

MEETING MINUTES

DATE OF MEETING:	August 1, 2019, 10:00am.		
PROJECT:	Pentucket Regional School District (PRSD)		
PROJECT NO.:	16-0744		
SUBJECT:	Working Group (WG)		
ATTENDEES:			
	Justin Bartholomew (JB)	PRSD Superintendent	Y
	Jonathan Seymour (JS)	Pentucket HS Principal	N
	Ken Kelley (KK)	Pentucket MS Principal	Y
	Wayne P. Adams (WA)	Pentucket	Y
	Greg Labrecque (GL)	Business Manager	Y
	Greg Hadden (GH)	PRSD Facilities Director	Y
	Jon Lemieux (JL)	Vertex	Y
	Steve Theran (ST)	Vertex	Y
	Dena Trotta (DT)	PRSD, School Committee Vice-Chair	N
	Lisa O'Connor (LO)	PRSD, School Committee Chair	N
	Brad Dore (BD)	Dore & Whittier Architects Inc. (D+W)	N
	Jason Boone (JBo)	D+W	Y*
	Josh Hagan (JH)	D+W	Y
	Nick Beck (NB)	D+W	Y
	Giovanna Chaisson (GC)	D+W	Y
	Mark Marshall (MM)	D+W	N
	Margaret Daly	D+W	Y
	Lindsey Woodland (LW)	D+W	N
	Erica Warner	D+W	Y
	María Fernández-Donovan (MFD)*	D+W	Y
This format = members of the group not attending the meeting.			

Agenda:

- Permit Update
- Design:
 - Dining
 - Library
- Salvage List

ARCHITECTS
PROJECT MANAGERS

260 Merrimac Street Bldg 7
Newburyport, MA 01950
978.499.2999 ph
978.499.2944 fax

212 Battery Street
Burlington, VT 05401
802.863.1428 ph
802.863.6955

www.doreandwhittier.com

TEM NO.	NOTES	ACTION BY
	<p>Planning - The Planning Board of Groveland will decide if the project can proceed with a Minor Site Plan Review on August 20. D&W will be notified soon thereafter. West Newbury Planning Board will proceed with full Site Plan Review.</p>	
<p>2.</p>	<p>Design Update: School Building Interiors The public common areas, which include the spaces between the Administration block, the Auditorium areas, the Middle School wing and the High School wing, is referred to as the “connective tissue” and identified by exposed wood structure roof structure and ceilings, glass curtainwall, polished concrete floor, glass guardrails and open spaces. The school academic and administration areas are visible as the brick volumes through the common areas. D&W stated that although effort will be made to keep the areas as clean as possible of systems, the MEP+FP systems are in the process of design and so have yet to be added to the renderings.</p> <p><u>Dining Area</u></p> <ul style="list-style-type: none"> • Dining happens through-out the common areas: D&W will verify seat count for the following meeting. Currently the school serves in 2 seatings. The school can change to 3 seatings, (1 for MS, 2 for HS) each with a third of the school population. The goal is to seat 360-380 per seating. • Potential motorized video screen locations at the main dining area will be studied. Motorized shades will be installed at the curtain wall. • D&W proposed a graphic on the curved Auditorium wall facing the dining area. The design, an abstraction of a Merrimack River map, is proposed to be built with different concrete block colors and textures. The working group reacted very positively to the proposal (“Cool!”) and asked if D&W would consider adding graphics showing the 3 towns and bridges. • D&W met with the acoustic engineer to design the spaces with auditory comfort. Acoustics in the dining areas will be addressed with acoustic baffles suspended from the wood ceiling, acoustic wall panels between the guardrail and the ceiling edge of the mezzanine, acoustic ceiling below the mezzanine. The seating area outside the servery and that on the second floor will have a wood plank ceiling with acoustic batt insulation above which will provide service access. • D&W is going to involve a lighting consultant for this space. <p><u>Library</u></p> <ul style="list-style-type: none"> • The Library has similar interior vocabulary as the Dining Area: <ul style="list-style-type: none"> ○ Exposed roof wood structure, with acoustic baffles. ○ Exterior brick material from the Middle School wing and 	<p>Record</p>

