT

10.3 Energy Use Reduction

1 to 10 points

INTENT

Further increase energy efficiency within buildings to reduce the burden on local utilities.

REQUIREMENTS

OPTION 1

Using one year's worth of meter data, calculate reduction compared to baseline data (data from first review).

Energy reduction beyond the baseline set by 1st year data energy usage will be awarded credits based on the following table:

<u>SAM Credit</u>	<u>Energy Reduction</u>	<u>Points</u>
10.3.1	5%	1
10.3.2	10%	2
10.3.3	15%	3
10.3.4	20%	4
10.3.5	25%	5
10.3.6	30%	6
10.3.7	35%	7
10.3.8	40%	8
10.3.9	45%	9
10.3.10	50%	10

Example: A terminal occupant collected and recorded electric meter data from two years ago and designated this period as the baseline electric usage. The annual electric use for the baseline year was 100,000 kWh. In the subsequent year, due to energy efficiency upgrades and improvements, the terminal occupant was able to lower energy usage for this period to 80,000 kWh. This calculates to a 20% improvement over the baseline and therefore 4 points are awarded.



OR

OPTION 2

Create an inventory of all the energy improvements and upgrades that terminal occupant has undertaken to improve their energy efficiency prior to and during the performance review.

A point will be awarded for each of the improvements. Up to 6 points may be awarded by achieving any of the following measures:

<u>Measure</u>	<u>Points</u>
LED lighting for 60% of lighting load	1
LED lighting for 100% of lighting load	2
Lighting sensors or timers	1
Organize circuiting of lighting and systems so that individual areas are separately controlled relative to daylight and heating/cooling zones	1
Motion sensors/occupancy sensors in stairs, restrooms, storage rooms, equipment rooms and office space	1
High-efficiency motors and variable-speed pumping systems	1
ENERGY STAR furnaces, exhaust fans, ceiling fans, and air conditioners	1

SUBMITTALS

Include descriptive narrative and calculations in the SAM Checklist.

TECHNOLOGY/STRATEGY

Select ENERGY STAR rated equipment, optimize HVAC systems and lighting, and implement an energy management plan that reduces energy consumption. Any strategies that reduce energy consumption should be considered that will impact the results of this credit. Additional points can be obtained using strategies as outlined in the other credits of this section.



Standard Practice

None

Recommended Practice

- Use high-efficiency equipment, fixtures, appliances, and lighting
- Maintain an energy management plan that addresses off-hour usage, timers, and/or sensors

Best Available Practice

None



10.0 ENERGY MANAGEMENT

10.4 Optimize Energy Performance: Equipment & Appliances

1 to 3 Points

INTENT

Achieve increasing levels of energy conservation beyond the referenced standard to reduce environmental and economic impacts associated with excessive energy use.

REQUIREMENTS

For all ENERGY STAR qualified equipment and appliances installed in the terminal occupant space, points will be awarded based on the following percentages by pieces of equipment:

<u>SAM Credit</u>	<u>ENERGY STAR Qualified Equipment*</u>	<u>Points</u>
10.4.1	50%	1
10.4.2	75%	2
10.4.3	100%	3

*As a percentage of ENERGY STAR eligible equipment
Excluded are HVAC, lighting and building envelope products.

This requirement applies to appliance, office equipment, electronics and commercial food service equipment. Excluded are HVAC, lighting and building envelope products.

SUBMITTALS

Include descriptive narrative and calculations in the SAM Checklist.

TECHNOLOGY/STRATEGY

Select energy-efficient equipment and appliances, as qualified by the EPA's ENERGY STAR Program (<https://www.energystar.gov>).

Standard Practice

None



Recommended Practice

Consider the following for terminal occupant spaces:

- Provide high-efficiency motors and variable-speed pumping systems
- Provide ENERGY STAR compliant equipment and appliances such as:
 - Dishwashers
 - Water Heaters
 - Washing machines
 - Dryers
 - Refrigerators
 - Walk-in refrigerators
 - Freezers
 - Ranges
 - Computers
 - Printers
 - Copiers
 - Phones
 - Televisions
 - Steamers
 - Fryers
 - Hot food holding cabinets
 - Ice machines
 - Convection ovens
 - Combination ovens
 - Griddles
 - Broilers
- Provide other high efficiency equipment and appliances such as:
 - Hand Dryers
 - Food warmers
 - Charbroilers
 - Grills
 - Registers
 - Power strips

Best Available Practice

None



11.0 WASTE STREAM MANAGEMENT

11.1 Prerequisite 1 – Waste Source Separation

Required

INTENT

Determine the overall generation of various wastes produced and reduce ongoing waste and toxins generated by the terminal occupant.

