Bond Reimbursement and Grant Review Committee Meeting Agenda

March 17, 2021
3:00 pm – 4:30 pm

Audio Teleconference available through free online WebEx application.
Join via Computer -- Meeting Number: 177 081 8785 Password: BRGR317
Join via Phone – 1-650-479-3207 Call-in toll number (US/Canada) Meeting: 177 081 8785 Password: 2747317

Chair: Heidi Teshner

Wednesday, March 17, 2021

Agenda Topics

3:00 – 3:05 PM	Committee Preparation • Call-in, Roll Call, Introductions • Chair's Opening Remarks • Agenda Review/Approval • Past Meeting Minutes Review/Approval
3:05 – 3:15 PM	Public Comment (additional comments related to agenda topics may be solicited throughout the meeting)
3:15 – 3:25 PM	New Member Welcome and Orientation
3:25 – 3:45 PM	BR&GR Workplan Review & Update
3:45 – 3:55 PM	Subcommittee Reports • Model School • School Space • Design Ratios
3:55 – 4:20 PM	Publications • *Construction Standards - Part 3 System Standards (final draft)* • *Construction Standards - Part 2 Design Guidance (progress)* • *Alaska School Facilities Preventive Maintenance Handbook (progress)*
4:20 – 4:30 PM	Committee Member Comments
4:30 PM	Adjourn

Bond Reimbursement and Grant Review Committee

As of: March 1, 2021

Member	Appointed	Re-appointed	Term Expires
Heidi Teshner — Chair Commissioner or Commissioner's Designee	Commissioner's Designee	--	--
Vacant House of Representatives Member	Appointed by Speaker	--	--
Vacant Senate Member	Appointed by President	--	--
Randy Williams Professional Degrees & Experience in School Construction	03/01/2019		02/28/2023
Dale Smythe Professional Degrees & Experience in School Construction	03/01/2017	03/01/2021	02/28/2025
James Estes Experience in Urban or Rural School Facilities Management	03/01/2019		02/28/2023
Kevin Lyon Experience in Urban or Rural School Facilities Management	03/01/2021		02/28/2025
David Kingsland Public Representative	03/01/2019		02/28/2023
Branzon Anania Public Representative	03/01/2021		02/28/2025

Members appointed by commissioner unless noted. See AS 14.11.014 and 4 AAC 31.087.

Bond Reimbursement & Grant Review Committee

New Member Orientation

Welcome to the Bond Reimbursement and Grant Review committee. You have been appointed by the Commissioner of the Department of Education and Early Development (DEED) to fulfill a specific term of office because it was felt you can make a difference in the lives of public school children in Alaska by shaping the facility learning environment.

The committee consists of six members appointed by the Commissioner of DEED for overlapping terms, based on specific criteria. See AS 14.11.014. There are two legislative members, appointed by the Senate President and the Speaker of the House. A designee of the Commissioner serves also.

Acronyms

A4LE: Association for Learning Environments
(formerly CEFPI: Council of Educational Facility Planners International)

ASHRAE: American Society of Heating, Refrigerating and Air-Conditioning Engineers

BRGR: Bond Reimbursement and Grant Review Committee

CIP: Capital Improvement Project

DEED: Department of Education and Early Development

PM: Preventive Maintenance

SBOE: State Board of Education and Early Development

Contents

Committee History

The Alaska State Legislature established the nine member Bond Reimbursement and Grant Review Committee under AS 14.11.014 in 1993 by Sec. 9, Ch. 78, SLA1993 (CSSB 7(FIN) am H).

The committee's first meeting was convened on February 15, 1994. A member history is attached.

Committee Duties

Following is an overview summary of committee duties established in AS 14.11.014(b), followed by a detailed tabulation of statutory responsibilities and how those have been implemented.

Annual Duties

Review DEED CIP List Priorities (Initial: November 5; Reconsideration: December 15; Final: January-February)
Establish [Revise] Grant Application Form
Establish [Revise] Project Ranking Method

At Will Duties

Make Recommendations to the State Board of Education & Early Development for Grants and Bond Projects
Develop School Construction Criteria
Review/Analyze Existing Prototypically Designs
Review/Recommend Changes in Grant & Bond Project Approval Processes to the State Board of Education & Early Development
Set Energy Efficiency Standards

Tabulated Duties

Statutory Language	Implementation Practices & Status
(1) review the department's priorities among projects for which school construction grants are requested;	Annually review the DEED initial (Nov. 5) CIP priority lists. Receive a department briefing regarding the preparation of the list including comparative statistics and any issues in its preparation.
(2) make recommendations to the board concerning school construction grants and make recommendations to the commissioner concerning projects for which bond reimbursement is requested;	Provide information on current funding needs for school capital projects and make recommendations through the Commissioner to the State Board for school construction and major maintenance grant funds. Historically, the committee has not been active in recommendations on debt reimbursement projects.

Statutory Language	Implementation Practices & Status
(3) develop criteria for construction of schools in the state; criteria developed under this paragraph must include requirements intended to achieve cost-effective school construction;	A Construction Standards subcommittee was functioning from 2000 – 2004. Three subcommittees active from 2017 to present. Comprehensive construction criteria has not been developed to a point of implementation.
(4) analyze existing prototypical designs for school construction projects;	Committee work on prototypes has been periodic since 1995 and includes an adopted *Guidelines for School District Us of Prototypes* (2004).
(5) establish a form for grant applications;	First application form was approved in April 1994 and has been revised and updated annually since.
(6) establish a method of ranking projects;	First scoring rubric was approved in April 1994 and has been revised and updated annually since.
(7) recommend to the board necessary changes to the approval process for school construction grants and for projects for which bond reimbursement is requested;	Regulations needed to support the CIP application and approval have been developed through the committee and submitted by the department to the State Board.
(8) set standards for energy efficiency for school construction and major maintenance to provide energy efficiency benefits for all school locations in the state and that address energy efficiency in design and energy systems that minimize long-term energy and operating cost.	In December 2012, the committee recommended regulation language to the State Board adopting ASHRAE 90.1-2010. Following State Board action, this regulation (4 AAC 31.014(a)(7)) became effective June 2013. In 2019, the committee recommended adopting the ASHRAE 90.1-2016 update, which became effective December 2020.

Meetings

The committee traditionally meets in April and December. Extra work session meetings have occurred as needed for special projects throughout the remainder of the year. Tentative future meetings dates may be set at the end of a committee meeting; committee members are polled approximately two months in advance of an anticipated meeting for specific date and times.

The length of the meeting can vary from half a day to two days depending on the topics on the agenda; meetings are typically a single day or less. Supplementary work session meetings are typically two-hour teleconferences.

In-person meetings are often scheduled in close conjunction to State Board of Education & Early Development meetings, A4LE (formerly CEFPI), or Alaska Association of School Business Officials (ALASBO), if applicable, so meeting participants have the option of attending both events.

Traditionally, the committee has met in Juneau for the April meeting and in Anchorage for the December meeting. Travel authorization is always subject to current fiscal guidelines. The department has robust capacity to host meetings using the internet and teleconference. The standard platform for these meetings is WebEx.

Travel

The department will pay, and typically arrange, for transportation and lodging required for Commissioner-appointed members to attend in-person meetings.

Your Responsibilities

When you travel for the state on state-approved business, all original receipts (scans okay) must be turned in to the department to receive reimbursement. Meal receipts are the exception.

Per Diem

There is an established state per diem rate of $60 per day, travel days receive 75% reimbursement to this rate ($45). There is no need to keep receipts. Any meals that are provided to you should be noted, the amount for the meal will be withheld from your final reimbursement.

Lodging & Transportation

Typically the state will have a card on file at the hotel to pay for the room; a personal card should be used for any incidentals. Upon checkout, provide the hotel room receipt to the department.

The department will pay for taxi/shuttle charters when used to go to and from the meeting and your lodging and/or airport (tips are not reimbursable). The department will pay for parking when it is related to your meeting. This includes airport parking if you leave your vehicle at the airport for your trip. Please turn in your receipts for all ground transportation and parking expenses incurred.

To claim mileage expenses, please provide a printout of a map with the distance traveled.

Reimbursement

Any committee member that needs travel reimbursement will need to submit necessary paperwork in order to process their reimbursement. Receipts should be provided within 5 business days after travel return date.

Agenda Preparation/Meeting Decorum

Meeting Agenda

Agendas are drafted for each BRGR Committee meeting by department Facilities staff and are provided to committee members approximately one month prior to the scheduled meeting. Members can request modifications to the draft agenda through the chair until meeting packets are finalized and provided by the department. After meeting packets have been distributed, modifications to the agenda may occur when the agenda is reviewed and accepted at the beginning of each meeting. In general, agenda items fall under the categories of routine, regular, and special.

Routine Items

Routine agenda items are those that appear on every agenda. These include: agenda review, approval of minutes, public comment, and reports. Reports would include those from the department, from subcommittees, or from outside entities as requested by the committee.

Regular Items

Other agenda items are planned on a yearly basis, as follows:

December - Department Briefing includes CIP, Preventive Maintenance (PM) update, and is also typically when CIP recommendations are made to the State Board in advance of Board's March/April meeting (lists are presented, and acceptance assumed unless specific motion is made).

April - Department Briefing includes CIP application for next cycle approved; CIP appeal decisions reviewed/final lists presented; legislation updates (as applicable).

Publications – In keeping with the department's update cycle, publications are scheduled for committee review, action, and approval when necessary. Between two and four publications are updated each year. As a result, it is common to have one or more publications included in every committee agenda. The department's *Program Demand Cost Model for Alaskan Schools* is updated annually. The committee has, for now, assumed the role of technical expert in review of this tool's Escalation Model School element. A presentation by the department's cost consultant is made to the committee at each April meeting.

Special Items

When a need for specific action or research on a topic arises committee assignments are made, or assistance from the department is requested, to prepare materials. When sufficiently developed that topic is added to an upcoming agenda. The department, when it recognizes a need, may also place a special item on an agenda under the chair's discretion. Special agenda items are normally supported with a briefing paper (see Committee Packets following).

Open Meetings

All business of the committee is conducted in open meetings in accordance with applicable law. Meetings are recorded and minutes prepared.

Attendance

It is expected that all committee members appointed by the Commissioner will be present at scheduled committee meetings. If a committee member cannot attend a meeting, they should inform the chair or Facilities staff. This is important to maintain a quorum (5 members minimum).

If a committee member finds that he/she cannot continue with his/her duties as a committee member, he/she should send a notice of his/her resignation to the Commissioner and copy the chair.

Committee Protocol

The BRGR generally functions at an informal level unless specific action is needed to approve an item. The committee has no by-laws but generally follows Roberts Rules of Order for conducting a meeting. The Commissioner (or designee) will be the standing chair for the committee and will guide the meeting following the approved agenda. The chair may designate an acting chair or the committee may take action to appoint one. The chair may make motions, speak to motions, and vote on motions.

Committee Actions

When specific action is needed, such as approval of a publication or CIP application element, motions are made and may be approved by either a roll-call vote or by unanimous consent. In some instances, formal action may be needed in order to determine if a certain direction or recommendation meets the will of the committee. Any member may make such a motion at any time. The chair may call for a motion on any matter if judged to be appropriate or necessary.

- General form of a motion
  "I move that the Committee
  [state desired action (recommend / approve / adopt / disapprove)]
  [insert topic of motion]."

A "second" is required to support the motion and move it on for a vote. Any member may second a motion.

After the motion and second, the topic is open to additional discussion prior to a roll-call vote or adoption by unanimous consent.

Votes on motions can be taken in any manner prescribed under normal rules of order (acclamation, raised hand, etc.). Any member may call for a roll-call vote when the question is called on a motion. A majority of the quorum present approves a motion.

Committee Action Flow:

1. Presentation of topic for committee action
2. Committee questions and discussion
3. Call for a motion / motion
4. Motion seconded
5. Committee discussion on the specific motion
6. Amendment(s) if any to the motion
7. Call for vote of members present or adoption by unanimous consent

Public Input

There is typically a period of public comment as an agenda item at regular meetings. The chair will guide this formal process as needed. The chair may also recognize and solicit comment from any non-member present, whether department staff or other entity, at any time during the course of the meeting.

Committee Packets

Department staff prepares the committee packet. Electronic packets are e-mailed to members 5-10 workdays prior to scheduled committee meeting. Following a two-day review period to give the committee an opportunity to address agenda items or need for additional information, the agenda and packet are then posted to the BRGR website.

Typical Packet Materials

Draft Minutes

Minutes of prior meeting for committee approval.

Department Briefing

Updates are provided on normal department activities that may be of interest to the committee including preventive maintenance updates, reports of school capital project funding (debt and grant project funding approvals and amounts), status of department publications, updates on pertinent legislation, status of 4 AAC 31 regulation updates, Facilities section staffing changes, or information for special committee projects.

Subcommittee Reports

When subcommittees have been established by the BRGR, reports providing the status of subcommittee activities will be solicited from subcommittee chairs and included in each meeting packet as provided.

Occasional Packet Materials

CIP Application

The department annually presents proposed changes and updates to the prior year's CIP application for committee approval. As mentioned previously, the BRGR has a statutory responsibility to establish a form for CIP applications, and to establish a method for ranking projects. This duty to establish also extends to revising the application and ranking methods when needed—typically every year.

Topical Briefing Papers

A briefing paper format is used to bring specific topical items to the committee's attention. Topics have included the CIP process, construction standards, project delivery, preventive maintenance and facility management, prototype schools, school space, regulations and statutes, and equipment and technology. The department has a repository of past briefing papers in these subject areas available to committee members as needed for historical reference. Occasionally, subcommittees of the BRGR may need to prepare topical briefing papers. A template is available for use from the department.

Publications

The department currently manages 13 publications that provide guidance and tools for district use in the development and execution of school capital projects. Seven of these publications align with statutory duties of the BRGR Committee to establish an application process or set cost-effective school construction standards. The remaining six publications deal with the execution of funded projects, which is not a direct responsibility of the committee. It is the goal of the department to review each publication on a five-year rotation and either update the publication or discontinue it. By established protocol, the department uses the committee process (i.e., published agendas, open meetings, member input) for all publication updates. However, the department only seeks committee approval of the seven publications aligned with BRGR responsibilities prior to issuance. A list of department publications is attached.

Committee Website

The committee web page (education.alaska.gov/facilities/BRGR) is part of the Department's Facilities section website and is maintained by Facilities staff. It provides member information, meeting dates and locations, meeting agendas, packets, and minutes, both current and archived; and committee-adopted guidelines and reports.

Other portions of the Facilities website contains related information on the Capital Improvement Project application, priority lists, preventive maintenance program, and publications.

Alaska Administrative Code (Regulations)

4 AAC 31.087. Terms and conditions of office for members of bond reimbursement and grant review committee

(a) A person seeking appointment under AS 14.11.014(a)(1) - (3) to the committee may submit a resume and letter of interest to the commissioner.

(b) A term of office under AS 14.11.014(a)(1) - (3) for a member of the committee begins on March 1 and expires on the last day of February.

(c) Members of the committee appointed under AS 14.11.014(a)(1) - (3).

(1) shall serve overlapping four-year terms commencing on March 1 following the date of the member's appointment; and

(2) may serve not more than two consecutive terms.

(d) The commissioner's designee and the six committee members selected by commissioner under AS 14.11.014(a)(1) - (3) serve at the pleasure of the commissioner notwithstanding a committee member's term of office under (c) of this section.

(e) A vacancy on the committee occurring during a term of office is filled in the same manner as the original appointment and is filled for the balance of the unexpired term.

(f) Five members of the committee constitute a quorum for the transaction of business. The vote of a majority of the members present at a meeting of the committee at which a quorum is present is necessary for any action taken by the committee.

(g) A committee member serving under AS 14.11.014(a)(1) - (3) on September 20, 2015 may be appointed to a term of office established under this section. A committee appointment under AS 14.11.014(a)(1) - (3) in effect on September 20, 2015 continues until the last day of the following February. A term of office established under this section takes effect on March 1 following September 20, 2015. Members of the committee initially appointed under this section and AS 14.11.014(a)(1) - (3) will be appointed for the following terms:

(1) the longer-serving member in each category under AS 14.11.014(a)(1), (2), and (3) will be appointed for a three-year initial term;

(2) the other three members will be appointed for a one-year initial term.

(h) In this section, "committee" means the bond reimbursement and grant review committee established under AS 14.11.014.

BR&GR Member History

Month/Yr	DEED Designee	Senate Appointee	House Appointee	Professional Degree #1	Professional Degree #2	Urban/Rural School Mgt #1	Urban/Rural School Mgt #2	Public Representative #1	Public Representative #2
Sep 1993	Duane Guiley	Randy Phillips	Con Bunde	Harley Hightower	Mike Franks	Len Mackler	Twyla Barnes	Dee Hubbard	Don Gilman
May 1994	Duane Guiley	Randy Phillips	Con Bunde	Harley Hightower	Mike Franks	Len Mackler	**Frank Hill**	Dee Hubbard	Don Gilman
Nov 1995	Duane Guiley	Gail Phillips	Vacant	Harley Hightower	Mike Franks	Len Mackler	Frank Hill	Dee Hubbard	Don Gilman
Jan 1996	**Rick Cross**	?	Vacant	Harley Hightower	Mike Franks	Len Mackler	Frank Hill	Dee Hubbard	Don Gilman
May 1996	Rick Cross	?	Vacant	Harley Hightower	Mike Franks	Len Mackler	Frank Hill	Dee Hubbard	**Vacant**
Dec 1996	Rick Cross		Vacant	Harley Hightower	Mike Franks	Len Mackler	Frank Hill	Dee Hubbard	**Sam Towarak**
Mar 1997	Rick Cross	Vacant	Jeanette James	Harley Hightower	Mike Franks	Len Mackler	Vacant?	Dee Hubbard	Sam Towarak
Aug 1997	**Mike Morgan**	Gary Wilken	Jeanette James	Harley Hightower	Mike Franks	Len Mackler	Vacant?	Dee Hubbard	Sam Towarak
Feb 1998	Mike Morgan	Gary Wilken	Jeanette James	Harley Hightower	Mike Franks	Len Mackler	Vacant?	Dee Hubbard	Sam Towarak
Jun 1999	Mike Morgan	Gary Wilken	Jeanette James	Harley Hightower	Mike Franks	Len Mackler	Vacant?	Dee Hubbard	Sam Towarak
Nov 1999	Eddy Jeans	Gary Wilken	Jeanette James	Harley Hightower	Mike Franks	Len Mackler	**Jim Kohl**	Dee Hubbard	Sam Towarak
Feb 2000	Rick Cross	Gary Wilken	Jeanette James	Harley Hightower	Mike Franks	Len Mackler	Jim Kohl	Dee Hubbard	Sam Towarak
Aug 2000	**Eddy Jeans**	Gary Wilken	Jeanette James	Harley Hightower	**Wayne Jensen**	**Patrick Hickey**	Jim Kohl	Dee Hubbard	Sam Towarak
Sep 2001	Eddy Jeans	Gene Therriault	Jeanette James	Harley Hightower	Wayne Jensen	Patrick Hickey	Jim Kohl	Dee Hubbard	Sam Towarak
Dec 2001	Eddy Jeans	Gene Therriault	Jeanette James	Harley Hightower	Wayne Jensen	**Bob Tucker**	Jim Kohl	Dee Hubbard	Sam Towarak
Apr 2002	Eddy Jeans	Gene Therriault	Jeanette James	Harley Hightower	Wayne Jensen	Bob Tucker	Vacant	Dee Hubbard	Sam Towarak
Oct 2003	Eddy Jeans	Gene Therriault	Kevin Meyer	Harley Hightower	**Mark Langberg**	Bob Tucker	**Carl John**	Dee Hubbard	**Thomas Richards**

Month/Yr	DEED Designee	Senate Appointee	House Appointee	Professional Degree #1	Professional Degree #2	Urban/Rural School Mgt #1	Urban/Rural School Mgt #2	Public Representative #1	Public Representative #2
Jul 2004	Eddy Jeans	Gene Therriault	Kevin Meyer	Harley Hightower	Mark Langberg	Bob Tucker	Carl John	Dee Hubbard	Thomas Richards
Mar 2007	Eddy Jeans	Lyman Hoffman	Mike Hawker	Harley Hightower	Mark Langberg	Bob Tucker	Carl John	Dee Hubbard	Thomas Richards
Sep 2009	Eddy Jeans	Lyman Hoffman	Vacant	**Mary Cary**	Mark Langberg	Bob Tucker	Carl John	Dee Hubbard	Thomas Richards
Dec 2009	Eddy Jeans	Lyman Hoffman	Vacant	Mary Cary	Mark Langberg	Bob Tucker	Carl John	**Vacant**	**Vacant**
Apr 2010	Eddy Jeans	Lyman Hoffman	Vacant	Mary Cary	Mark Langberg	Bob Tucker	Carl John	**Doug Crevensten**	**Dean Henrick**
Jan 2011	**Elizabeth Nudelman**	Vacant	Pete Peterson	Mary Cary	Mark Langberg	Bob Tucker	Carl John	Doug Crevensten	Dean Henrick
Jan 2012	Elizabeth Nudelman	Vacant	Pete Peterson	Mary Cary	Mark Langberg	Bob Tucker	Carl John	Doug Crevensten	Dean Henrick
Jan 2013	Elizabeth Nudelman	Mike Dunleavy	Vacant	Mary Cary	Mark Langberg	Bob Tucker	Carl John	Doug Crevensten	Dean Henrick
Feb 2015	Elizabeth Nudelman	Anna MacKinnon	Liz Vazquez	Mary Cary	Mark Langberg	Bob Tucker	Carl John	Doug Crevensten	Dean Henrick
Nov 2015	Elizabeth Nudelman	Anna MacKinnon	Liz Vazquez	Mary Cary	Mark Langberg	Bob Tucker	Vacant	Doug Crevensten	Dean Henrick
Oct 2016	Elizabeth Nudelman	Anna MacKinnon	Liz Vazquez	Mary Cary	Mark Langberg	Bob Tucker	Vacant	Doug Crevensten	Vacant
Feb 2017	**Elwin Blackwell**	Vacant	Vacant	Mary Cary	Mark Langberg	Bob Tucker	**Bill Murdock**	Doug Crevensten	**Don Hiley**
Mar 2017	**Heidi Teshner**	Anna MacKinnon	Sam Kito III	**Dale Smythe**	Mark Langberg	Bob Tucker	Bill Murdock	Doug Crevensten	Don Hiley
Aug 2018	Heidi Teshner	Anna MacKinnon	Sam Kito III	Dale Smythe	Mark Langberg	Bob Tucker	**Vacant**	Doug Crevensten	Don Hiley
Mar 2019	Heidi Teshner	Vacant	Tammy Wilson	Dale Smythe	**Randy Williams**	**Jim Estes**	**William Glumac**	**David Kingsland**	Don Hiley
Apr 2019	Heidi Teshner	Cathy Giessel	Tammy Wilson	Dale Smythe	Randy Williams	Jim Estes	William Glumac	David Kingsland	Don Hiley
Jan 2020	Heidi Teshner	Cathy Giessel	Vacant	Dale Smythe	Randy Williams	Jim Estes	William Glumac	David Kingsland	Don Hiley
Dec 2020	Heidi Teshner	Cathy Giessel	Dan Ortiz	Dale Smythe	Randy Williams	Jim Estes	William Glumac	David Kingsland	Don Hiley

BRGR Member History & Background Info

Name	Position	Background	Approx Appointmt	Approx Resignation
Barnes, Twyla	Urban/Rural School Construction	Founding Director, SERRC	Sep 1993	May 1994
Blackwell, Elwin	DEED Designee	DEED Acting Director of School Finance (SF Manager)	Nov 2016	Feb 2017
Bunde, Con	House of Representatives	Representative [Anchorage]	Sep 1993	May 1995
Cary, Mary	Professional Degree	Project Manager [ASD]	Jun 2009	Feb 2017
Crevensten, Doug	Public	Retired Educator [FNBSD]	Mar 2010	Feb 2019
Cross, Rick	DEED Designee	DEED Deputy Commissioner	Jan 1996	Aug 1997
Dunleavy, Mike	Senate	Senator [Wasilla]	Jan 2013	Jan 2015
Estes, James "Jim"	Urban/Rural School Construction	Facilities Director [MSBSD]	Mar 2019	current
Franks, Mike	Professional Degree	Project Manager [LKSD and ASD]	Sep 1993	Jun 2000
Giessel, Cathy	Senate	Senator [Anchorage]	Apr 2019	current
Gilman, Don	Public	Mayor [KPB]	Sep 1993	May 1996
Glumac, William	Urban/Rural School Construction	Facilities Director [NSBSD]	Feb 2019	current
Guiley, Duane	DEED Designee	School Finance Director	Sep 1993	Dec 1995
Hawker, Mike	House of Representatives	Representative [Anchorage]	Mar 2007	Jun 2009
Henrick, Dean	Public	Facilities Director [KGBSD	Mar 2010	Sept 2016
Hickey, Patrick	Urban/Rural School Construction	Asst Superintendent [KPBSD]	Jul 2000	Sep 2001
Hightower, Harley	Professional Degree	Architect [Anchorage]	Sep 1993	Sep 2009
Hiley, Don	Public	SERRC Project Manager [Juneau]	Mar 2017	current
Hill, Frank	Urban/Rural School Construction	Superintendent [L&PSD]	May 1994	Feb 1997
Hoffman, Lyman	Senate	Senator [Bethel]	Mar 2007	Jan 2011
Hubbard, Dee	Public	DCED Retired; Leg. Staffer [Anchorage]	Sep 1993	Nov 2009
James, Jeanette	House of Representatives	Representative [Anchorage]	Sep 1993	Oct 2003
Jeans, Eddy	DEED Designee	DEED School Finance Manager	August 2002	April 2010
Jensen, Wayne	Professional Degree	Architect [Juneau]	Jul 2000	May 2002
John, Carl	Urban/Rural School Construction	SERRC, LYSD Capital Projects Director	Oct 2003	Oct 2015
Kingsland, David	Public	Educator, Principal [BSSD, NWABSD, Seward]	Mar 2019	current
Kohl, Jim	Urban/Rural School Construction	Facilities Manager, LKSD	Nov 1999	April 2002
Kito III, Sam (Rep.)	House of Representatives	Representative [Juneau]; former DEED Facilities Manager	Feb 2017	Jan 2019
Langberg, Mark	Professional Degree	P.E. [Anchorage]	Jul 2002	Feb 2019
MacKinnon, Anna	Senate	Senator [Eagle River]	Feb 2015	Jan 2019
Mackler, Len	Urban/Rural School Construction	Facilities Director [FNBSD}	Sep 1993	Jul 1999
Meyer, Kevin	House of Representatives	Representative [Anchorage]	Sep 2003	Jan 2007
Morgan, Mike	DEED Designee	DEED Facilities Manager	Aug 1997	Jul 1999
Murdock, William "Bill"	Urban/Rural School Construction	LKSD Project Manager	Dec 2016	Aug 2018
Nudelman, Elizabeth	DEED Designee	DEED Director of School Finance & Facilities	Jul 2010	Nov 2016

Name	Position	Background	Approx Appointmt	Approx Resignation
Ortiz, Dan (Rep.)	House of Representatives	Representative [Ketchikan]	Dec 2020	current
Peterson, Pete	House of Representatives	Representative	Jan 2011	Jan 2013
Phillips, Randy	Senate	Senator [Anchorage]	Sep 1993	Nov 1995
Richards, Thomas	Public	(associated with Fairbanks SD)	Jun 2002	Jun 2009
Smythe, Dale	Professional Degree	Architect [Anchorage]	Mar 2017	current
Teshner, Heidi	DEED Designee	DEED Director of Admin Services/ Finance & Support Services	Mar 2017	current
Therriault, Gene	Senate	Senator [Fairbanks]	June 2001	Jan 2007
Towarak, Sam	Public	Assistant Superintendent, BSSD	Dec 1996	May 2002
Tucker, Robert “Bob”	Urban/Rural School Construction	KIBSD/KIB	Aug 2001	Feb 2019
Vazquez, Liz	House of Representatives	Representative	Feb 2015	Jan 2017
Wilken, Gary	Senate	Senator	Aug 1997	Jan 2001
Williams, Randy	Professional Degree	Engineer [Anchorage]	Mar 2019	current
Wilson, Tammy	House of Representatives	Representative [North Pole]	Mar 2019	Jan 2020

State of Alaska **Department of Education & Early Development**
Bond Reimbursement & Grant Review Committee

B R G R W o r k P l a n
B R I E F I N G P A P E R

By: Tim Mearig
Facilities Manager

Phone: 465-6906

For: Bond Reimbursement & Grant Review Committee

Date: March 10, 2021

File: G:\SF Facilities\BR_GRCom\Papers\BRGR Workplan BP 2021-03.docx

Subject: BRGR Work Plan

Background

There are two documents that help the department and committee members structure and plan committee activities: 1) BRGR Master Work Plan and 2) BRGR Yearly Work Plan. These documents provide clear goals so that committee meetings are effective and advance the committee's duties.

Although the department guides the general development of the master and yearly work plans, due to being involved in the day-to-day tasks, committee members are encouraged to take an interest in suggesting and presenting on any topic within the committee's purview.

Master Work Plan

The Master Work Plan provides a long-range scope of activities. Topics that committee members may express as potentially useful or interesting to look into are noted for inclusion. These future projects are kept for evaluation and potential inclusion on the yearly work plan. The master work plan is typically presented and reviewed during new member orientation and when major special projects are completed, in order to line up the next undertaking.

Yearly Work Plan

The Yearly Work Plan is the guide by which the committee and the department plan tasks for the upcoming year. Current projects are detailed with specific tasks, responsibilities, and timelines. These tasks inform meeting scheduling and agendas. The yearly work plan is a fluid document, and tasks and timelines may be shifted as needed upon review at any meeting.

Organization

The work plans are structured by topic as defined by the committee duties set out in statute.

1. **CIP Grant Priority Review – [(b)(1)]**
   Tasks within this category are associated with the annual review of the CIP ranking lists published by the department.
2. **Grant & Debt Reimbursement Project Recommendations – [(b)(2)]**
   This category involves topics broadly related to CIP and project development process. As currently developed only a single, routine task is listed in the annual plan. However, there are

broad issue of oversight that remain challenging to implement, and open to discussion or specific research.

3. **Construction Standards for Cost-effective Construction – [(b)(3)]**
   Tasks within this category are related to development and evaluation of cost-effective construction standards. Recent and current efforts in this area have included building design ratios and the first draft of school construction standards. Statutory language changes in 2019 have also brought an increase focus to the committee's work in this area. (AS 14.11.017(d))
4. **Prototypical Design Analysis – [(b)(4)]**
   When prototype designs are proposed, review and offer recommendations. See the BRGR's 2004 "Prototype design guidelines". The statutory language changes noted above have brought an increase focus to the committee's work in this area also.
5. **CIP Grant Application & Ranking – [(b)(5) & (6)]**
   Topics and tasks specific to the CIP application and support materials, including scoring.
6. **CIP Approval Process Recommendations – [(b)(7)]**
   This category includes tasks related to overarching processes: publications the Facilities section produces that support project/application development and execution, regulation development, etc.
7. **Energy Efficiency Standards – [(b)(8)]**
   The main task encompassed in this category is the evaluation and recommendation of an energy efficiency standard adopted by the department. Currently this is the ASHRAE 90.1-2016 edition.

BRGR Discussion

- Evaluate existing work items for applicability (retain/remove), timelines, etc.
- Member suggestions for items to be included in the Master Work Plan.
- Any new items that members want to take up in the Yearly Work Plan.
- Tentative future meeting dates.
- Other?