TEM NO.	NOTES	ACTION BY
	<p>the Digital Creation Lab continues into the library interior.</p> <ul style="list-style-type: none"> ○ Glass curtain wall facing the rear courtyard to the west and the corridor to the east. ○ Trusses spanning between the Middle School wing and the Digital Creation Labs ensures that the library space is free of columns for maximum flexibility. ○ 2 teaching walls with projection on north and south walls. ○ Carpet floors. ○ Flexible furniture <ul style="list-style-type: none"> ▪ Library capacity is between 4,500-5,500 volumes on shelves with casters. ▪ Electric floor outlets are being coordinated with the electrical engineer. USB outlets is an option for some locations. <p>Extended Learning Areas</p> <ul style="list-style-type: none"> • The spaces will have the interiors vocabulary similar to the servery dining area: wood slat ceiling, exterior materials brought into the interior to express the building volumes • Graphics and signage are proposed at the corners. The design will protect the wall corners and is a good way to terminate materials. G. Hadden liked the fact that D&W is thinking about protecting the wall corners and asked that specific attention be given at the baseboard level. <p>Corridors</p> <ul style="list-style-type: none"> • Historically schools have tile on the walls for durability. D&W is looking for alternatives that are durable and different and so proposed a linoleum alternative: Full sheets, neutral color, no seams between doors, metal cap to finish the top, baseboard. The group was open to linoleum and asked the following: <ul style="list-style-type: none"> ○ Who owns that work as it is a flooring material to be installed on the walls? D&W will consult with WTR. ○ What is the cost? D&W stated the material is anticipated to cost less than half that of tile. ○ What is the substrate on the walls for its installation? D&W stated that it can be regular GWB and would recommend impact resistant GWB. A smooth surface is important so that the texture does not telegraph through. ○ Maintenance? Same as the floor, except that it is anticipated that less maintenance will be required as the wear and tear is significantly less than when the material is installed on the floor. <p>In conclusion, the Working Group is receptive to linoleum on the corridor walls.</p>	

TEM NO.	NOTES	ACTION BY
	<p>Exposed Ceilings</p> <ul style="list-style-type: none"> • The structure of most spaces in the building need to be fireproofed due to the construction type, except for the high school north wing north of the fire wall. <ul style="list-style-type: none"> ○ D&W showed images of sprayed fireproofing to the group. It is not thought of as attractive yet usually acceptable at utilitarian spaces. ○ Some spaces will have a ceiling, and therefore the fireproofing will not be visible for the occupant. ○ In spaces where no ceiling is planned for: <ul style="list-style-type: none"> ▪ The fireproofing will be visible. It can be painted (black in the case of the Drama Studio and Stage). ▪ An alternative for fireproofing is to paint the steel with intumescent paint, at a higher cost usually used at special spaces. ▪ A ceiling can be added. ○ G. Hadden expressed concerned regarding leaving the fireproofing exposed and visible. In his experience, the fireproofing eventually falls apart, either due to time, water or contact, when equipment needs to be maintained for example. He prefers a ceiling, even if not solid. 	
<p>3.</p>	<p>Lighting D&W is involving a lighting designer on the project for the Library, Dinning Areas and the exterior building lighting.</p> <ul style="list-style-type: none"> • D&W presented a variety of fixture design options for the interior to get feedback from the working group. In general, the working group liked simple and up/down lights. • G. Hadden asked to keep in mind the bulb changing maintenance aspects during light fixture selection process. • G. Hadden suggested light color control. D&W stated that the technology is available at a higher cost and will review this with the lighting consultant. 	
<p>4.</p>	<p>Design Update-Stadium: D&W continues work on the design of the Stadium. In an effort to get feedback from the coaches on the current design:</p> <ul style="list-style-type: none"> • a meeting has been set to meet with the coaches on August 22, 2019, 5:00pm, to discuss locker rooms, lockers, and fields. • Artificial school field locations and contact information was distributed previously to J. Seymour to distribute to the coaches. It is expected that the coaches will visit a few of those fields and talk to their users. Lessons learned, and comments are expected to be heard at the August 22 meeting. 	