REQUIREMENTS

Separate all solid waste refuse into, at a minimum, the following three waste types and have a solid waste disposal service provider that properly handles and disposes the separated waste streams:

- Recyclables: Cardboard, clean paper, glass, metals, plastic
- Compostables: Organic food waste, food waste contaminated paper and plastic that is certified by the Biodegradable Products Institute (BPI) or meets ASTM D6400 and/or ASTM D6868
- Non-Recyclables/Non-Compostables (Landfill Waste): Any residual waste not meeting the above two waste types

SUBMITTALS

Include descriptive narrative in the SAM Checklist outlining the types of waste, collection locations, and anticipated weights and/or volumes, if known (see SAM Credit 11.5).

TECHNOLOGY/STRATEGY

Work with your waste hauler or service provider to collect and analyze information on the amounts and types of waste generated by the facility.

Standard Practice

None



Recommended Practice

- Use source-separation to conduct a waste audit (see SAM Credit 11.5) as a baseline for evaluating future recycling efforts. Analyze the results of the audit and identify targets for expanding the terminal occupant's recycling program. Evaluate the capturing and recycling of specific wastes.

Best Available Practice

- Create a Five-Year Action Plan outlining waste reduction methods that will be undertaken in the coming years.



11.0 WASTE STREAM MANAGEMENT

11.2 Prerequisite 2 – Surplus Food Sent to Local Organizations

Required

INTENT

Increase terminal occupant's social responsibility by donating surplus food to local hunger relief organizations.

REQUIREMENTS

Unused (wrapped and packaged) food that would otherwise be discarded should be donated to local food banks. Terminal occupant s should follow the organization's guidelines as to the storage, preparation and donation of food.

SUBMITTALS

Include descriptive narrative on SAM Checklist detailing the amount of unused food that was donated and to which organizations.

TECHNOLOGY/STRATEGY

Efforts need to be undertaken to ensure that waste generated at airports does not all ultimately end up in area landfills. Food scraps and unused food account for a large portion of an airport's waste stream. Creative waste solutions to minimize contributions to airports are needed, especially for perishable foods.

Terminal occupant should donate unused food products to a local food bank, shelter, etc. The Good Samaritan Food Donation Act offers protection to citizens, businesses and nonprofit organization that proceed in good faith to donate, recover and distribute excess food. It promotes food recovery by limiting liability to acts of gross negligence or intentional misconduct (such as donating food from which others have already become ill) and absent these, donors and others shall not be subject to civil or criminal liability arising from the nature, age, packaging or condition of apparently wholesome food or apparently fit grocery products received as donations.

Standard Practice

None



Recommended Practice

- Donate surplus food to a local organization. Below is a sample list of representative organizations but not limited to:
 - Feeding America (<http://feedingamerica.org/>)
 - Food Donation Connection (www.foodtodonate.com)
 - Greater Chicago Food Depository (www.chicagosfoodbank.org)

CASE STUDY

Day-End Dough-Nation

Panera Bakery – St. Louis, Missouri

Through the Day-End Dough-Nation program, Panera Bread donates \$100 million of unsold baked goods in partnership with more than 3,500 local organizations every year.

<https://www.panerabread.com/panerabread/documents/press/2017/panera-bread-csr-2015-2016.pdf#page=66&zoom=100,0,0>

Buy One, Give One Business Model

The Soulful Project – Dallas, Texas

The Soulful Project works in a unique “buy one, give one” business model and teams up with retailers to sell their nutrient-dense hot cereal in their stores. The company donates a serving of wholesome hot cereal to a local food bank for every serving purchased. The company’s product has expanded and is now available through Amazon, various supermarkets and CIBO Gourmet Express Markets in airports all over the country.