Department of Education & Early Development
Division of Finance & Support Services/Facilities

Work Topics for the BR & GR Committee

Proposed As Of: ~~December 2, 2020~~March 17, 2021

BR&GR 2021 Work Items	Responsibility	Due Date
1. CIP Grant Priority Review – [(b)(1)]		
1.1. FY22 MM & SC Grant Fund Final Lists (4 AAC 31.022(a)(2)(B))	Committee	Apr 2021
1.2. ~~FY22~~ FY23 MM & SC Grant Fund Initial List	Committee	Dec ~~2020~~2021
2. Grant & Debt Reimbursement Project Recommendations – [(b)(2)]		
2.1. Six-year Capital Plan (14.11.013(a)(1); 4 AAC 31.022(2))	Dept	Annually, Nov
3. Construction Standards for Cost-effective Construction – [(b)(3)]		
3.1. Model School Costs (DEED Cost Model)		
3.1.1. Model School Analysis & Updates (Allowable Elements)		Annually, Jan-May
3.1.1.1. Solicit, Award, And Manage Model School Update	Dept	Annually, Jan
3.2. Cost Standards		
3.2.1. Cost/Benefit, Cost Effectiveness Guidelines	Dept	TBD
3.2.2. Life Cycle Cost Guidelines	Dept	TBD
3.3. Model School Building Systems Standards		
3.3.1. State Building Systems Standards		Mar 19- Feb 22
3.3.1.1. Cost Format Outline of System Standards (complete)	Dept	May 2019
3.3.1.2. Review Outline Model School System Standards (complete)	Committee	May 2019
3.3.1.3. Develop Services For Feasibility Analysis (complete)	Subcommittee	May 2019
3.3.1.4. Solicit, Award, Manage Feasibility & Cost/Benefit Analysis (c)	Dept	Jun 2019
3.3.1.5. Review Feasibility Report On Comprehensive Standards (c)	Subcommittee	Jul 19-Sep 19
3.3.1.6. Recommendation on Standards Development (complete)	Subcommittee	Dec 2019
3.3.1.7. Solicit, Award, Manage Partial Standards Development (c)	Dept	Jun 2020
3.3.1.8. Review Partial Standards, Recommend Direction (complete)	Subcommittee	Aug 2020
3.3.1.9. Review Final Standards Development Recommendation (c)	Committee	Sep 2020
3.3.1.10. Complete [See 6.2 New Publications]	Dept	~~Jun~~ Dec 2021
3.3.1.11. Implement [See 6.3 Regulations]	Dept	~~Feb 2022~~TBD
3.3.1.12. Coordinate with A4LE to maintain model school standards	Biennially	
3.3.2. School District Building Systems	Dept	TBD
3.4. Design Ratios		
3.4.1. Development of Design Ratio O:EW		
3.4.1.1. Compare Model & Existing School Ratios And Energy Use	Subcommittee	Feb 2020
3.4.1.2. Recommendation of ratios for BRGR (complete)	Subcommittee	Sep 2020
3.4.1.3. Amended/Corrected Final O:EW Ratios	Dept	Feb 2021
3.4.1.4. Final All Ratios~~, Release for Comment~~	Committee	Apr 2021
~~3.4.1.4.~~3.4.1.5. Validate, Release for Comment	Dept	TBD
~~3.4.1.5.~~3.4.1.6. Evaluate Public Comment, Make Recommendations	Committee	TBD
~~3.4.1.6.~~3.4.1.7. Manage Regulation Development & Implementation	Dept	TBD
3.4.2. Development of Design Ratio V:GSF		
3.4.2.1. Compare Model & Existing School Ratios And Energy Use	Subcommittee	Feb 2020
3.4.2.2. Recommendation of ratios for BRGR (complete)	Subcommittee	Nov 2020
3.4.2.3. Evaluate Recommendations, Provide Guidance	Committee	Dec 2020
3.4.2.4. Final All Ratios~~, Release for Comment~~	Committee	April 2021
~~3.4.2.4.~~3.4.2.5. Validate, Release for Comment	Dept	TBD
~~3.4.2.5.~~3.4.2.6. Evaluate Public Comment, Make Recommendations	Committee	TBD
~~3.4.2.6.~~3.4.2.7. Manage Regulation Development & Implementation	Dept	TBD
3.4.3. Development of Design Ratio V:ES		
3.4.3.1. Compare Model & Existing School Ratios And Energy Use	Subcommittee	Oct 2020
3.4.3.2. Recommendation of V:ES Ratio	Subcommittee	Jan 2020
3.4.3.3. Evaluate Recommendations, Provide Guidance	Committee	Feb 2020
3.4.3.4. Final All Ratios~~, Release for Comment~~	Committee	April 2021
3.4.3.5. Validate, Release for Comment	Dept	TBD

BR&GR 2020-2021 Work Items	Responsibility	Due Date
~~3.4.3.5.~~3.4.3.6. Evaluate Public Comment, Make Recommendations	Committee	TBD
~~3.4.3.6.~~3.4.3.7. Manage Regulation Development & Implementation	Dept	TBD
3.4.4. Develop Test Method for Ratios	Subcommittee	Jul 2020
4. Prototypical Design Analysis – [(b)(4)]		
4.1. Seek Peer Consensus on Reuse of School Plans and Systems		
4.1.1. Develop and Schedule AEC Peer Workshop on Reuse	Committee	TBD
4.1.2. Update Aug 4, 2004 Committee Position Paper	Committee	TBD
4.2. Codify Regulations As Needed for Reuse of Plans/Systems Policy		
4.2.1. Make Recommendations to Committee on Prototypes	Dept	Sep 2021
~~4.2.1.~~4.2.2. Make Recommendations to State Board on Prototypes	Committee	~~July 2021~~TBD
~~4.2.2.~~4.2.3. Manage Regulation Development and Implementation	Dept	~~Sep 2021~~TBD
5. CIP Grant Application & Ranking – [(b)(5) & (6)]		
5.1. FYXX CIP Briefing – Issues and Clarifications	Dept, Annually	Dec 20XX
5.2. FY23 CIP Draft Application & Instructions	Dept	Apr 2021
5.2.1. Life Safety/Code/POS Matrix Weighting Review	Cmte	~~Jan 2020~~Apr 2021
~~5.2.2. Preventive Maintenance Narratives Matrix (see 5.4.1)~~	~~Dept~~	~~Mar 2020~~
~~5.2. Priority Weighting Factors Review~~	~~Dept~~	~~TBD~~
5.3. FY23 CIP Final Application & Instructions	Committee	Apr 2021
5.4. ~~FY22 CIP Carryover Items~~	Dept	
~~5.4.1. Preventive Maintenance Narratives Matrix~~		
~~5.4.1.1. Seek Comments/Peer Review~~	~~Dept~~	~~Jan 2021~~
~~5.4.1.2. Review Comments, Propose Edits to Matrix~~	~~Committee~~	~~Feb 2021~~
~~5.4.1.3. Draft Adjusted Matrix~~	~~Dept~~	~~Mar 2021~~
~~5.4.1.4. Approve with FY23 CIP~~	~~Committee~~	~~Apr 2021~~
~~5.4.2. Life Safety/Code Matrix Scoring~~		
~~5.4.2.1. Prepare Briefing Paper/Analysis~~	~~Dept~~	~~Jan 2021~~
~~5.4.2.2. Review, Discussion, Seek Comment~~	~~Committee~~	~~Feb 2021~~
~~5.4.2.3. Draft Adjusted Matrix~~	~~Dept~~	~~Mar 2021~~
~~5.4.2.4. Approve with FY23 CIP~~	~~Committee~~	~~Apr 2021~~
5.5. Future CIP Application Issues		TBD
5.5.1. Space Allocation Issues	~~Subcommittee~~Dept	TBD
5.5.1.1. Analyze and Make Recommendation to Committee	~~Subcommittee~~Dept	TBD
5.5.1.2. Manage Regulation Development and Implementation	Dept	TBD
5.5.2. Projected Unhoused (erosion/environmental factors)	~~Subcommittee~~Dept	TBD
~~5.5.2.~~5.5.3. Total Point Balance Review	Dept	TBD
6. CIP Approval Process Recommendations – [(b)(7)]		
6.1. Publication Updates		
6.1.1. Program Demand Cost Model for Alaskan Schools	Dept	Annually, May
6.1.2. Alaska School Facilities PM Handbook		Dec 17–Apr 21
6.1.2.1. Preventive Maintenance Handbook – Validation (complete)	Dept	Feb 2018
6.1.2.2. Preventive Maintenance Handbook – Public Comment (c)	Committee	Mar 2018
6.1.2.3. Preventive Maintenance Handbook – Progress	Dept	May 2018
6.1.2.4. Preventive Maintenance Handbook – Progress	Dept	Dec 2018
6.1.2.5. Preventive Maintenance Handbook – Progress	Dept	Jun 2020
6.1.2.6. Preventive Maintenance Handbook – Progress	Dept	Sept 2020
6.1.2.7. Preventive Maintenance Handbook – Progress	Dept	Dec 2020
6.1.2.8. Preventive Maintenance Handbook – ~~Final Draft~~Progress	Dept	Feb 2021
6.1.2.9. Preventive Maintenance Handbook – ~~Public Comment~~Progres	~~Committee~~Dept	~~Feb~~ Mar 2021
6.1.2.10. ~~Preventive Maintenance Handbook – Final~~	~~Committee~~	~~April 2021~~
6.1.2.11. Preventive Maintenance Handbook – Progress	Dept	July 2021
6.1.2.12. Preventive Maintenance Handbook – Public Comment	Committee	Sept 2021
~~6.1.2.10.~~6.1.2.13. Preventive Maintenance Handbook – Final	Committee	Dec 2021
6.1.3. Site Selection Criteria and Evaluation Handbook		
6.1.3.1. Site Selection Handbook – ~~Initial~~Validation	Dept	~~May~~ Mar 2021
~~6.1.3.1.~~6.1.3.2. Site Selection Handbook – Initial	Dept	Apr 2021
6.1.3.3. Site Selection Handbook – Final	Committee	Sep 2021

BR&GR 2020-2021 Work Items	Responsibility	Due Date
6.1.4. Guidelines for School Equipment Purchases		
6.1.4.1. Guidelines for School Equipment Purchases – Validation	Dept	Apr 2021
6.1.4.2. Guidelines for School Equipment Purchases – Initial	Dept	May 2021
6.1.4.3. Guidelines for School Equipment Purchases – Public Cmt	Committee	Jul 2021
~~6.1.3.2.~~6.1.4.4. Guidelines for School Equipment Purchases - Final	Committee	Sep 2021
6.2. New Publications		
6.2.1. School Construction Standards Handbook (see 3.4.1)		May 17-Apr 21
6.2.1.1. Construction Standards Handbook – Outline	Dept	Sep 2018
6.2.1.2. Construction Standards Handbook – Validation	Committee	Oct 2018
6.2.1.3. Construction Standards Handbook – Feasibility	Dept/Subcmte	Jun 2019
6.2.1.4. Construction Standards Handbook – Feasiblity	Committee	Jul 2019
6.2.1.5. Construction Standards Handbook – Revalidation	Subcommittee	Dec 2019
6.2.1.6. Construction Standards Handbook – Partial Draft	Dept	Aug 2020
6.2.1.7. Construction Standards Handbook – Recommendation	Subcommittee	Aug 2020
6.2.1.8. Construction Standards Handbook – Partial Draft Review	Committee	Sep 2020
6.2.1.9. Construction Standards Handbook – Final Draft (Part 3)	Dept/Subcmte	Feb 2021
6.2.1.10. Construction Standards Handbook – Final Draft (Part 2)	Dept/Subcmte	Mar 2021
6.2.1.11. Construction Standards Handbook – ~~Final~~ Draft ~~(pub cmt)~~	Committee	Apr 2021
~~6.2.1.11.~~ Construction Standards Handbook – Final Draft (pub cmt)	Committee	Sep 2021
6.2.1.12. Construction Standards Handbook – Final	Dept	~~May~~ Nov 2021
6.2.1.13. Construction Standards Handbook – Final	Committee	~~Jun~~ Dec 2021
6.3. Regulations		
6.3.1. Baseline Design Ratios (see item 3.5.2)	Dept (w/Cmte)	
6.3.1.1. Draft Regulation	Dept (w/Cmte)	~~May 2021~~TBD
6.3.1.2. SBOE Public Comment on Regulation	Dept	~~Sep 2021~~TBD
6.3.1.3. Review Public Comments from SBOE Comment Period	Committee	~~Dec 2021~~TBD
6.3.2. Reuse of School Plans and Systems (see item 4.2)	Dept (w/Cmte)	
6.3.2.1. Draft Regulation	Dept (w/Cmte)	~~Sep 2021~~TBD
6.3.2.2. SBOE Public Comment on Regulation	Dept	~~Dec 2021~~TBD
6.3.2.3. Review Public Comments from SBOE Comment Period	Committee	~~Jan 2022~~TBD

7. Energy Efficiency Standards – [(b)(8)]

No current items.

Projected Meeting Dates

~~Feb 25, 2021 – Teleconference~~
- ~~Construction Standards Part 3 (Systems) Final Draft~~
- ~~Preventive Maintenance Handbook Final Draft~~
- ~~FY23 CIP PM Narratives~~
- ~~FY23 CIP Life/Safety Matrix Scoring~~
- ~~Evaluate Subcommittee V:ES Ratio Recommendation~~

~~March 18, 2021 – Teleconference~~
- ~~New Member Orientation~~
- ~~Construction Standards Part 2 (Design Guidance) Final Draft~~
- ~~Space Guideline Subcommittee Recommendations~~

April 14-15, 2021 ~~(Juneau), Full day +~~- Teleconference
- Final CIP Lists
- Consutant Review of Escalation Model School Elements
- FY23 Draft CIP Application and Instructions
- Final All Ratios (O:EW, V:GSF, V:ES)~~, Release for Comment~~
- Construction Standards Handbook (progress)~~ – Final Draft for Public Comment~~
- Site Selection Handbook – Initial

July 2021 TBD - Teleconference
- Construction Standards Handbook (progress)
- School Equipment – Initial
- Preventive Maintenance Handbook (progress)

BR&GR 2020-2021 Work Items **Responsibility** **Due Date**

September 2021 TBD - Teleconference

- Briefing Paper on Codifying Reuse of Plans/Systems Policy in Regulation
- Construction Standards Handbook – Final Draft (to Public Comment)
- School Equipment – Final
- Site Selection Handbook – Final
- Preventive Maintenance Handbook – Final Draft (to Public Comment)

Department of Education & Early Development
Division of Finance & Support Services/Facilities

Work Topics for the BR & GR Committee
AS 14.11.014
~~Updated~~Proposed: ~~12/19/17~~3/17/2021

BR&GR Work Items – Master List	Responsibility	Due Date
1. CIP Grant Priority Review – [(b)(1)]		
1.1. FYXX MM & SC Grant Fund Initial Lists (4 AAC 31.022(a)(2)(B))	Committee	Annually
1.2. FYXX MM & SC Grant Fund Reconsideration Lists	Committee	TBD
1.3. FYXX MM & SC Grant Fund Final Lists	Committee	TBD
2. Grant & Debt Reimbursement Project Recommendations – [(b)(2)]		
2.1. Six-year Capital Plan (14.11.013(a)(3); 4 AAC 31.022(2)(A))	Dept	Annually
2.1.1. Statewide Inventory	Dept	TBD
2.1.2. Statewide Facility Appraisal	Dept	TBD
2.1.3. Statewide Condition Survey	Dept	TBD
2.1.4. Renewal & Replacement Database	Dept	TBD
2.1.5. Presentation by ASD on Facility Condition Indexing	Committee	TBD
2.2. School Capital Funding	Dept (w Cmte)	TBD
2.2.1. Review Process & Funding Streams for Rural & Urban Projects	Dept	TBD
2.3. State's Role in Design & Construction		
2.3.1. In Organized City/Boroughs	Dept	TBD
2.3.2. In REAAs	Dept	TBD
3. Construction Standards for Cost-effective Construction – [(b)(3)]		
3.1. DEED Cost Model	Dept	2018
3.1.1. Model School Analysis (Allowable Costs)	Commmittee	Annually, Apr
~~3.1.2. Site Work + Major Maintenance Line Items~~	~~Dept~~	~~TBD~~
3.2. Cost Standards	Dept	TBD
3.2.1. Cost/Benefit, Cost Effectiveness Guidelines	Dept	TBD
3.2.2. Life Cycle Cost Guidelines	Dept	TBD
3.3. Commissioning	Committee	2018
3.3.1. Project Categories Requiring Commissioning	Committee	2018
3.3.2. Commissioning Agent Qualifications	Committee	2018
3.3.3. System Requirements for Commissioning	Committee	2018
3.4. Materials/Systems Analysis	Committee	TBD
3.4.1. Model School Building Systems	Dept	2018
3.4.2. School District Building Systems	Dept	TBD
3.5. Design Ratios	Committee	TBD
3.5.1. Building System Ratios ("Micro Ratios") ~~Climate Zones~~	~~Committee~~	TBD
~~3.5.2. Opening to Exterior Wall~~	~~Committee~~	~~TBD~~
~~3.5.3. Footprint Area to Gross Square Feet~~	~~Committee~~	~~TBD~~
~~3.5.4. Building Volume to Net Floor Area~~	~~Committee~~	~~TBD~~
~~3.5.5. Building Volume to Exterior Surface Area~~	~~Committee~~	~~TBD~~
3.6. Construction	Committee	TBD
3.6.1. Construction Duration		
3.6.2. Value Analysis		
3.6.3. Component Use and Specifications		
4. Prototypical Design Analysis – [(b)(4)]		
4.1. SB87 – Amendments to 14.11.014(b)(4)	Committee	TBD

5. CIP Grant Application & Ranking – [(b)(5) & (6)]

5.1.	FYXX CIP Draft Application & Instructions (14.11.013)	Dept	Annually
5.2.	FYXX CIP Final Application & Instructions	Committee	Annually
5.3.	Separate School Construction and Major Maintenance Applications	Committee	
5.4.	Separate Grant and Debt Applications	Committee	2019
5.5.	Appendix D Update – Type of Space Added or Improved	Committee	2019
5.5.1.	New Classifications & Terminology		
~~5.6. Expand Cond Survey Requirements Beyond Rehabilitations~~		~~Committee~~	~~2018~~
~~5.7. Facility Condition Survey Minimum Standard~~		~~Dept (w Cmte)~~	~~2018~~
~~5.8.~~5.6.	Review Issues with "Primary Purpose" Designations		
~~5.8.1.~~5.6.1.	Playgrounds, Parking Lots, etc.		
~~5.9.~~5.7.	Rural Definition For Art (see Instructions, Appx C)	Committee	TBD
~~5.10.~~5.8.	Space Allocation Issues (4 AAC 31.020(c))	Committee	TBD
~~5.10.1.~~5.8.1.	Career Tech		
~~5.10.2.~~5.8.2.	Resource Rooms and Special Ed		
~~5.10.3.~~5.8.3.	Space Related to Security		
~~5.10.4.~~5.8.4.	Net vs. Gross		
~~5.10.5.~~5.8.5.	Electrical/Mechanical Space		
~~5.10.6.~~5.8.6.	Storage in Remote Areas		
~~5.10.7.~~5.8.7.	"Found Space" (cost-effectiveness test)		
~~5.10.8.~~5.8.8.	Replacement Schools Clarifications		
~~5.10.9.~~5.8.9.	Non-school Facilities		
~~5.10.10.~~5.8.10.	Educational Adequacy/Space Increase		
~~5.10.11.~~5.8.11.	Community Use Space		
~~5.10.12.~~5.8.12.	Pre-school		
~~5.10.13.~~5.8.13.	Out-of-District Enrollment (vocational/charters, etc.)		
~~5.10.14.~~5.8.14.	Second Attendance Area Schools		
~~5.10.15.~~5.8.15.	Enrollment Projection Models		
5.8.16.	Standard Gym Size		
~~5.10.16.~~5.8.17.	Projected Unhoused (environmental/erosion timeline)		
~~5.11.~~5.9.	Rater's Guide Matrices		
~~5.11.1.~~5.9.1.	~~Life Safety/Code/Protection of Structure Matrix~~	~~Dept (w/Cmte)~~	~~Mar 2018~~
~~5.11.2.~~5.9.2.	Emergency Points Matrix	Dept (w/Cmte)	TBD
~~5.12.~~5.10.	Scoring Category & Weighting Factors		
~~5.12.1.~~5.10.1.	Weighting for Maintenance	Dept (w/Cmte)	TBD
~~5.12.2.~~5.10.2.	Weighting for Type of Space	Dept (w/Cmte)	TBD
~~5.12.3.~~5.10.3.	Weighting for Emergency	Dept (w/Cmte)	TBD
~~5.12.4.~~5.10.4.	Weighting for Life Safety/Code	Dept (w/Cmte)	TBD

6. CIP Approval Process Recommendations – [(b)(7)]

6.1.	Publication Updates (4 AAC 31.020(a))		
6.1.1.	Program Demand Cost Model for Alaskan Schools	Dept	Annually
6.1.2.	Capital Project Administration Handbook	Dept	2022
6.1.3.	Alaska School Facilities Preventive Maintenance. Handbook	Dept (w Cmte)	~~2018~~2021
6.1.4.	Project Delivery Method Handbook	Dept	2022
6.1.5.	Cost Format – *EED Standard Construction Cost Estimate*	Dept	~~2018~~2025
6.1.6.	Space Guidelines Handbook	Dept (w Cmte)	TBD
6.1.7.	Life Cycle Cost Analysis Handbook	Dept (w Cmte)	~~2018~~2023
6.1.8.	Swimming Pool Guidelines	Dept (w Cmte)	~~2019~~2024
6.1.9.	Guide for School Facility Condition Surveys	Dept (w Cmte)	~~2019~~2025
6.1.10.	A Handbook to Writing Educational Specifications	Dept (w Cmte)	~~2020~~2025
6.1.11.	Site Selection Criteria and Evaluation Handbook	Dept	~~2020~~2021
6.1.12.	Facility Appraisal Guide	Dept	TBD
6.1.13.	Guidelines for School Equipment Purchases	Dept (w Cmte)	2021
~~6.1.13.~~6.1.14.	Architectural and Engineering Services for School Facilities	Dept	2023

6.2.	New Publications		
6.2.1.	*School Design & Construction Standards*	*Dept (w Cmte)*	~~*2018*~~*2021*
6.2.2.	~~Architectural and Engineering Services for School Facilities~~	~~Dept~~	~~2020~~
6.2.3.	Outdoor Facility Guidelines for Secondary~~-~~ Schools	Dept	TBD
6.2.4.	Renewal & Replacement Guideline	Dept	TBD
6.3.	Regulations		
~~6.3.1.~~	~~Commissioning Requirements~~	~~Dept (w Cmte)~~	~~2018~~
~~6.3.2.~~6.3.1.	CIP "Primary Purpose" (see 5.6 Primary Purpose)	Dept (w Cmte)	TBD
~~6.3.3.~~	~~Facility "Clean-up" Reg Project~~	~~Dept (w/Cmte)~~	~~2018~~
6.4.	Online Application	Dept	TBD
6.5.	Database Review		
6.5.1.	Consolidate Into Single Database	Dept	TBD
6.5.2.	Coordination With Unity Project	Dept	TBD
6.5.3.	ADM By Grade Level	Dept (SERRC)	TBD

7. Energy Efficiency Standards – [(b)(8)]

7.1.	Reporting Requirements	Dept (w Cmte)	TBD
7.2.	Energy Modeling	Dept (w Cmte)	TBD
~~7.2.~~7.3.	Retro-Commissioning Evaluation Tool	Dept (w Cmte)	2020

State of Alaska **Department of Education & Early Development**
Bond Reimbursement & Grant Review Committee

Alaska School Design and Construction Standards

P U B L I C A T I O N C O V E R

March 17, 2021

Issue

The department seeks committee feedback on the draft additions and revisions to Part 2 Design Principles and Part 3 System Standards of the *Alaska School Design and Construction Standards* handbook.

Background

Last Updated/Current Edition
This is a new publication; no current edition is available.

Summary of Proposed Changes
The department has prepared revisions/additions to Part 2 Design Principles and two systems in Part 3 System Standards of the publication: 10 Equipment & Furnishings and 11 Special Conditions. These continue to supplement the work completed by BDS Architects.

Part 2 elements continue to be organized under the major headings of *Regionally Based Design*, *Site and Infrastructure*, *School Buildings*, and *High Performance Facilities*. Within the *School Buildings* section, the document uses the categories and types of space listed in the CIP application instructions, Appendix D. This results in a robust differentiation of spaces that may be beyond what is needed for this publication. The draft provided offers two formats for the information, a tabular listing and a narrative listing of requirements. Edits prepared for this review under the Category A space headings of General Classroom, Library/Media, and Bi-cultural/Bilingual illustrate these formats. Other narrative format elements are from work accomplished under the contract with BDS Architects.

Part 3 System Standards elements are organized to match the 11 systems in the department's *CostFormat* structure. With the inclusion of drafts for Sections 10 and 11, all systems are now represented.

Public Comment
No public comment period has occurred.
The handbook is scheduled to be presented for public comment once the work on both Part 2 and Part 3 is completed. A public comment period is anticipated to start in September 2021.

Version Summary & BRGR Review

Drafts of the publication were presented to the committee at the following meetings:

September 8, 2020 – original BDS draft presented that provided an overall structure to the publication and completed Part 1 describing its purpose and use. Part 2 Design Standards, and Part 3 System Standards were left incomplete due to limited funding for the consultant assistance; committee directed DEED to develop incomplete sections.

February 25, 2021 – DEED presented four draft sections for Part 3: 01 Site and Infrastructure; 02 Substructure; 03 Superstructure; and 07 Conveying Systems. Updated Part 3 structure and numbering to index to DEED CostFormat.

BRGR Input and Discussion Items

- Use of CIP Application Instructions' Appendix D. Committee has previously discussed updates and revision to the spaces identified in this appendix.
- Value of Part 3 'preambles' to each section.
- Is there an appropriate level of detail within each Part 3 section?
- Is there an appropriate level of detail and content within the Part 3 Required, Recommended, and Premium categories?
- Staff review items:
    - Library Space/Equipment: Books vs. electronic media
    - Art Classroom/Equipment: Allowed grades for ceramics space/equipment

Suggested Motion

No motion suggested at this time. Department will continue development and refinement of draft publication based on committee comments and discussion.

ALASKA SCHOOL DESIGN & CONSTRUCTION STANDARDS

Table of Contents

Part 1. PURPOSE & APPLICATION

1. Background

These Standards achieve two primary objectives. They fulfill a statutory mandate, and they establish consistency for state aid. In 1993, the Alaska legislature created the Bond Reimbursement and Grant Review Committee under AS14.11.014 and identified the committee's purpose. Among their many tasks, the committee was charged, through the Department of Education & Early Development (DEED), with the development of criteria intended to achieve cost effective school construction in the State of Alaska. These Standards are those criteria and are the result of decades of work by the committee. They also set the stage for continued work toward ensuring cost effective school construction

into the future.

Regarding consistency, powers granted to DEED provide broad authority for the state to revise a project's scope and budget if the costs are excessive, and to reject projects not in the state's best interests. These Standards have been developed to make these determinations more transparent; to provide consistent, clear information for school districts and design professionals, and to establish a uniform level of quality and performance for all of Alaska's public-school buildings.

The Standards also provide a framework for research, "best practices," accepted procedures, "lessons learned," statutory and regulatory requirements, and for inclusion of the experience of students and educators across the State of Alaska. The best of what is currently known and available in these areas is included; future knowledge and understanding will be incorporated through a vetted public process.

It should be acknowledged that the Standards are also very DEED-centric in fulfilling the two objectives stated above. They are not a building code. Alaska's adopted statewide building code requirements for schools, are already well developed and are enforced by the appropriate authority having jurisdiction (AHJ). Neither are the Standards district-level facilities manuals. They do not, for example, establish a preference for a side-coiling grill versus an upward acting grill for security or access separation. These standards fit between national code standards and local preferences. Their focus will always be cost effectiveness from a state perspective. The Standards apply to all new school construction and new additions to existing buildings. Renovation to existing facilities will adhere to the Standards, whenever possible, as approved by DEED.

School construction in Alaska encompasses a wide range of climates, differences in school sizes, and the logistics of building in remote areas with limited access to labor and materials. Building system and component types, quantities, and quality vary widely across school projects with state aid. Where applicable the Standards are tailored to address this wide range of conditions.

The Standards recognize the need to consider the long-term operations and maintenance of a school facility rather than focus solely on initial construction cost. Therefore, these Standards will not only consider the initial cost of construction but also operations and maintenance expenses, by looking at design and construction decisions on a life cycle basis.

It is evident that there is an extensive need for new and renovated school facilities. Many of the older schools in Alaska do not meet the program needs of today's complex learning environments. Older

schools tend to be costly to maintain, energy inefficient, and non-code compliant in some cases. There are also many safety issues within and outside of older school buildings. With a deep financial involvement by the State of Alaska, the Department of Education and Early Development has a responsibility to assure that projects meet established criteria for cost effectiveness including durability, economy, and quality.

One of the major objectives of the State is to address as many projects as possible within the limited financial resources at both the State and local levels. To this end the State wants to avoid unnecessarily expensive designs, unapproved assemblies, and products that carry premium costs. The Standards are intended as a baseline for architects, engineers, and other design professionals, along with school districts, to develop cost effective solutions to meet the needs of individual school communities. The information is provided to allow the planning, design, and construction process to proceed most efficiently—without undo restriction on the design of facilities—focusing efforts on the creation of the best possible educational environments for each project

2. Document Organization

These standards are intended to be used in conjunction with other school planning guidelines developed by DEED including those for alternative project delivery, school condition surveys, and site selection. When available, the Standard may also incorporate Design Ratios whose purpose will be to measure the efficiency of a school design as it relates to cost effectiveness. The Standards do not include all possible building components and materials used in school construction. They reflect the department's belief that good design is occurring every day based on the compendium of knowledge present in Alaska's design firms and school districts. Instead, they are to provide both general guidance to the design professional in key areas of concern, and specific guidance on selected design elements and materials that DEED has identified, based on experience from prior projects.

Part 1 – Purpose and Applications is an introduction to the Standards, their background, intended purpose and implementation

Part 2 – Design Principles deals with overall design, construction, and project management principles. Each design principle includes a list of standards and guidelines. These standards are displayed in three sections as *Required, Recommended,* and *Premium*.

Part 3 – System Standards is organized by a DEED-specific elemental cost structure with specific material or system selections, design criteria, and guidance.

Levels of Implementation
In Part 3 the System Standards are grouped into categories with the following definitions:

Required: These are required elements that are accepted practice by DEED. Not all Required elements are intended to be incorporated into any one project and will vary based on design intent, budget, region, climate and school size.

Recommended: These elements are recommended as alternatives and possible improvements or upgrades to the Required elements. These are also accepted practice by DEED.

Premium: These elements are considered substantial upgrades to the Required and Recommended designations. They can be included in projects but in most cases will not qualify for DEED funding. Inclusion of Premium elements requires DEED review.

Cost Factor and Life Cycle Cost Analysis Index
Selected materials described in Part 3 System Standard, have been designated with indicators of CF (Cost Factor) and LCCA (Life Cycle Cost Analysis). The indicators are followed by a numerical scale of 1 through 5.

For CF, a factor of 1 is the least costly option, 5 is the most expensive. For LCCA, 1 has the least life cycle to cost benefit, 5 has the most benefit.

3. Prerequisites

[This placeholder section title is for possible DEED-specific content developed around "prerequisites" on how the state might implement this document.]

4. Flexibility and Innovation

The State recognizes that there will be constant modifications to this document as new technologies and products enter the construction market. Design professionals are encouraged to discuss new approaches, technologies, and materials with DEED officials. Many design decisions should be based on a "life-cycle analysis" that considers energy use, first cost, operational cost, equipment life, and replacement cost. In addition, consideration should be given to materials that can be recycled and are not hazardous to the environment.

The State recognizes that school facilities will differ with each school district's educational program and internal organization. The design of the building will also be influenced by the school site, region, climate, and other external factors. A one-design-fits-all approach is not advocated; however, these Standards do attempt to address cost-effectiveness, quality considerations, and design efficiency. To allow for appropriate flexibility and innovation, as discussed above, the Standards set out elements as Required, Recommended, or Premium. Recipients of state-aid that wish to incorporate elements that exceed these standards (indicated as Premium) shall do so with non-state funds unless a variance is obtained from DEED.

The State has a commitment to the development of quality educational spaces that will meet the educational needs of students in Alaska schools. Spaces and buildings should be flexible in order that present and future programs can be housed appropriately to meet the needs of an ever-changing public-school curriculum. These standards and guidelines will be used by DEED when reviewing school capital projects approved for state-aid.

DEED encourages an integrated planning and design process that combines the Recipient's project requirements with these Standards to provide the design team with greater clarity as to the needs of both. The process of qualifying for state-aid for school capital projects as established in AS 14.11 provides all the necessary steps for close collaboration between the recipient district or city/borough

regarding the scope of a project. From the initial application and evaluation process through the design iterations, the importance of maintaining collaboration and DEED oversight throughout is critical. A cooperative approach will ensure a smooth process.

Part 2. DESIGN PRINCIPLES

1. REGIONALLY BASED DESIGN

School construction in Alaska encompasses a wide range of climates and must respond to the challenging logistics of building in remote areas with limited construction seasons. Design principles must be adapted based on climate and geographic region. The climates zones illustrated below will be used as a baseline to identify and evaluate appropriate design strategies in the application of these Standards. It remains the responsibility of design and facility professionals to understand any micro-climate or site-specific conditions which may impact the application of the Standards on a project-by-project basis.

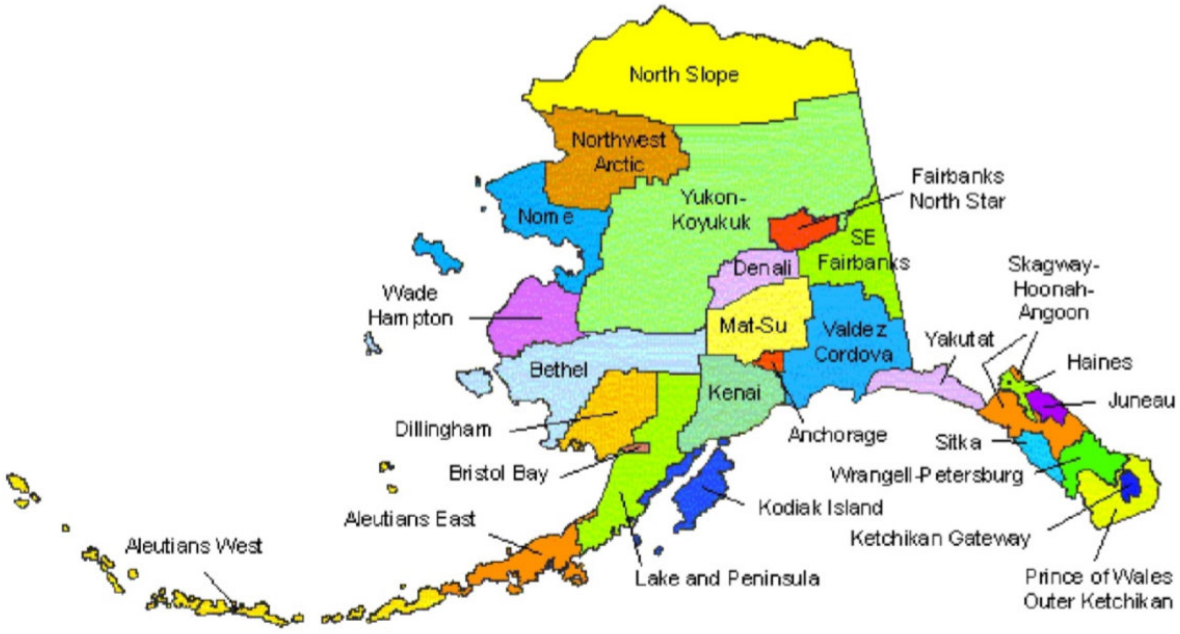

Table A301 Alaska Census Areas

Zone 6	Zone 7	Zone 8	Zone 9
Juneau	Aleutians East	Bethel	North Slope
Ketchikan Gateway	Aleutians West	Denali	
Prince of Wales	Anchorage	Fairbanks North Star	
Sitka	Bristol Bay	Nome	
Skagway-Hoonah-Angoon	Dillingham	Northwest Arctic	
Wrangell-Petersburg	Kenai Peninsula	Southeast Fairbanks	
Yakutat	Kodiak Island	Kusilvak (Wade Hampton)	
Haines	Lake & Peninsula	Yukon-Koyukuk	
	Matanuska-Susitna		
	Valdez-Cordova		

Consideration of geographic regions in the application of the Standards relate primarily to initial construction costs. The department has established an analytical model for the evaluation of

geographic cost variations across Alaska, as it relates to school facilities, and publishes the results of that analysis as part of the Demand Cost Model for Alaskan Schools. The geographic cost factors identified in that DEED publication will be used as a baseline to identify and evaluate appropriate design strategies in the application of these Standards. As with climate zones, it remains the responsibility of design and facility professionals to understand any local variations and site-specific conditions which may impact the application of the Standards on each project.

2. SITE & INFRASTRUCTURE

The State must be involved in reviewing site selection, design, and programming. Selected sites should be affordable, easily developed, and close to commercial-grade utilities wherever possible. Sites requiring extensive earthwork, long driveways, or environmental challenges should be avoided. In urban areas, schools should not be located directly on major roadways with high speeds or heavy traffic.

Recent tragedies at schools around the country have reinforced the need for designs to keep students and staff safe in our public schools. School safety experts and educational facility planners have been working together to develop recommendations that cover the outside and inside of school buildings. DEED encourages school districts to consider student safety as one of the most important criteria when designing or renovating schools.

Safety + Security Site Design

Required:

1. Develop site plans that allow two separate points of access to the site.
2. Make the main entrance easily identifiable from the street, primary parking area or main access route.
3. In settings where the school building is at or near grade, develop main entrances with discrete physical barriers such as concrete-filled steel bollards, boulders, planters or other physical barriers, as applicable, to prevent cars or trucks from being driven into the school.
4. Maintain clear and unobstructed sight lines for security and safety.
5. Obtain preliminary approvals from the Department of Transportation, the Army Corp of Engineers, and other appropriate agencies before site approval.
6. In school settings where emergency services are available, provide emergency vehicle access to all areas of the site, including playgrounds and fields.
7. In school settings where bus service is available, separate bus loop and parent drop-off areas and install fencing or guardrails to limit pedestrian circulation to designated crosswalks and sidewalks.
8. At urban schools, provide safe access for pedestrian and bicycle circulation from site entrances to the main building entrance and consider keeping pedestrian paths away from automobiles.
9. Provide safe, clearly marked pedestrian pathways, sidewalks, and boardwalks through the site.
10. Locate play areas away from vehicle circulation and parking areas. Provide accessible pedestrian pathways to playgrounds and athletic fields that avoid vehicular traffic.

11. Provide chain link fencing at the perimeter of playgrounds as required.
12. Avoid sidewalks that link to high speed roads and highways.
13. Provide clear vehicular circulation patterns and signage. Provide stop signs and speed tables.
14. Provide LED lighting at all travel ways, parking areas, and building perimeter.
15. Oil, propane, and gasoline tanks are preferred to be located below ground. When above ground protect the tank with fencing, berms or bollards. Small propane tanks serving kitchen or science room equipment may be located above ground.
16. Separate service vehicles from bus and parent drop-off areas.
17. Keep perennial bushes and trees a minimum of 20'-0 away from each side of major entrance doors.
18. Keep electric and telephone services secure from vandalism. Use the preferred method of protection, underground service from a street telephone pole to the entering point of a building.
19. Provide adequate lighting for the main entrance sidewalk and parking lot to discourage loitering and vandalism.
20. Provide appropriate site security gates at fire lanes to prevent non-authorized vehicles from driving around the sides or back of the school.
21. Provide exterior public address systems that can be heard in the parking lot, bus loop, and playgrounds.

Recommended:

22. Consider developing emergency off-site staging areas.
23. Consider providing a secondary access to the site for emergency vehicles.
24. Consider how an emergency evacuation will be conducted. Consider bus loading areas and/or staging areas.

Premium:

25. Locally required (i.e., municipality, borough, etc.) off-site improvements.
26. Masonry or stone pavers in locations with a geographic area cost factor above 105.
27. Concrete sidewalks further than 50'-0" from the main entrance.

Building Location and Orientation

Required:

1. Select the building site to minimize environmental impact and encourage a simple, straightforward construction process.
2. Orient the main entrance to face primarily south. Avoid entrances facing north.
3. Consider prevailing wind and wind speeds with regard to doors. Provide measures such as wing walls or rails to prevent wind from catching doors and causing damage.
4. Orient the building design to maximize natural daylighting in classrooms and other occupied spaces.
5. Keep building ventilation intakes away from vehicle exhaust and other sources of air pollution. Consider the site's prevailing winds when locating intake and exhaust equipment.

Recommended:

6. Consider orienting the longer axis of the building East-West for maximum solar impact.

Premium:

7. Building pads/sites with slopes in excess of 10 percent.

High-Performance Site Principles

Required:

1. Site buildings to maximize daylighting (a north-south orientation for classrooms).
2. Orient buildings with a major entrance on the south side whenever possible.
3. Choose native and adaptive plants that do not need permanent irrigation systems.
4. Conduct a Phase I Environmental Assessment (and Phase II if necessary, based on Phase I) to identify hazardous materials. Conduct required mediation on site.
5. Control erosion and sedimentation during construction.

