



# **ALBUQUERQUE PUBLIC SCHOOLS**

Facility Design & Construction / Maintenance & Operations

## **LEEDv4 Guideline**

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# TABLE OF CONTENTS

**INTRODUCTION: .....I**

**APS LEEDV4 CHECKLIST:.....1-2**

**CREDIT SPECIFIC REFERENCES: .....3**

**CREDIT SPECIFIC GUIDANCE: .....4-5**

**DELIVERABLES BY TEAM MEMBER BY PHASE: .....6-11**

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## Introduction

Albuquerque Public Schools requires a minimum LEED Silver certification for the design and construction of all new school projects. This document aligns the district's intent with LEED version 4 criteria. Measures that support student health and performance, and contribute to utility savings are a priority.

Refer to **Albuquerque Public Schools LEEDv4 for BD+C: Schools New Construction and Major Renovations Scorecard**.

- For prerequisites and credits marked "Reference," Refer to **Credit-Specific Reference** section for additional design criteria.
- For prerequisites and credits marked "Guidance," refer to **Credit-Specific Guidance** section for desired credit approach.

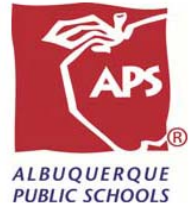
Engaging the **integrative design process** is integral to meeting the sustainability goals set forth by the LEEDv4 rating system and APS standard. The intent of the integrative process is to support high-performance, cost-effective project outcomes through early analysis of the interrelationships among systems. It includes creation of a simple box energy model and water assessment to explore how to reduce loads in the building and accomplish related sustainability goals. This activity occurs during the early planning phases of the project, and is complete prior to delivery of the design development package. It is typically led by the LEED consultant and energy modeler, with support from APS, the project architect and engineers. Results are incorporated into the Owner's Project Requirements (OPR) and Basis of Design (BOD).

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# Albuquerque Public Schools

## LEEDv4 for BD+C: Schools

### New Construction and Major Renovations Project Scorecard



Yes ? No					
1	0	0			<b>INTEGRATIVE PROCESS (IP)</b> 1
1			Credit		Integrative Process 1
Yes ? No					
1	14	0			<b>LOCATION AND TRANSPORTATION (LT)</b> 15
	1		Credit		Sensitive Land Protection 1
	2		Credit		High Priority Site 2
	5		Credit		Surrounding Density and Diverse Uses 5
	4		Credit		Access to Quality Transit 4
1			Credit		Bicycle Facilities 1
	1		Credit		Reduced Parking Footprint 1
	1		Credit		Green Vehicles 1
Yes ? No					
5	7	0			<b>SUSTAINABLE SITES (SS)</b> 12
Y			Prereq		Construction Activity Pollution Prevention Required
Y			Prereq		Environmental Site Assessment Required
	1		Credit		Site Assessment 1
	2		Credit		Site Development - Protect or Restore Habitat 2
1			Credit		Open Space 1
	3		Credit		Rainwater Management 3
2			Credit		Heat Island Reduction 2
1			Credit		Light Pollution Reduction 1
	1		Credit		Site Master Plan 1
1			R G	Credit	Joint Use of Facilities 1
Yes ? No					
1	9	2			<b>WATER EFFICIENCY (WE)</b> 12
Y			Prereq		Outdoor Water Use Reduction Required
Y			Prereq		Indoor Water Use Reduction Required
Y			R	Prereq	Building-Level Water Metering Required
1		1	G	Credit	Outdoor Water Use Reduction, Option 2, 50% 2
	7		Credit		Indoor Water Use Reduction 7
	2		Credit		Cooling Tower Water Use 2
		1	Credit		Water Metering 1
Yes ? No					
13	15	3			<b>ENERGY &amp; ATMOSPHERE (EA)</b> 31
Y			Prereq		Fundamental Commissioning and Verification Required
Y			Prereq		Minimum Energy Performance Required
Y			R	Prereq	Building-Level Energy Metering Required
Y			Prereq		Fundamental Refrigerant Management Required
5	1		G	Credit	Enhanced Commissioning, Option 1 & Option 2 6

3	13	
		1
2		
3		
	1	
		2

Yes ? No

6	7	0
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Y		
Y		

3	2	
2	4	
1	1	

Yes ? No

11	4	1
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Y		
Y		
Y		

2		
1	1	1
1		
1	1	
	1	
1	1	
3		
1		
1		

Yes ? No

3	3	0
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1		
1		
	1	
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	1	
1		

