

LACCD SUSTAINABILITY STANDARDS

October 2019

Build LACCD Program Sustainability Requirements Overview

Sustainability Policy: The LACCD Board of Trustees has adopted the Leadership in Energy and Environmental Design (LEED™) rating system¹ to deliver new construction and major renovation projects. The policy requires that:

- 1) All new buildings and major renovations over 7,500 sf and an occupied structure shall minimally be **LEED CERTIFIED**. Individual projects may stipulate LEED goals that exceed the minimum requirement.
- 2) All new buildings shall be designed to meet the current California Energy Code - **California Code of Regulations Title 24, Part 6 and California Code of Regulations, Part 11 (Cal Green Code) and applicable jurisdictional authorities**
- 3) Minor renovations are exempt from LEED certification, **but are required to meet CCR Title 24 and Cal Green.**
- 4) Sustainable Design compliance shall be monitored using a sustainability checklist for both new construction and renovation projects.
- 5) Renewable Energy and Emerging Technology shall be considered, evaluated, and approved on a project by project basis. -
- 6) LACCD requires that **15% of a project's energy use** to be supplemented by renewable energy, which shall come from on-site sources.
- 7) Bulk Procurement of Flooring Products: Design teams have the option of using master agreements available to LACCD for specifying flooring products. The list of master procurement contracts related to sustainability products is continually updated. Please contact the Contracts Department of the PMO for the most current agreements.
- 8) LACCD Division 1 General Conditions contain a section on Sustainable Design.

Application of the Sustainable Building Principles and Standards to New Construction Projects:

Projects that incorporate the District's Sustainable Building Principles and Standards meet all the following criteria:

- More than 50% of the funding is from Bond proceeds
- Building area is over 7,500 square feet
- Occupied Structure

- 1) If the above three criteria are satisfied, then the building is targeted to achieve a minimum of **LEED CERTIFIED** in the latest rating system by United States Green Building Council (USGBC).

¹ The LEED™ Green Building Rating System, developed by the United States Green Building Council (USGBC), is a consensus based national standardized process for delivering green buildings, providing third party verification for sustainability metrics.

- 2) Depending on the delivery method selected at project initiation, a higher certification goal may be targeted at the discretion of the College President and shared governance. *The driver for certification level should always be the program intent and LEED certification updates should reflect intent of sustainable features and criteria for the project.*
- 3) **Design/Bid/Build and Lease/Leaseback:** The Design-Build (DB) selection committee approves the best value proposal. The Facilities Master Plan & Oversight Committee (FMP&OC) approves sustainability features and level of LEED certification at 100% Design Development
- 4) **Major Renovation Projects:** Major renovation projects that incorporate the District's Sustainable Building Principles and Standards include projects that meet the following criteria:
 - More than 50% of the exterior envelope is renovated. (Exterior envelope is defined as exterior walls, windows/glazing, door systems and roof systems.)
 - Project scope includes upgrading major building systems, (mechanical, electrical and/or plumbing systems)
 - Occupied Structure
 - These projects should follow LEED certification requirements, and all sustainability requirements similar for new construction projects.
- 5) **Non-LEED Buildings:** If a building does not meet the District's criteria for new construction projects or major renovation projects, it is then considered a non-LEED™ project, i.e. these projects will continue to incorporate sustainable features that complement the program for the project, however, Non-LEED buildings will not pursue official LEED certification through GBCI. For a project to be considered Non-LEED it shall meet the following criteria:
 - Less than 50% of exterior envelope renovated.
 - Infrastructure projects
 - Non-occupied structures
- 6) **Design/Bid/Build and Lease/Leaseback:** The LACCD Sustainable Checklist for Renovation Projects shall be completed in Schematic Design phase and receive approval of sustainable features incorporated in Design Development Phase by the Program Manager of that college or the Program Management Office.
- 7) **Design Build:** The program criteria architect should complete the renovation checklist (Appendix Attachment 8A) and this should be included in the programming document included in the RFP.
- 8) **All non-LEED™ projects:** Non-LEED projects are to be listed on the FMP&OC Meeting Agenda where approval of the sustainable checklist will be provided. The LACCD Sustainable Checklist for Renovation Projects shall be completed in design development phase and receive approval of sustainable features incorporated.

Use of LEED Rating System

Green Building Certification Institute (GBCI) Coordination: The PMO will assign registration numbers for all LEED projects on LEED Online at project initiation when LEED certification requirement for the project is established.

- 1) GBCI certification process and LEED management will be provided by the design team. Throughout the design and construction process the Sustainability Consultant, who is part of the design team, is responsible for managing the LEED certification process and submits all documentation to the GBCI/USGBC for evaluation. LACCD does not necessitate hiring of a LEED consultant. If the architect takes on this role, the architect is required to perform the duties of LEED management with GBCI. **Refer to the Division 1 Specification for more on this topic.**
- 2) The LEED consultant should obtain campus specific information for project setup from the Program Management SM - Sustainability Program Manager (Project Manager/ Design Manager/ Sustainability Manager).
- 3) Issuance of a Credit Interpretation Request (CIR) to GBCI must be approved by the SM. SM should be advised of situation and copied on all communication to the GBCI/USGBC as related to LACCD projects.
- 4) The use of the 'sustainable education' innovation credit is at the discretion of the design team. This would give the user a summary of sustainable features of the project. Methods to display this information include a computer console at the entrance of the building with a looped PowerPoint presentation that would continuously display, cut away models of the building showing the sustainable features, signage describing the sustainable features, and/or commitment to tour the facility. The sustainability consultant on the project team should coordinate early in design with the owner to confirm how sustainable education will be incorporated into the project. Written approval is required of all owner items and on scorecard.
- 5) The Commissioning Agent (CxA) on the project, hired by LACCD, is responsible for submitting the prerequisite and enhanced Cx credit to the LEED Manager for the Design Team for submission to GBCI/USGBC.
- 6) Selection of LEED version- the program requirements will specify this information. When it does not, it should be assumed that the latest version of LEED will apply.
- 7) LACCD projects fall under the realm of New Construction. However, if a Design Build/Design Team wants to pursue a different LEED certification model (Schools, Commercial Interiors, Core and Shell etc.), it must be approved in writing during procurement, otherwise it will be assumed that New Construction will apply.

Procedural Requirements for Achieving Sustainability

Sustainable Design Process Summary: Sustainable building design will be achieved through execution of the following:

- 1) Design Teams shall provide Integrated design delivery, in coordination with Master planning, Programming, BIM modeling, Facility Management, energy efficiency and management best practices, Commissioning, Warranties and handover and post occupancy evaluation.
- 2) Balancing of programming requirements to available resources and funds.
- 3) During early stages of design, calibrating the cost model to choose sustainable design features in line with program requirements.
- 4) Consideration and understanding of operation and maintenance requirements, and resources of the building systems.

- 5) Compliance with all the LEED rating system requirements and processes to deliver the agreed level of LEED certification and enable Design Coordination among the various parties.
- 6) Integrated design through timely coordination between various disciplines will ensure a quality sustainable design delivery. Details of the coordination meetings required, who they are chaired by, goals and outcomes of the meeting and each party's responsibility are listed on pages 11-21.
- 7) **Sustainable Design Deliverables by Project Phase:** An outline of documents related to sustainable design and construction deliverables is provided on Pages 12-22. At various stages of programming, pre-planning, design, construction and post construction, the CPT is responsible to ensure that quality sustainable design deliverables are produced by the design team. Timely review and comment on the sustainable submittals will ensure a quality project.
- 8) **Facilities Master Planning & Oversight Committee (FMP&OC) Approval of LEED Projects**
 - All LEED™ and Non-LEED™ projects more than five million dollars are reviewed and approved in concept by the Facilities Master Planning & Oversight Committee (FMP&OC). The FMP&OC is a subcommittee of the LACCD Board of Trustees (BOT). The committee convenes monthly to review and give recommendations on approval of buildings (among other duties) that incorporate sustainable design features. Once sustainable features of LEED projects are approved the project teams shall continue to the next phase of design.
 - The FMP&OC approval process of LEED projects is similar to FMP&OC approval of all projects.
 - A Presentation to the FMP&OC subcommittee shall occur at the end of the Design Development Phase. FMP&OC approval must be obtained prior to proceeding to the Construction Documents Phase.
- 9) **Energy Modeling for New Construction and Major Renovation LEED Projects**
 - The project energy model is integral to confirming design compliance with sustainability and energy requirements at each phase of design process. Confirmation of sustainability goals through an energy model at each phase of design is required. Refer to energy modeling requirements in Appendix 8D
 - Criteria on LEED project energy modeling requirements and process: The design team should complete the Title 24 energy model and cover sheet and submit to CPT for review at each milestone deliverable. The energy model files are also required at certain phases of design completion. The CPT shall confirm compliance with sustainable design requirements. In addition to Title 24 modeling, whole building energy modeling is required for LACCD projects.
 - Energy Modeling Cover Sheet- See Appendix Attachment 8C
 - Energy modeling Requirements and Climate Zone information- See Appendix Attachments 8C/8D
- 10) **Commissioning**
 - All LEED™ projects will have a third-party Whole Building Commissioning Authority (WBCxA) firm. The WBCxA will be hired by LACCD, to oversee the commissioning process. Commissioning is a systematic quality process for enhancing delivery of a project. The process ensures that all commissioned systems and assemblies are planned, designed, installed, tested, operated, and maintained to meet to meet contract documents and LACCD requirements.