<https://sustainablebrands.com/read/organizational-change/the-soulful-project-targets-food-insecurity-withm-serving-donation-goal>



11.0 WASTE STREAM MANAGEMENT

11.3 Prerequisite 3 – Elimination of Petroleum Based Plastic Bags

Required

INTENT

Reduce the amount of plastic that is distributed and ultimately disposed within the terminals.

REQUIREMENTS

Vendor will do away with the use of petroleum based plastic bags in favor of bags that are more environmentally friendly.

SUBMITTALS

Include descriptive narrative on SAM Checklist detailing the alternate option given to customers in place of petroleum based plastic bags.

TECHNOLOGY/STRATEGY

Due to the negative environmental effects there have been international movements to discourage the use of petroleum based plastic bags. Plastic bags use up natural resources, consume energy to manufacture, create litter, choke marine life and add to landfill waste.

Standard Practice

- Ask the customer if they require a bag instead of giving bags to every customer

Recommended Practice

- Implement the use of post-consumer recycled paper bags or reusable bags

Best Available Practice

- Offer the use of biodegradable plastic bags



11.0 WASTE STREAM MANAGEMENT

11.4 Prerequisite 4 – Reduction of Plastic Waste: Biodegradable Trash Bags

Required

INTENT

Reduce the amount of plastic that are sold and ultimately disposed within the terminals.

REQUIREMENTS

Terminal occupants should use only biodegradable trash bags that once at a landfill break down at a faster rate than traditional trash bags.

SUBMITTALS

Include descriptive narrative on SAM Checklist detailing type of biodegradable trash bag used.

TECHNOLOGY/STRATEGY

Even given other initiatives to reduce the amount of waste, there inevitably will be waste generated that ends up in the area landfills. The combination of reducing the amount of waste sent to landfills and using trash bags that break down in the landfills will help decrease the massive amounts of garbage that are created.

The process behind the biodegradation occurs in two parts. First the plastic is oxidized, then microorganisms consume the plastic leaving behind "refuse" which is a reusable biomass which is both environmentally friendly and does not contain harmful toxins. All products then biodegrade and find their way into the waterways and the soil.

Biodegradable bags can be purchased at prices similar to the traditional trash bags used by many. However not all biodegradable bags break down in landfill conditions; some bags require oxygen to decompose.

Plastics are certified as biodegradable if they comply with ASTM D6954.

Standard Practice

None



Recommended Practice

- Eliminate the use of traditional plastic bags. Biodegradable bags will break down into CO₂ and water when it is exposed to UV light, moisture, heat and microorganisms

Best Available Practice

None



11.0 WASTE STREAM MANAGEMENT

11.5 Waste Stream Audit

4 points

INTENT

Determine the overall generation of various wastes produced and reduce ongoing waste and toxins generated by the terminal occupant.

REQUIREMENTS

Conduct a waste stream audit of the terminal occupant's entire ongoing consumables waste stream for the performance period. Use the initial audit to establish a baseline that identifies the types of waste making up the waste stream and the amounts of each type by weight and volume.

As part of the waste stream audit, terminal occupant will analyze their waste stream to determine weights and volumes of the following categories:

- Items for offsite disposal or incineration
- Items for composting
- Items for recycling

SUBMITTALS

Include descriptive narrative and calculations in the SAM Checklist outlining the types of waste and the weight and/or volumes. Refer to the EPA's website for waste audit worksheets.

<http://www.epa.gov/wastes/conserve/tools/rogo/documents/airport-recycling-guide.pdf>

TECHNOLOGY/STRATEGY

Understanding waste production patterns is an important first step to waste reduction. Work with your waste hauler or service provider to collect and analyze information on the amounts and types of waste generated by the facility.

Standard Practice

None



Recommended Practice

- Use the results of the waste audit as a baseline for evaluating future recycling efforts. Analyze the results of the audit and identify targets for expanding the terminal occupant's recycling program. Evaluate the capturing and recycling of specific wastes.

Best Available Practice

- Create a Five Year Action Plan outlining waste reduction methods that will be undertaken in the coming years.



11.0 WASTE STREAM MANAGEMENT

11.6 Waste Management Plan

2 points

INTENT

To reduce the waste generated by the terminal occupant and hauled to and disposed of in landfills and incinerators.

REQUIREMENTS

Maintain a waste reduction and recycling program that reuses, recycles, or composts waste.