Recommended:

6. Consider opportunities to reduce light trespass onto adjacent sites and improve nighttime visibility by reducing up-lighting, reducing maximum lumens of fixtures above horizontal, and locating luminaires well inside the project site boundary.
7. Consider opportunities to reduce impervious surfaces on site, reduce quantity and improve quality of stormwater runoff. Practice low-impact rainwater management strategies.

Premium:

8. Stormwater management: bioswales, pervious pavers.
9. Green roofs.
10. School vegetable gardens.

Building Entrances

Required:

1. Provide a single point of entry for all visitors that is easily identifiable from the main approach to the school. When called for by school district policy, visitors shall enter through a secure vestibule at the main building entrance. This arrangement may not be practical in a renovation or necessary in a very small school.
2. Design all exits and entrances so the building can be securely locked down after the start of school if desired
3. Safety and Security **at** Main Office
    a. Locate the main office door adjacent to the security vestibule lobby so office personnel can maintain visual supervision while visitors come in to sign the visitor log.
    b. Provide a hidden electronic security panic button in the office that can send a signal to police or emergency responders when a crisis is developing at the school.
    c. Provide a minimum of two locations for interior intercom and exterior public address system. The second location should be designated as a “safe room.”
    d. Design main offices with a second means of exit, either directly outdoors or into a more remote hallway.
    e. Provide security cameras at the main entrance and other remote locations around the school. Video systems should be capable of being reviewed for live on-demand broadcasting as well as a minimum thirty-day archival library system.

   f. Design the main office so it has easy supervision of the security vestibule, the main entrance lobby, and one or more main corridors leading into the "heart" of the school.
4. In a secure vestibule arrangement, the interior bank of doors of the vestibule should be equipped with an electronic strike that allows the door to be unlocked electronically by main office personnel after visitors have been approved for entrance.
5. Provide proximity card readers for staff at the main, kitchen, and at least one other staff entrance.
6. Provide video cameras in the ceiling of the security vestibule and directly inside of the vestibule doors so that visitors can be photographed on video loops for later review.
7. Design all major entrances and exits with vestibules if they are likely to be used during school hours.
8. Design entrance doors to be controllable from a remote location, preferably at the administrative office, with a direct view and oversight of the main entrance security vestibule.
9. Install exterior rain canopies at the main entrance and exterior doors that are expected to have high usage.
10. In buildings that are at our near grade, protect all front entrances and other major doors used on a regular basis throughout the school day with concrete-filled steel bollards or other appropriate, rugged obstructions.

Premium:

11. Pivot hinges, sliders, or revolving doors.
12. Electric door openers other than at the ADA main entrance.
13. Overly complex ceiling finishes and features.

3. SCHOOL ~~FACILITIES~~BUILDINGS

Every school plan should be a reflection of the Space Allocation Guidelines found in Alaska Administrative Code (4 AAC 31.020), as well as the school district's educational specifications and pedagogy. The opportunity to design new or redesign existing school buildings is often a once-in-a-lifetime experience for teachers, school boards, and the local community. Serious consideration should be given to a comprehensive educational visioning process at local expense that reviews current state-of-the-art thinking and considers which educational strategies are most appropriate for the school's age group and local community values. Learning spaces should support traditional as well as expeditionary, and "virtual" learning experiences. The following general planning principles apply to all school facility design:

A. General Planning Principles

Required:

1. Design interior wall layouts to be simple and straightforward.
2. Zone the building for public and after-hours use.
3. Consider zoning the building for lockdowns that allow different sections of the building to be securely isolated.
4. Design the floor plan to carefully separate quiet, academic areas from noisy, high activity functions.

5. Design classrooms to conform to best practices for acoustic isolation and separation as defined by ANSI-S12.60-2010 (Acoustical Performance Criteria, Design Requirements, and Guidelines for Schools Part I).
6. Organize functional layouts to support small-group and large-group activities.
7. Designs should emphasize multi-functioning rooms to maximize daily use and minimize underutilized spaces.
8. Design the floor plan to optimize multi-functioning spaces such as cafeterias, commons, gymnasiums, and exploratory labs.
9. At the Concept Design or Schematic Design phase, school designs must demonstrate the ability to be expanded to accommodate a 15% increase in student population.
10. Provide acoustical and smoke separation by designing classroom walls to extend to the underside of the structural deck whenever possible and when required by codes.

Recommended:

11. Consider single or double intercommunicating doors between classrooms.
12. Schools should be designed to be as flexible as possible to accommodate future learning styles and technology
13. Operable partitions or large sliding doors.

Premium:

14. Complex floor patterns involving curves, cuts, and intricate details.
15. Wood floors, except where allowed for gymnasiums, or natural stone floors.
16. Elaborate, expensive, curved or complex walls, ceilings, windows, and arches.
17. Building plans with more than one elevator.
18. Stairways not required by code for egress.
19. Elaborate, monumental stairs, regardless of location or code compliance.
20. Interior channel glass wall systems or glass block walls.
21. Complex ceilings with multiple levels and decorative soffits.
22. Wood or metal slat ceilings.
23. Plaster or fiberglass shaped ceiling planes.
24. Ceiling tiles larger than 24" x 48".

General Building Safety + Security Planning Principles

Required:

1. Design the building so it can be locked down into separate security zones, preferably at internal firewalls requiring rated steel fire doors.
2. Provide a minimum of two means of exit out of any gymnasium, cafeteria, or library.
3. Provide a secure steel service door at the service entrance with a proximity reader and a means of identifying visitors without opening the door.
4. Provide locked, secure chemical storage areas that are not accessible to students or visitors.
5. Provide laminated security glass at remote exterior doors or sidelights.
6. Reduce the number of exterior doors that need to be supervised or checked for security and safety purposes.

7. Provide exterior doors convenient to playgrounds and playfields that can be quickly unlocked by proximity card readers in cases requiring "reverse evacuation."

Recommended:

8. Consider providing steel frame doors with no glass vision panels at remote, unsupervised doors.
9. Consider putting fire doors on electric hold opens and having them tied into the emergency security notification system that allows the main office to release fire doors for lockdown.

Premium:

10. TBD

Safety + Security at Classrooms

Required:

1. Provide commercial-grade hardware and locksets on all doors.
2. Provide heavy duty, commercial-grade hardware at classroom doors where the door can be quickly locked by the teacher from the inside.
3. Provide small vision panels with laminated security glass in classroom doors.
4. Provide a phone and two-way intercom system in every classroom.
5. Provide a minimum of one National Fire Protection Assoc. (NFPA)-approved escape window in every classroom, where necessary.

Recommended:

6. TBD

Premium:

7. TBD

Category A – Instructional or Resource

General Classrooms

Required:

1. Design classroom walls to the underside of the deck for smoke and acoustical performance.
2. Design all classroom doors to be easily lockable from the inside by the teacher but to allow egress from the classroom at any time.
3. Specify sinks and countertops with postformed backsplash and front edge.
4. Provide bookcases and teacher storage closets as required.
5. Provide waterproof finishes for winter boot storage.
6. Provide separate row switching to allow artificial light levels to be reduced when natural daylight can be maximized.
7. Design the classrooms for excellent acoustics.
8. Provide a simple, straightforward lighting plan that provides appropriate light levels on white boards and does not interfere with projectors or TV video screens.

9. Provide a technology plan that shows how technology can be incorporated in the classroom and supports the educational pedagogy.

Recommended:

10. Demountable wall systems
11. Operable wall systems or large sliding doors
12. Consider radiant floor heating for grade levels where children are likely to sit on the floors.
13. Consider classroom cubbies for coats, hats, and boots in grades Pre-K–2.
14. Consider toilets in the classrooms for grades Pre-K–1. For classroom toilets, provide seamless or ceramic tile flooring.
15. Consider ceramic tile to a wainscoting height of 48" on the wet wall.
16. Consider sinks in the classroom for grades Pre-K–5. Specify paperless and water-resistant materials, such as sheetrock, for wet walls.

Premium:

17. Decorative or specialty lighting other than standard classroom lights
18. Decorative wall sconces
19. Custom designed sliding doors or operable wall systems
20. Casework or architectural woodwork such as picture rails, wainscoting, crown moldings, or paneling
21. Decorative or expensive non-standard ceiling tiles or ceiling systems such as metal or wood slat ceilings

General Classrooms (Opt.)

Required:

1. Provide space and amenities for instruction and learning associated with grade levels in support of adopted curriculum and a variety of teaching/learning styles in all or some of the following areas: instructor-led learning, individual, team and project-based learning, small group activities, computer-based learning/research, instructional storage, personal storage.
2. Provide from among the following features for this educational space:

System	Features
Spatial Elements	Ceilings - 9ft +/-,
Finishes	Floor: vinyl or rubber sheet at project and entry/exit areas, carpet at teacher and student stations, Ceiling: acoustic tile, Walls: paint
Doors	Interior for code compliance
Specialties	Base cabinets w/laminate counter, Wall cabinets, Teacher wardrobe, 12ft whiteboard (2), PT dispenser, Soap dispenser, Window coverings (full, room darkening)
Plumbing	Stainless steel double sink w/lever mixing valve
Heating/Cooling	As calculated for code compliance
Ventilation/Exhaust	As calculated for code compliance
Lighting	Pendant or drop-in indirect, three-bank controls plus dimming
Power	110v duplex for code compliance, 110v quadplex at each data port

System	Features
Special Systems	Phone/intercom, synchronized clock, interactive whiteboard, projector, duplex data ports (7), instructional voice amplification.
Equipment/Furnishings	None required

Recommended:

1. Consider demountable wall systems.
2. Consider double leaf door openings between classrooms.
3. Consider radiant floor heating for grade levels where children are likely to sit on the floors.
4. Consider classroom cubbies for coats, hats, and boots in grades Pre-K–2.
5. Consider toilets in the classrooms for grades Pre-K–1. For classroom toilets, provide seamless or ceramic tile flooring.
6. Consider ceramic tile to a wainscoting height of 48" on the wet wall.
7. Consider sinks in the classroom for grades Pre-K–5.
8. Specify paperless and water-resistant materials, such as sheetrock, for wet walls.

Premium:

9. Operable wall systems or large sliding doors.
10. Decorative or specialty lighting other than standard classroom lights
11. Decorative wall sconces
12. Custom designed sliding doors or operable wall systems
13. Casework or architectural woodwork such as picture rails, wainscoting, crown moldings, or paneling
14. Decorative or expensive non-standard ceiling tiles or ceiling systems such as metal or wood slat ceilings

Library & Media Spaces

Required:

1. Provide space which supports the following uses: collections (i.e., stacks), computer workstations, individual and group seating, staff workspace, meeting/collaboration space, and presentation space.

~~1.~~2. Provide space in amounts needed to meet defined program needs based on guidelines contained in 4 AAC 31.020(a).

3. Provide robust infrastructure including power receptacles above code-minimum, USB charging ports, wireless connectivity, and interactive white board(s).

~~2. Refer to the [enter appropriate space standard source(s)] for acceptable room sizes based on student population.~~

~~3. Design the library in consultation with school district librarians and design guidelines developed by the [Alaska?] Library Association.~~

4. Design the library for easy adult supervision; avoid creating dead zones.

5. Provide appropriate structural design to accommodate heavy book loading.

~~5.~~6. Provide moveable furniture and equipment for maximum flexibility; use fixed built-in features sparingly.

Recommended:

7. ~~X~~Consider distributed versus centralized media for small student populations and adjust classroom sizes accordingly.
~~6.~~8. Consider planning and design guidance from the American Association of School Librarians (AASL).
~~7.~~9. Consider providing an exterior swing door for connection to supporting exterior spaces.

Premium:

~~8.~~10. Space required for non-district, municipal/borough-owned library functions.
~~9.~~11. Excessively high ceilings or volumes.
~~10.~~12. Expensive architectural woodworking, paneling, and custom millwork.
13. Custom ceilings, soffits, skylights, or other monumental architectural features.
~~11.~~14. More than one exterior door.

Special Education Areas

Required:

1. Integrate special education spaces within the larger school population.
2. Provide appropriate storage for special education equipment.
3. Provide appropriate structural support for special swings or hanging equipment.
4. Provide quiet spaces or timeout rooms that are hygienic, vandal proof, and code compliant.

Recommended:

5. Consider OT and PT space adjacent to or inside of other multi-functioning spaces to maximize efficiency.

Premium:

6. TBD

Bi-Cultural/Bilingual Spaces

Required:

1. ~~TBD~~Provide space and amenities for project-based learning associated with cultural and traditional language heritage when supported with intentional curriculum in all or some of the following areas: food processing and preparation, construction and use of traditional art/artifacts and apparel, oral and visual presentation both live and electronic.
2. Provide from among the following features for this educational space:

System	**Features**
Spatial Elements	Ceilings - 9ft +/-,
Finishes	Floor: vinyl or rubber sheet, Ceiling: acoustic tile, Walls: paint
Doors	Interior for code compliance, Exterior (1)
Specialties	Base cabinets w/laminate counter, Wall cabinets, Teacher wardrobe, 12ft whiteboard (2), PT dispenser, Soap dispenser, Window coverings (full, room darkening)

System	Features
Plumbing	Stainless steel double sink w/lever mixing valve
Heating/Cooling	As calculated for code compliance
Ventilation/Exhaust	Range hood at cooking surfaces
Lighting	Drop-in indirect, two-bank controls
Power	110v duplex for code compliance, 110v quadplex at each data port, as required for appliances.
Special Systems	Phone/intercom, synchronized clock, interactive whiteboard, projector, duplex data ports (7), instructional voice amplification.
Equipment/Furnishings	Range, Refrigerator, Microwave/hood, Dishwasher (all residential)

Recommended:

3. ~~TBD~~Consider dedicated room exhaust for odor control.
4. Consider locking hardware on one or more cabinets if valuables will be stored.
5. Consider elements for display of 2D and 3D projects.
6. ~~1.~~ Consider an addition interior door if provided for the purpose of after-hours/community use.

Premium:

7. ~~TBD~~Commercial appliances.
8. ~~2.~~ Oversize or non-standard doors.

Art Classrooms

Required:

1. Provide separate storage area and separate kiln room with exhaust (see also, Premium).
2. Specify cleanable and stain resistant room finishes, including countertops, floors, and wall backsplashes.
3. Design for abundant natural lighting with preferred north orientation.
4. Provide appropriate acoustical absorption in rooms with open ceiling structure.
5. Provide adequate storage for student projects.
6. Provide adequate wall display systems for hanging two-dimensional artwork.

Recommended:

7. Consider concrete or seamless floors that can resist paint, markers, and other art materials.
8. Consider floor drains with appropriate traps and trap primers.
9. Consider multiple station student cleanup sinks.

Premium:

10. Ceramics/pottery equipment in schools serving students below grade 9.
11. Stone or epoxy countertops.
12. Wood cabinetry or architectural millwork.
13. Decorative or special light track lighting.
14. Expensive tile floors such as stone, ceramic tile, or quarry tile.

Science Labs

Required:

1. Design and equip science labs to support the educational specifications and to conform to the [enter appropriate space standard source(s)]. Equip science rooms and labs to serve only the science program for which the room is designed.
2. Design science rooms or labs using best practices for safety.
3. Design science labs to allow for adult supervision throughout the room.
4. Provide deluge showers, eye wash stations, and emergency shut-off equipment where required for safety.
5. In science rooms and labs where chemicals will be used, specify appropriate chemical-resistant furniture and countertops, fume hoods, acid neutralization tanks, and plumbing that will prevent wastewater contamination.
6. In science rooms and labs where chemicals will be used, design appropriate safety equipment into the room and design appropriate prep rooms with lockable storage and fireproof, chemical-resistant cabinets.
7. In middle and high school science labs, provide appropriately designed tables and countertops for computer use with experiments.
8. Design to maximize shared amenities such as fume hoods, prep rooms, and storage.

Recommended:

9. TBD

Premium:

10. Compressed air systems
11. Gas at rooms other than chemistry
12. Fume hoods at rooms other than chemistry

Music Classrooms

Required:

1. Design band, chorus, keyboard, and practice rooms to prevent noise from leaking into adjacent spaces and floors. Design walls and floors to prevent noise through ceilings or structural elements.
2. Provide acoustic vestibules at doorways to prevent music from disturbing the rest of the building.
3. Tune band and chorus rooms with sound absorbing materials and acoustic mass to prevent sound transmission.
4. Tune chorus spaces to help amplify the human voice without the use of amplification systems.
5. Specify washable hard surface floors in band rooms.
6. Provide security glass in the doors of keyboarding and practice rooms.
7. Prefer flat floors with portable risers over permanent concrete step floors.
8. Design door configurations to allow for the easy movement of pianos, drums, and other large instruments.
9. Provide lockable storage for music instruments.

10. Design for convenient access to stages and other performance areas.

Recommended:

11. TBD

Premium:

12. Natural hardwood paneling or woodwork used as acoustical baffles and reverberation panels
13. Specialty flooring
14. Television or acoustical recording studios or services
15. Prefabricated practice rooms

Computer Lab/Technology Resource

Required:

1. TBD

Recommended:

2. TBD

Premium:

3. TBD

Consumer Education Classroom

Required:

1. TBD

Recommended:

2. TBD

Premium:

3. TBD

Career and Technology Education

Required:

1. TBD

Recommended:

2. TBD

Premium:

3. TBD

Gymnasiums

Required:

1. Provide synthetic sports floors in Pre-K-5 schools.
2. Specify MFMA-RL second or better grade, plain sawn hard maple floor systems for middle and high schools only.
3. Provide minimum underslab 15 mil vapor retarder that meets Class “B” WYB.

4. Refer to the [enter appropriate space standard source(s)]to determine the size of the gymnasium, locker rooms, bleachers and support areas.
5. Provide public toilet areas near the gymnasium.
6. Provide for wireless network computer access in the gymnasium and offices.
7. Locate gymnasiums adjacent to or with easy access to exterior playfields and parking lots for public events.
8. Locate bleachers and gymnasium doors to protect floors from street shoe traffic.
9. Provide energy-efficient lighting that can resist damage from thrown basketballs, softballs and dodge balls.
10. Provide safety and security cages around light switches, thermostats, sensors, etc.
11. Locate door swings, equipment, and other enclosures so they do not become dangerous obstructions to running students playing within the space.
12. Present affordable strategies for maintaining appropriate humidity levels for wood flooring.
13. Design gymnasiums with supporting toilet and shower facilities.
14. Consider sports net dividers to maximize class use of gyms.
15. Limit wall padding to competition court basketball backstops only.
16. Floor painting and striping for intended sports and physical education purposes.

Recommended:

17. Consider gymnasiums as possible multi-functioning and multipurpose spaces. Provide enough sound absorbing material to allow for good voice recognition, and appropriate sound amplification for group presentations
18. School names, mascots, or logos on floor and walls.

Premium:

19. Separate, specialized dehumidification systems for wood floors
20. Glass backboards or automatic electric winch backboards other than two for the main court
21. Climbing walls
22. Movable bleacher systems designed to be relocated throughout the room
23. Large, tall, electric operable divider systems
24. Specialty equipment other than basketball and volleyball supports or tie-downs
25. Batting cages
26. Television platforms for broadcasting games and events
27. College or professional grade floor systems

Auditoriums + Stage

Required:

1. Consult the [enter appropriate space standard source(s)] for state-supported stage sizes based upon program and grade configuration.
2. Specify a state-supported basic stage curtain, sound system, and theatrical lighting systems
3. Design dressing rooms, storage rooms, and scenery shops only if academic theater programs exist as part of the school curriculum.
4. Design a reasonably sized control booth, 10’-0" x 15'-0".

5. Specify sealed or painted concrete floors with carpeted aisles.
6. Locate the control booth for visual supervision of the stage and for video and audio recording of performances.
7. Design the auditorium stage and all support areas to be ADA accessible.

Recommended:

8. X

Premium:

9. Square footage that exceeds that required for seating one-third of the student body or for the appropriate stage as recommended by the [enter appropriate space standard source(s)]
10. Additional seating
11. Additional theater curtains
12. Proscenium arches wider than 60'-0"
13. Fly galleries
14. Stage gridirons, pin rails, or catwalks over stages
15. Proscenium openings higher than 25'-0" or stage ceilings higher than 30'-0"
16. Under-stage storage
17. Orchestra pits
18. Professional theater lighting systems
19. Theater balconies or spectator boxes
20. Elevators dedicated to serving just the auditorium
21. Special curved plaster wall or ceiling assemblies designed for acoustic balancing
22. Decorative wood paneling, wallpaper, and murals
23. Spaces and systems for “black-box” theaters

Category B – Support Teaching

Counseling/Testing

Required:

1. TBD

Recommended:

2. TBD

Premium:

3. TBD

Teacher Workrooms/Offices

Required:

1. TBD

Recommended:

2. TBD

Premium:

3. TBD

Teacher Breakroom

Required:

1. TBD

Recommended:

2. TBD

Premium:

3. TBD

Educational Resource Storage

Required:

1. TBD

Recommended:

2. TBD

Premium:

3. TBD

Time-out Rooms

Required:

1. TBD

Recommended:

2. TBD

Premium:

3. TBD

Parent Resource Rooms

Required:

1. TBD

Recommended:

2. TBD

Premium:

3. TBD

Category C – General Support

Administrative Areas

Required:

1. TBD

Recommended:

2. X

Premium:

3. X

Health Clinic + Nurse Space

Required:

1. TBD

Recommended:

2. X

Premium:

3. X

Conference Rooms

Required:

1. TBD

Recommended:

2. X

Premium:

3. X

Commons/Lobby

Required:

1. TBD

Recommended:

2. X

Premium:

3. X

Cafeteria

Required:

1. TBD

Recommended:

2. X

Premium:

3. X

Kitchen

Required:

1. TBD

Recommended:

2. X

Premium:

3. X

Multipurpose Room

Required:

1. TBD

Recommended:

2. X

Premium:

3. X

Student Store

Required:

1. TBD

Recommended:

2. X

Premium:

3. X

Weight Room

Required:

1. TBD

Recommended:

2. X

Premium:

3. X

Locker Rooms

Required:

1. TBD

Recommended:

2. X

Premium:

3. X

Pool

Required:

1. TBD

Recommended:

2. X

Premium:

3. X

Category D – Supplementary

Corridors

Required:

1. TBD

Recommended:

2. X

Premium:

3. X

Stairwells/Elevators

Required:

1. TBD

Recommended:

2. X

Premium:

3. X

Mechanical

Required:

1. TBD

Recommended:

2. X

Premium:

3. X

Telecom Rooms

Required:

1. Provide dedicated space for telecom rooms. Avoid co-locating racks in electrical or mechanical rooms.
2. Use 2-post racks unless equipment needs call for a 4-post.
3. Provide cable runway over racks for routing cabling.
4. Limit number of telecom rooms to minimum required per standards for size of the building.
5. Locate telecom room in central area of building where possible to average cable lengths.
6. Electrical panel serving the telecom room should have surge protection.

Recommended:

24. Provide rack-mounted UPS for essential systems.
25. Coordinate with Mechanical for cooling needs.
26. Locate utility service entrance in Main Telecom Room where possible.
27. Size room large enough to allow for fire alarm, access control, intrusion detection, DDC, and other similar systems to be located in the room.
28. Provide one circuit per rack, with a larger circuit provided to the main rack with UPS.
29. Use multi-connection KVM units instead of fixed monitors/workstations.
30. Install a paging speaker and telephone in the room.

Premium:

31. Central UPS systems.
32. Air conditioning if temperatures are not excessive in-rack cooling systems.

Maintenance & Receiving

Required:

1. TBD

Recommended:

2. X

Premium:

3. X

Building Storage

Required:

1. TBD

Recommended:

2. X

Premium:

3. X

Restrooms

Required:

1. TBD

Recommended:

2. X

Premium:

3. X

Custodial

Required:

1. TBD

Recommended:

2. X

Premium:

3. X

Conditioned Food Storage

Required:

1. TBD

Recommended:

2. X

Premium:

3. X

Recycling Rooms

Required:

1. TBD

Recommended:

2. X

Premium:

3. X

4. HIGH PERFORMANCE FACILITIES

The Alaska DEED encourages high-performance schools for Alaska communities. A high-performance school is designed to conserve natural resources, save money, and improve the overall health and well-being of students, staff, and community. Emphasis is placed on low-impact site design, reduced impact on local infrastructure, energy efficiency, water use reduction, non-toxic materials, waste management, indoor air quality, efficient operations, and community engagement.

High performance school design principles can be broken into three general areas of emphasis:

- Integrative design process
- Human health and comfort
- Demand reduction

These principles are woven throughout this document as both required strategies and suggestions for premium strategies. Resources on high-performance school design are included at the end of this section to provide further guidance to project teams.

A. Integrative Design Process

One of the key ingredients to creating a high-performance school is to conduct an integrative design process. The integrative design process is a collaborative approach that includes the full team in decision-making from project inception through design, construction, and commissioning. The process focuses on a whole-systems design approach: recognition that all the components of the building work interdependently and affect the performance of one another.

A few key steps to implementing an integrative design process include:

- Set sustainability goals with the owner at project inception.
- Conduct a full team meeting at the beginning of each project phase.
- Include high-performance design principles as an agenda item at all project meetings.
- Incorporate life cycle costs and operating costs into the project decision-making process.

Buildings are often budgeted on first costs alone. Life cycle costing takes a more integrated approach, factoring in energy savings over time, durability and reduced maintenance of systems and materials, and enhanced occupant health and productivity. High performance design principles place emphasis on looking at the building as a whole over time to minimize energy use, maximize cost savings, and create comfortable and healthy spaces for the occupants.

B. Human Health and Comfort

Learning environments have a huge impact on student performance, health, and overall well-being. High performance schools can provide high quality indoor air and thermal, visual, and acoustical comfort. Emphasis is placed on daylight in classrooms and views to the outdoors, HVAC and lighting controls, non-toxic materials, enhanced filtration, carbon dioxide sensors, cross-contamination prevention, natural ventilation, and increased outdoor airflow rates in mechanically ventilated spaces.

Benefits of high-performance schools can include improved student performance, increased student health, reduced student absentee rates, and greater staff satisfaction.

Required:

1. Low water consumption plumbing fixtures.
2. Provide third-party commissioning starting at project concept design.
3. Design heating and cooling systems to meet the requirements of ASHRAE 55 Thermal Comfort in Buildings (latest edition).
4. "Right sizing" of HVAC equipment based on development of building massing and envelope. May require multiple iterations as building layout changes during design.
5. Avoid operating independent heating and cooling systems simultaneously. Utilize HVAC systems that will redistribute heat while also providing cooling, such as variable refrigerant flow (VRF) systems.
6. Design variable output HVAC systems to adapt to varying building heating and cooling demands.
7. Utilize low temperature heating and cooling systems, such as in-floor radiant.
8. Use high-efficiency HVAC equipment.
9. Provide building occupants with individual access to building temperature controls.
10. Minimum MERV-13 filtration on all ventilation systems.
11. Demand control ventilation, with carbon dioxide (CO2) sensors installed in spaces with high occupant density.

Recommended:

12. Best practices include providing green spaces, open spaces, and shared community spaces in the building; reusing and recycling materials during construction and occupancy; and creating an environment that is a community teaching tool for high performance building and sustainable living.
13. Consider using energy modeling and iterative design to reduce building energy consumption by 5% over ASHRAE-90.1 (current version).
14. Consider providing more than ASHRAE 62.1 minimum outdoor air rates. This may not be appropriate for all locations in Alaska.
15. Consider using the building control system to monitor indoor air quality and adjust ventilation rates to mitigate contaminants such as CO2 and VOCs.
16. Consider providing a building flushout post construction.

Premium:

17. Provide on-going commissioning of the facility every 5 years.
18. Consider utilizing grey water reclamation systems for use with flushing plumbing fixtures.
19. Consider on-site harvesting of renewable energy such as wind and solar.
20. Provide static and/or dynamic educational displays describing the sustainable features of the facility.
21. Provide a display showing instantaneous and aggregate building water and energy consumption.

Demand Reduction

High-performance schools are designed to reduce demand on energy and natural resources, to optimize the performance of building systems, and to reduce the overall operating costs of the school. Emphasis is placed on energy efficient mechanical systems, high-performance envelope design, low-flow water fixtures, renewable energy systems, lighting and daylight controls, and energy efficient equipment and appliances.

As part of an integrative design process, energy modeling and commissioning will confirm that all systems and components are integrated to achieve optimum results and are installed and operated as designed. One strategy may offset another. For instance, daylight sensors may cost more up front as an individual strategy, but once energy savings and associated reduced mechanical loads are considered, the team may realize that they can save money by selecting a smaller mechanical system.

Practices to optimize systems integration and increase efficiency include energy modeling and building commissioning. Design-phase energy modeling is a tool to use early and throughout the design process to test a variety of energy efficiency measures to determine the best way to align systems and components. Commissioning also offers an opportunity to make adjustments in the field and to train occupants on how to use the systems, improving efficiency even further.

Employing high-performance principles such as demand reduction, energy efficiency, and system optimization results in climate appropriate solutions, buildings that have low-to-no impact on local infrastructure, and an overall reduction in the project's carbon footprint.

High-Performance Certifications

High-performance building certification systems such as the United States Green Building Council (USGBC) LEED for Schools Rating System can provide detailed guidance on implementing high performance school design strategies.

Although DEED recognizes the value of building certifications by a third-party organization, the State will not participate in costs associated with these certifications that may result in materials and systems that cannot be supported by the State.

Premium:

1. Green Building Certification: Register the project with the USGBC LEED Rating System and obtain LEED for Schools certification.
2. Educational Display: Provide a permanent display, building signage, digital dashboard, or building tour that describe the high-performance features of the school.
3. Carbon Footprint Reporting: Calculate the school's carbon footprint. Include a greenhouse gas inventory and opportunities to reduce greenhouse gas emissions.
4. Climate Action Plan: Develop and implement a climate action plan to raise awareness of the school community's carbon footprint and engage students, staff, and the community in reducing that carbon footprint.
5. Performance Benchmarking: Track the school's energy use over time, using a tool such as the US EPA's Energy Star Portfolio Manager.

Part 3. SYSTEM STANDARDS

01. SITE AND INFRASTRUCTURE

[The following Site and Infrastructure language was added by department Facilities staff in the 2/12/2021 draft version.]

011 Reserved

011X TBD

012 Reserved

012X TBD

013 Site Improvements

0131 Vehicular Surfaces

Required:

1. Parking areas, access drives, and vehicular circulation will have appropriate structural subbase, 4 inch basecourse, and 2 inch asphalt paving; increase cross-section at truck delivery and bus loops.
2. Provide parking spaces at a ratio of 1/20 K-6 students and 1/15 9-12 students for the projected student population.
3. Provide dedicated bus lanes/bus loops and dedicated parent pick-up/drop-off areas. Design vehicle circulation and parking areas to maximize site safety.
4. Minimize islands and other obstructions in parking areas, except where needed for circulation control, to accommodate snow removal and storage.
5. Provide parking lot lighting to IES standards. (Ref. Section *0163 Lighting & Equipment* for additional provisions.)
6. Provide accessible parking spaces in accordance with applicable codes.

Recommended:

7. Consider a top course of uniform gravel, crushed rock, or recycled asphalt in any community without access to a batch or drum-mix plant within an approximate 45min delivery radius.
8. In roadless communities, consider vehicular surfaces of the best available local fill.
9. Consider designing mitigations in vehicular pavement to prevent stormwater and snowmelt from flowing across pedestrian surfaces.
10. Consider speed control measures a long straightaways and high-pedestrian areas.
11. Consider designating parking spaces near the main entrance for carpool and low-emitting vehicles.
12. Consider providing headbolt heaters at staff parking areas in climate zones 8 and 9. (Ref. Section *0161 Electrical Services & Distribution* for additional provisions.)

Premium:

13. Paving plants as a project cost.
14. Additional parking and locally mandated parking over the above the standards.
15. Concrete pavement other than at loading dock aprons and dumpster approaches.
16. Asphalt concrete pavement more than 2in thick except at loading docks, bus loops, and dumpster approaches which may be 4in.
17. “Porous” drainage pavement.
18. Access controlled (e.g., magnetic cards, etc.) parking lots.
19. Colored pavement.
20. Radiant parking snow melt systems.
21. Headbolt heaters in climate zones 6 and 7, or those in zones 8 and 9 beyond 50% of the anticipated number of school staff.

0132 Pedestrian Surfaces

Required:

1. X

Recommended:

2. X

Premium:

3. Concrete or asphalt pavers.
4. Concrete walks other than at the main entrance.
5. Radiant sidewalk snow melt systems

0133 Elevated Decks & Ramps

Required:

Recommended:

Premium:

0134 Site Walls

Required:

Recommended:

Premium:

0135 Landscaping & Irrigation

Required:

1. Prioritize the location of plantings at the main entrance and as buffering for paved areas and walks, and along public building facades.
2. Avoid plantings that create a security or visibility issue near entrances.
3. Provide native, water conserving plants.
4. Plant trees of a reasonable size and caliper.
5. Locate trees away from the building to provide a minimum of 12'-0" clearance from the drip line of a fully grown tree.

Recommended:

6. X

Premium:

7. Annual plantings.
8. Buffering plantings required by local authorities.
9. Non-native plantings or trees.
10. Site irrigation systems for athletic fields.

0136 Fencing and Gates

Required:

1. X

Recommended:

2. X

Premium:

3. Chain link fence coatings and screen slats.

0137 Site Furnishings & Equipment

Required:

1. X

Recommended:

2. X

Premium:

3. Decorative benches and elements.
4. Stone benches or plazas.

0138 Playgrounds & Playfields

Required:

1. Design field orientation to conform with National Associations–Court and Field Diagrams.
2. Design play areas to conform to ASTM (American Society of Testing Materials) standards and the publication by the National Principals Association.

3. Specify play area equipment and surfaces to meet Consumer Product Safety Commission standards.
4. Provide drainage for play areas to prevent ponding.
5. Specify surfaces and play equipment for soft play areas that meet ADA and OSHA standards.
6. Provide subsurface drainage systems under soft play areas.
7. Use linear shapes and simple forms at play areas to accommodate snow removal and maintenance.
8. Specify playground equipment constructed of durable, weather-resistant, low maintenance materials.

Recommended:

9. Consider bike racks at the main entrances to the building.
10. Consider installing empty conduit for future power to the athletic fields.

Premium:

11. Athletic and play areas that exceed the DEED's minimum standards.
12. Bike trails or exercise trails.
13. Bleachers, lighting, concession stands, irrigation systems, press boxes, scoreboards, and drinking fountains.

0139 Other Site Improvements

Required:

Recommended:

Premium:

014 Site Structures

0141 Freestanding Shelters

Required:

Recommended:

Premium:

0142 Attached Shelters

Required:

Recommended:

Premium:

0143 Support Buildings

Required:

Recommended:

Premium:

015 Civil/Mechanical Utilities

0151 Water Systems

Required:

1. Select sites with public water available to the site.
2. Locate water utility connections away from main building entrance.
3. Coordinate water connections with wastewater, and fuel utility connections to enter building at mechanical utility spaces.
4. Where water piping is installed above ground outside of buildings, locate piping away from the main building entrance.
5. Locate water piping to allow access for pipe maintenance and building maintenance; locate piping away from pedestrian walkways and vehicle traffic to the greatest extent practicable.

Recommended:

6. Consider recirculating and/or heat trace on water supply mains as required by site climate conditions.

Premium:

7. Avoid depressed loading docks.

0152 Sanitary Sewer

Required:

1. Select sites with public wastewater available to the site.
2. Locate wastewater utility connections away from main building entrance.

3. Coordinate wastewater connections with water, and fuel utility connections to enter building at mechanical utility spaces.
4. Where wastewater piping is installed above ground outside of buildings, locate piping away from the main building entrance.
5. Locate wastewater piping to allow access for pipe maintenance and building maintenance; locate piping away from pedestrian walkways and vehicle traffic to the greatest extent practicable.
6. Locate kitchen delivery areas, school maintenance, delivery, and dumpsters away from the main building entrance or student activity areas.
7. Locate the dumpster to encourage and maximize recycling of waste materials. Show storage areas for recycled materials in and outside the building on site and building plans.
8. Enclose the dumpster with an 8'-0"-high chain link fence and set it on a bituminous concrete slab with steel bollard bumpers. Provide a 12'-0"-long reinforced concrete pad on the loading side of the dumpster.