- The WBCxA oversees the Commissioning Agents (CxA) and processes. The Commissioning Agent verifies that building systems perform interactively according to Basis of Design and Owner project Requirements (OPR).
- (OPR) i.e. Building User Group's Operational Needs. The OPR shall be developed as early as possible in the project's conceptual phase. The development of the OPR document shall include all relevant stakeholders, including representatives from LACCD, PMO, CPT, Operations and Maintenance, Design Team, etc.
- The Owner Project Requirements (OPR) is required to be generated (in addition to the programming criteria documents) for all new and renovation building projects. The Commissioning Agent for the project shall prepare the OPR. The OPR shall be developed during the programming phase. The OPR document is critical to the Cx process and must be prepared in programming because:
 - (a) the CxA reviews all Basis of Design Narratives generated by the design/design build teams against the OPR.
 - (b) The CxA reviews design drawings for compliance against the OPR.
 - (c) The OPR is required to contain sufficient critical technical data that will maximize this process. Without a good OPR, or OPR not included at the correct time of procurement, this process becomes invalid.
- The Commissioning process encompasses and coordinates traditionally separate functions of system documentation, equipment Startup, Control System Calibration, testing and balancing, and performance testing and training.
- At a minimum the Commissioning Agent shall perform the following:
 - 1) Prepares the Owner Project Requirements using the nominal group technique method as described in ASHRAE Standard 202, The CxA reviews the Basis of Design (BOD) prepared by the design team against the Owner Project Requirements (OPR).
 - 2) Review related CxA construction specifications and provide comments and/or observations to the Design Team and WBCxA. Refer to LACCD General Requirements and Technical Specifications for Commissioning.
 - 3) Performs all LEED related and non-LEED Commissioning.
 - 4) Procure resolution for identified design and construction Cx related issues.
 - 5) Completes LEED related documentation on LEED Online and attests to successful commissioning efforts for the project.
 - 6) Continues commissioning activities approximately 10 months after beneficial occupancy. The contractor is required to be available for warranty issues and the design consultant is required to be available for clarifications on design issues.
- Commissioning is coordinated by the WBCxA through the CPT. PMO has a Whole building commissioning authority (WBCxA) on staff that manages all WBCxA contracts. Any disputes, etc. are to be brought to the attention of the WBCxA. The PM/SM/RDL/RPL should be kept informed.

Mandatory Sustainability Features

LACCD projects shall include energy efficiency and other sustainable features. The list below provides LEED features, Deviations from this list are only allowed in writing and shall be approved by the Building User Group and PMO. Refer to the LEED reference guide for additional strategies and sustainable features to incorporate in the building projects.

- 1) Stormwater Design - Quality Control
- 2) Stormwater Design Criteria
- 3) Heat Island Reduction - Non-Roof
- 4) Heat Island Reduction - Roof
- 5) Light Pollution Reduction
- 6) Water Efficiency Landscaping
- 7) Building Water Use Reduction – Water Efficient Plumbing Fixtures
- 8) Building Water Use Reduction - Water Efficient Appliances for Process Loads
- 9) Commissioning Fundamental & Enhanced
- 10) Optimize Energy Performance – EUI
- 11) Optimize Building Energy Performance – Whole Building Energy Performance Modeling
- 12) Optimize Energy Performance Strategies – HVAC Equipment Efficiency
- 13) Optimize Energy Performance Strategies – Resets (Chilled Water Reset, Condenser Water Reset, Fan Static Pressure Reset and Supply Air Temperature Reset)
- 14) Optimize Energy Performance Strategies – Air-side Economizers
- 15) Optimize Energy Performance Strategies – Demand Control Ventilation
- 16) Optimize Energy Performance Strategies – Fan & Pump Energy Use
- 17) Optimize Energy Performance Strategies - Motors and Variable Frequency Drives
- 18) Optimize Energy Performance Strategies – Condensing Boilers
- 19) Optimize Energy Performance Strategies – Outside Air Intake Locations
- 20) Optimize Energy Performance Strategies – Building Management System (BMS)
- 21) Optimize Energy Performance Strategies – Daylighting and Daylight-Responsive Controls
- 22) Optimize Energy Performance Strategies – Occupancy Sensors
- 23) Optimize Energy Performance Strategies – Efficient Lighting Systems
- 24) Optimize Energy Performance Strategies – Efficient Electrical Distribution
- 25) Optimize Energy Performance Strategies – Plug Load Management
- 26) Optimize Energy Performance Strategies – Low Pressure Filters
- 27) Optimize Energy Performance Strategies – Energy Efficient Appliances
- 28) Materials and Resources – Storage & Collection of Recyclables
- 29) Materials and Resources – Construction Waste Management: 75%
- 30) Materials and Resources – Recycled Content: 20%
- 31) Materials and Resources – Regional Materials: 20%
- 32) Materials and Resources – Certified Wood: Over 50%
- 33) Materials & Resources Strategies – Red List Building Materials
- 34) Materials & Resources Strategies – Furniture, Fixtures & Equipment (FF&E)
- 35) Indoor & Environmental Quality – Construction IAQ Management Plan - During Construction
- 36) Indoor & Environmental Quality – Construction IAQ Management Plan – Before Occupancy
- 37) Indoor & Environmental Quality – Low Emitting Materials – Adhesives and Sealants, Paints & Coatings, Carpet Systems, Composite Wood and Agri-fiber Products

- 38) Indoor & Environmental Quality – Indoor Chemical & Pollutant Source Control
- 39) Indoor & Environmental Quality – Controllability of Systems – Lighting System Controllability
- 40) Indoor & Environmental Quality – Daylight & Views – Daylight: 75% of Spaces
- 41) Indoor & Environmental Quality – Daylight & Views – Views: Critical Spaces Requiring Views

NOTE:

If a project cannot comply with any of the mandatory measures as provided in this section, please submit a Sustainability Standard Deviation Request Form to CPT. PMO and District approval is required. (Refer to Appendix 9F Attachment).

Campus Provided Credits

See Appendix Attachment E for Campus Maps that identifies LEED credit documentation completed at each campus.

Requirements of renovation projects not meeting the LEED certification threshold

See Appendix Attachment 8A

For renovation projects, look for RFP to include mandatory requirements within this checklist.

Appendix (Reference Documents)

- a. Renovation Project Checklist – Appendix 8A
- b. Sustainability Cover Sheet – Appendix 8B
- c. Energy Modeling Cover Sheet – Appendix 8C
- d. Energy Modeling Climate Zone Information – Appendix 8D
- e. Provided by Campus Credits (Maps) – Appendix 8E
- f. Sustainability Standards Deviation Request – Appendix 8F

Abbreviations

ARB - Air Resources Board	ASTM - American Society for Testing and Materials
ATCM - Air Toxics Control Measure	ASHRAE - American Society of Heating, Refrigerating and Air-Conditioning Engineers
BAS – Building Automation System	BIFMA - Business and Institutional Furniture Manufacturers Association
BIM – Building Information Modeling	BMPs – Best Management Practices
BMS - Building Management System	BOD – Basis of Design
BOT – Board of Trustees	BUG – Building User Group
CBC – California Building Code	CEC – California Energy Code
CD- Construction Documents	CFCs - Chlorofluorocarbons
CFD - Computational Fluid Dynamics	CMC – California Mechanical Code
CO2 - Carbon Dioxide	CPC – California Plumbing Code
CPT – College Project Team	CSL - Candidate Standard Level
CWA – Clean Water Act	CxA – Commissioning Agent
DB – Design Build	DBB – Design Bid Build
DCV - Demand Control Ventilation	DD- Design Development
DDC - Direct Digital Control	ECM – Electronically Commutated Motor

