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
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UST Aviation Services
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Westfield Concession Management
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APPENDICES

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