Recommended:

9. Consider wastewater pretreatment systems at sites with septic systems.
10. Consider coordinating with the vacuum waste utility to have vacuum collection sumps installed within the school building, for sites served by utility level vacuum waste systems.

Premium:

11. X.

0153 Storm Water

Required:

1. Design an on-site drainage system to keep stormwater run-off away from the building and to keep grounds, paved areas, and playfields free of standing water.
2. Design “open pond” stormwater storage systems. Avoid buried storage systems.
3. Enclose stormwater ponds and holding areas with 4'-0"-high galvanized chain link fencing. Provide gates for maintenance.
4. Provide drip edges at sloped roof areas with positive means of collecting roof runoff and a pipe to convey the flow to the drainage system. Do not use perimeter foundation drains to intercept roof runoff.

Recommended:

5. X

Premium:

6. Chain link fence coatings and screen slats.

0154 Fuel Systems

Required:

1. Locate fuel oil storage away from the building front entrance.

2. Enclose bulk fuel oil storage areas with 8'-0"-high galvanized chain link fencing. Provide gates for maintenance.
3. Install UL-142 above grade double wall intermediate fuel oil storage tank as close as practicable to fuel-fired mechanical equipment. Enclose with 6'-0"-high galvanized chain link fencing. Provide gates for maintenance.
4. Provide containment for fuel oil piping installed below ground including double-wall fuel-rated piping, corrugated carrier pipe, pipe transition and containment sumps.

Recommended:

5. Consider installing a fuel leak detection system with alarms to monitor integrity of fuel storage tank and distribution piping.

Premium:

6. Do not bury ferrous fuel oil piping.
7. Fuel level monitoring system with digital outputs for remote viewing and connection to building energy management system/control system.

0155 Heating/Cooling Piping & Utilidors

Required:

1. X

Recommended:

2. X

Premium:

3. X.

016 Site Electrical

0161 Electrical Service & Distribution

Required:

1. Utilize 3-phase power if available.
2. Coordinate with the local utility for connection point, distribution voltage, and power plant capacity early in the design.

Recommended:

3. If designing the line extension, try to locate transformers as close as practical to service entrance.

Premium:

4. X

0162 Data/Comm Service & Distribution

Required:

1. Utilize public fiber optic services if available.

Recommended:

2. Where practical, use the same routing as power to reach site/building.

Premium:

3. X

0163 Lighting & Equipment

Required:

1. This lighting is for general use. Specific applications such as athletic fields, hockey rinks, and similar would be included in design of those site elements.
2. Building-mounted lighting may be used for site lighting if practical, or as a supplement to pole-mounted lighting.
3. Pole-mounted lighting should be designed for roadway, driveway, and parking areas per IES standards. Additional lighting should be considered for hardscape, playground equipment, sledding hills, and similar areas where use may require artificial lighting.
4. Poles should be located on the perimeter of parking areas to stay out of the way of snow removal paths as much as possible.
5. Lighting parameters including minimum lighting levels, glare, uniformity, and similar should meet IES standards where no local code is in effect.

Recommended:

6. Consider providing conduit to new poles for signal wiring to cameras, wireless access points, etc., as design budget and need allows.

Premium:

7. X

0164 Security Systems

Required:

Recommended:

Premium:

017 Offsite Work

0171 Offsite Improvements

Required:

Recommended:

Premium:

0172 Offsite Utilities

Required:

Recommended:

Premium:

0173 Other Offsite Work

Required:

Recommended:

Premium:

02.**SUBSTRUCTURE**

[The following Site and Infrastructure language was added by department Facilities staff in the 2/12/2021 draft version.]

021 Standard Foundations & Basements

0211 Continuous & Column Footings

Required:

1. 4000psi concrete is the basis of design. Mixes for other strengths are subject to evaluation by life-cycle cost analysis.
2. Carbon steel reinforcing bar is the basis of design with ratios in the 30-80lbs range per cubic yard of concrete.
3. Design footings sized in accordance with building codes, soils and superimposed loads.
4. Soil bearing pressures below 2000psi require site selection justification and DEED approval.

Recommended:

5. All weather wood (AWW) footings consisting of timbers and strongbacks are acceptable where soils are appropriate (i.e., low moisture, non-permafrost). AWW foundations must be supported by appropriate life-cycle cost analysis.

Premium:

6. Coated reinforcing bar, including galvanized and epoxy, and stainless steel.
7. Reinforcing bar above 80lbs per cubic yard of concrete.

0212 Foundation Walls & Treatments

Required:

1. Extend foundation walls to frost depths per local conditions/codes.
2. 4000psi concrete is the basis of design. Mixes for other strengths are subject to evaluation by life-cycle cost analysis.
3. Carbon steel reinforcing bar is the basis of design with ratios in the 50-100lbs per cubic yard of concrete.
4. Design foundation walls sized in accordance with building codes, soils and superimposed loads.
5. Insulate foundations as required by DEED-adopted energy codes to eliminate or minimize heat loss.
6. Provide dampproofing treatment as required by local conditions/codes.
7. Provide durable (e.g. 10mil poly) vapor barrier on all exposed earth contained within foundation walls.

Recommended:

8. Concrete masonry units (CMU foundation walls, with reinforcing, are acceptable.
9. All weather wood (AWW) foundation walls consisting of framing and sheathing are acceptable where soils are appropriate (i.e., low moisture, non-permafrost). AWW foundations must be supported by appropriate life-cycle cost analysis.
10. Frost protected shallow foundations (FPSF) including perimeter insulation are acceptable when supported by appropriate life-cycle cost analysis.
11. Avoid below grade functional space enclosed by foundation walls whenever possible.
12. Exterior sheet waterproofing on foundation walls that enclose space below the finish grade level; includes below-grade mechanical and service spaces.

Premium:

13. Coated reinforcing bar, including galvanized and epoxy, and stainless steel.
14. Reinforcing bar above 100lbs per cubic yard of concrete.
15. Foundation walls enclosing below grade space classified under adopted codes as occupied space.

0213 Foundation Drainage

Required:

1. Install perimeter foundation drainage only where required by codes adopted by the state or a local jurisdiction with delegated authority.

Recommended:

2. When required by local conditions/code, perforated pipe footing drains bedded in drain rock with filter fabric are acceptable.

3. Run foundation drain systems to daylight where possible and appropriate (see *0153 Storm Water* for standards on site drainage collection).
4. Drainage mats and other water/moisture control measures are acceptable when required by site conditions and supported by appropriate life-cycle cost analysis.

Premium:

5. Sites requiring underslab drainage.

022 Slab on Grade

0221 Structural & Non-structural Slab

Required:

1. 4000psi concrete is the basis of design for interior slabs. 5000psi concrete is the basis of design for exterior, exposed slabs. Mixes for other strengths are subject to evaluation by life-cycle cost analysis.
2. Carbon steel reinforcing bar is the basis of design with ratios in the 20-50lbs range per cubic yard of concrete.
3. Structural slabs are not anticipated except at isolated point loads for installed equipment.
4. Non-structural slabs shall be 4” nominal thickness.
5. Provide standard compacted sub-base, welded wire fabric reinforcement, moisture control, and trowel finish.
6. Insulate slabs as required by DEED-adopted energy codes to eliminate or minimize heat loss.
7. See *0311 Lower and Main Floors* for wood and steel superstructures.

Recommended:

8. Consider reinforcing bar in non-structural slabs where required for slab openings, incidental loads, and perimeter durability.
9. Consider shrinkage and crack control using glass fiber reinforcing in-lieu of or in addition to welded wire fabric.
10. Integrate footings and slabs where part of an approved design assembly such as at FPSF.
11. Consider polished concrete finish where appropriate to be used in-lieu of applied floor coverings.
12. Consider providing full frost-depth wall foundations under entry slabs where necessary to prevent frost heaving.
13. including perimeter insulation are acceptable when supported by appropriate life-cycle cost analysis required by site conditions and supported by appropriate life-cycle cost analysis.

Premium:

14. Coated reinforcing bar, including galvanized and epoxy, and stainless steel.
15. Reinforcing bar above 50lbs per cubic yard of concrete.
16. Colored or decorative concrete slabs exceeding 40 percent of exposed concrete.

0222 Trench, Pit and Pad

Required:

1. 4000psi concrete is the basis of design for pits and pads. Mixes for other strengths are subject to evaluation by life-cycle cost analysis.
2. Carbon steel reinforcing bar is the basis of design with ratios in the 50-100lbs range per cubic yard of concrete.
3. Elevator pits shall be provided in the dimensions and depths required.
4. Pads to provide adequate securing of equipment will be provided where required for anchoring or other safety measures were required by codes adopted by the state or a local jurisdiction with delegated authority.

Recommended:

5. Consider non-seismic housekeeping pads for major HVAC and electrical equipment at nominal heights not to exceed 4in above the surrounding floor level.

Premium:

6. Trenches formed of concrete; slab block-outs and reinforcing for nominal trench drains in support of CTE are acceptable.

0223 Underslab Elements

Required:

1. None.

Recommended:

2. Consider underslab rigid insulation in support of FPSF and where otherwise supported by an energy life-cycle cost analysis of the proposed heating system.

Premium:

3. Sites requiring underslab drainage.

024 Special Foundations

0241 Piling & Pile Cap

Required:

1. Provide a steel H-pile foundation including steel or lumber pile caps and required lateral bracing where soil bearing pressures cannot support a standard foundation or where it is not cost effective to remove poor soils and replace with suitable fill.
2. Install thermistor tubes integral with pile.

Recommended:

3. Consider a treated wood piling foundation including timber or engineered lumber pile caps, and required lateral bracing for smaller education related facilities up to 5000gsf.
4. Consider steel pipe piles where supported over H-piles based on a life-cycle cost analysis.

Premium:

5. Sites where pile stick-up exceeds a total average of 6ft for all piles, or any pile stick-up exceeds 12ft.
6. Pile foundations exceeding 40#/FPA (does not include lateral bracing or pile caps).

0242 Caissons

Required:

1. None; caisson foundations not anticipated.

Recommended:

2. Consider caisson foundations where bedrock (+/- 15,000psi) occurs at shallow depths of up to 8ft below grade. If this foundation is proposed, it must be supported with an appropriate cost analysis of the full substructure.

Premium:

3. Caisson foundations where total estimated 02 Substructure cost exceeds other alternatives.

0243 Grade Beams

Required:

1. None; grade beam foundations not anticipated.

Recommended:

2. Consider grade beam foundations where adequate support for continuous footings is not available, subgrade point loads are available or can be created (i.e., piliing, etc.), and concrete is readily available and cost effective. If this foundation is proposed, it must be supported with an appropriate cost analysis of the full substructure.

Premium:

3. Grade beam foundations where total estimated 02 Substructure cost exceeds other alternatives.

0244 Arctic Foundation Systems

Required:

1. Provide an arctic foundation system consisting of thermopile (with or without helical ribs, pile extensions, steel or lumber pile caps and required lateral bracing where soils consist of continuous or discontinuous permafrost.
2. Install thermistor tubes adjacent to each pile.
3. Thermopile and thermosyphons will be included in a project's commissioning plan unless approved otherwise by DEED.

Recommended:

4. Consider passive thermosyphons in-lieu-of thermopile where suitable fill is available to support installation of standard foundations.
5. Consider underslab rigid insulation in support of FPSF and where otherwise supported by an energy life-cycle cost analysis of the proposed heating system.

Premium:

6. Arctic foundations with active refrigeration.
7. Gravel pads in conjunction with thermopile arctic foundations.

0245 Other Special Foundations

Required:

1. None; other special foundations such as sheet pile, raft, multi-point frame, etc. are not anticipated.

Recommended:

2. Consider other special foundations when building loads and soil conditions may exclude other substructure solutions. If a special foundation is proposed, it must be supported with an appropriate cost analysis of the full substructure.

Premium:

3. Other special foundations where total estimated 02 Substructure cost exceeds other alternatives.

A. Design Ratios

Standard Foundations & Basements

1. Total building deadload/GSF
2. Cubic feet of concrete/GSF
3. Pounds of rebar/CY concrete

Slab on Grade

4. Total building deadload/GSF
5. Cubic feet of concrete/GSF
6. Pounds of rebar/CY concrete

Special Foundations

7. Total building deadload/GSF
8. Pile weight (LB)/Footprint area (FPA).
9. Install

B. Design Criteria

Substructure is typically far more expensive in Alaska than in other parts of the country. Usually substructure system options are limited by the soil conditions of a particular site. As it affects the cost of site development, the soil conditions of the selected site also play a large part in the cost of the foundation system and determining the number of substructure system options that are acceptable on a given site. Thus, the quality of soils should be given significant weighting when evaluating site options. Building sites whose soil conditions allow the use of standard concrete foundations are preferable to sites that require piling foundations.

- Multi-story construction shall be considered and presented as a schematic design option for all school structures over 40,000 GSF
- Where appropriate for soil conditions, standard concrete foundations are almost always the preferred substructure system
- If any other substructure system is to be considered, a cost analysis will be performed. Cost analysis shall include cost of energy and maintenance.
- Where soils are of low moisture content, all weather wood foundations should be considered for facilities smaller than 20,000 GSF
- Where appropriate for soil conditions, substructure systems utilizing a heated crawlspace with perimeter closure are preferable to substructure systems that utilize an elevated building with an air space between the underside of the building and grade

03.**SUPERSTRUCTURE**

[The following Site and Infrastructure language was added by department Facilities staff in the 2/12/2021 draft version.]

A. Building System Summary

The ***Superstructure*** of a building consists of all gravity and lateral force resisting members above the substructure to and including the roof deck. The department recognizes three sub-categories in this building system: ***Floor Structure***, ***Roof Structure***, and ***Stairs***. Floor, roof, and stair structures normally include vertical members (columns, walls), horizontal members (beams, joists/rafters, trusses), decking (wood sheathing, concrete, etc.), and a variety of bracing elements. In some superstructure systems with bearing walls (e.g., masonry units, light-gauge steel, nominal wood framing, etc.) the superstructure blends with the Exterior Closure and Interiors systems. In ***Floor Structure*** using slab-on-grade, the system overlaps with ***Substructure***.

B. Design Philosophy

Alaskan schools must be provided with an adequate superstructure which responds efficiently, and effectively to building loads as prescribed in adopted building codes and to the conditions of the local environment and building's use. Structural efficiency measures include minimizing the deadload of the building, selecting high strength-to-weight and strength-to-cost materials, building simplicity, and structural member uniformity. A uniformly loaded floor system is typically the most cost-effective elevated floor system; concentrated point loads must be accommodated but should be minimized. It should be noted that concrete slab on grade floor systems is the least expensive floor system in areas where concrete is readily available For additional design parameters see the **Design Ratio** section of this system.

The same can be said for roof assemblies that are typically comprised of roof sheathing, roof rafters or trusses, beams, and columns carrying concentrated vertical loads to the foundation or a lower floor assembly. Structural roof assemblies that utilize load-bearing partitions are typically more cost-effective than assemblies that use post and beam systems to bear vertical loads. With the inclusion of the structural insulated panels in the roof assembly and its use to replace both the roof sheathing and roof rafters or trusses due to its large span and loading limits, roof assemblies have become more

reliant on a post and beam assembly. While the use of structural insulated roof panels may reduce the time required to fully construct the structural roof assembly, its inherent inclusion of heavily loaded beams and columns adds to the overall cost of the superstructure.

The previous paragraphs deal with how the structural systems are designed to accommodate gravity loads. Consideration must also be given to how the structural system performs under lateral, seismic, and wind loading conditions. The best way to design a cost-effective structural system to handle wind loads is to limit them. The building's form and massing play a significant role in limiting the structure's exposure to wind loads and should be considered by the architect at the outset of design. Buildings that expose large areas of high bay space to lateral wind loads will not be conducive to cost-effective structural design.

C. Model Alaskan School

The Model Alaskan School includes a main floor structure of reinforced concrete slab on grade and includes a small portion of elevated floor with steel columns, beams, joists, metal decking and concrete. The roof structure uses a combination of wood frame bearing wall, steel columns, beams, joists, and metal decking. Steel angle bracing and light gauge steel shear walls provide lateral support. Acceptable alternatives are detailed in the construction standards that follow.

031 Floor Structure

0311 Lower & Main Floors

Required:

1. Structural frame floor assemblies of wood or metal consisting of posts, beams/frame walls, joists, and decking are required when slab on grade is not cost effective. Support frame floor assemblies with appropriate cost analysis (e.g., in geographic regions where the cost of concrete is high, or soils will not permit this standard).
2. Design frame floor assemblies (materials, size, spacing, etc.) for maximum efficiency in accordance with building codes and superimposed loads.
3. HHS shapes for columns/posts, W-shapes for beams/girders, open web trusses for joists and fluted sheet metal for decking form the basis of design.
4. Wood members functioning in the capacity of metal deck and concrete must be minimum 1-1/8" wood structural panel or wood decking.
5. Insulate frame floors as required by DEED-adopted energy codes to eliminate or minimize heat loss.
6. Provide protective coating on structural members as required by local conditions/codes.

Recommended:

7. Consider light-gauge steel, engineered wood, or lumber for any component listed in the basis of design. Support light gauge steel and wood members and assemblies with appropriate cost analysis and justification (e.g., building dimensions and configurations with small spans).
8. Consider, where pile foundations (0241, 0244) are accepted, a structural insulated panel (SIP), with or without embedded floor joists, as required to meet code-specified loading. If panels will not span between pile caps, consider intermediary engineered wood beams or steel wide

flange beams. Support SIP assemblies with an appropriate cost analysis of the full substructure and 0311 floor structure.

Premium:

9. Framed floor assemblies where total estimated 02 Substructure + 0311 Lower and Main Floors cost exceeds other alternatives.

0312 Upper Floors

Required:

1. Provide structural frame floor assemblies of wood or metal consisting of columns, beams/frame walls, joists, and decking.
2. Design upper floor assemblies (materials, size, spacing, etc.) for maximum efficiency in accordance with building codes and superimposed loads.
3. HHS shapes for columns/posts, W-shapes for beams/girders, open web trusses for joists and fluted sheet metal for decking form the basis of design.
4. Wood members functioning in the capacity of metal deck and concrete must be minimum 1-1/8" wood structural panel or wood decking.
5. Insulate upper floor perimeters as required by DEED-adopted energy codes to eliminate or minimize heat loss.
6. Provide protective coating on structural members as required by local conditions/codes.

Recommended:

7. Consider light-gauge steel, engineered wood, or lumber for any component listed in the basis of design. Support light gauge steel and wood members and assemblies with appropriate cost analysis and justification (e.g., building dimensions and configurations with small spans).
8. Consider framed bearing walls in-lieu-of columns and beams/girders where cost effectiveness can be increased when considering the combination of systems in 0312 and 0411 Exterior Walls or 0312 and 0611 Fixed Partitions.
9. Consider, where pile foundations (0241, 0244) are accepted, a structural insulated panel (SIP), with or without embedded lumber, as required to meet code-specified loading. If panels will not span between pile caps, consider intermediary engineered wood beams or steel wide flange beams. Support SIP assemblies with an appropriate cost analysis of the full substructure and 0311 floor structure analysis.

Premium:

10. Framed floor assemblies where total estimated 02 Substructure + 0311 Lower and Main Floors cost exceeds other alternatives.
11. Exterior balconies and construction.

0313 Ramps

Required:

1. Ramps accepted with framing equal *to 0311 Lower and Main Floors* and alternative systems as required by building function and with approved cost analysis.

Recommended:

2. Consider light-gauge steel, engineered wood, or lumber for any component listed in the basis of design. Support light gauge steel and wood members and assemblies with appropriate cost analysis and justification (e.g., ramp dimensions and configurations).
3. See Section *0711 Passenger Elevators* for use of ramps in-lieu-of elevators.

Premium:

4. Framed ramp assemblies where total estimated 02 Substructure + 0311 Lower and Main Floors cost exceeds other alternatives.
5. Ramps wider than 10% of the minimum permitted under applicable codes.

032 Roof Structure

0321 Pitched Roofs

Required:

1. Provide structural frame roof assemblies of wood or metal consisting of columns, beams/frame walls, rafters, and decking.
2. Provide trusses where clear spans are required or possible (gymnasiums, multipurpose, library, etc.).
3. Design roof assemblies (materials, size, spacing, etc.) for maximum efficiency in accordance with building codes and superimposed loads.
4. HHS shapes for columns/posts, W or HSS steel for beams/girders, open web trusses or engineered wood for rafters, and fluted sheet metal for decking form the basis of design.
5. Wood members functioning in the capacity of metal deck may wood structural panel or wood decking with appropriate span ratings as required by applicable building codes.
6. Provide protective coating on structural members as required by local conditions/codes.

Recommended:

7. Consider light-gauge steel, engineered wood (including GLB) or lumber for any component listed in the basis of design. Support light gauge steel and wood members and assemblies with appropriate cost analysis and justification (e.g., building dimensions and configurations with small spans).
8. Consider framed bearing walls in-lieu-of columns and beams/girders where cost effectiveness can be increased when considering the combination of systems in 0321 and 0411 Exterior Walls or 0321 and 0611 Fixed Partitions.
9. Consider a structural insulated panel (SIP), with or without embedded lumber, as required to meet code-specified loading. Support SIP assemblies with an appropriate cost analysis of the full substructure and 0321 roof structure analysis.

Premium:

10. Framed roof assemblies where total estimated 02 Substructure + 0321 Pitched Roofs cost exceeds other alternatives.

0322 Flat Roofs

Required:

1. Provide structural frame roof assemblies of wood or metal consisting of columns, beams/frame walls, rafters, and decking.
2. Provide trusses where clear spans are required or possible (gymnasiums, multipurpose, library, etc.).
3. Design roof assemblies (materials, size, spacing, etc.) for maximum efficiency in accordance with building codes and superimposed loads.
4. HHS shapes for columns/posts, W or HSS steel for beams/girders, open web trusses or engineered wood for rafters, and fluted sheet metal for decking form the basis of design.
5. Wood members functioning in the capacity of metal deck may wood structural panel or wood decking with appropriate span ratings as required by applicable building codes.
6. Provide protective coating on structural members as required by local conditions/codes.

Recommended:

7. Consider light-gauge steel, engineered wood (including GLB) or lumber for any component listed in the basis of design. Support light gauge steel and wood members and assemblies with appropriate cost analysis and justification (e.g., building dimensions and configurations with small spans).
8. Consider framed bearing walls in-lieu-of columns and beams/girders where cost effectiveness can be increased when considering the combination of systems in *0322* and *0411 Exterior Walls* or *0322* and *0611 Fixed Partitions*.

Premium:

9. Exposed structural members where cost analysis demonstrates a cost increase above 2% for the *0321* and *0322* systems.
10. Framed roof assemblies where total estimated *02 Substructure* + *0322 Flat Roofs* cost exceeds other alternatives.

0323 Special Roofs

Required:

1. None; other special roof such as (occupied) roof decks, canopies, etc. are not anticipated.

Recommended:

2. Consider other special roofs when building loads, logistics, materials and construction may exclude other roof solutions. If a special roof is proposed, it must be supported with an appropriate cost analysis of the full superstructure.

Premium:

3. Other special roofs where total estimated 03 Superstructure cost exceeds other alternatives.

033 Stairs

0331 Stair Structure

Required:

1. Provide stair structure assemblies for stairs and landings, of wood or metal consisting of stringers, treads, risers, connectors, beams/joists. Treads and landings may include concrete decking.

2. Design stair assemblies (materials, size, spacing, etc.) for maximum efficiency in accordance with building codes and superimposed loads (example: plate steel stringers with stiffening provided by treads and risers).
3. Provide stairs in the quantity prescribed by code and with dimensions not greater than 10% of code minimums.
4. Provide protective coating on structural members as required by local conditions/codes.

Recommended:

5. Consider up to one stair associated with a primary common area or public space that has 'architectural features' such as: no stair enclosure, concealed structure, concealed connections, open risers, cantilevered treads, integrated enhanced finishes, etc.
6. Consider alternative stair types where permitted by code for limited access such as alternating tread stairs.

Premium:

7. Stairs with any dimension greater than 10% of the minimum permitted under applicable codes.
8. More than one stair with 'architectural features'.

0332 Stair Railings

Required:

1. Provide stair railing assemblies for stairs and landings, of wood or metal consisting of posts, rails, spindles/panels, shoes, and connectors.
2. Design railing assemblies (materials, size, spacing, etc.) for maximum efficiency in accordance with building codes and superimposed loads.
3. Provide railings in the quantity prescribed by code and with dimensions not greater than 10% of code minimums.
4. Provide protective coating on railing members as required by local conditions/codes.

Recommended:

5. Consider up to one stair railing associated with a primary common area or public space that has 'architectural features' such as: decorative posts, tempered glass panels, , concealed structure, concealed connections, open risers, cantilevered treads, integrated enhanced finishes, etc.
6. For stairs railings in high-visibility areas, consider stainless steel for all high-wear elements such as handrails and shoes to reduce long-term maintenance costs.
7. Where functionally and visually appropriate, consider stair railings with top rails at guardrail heights and separate handrails.

Premium:

8. Railings with any dimension greater than 10% of the minimum permitted under applicable codes except as noted.
9. More than one stair railing with 'architectural features'.

0333 Ladders & Steps

Required:

1. Provide ladder assemblies of wood or metal consisting of rails, rungs, cages, and connectors.
2. Provide structural step assemblies in conformance with applicable provisions of *0331 Stair Structure*.
3. Design ladder assemblies (materials, size, spacing, etc.) for maximum efficiency in accordance with building codes and superimposed loads.
4. Provide ladders in the quantity prescribed by code and with dimensions not greater than 10% of code minimums.
5. Provide protective coating on ladder members as required by local conditions/codes.

Recommended:

6. Consider alternating tread stairs and other alternatives to ladders to improve access.

Premium:

7. Ladder and step materials not commonly accepted as 'utilitarian'.

D. Design Criteria & Ratios

Criteria

- All single-story structures and smaller (60,000 GSF or less) two story structures should utilize uniform loading structural systems (i.e. load bearing walls) wherever feasible.
- Building massing should limit exterior wall area and exterior exposure of large high bay spaces to wind loads.

Ratios

04. EXTERIOR CLOSURE

[The following Exterior Closure language is from the BDS submittal]

The overall building design affects the performance of the exterior closure. The footprint, configuration, and structural grid should be simple and straightforward, without complex geometries. The State prefers multi-level buildings to reduce the overall footprint and to decrease the exterior surface and roof area. Design Ratios are referenced where applicable. Exterior walls should be straight, with few, if any, curves. Avoid complex configurations with unnecessary corners and changes of materials. DEED-adopted energy codes will have a significant influence on envelope design and must be complied with in the most cost-effective way possible. Exterior closures should be designed holistically to control transfer of heat, air, moisture, vapor drive, daylight and noise.

041 Exterior Walls and Soffits

Required:

1. Wall and soffit assemblies should be designed to consider life-cycle analysis, energy efficiency, durability, low or no required maintenance and overall costs of assemblies.
2. Materials used for exterior enclosures shall be of commercial grade, durable with an intended 20-year or longer usable life.
3. Consider use of a load-bearing exterior wall assembly where feasible. Wall assemblies constructed from dimensional lumber, structural insulated panels, metal studs, and concrete masonry units are all capable of serving this dual-purpose role as exterior closure and structural system.
    a. Wood studs – FC-3, LCCA-3, Labor intensive.
    b. Structural insulated panels FC-3 to 4 (better in remote locations), LCCA-3.
    c. Metal Studs – FC-4, Thermal Bridging leads to more complex total wall assembly. LCCA=3.
    d. Concrete masonry units FC-3 (rural location 1). LCCA-1. CMU become very expensive in rural location due to freight. CMU has addition LCCA cost for future renovation as it is difficult to remove/modify.
4. Exterior Cladding and Siding: Exterior material choices are numerous and diverse. When choosing cladding, careful consideration should be given to design guidelines listed above and coordinated with District design preferences. Products that require sealants and repeated paint and stain maintenance are discouraged. Products include:
    a. Structural Insulated Panels (SIP): Overall thickness, surface thickness, and R-value appropriate to region and structural design intent. FC-3, LCCA-3
    b. Metal Wall Panels: 24-gauge minimum thickness zinc-coated (galvanized) or aluminum-zinc alloy-coated sheet steel. fluoropolymer exterior finish with minimum 20-year finish warranty. FC-2, LCCA-2, (in rural locations overall wall system maybe more expensive as more layers of material are used in total system.
    c. Insulated Metal Wall Panels (IMP): 24-gauge minimum thickness zinc-coated (galvanized) or aluminum-zinc alloy-coated sheet steel. fluoropolymer exterior finish with minimum 20-year finish warranty. R-value as appropriate to the climate and region. FC-2, LCCA-2
    d. Phenolic Resin Panels: install per manufacturer's instructions on recommended mounting and fastening systems. Specify colors and patterns proven to not fade over time due to ultraviolet radiation exposure. FC-4, LCCA-2
    e. Fiber Cement Panels: install per manufacturer's instructions on recommended mounting and fastening systems. FC-4, LCCA-2
    f. Exterior Insulation Finish System (EIFS). Specify impact resistant mesh that will resist damage from projectiles. Provide flashing to prevent water intrusion into the system. Provide drainage layer behind insulation layer to allow moisture to escape if needed. FC-4, LCCA-2 to 4, (expensive to repair in rural locations).
    g. Exterior Masonry: Can also serve as the structural system. Consider also as an exterior 4' to 8' high protective "wainscot" with different materials above. Avoid use in remote areas due to transportation costs. Schedule installation to avoid the need for

temporary heat. Masonry or concrete walls should contain weep holes at the base of walls 8"-12" above finish grade, unobstructed, with insect screen. FC-3, LCCA-1 to 2

5. Wall Insulation: Types and R-values; the following values or those values tested from manufacturers may be used in determining R-values of wall assemblies.
    a. Expanded Polystyrene (EPS) Board R-Value = 4.17 per inch FC-2, LCCA-2
    b. Extruded Polystyrene (XPS) Board R-Value = 4.17 per inch FC-3, LCCA-3
    c. Polyisocyanurate (Polyiso) Board R-Value = 5.6 per inch FC-2, LCCA-2
    d. Glass-Fiber Batt Insulation R-Value = 3.16 per inch FC-1, LCCA-2
    e. Glass-Fiber Batt Insulation (High Density) R-Value = 4.28 per inch FC-1, LCCA-2
    f. Glass-Fiber Blown-In Insulation R Value = 3.7 - 4.28 per inch FC-1, LCCA-2
    g. Mineral Wool Batt Insulation R-Value = 4.0 per inch FC-4, LCCA-2
    h. Open Cell Spray Foam Insulation R-Value = 3.6 per inch FC-3, LCCA-3
    i. Closed Cell Spray Foam Insulation R-Value = 6.0 - 6.5 per inch FC-3, LCCA-3
6. Soffits such as at overhangs: Provide the following:
    a. Siding material as described in Siding and Cladding, item 4 above.
    b. Exterior Air/Weather Barrier System as described in item 12 below.
7. Soffit areas that separate exterior space from heated space: This construction should be avoided or minimized. Where used in fire sprinklered buildings, and the size of the soffit requires sprinkler coverage, sprinkler piping must be in a heated space or a dry sprinkler system provided.
8. Continuous Exterior Insulation (CI): provide a continuous layer of insulation at the exterior side of the wall assembly. Protect CI with air/weather barrier and siding material in a rain screen assembly. Minimum R-Value of continuous insulation layer of R-7. Use CI to mitigate thermal conductance through wall structure. CF-1, LCCA-1 low first cost and significant LCCA advantage due to energy savings.
9. Vapor Retarders at Exterior Walls: Provide vapor retarder at the warm side of wall insulation with permeance rating not to exceed 0.13 perms, polyethylene, 6-10 mils thick. Where vapor retarder is not in direct contact with a cover material such as gypsum wallboard, vapor retarder shall have a flame-spread rating not to exceed 25 and a smoke density not to exceed 450. Ensure vapor retarder is continuous at wall to roof transitions. Minimize penetrations of vapor retarder.
10. Vapor Retarders at Concrete Floor Slabs: Floor slabs on grade with non-permeable floor finishes should have a vapor retarder of 0.05 perms or less, polyethylene, 10-15 mils thick. Non-permeable floor finishes include (but are not limited to) epoxy, polyurethane, vinyl, linoleum, and rubber. Under slab vapor retarders must be durable enough to withstand construction activity. Penetrations should be detailed according to the manufacturer's instructions. Specifications should require measurement of slab relative humidity in accordance to meet the requirements of the floor finish manufacturer.
11. Thermal Resistance: Insulation and minimum R-values of wall assemblies shall accommodate regional climate. Minimum wall assembly value in all Climate Regions is R-19.
12. Exterior Air/Weather Barrier Systems: Self-adhering sheets, fluid applied membrane, or mechanically attached building wrap. Detail wall/roof intersection to provide continuous air/weather barrier system. FC-2 to 4, LCCA-2 to 3 (product vary in cost and performance)

13. Impact Resistance at Exteriors: Provide impact resistant material up to a minimum of four feet above ground height. FC-3, LCCA-3
14. Corrosion Resistance: Consider local risks of corrosion from environmental or industrial sources.
15. Graffiti Resistance: Enable the removal of graffiti without damage to the appearance, finish, and durability of the substrate
16. Acoustics: Consider local conditions for requirements.
17. Building massing should limit exterior exposure of large high bay spaces to wind loads
18. Design flashing details as per Sheet Metal and Air Conditioning Contractors' National Assoc. (SMACNA) flashing recommendations to prevent water infiltration into the wall.
19. Design simple, cost effective steel, concrete, or masonry lintels. Specify galvanized at exterior steel lintels.
20. Do not use paper or organic products that support mold growth when wet in any exterior wall assembly.

Recommended:

21. Avoid materials that require paint or sealers to prevent water intrusion.
22. Impact Resistance: Provide impact resistant material up to a minimum of eight feet above ground height. CF-1, LCCA-1
23. Avoid masonry veneer. CF-3, LCCA-2
24. Consider power and data raceways at exterior walls to reduce the number of penetrations in the vapor retarder.
25. Insulated Metal Wall Panels (IMP) with addition of air/weather barrier directly behind the IMP for additional protection. Air/Weather Barrier CF-1, LCCA-1

Premium:

26. Glazed bricks, cast stone, "architectural" finish cast-in-place concrete. Cost prohibitive in most rural applications CF-4, LCCA-3
27. Precast concrete Cost prohibitive in rural application due to freight and need of large equipment to handle. CF-3 to 4 LCCA-2.
28. Granite, slate, or other stone that is more expensive than common masonry. CF-5, LCCA-2
29. Lead-coated copper, stainless steel, zinc, or other metal shingles and siding products. CF-4, LCCA-1, may have application in saltwater environments
30. Ceramic, porcelain, or other tile products that are more expensive than common brick. CF-3 to 4, LCCA-2
31. Enamel panels or other manufactured curtain wall products. CF-4, LCCA-3
32. Exterior porcelain tile, glass tile, or glass cladding systems. CF-4, LCCA-3
33. Composite stone veneer cladding CF-4, LCCA-3 weight of material is problematic in rural locations.
34. Channel glass facades. CF-5, LCCA-4

Underbuilding Soffits

Required:

1. Buildings located in some regions are recommended to be elevated based on local geotechnical and climatic condition. In such a structure, where the space underneath the building is exposed to the elements, consider enclosure with sheathing or another weather-resistant covering.
2. Consider structural insulated panels (SIPs), which are all capable of serving a dual-purpose role as exterior closure and structural system. FC-3, LCCA-3
3. Exposed underside of SIPs:
4. Plywood bottom surface
5. Provide coverage of any exposed foam insulation with intumescent paint
6. Moisture Resistance: Provide vapor retarder to inside of insulation.
7. Thermal Resistance: Insulation and minimum R-values to accommodate regional climate.
8. Provide barrier system (skirting) to prevent public access to underside of building for fire-safety prevention. CF-1, LCCA-1
    a. Chain link fence

Recommended:

9.