EERs - Energy Efficiency Ratios	EMS - Energy Management System
EPM – Energy Project Manager	EPACT – Energy Policy ACT
EPA - Environmental Protection Agency	ETV - Environmental Verification
EUIs - Energy Use Indices	FF&E - Furniture, Fixtures and Equipment
FMP&OC - Facilities Master Planning & Oversight Committee	FSC - Forest Stewardship Council
GBCI – Green Building Certification Institute	HCFCs - Hydrochlorofluorocarbons
HVAC – Heating Ventilation & Air Conditioning	IAQ - Indoor Air Quality
IDM - Integrated Design Manual	ISO - International Organization for Standardization
LACCD – Los Angeles Community College District	LED - Light-Emitting Diodes
LEED – Leadership in Energy & Environmental Design	LLB – Lease- Lease Back
MDF - Medium Density Fiberboard	M&DR – Metering & Demand Response
MEP – Mechanical, Electrical & Plumbing	MERV - Minimum Efficiency Reporting Value
NEMA - National Electrical Manufacturers Association	O&M – Operations & Maintenance
OPR – Owner Project Requirements	PM – Project Manager
PMO – Program Management Office (of Build LACCD)	PVC - Polyvinyl Chloride
RPM– Regional Program Manager	REHVA - Federation of European Heating, Ventilation and Air Conditioning Associations

RoHS - Restriction of Hazardous Substances Directive	RPD – Regional Program Director
SCAQMD - South Coast Air Quality Management District	SMACNA - Sheet Metal and Air Conditioning Contractors National Association
SMPL –Sustainability Manager	SRI - Solar Reflectance Index
SUSMP - Standard Urban Stormwater Mitigation Plan	TARP - Technology Acceptance Reciprocity Partnership
TMDLs - Total Maximum Daily Loads	TSS - Total Suspended Solids
USGBC – United States Green Building Council	VAV – Variable Air Volume
VFDs - Variable Frequency Drives	VOC - Volatile Organic Compounds
WBCxA – Whole Building Commissioning Agent (PMO CxA)	

A. Critical Sustainable Design Coordination among various parties

Integrated design through timely coordination between various disciplines will ensure a quality sustainable design delivery. Details of the coordination meetings required, who they are chaired by, goals and outcomes of the meeting and each party’s responsibility are listed below.

During Programming

Meeting # (can be touch base/email)	USGBC Registration
Chaired by	PMO, SM
Participants and responsibilities	CPT Programming Criteria Architect
Goals and Outcomes	Establish a project registration, rating system and number for the project on LEED Online from LACCD pre-registered projects. Confirm timeline and registration info for team member to accurately complete LEED online registration (for DB teams on boarding). Architect (DBB) or DB team to invite PMO and CPT to LEED Online with PM level access.

Meeting #	Programming Meeting
Chaired by	Programming Criteria Architect (PCA) and the MEP criteria engineers
Participants and responsibilities	CPT to coordinate meeting invitation list and logistics Campus Facilities, Building User Group SM, RPM
Goals and Outcomes	During Programming, alternative heating, cooling and ventilation systems should be evaluated. The use of natural ventilation, radiant floors, passive and active chilled beams, underfloor air distribution, and displacement ventilation should be studied by the PCA and their MEP teams. The program should be reviewed in its DRAFT form with the BUG and CPT and alternative systems study should be presented. The MEP programming criteria team should list specific criteria for rooms where these systems are considered.

Each project should have its own Owner Project Requirements (OPR) tailored to the program of the project. The meeting should occur after program has been established. The Program and the OPR should be coordinated. Programming Criteria Architect, RPM and SM is required to coordinate with the WBCxA and review the OPR for coordination.

Meeting #	OPR BUG Meeting BUG - A group determined by shared governance to make up the campus approval committee, and usually consists of Dean of the college curriculum, building department chairs for college, Facilities Director and others as deemed appropriate.
Chaired by	WBCxA (or project CxA)
Participants and responsibilities	CPT to coordinate meeting invitation list and logistics Campus Facilities Building User Group PMO WBCxA, SM, RPM CxA (or WBCxA) to develop an OPR based on this meeting with BUG
Goals and Outcomes	Define training requirements overview based on building needs.

100% Schematic Design, 50% DD (Prior to FMP&OC Meetings), 100% DD, DSA Documents

Meeting #	Energy & Asset Modelling Review
Chaired by	Design Team Energy Modeler
Participants and responsibilities	PMO- SM, AE Energy Modeler, EPM, District Facilities Office or designee as assigned. Facilities PM for Central Plants (if applicable)
Goals and Outcomes	As needed, when compliance is not achieved, conduct a status meeting to confirm progress at the energy modeling milestones. Discuss central plant modeling and design criteria as applicable.

100% Schematic Design, 50% DD, 50% & 95% CD, DSA Documents

Meeting #	Sustainability Review at each phase of design
Chaired by	CPT
Participants and responsibilities	AE Design Team members as appropriate Facilities Management- for O&M and design input Construction Team as applicable to delivery process PMO-SM, WBCxA, EPM, District Facilities Office or designee as assigned, Facilities PM for Central Plants (if applicable) Optional- BIM
Goals and Outcomes	-Validate design goals, status check; confirm sustainability requirements are incorporated into the design drawings. -Confirm facilities training needs -Confirm central plant and energy requirements and design options -Coordinate with Project WBCxA

Construction- Kick Off

Meeting #	LEED Kick off, Cx Kick-off and Asset Modelling Mtg.
Chaired by	Design Team Sustainability Consultant
Participants and responsibilities	CPT Cx Agent Construction Team including all MEP, BAS and renewable energy subcontractors PMO- SM (Can be individual or combined meeting)
Goals and Outcomes	Convey contractor LEED credits roles and responsibilities Convey Whole Building Commissioning Plan and coordination with Sub-contractors Review construction schedule with respect to Cx activities at pre-functional and functional testing

	Kick off asset modeling criteria, requirements and roles and responsibilities
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Construction-Substantial Completion

Meeting #	Building Flush out- This can be concurrent with a WBCxA coordination meeting
Chaired by	CPT
Participants and responsibilities	WBCxA Construction Team ME Consultant LEED consultant
Goals and Outcomes	Confirm the flush-out duration, responsibilities, schedule and LEED deliverables and incorporation of flush-out in the project completion schedule.

Construction- Handover Process

Meeting #	WBCxA Training
Chaired by	WBCxA
Participants and responsibilities	CPT Building Facilities, Facilities PM for Central Plants (if applicable), Construction Team representative
Goals and Outcomes	Conduct training as specified in the specifications to fulfill LEED Cx and District Cx requirements.

Construction- Post Occupancy 10 months

Meeting #	WBCxA Warranty Review
Chaired by	WBCxA
Participants and responsibilities	Building Facilities Construction Team representative CPT Optional-PMO-RPM, RPD, SM, Facilities PM for Central Plants (if applicable)
Goals and Outcomes	Building performance review and report Coordination with building performance model Coordination with energy model and asset tracking

Construction-Post Occupancy Warranties

Meeting #	11-month Post Occupancy Warranty walk
Chaired by	CPT & WBCxA
Participants and responsibilities	CxA PMO- post construction group Facilities manager Construction Team
Goals and Outcomes	Create 11-month warranty list Address outstanding warranty issues Review training information and questions

Sustainable Design Deliverables by Project Phase

Below is an outline of documents related to sustainable design and construction deliverables. At various stages of programming, pre-planning, design, construction and post construction, the CPT is responsible to ensure that quality sustainable design deliverables are produced by the design team. Timely review and comment on the sustainable submittals will ensure a quality project.

Programming

Document Name:	Sustainable Design Criteria for project- included in project program
Prepared by:	Programming Architect
Reviewed by:	CPT PMO- SM, EPM, District Facilities Office or designee as assigned, Facilities PM for Central Plants (if applicable)
Scope and Goal	Establishes final scope of sustainability and Energy efficiency and management best practices for the project

Document Name:	Owner Project Requirements
Prepared by:	Commissioning Agent for Building User Group (BUG) Facilities Management
Reviewed by:	CPT, BUG, PMO- SM, EPM, District Facilities Office or designee as assigned, Facilities PM for Central Plants (if applicable)
Scope and Goal	Establishes system requirements for the project

Design- Schematic

Document Name	Sustainability Narratives, Systems Narratives and Basis of Design, LEED Checklist, Schematic Energy Model, Sustainability Cover sheet & Energy Modeling cover sheet
Prepared by:	Design Team
Reviewed by:	CPT , SM, CxA, project LEED consultant
Scope and Goal	Establishes the sustainability criteria for the project, Design response to the OPR and identifies the sustainability features for the project. Energy model review should establish preliminary targeted energy compliance for the project.