SUBMITTALS

Include descriptive narrative in the SAM Checklist as well as a copy of the Waste Management Plan.

TECHNOLOGY/STRATEGY

For a terminal occupant space to operate successfully, the terminal occupant's staff must understand the space's current performance, critical metrics must be established, and steps to improve performance must be developed.

Standard Practice

None

Recommended Practice

- Develop an Waste Management Plan for the terminal occupant space

Best Available Practice

- Continuously improve upon and require that all employees are trained on the merits and policies contained within the Waste Management Plan.



WASTE MANAGEMENT PLAN TEMPLATE
SAM Credit 11.6

Terminal Occupant Information

Date	
Terminal occupant	
Owner	
Address/Location	
Contact Person	
Phone	
Email	

Waste Management Survey

All questions apply to systems and waste under the terminal occupant's control and/or within the space being evaluated.

SOLID WASTE

1. Solid Waste Management Company (list all that apply)			
2. Do you receive waste generation reports from waste hauler?	Yes	No	
3. If yes, what is annual solid waste generation?			lb/yr
From:		To:	
	month/year		month/year
4. If yes, what is annual solid waste recycled?			lb/yr
From:		To:	
	month/year		month/year
5. If yes, what is annual solid waste composted?			lb/yr
From:		To:	
	month/year		month/year
6. Indicate with an X in the appropriate column the types of recyclable/compostable solid wastes generated:	Source Separated	Single-Stream	
a. Cardboard/cardstock	☐	☐	



b. Aluminum		
c. Steel		
d. Glass		
e. Paper		
f. Plastics		
g. Compostable waste (incl. food waste)		
h. Coffee Grounds		
i. Other (list)		
7. Does terminal occupant have a designated recycling/composting area? Describe location:		

LIQUID WASTE

1. Liquid Waste Management Company (list all that apply)			
2. Do you receive waste generation reports from waste hauler?		Yes	No
3. If yes, what is annual liquid waste generation?		gal/yr or lb/yr	
From:		To:	
month/year			month/year
4. List liquid waste types that are recycled – e.g. grease, motor oil			
5. Does terminal occupant have a designated recycling area? Describe location:			

**SPECIAL WASTE**

1. Does terminal occupant have universal waste management plan for safe disposal of batteries, paints, solvents, electronics, mercury-containing lamps, printer cartridges, etc.	Yes	No
2. List all types of universal wastes above and include quantities disposed/recycled, if known:		
3. Does terminal occupant have a designated universal waste recycling area? Describe location:		

Other Waste Management Questions

1. What is terminal occupant's largest waste sources/products:		
2. Waste Reduction Techniques – e.g. bulk purchasing, manufacturer take-back programs, donation programs, etc.		
3. Education and Training – If yes, please describe		
Waste Minimization/Recycling Signage	Yes	No
Employee Training – Waste Management	Yes	No
Customer Education – Waste Management	Yes	No



4. Has terminal occupant performed a third-party waste audit? If yes, describe results:

5. Does terminal occupant track waste generation, recycling, and disposal quantities? If yes, indicate if and where results are reported – e.g. website, documents.

6. Describe goals for waste reduction over time – e.g. waste reduction initiatives.

(Please use additional pages as necessary to complete)



11.0 WASTE STREAM MANAGEMENT

11.7 Waste Reduction

1 to 10 points

INTENT

Further increase solid waste reduction within buildings to reduce the burden on landfills and minimize emissions due to transport.

REQUIREMENTS

OPTION 1

Using one year's worth of data based on the waste stream audit, calculate reduction compared to baseline data (data from first review, waste audit) of waste sent to landfill.

Waste reduction beyond the baseline set by 1st year data will be awarded credits based on the following table:

<u>SAM Credit</u>	<u>Reduction of waste sent to landfill (by percent)</u>	<u>Points</u>
11.7.1	5%	1
11.7.2	10%	2
11.7.3	15%	3
11.7.4	20%	4
11.7.5	25%	5
11.7.6	30%	6
11.7.7	35%	7
11.7.8	40%	8
11.7.9	45%	9
11.7.10	50%	10

Example: A terminal occupant collected and recorded waste disposal data from two years ago and designated this period as the baseline waste disposal. The annual amount of waste that was disposed in landfills for the baseline year was 100 tons. In the subsequent year, due to waste reduction initiatives, the terminal occupant was able to



lower waste disposal for this period to 80 tons. This calculates to a 20% improvement over the baseline and therefore 4 points are awarded.