Premium:

10. Building skirting:
    a. Perforated metal panel or CF-4 LCCA-2
    b. Welded wire fabric. CF-4 LCCA-2
11. Metal panel siding on underside of SIPs. CF-2 LCCA-1

042 Exterior Glazing

Required:

1. Provide glass thickness and safety glass materials appropriate to safety risk, energy performance requirements and local conditions, including wind loads and internal air pressures, deflections, safety and code compliance.
2. Conduct life cycle analysis and collect detailed warranty information on vinyl, vinyl-clad, and fiberglass windows for DEED review and approval prior to incorporation into the design. CF-3
3. Exterior windows must have insulated glazing system (outer glazing low E coating with an air space and interior glazing that meets latest adopted edition of IBC for wind pressures). Consider building energy efficiency, interior glare, daylighting, acoustic performance, and security when selecting exterior window and glazing systems. Consider high performance glazing units with high visible light transmittance for better daylighting and a low solar heat gain coefficient (SHGC) in accordance the National Fenestration Rating Council.
4. Exterior glazing: area recommended not to exceed 10% of the entire exterior closure area. Consider a balance of natural lighting, view, solar gain and heat loss.
5. Glazing in windows in high-traffic areas and vandal-prone areas should provide an appropriate level of impact resistance.

6. To simplify replacement of broken units, avoid individual glass pieces larger than 4 feet in width or 6' in height.
7. Exterior windows constructed with thermally broken frames to reduce heat loss and prevent thermal conduction.
8. Provide thermally broken aluminum windows, aluminum clad wood windows or storefront systems for larger window installations. CF-4, LCCA-3
9. Provide commercial-grade windows. Provide prefinished exterior surfaces as opposed to field finished or painted options.
10. Provide casement and awning windows with screens at operable vents. Casement and awning windows must not be oversized and must be easily opened by crank mechanisms. Do not locate operable windows at locations where persons can accidently strike the frame of an open window. Provide adequate number of locking points to provide positive closure
11. Specify windows with sub-frame construction for efficiency and to resist water penetration.

Recommended:

12. Consider single or double hung windows with window screens in appropriate climates (primarily zones 6 and 7) as a character defining feature of an existing building or as an historic treatment. CF-3, LCCA-3
13. Consider specifying high-performance glazing as determined by orientation and energy modeling. CF-4, LCCA-TBD Depending on glazing price of windows can double, LCCA analysis of the systems vary.
14. Consider polycarbonate covers at windows susceptible to vandalism and in remote areas where window replacement is not readily available.

Premium:

15. Stainless steel, mahogany, teak, or exotic hardwood windows, skylights, or doors.
16. Triple-glazed windows in climate zones 6 and 7 without an LCCA.
17. Bullet-proof glass. Consider providing UL 752 Ballistic Rating of Levels 3 through 7. Degree of ballistic protection level should be determined by school district or community policy and design parameters for each school.
18. Any manufacturer's non-standard window sizes.
19. Any windows of special sizes requiring manufacturer's premium costs.
20. Silicone glazing systems, butt glazing systems, or double wall glazing systems.
21. Non-standard colors or finishes on windows that require manufacturer's premium costs.
22. Glazed channel glass wall systems.
23. Arched or complex windows and frames.

043 Exterior Doors

Required:

1. Exterior doors shall be water-tight, weather-tight, and protected from climatic influences, including rain and strong winds.
2. Exterior doors subject to continual heavy use must be constructed both for strength and resilience against wear, and against accidental and deliberate damage. Sufficiently robust to provide appropriate building security and to withstand high traffic conditions without stress or

damage to the door, glazing or hinges. Specify exterior doors with fully welded metal frames. Avoid "knock-down" frames at exterior doors.

3. Door materials include:
    a. Insulated, fully galvanized steel, primed and painted. CF-2, LCCA-1
    b. Fiberglass, especially suitable for coastal, salt environments, climate zones 6 and 7.
    c. Aluminum, factory finish CF-2, LCCA-1
4. Avoid the use of fully glazed door systems
5. Specify Grade 5 exterior door hardware with stainless steel components and no plastic components in hinges, locks, panic hardware, or lever handles. CF-4, LCCA-1
6. Specify exterior doors with fully welded metal frames. Avoid "knock-down" frames at exterior doors. CF-3, LCCA-1
7. Provide electronic locks and controls at exterior doors where required for security.

Recommended:

8. Specify 42" wide doors only at limited locations when functionally necessary such as at service doors. CF-2, LCCA-1
9. When selecting exterior materials for remote communities consider the site-specific local complexities of construction logistics.

Premium:

10. Non-standard doors that are higher than 84" or wider than 36" – other than service doors. CF-4, LCCA-1
11. Any doors of special sizes requiring manufacturer's premium costs. CF-4, LCCA-1
12. Non-standard colors or finishes on doors that require manufacturer's premium costs. CF-4, LCCA-2
13. Stainless steel doors or frames. CF-4, LCCA-1
14. Overhead doors except at service/delivery. CF-3, LCCA-3
15. Bullet-proof doors. Consider providing UL 752 Ballistic Rating of Levels 3 through 7. Degree of ballistic protection level should be determined by school district or community policy and design parameters for each school.

044 Exterior Accessories

Required:

1. Louvers: specify internally draining style. In all climate zones, in high wind environments provide protective exterior wall mounted hoods to prevent accumulation of rain, snow and ice within louvers. Hoods shall be galvanized and painted metal or stainless steel with sloped tops.
2. Guardrails and handrails: Provide at locations and construction as required by IBC. Materials include galvanized, galvanized and painted or high performance coated steel; aluminum (bare or coated); treated wood or combinations of the above.

Recommended:

3. Screening enclosures at services areas and dumpsters: cedar fencing, front of the enclosure may have a gate, however, may also be left open for ease of access.

4. Light Shelves: at large window areas to reduce interior glare and solar heat gain, primarily at south and west facing facades. Light shelves may be pre-manufactured as part of the window system or "stick built".

Premium:

5. Light shelf on the interior side of windows can deflect solar gain and also reflect light upward to augment or reduce artificial light needs.

05.ROOF SYSTEMS

[The following Roof Systems language is from the BDS submittal]

051 Pitched Roofs

Required:

1. Recommended pitch for major portion of roofs is 3 in 12 to 6 in 12. Where the size of the structure in a pitched roof design causes an excessive volume of unused attic space consider changing to a low slope roof design.
2. Snow shedding: On roof materials prone to snow shedding carefully consider the discharge areas to provide occupant safety and to avoid damaging nearby surfaces. Snow shedding shall not occur at any door, including service and maintenance doors.
3. Gutters and downspouts: Where needed to control run off provide commercial grade gutter and downspouts. Ensure downspout discharge is in a controlled drainage system. Do not discharge run-off over sidewalks or other pedestrian circulation.
4. Roof penetrations: minimize the number of roof penetrations. Where possible, sidewall penetrations such as mechanical intake and exhaust are preferred. On metal roof surfaces locate necessary penetrations near to the ridge to minimize risk of sliding snow damage. Provide heavy gage snow diverters above penetrations where shedding may damage penetrations.
5. Installation detailing shall consider and accommodate thermal expansion and contraction.
6. Roof Materials: When choosing roofing systems, careful consideration should be given to design guidelines listed above and coordinated with District design preferences
    a. Standing Seam Metal Roofs: Sheet material, 24 gauge minimum in portable roll formed or factory formed profiles. Base metal aluminum-zinc alloy coated hot-dipped process and prepainted. Preferred 2-coat fluoropolymer finish system, 20-year warranty on the finish. Avoid large roofs where metal lengths exceed practical lengths due to shipping, handling and machine roll forming considerations. Avoid field splices. CF-3, LCCA-3
    b. Insulated Metal Roof Panels (IMP). Overall thickness, surface thickness, and R-value appropriate to region and structural design intent. CF-3, LCCA-3
    c. Asphalt Shingles: asphalt coated glass felt, mineral granule surfaced, Class A fire resistance. Installation must be rated for site wind conditions. 35 year warranty. Do not specify residential grade shingles. CF-1, LCCA-3

d. Structural Insulated Panels (SIP) covered with an approved roofing option: Overall thickness, surface thickness, and R-value appropriate to region and structural design intent. Provide ventilation space above SIP. C-2, LCCA-2
e. Underlayment: self-adhering polymer-modified asphalt sheet, 40 mil total thickness, polyethylene sheet top surface, specify slip resistant top surface when needed for safe installation. CF-2, LCCA-1

7. Roof Insulation: Types and R-values; the following values, or tested values from manufacturers may be used in determining R-values of roof assemblies.
   a. Expanded Polystyrene (EPS) Board R-Value = 4.17 per inch CF-2, LCCA-1
   b. Extruded Polystyrene (XPS) Board R-Value = 4.17 per inch CF-3, LCCA-1
   c. Polyisocyanurate (Polyiso) Board R-Value = 5.6 per inch CF-2 to 3, LCCA-1
   d. Glass-Fiber Batt Insulation R-Value = 3.16 per inch CF-1, LCCA-1
   e. Glass-Fiber Batt Insulation (High Density) R-Value = 4.28 per inch CF-1, LCCA-1
   f. Glass-Fiber Blown-In Insulation R Value = 3.7 - 4.28 per inch CF-1, LCCA-1
   g. Mineral Wool Batt Insulation R-Value = 4.0 per inch CF-3, LCCA-1
   h. Open Cell Spray Foam Insulation R-Value = 3.6 per inch CF-3, LCCA-1
   i. Closed Cell Spray Foam Insulation R-Value = 6.0 - 6.5 per inch CF-4, LCCA-1
8. Ventilation: provide ventilation openings equal to or exceeding building code requirements for the roof area to be ventilated. Ensure the structure and associated blocking does not impede air movement. In high wind areas provide design to mitigate infiltration of wind driven rain, snow or ice crystals through use of filters and/or baffle design at ventilation openings. Provide weep holes, or similar, to allow escapement of moisture accumulation such as at ridge vents.

Recommended:

9. Attachment: Fasten sheet metal roofing to supports with concealed clips at each standing-seam joint, avoid exposed fastener systems.
10. Provide (2) layers of underlayment at slopes of 2 in 12 or less. CF-1, LCCA-1
11. At asphalt shingle installations, minimum of one daub of roofing cement at each shingle, one inch in diameter, to prevent wind uplift
12. Asphalt Shingles: asphalt coated glass felt, mineral granule surfaced, Class A fire resistance. Installation must be rated for site wind conditions. 50 year warranty.

Premium:

13. Polyurethane Foam (PUF) roof assemblies.
14. Metal shingles and tiles – required DEED review and approval
15. Clay or ceramic roof tiles - require DEED review and approval
16. On large roof areas served by gutters: Gutter system large enough to walk in and with safety rail along the side of gutter and tie offs for cleaning.

052 Flat Roofs (Low Slope)

Required:

1. Low slope roofs to be exposed membrane over coverboard, insulation, vapor retarder and thermal barrier board over structural deck. Specify roofs with extended warranties with 20-year minimum life. CF-3, LCCA-3
2. Assemblies should be fully adhered systems. Mechanically attached systems may be used when conditions do not allow for fully adhered. In a mechanically attached system provide self-healing vapor retarder to reduce impact of attachment penetrations through the system.
3. Slope of the surface membrane to drain is 3/8 inch per foot preferred, 1/4 inch per foot minimum. Calculate slope of valleys at tapered crickets to maintain positive drainage.
4. Membranes:

   Note, membranes requiring heated asphaltic products may not be practical in remote locations due to transportation costs and logistics.

   a. Ethylene propylene diene monomer (EPDM) single ply membrane, 60 mil, internally reinforced. CF-2, LCCA-2
   b. Ethylene propylene diene monomer (EPDM) single ply membrane, 90 mil, non-reinforced. CF-2, LCCA-2
   c. Asphaltic built-up, 5-ply (BUR) consisting of base sheet, 3 ply sheets plus cap sheet. CF-4, LCCA-3
   d. Asphaltic mineral cap built-up, 5-ply (MCBUR) consisting of base sheet, 3 ply sheets plus mineral cap top sheet. CF-4, LCCA-3
   e. Weldable Thermoplastic Polyolefin (TPO) single ply membrane CF-3, LCCA-2
   f. Weldable Thermoplastic Polyvinyl Chloride (PVC) single ply membrane CF-3, LCCA-2
   g. Modified Bitumen, multi-ply membranes CF-4, LCCA-2
5. Insulation: See 5.A.7 above for insulation types and R-values.
6. Roof drains: Provide code required secondary overflow drains. Connect to internal rain leaders leading to storm drain system where available. Provide insulation sump at roof drains. Rain leaders may lead to dry wells or to daylight where storm drains are not available. Avoid the use of scuppers except for secondary overflow drains. Provide rock/debris screening at any discharge pipes where accessible from ground level. Provide measures to prevent freezing around roof drains such as reduced R-value around drains, minimum R-value around drains is R-12. Use heat trace as a last option.
7. Do not discharge water, snow, and ice along the face of the walls. Design systems to prevent water from sheeting down across the face of exterior walls or splashing against exterior walls at grade.
8. Parapets: Top of parapet to be minimum 12” above the roof surface. Roof membrane to lap up and over the parapet and be protected by a cap flashing. Cap flashing to be held by a continuous wind cleat, fastened at an on-center distance capable of resisting site-specific wind conditions.
9. Minimize roof penetrations through the roof membrane. All roof penetrations to be made by certified installers with approved roofing manufacturer’s details. Avoid “shelves” on the

exterior faces of parapet that might hold ice to prevent potential of falling and personal injury and to avoid melting and staining down the face of the wall.

10. Mechanical equipment curbs should have diversion crickets to maintain rainwater flow and avoid damming. Elevate mechanical equipment a minimum of 18" above the roof surface. Locate mechanical air intakes a minimum of 24" above the roof surface.

Recommended:

11. EPDM, 90 mil, single ply membrane. CF=3, LCCA-3
12. At BURs – Built-up bituminous roofing: asphalt saturated glass fiber felts, four ply plus base sheet. CF-4, LCCA-4
13. Where possible, achieve roof slope by sloping the building structure to reduce the quantity of tapered insulation.
14. Minimize complex and multiple roof levels in the building design.

Premium:

15. Roof warranties exceeding 30 years
16. Liquid Applied Membranes (LAM) CF-3
17. Any colored roofing system other than manufacturer's standard colors CF-4, LCCA-1
18. Green/vegetative roofs. CF-5, LCCA-5

053 Roof Accessories

Required:

1. Provide OSHA compliant rooftop safety railings where rooftop equipment requires access within 10 feet of a roof edge.
2. Design roof hatches for maintenance large enough to accommodate individuals equipped with full emergency gear or service personnel with supplies and toolboxes.
3. Design roof access with regular stairways or alternating tread stairs, not by ship's ladders or exterior roof ladders whenever possible.
4. Provide snow guards to prevent large accumulations of snow and ice from shedding. CF-1, LCCA-1

Recommended:

5. Skylights are discouraged with preference given to vertical glazed clerestories. Locate base of glazing minimum 24" about roof surface
6. Permanently mounted safety harness tie offs CF-1, LCCA-4

Premium:

7. Roof deck plazas with pavers and protective railings, walls and supports.

06.INTERIORS

[The following Interiors language is from the BDS submittal]

Interior partitions, soffits, openings, finishes, and specialties typically account for ~10-12 % of a project's total construction cost. In a traditional school design, the cost of partitions and doors are

fairly consistent. However, the use and quantity of special partitions such as glazing and movable partitions varies between school designs and can significantly impact the cost of the interiors. The use and quantity of casework also varies between school designs, thus affecting the project cost. The material choice and specification of interior floor, wall, and ceiling also plays a large part in determining the cost of a project's interiors. Guidelines for these systems and their components are as follows:

A. Partitions/Soffits

Required:

1. Specify interior construction materials of high durability, low maintenance, and an expected life span of 30 years.
2. All walls to be durable and provide the appropriate STC ratings for school spaces (per ANSI/ASA S12.60 on Classroom Acoustics):
3. Standard partition construction will be 20-gauge metal framing sized for needed wall cavity widths, 5/8" gypsum wall board each side, taped, mudded and finished to Level 4. Add the following: CF-3 LCCA-3
    a. plywood sheathing where required for shear CF-2 LCCA-1
    b. wood blocking as permitted by code where required for wall-mounted accessories CF-2 LCCA-1
    c. 18-20 ga metal backing if wood is not permitted CF-3 LCCA-1
    d. cementitious backer board where installing wall tile CF-3 LCCA-1
    e. acoustical insulation, resilient channel, and sealant where required for STC ratings CF-3 LCCA-1
    f. impact resistant GWB or surface applied impact resistance at high-traffic areas
4. Standard soffit construction will be 20-gauge metal framing, cold rolled channel, or fabricated metal suspended-ceiling systems sized for anticipated loads and spans, 5/8" gypsum wall board, taped, mudded and finished to Level 4. Add the following:
    a. additional gypsum wall board where required for fire resistance CF-3 LCCA-3
    b. wood blocking as permitted by code where required for wall-mounted accessories CF-2 LCCA-1
    c. 18-20 ga metal backing if wood is not permitted CF-3 LCCA-1
    d. acoustical insulation, resilient channel, and sealant where required for STC ratings
5. Partitions and soffits to be easy to maintain and easily cleanable
6. High traffic areas to be impact resistant CF-4 LCCA-1
7. Provide expansion/control joints as required
8. Gymnasium wall finishes to have hard surfaces below 8' to allow for rebound of balls. Cost and LCCA vary on types of surfaces
9. Non-porous, easily cleanable surfaces for food services areas. Ceramic or porcelain tile wainscot to 4'-0" A.F.F. at a minimum for wet areas. Provide full height ceramic tile at grease-prone areas. CF-3 LCCA-3

Recommended:

10. Concrete masonry walls where cost effective and deemed essential by design team (may need LCCA) CF-3 to 5 in rural locations LCCA-1
11. Wood framed walls where more cost effective. CF-3 LCCA-3
12. At glazed porcelain and/or ceramic tile, consider use of manufactured metal trim pieces at base, corners, and terminations. CF-1 LCCA-1
13. Acoustical panels: fabric wrapped panels or paint-grade wood fiber strand board CF-1 LCCA-2

Premium:

14. Radiused and curved walls.
15. Walls that exceed the minimum STC rating for school spaces
16. Walls that use both impact resistant GWB and an impact resistant applied wall finish

Special Partitions

Required:

1. X

Recommended:

2. Consider 2-way mirrors in observation areas; safety glazing.

Premium:

3. Operable partitions or large sliding doors.

Interior Openings

Required:

1. Interior doors systems shall be readily available and have a wide variety of offerings including acoustical, fire rated, hollow metal and flush wood veneer. CF-varies LCCA-varies
2. All doors within public use areas to be ADA compliant
3. All swing doors throughout to have ADA compliant, lever-style, commercial grade hardware
4. Overhead doors at food service pass-throughs, shop areas, or for separating zones ; lockable
5. Specify interior doors with welded metal frames in all new construction. “Knock-down” frames are discouraged. CF-3 LCCA-3
6. Standard door assemblies to be solid core, factory-finished wood doors and painted hollow metal frames, with fire resistive ratings as required by code. 1 ¾” 16 gauge insulated hollow metal doors may be used in lieu of wood; metal doors should be used in PE, shops, gym, labs and locker rooms.
    a. Provide glass vision lite kits and/or louvre openings as indicated by ed specification and/or program.
    b. In un-rated assemblies, provide ¼” clear tempered glass door inserts and relites
    c. Vision Lite kits within doors to have 18 gauge cold rolled steel frames with mitered and welded corners and should utilize standard sizes: 6”x27”, 12”x12”, 24” x 24”, 24” x 36”, 24” x 60”.
7. Door hardware in a variety of configurations including, but not limited to:

a. Office sets: full-perimeter gaskets and door bottom with neoprene element, office lockset, wall or floor stop
b. Storage sets: full-perimeter gaskets and door bottom with neoprene element, storage lockset, wall or floor stop, closer, kickplate.
c. Classrooms: full-perimeter gaskets and door bottom with neoprene element, closer, wall or floor stop, lockdown locking mechanism
d. Gymnasium doors or sets of double doors used to close down portions of the school: panic hardware, closers, kickplates, locking doors (manual or card reader), floor or wall stops where possible, overhead stops where floor/wall stops aren't possible and full-perimeter gaskets and door bottom with neoprene element. Double doors should not have astragals. CF-3 LCCA-3
e. ADA/Unisex single-toilet room doors: full-perimeter gaskets and door bottom with neoprene element, lockset with occupied indicator, wall or floor stop.
f. Teacher work and support spaces: silencers, proximity card readers, closer, wall or floor stop

8. Limit the size of windowpanes and relites to standard sizes: 18, 24, 36, 48, 60 inches wide by 18, 24, 36, 48 or 60 inches high. Limit overall size of windowpanes; use multiple smaller windows in lieu of one large window. Glazing/relites adjacent to doors can go up to 84 inches high.
9. Relite and frames to be painted hollow metal, with fire resistive ratings as required by code.
10. Window & relite frames and sills to be paint grade. CF-3 LCCA-3

Recommended:

11. All classroom doors to have closers, with closing mechanism to be mounted on the classroom side to allow for locking devices to be applied in the event of lockdown situations.
12. Door glazing insert kits in a variety of sizes, safety glazing. CF-3 LCCA-3
13. Consider single or double intercommunicating doors between classrooms. CF-3 LCCA-2

Premium:

14. Bulletproof doors & glazing; UL Listed Level 1- Level 3 is acceptable. CF-5 LCCA varies
15. A. UL 752 - Level 1 - protects against 9mm full metal copper jacked with lead core. No spall, no penetration.
    a. UL 752 – Level 2 – protects against .357 Magnum jacketed lead soft poont. No spall, no penetration.
    b. UL 752 – Level 3 – protects against .44 Magnum lead semi-wadcutter gas checked. No spall, no penetration
16. Motorized overhead doors with glazing used as space dividers walls between classrooms CF-4 LCCA-4
17. Non-standard doors that are higher than 84" or wider than 36". CF-4 LCCA-2
18. Any doors or windows of special sizes requiring manufacturer's premium costs. CF-4 LCCA-2
19. Non-standard colors or finishes on doors that require manufacturer's premium costs. CF-4 LCCA-1
20. Silicone glazing systems, butt glazing systems or double wall glazing systems.
21. Arched or complex windows and frames

22. *Non-standard relites and vision lite kits*

Special Floors

Required:

1. X

Recommended:

2. Provide floors in stage/platform areas appropriate for a variety of performances: dance performances, vocal/music performances, etc. Floors, where required by the program, shall be a cost-effective, self-install sprung floor, resilient finish panel system designed for permanent installation. CF-4 to 5 LCCA-3

Premium:

3. Raised floor raceway systems CF-3 LCCA-3
4. Auditorium spring floor panel system with hardwood surfaces

Interior Finishes

Required:

1. Specify applied finishes shall be easy to clean and resistant to moisture and mold/bacterial growth
2. Selected finishes to be sustainable and contribute to a healthy, productive learning environment. Evaluate products for recycled content, recyclability, waste reduction, energy efficient maintenance, low VOC content and post-installation product emissions.
3. Acoustical ceilings and panels to contain recycled content where possible
    a. Sound absorptive with a minimum NRC of .55 and a CAC rating of 35.
    b. Ceilings to be installed with a standard 15/16” grid system and seismically braced. Ceiling suspension system to be hot dipped galvanized steel to inhibit rust
    c. Ceilings within food service and lab areas to be washable & scrubbable
    d. Acoustic ceilings shall meet ASTM C 1264 for Class A materials
    e. Acoustical wall treatments to be rigid fiberglass board and fine-grain cork core faced with fabric approved for wall panel use.
4. Provide a walk-off mat system at every main entrance
5. Carpet tiles are preferred for office and classroom spaces throughout (exception: labs and art rooms)
    a. Carpet tile should have a high wear / TARR rating, stain resistance and cleanability; carpet to have moisture impervious backing
    b. Carpet tiles should have a minimum of 25% recycled content and a minimum of 17 ounce face weight.
    c. Carpets to be low-voc, use low-voc adhesives and be compatible with low-voc, water based solvents/cleaning agents.
6. Resilient flooring such as linoleum, sheet vinyl, rubber flooring or vct is preferred for hallways/corridors, art classrooms, storage rooms and other locations where carpet is not ideal.

a. Resilient floor materials to be low-voc, use low-voc adhesives and be compatible with low-voc, water based solvents/cleaning agents.
b. All resilient materials shall be commercially rated for heavy-duty wear
c. Resilient sports flooring to have striping for common indoor sports played within the district.
d. Science labs to have chemical resistant flooring.
e. Provide static dissipative flooring where required by the program.

7. Adhesives and sealants used in the building interior (inside the exterior moisture barrier) must be low VOC
8. Acoustical wall panels above 8'-0" in gymnasiums, pool areas or other echo-producing locations. Design team to include an acoustical engineer to determine the number/type of acoustical panels needed for each specific environment.
9. Paint / sealers used throughout should be durable and scrubbable, with low to no-VOC content
    a. Use acrylic, water based for non-metal surfaces
    b. Use alkyd enamel paints on metal surfaces
    c. Use water-based epoxy paints in interior spaces with high humidity or areas subject to surface moisture
    d. Use concrete sealer and/or concrete paint where required by the program
    e. Wall paint to have a minimum of three (3) applied coats
    f. Door/relite frames to have a minimum of two (2) applied coats
10. Standard resilient wall base should be use throughout office, classroom, and hallway areas with slight modifications based on the rooms
    a. Tile base where walls are receiving tile applications
    b. resilient sheet cove base with top trim in toilet rooms or food service areas
11. Wood sports flooring, where required by the program, to be second and better grade maple strip flooring with striping for common indoor sports played within the district CF-4 to 5 LCCA-3

Recommended:

12. Consider Porcelain tile and mosaic tile floor and wall finishes in toilet/shower rooms where required by the program. All tile and grouts should be installed based on the installation conditions and as recommended by the Tile Council of America. CF-3 LCCA-1
    a. Use epoxy-modified grout mixture for high moisture areas
    b. Wall padding in gymnasiums to be limited to competition court basketball backstops
13. Consider ceiling grids to support hanging displays in all classrooms and hallways
14. Consider FRP panels as needed for service and as required CF-2 LCCA-1
15. Gymnasium wall finishes to have hard surfaces below 8' to allow for rebound of balls. Surfaces above 8' to have acoustical wall panels
16. Non-porous, easily cleanable surfaces for food services areas. Ceramic or porcelain tile wainscot to 4'-0" A.F.F. at a minimum for wet areas. Provide full height ceramic tile at grease-prone areas.

Premium:

17. LEED and/or WELL Certified building CF-3 LCCA-1
18. Wall paneling or wallpaper CF-4 LCCA-2
19. Full height wall tile except at grease-prone areas in Kitchens CF-4 LCCA-1
20. Flooring materials other than rubber, vinyl composition tile, linoleum, or floor carpet.
21. Wood sports flooring for elementary schools
22. Cork, bamboo, recycled rubber, or other expensive flooring materials
23. Wood, Plywood wrapped or stainless steel wall base
24. Wax-free resilient floor systems
25. Recessed walk-off grate entry system CF-4 LCCA-1
26. Decorative or expensive non-standard ceiling tiles or ceiling systems such as metal or wood slat ceilings CF-5 LCCA-2
27. ACT ceiling trims other than 15/16" grid profiles
28. Ballistic and blast mitigation coatings or films
29. Architectural resin panels
30. Chair rails, crown mouldings, picture rails or art display systems
31. Cove base in areas other than toilet rooms
32. Acoustical felt wall panels

Specialties

Required:

1. Specify durable and easily cleaned casework. Base requirement is high pressure laminates over stable substrate with 4mil PVC edge banding. Counters are high pressure laminate with postformed backsplash and front edge profile. Standard casework to be provided throughout with the following special conditions: CF-3 LCCA-1
    a. Resin counters in science labs space. CF-4 LCCA-1
    b. High school science labs to have lockable, ventilated acid storage cabinets, lockable and labeled alkali metals & halogens storage cabinet, lockable casework for with minimum 15” inside useable depth, and trays to fit cabinets/shelves under bottles to prevent liquid spills
    c. Polycarbonate or wired glazing to be used for casework within science lab space. CF-3 LCCA-1
    d. Coat cubby areas with coat hooks, storage above and benches for changing shoes/outdoor gear. Provide dividers and spacing between hooks to prevent the spread of head lice
    e. Boot racks with space below to allow for cleaning
    f. Perimeter counter with sab sinks/stations, and art drying racks in art classrooms
    g. Library Circulation desk with 6’ minimum counter space including ADA height counter, book drop, supply drawers, files, and technology including computer, printer & storage
2. Interior signage to be provided at all areas required by code to receive signage
    a. All signs to have grade 2 Braille, tactile characters and pictograms as required by code

b. All signs to coordinate with interior and exterior finish palettes

3. Student lockers shall be provided as required by the programming documents, and should be steel construction with sloped top and closed base; locks requirements to be selected by the school. Lockers within locker rooms and changing areas to be ventilated steel construction.
4. 3 eye bolts to be provided in the ceiling, 18" apart, and designed load of 750 lbs. minimum in occupational/physical therapy/special needs classrooms to be used to attach swings or other therapy equipment.
5. Built-in toilet room items to include, but not limited to commercial-grade, readily available:
    a. Soap dispensers
    b. Mirrors
    c. Toilet paper dispenser
    d. Seat cover dispensers
    e. Sanitary napkin receptacles
    f. Grab bars
    g. Paper towel dispensers
    h. Baby changing stations and/or adult-sized changing stations for special needs classrooms as indicated by the program documents.
    i. Waste receptacles
    j. Toilet partitions; to be durable and graffiti resistant. Partition hardware or door type to be selected to provide maximum privacy and minimum gaps between stall components.
    k. ADA shower with shower seat
6. Corner guards to be minimum of 2mm thick, have a 1 ½" wing on either side and be a minimum of 4'-0" A.F.F. Material to be textured rigid material and available in 90 degree and 135-degree corner styles. CF-2 to 4 LCCA-1
7. Fire extinguishers to be provided per code. All fire extinguisher cabinets to be recessed. Provide signage and stickers on cabinet for fire extinguisher visibility.
8. Stage curtains and backdrops in auditorium and performance spaces
9. Fixed seating in auditoriums to have tilting upholstered seat and back and integral arms. Seat number/row letters to be Americans with Disabilities Act (ADA) compliant. Provide wheelchair access as required by code.
10. Adjustable, retractable basketball backboards/hoops
    a. Recessed floor plates for volleyball posts
    b. Wall-hung hand sanitizer stations
11. Window treatments to be roller shades or miniblinds. Provide fascia on coverings to hide mounting brackets and mechanisms.
12. Install sliding double whiteboards with an integrated map/poster rail at top and tackboards, typical within all classrooms where markerboards are called out. Music rooms to have whiteboards with and without staff lines
13. Cork bulletin boards with aluminum frame in manufacturer standard sizes
14. Install retractable, recessed projection screens

Recommended:

15. X

Premium:

16. Signage: signage with changeable inserts, ADA signage on acrylic with standoffs or vinyl graphic signage
17. Toilet room premiums: motion-sensored soap dispensers, automatic hand dryers CF-4 LCCA-3
18. Antimicrobial lockers to help protect against bacteria, mold, yeast and mildew or hardwood or hardwood veneer lockers. CF-4 LCCA-3
19. Wood or metal framed mirrors of custom size, backlit
20. Stainless steel corner guards
21. Hardware pulls greater than 6" in length
22. Solid surface countertops and backsplash
23. Climbing walls
24. Magnetic glass whiteboards, electronic smartboards or other technology-based display boards
25. Dry-erase wallcovering surfaces that double as projection screen
26. Motor operated projection screen in any location other than auditoriums or presentation lecture areas
27. Solid surface counters and backsplashes, solid vinyl, recycled glass, or polycarbonate counters
28. Stainless steel lab storage & cabinetry
29. Solid wood cabinets or wood veneer cabinets
30. Casework or architectural woodwork such as picture rails, wainscoting, crown moldings, or paneling
31. Suspended acoustical felt baffles & wall panels
32. Lit display cases
33. Motorized roller shades
34. Built-in bleachers or built-in, retractable bleachers

Built-in Furnishings, Equipment & Technology

Modern school design requires detailed coordination between the building shell and built-in furnishings and technology. This section outlines the built-in components installed by general contractors and the movable furnishings and technology provided and installed by other vendors prior to occupancy of the building.

The voice/data components of any building are changing rapidly from year to year with new technology resulting in faster, lightweight, affordable, and portable "plug-in" equipment. The State expects schools to take advantage of the latest technology that can simplify building systems and lower installed technology costs.

Required: *(list includes basic items; additional items may be required)*

1. Building entry vestibules to have perimeter benches in the parent pick-up / drop-off zones and lost & found bin CF-3 LCCA-1

2. Hallway areas to have lockable display cases for 2-d and 3-D displays, benches near toilet rooms and tackboards CF-3 LCCA-1
3. IT/Communications room to have the following items:
    a. Dedicated space. Avoid co-locating within electrical/mechanical spaces.
    b. Limit number of telecom rooms to minimum required per standards for size of the building.
    c. Locate telecom room in central area of building where possible to average cable lengths.
    d. Open wall shelving
    e. 4-post server racks where necessary
    f. IT desk or workstation for monitoring of equipment
    g. Servers, routers, monitoring equipment, patch panels, data distribution panels
    h. Uninterrupted power supply for essential systems.
    i. Servers for security cameras / CCTV system
    j. Room for fire alarm control panel if located there
    k. Security panel
    l. Intercom head end
    m. Layout space for building/repairing equipment
    n. 4-post server racks
    o. Servers, routers, monitoring equipment, patch panels, data distribution panels
    p. CCTV system DVR recorder (can be rack mounted within this space)
    q. Intercom head end
    4. Classroom equipment & furniture for classrooms and relocatable/portable classrooms includes, but is not limited to:
    r. Provide built-in furniture, equipment and technology within teaching spaces to aid in a variety of teacher teaching and display methods
    s. Teacher workstations: desk, ergonomic task chair, adult guest chair, file storage, phone and computer workstation
    t. Two-pod combined space capability
    u. Reconfigurable / combinable tables or student desks and chairs; maximize the use of these items
    v. Low bookcases
    w. Up to 6 computer stations with mobile tables
    x. Lockable storage units/wardrobes
    y. Provide analog clock in a visible location
    z. Intercom system with speakers in all occupied spaces
    aa. Provide two flag older brackets for the US and Alaska flags in each classroom
    bb. Shelving with storage within classrooms
    cc. Mobile screens / dividers with markerboard and tackable surface
    dd. Casework/counter with handwashing sink and wall-mounted soap and paper towel dispensers

ee. Wall-hung hand sanitizer stations
ff. Bookshelves or open shelving in usable and easily accessible heights for each age group
gg. Storage cabinets for supplies
hh. Kitchen / cafeteria / kitchenette cabinetry
ii. Cabinetry with resin counters within science and lab areas

5. Library furniture items to include, but not be limited to:
    a. Book drop with catch bin in library space
    b. Display case for 3D displays
    c. Perimeter storage
    d. Book stacks for approximately 20,000 volumes
    e. 2-shelf picture book storage, including bins and vertical storage for 4,000 books with low round tables and 6 chairs
    f. Online catalog computer stations with work surface for books & papers
    g. Desk for teacher materials, and mobile tables and chairs for 30 students
    h. Recreational reading area
    i. Study carrels and chairs
    j. Markerboards & tackboards
    k. Projection screens
    l. Analog wall clock
    m. Library office / workroom within the library space to have a minimum of 20 lineal feet of perimeter cabinetry with sink and intermittent openings for knee space, lockable storage cabinets, ergonomic task chairs, lockable file cabinets, librarian desk/workstation, guest chair, paper towel & soap dispensers at sink, tackboards and markerboards and storage space for book cart storage
    n. Library storage room to have upper & lower cabinetry, heavy duty shelving, lockable file cabinets, video monitors and other A/V equipment on rolling carts and laptop carts.
6. Administration area should maximize the use of modular, moveable furniture. Furniture includes but is not limited to:
    a. Built-in reception counter with ADA height section and lockable storage pedestals, waiting area with chair rail
    b. Waiting area with guest chairs, chair rail
    c. Principal office with workstation, file cabinets, pedestal, task chair
    d. Administrative work area with desks, task chairs, file cabinets, storage cabinets, copy/print areas, mail service center, tackboards and staff workroom
    e. Secure storage area to have staff work space for 1-2 staff, space for a fireproof safe and fireproof lateral file cabinets for student records.
    f. Student quiet area outside Principal's office to have one study table & chair
7. Staff work area and support space furniture includes but is not limited to:
    a. Copy/print/scan machines in teacher work areas, and administrative office areas
    b. Built-in cabinetry and open shelving for materials & resources

c. Kitchenette with base & upper cabinets, microwave shelf at ADA height, and refrigerator
d. Conference table with chairs and/or stools, equipment carts
e. Markerboard and tackable surfaces
f. Analog clock
8. Art & Science Labs
g. Soap & paper dispensers and rubbish bins
h. 1 teacher workstation table with single lab sink/station, 1 teacher desk & ergonomic chair
i. Moveable lab tables with adjustable height chairs
j. Kiln, clay mixer and clay reclamation bin
k. Heavy-duty shelving in kiln area
l. Lockable bins for clay storage and mobile carts for moving greenware into the kiln room
m. Markerboard and tackable surfaces
n. Analog clock
o. Retractable projection screen
p. Probe-ware: thermistors, acid probes, etc.
q. Alcohol burners and/or hot plates for science use; gas only for high school use
r. Fume hood
s. Lockable flammable materials storage cabinet; secure to wall
9. Technology lab
t. 30 computer workstations with ergonomic, adjustable student height chairs
u. 1 teacher workstation with ergonomic chair
v. Production station with printer, supplies
w. Lockable storage cabinet
x. Markerboard and tackboards
y. Retractable projection screen
z. Analog wall clock

10. OT / PT Equipment Storage room should accommodate at a minimum the following:
a. Balance beams
b. Exercise bolsters & ball swings
c. Balance boards
d. Standers
e. Stairs
f. Wedge positioning devices
g. Sideline chairs
h. Wheelchair and HOYA lift
i. Heavy-duty open shelves of varying depths with adjustable shelves
j. Bins for PT Equipment

11. Speech therapy classrooms to include, but is not limited to:

a. Markerboards
b. Student chairs
c. Teacher desk, ergonomic chair and 3 adult chairs
d. Locking file cabinets
e. Moveable tables for computers / technology
f. Wall-hung hand sanitizer stations
g. Bookshelves or open shelving in usable and easily accessible heights
h. Analog wall clock

12. Music Classrooms to include, but is not limited to:
    a. Tackboards
    b. Minimum of 60 music stands with storage cart
    c. Stackable chairs
    d. Lectern
    e. Tall storage cabinets
    f. Lockable wall cabinets for instrument storage
    g. Piano, electronic keyboard and benches
    h. Portable risers for use on stage
    i. Analog wall clock
    j. Music sorting rack and sheet music storage
    k. Music office & storage with open wall shelving, work counter with stool for instrument repair, upper and lower cabinetry for storage of materials and resources, lockable wardrobe storage, teacher desk with ergonomic chair, copy/printer/scanner, tackboard
13. PE office equipment and furniture:
    a. Casework for instructional materials & recourses
    b. Workstations with desk, lockable pedestals, computer, ergonomic task chair
    c. Lockable wardrobe storage units
    d. Lockable file cabinets
    e. Copier/printer/scanner
    f. Markerboard and tackable surfaces
14. Gymnasium equipment to include, but is not limited to:
    a. Ceiling mounted tracks for climbing ropes
    b. Safety wall padding
    c. Two flag holders (US and Alaska flags)
    d. Electronic scoreboard and associated speaker system
    e. Safety caging around clocks, exit signs, emergency lighting, speakers, fire alarm apparatus or other equipment
    f. Storage room for sports equipment and associated fixed racks or rolling cart storage for tumbling mats, volleyball nets and standards, kickballs, basketballs, volleyballs, soccer balls, balance beams, equipment for various Native Youth Olympics events,

cones, hoops, jump ropes, tug-of-war ropes, baseball equipment, cross country skis and poles.