TEM NO.	NOTES	ACTION BY
	<ul style="list-style-type: none"> D&W asked PRSD to confirm the target number of spectators for the stadium bleachers. J. Batholomew asked what is the number for North Reading. <i>(After the meeting D&W found out the count for N. Reading stadium bleachers to be over 1,100. D&W also learning that the PRSD coach Dan Thornton stated that a Thanksgiving Pentucket game historically attracts around 400 spectators.)</i> The current design has about 800 occupancy at the Gym bleachers and 800 occupancy at the Stadium bleachers. 	PRSD
5.	PRSD Branding Maria reached out to Joseph Bouffard after Justin emailed both parties and a conversation is scheduled for August 9 th .	Record
6.	User Group Meetings D&W met with Drama, Music and PE Alternative users on July 25. Feedback is being considered for the design.	Record
7.	Salvage List: A walkthrough to record the salvage list needs to be scheduled. It was determined K. Kelly will help schedule it for the Middle School building and J. Seymour will help schedule it for the High School. G. Hadden will provide a salvage list for the Maintenance Department.	D&W, KK, JS, GH
8.	District Offices – Land Acquisition update: J. Bartolomeu reported progress regarding the land acquisition. The shape of the land swap area is being determined. The current Owners want to maintain enough frontage in their property to be able to keep two buildable lots. D&W requested to be kept informed and stated that a little extra space in the back of the building could allow the driveway to be designed less tight to the building.	
9.	Flow Test D&W inquired about the status of the flow test. G. Hadden will communicate with Groveland and provide information to D&W to schedule the flow test as soon as possible.	D&W, GH
10	Sustainability Update: <ul style="list-style-type: none"> D&W received the signed NGRID rebate program papers from PRSD and forwarded them to NGRID. The project is officially participating in the rebate program. D&W will provide a copy of the DD set to DMI for review. D&W confirmed to TGE that the project is in the NGRID rebate program. 	Record