Yes ? No

3	3	0
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1		
	1	
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1		
1		
	1	

Yes ? No

44	62	6
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G	Credit	Optimize Energy Performance, Option 1, 10%	16
	Credit	Advanced Energy Metering	1
R	Credit	Demand Response	2
R G	Credit	Renewable Energy Production	3
	Credit	Enhanced Refrigerant Management	1
	Credit	Green Power and Carbon Offsets	2

**MATERIALS & RESOURCES (MR) 13**

R	Prereq	Storage and Collection of Recyclables	Required
	Prereq	Construction and Demolition Waste Management Planning	Required
R G	Credit	Building Lifecycle Impact Reduction, Option 4	5
G	Credit	Building Product Disclosure and Optimization - Environmental Product Declarations	2
G	Credit	Building Product Disclosure and Optimization - Sourcing Raw Materials	2
G	Credit	Building Product Disclosure and Optimization - Material Ingredients	2
G	Credit	Construction and Demolition Waste Management, 50%	2

**INDOOR ENVIRONMENTAL QUALITY (EQ) 16**

	Prereq	Minimum Indoor Air Quality Performance	Required
R	Prereq	Environmental Tobacco Smoke (ETS) Control	Required
	Prereq	Minimum Acoustical Performance	Required
G	Credit	Enhanced Indoor Air Quality Strategies, Option 1 & Option 2	2
	Credit	Low-Emitting Materials	3
	Credit	Construction Indoor Air Quality Management Plan	1
	Credit	Indoor Air Quality Assessment	2
G	Credit	Thermal Comfort	1
R	Credit	Interior Lighting	2
	Credit	Daylight	3
	Credit	Quality Views	1
	Credit	Acoustic Performance	1

**INNOVATION (IN) 6**

R	Credit	Innovation, Mold Prevention	1
R	Credit	Innovation, Institutional Energy Management	1
	Credit	Innovation	1
	Credit	Innovation	1
	Credit	Innovation	1
	Credit	LEED® Accredited Professional	1

**REGIONAL PRIORITY (RP) 4**

	Credit	Regional Priority, Renewable Energy Production	1
	Credit	Regional Priority, Surrounding Density and Diverse Uses	1
	Credit	Regional Priority, Access to Quality Transit	1
	Credit	Regional Priority, Bicycle Facilities	1
	Credit	Regional Priority, Heat Island Reduction	1
	Credit	Regional Priority, Outdoor Water Use Reduction	1

**PROJECT TOTALS (Certification Estimates) 110**

Certified: 40-49 points Silver: 50-59 points Gold: 60-79 points Platinum: 80+ points



## **Credit-Specific References**

The references listed below are intended to supplement or guide the approach to certain prerequisites and credits. APS Standards, Guidelines and Specifications are available on the APS website under Design Standards and Guidelines, and Maintenance & Operations.

### General

APS Specification Section 018113 Sustainable Design Requirements

### SS Credit – Joint Use of Facilities

<http://www.aps.edu/community/facility-rentals/user-groups>

### WE Prerequisite – Building-Level Water Metering

APS Measurement & Verification Guideline

### EA Prerequisite – Building Level Energy Metering

APS Measurement & Verification Guideline

### EA Prerequisite & Credit – Commissioning

APS Specification Section 220800 Plumbing Systems Commissioning Requirements

APS Specification Section 230800 Mechanical Systems Commissioning Requirements

APS Specification Section 260800 Electrical Systems Commissioning Requirements

### EA Credit – Demand Response

APS Mechanical Design Standards

### EA Credit – Renewable Energy Production

APS Solar Photovoltaic System Design Guidelines

### MR Prerequisite – Storage and Collection of Recyclables

APS Procedural Directive for the Storage and Collection of Recyclables

APS Elementary School and Middle School Planning Standards

### MR Credit – Building Life-Cycle Impact Reduction

APS Building Life-Cycle Impact Reduction Documentation Requirements

### EQ Prerequisite – Environmental Tobacco Smoke Control

APS standard no-smoking sign

### EQ Credit – Interior Lighting

APS Electrical Design Standards

### ID Credit – Mold Prevention

APS Mold Prevention Credit Submittal Guidance

### ID Credit – Institutional Energy Management

APS Institutional Energy Management Credit Submittal Guidance

## Credit-Specific Guidance

Prerequisites and credits listed on the APS LEEDv4 checklist shall follow the standard guidance provided by the US Green Building Council, LEED Reference Guide for Building Design and Construction v4, July 2014, with addenda.