15. Cafeteria / Food Service equipment to include, but is not limited to:
    a. Double ovens
    b. Range with exhaust hood
    c. Refrigerators, freezers
    d. Hot carts
    e. Microwaves
    f. Handwashing sink, prep-sink, 3-compartment sink with disposal
    g. Dishwasher / dish sanitizer
    h. Foldable lunch tables and chairs
    i. Recycle and rubbish bins
    j. Tackboards
    k. Markerboard
    l. Motor-operated retractable projection screen
16. Observation / conference combo rooms to include:
    m. Conference table & chairs
    n. Markerboards & tackboards
17. Achievements for rewarding good behavior to include, but not be limited to:
    o. Comfortable lounge-type furniture
    p. Gaming equipment with monitors, video access and controls
18. Chair dollies and table storage carts for multi-purpose room furniture
19. Kitchenette equipment to include, but is not limited to:
    a. Rolling carts
    b. Microwave
    c. Refrigerator / freezer
    d. Tackboards
    e. Recycle and rubbish bins
20. Outdoor Storage equipment to include, but is not limited to:
    a. Lockable fireproof storage cabinet for volatile materials
    b. Metal shelving for exterior maintenance items/tools
21. Custodial room equipment to include, but is not limited to:
    a. Workstation for controls computer in boiler room with tackboard
    b. Locking metal storage cabinets
    c. Rubber discharge mats and lockable storage cabinets in electrical rooms
22. Group rooms to have marker boards, tackable surfaces, a conference table and 8-10 chairs
23. Window coverings on all windows within occupied spaces; roller-shade style
24. Storage rooms to have counters with lockable cabinets for storage of instructional supplies and materials, heavy-duty shelving and lockable file cabinets and mobile technology carts

Recommended:

Premium:

25. Magnetic glass whiteboards, electronic smartboards or other technology-based display boards CF-3 LCCA-1
26. Dry-erase wallcovering surfaces that double as projection screen CF-2 LCCA-1
27. Motor operated projection screen CF-2 LCCA-1
28. Solid surface counters and backsplashes, solid vinyl, recycled glass, or polycarbonate counters CF-4 LCCA-1
29. Stainless steel lab storage & cabinetry CF-4 LCCA-1
30. Solid wood cabinets or wood veneer cabinets CF-3 LCCA-1
31. Casework or architectural woodwork such as picture rails, wainscoting, crown moldings, or paneling CF-2 LCCA-1
32. Suspended acoustical felt baffles & wall panels CF-5 LCCA-3
33. Lit display cases CF-2 LCCA-2
34. Motorized roller shades CF-3 LCCA-2

07.CONVEYING SYSTEMS

[The following Site and Infrastructure language was added by department Facilities staff in the 2/12/2021 draft version.]

071 Passenger Conveyors

0711 Passenger Elevators

Required:

1. Install elevators only where required by codes adopted by the state or a local jurisdiction with delegated authority. (For multi-story schools meeting accessibility requirements with ramps in-lieu-of elevators, see 4 AAC 31.020 for a space variance.)
2. Install electric traction elevators when permitted for maximum energy efficiency.
3. Installations not within 100 road miles of an establish elevator service center at the time of construction are limited to hydraulic elevators excluding roped-hydraulic mechanisms.
4. In-ground hydraulic elevators must be supported by a geotechnical report showing suitable subsurface conditions.
5. Single piston hydraulic systems may not be eccentrically loaded.
6. Elevators will be supplied with backup power for lowering (only?).
7. Elevators will be included in a project's commissioning plan unless approved otherwise by DEED.

Recommended:

8. Elevators with machine rooms are preferred for maintenance simplicity. (For space variances associated with machine rooms, see 4 AAC 31.020).

9. Where a sump is required for an elevator pit, locate the sump pump outside the elevator shaft.
10. Education related facilities with three or more stories should consider in-ground hydraulic pistons where subsurface geotechnical consideration allow.
11. Cab flooring should match adjacent lobby/corridor flooring; doors and frames should be stainless steel.
12. Robust, durable controls, one per car (including both card access if a building standard and keyed controls), sensors, and connection to building automation.

Premium:

13. Educations related facilities with more than one passenger elevator. [CF-X, LCCA-X??]
14. Elevators with rated speeds above 200fpm and load capacities above 2500lbs.
15. Cab construction, features (lighting, etc.), and finishes above the manufacturer's standard base or that require manufacturer's premium costs except as noted above.

0712 Lifts & Other Conveyors

Required:

1. Passenger lifts or wheelchair lifts may be used where permitted by codes adopted by the state or a local jurisdiction with delegated authority. Primarily this will be at floor level changes that are less than a story height.
2. Inclined stair lifts are not permitted.

Recommended:

3. A lift's audio-visual alarm shall be operational at all times and shall activate when the lift is in operation except that a lift installed at a stage shall be free of a warning light or alarm.
4. Lifts shall have shielding devices to protect users from the machinery or other hazards and obstructions.
5. Cab flooring should match adjacent lobby/corridor flooring.

Premium:

6. Escalators or any type of moving walkway.

072 Material Handling Systems

0721 Elevators & Lifts

Required:

1. Dedicated freight elevators (or lifts where permitted by code) in education related facilities may be installed where the upper level(s) served by the conveyance total in excess of 100,000gsf.
2. If layouts permit, and as allowed by code, a required passenger elevator may be increased in size and capacity to function as a freight conveyance.
3. Vehicle lifts in the following quantities may be installed at any education related facility serving grades 9-12 whose approved educational specification includes an automotive Career Technology Education pathway:

<500 students grades 9-12	1
501 – 2000 students grades 9-12	2
>2000 students grades 9-12	3

Recommended:

4. Lifts shall have shielding devices to protect users from the machinery or other hazards and obstructions.
5. The maximum lifting height for vehicle lifts shall be 68 inches.
6. Two post lifts are limited to slab-on-grade construction; use four post lifts for elevated floors.
7. Where portable automotive lifts can meet curriculum requirements, such lifts shall be purchased and provided under School Equipment.

Premium:

8. Eligible educations related facilities with more than one freight elevator or lift.
9. Freight elevator dimensions exceeding 5ft x 8ft and load capacities above 5500lbs.
10. Vehicle lifts in excess of allowable quantities.
11. Vehicle lifts with load capacities above 3000lbs or with ancillary accessories or features such as alignment calibration.

0722 Hoists & Cranes

Required:

1. None.

Recommended:

2. None.

Premium:

3. Site constructed, permanent, overhead hoist or crane assemblies.

0723 Other Systems

Required:

1. None.

Recommended:

2. Dumbwaiters of any size permitted by code may be used when transfer of materials between floors is needed and freight elevators are not permitted. (Note: dimensions and capacity of dumbwaiters are restricted by code and are very modest.)

Premium:

3. Belt conveyors, pneumatic tube systems, linen/trash/mail chutes, or operable scaffolding.

08.**MECHANICAL**

[The following Mechanical language is from the BDS submittal]

The building mechanical systems encompass plumbing, heating, ventilation and air-conditioning (HVAC), and fire sprinkler protection systems. Mechanical systems shall be designed to conserve energy and water to reduce operating costs and demand on community resources. The systems shall be integrated with the design of the building plan and envelope to optimize performance and provide occupant comfort. The systems shall be durable, expandable, and easily maintained. Mechanical systems shall comply with DEED-adopted energy codes.

A. General

Required:

1. Design in accordance with the version of ASHRAE 90.1 currently required by DEED, including amendments by DEED.
2. Incorporate redundancy into critical mechanical systems at remote sites.
3. Provide sufficient floor space to provide minimum equipment clearances, and to allow maintenance activities and maintenance equipment.
4. Design piping systems to provide ease of maintenance - valves and equipment that are readily accessible, clearly indicated access locations, and clearly labeled piping, valves and equipment.
5. Do not abandon equipment or systems in building for remodel/addition projects. Demolish piping, ducts and wiring back to active portions of the systems.
6. Install low volatile organic compound (VOC) containing materials in accordance with 40 CFR 59, the **National Volatile Organic Compound Emission Standards For Consumer And Commercial Products.**
7. Design building systems to allow for future expansion.

Recommended:

8. Consider accommodating future removal and replacement of all mechanical equipment, with appropriate coordination between disciplines to provide for this occurrence.

Premium:

9. X

Plumbing

Required:

1. Meet the requirements of NSF-61 for materials in contact with drinking water.
2. Provide water conserving fixtures that meet the Energy Policy Act (EPAct) 1992, with Amendments.
3. Design potable water systems to conserve water to the greatest extent practicable, without compromising system performance.
4. For sites that use sewage lift stations, design waste and vent piping systems to use as few lift stations as practicable.
5. Provide furred out walls for plumbing fixtures installed on exterior walls. Do not install plumbing piping in the building thermal envelope.
6. Provide commercial fixtures that are durable and easily maintained.

7. Specify floor mounted wall carriers for urinals, lavatories and drinking fountains.
8. Group spaces with high fixture counts together – i.e. public restrooms, commercial kitchens, custodial.
9. Provide plumbing walls large enough for wall-mounted water closet carriers – 11-inches minimum for single-wall carriers, and 16-inches for back-to-back carriers.
10. Install isolation valves on piping serving rooms with ganged fixtures – such as restrooms, science rooms, kitchens.
11. Provide toilets in Pre-k–1st grade classrooms.
12. Provide sinks in classrooms for elementary grades including grade 5.
13. Provide solids interceptors (plaster traps) at art rooms.
14. Provide grease interceptors in commercial kitchens.
15. Specify floor drains with trap primers.
16. Pitch all slabs to floor drains.
17. Avoid locating floor and roof drains over electrical and data system equipment.
18. Install floor drains next to air handlers.
19. Install floor drains next to all equipment that produces condensate.
20. Install floor drains next to fire sprinkler pumps if practicable.
21. Provide emergency eyewash, shower units, floor drains, and sloped slabs as required by Occupational Safety and Health Administration (OSHA) in science rooms, art rooms, shop and maintenance spaces, and any classroom where chemicals are used.
22. Provide tamper-proof hose bibs adequately spaced around the perimeter of the building, except in locations where water supply is limited.
23. Locate plumbing vents away from roof edges, and snow drift locations, and near the ridge of sloping roofs.
24. Install roof plumbing vents in visually discrete locations to the greatest extent practicable.
25. Install cleanouts in locations readily accessible to maintenance personnel.
26. Use cast iron dome strainers on roof drains. Do no use plastic.
27. Specify insulated roof drain sumps to prevent condensation from forming inside the building.
28. Store domestic hot water at minimum 140°F to prevent Legionella growth.
29. Provide recirculation loop for domestic hot water systems out to the furthest hot water fixture. Only operate during occupied hours.
30. Provide hot water in accordance with Alaska Food Code_18 AAC 31 for facilities with commercial kitchens.
31. Garbage disposals are not an accepted fixture.
32. Utilize rainwater and/or snowmelt capture systems for facilities with limited access to potable water.

Recommended:

33. Avoid installing plumbing fixtures on exterior walls.
34. Consider reducing potable water use by choosing low-flow water fixtures that meet these maximum flow rates:
    - Lavatories 0.5 gpm metered

- Sinks 0.5 gpm
- Water closet 1.28 gpf
- Urinal 0.125 gpf
- Showerhead 1.5 gpm
- Kitchen sink (commercial kitchen sink excluded) 1.5 gpm

35. Avoid using ultra-low flow or waterless water closets and urinals.
36. Consider providing automatic controls at lavatories, water closets and urinals.
37. Specify intuitional/penal grade shower heads.
38. Consider providing bottle fill stations.
39. Consider providing multi-station wash fountains with automatic operation for elementary ganged restrooms.
40. Install hose bibbs with backflow protection in mechanical equipment rooms for equipment cleaning.
41. Consider installing bubblers on elementary classroom sinks.
42. Consider providing above-floor grease traps with automatic grease skimming technology in commercial kitchens.
43. Consider providing large sinks – minimum 30" wide x 18" front-to-back – with solids interceptors in Alaska Native cultural studies classrooms.
44. Consider install ceiling anchor points above lift stations, for mounting equipment to aid in removing pumps.
45. Consider choosing equipment and appliances with an Energy Star label.

Premium:

46. Install electric heat trace and insulation on roof plumbing vents.
47. Provide flow meter on the domestic water service for monitoring by the building control system. CF-2 LCCA-2
48. Design gray water and rainwater capture, treatment and distribution systems for urinal and water closet flushing. CF-varies LCCA-varies

HVAC

Required:

1. Locate mechanical rooms away from educational spaces to avoid the transfer of noise and vibrations.
2. Avoid placement of equipment and building openings on leeward side of building where subject to snow drifting.
3. Locate balancing valves and dampers to allow easy access for testing and balancing.
4. Coordinate with local electric utility for equipment motor sizes requiring variable frequency drives (VFD).
5. Control indoor air quality during construction, meeting SMACNA IAQ Guideline for Occupied Buildings under Construction 2007, Chapter 3.
6. Cover and seal ventilation equipment and ductwork during construction to prevent dust and debris in ductwork and equipment.

7. Provide radon testing for buildings with slab-on-grade construction, below grade crawlspaces, and basements, particularly in locations known to have radon. Design radon mitigation systems as needed.
8. Use energy recovery on ventilation systems according to size, based on DEED requirements.
9. Install preheat coils on outside air ducts in locations with winter design temperatures lower than 40°F to avoid condensation when mixing with return air. Provide preheat coils with summer filters.
10. Locate equipment like make-up air units (MAU) for kitchens on the roof, where practicable due to climate.
11. Implement demand control ventilation.
12. Utilize economizer cooling and natural ventilation to the greatest extent practicable.
13. Use sound attenuation for air handlers and ductwork serving classrooms, media centers, theaters and administrative spaces.
14. Locate building air intakes away from sources of air pollution such as buses, exhaust vents, kitchens, and shop spaces.
15. Exceed minimum distances as needed between outside air intakes and pollution sources if subject to entrainment and carryover from wind.
16. Locate louvers at least 8'-0" above grade and keep plantings away from louvers.
17. Locate intake louvers away from sources of air pollution such as buses, exhaust vents, kitchens, and shop spaces.
18. Avoid using louvers on outside air intakes in locations with frequent wind driven snow and rain, and subject to heavy frosting. Use arctic-tee hoods instead.
19. Maintain outside air intake velocities at or below 500 feet per minute to avoid entraining rain and snow.
20. Use 3/4” birdscreen on outside air intakes to avoid frost build up.
21. Provide deck-to-deck partitions, dedicated exhaust to the outdoors, and negative air pressure for spaces with hazardous materials (janitors’ closets, chemical mixing areas, darkrooms, and high-volume copy rooms, etc.).
22. Operate exhaust fans with lighting controls in small restrooms.
23. Operate exhaust fans with dedicated wall switches in janitor closets to allow continuous operation.
24. Provide appropriate air conditioning in computer rooms, computer labs, and data hub rooms. Utilize economizer cooling for server and data rooms and reject heat to return path of building ventilation system, to the greatest extent practicable.
25. Limit air conditioning to spaces used year-round: administrative offices, auditoriums, data and equipment rooms with equipment that generates heat, and spaces needed for summer school programs.
26. Provide exhaust fans sized for 5 air changes per hour in spaces that allow access to below-floor sewage lift stations. Exhaust fans to have dedicated switches to allow continuous operation.
27. Install duct access doors at inlet and outlet side of all duct mounted equipment.
28. Install control systems capable of operation by school district personnel.
29. Maintain monthly and annual records of resource consumption (water, fuel, electric).

30. Provide individual room temperature controls.
31. Use locking enclosures on temperature sensors and thermostats in public spaces

Recommended:

32. Consider hiring a 3rd party agent to perform commissioning in accordance with DEED requirements based on facility size construction scope. Systems to consider for commissioning include: heating ventilation and cooling (HVAC), controls, lighting and power loads, and air barrier systems.
33. Consider requiring extended warranties on boilers, air handlers and other major equipment.
34. Consider locating HVAC equipment in mechanical rooms or penthouses, not on roofs, in most regions of Alaska.
35. Consider installing floor mounted equipment on 4" tall concrete housekeeping pads.
36. Consider providing variable frequency drives (VFD) or electrically commutated motors (ECM) on all equipment for balancing.
37. Consider providing VFDs with integral disconnects.
38. Consider installing BTU metering of hydronic heating.
39. Consider using condensing boilers and low temperature (140 °F and lower heating supply) hydronic heating systems when using natural gas or propane as heating fuel.
40. Use high efficiency 3-pass cast iron boilers for locations heating with fuel oil.
41. Consider providing glycol fill and storage tanks with integral pump, check valve, isolation valves, pressure switch, and alarm panel.
42. Consider installing radiant ceiling panels or radiant floors in restrooms and locker rooms, rather than fintube.
43. Consider using utility waste heat where available. Size plate-and-frame heat exchangers for future expansion.
44. Consider using utility load-shed electric heat where available. Provide sufficient storage/buffer capacity for electrothermal systems.
45. Consider installing bypass filtration on new hydronic heating systems connected to existing piping and equipment.
46. Consider using energy recovery on all ventilation systems.
47. Consider using energy modeling during the design phase for system selection and building configuration.
48. Consider compiling comprehensive life cycle analyses throughout the design phase that addresses the initial cost of the systems, annual operating cost, maintenance costs, and replacement costs.
49. Consider providing passive radon venting that can be converted to active ventilation when site soil test confirm radon mitigation is needed.
50. Consider using factory-fabricated, listed grease duct for Type 1 kitchen hoods.
51. Consider using listed fire-wrap insulation on welded grease duct rather than architectural shafts.
52. Consider providing Minimum Efficiency Reporting Value (MERV) 13 filters, MERV 11 minimum if higher-rated filters are not provided by the unit manufacturer.

53. Consider designing building systems to allow for 15% capacity for future expansion when population rates indicate future growth.
54. Consider direct digital control (DDC) system with remote (web) access, alarms, graphics of all monitored and controlled equipment and systems, and programming tools for maintenance personnel.
55. Consider requiring control contractor to inspect control system performance, confirm occupant comfort, and provide training 1 month prior to 1-year warranty date

Premium:

56. Provide ongoing building commissioning.
57. Consider renewable energy sources such as geothermal, biomass, and thermal electric storage from turbines.
58. Install variable refrigerant flow (VRF) or variable refrigerant volume (VRV) for interior spaces that need cooling, and reject heat in other portions of the building.
59. Dehumidification systems for summer use
60. Electrostatic precipitators for wood chip systems
61. Building flush-out following LEED requirements. CF-varies LCCA-low
62. Connect a permanent metering system to the building management system to track water and energy consumption, manage use, and identify opportunities for additional savings.
63. Establish service contract with control contractor with clearly stipulated and measurable performance requirements.
64. Re-commission systems two years after the school opens to ensure the energy conservation features are operating as intended and to make adjustments to increase efficiency..

Fire Protection

Required:

1. Check with the AHJ for special requirements related to fire panel types/locations and fire department connections (FDC).
2. Provide complete National Fire Protection Assoc (NFPA) 13 systems.
3. Design sprinkler systems in conformance with local sprinkler ordinances.
4. Use cross contamination protection (i.e. backflow prevention) when connecting fire sprinkler system to potable water supply, including fire pumps.
5. Do not combine potable water and fire sprinkler water storage if practicable.
6. Do not recirculate fire sprinkler pump discharge to a potable water supply.
7. Provide a dedicated fire pump room with fire-rated construction, and door directly accessible to the outdoors or through a fire-resistant-rated corridor, per NFPA 20, for facilities with fire pumps.
8. Provide direct access from the fire sprinkler pump room
9. Use Schedule 40 black steel pipe for threaded fittings.
10. Use galvanized Schedule 40 black steel pipe for dry pipe systems.
11. Avoid dry sprinkler systems as much as practicable.
12. Use dry heads at entry/exit vestibules on wet fire sprinkler systems.

13. Conceal fire sprinkler piping to the greatest extent practicable in occupied spaces.
14. Do not install exposed sprinkler piping below 10 feet above finished floor to the greatest extent practicable.
15. Standardize on sprinkler heads throughout building.

Recommended:

16. Consider using electric fire pumps if electric utility has sufficient capacity.
17. Consider installing diesel fire sprinkler pumps near other fuel-fired equipment for efficient fuel storage and distribution.
18. Consider fabricating all exterior building overhangs, walkways, balconies, porches, etc., of dimensions and/or materials to avoid fire sprinkler protection.
19. Consider nitrogen-generator for dry sprinkler systems, rather than air compressor only.

Premium:

20. X

Special Mechanical Systems

Required:

1. Provide dust collection systems designed to NFPA 68, 69 and 654, as applicable, in facilities with equipment producing combustible dust – vocational education, maintenance shops, etc.
2. Compressed air and vacuum systems to have dedicated equipment rooms with limited access, constructed per the building code based on the type of gases stored.
3. Provide lab exhaust hoods for labs and science rooms, with lighting, fan switch, retractable sash. Install other accessories as required by school district.
4. Install HVAC systems for swimming pools to maintain space temperature and humidity levels between 82°F to 86°F, and 50% to 60% relative humidity.
5. Provide water mist fire sprinkler protection system designed to NFPA 750, where water mist is used in lieu of an NFPA 13 sprinkler system.

Recommended:

6. Use outside air only for pool room dehumidification, if possible, based on site climate conditions.

Premium:

7. X

09.**ELECTRICAL**

[The following Electrical language is from the BDS submittal]

Building systems shall be energy efficient to reduce initial construction costs as well as long-term energy consumption and operating costs. Electrical systems shall comply with DEED-adopted energy codes.

1. The building electrical systems encompass lighting, power, telecommunications, and electronic safety and security systems. These systems are for the purposes of life safety, user convenience, building and user security, occupant comfort, and educational delivery.
2. Electrical systems shall be designed in accordance with applicable codes and standards and shall conserve energy while also meeting the needs of the building and users.
3. The systems shall be integrated with the building programming, floor plan, and local District requirements to enhance and support the building's usefulness and longevity.
4. The systems shall be robust, expandable where feasible, and easily maintained.
5. Design shall meet present needs, with consideration given to future. Spare capacity or the ability to expand in the future should be evaluated within budgetary constraints.
6. Electrical systems should be considered for replacement based on age, condition, availability of parts, availability of support, and obsolescence.

A. Service and Distribution

1) MDPs & Switchgear

Required:

1. Size equipment for all building and site systems.
2. Locate equipment as close to the service entrance as practical to minimize the length of large feeders.
3. Use secondary distribution panels to consolidate panels and reduce the number of feeders running throughout the building.

Recommended:

4. Limit spare capacity to around 25% of physical breaker capacity or overall electrical capacity.
5. Provide surge protection at the main distribution panel, particularly on grids with lower reliability.
6. Provide metering with a network connection at the main distribution panel and any large distribution panels for accurate energy monitoring.
7. Allow listed series-rated systems to lower rating and cost of downstream panels and breakers.
8. Allow aluminum conductors on large feeders to lower project costs, if local District maintenance personnel are in agreement.

Panels & Motor Control Centers

Required:

1. Locate panels away from student-occupied areas unless unavoidable. Try to consolidate in electrical rooms, storage rooms, or similar spaces. Coordinate locations during design and monitor during construction to maintain working clearance. Provide an equipment grounding conductor in all conduits containing line voltage conductors.
2. Provide a dedicated neutral conductor for all circuits requiring a neutral.

Recommended:

3. Feed lighting circuits from a single panel that can be monitored.
4. Limit spare capacity to around 25% of physical breaker capacity or overall electrical capacity.

5. Provide surge protection for panels primarily serving classroom and office receptacles, or telecom equipment.
6. Locate a panel in areas with high numbers of circuits required, such as the kitchen and mechanical rooms, to minimize the length of branch circuits and number of disconnects.

Premium:

7. Building-wide monitoring of all panels.

Transformers

Required:

1. Size transformers for required load.
2. Avoid excessive transformer capacity and losses.
3. Coordinate with the electrical utility early in the project to identify delineation of work, particularly with respect to utility/medium-voltage transformers and circuit.
4. Vibration isolators are required where transformers may affect nearby spaces.

Recommended:

5. Consider using 120/208V where practical to avoid step-down transformers.
6. Utilize wall-mount or suspended configurations to maximize floor space.

Premium:

33. X

Power Distribution

Required:

1. Provide adequate electrical capacity for future building expansion.
2. Specify variable speed/frequency drives on electrical motors. Coordinate requirements with Mechanical.
3. Specify a minimum of two (2) double duplex outlets (2 outlets per circuit) per classroom wall unless covered with cubbies/casework that makes them inaccessible.
4. Provide receptacle load control in private offices, computer labs, and open office areas per energy code requirements. Switch receptacles with lighting occupancy sensor.
5. Provide tamper-resistant and GFCI receptacles where required by code.
6. Provide dedicated circuits for 120V equipment and appliances equal to or greater than 10 amps of draw.
7. Provide power and data for electronic whiteboards or digital TVs in classrooms.

Recommended:

8. Consider using GFCI circuit breakers where maintaining ready access to GFCI receptacles may be difficult.
9. Limit general purpose circuits to 6 duplex outlets.
10. Limit high-draw areas (kitchen, break room/lounge, workroom, etc.) to 2 duplex outlets per circuit in areas with high concentrations of equipment.
11. Use floor boxes and power poles in areas where they serve a specific purpose, instead of general power distribution.

12. Avoid headbolt heater outlets over 50% of staff positions. Consider time or occupancy based control of these circuits.
13. Provide locations with dedicated circuits for laptop charging stations if programmed.

Premium:

14. Excessive receptacle counts, including surface raceway with high quantities outside of labs or workbenches where required.

Lighting

Required:

1. Fixture types should be commodity level, commonly available, and cost effective to the extent possible. The use of custom/architectural fixtures, whether for general or decorative/accent lighting, should be limited to small areas of architectural interest and fit within budgetary constraints of the project.
2. Fixture source should be LED for efficiency and life expectancy unless design criteria justifies use of alternate sources.
3. Maintenance should be considered in fixture placement and selection. Fixtures should have field replaceable components, readily available replacement parts, and be installed in a manner that allows for access by local maintenance staff to clean, test, or repair.
4. Minimize the types of lamps to reduce inventory and replacement costs.
5. Provide fixtures that are easily relamped and cleaned.
6. Lighting levels shall be in accordance with Illuminating Engineering Society standards and Alaska Administrative Code (AAC). Lighting levels shall meet or exceed minimum recommended levels of the latest published version of the IES Handbook (25-65 age group) unless AAC requires higher light levels.
7. Emergency lighting/exit signs shall be provided in all code-required areas. Additional emergency lighting should be provided in areas with either increased risk of injury during an outage, or likelihood of persons unfamiliar with the space. These would include support spaces (electrical/mechanical/telecom rooms), large restrooms, conference/meeting rooms, kitchen, and similar.
8. Coordinate ceiling plan and lights with projectors and IT equipment.
9. Provide light emitting diode (LED) site lighting with zero cut-off fixtures where light trespass is unwelcome.
10. Provide lighting controls for dimming or multi-level light switching in educational spaces.
11. Install task lighting at instructional area wall surfaces where necessary.
12. Install LED fixtures or extended life lamps in areas with high ceilings where relamping is difficult.
13. Lighting control shall meet current codes at a minimum. Additional energy savings may be achievable with a more complex system but should be balanced with local maintenance capabilities and project budget constraints.
14. Minimum lighting control elements should include exterior photocell control, interior occupancy sensor control of applicable spaces, dimming of fixtures either through manual interface, daylight sensor input, or occupancy sensors, and multi-zone layouts for more

functional use of spaces. Examples would be a separate teaching wall zone in classrooms, or multiple zones in a gym or multi-purpose room to allow for most lighting to be off while maintaining some visibility.

Recommended:

15. Consider control for site and corridor lighting systems with the direct digital control system or a lighting control system.
16. Consider direct/indirect fixtures in classrooms with 10'-0" ceilings or greater.
17. Track energy use through a building automation system (BAS) or local metering of the lighting panel.
18. Use dimmable site lighting with integral photocell/occupancy sensors to reduce energy use.
19. Use fixtures with integral controls where practical to reduce device count and cabling.

Premium:

20. Building-wide lighting controls with extensive individual control of fixtures or connection with other systems. CF-3 LCCA-2
21. Architectural fixtures outside of limited use noted above. CF-4 to 5 LCCA-3

Special Systems

1) General Design Principles

1. Design principles apply as noted in Electrical.
2. In the absence of code requirements, design should follow BICSI or similar standards to the extent possible.

Data and Communications

Required:

1. Provide classroom ceilings with an outlet with voice/data capability and power for technology (if required, verify if PoE first)
2. Provide for wireless connectivity. Coordinate with IT for number and location of needed devices.
3. Provide minimum CAT 6 cabling–all horizontal cabling to be less than 295' in length.
4. Provide one (1) voice/data jack at each classroom wall unless inaccessible due to cubbies/casework.
5. During design development, provide layouts and cut sheets for all equipment requiring active electrical equipment to be built-in or purchased as part of movable equipment budget.
6. Provide cable pathways between all points.
7. Use plenum-rated cabling where distributed in open-air environments.

Recommended:

8. Provide fiber optic backbone between telecom rooms.
9. Provide Category 6A cabling to wireless access points.
10. Use J-hooks for smaller cable counts, consolidate into cable tray for larger counts.

11. Coordinate with Architect to minimize number of inaccessible conduit sleeves in cable pathway to telecom rooms.

Premium:

12. Raised floor raceway systems
13. Oversize cable tray systems.
14. PON or similar fiber distribution systems.

Clock/Intercom

Required:

1. Provide general paging throughout the building, with ability to page via phone system.

Recommended:

2. Provide multiple paging zones, including classrooms, corridors, exterior, support spaces. Consider a network-based solution with individual zones for each classroom.
3. Provide synchronized central clock system.

Premium:

4. Augmented/Virtual Reality Systems

Audio/Video

Required:

1. Provide power and data for electronic whiteboards or digital TVs in classrooms.
2. Provide HDMI connection at teacher's desk for electronic media.
3. Provide sound system in Gym/MPR/Commons with speakers, microphones, media input (CD optional/Aux input), amplifier and digital signal processor/mixer.
4. Provide small sound system in Band/Orchestra/Choir for support of program.
5. Coordinate location of motorized screen controls with sound input, basketball hoops, stage controls, lighting, etc.

Recommended:

6. X

Premium:

7. Augmented/Virtual Reality Systems
8. Multiple fixed projectors in large spaces.
9. TV Walls instead of projector screens.
10. Digital Signage, Graphic Walls for decorative/accent purposes.

Safety and Security

1) Electronic Safety and Security- General Design Principles

1. Except for code-required fire alarm systems, all other systems in this section are optional and should be considered based on budget, local District wants and needs, and area considerations such as likelihood of vandalism or intrusion.

Fire Alarm System

Required:

1. Code-minimum coverage for initiating and notification devices.
2. Code-required monitoring of mechanical equipment, generator, suppression systems, fire pump.
3. 24-hour monitoring service in areas served with a fire department.
4. Automatic dialer with local contacts in areas without a fire department.

Recommended:

5. Additional detection in areas with elevated risk of fire, such as storage rooms, kitchen, mechanical/electrical spaces, public restrooms.
6. Exterior notification on at least two sides of the building.
7. Low-frequency sounder/horn and high-candela strobe in areas that may be used for sleeping, even if occupancy is not called out for itinerant housing.

Premium:

8. Pre-action systems.
9. Full coverage detection.

Access Control System

Required:

1. If a system is used, limit number of doors to main entry points, including front, playground, staff entry, and loading dock/kitchen. Office area may be controlled.

Recommended:

2. Verify requirements with School District.
3. Use card readers or combination card reader/key pad.
4. Minimize use of key pad only, and if so assign unique codes to individuals. Do not assign a common code to a given door.
5. Use of a reader or button to initiate lockdown in the office should be provided. Lockdown should re-lock all doors, and release any magnetic door holders to seal off corridors/MPR/Gym, etc.
6. System should function independently if network connection is lost.
7. System should use standard readers, locks, and hardware to the extent possible to allow for migration to a different software.

Premium:

8. Card readers on interior doors except for the office area, particularly when used widely to eliminate keys.
9. Cabinet locks and similar where keys would normally be used.
10. Proprietary hardware (such as wireless locksets, hubs, etc.) that cannot migrate in case of software replacement.
11. Badging printers at every school in a District instead of centralized credentials.

Intrusion Detection System

Required:

1. Verify need/want with School District.

Recommended:

2. Utilize a combination of door contacts, glassbreak sensors, motion sensors for intrusion detection.
3. Locate a keypad at main entry and staff or kitchen entry.
4. Provide either a 24-hour monitoring service or automatic dialer with local contacts (particularly if no local law enforcement agency exists).
5. Connect to lighting controls if used to switch on corridor/site lighting upon alarm.
6. System can monitor industrial alarms, but avoid redundancy with building control system.

Video Surveillance System

Required:

1. Verify need/want with School District.

Recommended:

2. Provide surveillance cameras at least at all major entry points and corridor intersections, with traffic in and out of the office covered.
3. Provide a workstation in the Principal's office for review/download of video, and a monitor in the main office.
4. In schools with a security officer, Assistant Principal, or other similar party, additional workstations should be provided for effective monitoring.
5. IK08 impact resistance is the minimum allowed for cameras that can be touched, or objects thrown at them from less than 10' away.
6. Playgrounds should be monitored.
7. Use multi-sensor or wide-angle cameras wherever possible to replace multiple cameras with a single camera.
8. IK10 impact resistance is recommended.
9. Video system can integrate with access control/intrusion detection to assist those systems.