OR

OPTION 2

Create an inventory of all the waste reduction initiatives that terminal occupant has undertaken to reduce solid waste prior to and during the performance review.

A point will be awarded for each of the initiatives. Up to 6 points may be awarded by achieving any of the following measures:

<u>Technology/Strategy</u>	<u>Points</u>
Utilize trash compactors or bailers	1
Repurpose or reuse products or materials program	1
Bulk purchasing, reduced packaging	1
Oil and grease recycling	1
Coffee grounds composting or recycling program	1
Electronic waste recycling program	1

SUBMITTALS

Include descriptive narrative and calculations in the SAM Checklist.

TECHNOLOGY/STRATEGY

Maintain an effective recycling program that at a minimum addresses the traditional recyclables (paper, metal, glass, and plastic) Determine effective strategies for addressing other waste products which might include composting, for organic wastes, or reuse or repurposing for wood or other building materials. Waste reduction strategies including purchasing in bulk to reduce packaging waste or elimination of disposable products should also be considered.

Standard Practice

- Employ traditional recycling (paper, metal, glass, and plastic)



Recommended Practice

- Compost organic wastes such as food scraps and landscaping waste
- Reuse or repurpose building materials
- Donate unused inventory to charities
- Make waste materials available to other entities through a warehouse or sharing program
- Employ purchasing strategies that reduce waste volume, e.g. bulk purchases

Best Practice

None

CASE STUDY

Reduce and Recycling Initiative Argo Tea – Chicago, Illinois

Argo Tea encourages conservation of the earth's resources by offering a discount for the use of ceramic mugs for in-café service or the use of personal travel tumblers to enjoy drinks on-the-go. All customers are encouraged to recycle their cups and other recyclable materials using the recycling receptacles in the cafes when possible.

<https://www.argotea.com/pages/sustainabilitea#:~:text=>



11.0 WASTE STREAM MANAGEMENT

11.8 Storage and Collection of Recyclables

1 point

INTENT

Facilitate the reduction of waste generated by terminal occupant space occupants that is hauled to and disposed of in landfills.

REQUIREMENTS

Provide an easily accessible dedicated area or areas that serve the terminal occupant space for the collection and storage of materials for recycling, including paper, corrugated cardboard, glass, plastics and metals. An area should also be dedicated to collection and storage of compostable food waste, if applicable.

SUBMITTALS

Include descriptive narrative in the SAM Checklist.

TECHNOLOGY/STRATEGY

Ensure that within the terminal occupant space there is an area for recyclable collection and storage that is appropriately sized and located in a convenient area. These areas would likely be designed and sized differently depending on the ultimate use and waste stream of the facility (e.g., office, airlines, concessionaires, etc.) Identify local waste handlers and buyers for glass, plastic, office paper, e-waste, newspaper, cardboard, metals, fluids, fixtures, and organic wastes. Instruct employees, occupants, and contractors on the recycling procedures. Consider employing cardboard balers, aluminum can crushers, recycling chutes and other waste strategies to further enhance the recycling program.

Standard Practice

- Designate an area for recyclable collection and storage that is appropriately sized and located in a convenient area
- Instruct employees, users and occupants on recycling procedures

Recommended Practice

- Investigate and incorporate collection rooms for recycling streams that make sense for each terminal occupant space
- Coordinate recyclable waste collection with hauler capability



- Recycle the following waste, whenever feasible:
 - Aluminum
 - Glass
 - Paper, newspapers, magazines, and cardboard
 - Carpet
 - Wood (pallets/crates, etc.)
 - Food waste/grease and compostables
 - Organic waste and compostables
 - Gas & oil filters
 - Motor oil and Anti-freeze
 - Scrap metal
 - Batteries
 - Light bulbs
 - Toner cartridges
 - Tires
 - Electrical wiring
 - Electronics including monitors

Best Available Practice

- Employ cardboard balers, aluminum can crushers, recycling chutes and other technologies to enhance the recycling program



11.0 WASTE STREAM MANAGEMENT

11.9 Track and Report Recycling Activity

2 points

INTENT

Determine the types and amounts of recyclable waste and determine strategies for reducing and diverting additional waste from landfills.