Items to confirm with SM in schematic design phase regarding a LEED project:

- i. LEED boundary of project
- ii. Occupied space in the program
- iii. Occupancy of project to be used for LEED submission
- iv. Owner provided sustainability attributes (pull exhibits from the sustainability standards at back of the document that show bicycles and metro paths etc.)
- v. M&DR program interface
- vi. Central Plant Coordination
- vii. Project appropriate certification level (LEED certified is the program minimum)
- viii. LEED scorecard approval from owner at 100% SD and 100% CD

Sustainability Cover Sheet- See Appendix Attachment 8B

See Energy model requirements- See Appendix Attachments 8C/8D

Design- 50% Design Development

Document Name:	Sustainability Narratives, Systems Narratives and Basis of Design, LEED Checklist, Schematic Energy Model, Sustainability Cover sheet & Energy Modeling cover sheet
Prepared by:	Design Team
Reviewed by:	CPT, SM, BIM, project LEED consultant
Scope and Goal	Tracks status of sustainability. Show incorporation of sustainability features and LEED requirements in documents

Design- 100% Design Development

Document Name:	Energy modeling cover sheet + Model + asset tracking
Prepared by:	Design Team
Reviewed by:	CPT , SM, BIM, project LEED consultant
Scope and Goal	Energy model in line with design progress and incorporating sustainable design goals

Design- Construction Documents

Document Name:	Sustainability Narratives, Systems Narratives and Basis of Design, LEED Checklist with action items from various design members, renewable energy allocation from campus bank and/or project renewable energy
Prepared by:	Design Team
Reviewed by:	CPT, SM, BIM, project LEED consultant
Scope and Goal	Tracks status of sustainability. Show incorporation of sustainability features and LEED requirements in documents Confirms WBCxA and Training requirements

GBCI Design Submission

Document Name:	LEED Online
Prepared by:	Design Team
Reviewed by:	CPT, project LEED consultant
Scope and Goal	Completes GBCI submission

Construction- Kick Off

Document Name:	Contractor Project Plans MRc2, MRc4, MRc5, MRc7, EQc4.1-4.4 (as applicable)
Prepared by:	Contractor
Reviewed by:	CPT, project LEED consultant
Scope and Goal	Establishes projection plan for targeted credits on construction LEED scorecard

Construction-Progress

Document Name:	Contractor credit status for all construction related sustainability items
Prepared by:	Contractor
Reviewed by:	CPT, project LEED consultant
Scope and Goal	Establishes construction LEED scorecard status

Construction-Progress

Document Name:	BIM asset deliverable
Prepared by:	Construction team
Reviewed by:	CPT, PMO -BIM
Scope and Goal	Tracking energy model and asset management document

Document Name:	M&DR Review
Prepared by:	PMO-EPM, District Facilities Office or designee as assigned
Reviewed by:	CPT, Facilities Director, project LEED consultant
Scope and Goal	Confirms compliance with District M&DR and requests additional documentation or information related to metering and demand response for the project as required by project program

Construction-Substantial Completion

Document Name:	WBCxA Training Manuals and Schedule
Prepared by	Construction Team
Reviewed by:	CPT, PMO-SM and PMO- WBCxA
Scope and Goal	Confirm training is in accordance with OPR and Specification requirements

GBCI Construction Submission

Document Name:	LEED Online
Prepared by:	Design and Construction Team
Reviewed by:	CPT, Project LEED consultant
Scope and Goal	Completes GBCI submission

Construction- DSA Closeout

Document Name:	Final OPR, Basis of Design, Construction Manual, Training Manuals, LEED Online documentation, Energy model
Prepared by:	Design and Construction Team
Reviewed by:	CPT Facilities Director PMO- SM, PMO- WBCxA, Post Constr., EPM, District Facilities Office or designee as assigned, WBCxA
Scope and Goal	Establishes final documentation from Design and Construction Team

Construction- Post Occupancy 10 months

Document Name:	WBCxA Warranty Report
Prepared by:	Cx Agent
Reviewed by:	CPT, Construction Team, Facilities Director PMO- WBCxA
Scope and Goal	Review report on post occupancy information on the building, possible corrections in system

1) Stormwater Design- Quality Control
Capture of Stormwater on the Project Site

REFERENCES	REQUIREMENTS
<ul style="list-style-type: none"> • Stormwater Best Management Practice Design Guide • Division 1 Storm water management spec 	<p>The project must obtain the LEED Credit for storm water management and the requirements below:</p> <ul style="list-style-type: none"> • The LACCD stormwater systems for its nine colleges will be designated under the next Small Municipal Separate Storm Sewer System (MS4) Permit [current permit: State Water Resources Control Board (SWRCB) Water Quality Order No.2013-001-DWQ], henceforth referred to as the Small MS4 Permit. comply with Small MS4. • Stormwater must be collected and infiltrated on-site or stored for use if the program calls for non-potable water use. • For zero lot line projects only- reduce runoff by 85%. • Reduce impervious area during design. By reducing impervious area, stormwater infrastructure can be minimized from the project. • Strategies to minimize or mitigate impervious surfaces include: <ul style="list-style-type: none"> ○ LID Site Planning <ul style="list-style-type: none"> ▪ Reduce impervious surfaces ▪ Disconnect impervious surfaces ▪ Maintain natural depressions and good infiltrating soil ▪ Conserve natural areas ○ LID Site Design <ul style="list-style-type: none"> ▪ Pervious paving materials and/or open grid paving ▪ Green roofs ○ Stormwater Structural Controls Measures <ul style="list-style-type: none"> ▪ Infiltration basins or underground infiltration systems ▪ Bioretention systems ▪ Stormwater capture and use ▪ Biofiltration systems, if infeasible to infiltrate or harvest and use stormwater

Stormwater Management

LACCD and its nine colleges will be designated under the next Small Municipal Separate Storm Sewer System (MS4) Permit [current permit: State Water Resources Control Board (SWRCB) Water Quality Order No.2013-001-DWQ], henceforth referred to as the Small MS4 Permit. The stormwater sizing criteria for LACCD projects not meeting LEED certification is identified in the Small MS4 Permit (SWRCB Order No.2013-001-DWQ), as this is the criteria that LACCD and its nine colleges will be subject to when LACCD is designated under the Small MS4 Permit. Section F.5.g.2.b. of the Small MS4 Permit covers the numeric sizing criteria for structural stormwater retention and treatment systems for Non-Traditional MS4 Permittees. Section F.5.g.2.b. Numeric Sizing Criteria for Storm Water Retention and Treatment states: The Permittees shall require facilities designed to evapotranspiration, infiltrate, harvest/use, and biotreat storm water to meet at least one of the following hydraulic sizing design criteria:

(1) Volumetric Criteria

- a) The maximized capture storm water volume for the tributary area, on the basis of historical rainfall records, determined using the formula and volume capture coefficients in the Urban Runoff Quality Management, WEF Manual of Practice No. 73/ASCE Manual of Practice No. 87 (1998) pages 175-178 (that is, approximately the 85th percentile 24-hour storm runoff event); or
- b) The volume of annual runoff required to achieve 80 percent or more capture, determined in accordance with the methodology in Section 5 of CASQA's Stormwater Best Management Practice Handbook, New Development and Redevelopment (2003), using local rainfall data.

(2) Flow Based Criteria

- a) The flow of runoff produced from a rain event equal to at least 0.2 inches per hour intensity; or
- b) The flow of runoff produced from a rain event equal to at least 2 times the 85th percentile hourly rainfall intensity as determined from local rainfall records.

As the above criteria are likely not to change with the adoption of the new Small MS4 Permit the above criteria should be used for projects not pursuing LEED certification.

The following BMPs are considered preferable for LACCD campuses to meet the criteria identified above for the Small MS4 Permit:

- **LID Site Planning**
 - Reduce impervious surfaces
 - Disconnect impervious surfaces
 - Construct hardscape to drain towards planters
- **LID Site Design**
 - Pervious paving materials and/or open grid paving
 - Green roofs
- **Stormwater Structural Controls Measures**
 - Infiltration basins or underground infiltration systems
 - Bioretention systems
 - Stormwater capture and use
 - Biofiltration systems, if infeasible to infiltrate or harvest and use stormwater