Premium:

10. Surveillance cameras at locations other than exterior doors, office, playgrounds, or corridors.
11. Interior cameras that exceed the ratio of 1 camera per 5,000 sf
12. Security camera systems that exceed 20 cameras for schools under 50,000 sf. For schools over 50,000 sf, add 2 cameras (one inside, one outside) per 5,000 sf.
13. Pan-tilt-zoom cameras, particularly without an active security officer.
14. Video walls, analytics packages if not justified, thermal or other specialty cameras.

Secure Entry and Lockdown

Required:

1. Verify need/want with School District.

Recommended:

2. Provide a lockdown button at the main office and security office. Lockdown should re-lock all doors, and release any magnetic door holders to seal off corridors/MPR/Gym, etc.
3. If lockdown is only used for duress (as opposed to abundance of caution such as non-custodial parent), button should call local law enforcement and/or alert District.
4. If lockdown and duress functions differ, provide two buttons.
5. Broadcast a coded message to classroom paging zone upon activation of button to alert teachers to lock doors.
6. Provide a controlled point at main entry to screen visitors, including intercom/camera.

Other Electrical Systems

1) Power Generation and Distribution

Required:

1. None

Recommended:

2. Use battery backup instead of an emergency generator. If a generator is included, design it for standby functions.
3. Consider a standby generator to support safety, security, and core building systems..
4. Locate the generator inside of the building, or in an equipment enclosure instead of a walk-in module to preserve square footage.

Premium:

5. Photovoltaic arrays or systems
6. Electrical wind generators
7. Standby generator beyond critical systems.
8. Walk-in generator modules or buildings.
9. Excessive capacity, either electrically or physical.
10. Redundant generators or bypass isolation automatic transfer switches.

010. EQUIPMENT & FURNISHINGS

[The following Site and Infrastructure language was added by department Facilities staff in the 3/8/2021 draft version. BDS language from 06 Interiors "Built-in Furnishings, Equipment & Technology" was incorporated into these sections.]

A. Building System Summary

The **Equipment & Furnishings** of school buildings consist of the educational program and support equipment physically connected to the facility or its support systems. It also includes furnishings that are fixed or integral to the building. The department recognizes two sub-categories in this building system: **Equipment** and **Furnishings**. Equipment in this category is normally incorporated into load calculations by engineering disciplines and installed by a contractor using one or more trades. Furnishings in this category are of traditional types (chairs, bookcases, tables, etc.) but that are built-

in or affixed to the facility. The **Furnishings** category fits in a niche between **Specialties** in **06. Interiors** and moveable fixtures, furnishings and equipment (FF&E). Lockers, casework, display cases, bleachers and window coverings are all examples or items covered in **Specialties**. For additional information and standards on FF&E, see the department's publication ***Guidelines for School Equipment Purchases***.

B. Design Philosophy

Cost effective school construction requires detailed design coordination between the school's building systems and the **Equipment** and **Furnishings** needed to deliver and support education. Items in this section include those that have proven to need a moderate to high level of integration to meet their intended function, and to avoid changes during construction. The building technology and educational technology elements deserve a special note as components related to these areas are changing rapidly from year to year with new technology resulting in faster, lightweight, affordable, and portable "plug-in" equipment. The State expects schools to take advantage of the latest technology that can simplify building systems and lower installed technology costs. For additional design parameters see the **Design Ratio** section of this system.

C. Model Alaskan School

The Model Alaskan School includes a selection of athletic equipment (main and secondary basketball goals, volleyball floor inserts, chinning bar, pegboard), food preparation (refrigerator, freezer, convection oven, range and hood, under-counter fridge), laundry equipment (stacked washer and dryer), classroom equipment (projection screens, window blinds), and entry mats. Associated with special electrical systems, the model also provides for classroom and gym/stage audio visual systems. Associated with plumbing systems, the model provides for three-compartment sink, handwash sink, and grease interceptor. Acceptable additional items and alternatives are detailed in the construction standards that follow.

101 Equipment

1011 Food Service & Kitchen Equipment

Required:

1. Provide equipment for basic food preparation and cleanup for student lunch preparation of up to 40 meals/day in all school facilities to include appropriately sized items from the following categories:
   - Reach-in refrigerator
   - Reach-in freezer
   - Combi steam/convection oven
   - Commercial range
   - Wall-mounted shelving
   - Dishmachine
   - Mop sink cabinet
   - Type 1 vent hood

   (Ref. Section *0811 Plumbing Fixtures* for code required prep and cleanup sinks.)
2. Provide equipment for full-service food preparation and cleanup for student lunch preparation of over 40 meals/day. Size and select equipment based on DEED-reviewed kitchen design from the basic equipment list and the following categories:
   - Walk-in refrigerator
   - Walk-in freezer

- Steam kettle
- Braising pan
- Production steamer
- Fryer
- Ice maker
- Type 2 vent hood(s)

(Ref. Section *0811 Plumbing Fixtures* for code required prep and cleanup sinks.)

3. Provide other support equipment that is mobile/moveable and plugs into standard receptacles as FF&E. Items below are considered FF&E; see Building System Summary preceding:
   - Prep appliances (mixer, slicer, etc.)
   - Cooking appliances (microwave, toaster)
   - Mobile hot/cold serving tables
   - Mobile heating cabinets
   - Multi-tier shelving units
   - Mobile prep/work tables
   - Mobile transport carts
   - Pots/pans/utensils

Recommended:

4. Consider providing equipment for a warming/cooking kitchen only when the district provides a central kitchen to include:
   - Reach-in refrigerator
   - Reach-in freezer
   - Convection oven
   - Wall-mounted shelving
   - Mop sink cabinet
   - Type 1 vent hood

   (Ref. Section *0811 Plumbing Fixtures* for code required prep and cleanup sinks.)

Premium:

5. Equipment for full-service food preparation in districts which operate a central kitchen.

1012 Athletic Equipment

Required:

1. Provide ceiling or wall-mounted basketball backboard/hoops at competition court; motor-operated raise/lower.
2. Provide floor inserts for volleyball standards/nets.
3. Provide a multi-sport wall-mounted score board opposite each set of bleachers.

Recommended:

4. Consider secondary, wall-mounted basketball backboards/hoops at recreational courts; motor operated raise/lower.
5. Consider mat hoists where wrestling programs are established.
6. Consider ceiling mounted gym curtains to support multiple concurrent programs; motor-operated raise/lower.
7. Consider ceiling-mounted climbing ropes.
8. Consider chinning bar(s), peg climbing board, and other wall-mounted fitness equipment requiring structural support.
9. Consider a motor-operated projection screen.
10. Consider a high-capacity washer and dryer.

Premium:

11. Whirlpools or ice-bath equipment.

12. Saunas

1013 Career & Technology Equipment

Required:

1. Provide the following woodworking equipment in floor-standing models: 10in table saw with 'saw stop' technology, 12in band saw, 1hp drill press. (Other benchtop and plug-in equipment will be provided as FF&E)
2. Provide the following metal working equipment: welding station/booth, 1hp milling machine/lathe.

Recommended:

3. Consider additional woodworking equipment to include: lathes, router/joiner, and belt/disc sanders.
4. Consider additional metal working equipment to include: sheet metal brake, and grinders.
5. Consider moving all equipment to portable, tabletop, 110v for small programs and additional flexibility. All such equipment would be provided as FF&E.
6. Consider medium format 4ftx8ft CNC machine.
7. See Section *0721 Elevators and Lifts* for provisions associated with vehicle lifts.

Premium:

8. See Section *0733 Hoists and Cranes* for premium limitations.

1014 Science Equipment

Required:

1. [See Section *0652 Casework/Millwork* for fixed lab tables.]
2. Provide one 36in fume hood.

Recommended:

3. Consider a 48in fume hood for larger programs; demonstration type or double sided.
4. Consider a commercial undercounter dishwasher at Science Storage/Prep.

Premium:

5. Fume hoods larger than 48in.

1015 Library Equipment

Required:

1. Provide a book drop with catch bin; free standing or built-in to casework.
2. Provide book stacks in a combination of wall perimeter (5-6 shelf) and freestanding (2-3 shelf) for approximately 50 volumes/student capacity. Laminate finish. [Note: Other book display shelving to be FF&E; all seating, tables and other loose furnishings to be FF&E.]
3. Provide a motor-operated projection screen.

Recommended:

4. Consider wood veneer on book stacks in libraries serving any secondary grades.

Premium:

5. TBD

1016 Theater Equipment

Required:

1. Provide motor-operated projection screen.
2. Provide motor-operated stage curtain.

Recommended:

3. Consider fixed overhead rigging for stage curtains, sets, and lighting.
4. Consider stage lighting system including fixtures and control board.
5. Consider 48 channel sound mixing board.

Premium:

6. Orchestra pit equipment

1017 Art Equipment

Required:

1. [None required.]

Recommended:

2. Consider up to two gas-fired kilns.
3. Consider heavy-duty clay mixer.
4. Consider electric pottery wheels; quantity for anticipated class size.

Premium:

5. Darkrooms for chemical film/print processing.

1018 Loading Dock Equipment

Required:

1. [None required.]

Recommended:

2. Consider bin-size recyclable baler and multi-waste compactor.
3. Consider providing fixed commercial compactor chute (to align with vendor provided compactor and waste service).
4. Consider dock bumpers where elevated truck loading/unloading occurs.

Premium:

5. Dock leveler systems.

1019 Other Equipment

Required:

1. [None required.]

Recommended:

2. Consider kitchenette at Special Needs Life Skills areas with residential type refrigerator, range, over range microwave, and dishwasher.
3. Consider high-capacity washer and dryer at Intensive Needs program area.
4. Consider ceiling mounted plates/eye bolts at OT/PT program area.

Premium:

5. TBD

102 Furnishings

1021 Fixed Furnishings

Required:

1. Provide benches at building entry vestibules/lobby in the parent pick-up/drop-off zones; secure to floor.

Recommended:

2. Consider built-in benches/seating at Library and Elementary Classroom.

Premium:

3. TBD

1022 Mats

Required:

1. Provide walk-off grates/mats at entry vestibules.

Recommended:

2. TBD

Premium:

3. TBD

1023 Other Furnishings

Required: Required:

1. TBD

Recommended:

2. TBD

Premium:

3. TBD

011. SPECIAL CONDITIONS

[The following Site and Infrastructure language was added by department Facilities staff in the 3/8/21 draft version.]

A. Building System Summary

The **Special Conditions** related to school buildings consist of both special purpose facilities and project conditions that bridge across, rather than fitting within, several of the core building systems. The 'system' deals with the installation, removal, or relocation of integrated or self-contained support buildings, and with site conditions that, while altering the site, do not install utility or improvement features. Generally, all elements related to hazardous materials and conditions are included within this system. The department recognizes three sub-categories in this building system: **Special Construction**, **Special Demolition**, and **Special Site Conditions**. Special Construction includes three specific use-types. Special Demolition includes all demolition work from entire buildings to selective building elements and utilities. It also captures hazmat associated with that demolition. Special Site Conditions deals with management of site conditions for both effective construction execution and long-term building operations. Remediation work for sites is also captured. **Special Construction** will overlap nearly all building system sections **02** through **09** depending on complexity, as will **Special Demolition**. The **Special Site Conditions** category abuts **01. Site & Infrastructure** categories but should not have much, if any, overlap.

B. Design Philosophy

Cost effective school construction can sometimes be enhanced by isolating special facility uses such as greenhouses or various types and combinations of utility modules and providing them as separate facilities. These solutions, while more common in remote school locations, are not automatic for any project and should be based on solid value analysis. Similarly, selective, and whole building demolition work occurs across a range of scope and possibility. Final project solutions should be driven by options analysis supported by accurate life-cycle costing. Site conditions can have a significant impact on cost effective school construction. Factors such as topography, erosion, proximity to natural hazards, wetlands, site drainage, and flooding must be properly evaluated in the project planning phase. The department's publication ***Site Selection Criteria and Evaluation Handbook***, provides guidance and tools in these areas. The State expects school districts to thoroughly evaluate **Special Conditions** that can simplify building systems and lower construction costs. For additional design parameters see the **Design Ratio** section of this system.

C. Model Alaskan School

The Model Alaskan School includes site preparation work that aligns with Special Site Conditions of this section to include clearing and grubbing, survey and layout, SWPPP, excavation, geotextiles, fill, and compaction work. While the full ***Program Demand Cost Model for Alaskan Schools*** does include estimating elements for demolition and hazardous materials conditions, its Model School Escalation file does not. Primarily this is due to these elements being dependent on specific project environments and conditions. Acceptable additional items and alternatives are detailed in the construction standards that follow.

111 Special Construction

1111 Packaged Utility Modules

Required:

1. Provide packaged utility module supporting any of the following functions in locations where site-constructed solutions are less cost effective: fire suppression, heating plants (i.e., oil and wood-fired boilers, etc.), power generation, walk-in refrigerator/freezers (CF-3 LCCA-1).

Recommended:

2. Consider including electrical services in conjunction with utility modules providing heating plants (CF-3 LCCA-1).

Premium:

3. Packaged utility modules with utility runs to the supported facility that exceed 40ft.

1112 Swimming Pool

Required:

1. Swimming pools are supported as school space under AS 14.11 under certain conditions. Refer to the most current department publication *Swimming Pool Guidelines for Educational Programs*.

Recommended:

2. Consider construction of swimming pools in support of the educational program where the capacity exists to meet the above average operations and maintenance costs of such facilities over time.
3. Consider partnering with related municipal and borough entities in sharing the cost of initial capital, O&M, and capital renewal costs though a joint use agreement (ref. 4 AAC 31.020(g)).

Premium:

4. Swimming pool tank sizes, amenities, and resulting facilities not supported under statute and regulation.

1113 Greenhouse

Required:

1. None required. [Note: Greenhouses are considered school space under 4 AAC 31.020.]

Recommended:

2. Consider building-attached greenhouse spaces when such spaces can meet the educational program being provided (ref. ***0142 Attached Shelters***).
3. Consider freestanding greenhouses in support of the educational program where the capacity exists to meet the above average operations and maintenance costs of such facilities.

Premium:

4. Greenhouse space which is beyond the allowable gross square footage in the attendance area (ref. 4 AAC 31.016 and 4 AAC 31.020).

112 Special Demolition

1121 Structure Demolition

Required:

1. Provide demolition of existing schools which are no longer cost effective to repair and or transfer to another entity when approved for replacement as part of an application for state-aid under AS 14.11 (CF-3 LCCA-1).
2. Provide demolition of state-owned abandoned school sites as part of the development of new schools, replacement schools, or additions/renovations to existing schools.
3. Secure permits for local disposal (i.e., one-time monofill on state-owned or district-owned property), on property owned by others by agreement, or in approved local landfills.

Recommended:

4. Consider the demolition of education support facilities that have exceeded their useful life and cannot be renovated for additional use(s).
5. Consider removal of demolition waste to a landfill in Alaska or outside of Alaska when local disposal options have been exhausted (CF-3 LCCA-1).

Premium:

6. Demolition of any structure not accepted as an *education related facility* and approved by the department.

1122 Building Selective Demolition

Required:

1. Provide selective demolition in support of approved new work or renovation.
2. Secure permits for local disposal in approved local landfills.

Recommended:

3. Consider removal of demolition waste to a landfill in Alaska or outside of Alaska when local disposal options have been exhausted (CF-3 LCCA-1).

Premium:

4. Any selective demolition not accepted as part of an *education related facility* and approved by the department.

1123 Site & Utility Demolition

Required:

1. X

Recommended:

2. X

Premium:

3. X

1124 Hazardous Material Removal

Required:

1. X

Recommended:

2. X

Premium:

3. X

1125 Building Relocation

Required:

1. X

Recommended:

2. X

Premium:

3. X

113 Special Site Conditions

1131 Site Shoring & Dewatering

Required:

1. X

Recommended:

2. X

Premium:

3. X

1132 Site Earthwork

Required:

1. X

Recommended:

2. X

Premium:

3. X

1133 Site Remediation

Required:

1. X

Recommended:

2. X

Premium:

3. X

State of Alaska **Department of Education & Early Development**
Bond Reimbursement & Grant Review Committee

Alaska School Facilities Preventive Maintenance & Facility Management Handbook

P U B L I C A T I O N C O V E R

March 17, 2020

Issue

The department is providing a status update to the committee on the draft 3rd Edition *Alaskan Schools Preventive Maintenance &Facility Management Handbook*. The following summary of work will be updated as work progresses. For this update, the department is presenting the areas in **bold** below:

Summary of Work Remaining

The current draft, *PMFM Handbook BRGR Draft_3-8-2021*, requires considerable additional development in the following areas:

- Examples and Lessons Learned for initial commissioning and retro-commissioning.
- Sustaining a maintenance management program by proper budgeting, staffing, software upgrades, performance metrics, and evaluations/inspections.
- **Developing an energy management program.**
- Implementing and Sustaining an energy management program.
- Implementing and Sustaining a custodial program (intro and outline).
- District design and construction standards interface.
- Additional Considerations sections:
  - Managing contracted staff
  - Evaluating your maintenance program
  - Environmental safety
  - Portable devices in the maintenance workflow
  - Electronic O&M manuals
- Appendix A – PM components (aligned with DEED system structures)
- Appendix C – Facility funding formulas
- Appendix F – Bibliography of maintenance publications
- Appendix G – Standard for a clean classroom (now post-Covid 19?)

BRGR Input and Discussion Items

Below are questions and comments developed by DEED during the preparation of this draft for consideration by the BRGR Committee:

- Review the updated section *Developing an Energy Management Program*. Comments solicited on both the outline structure/headings and the content of each section.

Recommended Action

None.

Alaska School Facilities Preventive Maintenance & Facility Management Handbook

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Background

The primary focus of the original (1997) and second edition (1999) of the *Alaska School Facilities Preventive Maintenance Handbook* was to present school districts with a basic outline on how to develop and implement a preventive maintenance program. At that point in history, the Department of Education and Early Development realized that many of the school facilities built following the oil boom of the late 1970s were in poor condition and several were already in dire need of major repairs a mere couple decades after original commissioning. In some cases, it was found that the operational systems for many of these schools were having their life-expectancy curtailed mainly because of maintenance staffing levels, training, and management practices. Even though preventive maintenance was present in some of our school districts, other school districts appeared to be unaware of its existence, or simply did not know how to go about managing their schools with adequate maintenance in a manner which would benefit each school while keeping operational and maintenance costs under control.

As a proposal to address these issues, and as a means to better streamline accountability and efforts in all school districts across the state, state officials focused their attention to ensure school districts had at least minimum standards for preventive maintenance and facility management program. In 1998, new legislation was passed and in 2000 regulations were promulgated to implement minimum criteria for maintenance and facility management if school districts wished to remain eligible for state-aid for school capital projects.

The prime objective of these new standards was to empower school districts to develop functioning preventive maintenance and facility care programs; as a reward for their efforts and demonstrated achievements, the department would then enable eligible school districts to apply for future grants.

This narrative summarizes the birth of the preventive maintenance program and the main factors which came about to justify its existence. It was imperative then, and continues today, that the department and districts collaborate to ~~moving~~ move all districts beyond a point—real or perceived—~~-~~of perpetual "breakdown maintenance" and "fix-it" capital expenditure. We must jointly move to integrated, sustainable, best-practice facility care and management. This type of maintenance and facility management is beneficial to the taxpayer, to maintenance personnel, and to the students and staff in our schools.

Statutory Authority

Alaska Statutes (AS)

- Assign responsibility for preventive maintenance, custodial services and routine maintenance (AS 14.14.090, AS 14.08.111, AS 14.14.060)

> AS 14.14.090. In addition to other duties, a school board shall . . .
> (10) provide for the development and implementation of a preventive maintenance program for school facilities . . .
>
> AS 14.08.111. A regional school board shall . . .
> (8) provide custodial services and routine maintenance of school buildings and facilities;
>
> AS 14.14.060
> (f) The borough school board shall provide custodial services and routine maintenance for school buildings and shall appoint, compensate and otherwise control personnel for these purposes. The borough assembly through the borough administrator, shall provide for all major rehabilitation, all construction and major repair of school buildings. The recommendations of the school board shall be considered in carrying out the provisions of this section.

- Define preventive maintenance (AS 14.14.090); and,

> AS 14.14.090
> (10) . . . in this paragraph, "preventive maintenance" means scheduled maintenance actions that prevent the premature failure or extend the useful life of a facility, or a facility's systems and components, and that are cost-effective on a life-cycle basis.

- Establish the requirements of a preventive maintenance plan (AS 14.11.011, AS 14.11.100).

> AS 14.11.011
> (b) For a municipality that is a school district or a regional educational attendance area to be eligible for a grant under this chapter, the district shall submit . . .
> (4) evidence acceptable to the department that the district
> (A) has a preventive maintenance plan that
> (i) includes a computerized maintenance management program, cardex system, or other formal systematic means of tracking the timing and costs associated with planned and completed maintenance activities, including scheduled preventive maintenance;
> (ii) addresses energy management for buildings owned or operated by the district;
> (iii) includes a regular custodial care program for buildings owned or operated by the district;
> (iv) includes preventive maintenance training for facility managers and maintenance employees;

Statutory Authority

(v) includes renewal and replacement schedules for electrical, mechanical, structural, and other components of facilities owned or operated by the district; and

(B) is adequately adhering to the preventive maintenance plan.

AS 14.11.100

(j) Except as provided in (l) of this section, the state may not allocate money to a municipality for a school construction project under (a)(5), (6), or (7) of this section unless the municipality complies with the requirements of (1) - (5) of this subsection . . . . In approving a project under this subsection, and to the extent required under (a)(8) - (17) of this section, the commissioner shall require . . .

(5) evidence acceptable to the department that the district

(A) has a preventive maintenance plan that

(i) includes a computerized maintenance management program, cardex system, or other formal systematic means of tracking the timing and costs associated with planned and completed maintenance activities, including scheduled preventive maintenance;

(ii) addresses energy management for buildings owned or operated by the district;

(iii) includes a regular custodial care program for buildings owned or operated by the district;

(iv) includes preventive maintenance training for facility managers and maintenance employees; and

(v) includes renewal and replacement schedules for electrical, mechanical, structural, and other components of facilities owned or operated by the district; and

(B) is adequately following the preventive maintenance plan.

Read in their entirety, these statutes establish that preventive maintenance of Alaska schools is solely the responsibility of school districts, and that funding for such must be included within the district's operating budget. Some school districts share the duties of maintenance with another agency within the city or borough. The statutes in no way prohibit school districts from acting in conjunction with these associated agencies to affect all or a part of their maintenance program. However, doing so does not relieve the school board of its obligations in the areas of preventive maintenance.

Also, based on this statutory authority, the department's capital improvement project (CIP) application does not allow capital funding for the accomplishment of preventive maintenance. A district requesting capital funding for both school construction and major maintenance projects must provide "evidence that the proposed project should be a capital improvement project and not part of a preventive maintenance program, or regular custodial care program." (AS 14.11.011(b)(3))

Regulatory Requirements

Alaska Administrative Code (AAC)

- Provides direction in regulation for development of a school district Preventive Maintenance and Facility Management program and for periodic review by the department that districts are adhering to the plan.

4 AAC 31.013. Preventive maintenance and facility management

(a) For a district to be eligible for state aid under AS 14.11.011 or AS 14.11.100, the district must have a facility management program that addresses the following five elements of facility and maintenance management:

(1) a formal maintenance management program that records maintenance activities on a work order basis, and tracks the timing and cost, including labor and materials, of maintenance activities in sufficient detail to produce reports of planned and completed work;

(2) an energy management plan that includes

(A) the recording of energy consumption for all utilities on a monthly basis for each building; for facilities constructed before 12/15/2004, a district my record energy consumption for utilities on a monthly basis when multiple buildings are served by one utility plant; and

(B) regular evaluation of the effectiveness of and need for commissioning existing buildings;

(3) a custodial program that includes a schedule of custodial activities for each building based on type of work and scope of effort;

(4) a maintenance training program that specifies training for custodial and maintenance staff and records training received by each person; and

(5) a renewal and replacement schedule that, for each school facility of permanent construction over 1,000 gross square feet, identifies the construction cost of major building systems, including electrical, mechanical, structural and other components; evaluates and establishes the life-expectancy of those systems; compares life-expectancy to the age and condition of the systems; and uses the data to forecast a renewal and replacement year and cost for each system.

(b) Repealed 12/15/2004.

(c) At the request of a chief school administrator, the department will assist a district in implementing a qualifying preventive maintenance program through consultation, on-site reviews, and training.

(d) Repealed 12/15/2004.

(e) The department will make a determination of a district's compliance with each element required in (a) of this section, based on evidence of a program acquired by the department, including information gathered by the department during an on-site visit conducted under (f) of this section. The department may change a determination at any time during the year based on new evidence. For purposes of eligibility for an application submitted under AS 14.11.011, on or before June 1, the department will provide preliminary notice of its determination. Districts that are not in full compliance must provide evidence of compliance to

the department by August 1. On or before August 15, the department will notify districts of its final determination regarding compliance. The department will deny a grant application submitted under AS 14.11.011 by a district that has received a final determination from the department that the district is out of compliance with this section.

(f) The department will conduct an on-site inspection of school district preventive maintenance and facility management program at least once every five years; however, if the department issues a finding of noncompliance under (e) of this section and the district does not provide adequate evidence of compliance, the department may postpone an onsite visit beyond the five-year period. The department may make additional inspections as it deems necessary. The department may change its determination of compliance based on information obtained during an on-site inspection.

(g) In this section

(1) "district" has the meaning given in AS 14.11.135 ;

(2) "maintenance activities" means all work performed by district staff or contractors on building systems, components, utilities, and site improvements.

(h) Notwithstanding (e) and (f) of this section, the department may make a determination of provisional compliance for a district that provides evidence of a plan that meets all required elements identified in (a) of this section but does not provide documentation of adherence to that plan. A determination of provisional compliance will allow a district to be eligible for state aid until a final determination of compliance or non-compliance is provided.

Facility Management Overview

Facility Management as a Strategy

Overview

The preceding Background section summarizes the genesis of department-generated preventive maintenance guidance and the following legislation-driven expansion of that narrow facilities care element into a more comprehensive maintenance and facility management requirement. Over the past fifteen years, nearly 100% of Alaska's school districts have achieved compliance in meeting minimum standards. Every school district, with a single exception, has at some point between 2001 and 2016, met the state's minimum standards for maintenance and facility management of school facilities. In August 2002, only six districts met minimum standards. By August 2003, the number was 22. It peaked at 52 school districts in 2008. Disturbingly, since the peak in 2008, and through 2017, two school districts lost certification (and regained it) and an additional 12 school districts have experienced a year or more of provisional compliance where minimum standards are achieved but for which there is not at least 12 months of data demonstrating adherence to the standard. In each of these 14 lapses, it was clear that the measured maintenance, operations, and capital planning areas were not sufficiently integrated into a facility management program so as to remain sustainable through personnel changes or economic shifts in the school district. On a brighter note, some of Alaska's school districts have exceeded the minimum requirements and are operating closer to the forefront of facilities management. Practices and processes such as predictive maintenance to forecast equipment failure, equipment upgrades based on lower life-cycle costs, and managing demand for space are beginning to appear in the department's assessment visits. The Department believes these kinds of results are achievable in every school district, at every level of resource availability, through integration and district-level ownership.

Purpose

The purpose for this document is three-fold:

1. To expand department guidance to reflect the full breadth of maintenance and facility management addressed in statute and regulation,
2. To foster greater consistency and sustainability in meeting department requirements by focusing on the integration of operations, maintenance, and capital planning under a Facility Management paradigm, and
3. To offer best-practice insights and meaningful tools to help create facility management programs that exceed minimum requirements.

The structure of this document supports these purposes by addressing each of the five components of maintenance and facility management in three areas: developing, implementing, and sustaining. In addition, where general facility management topics cross one or more of the five mandatory components, these topics are addressed in this Overview section rather than repeatedly in each category. Other pertinent topics and best practices are combined in a section of the publication entitled Additional Considerations. Finally, specific tools and resources are provided as appendices following the narrative documentation.

Facility Management Overview

With limited availability of capital funding, and community pressure on local funding for public works, it is vitally important for school districts to fully integrate overall facility management into district operations. Facility management is not just a matter of fixing things when they break; it is a comprehensive program of operating, maintaining, repairing, and replacing components and systems for optimal results. Such a process addresses facility issues before they have a chance to create a crisis or emergency in a school district facility. With a comprehensive facility management program, a school district has tools that will extend the effectiveness of each maintenance and operations dollar so that the maximum amount of funding is made available for the students in the classroom. Processes for implementing a comprehensive facility management program are heavily dependent on actionable data and include:

- tracking tools such as work-orders,
- planning tools such as reports, and
- other tools such as active inventory control for custodial and classroom supplies.

Facility Management Integration

Whole-building preventive maintenance was the threshold step for Alaska's school districts on the path toward life-cycle, cradle-to-grave, sustainable facility management. That was soon followed with requirements that covered operations (custodial, energy management), maintenance (maintenance management, maintenance training), and construction (capital planning). While each of these functional areas can be built up and managed independently, it is their integration that is most likely to ensure sustainability. In the effort to achieve the most value for the facility dollar contributed from all sources—local, state, and federal—operations, maintenance, and construction programs need to be coordinated though an effective facility management program. They all work hand in hand to extend the life of existing facilities. State law provides the basic building blocks for school districts to get the most out of their facilities. Some school districts have exceeded the minimum requirements and are functioning at the forefront of facilities management, integrating processes, practices, and data between functional areas. They are sustaining momentum by using strategic and tactical measures to extend the service life, lower life-cycle costs, and lower occupancy costs.

Building Systems and Components Inventory

Introduction

An accurate inventory of the systems and components in a facility is core knowledge for facility management. The school district's maintenance management program, custodial program, and capital planning program all depend on this essential data. Energy management programs and maintenance training programs also draw from this information.

Facility Audits and Annual Inspections

Introduction

The implementation phase of both maintenance management and capital planning should establish the practice of regular assessments of facility conditions as part of their programs.

Integrating condition data between these two elements of facility management will also assist school districts in sustaining these two programs long-term. One practical integration is making the measurement of performance indicators in each area dependent on data gathered and updated under the other program.

Facilities Budgeting and Funding

Introduction

Budgeting and funding for school facilities includes all elements of facility management—operations, maintenance, and construction. The interface between maintenance management, custodial programs, energy management, and capital planning (renewal) is especially important when considering the costs associated with school facilities.

Data for Informed Decision Making

Introduction

"Timely access to relevant facilities data is essential to both effective management of school facilities by district officials and appropriate oversight of public investments by a community. Providing the needed information to the public and other decision makers involves:

- the development or maintenance of a facilities information system capable of collecting, organizing, storing, analyzing, and reporting relevant, timely, comparable, and accurate facilities data (chapter 2);
- the meaningful analysis of available data, including the use of appropriate indicators, indices, measures, and benchmarks (chapter 3);
- the collection and frequent updating of a host of clearly defined, comparable data elements that describe school facilities and their funding, operations, maintenance, and use (chapter 4);
- the maintenance of data definitions, data standards, quality controls, and operational protocols affecting the collection, analysis, and use of data;[1]
- the presentation of those data into formats that are reasonably usable by the various stakeholder audiences;[2] and
- timely access to the data in printed public reports or via public websites.[3]

School districts and states throughout the country continue to increase their use of facilities data to inform decision making: to manage day-to-day operations, maintenance, and repairs, as well as short-term operational planning, long-term capital planning, and master facilities

[1] For more information about ensuring data quality and appropriate data use, see the *Forum Guide to Building a Culture of Quality Data: A School and District Resource* (https://nces.ed.gov/forum/pub_2005801.asp) and the *Forum Guide to Taking Action with Education Data* (https://nces.ed.gov/forum/pub_2013801.asp).

[2] For more information about data presentation, see the *Forum Guide to Data Visualization: A Resource for Education Agencies* (https://nces.ed.gov/forum/pub_2017016.asp).

[3] For more information about improving access to education websites, see the *Forum Guide to Ensuring Access to Education Websites* (https://nces.ed.gov/forum/pub_2013801.asp).

planning. High-quality facilities data are used to create efficiencies, save money, preserve the life of capital resources, and help decision makers become more transparent and accountable to education stakeholders." [2]

[KPIs and metrics here]

Commissioning: A Special Type of Facility Audit

Introduction

Smart buildings are complex buildings. Many of the leading-edge practices in facility management are dependent on the technology of automated systems. Predictive maintenance is often based on digital sensor technology. Energy management depends on sensors, measurements, and electronically controlled mechanical and electrical equipment. Building complexity takes maintenance training requirements to new levels. In response to building complexity, commissioning has evolved from a subtask of other professions and trades to a position of prominence—many would argue its own discipline.

Initial Commissioning

Initial commissioning (often abbreviated Cx) occurs as part of the construction project close-out and the handover of an education facility to the owner—be that the city/borough or the school district. "Commissioning ensures that the new building operates as the owner intended and that building staff are prepared to operate and maintain its systems and equipment." [3] The scope of work included in commissioning, along with the entities involved, is a matter of contractual agreement and can vary from project to project. A key feature of any commissioning agreement should be the involvement of those who will be operating and maintaining the facility.

The department recognizes the need for commissioning within the following building systems: mechanical, electrical, controls, bulk fuel, and building envelope. Much of the commissioning effort will be to optimize the inter-relation of components within these systems but there will also be cross-system coordination which is needed such as when occupancy sensors might control both lighting and ventilation systems. Because of this cross-discipline need, utilizing a certified commissioning agent is required on certain school capital projects with state-aid.

Retro Commissioning

Retro commissioning (RCx), also known as existing building commissioning (EBCx) can generally be expected to yield a positive payback after approximately five years of building operations. It may also be appropriate to conduct retro commissioning at any time on a building which never received initial commissioning. Most energy service companies (ESCOs) make it a practice to include a retro commissioning piece in their energy savings performance contracts. The basis for this is the relatively safe assumption that most, if not all, existing buildings are not performing optimally with respect to their energy performance.

During the portions of the building life-cycle that follow project delivery—i.e., operations, capital asset management—buildings, and building uses, change. Equipment is added, school

populations grow and shrink, and space utilization is altered. These, and other changes can render previous systems and settings ineffective. For good cause, and often for inappropriate reasons, building control systems are bypassed or overridden by maintenance personnel. Reasons for temporary overrides can be forgotten, resulting in systems operating outside of the original parameters. Retro commissioning, done well, can account for these building changes and can recalibrate building performance.

Example/Vignette

Initial Commissioning: The Lower Kuskokwim School District has completed several state-of-the-art new schools and renovation/additions since 2005 and has several more in the pipeline. On the XXX School project, the district . . . .

Lessons learned include:

Retro Commissioning: The XYZ School District has implemented retro commissioning on it XXX School project, the district . . . .

Lessons learned include:

Maintenance Management

Developing a Maintenance Management Program

Introduction

Department regulations for maintenance management require:

> *(1) a formal maintenance management program that records maintenance activities on a work order basis, and tracks the timing and cost, including labor and materials, of maintenance activities in sufficient detail to produce reports of planned and completed work;*

This brief paragraph results in a series of eight documents—seven reports plus samples of varying work orders—that are intended to provide solid evidence of a minimally compliant maintenance management program. School district maintenance managers may be able to develop this level of maintenance plan on an ad-hoc basis with rules of thumb and the knowledge of experienced maintenance technicians. This is especially true for small facilities with a minimal range of components and systems. However, as school facility complexity increases, maintenance management plans are best built from a component-based inventory.

The most common deficiency noted during the department's certification process, is that maintenance management programs do not track materials associated with maintenance work. All school districts have systems that track labor, but materials tracking, by work order, is often lacking. This does not meet minimum criteria. While there is no question that a well-developed maintenance management program must track labor efforts, materials can be a significant component of maintenance and tracking them by work order is important for measuring the impact of repeated maintenance, or trends on systems.

Compliance with this regulation is demonstrated by providing:

- copies of work orders in various states of completion;
- report total maintenance labor hours collected on work orders by type of work (e.g., scheduled, corrective, operations support, etc.) vs. labor hours available by month for the previous 12 months;
- report scheduled and completed work orders by month for previous 12 months;
- report number of incomplete work orders sorted by age (e.g., 30 days, 60 days, and 90 days, etc.) and status for the previous 12 months (e.g., deferred, awaiting materials, scheduled, etc.);
- report comparison of scheduled maintenance work order hours to unscheduled maintenance work order hours by month for the previous 12 months;
- report monthly trend data for unscheduled work orders showing both hours and numbers of work orders by month for the previous 12 months;
- report planned maintenance activity for the following quarter;
- report completed maintenance activity for previous three months including labor and material costs; and

- report preventive maintenance components by building system.