REQUIREMENTS

Retain periodic recycling reports to be summarized for the performance review period. Note that this is a waste audit for the recyclables stream. Types of waste to be tracked include:

- Glass – bottles and other containers
- Metal – aluminum and steel containers, foil
- Plastic – bottles, containers, packaging, bags
- Paper – office paper, bags, cup sleeves, cup carriers, non-thermal receipt tape, customer checks, newspaper, magazines
- Cardboard – cardstock, display boards, corrugated fiberboard, paperboard
- Rubber – tires
- Fats, Oils, and Grease
- Other (specify what items are recycled)

SUBMITTALS

Include descriptive narrative and calculations in the SAM Checklist outlining the types of waste and volumes recycled.

TECHNOLOGY/STRATEGY

Standard Practice

- Track recycling activity over time. Use the report to identify seasonal swings in recycling rates and program costs and benefits.



Recommended Practice

None

Best Available Practice

- Provide the results of the recycling reports to the community and other interested stakeholders

CASE STUDY

Startsomewhere® Sustainability Program HMShost – Bethesda, Maryland

Global restaurateur HMShost's Startsomewhere Sustainability Program has been selected as a finalist in the Sustainability category of the National Restaurant Association's 2014 Operator Innovations Awards. Under the program in 2016, HMShost recycled approximately 1.6 million gallons of cooking oil, 7 thousand pounds of plastic film, and donated 1.35 million pounds of food to community food banks across the country.

<https://www.hmshost.com/community/detail/sustainability-and-startsomewhere-initiative>



11.0 WASTE STREAM MANAGEMENT

11.10.1 Organic Byproduct Recycling: Coffee Grounds

4 Points

INTENT

Facilitate the reduction of waste generated by terminal occupant space occupants that is hauled to and disposed of in landfills.

REQUIREMENTS

Implement a coffee grounds collection program that provides a means of separating grounds from the rest of the waste stream and finding other uses for the waste.

SUBMITTALS

Include descriptive narrative on SAM Checklist detailing the collection and disposal of coffee grounds from the terminal occupant space.

TECHNOLOGY/STRATEGY

With the implementation of increased security at airports, passengers are spending an increased amount of time at the airport and in turn creating more waste. In conjunction with the Airport, terminal occupants should commit to reducing the amount of waste that eventually arrives at the landfills.

The weight of used coffee grounds can significantly impact the cost of waste removal. Though the use of creative solutions, the coffee grounds can instead be used for composting/fertilizer needs or insect control.

Standard Practice

None

Recommended Practice

- Collect the used coffee grounds and sell to a third party as a commodity. Permits and EPA approval may be required depending on the terminal occupant's location.

Best Available Practice

- Re-use coffee grounds onsite as soil additives. Permits and EPA approval may be required depending on the terminal occupant's location.



11.0 WASTE STREAM MANAGEMENT

11.10.2 Organic Byproduct Recycling: Fats, Oils and Grease

2 Points

INTENT

Facilitate the reduction of waste generated by terminal occupant space occupants that is hauled to and disposed of in landfills.

REQUIREMENTS

Terminal occupant would install and maintain used cooking oil/liquid grease collection equipment and participate in a grease recycling program. Terminal occupant s are solely responsible for all costs associated with the interception, collection and appropriate disposal of fats, oils and grease generated by their operations on the premise.

SUBMITTALS

Include descriptive narrative on SAM Checklist detailing the type, amount and process/company used to convert the fats, oils and grease.

TECHNOLOGY/STRATEGY

With the implementation of increased security at airports, passengers are spending an increased amount of time at the airport and in turn creating more waste. In conjunction with the Airport, terminal occupant s should commit to reducing the amount of waste that eventually arrives at the landfills.

New technological advances are now allowing items that previously used to be discarded to now be re-purposed. A prime example is grease from concessionaires and flight kitchens that can be converted into biofuels than can be used by the company or sold to other parties.

Standard Practice

None

Recommended

- Collect the used fats, oils and grease and sell to a third part as a commodity

Best Available

None



11.0 WASTE STREAM MANAGEMENT

11.11 Repurposing of Goods

2 Points

INTENT

Promote the reuse of materials, equipment and products to reduce demand for virgin materials and reduce waste, thereby lessening impacts associated with the extraction and processing of virgin resources.