TEM NO.	NOTES	ACTION BY		
	<ul style="list-style-type: none"> • LEED update <ul style="list-style-type: none"> ○ Project registration to be completed. Owner representative is listed as: Jonathan Seymour. ○ The number of parking spots on the site needs to be confirmed for credit LTc8. D&W reported that the current target number is 415, in which case 9 charging stations and 21 LEFE (Low Emitting Fuel Efficient) spots will be assigned. The group expressed desire for a larger number to be able to cover event days. D&W will review how many “event parking spots” can be added. <i>After the meeting J. Bartholomew confirmed that 415 is acceptable, but 435 parking spots would be optimal.</i> (not including event parking days) ○ D&W asked that the fixture type be selected for credit WEc2. Plumbing fixture recommendations from the sustainability consultant below <p style="text-align: center;">PLUMBING FIXTURES for LEED improvement</p> <table border="0" style="width: 100%;"> <tr> <td style="background-color: #ffffcc; padding: 5px;"> Current fixture schedule: Water Closet: 1.28 gpf Urinals: .125 gpf Lavatories: .5 gpm Showerhead: Kitchen Sink: .5 gpm </td> <td style="background-color: #ccffcc; padding: 5px;"> TGE recommendation: Water Closet: 1.28 gpf OR 1.1 gpf Urinals: .125 gpf Lavatories: .35 gpm Showerhead: 1.5 gpm Kitchen Sink: .5 gpm </td> </tr> </table> <p>Option 1: With just the lavatories reduced from .5 gpm to .35 gpm we move from a 28.27% water use reduction (1 point) to a 32.46% water use reduction (2 points).</p> <p>Option 2: If we change just the water closets from 1.28 gpf to 1.1 gpf we move from a 28.27% water use reduction (1 point) to a 35.80% water use reduction (3 points).</p> <p>The question is: Is the school comfortable with 1.1 water closets, or are their maintenance concerns with this? If there are concerns, we would recommend just reducing the lavs to .35 gpm.</p> <p>were emailed to G. Hadden before the Working Group meeting for review. G. Hadden stated that the fact that the pipes supporting the plumbing fixtures will be new, he feels comfortable that the water saving fixtures will function well. After discussing the options, the group decided to proceed with:</p> <ul style="list-style-type: none"> • Change lavatories from .5 gpm to .35 gpm • Change water closets from 1.28gpm to 1.1gpm. <p>D&W will notify The Green Engineer.</p> <ul style="list-style-type: none"> ○ D&W asked confirmation for the credit EAc1 – Monitor based enhanced commissioning for an additional point. 	Current fixture schedule: Water Closet: 1.28 gpf Urinals: .125 gpf Lavatories: .5 gpm Showerhead: Kitchen Sink: .5 gpm	TGE recommendation: Water Closet: 1.28 gpf OR 1.1 gpf Urinals: .125 gpf Lavatories: .35 gpm Showerhead: 1.5 gpm Kitchen Sink: .5 gpm	<p>Record</p> <p>D&W</p> <p>D&W, TGE</p>
Current fixture schedule: Water Closet: 1.28 gpf Urinals: .125 gpf Lavatories: .5 gpm Showerhead: Kitchen Sink: .5 gpm	TGE recommendation: Water Closet: 1.28 gpf OR 1.1 gpf Urinals: .125 gpf Lavatories: .35 gpm Showerhead: 1.5 gpm Kitchen Sink: .5 gpm			

TEM NO.	NOTES	ACTION BY
	<p>G. Hadden previously agreed to targeting this credit fully (6 points) even though MSBA only requires enough for 5 points. This was reported to and approved by the Working Group at the meeting of June 20, 2019. D&W provided hard copies of TGE's Fundamental and Enhanced Commissioning v4 Memo and the Commissioning LEED v4 Documentation Action List to the Vertex, G. Hadden and J. Bartholomew for reference. See copies attached.</p> <p>Vertex will confirm that Jacobs commissioning scope and will follow up with additional scope arrangements if needed.</p> <p>D&W will notify TGE to 6 points to Yes.</p>	<p>D&W TGE</p>
<p>11</p>	<p>CM: D&W reported that WTR will be ready to talk about temporary parking at a late September Working Group meeting. This is scheduled for the August 26th Working Group meeting.</p>	<p>D&W WTR</p>
<p>12</p>	<p>Record Storage Requirements D&W asked for the record storage requirements for the school building. JB stated that most record storage is located at the District Offices. A few file cabinets at the Administration Offices of the school is enough.</p>	<p>D&W</p>
<p>13</p>	<p>Turf at the front fields JB would like to know what would be required to get the front fields next to Rt.113 to be artificial turf.</p> <ul style="list-style-type: none"> • The underlayment of natural vs artificial turf is different. The decision to make a change would need to be done before work starts and would need t allow for time for design. Site work is scheduled towards the end of the construction and therefore there is time to figure it out if there are funds. • What does the MSBA allow within their process? Vertex to confirm. 	<p>Vertex</p>
<p>14</p>	<p>Meetings/presentations ahead The group agreed to Working group meetings every other week.</p> <p>The following meetings are scheduled as:</p> <ul style="list-style-type: none"> • August 15, 2019 – Working Group • August 22, 2019 - coaches' user group meeting • August 29, 2019 – Working Group, Sustainability update • TBD – Salvage list walkthroughs • September 26, 2019 – Working Group, WTR/parking 	<p>All</p>

Attachments: TGE's Fundamental and Enhanced Commissioning v4 Memo
TGE's Commissioning LEED v4 Documentation Action List

The above is our summation of our meeting. If you have any additions and/or corrections, please contact this office for incorporation into these minutes. After 10 days, we will accept these minutes as an accurate summary of our discussion and enter them into the permanent record of the project.