2) Stormwater Design Criteria

REFERENCES	REQUIREMENTS
<ul style="list-style-type: none"> • Stormwater Best Management Practice Design Guide • California LID Web Portal including standard bioretention and pervious pavement design plans http://califronialid.org • California Stormwater Quality Association New Development and Redevelopment Handbook https://www.casqa.org/resources/bmp-handbooks/new-development-redevelopment-bmp-handbook 	<p>Project must obtain the LEED credit for storm water treatment and the requirements below:</p> <p>Implement a stormwater management plan that reduces impervious cover, promotes infiltration, and captures and retains or if infeasible biofilters the stormwater runoff from 90% of the average annual rainfall using acceptable best management practices (BMPs). Biofiltration systems used to biofilter runoff must be capable of removing 80% of the average annual post development total suspended solids (TSS) load based on existing monitoring reports. Total Suspended Solids (TSS) are particles or flocs that are too small or light to be removed from stormwater via gravity settling. Suspended solid concentrations are typically removed via filtration.</p> <p>Use either non-structural stormwater management measures, structural stormwater management measures, or a combination of the two. BMPs are considered to meet these criteria if (1) they are designed in accordance with standards and specifications from a state or local program that has adopted these performance standards, or (2) there exists in-field performance monitoring data demonstrating compliance with the criteria. Structural stormwater management measures must meet the requirements of the Small Municipal Separate Storm Sewer System (MS4) Permit [current permit: State Water Resources Control Board (SWRCB) Water Quality Order No.2013-001-DWQ], see Section 7 for details. Data must conform to accepted protocol (e.g., Technology Acceptance Reciprocity Partnership [TARP], Washington State Department of Ecology) for BMP monitoring.</p> <p>A stormwater management plan must adhere to requirements of the Small Municipal Separate Storm Sewer System (MS4) Permit [current permit: State Water Resources Control Board (SWRCB) Water Quality Order No.2013-001-DWQ].</p> <ul style="list-style-type: none"> • In addition, all stormwater elements of a project may have to adhere to additional regulation including Total Maximum Daily Loads (TMDLs), Endangered Species Act, CWA Section 404 Dredge and Fill Permits, and Section 401 Water Quality Certifications <p>The following BMPs are considered preferable for the campus context:</p> <ul style="list-style-type: none"> ○ LID Site Planning <ul style="list-style-type: none"> ▪ Reduce impervious surfaces ▪ Disconnect impervious surfaces - Construct hardscape to drain towards planters ○ LID Site Design <ul style="list-style-type: none"> ▪ Pervious paving materials and/or open grid paving ○ Stormwater Structural Controls Measures <ul style="list-style-type: none"> ▪ Infiltration basins or underground infiltration systems ▪ Bioretention systems ▪ Stormwater capture and use ▪ Biofiltration systems, if infeasible to infiltrate or harvest and use stormwater <p>These strategies reduce imperviousness and promote retention and filtration, thereby reducing the volume and velocity of stormwater and pollutant loading.</p>

3) Heat Island Reduction - Non-Roof

REFERENCES	REQUIREMENTS
<ul style="list-style-type: none"> • ASTM E 1980 • ASTM E 903 • ASTM E 1918 • ASTM C 1549 • ASTM E 408 • ASTM C 1371 • LEED reference guide 	<ul style="list-style-type: none"> • The project must obtain the LEED credit and meet the requirements below: • Provide any combination of the following strategies for 50% of the <u>site hardscape</u> (including roads, sidewalks, courtyards and parking lots): <ul style="list-style-type: none"> ○ Shade (within 5 years of occupancy) ○ Paving materials with a three-year aged Solar Reflectance Index (SRI) of at least 28 (or initial SRI of at least 33) ○ Open grid pavement system (50% unbound) OR • Any roof used to shade or cover parking must have a three-year aged SRI of at least 32 (or initial SRI of 39 at installation) or be 100% covered by energy generation systems.

4) Heat Island Reduction – Roof

REFERENCES	REQUIREMENTS
<ul style="list-style-type: none"> • Cool Roof Rating Council: www.coolroofs.org • ASTM E 1980 • ASTM E 903 • ASTM E 1918 • ASTM C 1549 • ASTM E 408 • ASTM C 1371 • LEED reference guide 	<ul style="list-style-type: none"> • The project must obtain the LEED credit and the requirement below: • Use roofing materials having a three-year aged Solar Reflectance Index (SRI) equal to or greater than 64 for low sloped roofs, 32 for steep sloped roofs for 100% of the roof surface. • Low sloped roofs and steep sloped roofs as defined by LEED criteria reference guide

5) Light Pollution Reduction

REFERENCES	REQUIREMENTS
<ul style="list-style-type: none"> • LEED Reference Guide • http://www,Darksky.org 	<ul style="list-style-type: none"> • Projects shall install LED luminaires for all campus lighting applications and shall follow the District Facilities standards • Meet the criteria of the International Dark-Sky Association. <ul style="list-style-type: none"> • Include adaptive controls - timers and motion sensors • Only light the exact space and in the amount required for particular tasks • Select fixtures with the International Dark Sky Associations Fixture Seal of Approval (The Fixture Seal of Approval provides objective, third-party certification for luminaires that minimize glare, reduce light trespass, and don't pollute the night sky.) • Do not specify exterior lighting fixtures and applications where light output spills directly into the sky. Do not use uplight FIXTURES in exterior applications. • Do not locate indoor luminaires wherever their main light output exits the building through a window.

6) Water Efficient Landscaping

REFERENCES	REQUIREMENTS
<ul style="list-style-type: none"> • A Guide to Estimating Irrigation Water Needs of Landscape Plantings in California The Landscape Coefficient Method and WUCOLS III • http://ucanr.edu/sites/WUCOLS/ • LEED reference guide 	<ul style="list-style-type: none"> • The project must obtain the LEED credit and meet the following requirements: • Reduce potable water demand used for landscape by a minimum of 50% for the site’s peak watering month. • Incorporate drought-tolerant and native or adaptive plants into the landscape. • Specify drought tolerant plant species only. • Use drip irrigation. • Use harvested greywater or rainwater for irrigation purposes when available. Infrastructure inclusion will be specified on a case by case basis in the program documents. • When installing new landscaping, irrigation controllers are required for all landscaped areas. • Metering of Landscape Water Use-Landscaping over a total of 5000 sf (incongruous) is required to have landscaping water use metered. Meter should be network capable and capable of reporting the data to a web-based application. <p>In order to determine potable water reduction through water efficient landscaping the Landscape Coefficient methodology must be used. This method compares the calculated July irrigation water requirement for the project design with that of a standard design of that same project without the use of water efficient irrigation equipment and the use of native and drought tolerant plants.</p>

7) Building Water Use Reduction – Water Efficient Plumbing Fixtures

REFERENCES	REQUIREMENTS
<ul style="list-style-type: none"> • ASME Standard A112.19.19-2017 • LEED reference guide 	<ul style="list-style-type: none"> • The project must obtain the LEED credit for 30% above base water fixtures and the requirement below: • Utilize low-consumption water closets to reduce the potable water usage for sewage conveyance. Flush fixtures shall not exceed the following criteria: <ul style="list-style-type: none"> ○ Water Closets 1.28 gpf, maximum. Urinals: low flow 0.125 gpf • Utilize low-consumption flow fixtures (lavatories, sinks and showers) in order to reduce potable water consumption. Flow fixtures shall not exceed the following criteria: <ul style="list-style-type: none"> ○ Showers: 1.5 gpm, maximum ○ Kitchen/Break Room Sinks: 1.0 gpm, maximum • Meter water use at the building level for all new construction projects over 3000 sf. For renovation projects, refer to the renovation checklist included in the program for mandatory requirements.

8) Building Water Use Reduction - Water Efficient Appliances for Process Loads

REFERENCES	REQUIREMENTS
<ul style="list-style-type: none"> • www.energystar.gov • LEED reference guide 	<ul style="list-style-type: none"> • For all water consuming process loads, use LEED required allowances and requirements per the LEED reference guide. (version project is pursuing) • The following process loads have to be included at a minimum: • 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 meter, conductivity controllers and overflow alarms, efficient drift eliminators that reduce drift to maximum of 0.0002% of re-circulating water volume for counter flow towers and 0.0005% of re-circulated water flow for cross-flow towers. <ul style="list-style-type: none"> • Clothes washers • Dishwashers • Pre-rinse spray valves • Ice machines • Food Steamers • Combination Ovens

9) Commissioning, Fundamental & Enhanced

LACCD requires fundamental and enhanced commissioning (as defined by the LEED rating system) be conducted for all new construction projects.

- CxA shall report directly to the owner’s representative (WBCxA)
- CxA will at a minimum:
 - Assist with development of the OPR or develop the OPR.
 - Provide at least one commissioning design review of the OPR, BOD, and design documents, prior to mid-construction documents phase.
 - Perform a back check of all subsequent design submissions, to ensure that peer review comments and commissioning comments have been included in the final design.
 - Include commissioning requirements into the construction documents (Division 1 and other specifications)
 - Develop and utilize commissioning plan.
 - Review Contractor submittals for commissioned systems
 - Conduct a review of building’s energy-related systems contractor submittal.
 - Develop building enclosure testing plan
 - Verify the installation and performance of energy consuming systems and thermal envelop meet the OPR and BOD, including:
 - Develop and track startup checkouts/pre-functional checklists to ensure equipment has been installed and hooked up properly, has been pre-functionally started-up, and has had all applicable leak/pressure tests completed.
 - Develop and conduct functional acceptance test procedures to verify that all equipment runs through the controls sequences of operations properly
 - Keep a log of any issues that are observed during the commissioning process, including methods and dates of resolution, to serve as a chronological report of the commissioning process
 - Develop an on-going Commissioning Plan including:
 - Develop a current Facilities Requirements & Operations Maintenance Plan with systems manuals.
 - Functional acceptance test forms
 - Recommended schedule for recommissioning
 - Verify that the requirements for training facilities and operating personnel is completed
 - Complete a final commissioning report

REFERENCES	REQUIREMENTS
LEED Reference Guide	<ul style="list-style-type: none"> ○ The project must obtain the LEED prerequisite and credit and follow all the requirements of the contract related to commissioning. ○ All commissioning requirements and activities will be managed through the Whole building Commissioning Authority. (WBCxA) ○ The programming criteria Architect shall review the OPR during programming (before RFP) to ensure all program requirements listed in the OPR are included in the proposed project. Programming criteria architects cost estimate shall include the OPR requirements. ○ Compliance with OPR during design and construction and at contract completion will be monitored by the CxA for the project.