REQUIREMENTS

Whenever possible, identify items that can be donated, salvaged, refurbished or reused by a third party. This credit can also be achieved by utilizing donated, salvaged, refurbished or used items from an outside party.

SUBMITTALS

Include descriptive narrative on SAM Checklist detailing the types of products that were donated and to whom.

TECHNOLOGY/STRATEGY

Salvage and donation are important waste prevention strategies, since they reduce the need for the purchase and manufacture of new products and help keep materials out of landfills. Identify opportunities to incorporate salvaged materials into daily operations. Consider salvaged materials such as cabinetry and furniture, pumps, motors, electrical panels, fixtures and tanks.

The terminal occupant may also identify items that can be sold or donated to other users. Consider items such as appliances, carpet, shelving, displays, and non-perishable inventory

Standard Practice

None

Recommended Practice

Terminal occupant s should identify items for reuse and donate the goods:

- Egg cartons, strawberry baskets, poster board, and other materials can be sent to schools or daycare centers for use in arts and crafts activities



- Collect magazines, newspapers, and books from international passengers and donate them to local educational facilities that teach foreign languages, senior centers, and/or united service organizations
- Guest hangers no longer suitable for use can be repurposed to local dry cleaners
- Linens, towels, blankets, soap, shampoo, uniforms, and used furniture can be donated to a local shelter
- Flowers that were used for banquets and celebrations can be sent to a local hospice or hospital

Best Available Practice

None



12.0 INNOVATION IN TERMINAL OCCUPANTS –

Operations & Maintenance

12.1 – 12.3 Innovation for Terminal Occupants

1 to 3 Points

INTENT

Provide terminal occupant s the opportunity to achieve exceptional performance above the requirements set by the Sustainable Airport Manual Green Airplane Rating System and/or innovative performance not specifically addressed by the Sustainable Airport Manual.

REQUIREMENTS

In writing, identify the intent of the proposed innovation credit, the proposed requirement for compliance, and the proposed submittals to demonstrate compliance, and the approach (strategies) that might be used to meet the requirements.

Up to three points are available for this credit:

<u>SAM Credit</u>	<u>Points</u>
12.1	1
12.2	1
12.3	1

SUBMITTALS

Include descriptive narrative in the SAM Checklist following the criteria in the Requirements section above.

TECHNOLOGY/STRATEGY

Substantially exceed a SAM performance credit such as energy performance or water efficiency and/or apply strategies or measures that demonstrate a comprehensive approach and quantifiable environment and/or health benefits.



Chicago Department of Aviation
SUSTAINABLE AIRPORT MANUAL



Refer to LEED Credit Interpretation Results (CIRs) or the Innovation in the LEED Design Credit Catalog⁶ for potential strategies that may be considered for innovation. The SRP will review proposed innovations by the concessionaire or terminal occupant on a case by case basis.

⁶ Available at www.usgbc.org.



12.0 INNOVATION IN TERMINAL OCCUPANTS

12.4 Community/Cultural Responsibility

1 to 3 Points

INTENT

Promote specific social and cultural initiatives considered to be important to the sustainability of the airport environment and surrounding community.

REQUIREMENTS

A point will be awarded for each of the initiatives listed below that are promoted and organized by the terminal occupant up to a maximum of 3 points:

- Industry Award – Terminal occupant has received an industry award for their sustainability initiatives.
- Green Certification – Terminal occupant has achieved a green certification from an industry organization, e.g. Good Food Purchasing Program, Green Restaurant Association, Green Seal, SAM Design & Construction Green Airplane Rating, LEED certified project, ISO 14001, etc.
- Employee Wellness Program – Have in place a program that encourages good health. Programs that maintain good health include but are not limited to health club memberships, incentivized programs for weight loss or to quit smoking, access to yoga, meditation, tai chi, zen gardens, bicycles for employees at work, etc.
- Carpooling Incentives – Provide incentives to employees for carpooling.
- Community Outreach and Volunteerism Programs
- Cultural Programs – Promote and organize programs that display or present local art, performers, and culture and make accessible to the travelling public and/or airport community regarding culture, art, community connectivity, etc. Other Community/Cultural Programs

SUBMITTALS

Include descriptive narrative and calculations in the SAM Checklist. Indicate in the narrative which of the above technologies and strategies are being included in the project and, where applicable, indicate where these items are shown in the drawings or specifications.