Sincerely,

DORE & WHITTIER ARCHITECTS, INC.
Architects ▪ Project Managers

Maria Fernandez-Donovan AIA, LEED AP BD+C, MCPPO
Project Manager

cc: All attending

MEMORANDUM

Fundamental Commissioning

Intent

To support the design, construction, and eventual operation of a project that meets the owner's project requirements for energy, water, indoor environmental quality, and durability.

Requirements

Commissioning Process Scope:

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

Requirements for exterior enclosures are limited to inclusion in the owner's project requirements (OPR) and basis of design (BOD), as well as the review of the OPR, BOD and project design. NIBS Guideline 3-2012 for Exterior Enclosures provides additional guidance.

- Develop the OPR.
- Develop a BOD

The commissioning authority (CxA) must do the following:

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

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

Commissioning Authority

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

- The CxA must have documented commissioning process experience on at least two building projects with a similar scope of work. The experience must extend from early design phase through at least 10 months of occupancy

- The CxA may be a qualified employee of the owner, an independent consultant, or an employee of the design or construction firm who is not part of the project's design or construction team, or a disinterested subcontractor of the design or construction team.
 - For projects smaller than 20,000 square feet (1 860 square meters), the CxA may be a qualified member of the design or construction team. In all cases, the CxA must report his or her findings directly to the owner.

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

Current Facilities Requirements and Operations and Maintenance Plan

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

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

Enhanced Commissioning

INTENT

To further support the design, construction, and eventual operation of a project that meets the owner's project requirements for energy, water, indoor environmental quality, and durability.

OPTION 1

Path 1: Enhanced Commissioning (3 points)

To achieve Option 1 – Enhanced Systems Commissioning, a project must “complete the following commissioning process (CxP) activities for mechanical, electrical, plumbing, and renewable energy systems and assemblies in accordance with ASHRAE Guideline 0-2005 and ASHRAE Guideline 1.1-2007 for HVAC&R systems, as they relate to energy, water, indoor environmental quality, and durability.”

- Review contractor submittals
- Verify inclusion of systems manual requirements in construction documents
- Verify inclusion of operator and occupant training requirements in construction documents
- Verify systems manual updates and delivery
- Verify operator and occupant training delivery and effectiveness
- Verify seasonal testing

- Review building operations 10 months after substantial completion
- Develop an on-going commissioning plan

Include all enhanced commissioning tasks in the OPR and BOD

Path 2: Monitoring-Based Commissioning (1 additional point)

To achieve this portion of the credit, “monitoring-based procedures must be developed that identify points to be measured and evaluated in order to assess the performance of energy and water consuming systems. The procedures and measurement points must be included in the commissioning plan and address the following”:

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

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

OPTION 2

Envelope Commissioning (2 points)

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

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

Commissioning authority must complete the following:

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

END OF MEMO

LEED-NC v4 Commissioning LEED Documentation Action List

Initially developed 06.13.19

General:

LEED App. Submission Target:

Primary LEED Contact:

LEED Item	Required Action on LEED Online	Status, Comments & Next Steps
<p>Prereq: EAp1 Fundamental Commissioning and Verification</p>	<p>1. Upload Commissioning Authority (CxA) experience.</p> <ul style="list-style-type: none"> a. Provide documentation demonstrating the CxA's appropriate project experience for at least 2 similar projects of comparable size. Include name, certifications, company, and any other relevant information. 	
	<p>2. Confirm the Owner's Project Requirements (OPR) include the following at minimum:</p> <ul style="list-style-type: none"> a. Owner and user requirements b. Environmental and Sustainability goals c. Energy efficiency goals d. Indoor environmental quality requirements e. Equipment and systems expectations f. Building occupant operations and maintenance personnel requirements g. Building envelope requirements 	
	<p>3. Confirm the Basis of Design (BOD) includes the following elements at minimum:</p> <ul style="list-style-type: none"> a. Specific codes, standards, and guidelines considered during design b. Information regarding ambient conditions c. Usage assumptions d. Operations and maintenance assumptions e. Performance criteria from OPR f. Design and operations narratives g. Equipment make and model used as basis of drawings and specifications h. Envelope design criteria 	
	<p>4. Confirm the following commissioning tasks have been completed for all mechanical, electrical, plumbing, and renewable energy systems:</p> <ul style="list-style-type: none"> a. Developed and implemented a Cx plan b. Confirmed incorporation of Cx requirements into the construction documents c. Developed construction checklists d. Developed a system test procedure e. Verified system test execution f. Maintained an issues and benefits log throughout the Cx process g. Prepared a final Cx Process Report 	

LEED-NC v4 Commissioning LEED Documentation Action List

Initially developed 06.13.19

	<ul style="list-style-type: none"> h. Documented all findings and recommendations and reported directly to the project owner throughout the process 	
	<ul style="list-style-type: none"> 5. Provide dates for the CxA review of: <ul style="list-style-type: none"> a. OPR b. BOD c. Construction Documents d. Envelope Design 	OPR: BOD: CDs: Envelope: Note: If someone other than the CxA reviewed the envelope design, upload his/her qualifications.
	<ul style="list-style-type: none"> 6. Complete 'Table: Commissioning Systems Scope' by indicating which of the following subsystems have been commissioned: <ul style="list-style-type: none"> a. Mechanical <ul style="list-style-type: none"> i. HVAC&R equipment ii. HVAC&R controls b. Electrical <ul style="list-style-type: none"> i. Service and Distribution ii. Lighting and lighting controls iii. Daylighting controls c. Plumbing <ul style="list-style-type: none"> i. Domestic hot water ii. Pumps iii. Controls d. Renewable Energy Systems 	Note: If the project includes Renewable Energy systems and is pursuing the EA credit Renewable Energy Production – “Renewable energy systems must be commissioned PRIOR to project occupancy.”
	<ul style="list-style-type: none"> 7. Upload: Commissioning Plan Table of Contents <ul style="list-style-type: none"> a. Plan should include: <ul style="list-style-type: none"> i. Cx Program Overview ii. Information on Cx team iii. Information on Cx process activities 	
	<ul style="list-style-type: none"> 8. Upload: Functional Performance Test <ul style="list-style-type: none"> a. Provide at least one complete functional performance test for each of the applicable systems indicated in 'Table: Commissioning systems scope (mechanical, electrical, plumbing, renewable energy) 	
	<ul style="list-style-type: none"> 9. Upload: Current Facilities Requirements and Operations and Maintenance (O&M) plan Table of Contents <ul style="list-style-type: none"> a. The plan must include: <ul style="list-style-type: none"> i. Sequence of operations for the building ii. Building occupancy schedule iii. Equipment run-time schedules iv. Setpoints for all HVAC equipment v. Set lighting levels throughout the building vi. Minimum outside air requirements vii. Any changes in schedules or setpoints for different seasons, days of the week, and times of day 	