10) Optimize Building Energy Performance - EUI

REFERENCES	REQUIREMENTS
LEED Reference Guide	<ul style="list-style-type: none"> ○ All projects shall meet or exceed the following energy use indices (EUIs) by building type. Buildings that contain more than one type of space shall calculate the EUI target as a weighted average EUI based on the various uses of the building. ○ The project team shall confirm all energy model assumptions with LACCD, through the Energy model cover sheet (in Appendix) at various stages of design. Items to verify include building plug loads and schedules for building occupancy, lighting, and equipment loads. The appendices of these Standards contain many of the energy model criteria to be used.

ENERGY USE INDEX (EUI) TARGETS

Building Type	Site Energy Use Index (kBtu/sq.ft./yr)
Offices	30
Parking – Above Ground	3
Physical Ed. – Fitness Rooms	50
Physical Ed. – Sports Courts	40
Classroom / Auditorium	30
Food Service	120
Lab / Science	150
Library	30
Performance / Theater	40
Maintenance Shop / Warehouse	10

11) Optimize Building Energy Performance - Whole building Energy Performance Modeling

REFERENCES	REQUIREMENTS
<p>Codes</p> <ul style="list-style-type: none"> • CEC • “Assessment of the Technical Potential for Achieving Net Zero-Energy Buildings in the Commercial Sector”, NREL/TP-550-41957, December 2007 	<ul style="list-style-type: none"> • Design the building to maximize energy savings as compared to Title 24 standards as listed in the LACCD policy. • Confirm all energy model assumptions in the energy modeling cover sheet at SD phase and each subsequent phase if changes occur. • Perform a Whole Building Energy Simulation using EnergyPro, eQuest, or VisualDOE software. Calculate the percentage improvement in proposed building performance compared to baseline building performance per Title 24. • Provide the energy model in native format at milestone deliverable listed below <ul style="list-style-type: none"> -100% Design Development -50% Construction documents -100% Construction Documents (after LEED submission when all LEED required edits have been made to the model) -100% Construction Completion. • Building level metering is required. Refer to the Metering and Demand Response requirements in the contract. • At 11-month warranty walk, the Energy Modeling team is required to compare the buildings actual energy usage against the modeling data provided during design and forward a recommendation to bridge any potential gaps between the model and building performance.

12) Optimize Energy Performance Strategies – Utilize current ANSI/ASHRAE/IES Standard 90.1 for Minimum HVAC Equipment Efficiency and Tables for different types of HVAC Equipment

REFERENCES	REQUIREMENTS
<ul style="list-style-type: none"> • <u>ANSI/ASHRAE/IES Standard 90.1-current version</u> 	<p>All HVAC equipment must meet the minimum efficiency standards outlined in the ASHRAE Standard 90.1-current year. Please reference the appropriate Tables for Minimum Equipment Efficiencies.</p>

13) Optimize Energy Performance Strategies - Air-side Economizers

Often small server rooms and other equipment rooms require 24/7 cooling, but they are located in the interior of buildings, where outside air ductwork is difficult to route. With an integrated design approach, the architects and engineers work together to provide the necessary room locations or provisions for duct routing that allow economizers.

REFERENCES	REQUIREMENTS
<ul style="list-style-type: none"> • Current Building Energy Efficiency Standards, T-24, Part 6, CEC • LEED Reference Guide 	<ul style="list-style-type: none"> • Provide enthalpy economizers for all cooling systems, including but not limited to the following. <ul style="list-style-type: none"> ○ Central air handling units ○ Packaged rooftop units ○ Dedicated cooling units serving electrical rooms, server rooms, and elevator machine rooms with cooling loads greater than 4.5 tons. • Provide adequate filtration for sensitive equipment such as computer rooms, server rooms and laboratories.

14) Optimize Energy Performance Strategies - Demand Control Ventilation

REFERENCES	REQUIREMENTS
<ul style="list-style-type: none"> • Current Building Energy Efficiency Standards, T-24, Part 6, CEC • LEED Reference Guide 	<ul style="list-style-type: none"> • Demand Control Ventilation systems shall meet the requirements of the latest California Energy Code with the following additional requirements. <ul style="list-style-type: none"> ○ DCV is required in classrooms. ○ DCV is required for spaces larger than 500 ft² and with a design occupancy for ventilation of ≥ 25 people per 1,000 ft² of floor area and served by systems with one or more of the following: Economizers, Automatic modulating control of outdoor air dampers, and design outdoor airflow greater than 3,000 cfm. • CO monitoring systems shall be provided for all mechanically-ventilated enclosed parking garages. The ventilation rate shall be at least 0.15 cfm/ft² when the garage is scheduled to be occupied. • Exhaust rates shall not be reduced below 0.05 cfm/ft² during occupied hours.

15) Optimize Energy Performance Strategies - Fan and Pump Energy Use

REFERENCES	REQUIREMENTS
<ul style="list-style-type: none"> • Current SMACNA Standards • LEED Reference Guide 	<ul style="list-style-type: none"> • Ductwork shall be sized for pressure drops no greater than 0.08 in.wg. per 100 ft. • Pipework shall be sized for pressure drops no greater than 4 ft.wg. per 100 ft. • Coils and filters shall be sized for face velocities no greater than 400 fpm. • Single-duct terminal units, including the reheat coil, shall be sized for pressure drops no greater than 0.5 in.wg. <ul style="list-style-type: none"> ○ Exception: laboratories or other similar spaces that are served by Venturi-type air valves for precise air flow control.

16) Optimize Energy Performance Strategies - Motors and Variable Frequency Drives

REFERENCES	REQUIREMENTS
<ul style="list-style-type: none"> Current Building Energy Efficiency Standards, T-24, Part 6, CEC 	<ul style="list-style-type: none"> Motors shall be NEMA Premium Efficiency. Small motors in fan-powered boxes and similar units shall be ECM type. VSDs/VFDs shall have a minimum efficiency of 97% and a minimum fundamental power factor of 0.98 at all speeds. <ul style="list-style-type: none"> Provide VSDs/VFDs for all hydronic systems as described in 2013 CEC Building Energy Efficiency Standards. Balancing valves are not permitted on hydronic system pumps with VFDs.

17) Optimize Energy Performance Strategies - Condensing Boilers

REFERENCES	REQUIREMENTS
<p>Current Building Energy Efficiency Standards, T-24, Part 6, CEC</p>	<ul style="list-style-type: none"> All heating water boilers shall be condensing type with an AFUE rating of 95%. <ul style="list-style-type: none"> Exception: renovation projects where existing heating coils do not have adequate capacity at lower water temperatures. All heating coils shall be sized to provide a return water temperature no greater than 110°F. Neutralization kits shall be provided to neutralize the condensate from the boiler.

18) Optimize Energy Performance Strategies - Outside Air Intake Locations

REFERENCES	REQUIREMENTS
<p>LEED Reference Guide</p>	<ul style="list-style-type: none"> Locate outside air intakes on the north side of the building or in another shaded location. Outside air intakes should be located 20 feet from exhausts and other air polluting factors. Wind direction should be considered when designing these.

19) Optimize Energy Performance Strategies - Building Management System (BMS)

REFERENCES	REQUIREMENTS
<ul style="list-style-type: none"> “VAV System Static Pressure Setpoint Reset”, ASHRAE Journal, June 2007 	<p>All new buildings and major renovations shall implement a direct digital control (DDC) building management system (BMS) that is consistent with the campus standards for system protocol (BACnet, LONworks, etc.) and manufacturers.</p> <ul style="list-style-type: none"> Provide a BMS that meets the performance requirements of Standards for “Measurement & Verification”. Provide a BMS that meets the requirements of Standards for “Education in Building Energy Use”. Provide controls devices and BMS sequencing that provides the following HVAC controls functionality. <ul style="list-style-type: none"> Static pressure reset using trim & respond algorithms for VAV air distribution systems. Supply air temperature reset Night purge ventilation for central air handling units and packaged rooftop units. Capability to implement load shedding and load management.