Where APS desires a specific compliance approach, information is provided below.

### SS Credit – Joint Use of Facilities

OPTION 1. APS permits non-APS entities to use its facilities for non-school functions when such events do not conflict or interfere with the instructional day or school-related events. APS maintains an application process for non-APS entities to request use of APS facilities. All requests shall be completed using the district's online application process.

### WE Credit – Outdoor Water Use Reduction

OPTION 2. Reduce the project's landscape water requirement by at least **50%** from the calculated baseline for the site's peak watering month.

### EA Credit – Enhanced Commissioning

OPTION 1, PATH 1. Enhanced Systems Commissioning. Include the demand response processes in the scope of the commissioning authority. Include on-site photovoltaic systems in the scope of the commissioning authority.

AND,

OPTION 2. Envelope Commissioning.

### EA Credit – Optimize Energy Performance

OPTION 1. **10%** minimum energy savings required (3 points), exclusive of energy offset by on-site renewable systems.

### EA Credit – Renewable Energy Production

Maximize onsite renewable energy generation based on available space, targeting no less than 15%, and up to 100% of project's electrical energy use.

### MR Credit – Building Life-Cycle Impact Reduction

OPTION 4. Whole-Building Life-Cycle Assessment.

## **FOR THE FOLLOWING THREE CREDITS, OBTAIN A MINIMUM OF 2 OF 6 AVAILABLE POINTS:**

- MR Credit – Building Product Disclosure and Optimization, Environmental Product Declaration
- MR Credit – Building Product Disclosure and Optimization, Sourcing of Raw Materials
- MR Credit – Building Product Disclosure and Optimization, Material Ingredients

### MR Credit – Construction and Demolition Waste Management

OPTION 1, PATH 1. Recycle and/or salvage nonhazardous construction and demolition materials for a minimum of **50%** of waste materials. A 75% diversion rate is desired, but not required.

OR,

OPTION 2. Do not generate more than 2.5 pounds of construction waste per square foot of the building's floor area.

### EQ Credit – Enhanced Indoor Air Quality Strategies

OPTION 1. Enhanced IAQ Strategies.

AND,

OPTION 2. Carbon Dioxide Monitoring.

### EQ Credit – Low-Emitting Materials

Required categories include interior paints and coatings applied on site, interior adhesives and sealants applied on site, and flooring. Other categories are desired, but not required.

### EQ Credit – Thermal Comfort

Design heating, ventilating, and air-conditioning (HVAC) systems and the building envelope to meet the requirements of ASHRAE Standard 55–2010, Thermal Comfort Conditions for Human Occupancy, with errata.

Thermal controls compliance in all classroom spaces is required. Thermal controls compliance in all other areas is desired, but not required.

## **Deliverables by Team Member by Phase**

This list reflects the minimum requirements to comply with the prerequisites and credits prescribed on the APS LEEDv4 BD+C Schools Checklist. Additional information may be required based upon project-specific credits determined by the project team.

### **ALBUQUERQUE PUBLIC SCHOOLS**

#### **Project Phase: Master Planning**

1. Phase 1 Environmental Site Assessment
2. If hazardous materials are identified, Phase 2 Environmental Site Assessment

#### **Project Phase: Schematic Design**

1. LEED Consultant Contract
2. Energy Consultant Contract
3. Daylight Consultant Contract
4. Commissioning Agent Contract
5. Envelope Consultant Contract
6. Acoustical Consultant Contract
7. Contract for an exterior noise survey to inform acoustical design.