LEED-NC v4 Commissioning LEED Documentation Action List

Initially developed 06.13.19

	<ul style="list-style-type: none"> viii. Systems narratives describing the mechanical and electrical systems and equipment, and envelope. ix. A preventative maintenance plan for the building equipment described in the systems narrative x. A Cx program that includes periodic Cx requirements, ongoing Cx tasks, and continuous tasks for critical facilities 	
	<p>10. Upload: Cx Report Summary</p> <ul style="list-style-type: none"> a. Executive summary to include a list of systems commissioned (and by whom), a summary of issues corrected, and a list of major outstanding/unresolved issues. 	
<p>Credit: EA c Enhanced Commissioning – Option 1 Enhanced Systems Cx</p>	<p>1. Confirm the following tasks have been completed for all mechanical, electrical, plumbing, and renewable energy systems:</p> <ul style="list-style-type: none"> a. Reviewed contractor submittals b. Verified inclusion of systems manual and operator and occupant training requirements in the construction documents c. Verified systems manual updates and delivery d. Verified operator and occupant training and delivery e. Verified seasonal testing f. Reviewed or is scheduled to review building operations 10 months after substantial completion g. Developed an ongoing Cx plan 	<p>Note: If the project includes Renewable Energy systems and is pursuing the EA credit Renewable Energy Production – “Renewable energy systems must be commissioned PRIOR to project occupancy.”</p>
	<p>2. Provide date of Systems Manual delivery</p>	
	<p>3. Upload: Training Plan</p> <ul style="list-style-type: none"> a. Provide a training plan and/or schedule for operator and occupant training, including planned participants and training scope, OR provide a narrative describing the operator and occupant training plan. 	
	<p>4. Upload: Ongoing Cx Plan Table of Contents</p> <ul style="list-style-type: none"> a. Include blank testing materials: functional performance tests for all commissioned as-built systems in the building, as well as an issues log. b. Include direction for testing new and retrofitted equipment c. Include continuous documentation and updating of building operating plan and current facility requirements throughout the building’s lifetime. 	
<p>Credit: EA c Enhanced Commissioning – Option 1, Path 2</p>	<p>1. Confirm the Cx Plan addresses the following as they relate to monitoring-based procedures:</p> <ul style="list-style-type: none"> a. Roles and responsibilities 	

LEED-NC v4 Commissioning LEED Documentation Action List

Initially developed 06.13.19

Monitoring-Based Cx (MBCx)	<ul style="list-style-type: none"> b. Measurement requirements (meters, points, metering systems, data access) c. Points to be tracked, with frequency and duration for trend monitoring d. Limits of acceptable values for tracked points and metered values e. Elements used to evaluate performance f. Action plan for identifying and correcting operational errors and deficiencies g. Training to prevent errors h. Planning for repairs needed to maintain performance i. Frequency of analyses in the first year of occupancy (at least quarterly) 	
	<ul style="list-style-type: none"> 2. Upload: Measurement points <ul style="list-style-type: none"> a. Provide a list of measurements points to be tracked, including frequency and duration for trend monitoring 	
Credit: EAc Enhanced Commissioning – Option 2 Building Envelope Cx (BECx)	<ul style="list-style-type: none"> 1. Confirm EA prerequisite Fundamental Commissioning and Verification tasks were completed for the building’s thermal envelope: <ul style="list-style-type: none"> a. Reviewed OPR b. Reviewed BOD c. Reviewed Construction Documents d. Developed and implemented a BECx plan e. Confirmed incorporation of BECx requirements into the construction documents f. Developed construction checklists g. Developed a system test procedure h. Verified system test execution i. Maintained an issues and benefits log throughout the BECx process j. Prepared a final BECx Process Report k. Documented all findings and recommendations and reported directly to the project owner throughout the process 	
	<ul style="list-style-type: none"> 2. Confirm BECx information is included in: <ul style="list-style-type: none"> a. Cx plan b. Current Facilities Requirements and O&M plan c. Cx Report Summary 	
	<ul style="list-style-type: none"> 3. Provide evidence of performance testing having been conducted 	

LEED-NC v4 Commissioning LEED Documentation Action List

Initially developed 06.13.19

	<p>4. Confirm the following tasks have been completed for the building envelope:</p> <ul style="list-style-type: none">a. Reviewed contractor submittalsb. Verified inclusion of systems manual and operator and occupant training requirements in the construction documentsc. Verified systems manual updates and deliveryd. Verified operator and occupant training and deliverye. Verified seasonal testingf. Reviewed or is scheduled to review building operations 10 months after substantial completiong. Developed an ongoing Cx plan	
--	--	--