20) Energy Performance Strategies - Daylighting and Daylight-Responsive Controls

REFERENCES	REQUIREMENTS
	<ul style="list-style-type: none"> • All multi-occupant spaces such as conference rooms, classrooms, and common areas within the building shall incorporate daylight controls. • Commission daylighting controls after furniture is in place.

21) Optimize Energy Performance Strategies - Occupancy Sensors

REFERENCES	REQUIREMENTS
Current Building Energy Efficiency Standards, T-24, Part 6, CEC	<ul style="list-style-type: none"> ○ Refer to Title 24 requirements for Wall or Ceiling Mounted Lighting Sensors ○ Commission occupancy sensors after furniture is in place.

22) Optimize Energy Performance Strategies - Efficient Lighting Systems

REFERENCES	REQUIREMENTS
IESNA Lighting Handbook https://www.ies.org	<ul style="list-style-type: none"> • Use Illuminating Engineering Society of North America recommendations for minimum illuminance levels required for task lighting. • Provide separately controlled ambient and task lighting for all office spaces. • Lamp Efficacy: <ul style="list-style-type: none"> ○ Only Use lamps or luminaires of higher efficacy (>100 lumen/watt). • Projects shall install LED luminaires for all campus lighting applications and shall follow the District Facilities standards. • All exit signs shall be LED-type.

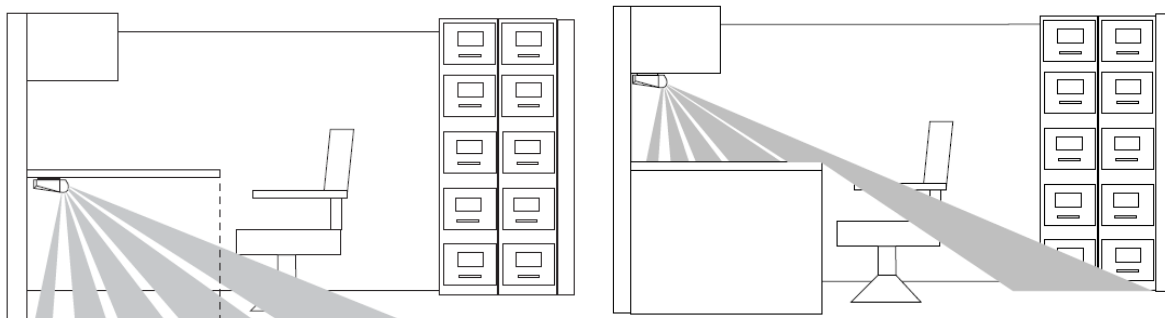
23) Optimize Energy Performance Strategies - Efficient Electrical Distribution

REFERENCES	REQUIREMENTS
	<ul style="list-style-type: none"> • Provide electrical transformers that are 30% more efficient than the TP-1 standard.

24) Optimize Energy Performance Strategies - Plug Load Management

The design team is to coordinate the following items for effective plug load management for all projects.

REFERENCES	REQUIREMENTS
<ul style="list-style-type: none"> • https://www.nrel.gov/docs/fv13osti/54175.pdf 	<ul style="list-style-type: none"> • The location and mounting method of the occupancy sensor shall be coordinated with the architect, furniture vendor and client for proper functioning of the device. • For open office areas, the occupancy sensor shall be furniture mounted. It is preferable to mount it in a location that detects hand motion. The occupancy sensor can also be located below the work surface to avoid unnecessary motion detection. • The occupancy sensor shall be located to avoid coverage of open doors or entrances. • Each user shall be provided with instructions as to how to use and adjust the device to suit the needs of the individual workspace. • Commission occupancy sensors after all furniture is in place. • Refer to the illustrations below for examples of how to mount the occupancy sensor for proper detection. • Plug load management of vending machine -Vendingmizers shall be installed in all vending machines



25) Optimize Energy Performance Strategies - Low Pressure Filters

REFERENCES	DESIGN STANDARDS
<p>ASHRAE Standard 52.2</p>	<ul style="list-style-type: none"> • Provide deep-pleated filters with initial pressure drops for a 24"x24" module at 500 fpm, no greater than <ul style="list-style-type: none"> ○ MERV 10: 0.25 in. wg. ○ MERV 11: 0.31 in. wg. ○ MERV 13: 0.34 in. wg. ○ MERV 14: 0.37 in. wg. ○ MERV 15: 0.40 in. wg. ○ MERV 16: 0.61 in. wg. • Provide electrically-charged filters connected to a permanent electrical power source. <ul style="list-style-type: none"> ○ Electronic filters shall not produce ozone and shall not ionize particles.

26) Optimize Energy Performance Strategies - Energy Efficient Appliances

REFERENCES	DESIGN STANDARDS
<ul style="list-style-type: none"> • www.energystar.gov 	<ul style="list-style-type: none"> • Specify energy-efficient appliances that have earned the EnergyStar rating for the following equipment. <ul style="list-style-type: none"> ○ Computers, monitors, and computer accessories ○ Copiers ○ Printers ○ Televisions ○ Refrigerators ○ Freezers ○ Ice Makers ○ Commercial Kitchen Equipment ○ Vending Machines

27) Material and Resources - Storage and Collection of Recyclables

REFERENCES	DESIGN STANDARDS
<p>LEED Reference Guide</p>	<ul style="list-style-type: none"> • Recycling areas should be designed on each floor of the building and should have collection services for the following (at a minimum): <ul style="list-style-type: none"> ○ Glass ○ Plastic ○ Mixed paper ○ Metals ○ Cardboard ○ Organic waste ○ Include a signage plan that specifies what materials should go into which containers. • Each project should have a building level (maintenance accessible only) trash collection area that is dedicated to the separation and collection of materials for recycling.

28) Material and Resources - Construction Waste Management: 75%

REFERENCES	REQUIREMENTS
<p>LEED Reference Guide</p>	<ul style="list-style-type: none"> • LACCD has a goal of recycling 100% of demolition and construction waste. Project teams shall strive to maximize percentage of waste diverted. • The project must obtain the LEED credit for 75% construction waste recycling. Recycle or salvage at least 75% of construction, demolition and land clearing waste by weight or volume. • 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 OR comingled, hauled off-site and then sorted at the off-site facility.

29) Material and Resources - Recycled Content: 10%

Items to consider for recycled content due to their high recycled content and relative high material cost include:

- Aluminum curtain wall systems
- Aluminum and steel products
- Metal studs
- Carpet
- Ceiling tiles
- Gypsum board
- Insulation
- Asphalt paving
- Reclaimed lumber, timbers and wood finish

REFERENCES	REQUIREMENTS
<ul style="list-style-type: none"> • Green Building Pages: http://www.greenbuildingpages.com Appendix A ISO 14021 • https://www.buildinggreen.com/ 	<ul style="list-style-type: none"> • The project must obtain the LEED credit for 10% recycled content at a minimum. • Steel construction projects must obtain a minimum of 20% recycled content. • Projects should reference LEED for calculation methodology for this requirement.

30) Material and Resources - Regional Materials: 10%

Due to our proximity to the Pacific Ocean, In Los Angeles, a smaller portion of the building materials can be sourced within a 500 mile radius – these include:

- Masonry
- Concrete
- Reinforcing Steel
- Structural Steel
- Glazing
- Casework

REFERENCES	REQUIREMENTS
<ul style="list-style-type: none"> • Green Building Pages: http://www.greenbuildingpages.com/ • Geobytes: http://geobytes.com/CityDistanceTool • https://www.buildinggreen.com/ 	<ul style="list-style-type: none"> • The project must obtain the LEED credit for 10% regional content at a minimum. • Projects with a high level of concrete construction must obtain a minimum of 20% regional content. • Projects should reference LEED for calculation methodology for this requirement

31) Material and Resources - Certified Wood: More than 50% FSC certified wood

REFERENCES	REQUIREMENTS
<ul style="list-style-type: none"> Green Building Pages: http://www.greenbuildingpages.com/ 	<ul style="list-style-type: none"> Use wood-based materials and products, which are certified in accordance with the Forest Stewardship Council’s (FSC) Principles and Criteria, for wood building components. The target to achieve is more than 50% FSC Certified Wood These components include, but are not limited to: <ul style="list-style-type: none"> Structural framing General dimensional framing Flooring Sub-flooring Wood doors Wood finishes Casework Only include materials permanently installed in the project. Furniture excluded from the calculations.