#### **Project Phase: Design Development**

1. Owner's Project Requirements

#### **Project Phase: 95% Construction Documents**

1. Demand Response Enrollment Contract

#### **Project Phase: Construction**

1. If hazardous materials are identified, letter confirming remediation
2. Documentation of emission compliance standards for low-emitting furniture products

### **ARCHITECT**

#### **Project Phase: Schematic Design**

1. Site plan indicating basic location of hardscape, softscape and building footprint
2. Basic floor plan
3. Elevations indicating general building massing
4. General description of building systems
5. Occupancy count

#### **Project Phase: Design Development**

##### **Project Manual**

1. Basis of Design Narrative

##### **Site Plan Drawing**

1. Site area included in project
2. Location of vegetated landscape systems
3. Location and type of hardscape systems
4. Location of play areas

## **Project Phase: 50% Construction Documents**

### **Project Manual**

1. Specification Section 087100, Door Hardware – include closers at all rooms where hazardous materials are used or stored

### **Site Plan Drawing**

1. Bicycle storage and dedicated bicycle lanes
2. Location of designated recycling dumpster

### **Floor Plan Drawing**

1. Show staff shower/changing facility
2. Location and dimensions of all entryway systems
3. Designated areas for recycling bins
4. Partition Types

### **Roof Plan Drawing**

1. Roof Finish Materials
2. Location of skylights

### **Reflected Ceiling Plan Drawing**

1. Ceiling finish materials

### **Elevation Drawing**

1. Window locations coordinated with window schedule and glazing specification
2. Show location of permanent shading devices

### **Wall Section Drawing**

1. Exterior Envelope Systems

### **Schedules**

1. Kitchen equipment if included in project
2. Door schedule indicating door closers at all rooms where hazardous materials are used or stored (or in door hardware specification if available)
3. Partition types indicating deck-to-deck partitions at all hazardous use areas (or reflected ceiling plan indicating hard-lid ceiling)
4. Floor, wall, and ceiling finishes

## **PROJECT PHASE: 95% Construction Documents**

### **Site Plan**

1. Location of no-smoking signs

### **Site Details**

1. Details for No-Smoking signs

### **Details**

1. Include Exterior Enclosure Details as they relate to energy, water, indoor environmental quality and durability

## **Schedules**

1. Glare control devices for all windows

## **LANDSCAPE ARCHITECT**

### **PROJECT PHASE: 95% Construction Documents**

#### **Planting Plan**

1. Location and square footage of planted areas
2. Planting legend

#### **Irrigation Plan**

1. Irrigation systems
2. Irrigation controller type(s)

## **MECHANICAL/PLUMBING ENGINEER**

### **PROJECT PHASE: Design Development**

#### **Project Manual**

1. Basis of Design Narrative

### **PROJECT PHASE: 50% CONSTRUCTION DOCUMENTS**

#### **Project Manual**

1. ASHRAE 55-2010 Conditions for thermal comfort. For each space type, provide temperature set-points with range of operability, air speed data and radiant conditions used to determine design temperature, and relative humidity at conditions analyzed.
2. Mechanical systems design criteria.

### **PROJECT PHASE: 75% CONSTRUCTION DOCUMENTS**

#### **Project Manual**

1. Specifications indicating system compliance requirements with ANSI/ASHRAE/IESNA Standard 90.1 Mandatory Provisions
2. Completed ASHRAE Compliance forms

#### **Mechanical Floor Plan**

1. Location of all terminal units
2. Volume of outside air delivered to each terminal unit
3. Location of all supply diffusers with mixed air volume
4. Location of all exhaust fans with exhaust air volume from space
5. Location of all CO2 sensors
6. Dimensioned duct drawings for HVAC noise analysis

#### **Schedule and Details**

1. Plumbing and equipment schedules indicating WaterSense label, flush/flow rates, and appliance and equipment water use rates

2. ASHRAE 62.1-2010 output report from mechanical design software. Report should reflect the minimum design outdoor air required under worst-case conditions in all occupiable spaces per the ventilation rate procedure
3. Equipment selections (RTUs, VAVs, chillers, etc.)
4. Manufacturer's octave band sound power data for equipment (RTUs, VAVs, chillers, etc.)
5. Refrigerant type for all HVAC&R equipment

## **PROJECT PHASE: 95% CONSTRUCTION DOCUMENTS**

### **Schedule and Details**

1. Building-level water and energy meters
2. Peak Shaving Sequence of Operations for Demand Response
3. MERV 13 or Class F7 filters
4. CO2 monitoring and control sequence of operation
5. Specification for outdoor airflow measurement device with required set-points
6. Updated ASHRAE 62.1-2010 output reports

## **ELECTRICAL ENGINEER**

### **PROJECT PHASE: Design Development**

#### **Project Manual**

1. Basis of Design Narrative

### **PROJECT PHASE: 50% Construction Documents**

#### **Electrical Site Plan**

1. Luminaire locations and mounting heights

#### **Electrical Lighting Plan**

1. Location and type of all luminaires
2. Location and type of all lighting controls

#### **Schedule and Details**

1. Luminaire Schedule showing manufacturer, model number, lamp type, orientation, tilt angle, input wattage, and backlight-uplight-glare ratings
2. One-line diagram for the PV system and its interface to the local electrical utility
3. Light Fixture Schedule
4. Lighting control schedule indicating product specification and control levels.