Chicago Department of Aviation
SUSTAINABLE AIRPORT MANUAL



TECHNOLOGY/STRATEGY

Organize and implement initiatives or programs not listed above that have a social or cultural impact on the travelling public, employees, and/or surrounding communities.



12.0 INNOVATION IN TERMINAL OCCUPANTS

12.5 Menu Items (Green Walls, Alternative Water Heating, Biological Systems, or Exemplary Performance)

1 to 3 Points

INTENT

Promote specific technologies and strategies considered to be important to the sustainability of the airport environment.

REQUIREMENTS

A point will be awarded for each of the strategies or technologies listed below that are utilized by the terminal occupant up to a maximum of 3 points:

- Green Walls – Use green, vegetated wall systems, interior or exterior, if applicable. Green walls used for interior spaces must be designed for the improvement of indoor air quality as well as aesthetics.
- Alternative Water Heating – Use demand, tankless, instantaneous or solar water heating technology
- Biological systems, such as the use of vermiculture (worms), raising bees for honey, algae for fuel, etc.
- Exemplary Performance – Significantly exceed the requirements of any credit.
- Other

SUBMITTALS

Include descriptive narrative and calculations in the SAM Checklist. Indicate in the narrative which of the above technologies and strategies are being included in the project and, where applicable, indicate where these items are shown in the drawings or specifications.

TECHNOLOGY/STRATEGY

Organize and implement initiatives or programs not listed above that have a social or cultural impact on the travelling public, employees, and/or surrounding communities.

- Green Walls – Vegetated green wall systems can result in significant air conditioning savings. Vegetated green wall systems on exterior of building envelope can reduce wall surface temperatures by as much as 18°F (depending on which direction it is facing), which also results



in significant air conditioning savings, while reducing the heat island effect. In interior applications, green or living walls can help regulate indoor temperatures, humidity, and air quality. Green walls fall into two categories:

- Green facades (outside): Made up of climbing plants growing directly on a wall
- Living walls (inside): Modular panels often made of steel containers, geotextiles, irrigation systems, growing medium and vegetation
- Alternative Water Heating – Alternative water heating for the purposes of this credit includes two types of technologies – instantaneous and solar thermal:
 - Instantaneous hot water heating technology uses include demand, instantaneous, or tankless water heaters. Demand water heaters heat water directly without the use of a storage tank thus avoiding the standby heat losses associated with conventional storage tank water heaters. When a hot water tap is turned on, cold water is heated directly by a gas burner or an electric element as it passes through the unit. As a result, demand water heaters deliver a constant supply of hot water not limited by the volume of a storage tank.
 - Water heating – Solar thermal hot water heating technology uses a solar collector which is simply a heat exchanger designed to convert the sun's radiant light energy into thermal energy to be stored for later use. This collector uses optics and parabolic concentration technology to heat the fluid media passing through the selectively coated tubing manifold. The fluid media is circulated, via a pump, through the collector and into a storage tank located within the home/building.
- Biological Systems – This category is a catch-all for systems that use living organisms to produce a beneficial commodity. The commodity is considered beneficial if it provides a use that has environmental, financial, or social benefits. This can include apiaries for the production of honey or vermiculture for the disposal of organic wastes.
- Exemplary Performance – When achieving a high level of compliance with any of the previous credits, the SRP will evaluate any claims that go significantly above and beyond the requirements of any SAM credit. For example, for SAM Credit 9.5 – Sustainable Food and Consumer Products, the highest threshold achievable is 40%, however if the sustainable food and consumer products of a given terminal occupant exceed 80%, an exemplary performance point may be claimed.
- Other innovative technologies can be presented and will be evaluated by the SRP for final approval.



For comments, case studies, lessons-learned, new technologies or for any and all project submittal forms, please email:

SAMdocs@cityofchicago.org



Customer
Service
Center



Concourse C



Gates B9-B24

Baggage Claim
Animal Relief Area



 **CDA**

CHICAGO DEPARTMENT OF AVIATION

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