32) Materials & Resources Strategies - Red List Building Materials

REFERENCES	REQUIREMENTS
<ul style="list-style-type: none"> LEED v4 reference guide (For Enhanced V4 and Fundamental V4) International Living Future Institute 	<ul style="list-style-type: none"> This requirement is for new construction projects only- The responsible project team will be required to <u>submit in writing</u> that the project complies with the requirements below at 100% Construction documents and at project completion. For Design/Bid/Build and Lease-leaseback projects, Design team should submit written declaration at the end of design and DBE/Contractor to submit at the end of construction. For Design Build projects, the DBE to submit written declaration at the end of design and at the end of construction. Identify and specify lead and cadmium free products- Solder, flux, pipe, pipe fittings and fixtures must meet the California AB1953 standard for lead content by looking for ANSI approved third party certification. Compliance with the lead- and cadmium-free standard Identify electrical wiring and cabling with lead content less than 300 parts per million. (ppm) Roofing and flashing must not contain any lead. Lead and cadmium free paints must be specified using Green Seal certification for metal-free paints or equivalent source of lead and cadmium free documentation. Design plumbing systems to prevent copper corrosion using the following strategies at a minimum: <ul style="list-style-type: none"> Specify the AST M B828 standard for making capillary joints by soldering of copper and copper alloy tube and fittings for solder joints. Specify correct use of AST M B813 fluxes or use O-ring gaskets and crimping tools for jointing. Use compatible materials (e.g., copper straps for copper pipes) to reduce galvanic corrosion and similar problems. Specify PBT source reduction goals for sub-contractors. Ensure that return lines in a circulating hot water system have the same diameter as the supply lines. Avoid stagnant sections by minimizing direction and size changes.

	<ul style="list-style-type: none"> • Prevent electrical currents by grounding directly to a copper rod driven into the ground. Do not attach a grounding wire to water pipes. • Do not allow galvanized nails to touch copper piping. • Avoid induced stresses, provide enough pipe support, and allow for thermal expansion. • Carefully ream cut ends to reduce turbulence. Unreamed tubing corrodes and fails at a higher rate. • Use stainless-steel piping and components for industrial process water supplies, heat exchangers, chillers, and condensers when operation temperatures exceed 140 degrees F (60 degrees C). • Track specified and purchased materials during construction with a material checklist or PBT tracking form. Check the products' material safety data sheets (MSDS) and manufacturers' documentation before installation to ensure that only qualifying materials are used. At a minimum, review the following: <ul style="list-style-type: none"> • Roofing and flashing • Electrical wiring and cabling • Indoor and outdoor paints • Flux and solder • Pipes, pipe fittings, and fixtures • The following information about each product or material is recommended for inclusion in a tracking tool as defined by SM <ul style="list-style-type: none"> ○ Product type ○ Manufacturer ○ Product name ○ Allowable lead, cadmium, and copper content ○ Actual lead, cadmium, and copper content, with source of data • Materials containing the following products may not be used in building construction: <ul style="list-style-type: none"> ▪ Chlorinated Polyethylene and Chlorosulfonated Polyethylene ▪ Chlorofluorocarbons (CFCs) ▪ Chloroprene (Neoprene) – WITH THE EXCEPTION OF MEP EQUIPMENT ▪ Formaldehyde (Added) ▪ Halogenated Flame Retardants ▪ Hydrochlorofluorocarbons (HCFCs) ▪ Mercury ▪ Petrochemical Fertilizers and Pesticides ▪ Phthalates ▪ Polyvinyl Chloride (PVC) – WITH THE EXCEPTION OF ROOFING AND PIPING ▪ Wood treatments containing Creosote, Arsenic or Pentachlorophenol or added urea formaldehyde ▪ Endangered Wood Species
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33) Materials & Resources Strategies – Furniture, Fixtures & Equipment

REFERENCES	REQUIREMENTS
<ul style="list-style-type: none"> • Green Building Pages: http://www.greenbuildingpages.com • Energy Star: http://www.energystar.gov • Greenguard: http://www.greenguard.org • RoHS: http://www.gov.uk/guidance/rohs-compliance-and-guidance • BIFMA International: http://www.bifma.org/ 	<ul style="list-style-type: none"> • All systems furniture/seating introduced into the project space that has been manufactured or refurbished within one year prior to occupancy shall be: <ul style="list-style-type: none"> ○ GreenGUARD certified (or) ○ Meet EPA's Environmental verification (ETV) standards for volatile organic compounds (VOC) and formaldehyde emissions (or) ○ Meet Business and Institutional Furniture Manufacturers Association (BIFMA) emissions standards. • Domestic appliances and office equipment shall be Energy Star compliant. • Printers and copiers shall be Energy Star compliant in addition to meeting the Restriction of Hazardous Substances Directive (RoHS).

34) Construction IAQ Management Plan - During Construction

REFERENCES	REQUIREMENTS
<ul style="list-style-type: none"> • Sheet Metal and Air Conditioning Contractors' National Association, Inc. (SMACNA) www.smacna.org • Controlling Pollutants and Sources, IAQ Design for Schools; U.S. Environmental Protection Agency: www.epa.gov/iaq/schooldesign/controlling.html • ASHRAE 52.2- Method of Testing General Ventilation air-cleaning devices for removal efficiency by particle size. • Green Seal , GS-11 • Green Seal, GS-36 	<ul style="list-style-type: none"> • The project must obtain the LEED credit for construction IAQ management plan during Construction. • Develop and implement an Indoor Air Quality (IAQ) Management Plan for the construction and pre-occupancy phases of the building per LEED requirements (applicable version)

35) Construction IAQ Management Plan - Before Occupancy

REFERENCES	REQUIREMENTS
<ul style="list-style-type: none"> • SMACNA www.smacna.org • Controlling Pollutants and Sources, IAQ Design for Schools; U.S. Environmental Protection Agency www.epa.gov/iaq/schooldesign/controlling.html • LEED reference guide 	<ul style="list-style-type: none"> • The project must obtain the LEED credit during Occupancy. • Please reference LEED-NC for detailed instructions on flush out procedures and/or IAQ testing protocol.

36) Low Emitting Materials - Adhesives and Sealants, Paints & Coatings, Carpet Systems and flooring systems, Composite Wood and Agrifiber Products

REFERENCES	REQUIREMENTS
<ul style="list-style-type: none"> • Green Seal GS-11 www.greenseal.org/standards/paints.htm • Green Seal GS-03 www.greenseal.org/standards/anti-corrosivepaints.htm • SCAQMD Rule 1113, Appendix A2 • Carpet and Rug Institute Green Label Plus Testing Program • LEED reference guide 	<ul style="list-style-type: none"> • The project must obtain the LEED credit for adhesives and sealants, paints and coatings, carpet and flooring system, composite wood and agrifiber products. • The General contractor to address this requirement for low emitting materials at 5 sub-contractor meetings at a minimum for each year the project is in construction.

37) Indoor Chemical & Pollutant Source Control

REFERENCES	REQUIREMENTS
<ul style="list-style-type: none"> • 2015 Addenda Supplement to ASHRAE Standard 52.2-2012 • LEED reference guide 	<ul style="list-style-type: none"> • The project must obtain the LEED credit. • Only Permanent entryway systems should be installed. Temporary entry mats are not acceptable.

38) Controllability of Systems – Lighting System Controllability

REFERENCES	REQUIREMENTS
<ul style="list-style-type: none"> • LEED reference guide 	<ul style="list-style-type: none"> • The project must obtain the LEED credit. • At workstations within a building project, provide task lighting with workstation-level occupancy sensors in all office spaces. • For conference rooms and other multi-occupant spaces, provide dimming or multi-level lighting control for all multi-occupant spaces

39) Daylight & Views - Daylight: 75% of Spaces

REFERENCES	REQUIREMENTS
<ul style="list-style-type: none"> • LEED Reference Guide • The Art of Daylighting • http://www.wbdg.org/resources/daylighting.php 	<p>The project must obtain the LEED credit for daylighting.</p> <ul style="list-style-type: none"> • The project shall achieve a minimum glazing factor of 2% in a minimum of 75% of all regularly occupied areas. • Regularly occupied spaces include but are not limited to: office spaces, meeting areas, classrooms, laboratories and cafeterias. Areas that should not be considered include support areas for copying, storage, mechanical equipment, laundry and restrooms. • Daylighting should be provided in the following spaces: Classrooms, offices, laboratories, conference rooms, libraries. • Daylighting should be provided in all corridors via clearstory windows or skylights (not preferred by LACCD) for new construction projects.

40) Views: Views in all Critical work spaces

REFERENCES	REQUIREMENTS
<ul style="list-style-type: none"> • LEED Reference Guide • The Whole Building Design Guide, Daylighting: http://www.wbdg.org/resources/daylighting.php 	<p>The project must provide access to views (as defined by the LEED reference guide) in all the following regularly occupied spaces in the project at a minimum:</p> <ol style="list-style-type: none"> 1) All Classrooms 2) All Offices 3) All Conference rooms 4) All Cafeterias 5) All libraries

4. Campus Provided Credits

See Appendix Attachment 8E for Campus Maps that identifies LEED credit documentation completed at each campus.

5. Requirements of renovation projects not meeting the LEED certification threshold

See Appendix Attachment 8A

For renovation projects, look for RFP to include mandatory requirements within this checklist.