#### **Other**

1. Photometric plan indicating vertical illuminances on all vertical planes as they extend upward from the lighting boundary at grade level to a height of at least 33 feet above the tallest luminaire. Calculation points must be no more than 5 feet apart. Provide point-by-point calculation output for the vertical plane containing the greatest vertical illuminance (worst-case scenario). Alternatively, provide BUG rating for all exterior fixtures.

## **GENERAL CONTRACTOR**

### **PROJECT PHASE: Construction**

## **Management Plans**

1. Erosion and Sedimentation Control Plan
2. Construction Waste Management Plan
3. Indoor Air Quality Management Plan
4. Schedule of values indicating products that may contribute to LEED material and resource credit requirements.
5. List of products that contribute to achieving compliance with LEED Low Emitting Material requirements for Wet Applied Products, Composite Wood Products, Furniture, Insulation and Exterior Applied Products.

## **Submittal and Performance Documentation**

1. Inventory of diverted waste amounts and material streams
2. Environmental Product Declaration and/or Multi-Attribute Optimization documents for compliant products
3. Documentation of chemical inventory and/or product certifications for applicable products
4. Annotated photographs of indoor air and environmental quality measures during construction
5. Record of HVAC filtration media used during construction, if applicable
6. Flush-out or Air Quality Testing Report
7. Product data for interval recording meters

## **LEED CONSULTANT**

### **PROJECT PHASE: Design Development**

1. Preliminary Water Budget Analysis Summary Results
2. Identification of Targeted LEED Credits
3. Completed LEED Integrative Process Worksheet
4. Preliminary LCIA Report providing recommendations for credit compliance

### **PROJECT PHASE: 50% Construction Documents**

1. Specification Section 017419, Construction Waste Management
2. Specification Section 018113, Sustainable Design Requirements
3. Plots or calculation results verifying that design parameters meet ASHRAE Standard 55–2010 for 80% acceptability (e.g., psychometric chart; PMV or PPD calculations; ASHRAE Thermal Comfort Tool results)

## **ENERGY CONSULTANT**

### **PROJECT PHASE: Design Development**

1. Energy Performance Benchmark per the U.S. Environmental Protection Agency's Target Finder Tool
2. Simple Box Energy Analysis Summary Results with Design Performance Recommendations

### **PROJECT PHASE: 50% Construction Documents**

1. Updated energy model with evaluations of glazing, shading, insulation, and systems controls strategies – including a confirmation of required energy savings per “Minimum Energy Performance”
2. Energy model outputs analysis of demand response benefits and applicability



3. Compare projected energy production from solar PV contractor to energy model output

### **PROJECT PHASE: 95% Construction Documents**

1. Update of energy performance related to the “Minimum Energy Performance” requirement
2. Demand Response Plan
3. Update projected energy production from solar PV contractor to energy model output

## **COMMISSIONING AGENT**

### **PROJECT PHASE: Design Development**

1. Preliminary Commissioning Plan
2. Drawing and specification review comments

### **PROJECT PHASE: 50% Construction Documents**

1. Specification Section 220800 Plumbing Systems Commissioning Requirements
2. Specification Section 230800 Mechanical Systems Commissioning Requirements
3. Specification Section 260800 Electrical Systems Commissioning Requirements

### **PROJECT PHASE: 95% Construction Documents**

1. Systems Manual
2. Training Requirements
3. Commissioning Plan

### **PROJECT PHASE: Construction**

1. Installation and Verification Checklists
2. Test Scripts
3. Issues Log
4. Commissioning Report
5. Current Facility Requirements (CFR) and Operations & Maintenance (O&M) Plan
6. Functional Performance Test Reports
7. Issues Log

### **PROJECT PHASE: Post-Construction**

1. 10-month Post-Occupancy Review
2. Ongoing Commissioning Plan