School district officials should be prepared to discuss their maintenance management program and the results ~~from~~ generated by the program.

Maintenance Data Information

In order to have an effective maintenance management program, the first step is to develop a mechanism for collecting information on facility components and systems that will be the subject of the maintenance management program. There is a plethora of computer programs on the market that are specifically designed for such purpose; these are known as Computerized Maintenance Management Systems (CMMS). For all intent and purpose, the basic key to any of these programs is the capability to store, retrieve and analyze the information collected on facilities, their maintenance needs, and the organization's maintenance practices.

Early generations of CMMS consisted of software which was locally installed and hosted on district computers. Data storage was also local. Some of these systems were network compatible, making them useful for organizations where access to the system could not be centralized at one location or functional area. With the advent of 'cloud computing', many CMMS service providers developed business models which involved hosting customer facility and maintenance data on their own servers and providing a web-based user interface. Both of these delivery models remain available to organizations with the hosted-data model being prevalent in most Alaska districts. For a peek into history, see the pop-out for how CMMS worked in the 'good old days'.

Historical Management Systems

Modern CMMS have evolved following the use of 3" X 5" index cards and twelve manila folders (one for each month). One side of the index card contained information about the facility components and systems as well as the services that need to be performed. The back side of the card was used to record the date on which the service was performed, the name of the maintenance or custodial staff, and the cost of materials. Upon task completion, the card was placed in the manila folder assigned to the future month when the task was due. Although this method now seems crude, it could possibly still meet minimum requirements of the department for a small school district. The analogy is similar to having accountants using pencils, ledgers, and ten-key adding machines. However, the value of a CMMS—especially one specifically designed for school districts—is measureable and all but mandatory.

With the rise and almost universal market penetration of the software-as-service business model, most CMMS include an initial purchase fee (which can include software, hardware, installation, and set-up costs) and an annual service or maintenance fee. While selecting a suitable CMMS to meet the needs of their school district, school officials should be aware there are many options. Most vendors offer modules targeted at specific functions such as space management, fleet

management, and inventory management, many of which are neither required by statute or regulation nor useful to the school district. Marketing personnel within CMMS vendors excel at selling their products, but some companies have hidden fees that are charged after the program is instituted, where school districts find themselves forced to pay extra in order to achieve adequate results. Other companies, after a successful marketing push, offer poor customer service, which quickly becomes problematic during initial setup. Most of these programs are web-based and consume a good portion of bandwidth during usage. CMMS software should be user-friendly so that it can be implemented with minimal training for all maintenance and custodial personnel as well as school educators. The bottom line is to ask around to other school districts and see what will work best for your organization in order to make an informed decision. The department's PM State of the State, published annually by June 1 and finalized not later than August 15, includes data on each school district's CMMS tool.

Identification of Facilities, Systems, and Components

The second step in developing an effective maintenance management program is to get the information entered into the system.

In order to do so, someone will need to inventory and categorize systems and components maintained by the school district in each of the school facilities that the school district maintains. Vendors and a variety of consultants are willing to perform this task if district personnel are unable to. During the inventory, information such as quantity, type, size, age, condition, manufacturer, model, material specification, location, key parts, part numbers, specialized upkeep requirements (e.g., oil and filter types), and other item-specific data need to be documented. The data collection is time consuming and requires a significant amount of data entry. Part of this data entry will be development of an asset naming convention (see pop-out).

Asset Naming & Equipment IDs

"A little forethought at the start can save a lot of time in the future"

Creating an asset naming convention within your CMMS normally involves both an asset name and an asset ID. Asset names can usually be normal, descriptive text titles (e.g., Generator, Diesel Standby 200KVA Cummins). The problem comes when there are multiple instances of that same asset within the universe of assets managed within the CMMS. An asset ID, on the other hand, is a unique identifier—only one asset has that specific ID. Asset ID's, or equipment tags, are often cryptic combinations of text and numbers that include indicators tying the asset to industry classification systems and types, to particular facilities, to locations within that facility and to the quantity of that particular asset. Asset naming doesn't have to be complex but it must always be consistent and logical. Standardized naming conventions also aid in data reporting and analysis. Come up with a useful naming convention before you go live with your CMMS system because it can be difficult to change later.

The data collection will reveal systems and components that apply to each of the facilities. School district personnel may add items as necessary to create a complete plan. Many facilities may have multiple system types within a particular category (e.g., roofing, package unit heaters, etc.) as well as multiple components of the same type (e.g., circulating pumps, water closets, toilet partitions, etc.). For each item, and wherever appropriate, a specific preventive maintenance task should be developed. In large school districts, the data collection will reveal similarities amongst systems and components; following these observations, some school districts may elect to standardize as many of their systems and components as possible (e.g., same water closets, light fixtures, etc.), thereby reducing spare parts inventory and training costs, which in turn creates increased productivity and quality of work. Note that standardization may in some cases only be possible during remodel projects or new construction (e.g., boiler replacement / installation, unit heater replacement / installation, etc.); however, simple part replacements may also enable standardization (e.g., energy efficient bulbs, low-flush water closet flushometers, etc.) and save on utility costs.

To assist the school district with executing this task, the department has established a baseline by identifying facility systems and components that should be included in the CMMS. A list of these components is included as Appendix A and should clarify the tasks needing to be done in this section. While thorough, the list is not intended to be exhaustive of every possible component. The list is designed to dovetail with other useful assessment devices such as the Association for Learning Environments International (A4LE) *Alaska School Facility Appraisal* and the department's *Guide for School Facility Condition Survey*, as well as other professional facility audit organizations. The list also gives its users a better understanding on how to update Renewal and Replacement (R&R) schedules, a topic which will be discussed later in this guide. A sample of an R&R schedule is included as Appendix B.

Determining Present Conditions

While developing the inventory of systems and components described previously, the school district will need to complete an inspection of the components in order to establish their current condition. Following the identification of systems and components in each facility, a detailed inventory is needed to quantify the building components and to establish their current condition. This step includes both an objective process of fact-gathering and a subjective assessment of the current condition. Information such as quantity, type, size, manufacturer, model, material specification, location, key parts, part numbers, and other item-specific data will be documented. A qualified technician or professional will need to make the assessment of current condition. The condition assessment is used to determine both the immediate and future levels of preventive maintenance for the system or component and its end-of-service-life replacement date.

Establishing Appropriate Levels of Maintenance

Preventive maintenance efforts range from visual inspections only to performance testing and analysis; from minor adjustment, cleaning and/or lubrication to complete overhauls; from reconditioning to components replacement. [3]

Maintenance Management

School districts that are accredited by the Northwest Association of Schools and Colleges will recall that the accreditation standards include the following:

> Standard III - School Plant and Equipment
> "13. Inspection(s) of the school plant and equipment **shall** be made each school year by a qualified official and any deficiencies addressed." [4]

This type of standard is an example of a preventive maintenance requirement at the visual inspection level.

In establishing levels of maintenance, two determinations are needed. The first is to establish a basic life-span for the system or component (e.g., asphalt shingle roofing - 20yrs, oil-fired boiler, 15yrs, drive belt – 3yrs, etc.). The second determination is, "What maintenance activities are needed to ensure that this particular system/component meets or exceeds its life expectancy?"

Answers to the above queries can oftentimes be found in the Operations and Maintenance (O&M) manuals. These manuals are usually turned in shortly after facilities commissioning or major project completion. Manufacturers' literature, practical experience, test results, and industry averages are some ways to determine both acceptable life cycles and what preventive maintenance work would result in achieving those life expectancies in the most efficient manner; as mentioned previously (i.e., the lowest total life-cycle cost). Alaska presents formidable environmental challenges to our facilities, and the life expectancy of certain systems / components may vary greatly from one region to another, so an informed analysis is necessary.

Preparing the Work Items Plan

Once your levels of maintenance have been established, setting the tasks into a workplan is the next step. According to Basil Castaldi, a recognized expert, and author, in the field of facility planning, four elements make up any preventive maintenance work item.

> "In any prescribed maintenance program, the list of tasks to be performed is described in detail. The frequency and nature of the work are clearly stated. The materials to be used are specified in considerable depth and the manner in which the work is to be accomplished is expressed in simple language." [5]

Consider this further detail of these tasks:

I. The list of tasks to be performed is described in detail.

The detail that accompanies this step is critical and should be as comprehensive as the efforts that were placed in the previous step while identifying facilities, systems, and components. Any maintenance individual who is assigned any of the tasks should be able to determine the location of the equipment, what replacement parts, if any, are needed, what the work entails (e.g. replace air filters), tools and manuals required, estimated time of completion, what Personal Protective Equipment (PPE) should be worn, if any, etc. This task is particularly useful when a new maintenance employee takes over a particular school without having the possibility of shadowing an existing employee.

II. The frequency and nature of the work are clearly stated.

This task is self-explanatory. For instance, a school district may elect to conduct a 30 minute load test for its entire generator fleet at the beginning of each month, with exception to June and July when affected schools are in seasonal shut down. The test will include monitoring and recording all gauges. Another example may be the changing of air handlers filters twice a year, at the beginning of August, and then again at the beginning of February.

III. The materials to be used are specified in considerable depth.

This is another important task, because it avoids the plausibility of maintenance personnel switching various components of a system to a point where functionality and performance are diminished costing the district several operating dollars. For instance, clearly defining a specified nozzle for a fuel burner may enable boilers to maintain peak performance (e.g., hollow, 3.0 gallon per hour, 60 degree angle). Another example could be the adherence to specified air filters, where low-cost air filters may compromise the occupants' environmental safety and well-being (e.g., high capacity pleated filter, MERV 8, Moisture Resistant Die Cut Chipboard, Nominal Height 24 inches, nominal width 24 inches, nominal depth 2 inches).

IV. The manner in which the work is to be accomplished is expressed in simple language.

The tasks needing attention will be addressed by custodial and maintenance individuals with various educational backgrounds. The best means to ensure understandability across the board is to keep the language simple and direct.

Implementing a Preventive Maintenance Program

Introduction

Where the first school board responsibility was to *develop* a preventive maintenance program, the second responsibility is to *implement* a preventive maintenance program. This section offers guidance on carrying out the developed preventive maintenance work plan and establishes the importance of having management reports and a system of feedback from the field in order to implement an effective program.

The basic task of preventive maintenance implementation is to match needs with resources. However, both needs and resources are variables in the facilities management effort. As a result, implementation efforts may occur once to initiate a preventive maintenance program but will also require continuous monitoring of needs and resources to accommodate changes in these variables. For example, the work items assessment of a circulating pump may have indicated an anticipated failure in three years. At the three-year point, a stress test of the pump may indicate no appreciable degradation has occurred. This information may necessitate a revision to the preventive maintenance plan initially implemented.

The Need for Sustainability

Revisions to the maintenance plan must occur over the life-cycle of the facility. Other examples driving this change include the impact of new technologies, improvements to building systems or new tools that reduce repair times. These examples of variables in needs and resources all support the conclusion that implementation requires both an initial and an on-going effort. For additional discussion on Sustaining a Maintenance Management Program, see page 20.

Moving from the planning and development phase to implementation and operation almost always involves funding, regardless of the endeavor. Preventive maintenance is no exception. As evidence of the importance of funding in this transition, the portion of the Encyclopedia of Architecture devoted to implementation of a preventive maintenance program is largely a discussion of funding.[6] Because funding is so critical to the transition, some findings from research concerning maintenance funding and resources are included in the following paragraphs.

Determining Necessary Resources

As previously mentioned, most of the resource requirements result in a need for funds. Determining the level of funding needed for preventive maintenance at a detailed level requires estimating literally thousands of labor and material line items. This method is very time consuming. Other approaches to budgeting for preventive maintenance include establishing a formula based on a percentage of the operating budget or a percentage of building replacement value(s). In California, research showed that:

> "If a planned maintenance program is followed, about 5 percent of a district's operating budget will be required to provide an adequate maintenance program.
>
> In addition to the 5 percent expenditure for the district's maintenance program, a reserve fund is needed for unanticipated and emergency maintenance expenditures. Another criterion for determining budget requirements is to calculate 2.9 percent of the current net building replacement cost or a projected cost based on the square footage of property to be maintained." [7]

In another budgeting formula, the Encyclopedia of Architecture indicated:

> "The cost of preventive maintenance ranges according to the intent of the *plans developed.* To set a budget for this type of work, one may estimate 5% of the present value of the building for preventive maintenance activity. Perhaps 1.5% of the value of the building may be estimated for simpler structures or systems." [8]

The department's capital improvement project (CIP) application scoring criteria assigns increased points to school districts based on the percentage of total maintenance expenditures relative to the building replacement value(s). Maximum points are achieved when the percentage is five percent or greater.

One effective strategy for determining the necessary resources is to identify the smallest detailed increments of the preventive maintenance plan and combine them for the aggregate picture. Take each well-developed preventive maintenance work item and ask, "What skills (trained personnel), tools, materials (parts etc.), and time are needed to complete this work item?" Once these factors are tabulated and the resource needs are clear, the supporting issues of space for shops, material staging and transportation requirements can be addressed.

While starting with the most detailed information and building up yields a comprehensive assessment of necessary resources, broad and systematic thinking is required to arrive at the necessary organizational structure with which to accomplish the preventive maintenance program.

Determining Organizational Structure

The structure and organization of the preventive maintenance program must be in place before effective scheduling of work can occur. Some operations and maintenance organizations establish a cross-disciplined preventive maintenance work center whose main task is to inspect various systems and components (usually dynamic equipment) and write maintenance work orders. Following the inspection, more traditional work centers such as plumbing, sheet metal, etc. are assigned the actual work tasks. Other maintenance organizations are oriented almost completely to preventive maintenance tasks with major crafts taking responsibility for components and systems within their respective areas. In this model, a small multi-disciplined workcenter handles routine maintenance and emergency repairs and, in some cases, minor improvement work. These organizational structures are variations on how best to accomplish the work that is identified in the component needs-based maintenance assessment. This approach to

organizational structure—one that examines the necessary maintenance work and builds an organization structure to match—is often overlooked.

Another driver for determining organizational structure is management. This strategy asks the question, "How can the maintenance management resources best be managed?" The expectation is that from good management will follow good maintenance. Most of the management approach structures can be distilled to supporting, or describing, three approaches: centralized, decentralized (or zone maintenance), and hybrid.

Taken together, the combination of organizing personnel to accomplish necessary tasks, and organizing personnel for effective management is most likely to yield a comprehensive maintenance management implementation. There are many resources which can assist a district in implementing an organizational structure. Textbooks have been written and many trade periodicals run at least one if not multiple articles in any calendar year dealing with maintenance organization.

Scheduling and Assigning Work

The heart of any maintenance management program is scheduling and assigning specific maintenance tasks, and tracking the completion of those tasks. In addition, it is best practice to be able to account for all available maintenance hours and to measure time on task and other productivity and utilization metrics. This element of the maintenance management program takes the work items developed for each component and assigns them to the appropriate maintenance craftsperson or team according to the established structure and schedule.

This is accomplished through the CMMS. Once pertinent data is entered into the database system, work orders detailing the scheduled maintenance requirements can be generated and tracked along with all unscheduled work and categories of ancillary work such as training, education support, mail runs, etc. More advanced CMMS programs have an integral query feature which prompts maintenance managers for necessary input and provides industry standards for certain maintenance tasks. It is estimated that there are more than fifty suppliers of maintenance software packages with price variations based on need and capacity. Maintenance magazines and the world-wide-web are good locations to look for these products.

Intentional & Directed

In a roundtable of school maintenance directors, one mentioned an increased awareness of the need to be intentional in the scheduling and management of maintenance efforts. For this district, it appeared that the more workable way to achieve that goal was to bring maintenance scheduling to a more centralized location. For others, site-based management of maintenance is the norm and allows local flexibility in scheduling work. In a site-based organization, the site administrator, or principal, needs to understand the level of importance to be given to scheduled, preventive maintenance.

[Cover the related area of planning work here also (i.e., logistics, labor, scheduling of large PM overhauls and large repair or mission support projects handled by maintenance staff.]

Reporting Systems and Feedback

In addition to automating the list of items needing scheduled maintenance, most maintenance management software programs also provide the capability for a computerized building data file. This database of facility requirements can be used to generate a wide variety of accurate reports on matters related to building maintenance and operations and the associated costs. To a certain extent, an integrated maintenance system that incorporates both daily maintenance tasks and long-range planning depends on an automated database of facility information. Effective preventive maintenance programs depend on feedback from maintenance personnel and a reporting/tracking system of costs associated with the preventive maintenance effort. This information is used to maintain the proper balance between preventive maintenance and renewal and replacement efforts (i.e., determining when costs have increased to the extent that preventive maintenance on a system is no longer effective on life-cycle basis).

Through a combination of informal evaluations and formal audits, a reporting system should be established to analyze a district's maintenance system to achieve the most cost-effective maintenance program. In addition to general feedback and reporting, district maintenance programs should undergo periodic evaluations of their effectiveness. This can occur both at the worker's task level and at the maintenance management level. Evaluations can be done either internally or through the use of an outside evaluation team. Maintenance management audits examine the functional program and generally consider the following four factors:

Productivity - the portion of a worker's time that is directly productive.
Performance - how well the individual is working, e.g., is work being completed as planned?
Work Quality - is the individual producing a satisfactory work product?
Priority - effective allocation of available time to the most important tasks. [1]

Though maintenance management audits may look at symptoms of ineffective maintenance at the worker/task level (e.g. number of callbacks, work completed on schedule, etc.), a management audit's focus, as the name implies, is on improvements through better management.

Maintenance Management

Sustaining a Maintenance Management Program

Introduction

Why do maintenance management programs falter, and even fail, over time in Alaska's school districts? The answers to this question may be many and complex, but one over-arching response may be able to encompass the myriad details, and that is, the practices are not sufficiently integrated into the facility management construct of the district so as to be indispensable to district operations. This section of the handbook describes some key elements in the building lifecycle, which district leadership should use to weave maintenance management into the essential fabric of the district's operations.

Budgeting and Staffing

Software Upgrades

Performance Metrics

Evaluations, Inspections, & Education

Energy Management

Developing an Energy Management Program

Introduction

Department regulations for energy management require:

> *(2) an energy management plan that includes*
> *(A) the recording of energy consumption for all utilities on a monthly basis for each building; for facilities constructed before December 15, 2004, a district may record energy consumption for utilities on a monthly basis when multiple buildings are served by one utility plant; and*
> *(B) regular evaluation of the effectiveness of and need for commissioning existing buildings;*

~~This~~ The baseline requirement in *(2)(A)*—the recording of energy consumption—is deceptively simple. However, because the two categorical requirements—all utilities and all buildings—are comprehensive in nature, the complexity of record keeping multiplies quickly. Not only does the math of buildings x utilities result in many data points, the variety of utilities used varies from building to building as does the variety of delivery methods for those utilities. School district energy program managers will be challenged if they attempt to develop this level of energy plan on an ad-hoc basis without data tracking tools. However, as school facility complexity increases, energy plans, like maintenance programs, must be built from a facility-specific inventory.

Energy Management Plan vs. Policy

An energy management plan is a comprehensive documents that " . . . maps out internal maintenance schedules, equipment logs, and keeps equipment manuals and buildings drawings on hand for reference. Unlike an energy policy, the energy management plan is regularly updated, typically on an annual basis. It is used to document recent achievements, changes in performance, and shifting priorities." (AHFC White Paper, p.8).

The most common deficiency noted during the department's certification process is that energy programs are not tracking all types of utilities used or are not doing tracking using a monthly metric. This does not meet minimum criteria. While there is no question that a well-developed energy management program should include districtwide information (e.g., goals, standards, roles and responsibilities, etc.), the energy consumption records are specific, and unique to each building. As defined in the regulation, the energy plan needs to include recording energy consumption on a monthly basis for each building. Energy consumption recording must comprise all school district energy utilities such as heating fuel, steam, natural gas, liquid propane (LP) gas, recovered (waste) heat, electricity, wood, and coal. Non-energy utilities such as~~,~~ potable water, waste~~-~~water, refuse, etc. can be equally important to track in school districts but are not required under the regulation.

As noted, the regulation makes exception for buildings built before December 15, 2004. In such case, for instance, if a large fuel tank supplying multiple facilities was built prior to this date (e.g., school, teacher housings, and generator shed all feeding off one main fuel line), it is permissible to record the monthly utility readings for the entire distribution system. The same goes for electrical meters. However, any school built after this date must have individualized means to record each of its utilities (e.g., oil meter, waste heat meter, electric meter, etc.); the daisy-chaining of numerous buildings off one utility meter is no longer permitted.

The utility consumption records only provide the core data for energy management in a school district. This data needs to be monitored and used to guide energy management processes and to achieve energy use goals. In recognition of this need, subsection *(2)(B)* was added to the minimum requirements for a qualifying energy management program in 2020, This subsection begins to address the additional factors that are needed to develop a more complete, effective energy management program. ~~Other planning~~Such factors include purposes, objectives, goals, procedures, strategies, standards, benchmarks, assessments, education, incentives, and staffing These factors can be grouped into the major categories of: policy, data, objectives, strategies, and measurement.

Energy Policy

~~[This can include a discussion of having a board policy, a clear purpose statement to guide the program, Should answer the 'why' question but could also broadly address what and how.]~~
A policy or purpose statement regarding a school district's energy management program can be an effective anchor for the program, an important point of reference and statement of commitment. In its informative booklet, *Introduction to Energy Efficiency – A Guide to Managing Energy use in Public and Commercial Facilities*, the Alaska Housing Finance Corporation provides a well-developed framework for crafting an Energy Policy,

> **Energy Policy**
>
> An internal energy policy should state why the organization is committed to conserving energy and/or using it efficiently. Usually in the form of a paragraph, this piece outlines the purpose of the document such as conserving energy in the workplace, using energy more efficiently, reducing costs, reducing emissions, or showing environmental stewardship. Typically, this section also articulates areas of concern such as high and increasing energy costs, community sustainability, etc. (AHFC *Introduction to Energy Efficiency*, p.11).

A school district's energy policy should start at the school board level. The Alaska Association of School Boards (AASB) has developed the following recommended board policy, which can be edited to meet district needs:

> **BP 3511 ENERGY CONSERVATION**
>
> The School Board desires to reduce energy use in the district in order to help conserve natural resources and save money to support other district needs.

> The Superintendent or designee shall establish energy use reduction goals, monitor energy consumption and encourage employees and students to conserve resources. The Superintendent or designee shall regularly inspect district facilities and operations and make recommendations for maintenance and capital expenditures which may help the district reach its energy consumption goals.
>
> The Superintendent or designee shall establish an energy management program sufficient to meet, at a minimum, the standards needed in order to qualify for state-aid for school capital projects under AS14.11.

An energy policy should answer the 'why' question regarding energy conservation but can also address 'what' and 'how' elements in broad direction-setting statements. In the AASB sample, the initial sentence sets out the purpose of an energy management program while the following paragraphs establish a few key provisions on what kinds of steps will need to be taken to achieve that purpose. These provisions are further developed in the Objectives and Strategies sections of the energy management program.

Energy Data & Information

~~[Describes the need for and role of data and information. Goes on to list and describe the types of data and information that might be useful, or even critical to energy management. Maybe jump off the AHFC quote above, recognize the regulation baseline data already discussed and broaden to include a compendium of useful information.]~~

Information and reliable data is the foundation of an energy management program. Good data provides proof that plan goals are being achieved and draws attention to areas that are lacking. Expanding out from the core information of energy consumption, additional elements and layers of data become important in the process of managing energy. Basic data like overall energy use by month for each building is required to evaluate overall performance, but tracking plan goals is made easier by including more detailed energy use. For example, consider tracking fuel use at each boiler or water heater separate from generators and from other facilities; tracking lighting separate from plug loads and separate from HVAC systems. Other examples are tracking unique features like alternate energy systems separately and measuring hot water flow in addition to total water usage. This level of detail allows setting goals such as reducing lighting energy by 10%, or improving boiler firing sequences, where a single building meter would not provide enough feedback.

Information about the building systems is equally important. Keeping good records of original designs, as-built conditions, and modifications to equipment and control systems is crucial to keep costs down in future renovations or troubleshooting high energy use. Future designers will spend less time figuring out what is there and what the systems are doing if they have access to good records of previous work. Similarly, re-commissioning or retro-commissioning is more cost effective if the commissioning agent does not have to reconstruct the original design intent by reverse-engineering the systems.

Building Automation Systems (BAS) make collection of large amounts of useful data fast and easy. Engineers and researchers prefer too much data over too little; tracking as much as practical is generally recommended. However, even handwritten logs of meter readings or redline markups of original drawings can have great value to the energy management program.

Energy Objectives

~~[Describes the need for and role of specific but general objectives for the program that cover the full spectrum energy use. Goes on to provide a bullet list of districtwide program objectives and should cover everything from data gathering/management, to non-facilities operational measures, to O&M procedures, to new construction standards, to existing building assessment and retrofit.]~~ The objectives of an energy management program should flow out of the school district's energy policy. When developing these objectives, consider the primary influences on energy use such as building use by various occupants, energy production and transmission, building equipment and systems, and maintenance or custodial activities. While energy management objectives should cover the full spectrum of these, and other, energy use factors, it's helpful to try and group similar objectives together so that the resulting list of core objectives is in the six to ten range. To help with this, try not to include specific activities such as "enter monthly bills into the energy tracking spreadsheet." That and similar elements will be developed as strategies and actions needed to support the energy objectives.

Here are examples of energy objectives, grouped by overall category, developed by various school districts in their effort to achieve their stated energy policy:

Building Occupants and Users

- Create a sense of responsibility among students, teachers, staff, administrators, parents, and community members.
- Include all building users as part of the energy conservation process.

Data Gathering and Management

- Monitor all energy consumption.
- Track, monitor and report district progress, and identify trends and opportunities for savings.

Operations and Maintenance

- Operate at optimal efficiency and avoid unnecessary costs associated with reactive maintenance practices and procedures.
- Reduce our district's overall environmental impact and provide a healthier and safer educational environment.
- To reduce energy costs by evaluating and choosing appliances and equipment that are more energy efficient.

Existing Building Assessments

- Understand energy use and opportunities for improvements to energy efficiency at all facilities.

New Construction

- Reduce future energy costs in new facility construction and renovation whenever feasible.

Energy Strategies & Actions

~~[Describes the need to develop each Objective with actionable strategies for achieving the objective. Goes on to flesh out a few examples.]~~

Energy objectives can best be attained by developing clear and actionable strategies and identifying specific supporting actions. It's often at this point in the program development that roles and responsibilities are established, and personnel assignments made. That work will be addressed in the following section **Implementing an Energy Management Program**.

Here are examples of measures taken by various school districts in their effort to mitigate energy consumption:

- Energy monitoring via automated remote reporting;
- Turn off electrical appliances at the end of each day (e.g., lights, smart boards, computers, monitors, speakers, televisions, stereos, copy machines, kitchen hoods, etc.);
- Utilize minimal corridor night lighting during non-occupancy;
- Report all utility malfunctions immediately to maintenance personnel (e.g., oil / gas/ water leaks, lights no longer shutting off automatically, etc.);
- Shut down boilers, refrigerators, and freezers during summer;
- Turn down the heat during non-occupancy periods (also known as night setback), including holiday breaks;
- Install occupant sensor lighting;
- Install low-flow flush flushometers for water closet / urinals;
- Shut down the school at 5:00 p.m. one night a week;
- Optimize Heating Ventilation and Air Conditioning (HVAC) systems (e.g. replace air filters, tune-up boilers twice a year, ensure fans are not continuously running in manual override mode, ensure air louvers are operational, etc.);
- Replace antiquated lighting systems with more efficient ones (e.g. replace T-12 fixtures with T-8; replace Tungsten filament bulbs with high efficiency Light-Emitting Diode (LED) bulbs);
- Install provisional arctic porticos during cold season;
- Reward schools that decrease energy use (e.g., free movie night at the gym); and
- Enlist/appoint an 'energy champion' and ensure someone is comparing and using the information.
- Enter monthly utility records in a software program which is customized to monitor monthly energy usage. (Note: This is a collaborative process which will require close contact in between administrative personnel (e.g. personnel processing utility bills), maintenance personnel (e.g. personnel monitoring fuel consumption), and personnel responsible for the energy management program).

- Determine a benchmark year as the starting point for evaluating the school district's energy management efforts.
- Establish projected consumption and cost data. Projected consumption and cost data will be used to determine future energy upgrades and for budgeting purposes.
- Conduct annual rate review and utility bill analysis.
- Analyze monthly consumption data; track, monitor and review monthly utility bills and investigate and write work orders when consumption is outside of set parameters.
- Obtain and analyze load profiles including the power demand patterns of the highest energy-consuming schools in our district and look for load-shedding and/or load shifting opportunities.

Benchmarks and Measurement

~~[Describes the need to measure each strategy to determine effectiveness. Goes on to provide some examples of measurement processes (tie in to Data and Information) and sample benchmarks.]~~

No energy management program is complete without some type of feedback loop regarding effectiveness. Ideally, each energy strategy identified in support of the program's energy objectives would be measurable in some way. This need to measure returns us full-circle to the foundation of a good energy management program—information and data.

Following is an example of a specific energy strategy and its corresponding actions and measurement metrics:

> Strategy: Implement water heating set points and guidelines for management.
>
> Actions:
>
> 1. Perform PM inspections to identify leaks and check burners, gauges and pumps.
>   Standard: 100% of hot water generators/heaters inspected annually; verify with CMMS report.
> 2. Annually flush water heaters to remove sediment from the system and increase heat transfer efficiency.
>   Standard: 100% of water heaters flushed annually; verify with CMMS report.
> 3. Program water heaters for vacation shut-down to reduce unnecessary heating of water during extended vacation periods.
>   Standard: 100% of water heaters programmed; perform annual PM check to ensure no changes occurred.

Measuring effectiveness can build support at all levels for continued implementation and prioritization of energy management programs. The following sample narrative, which was included in a energy program report, would not have been possible without measurement protocols:

> *Two recent school renewal projects at ABC and XYZ Elementary Schools have been very successful at reducing the utility usage. Both schools have seen a 60% reduction in electrical and natural gas usage/sq.ft. after renovations were completed. The cost/sq.ft. for gas and electric at XYZ decreased from $2.17/sq.ft. to $.69/sq.ft. ABC decreased*

utilities $2.08 to $.64/sq.ft. We are looking forward to seeing successful reduction comparisons for QRS Elementary School and Student Nutrition for the recent building envelope and heating system upgrades.

Benchmark and measurement elements of the energy management program also become essential elements in sustaining a program over time. This will be discussed in additional detail in the following section **Sustaining an Energy Management Program.**

As described above, there is overlap between the energy management plan and the preventive maintenance management program in regards to maintenance schedules. Although maintenance personnel involvement is critical, a successful energy management plan also necessitates everyone's participation, from school board members to students. The energy plan should incorporate what measures are selected to optimize resource utilization while minimizing costs and expenses. Most importantly, the plan should utilize data gathering to benchmark whether or not efforts are paying dividends; to do so, many school districts set objectives (e.g., reduce fuel consumption by 15% within the next 12 months; reduce electric consumption by 10% within the next 12 months). The plan should be simple and clearly define everyone's tasks in support of the plan. School districts who have effective energy management plans usually assign its execution to a responsible individual with access to top-level administrators. In such manner, school board members can receive updates from their energy plan manager on a regular basis (e.g. monthly, quarterly, or bi-annually) and determine how well the plan is working. Officials may then review issues that could be faltering the plan objectives or need to attention.

~~Here are examples of measures taken by various school districts in their effort to mitigate energy consumption:~~

- ~~Energy monitoring via automated remote reporting;~~
- ~~Turn off electrical appliances at the end of each day (e.g., lights, smart boards, computers, monitors, speakers, televisions, stereos, copy machines, kitchen hoods, etc.);~~
- ~~Utilize minimal corridor night lighting during non-occupancy;~~
- ~~Report all utility malfunctions immediately to maintenance personnel (e.g., oil / gas/ water leaks, lights no longer shutting off automatically, etc.);~~
- ~~Shut down boilers, refrigerators, and freezers during summer;~~
- ~~Turn down the heat during non-occupancy periods (also known as night setback), including holiday breaks;~~
- ~~Install occupant sensor lighting;~~
- ~~Install low-flow flush flushometers for water closet / urinals;~~
- ~~Shut down the school at 5:00 p.m. one night a week;~~
- ~~Optimize Heating Ventilation and Air Conditioning (HVAC) systems (e.g. replace air filters, tune-up boilers twice a year, ensure fans are not continuously running in manual override mode, ensure air louvers are operational, etc.);~~
- ~~Replace antiquated lighting systems with more efficient ones (e.g. replace T-12 fixtures with T-8; replace Tungsten filament bulbs with high efficiency Light-Emitting Diode (LED) bulbs);~~

Energy Management

- ~~Install provisional arctic porticos during cold season;~~
- ~~Reward schools that decrease energy use (e.g., free movie night at the gym); and~~
- ~~Enlist/appoint an 'energy champion' and ensure someone is comparing and using the information.~~

~~Compliance with this regulation is demonstrated by providing:~~

- ~~Written copy of the energy management plan;~~
- ~~Utility report recording energy consumption for all utilities, on a monthly basis, for each building for the previous 12 months; and~~
- ~~Documentation of process with metrics on evaluation of need for commissioning existing buildings.~~

~~School district officials should also be prepared to discuss their energy management plan and the results gained from the plan.~~

Energy Management

Implementing an Energy Management Plan

Introduction

[This is where we will discuss any energy management implementation steps; how to put a plan into action.]

An Energy Champion

Incentives

Reporting & Feedback

Sustaining an Energy Management Plan

Introduction

[This is where we will discuss any maintenance management elements that respond to the cradle-to-grave/cradle-to-cradle life cycle of a building.].

Retro-Commissioning

" Building systems go out of tune, much like automobiles. In order to improve the EUI [Energy Use Index], which is similar to the miles per gallon in a car, building systems need to be re-commissioned every three to five years. "

Alaska Housing Finance Corporation. *White Paper on Energy Use in Alaska's Public Facilities*. November 7, 2012; p. 5.

Custodial Program

Developing a Custodial Program

Introduction

Department regulations for custodial programs require:

> *(3) a custodial program that includes a schedule of custodial activities for each building based on type of work and scope of effort;*

This baseline requirement—a schedule of custodial tasks for each building based on the type of work needed (i.e., the activity needed for each surface or equipment item) and the level of effort (i.e., the frequency of care for each type of work)—represents a significant planning effort. School district custodial program managers may be able to develop this level of custodial plan on an ad-hoc basis with rules of thumb and the knowledge of experienced custodians. This is especially true for small facilities with a minimal range of surfaces and appurtenances. However, as school facility complexity increases, custodial plans, like maintenance programs, are best built from a component-based inventory.

The most common deficiency noted during the department's certification process is that custodial programs are not building-specific but rather are a one-size-fits-all program written for the entire school district. This does not meet minimum criteria. While there is no question that a well-developed custodial program should include districtwide information (e.g., goals, standards, master schedules, organizational structure, staffing, etc.), the specific schedule of custodial activities is unique to each building.

The schedule of custodial activities is just the beginning of the planning needed to develop a complete and effective custodial program. Other planning factors include: expectations/goals, staffing, ~~schedules~~procedures, equipment, safety, and supplies.

Leadership

The custodial program is a tool, unique to each school district, customized to individual school facilities ~~districts~~, designed to guide custodial personnel in the execution of their work. ***"The first step toward establishing an effective custodial program is to determine the district's expectations of its custodial services. This requires input from both the school board (who ultimately will fund the program) and the building administration (who will live with the results of the program)."***[1] [NCES/ALASBO *Planning Guide for Maintaining School Facilities*, 2003, p.82] This is often developed as a vision statement. If this vision is absent, it falls to the Facility Manager to elicit it in order to make proper plans. Often, suitable statements from which to plan can be found in board policy.

Custodial Program

Sample Vision Statement

"It is our vision to provide the highest level of customer service satisfaction of any school district in Alaska by being innovative, flexible, and competitive with a can-do attitude."

One common, and helpful, step in establishing and communicating a vision is to provide a mission statement. These two elements, vision and mission, can serve as the basis of a custodial plan or program. The mission statement should be supported by goals and objectives. It is imperative that custodial program staff know what is expected of them. For example, will custodians do light maintenance? To whom do custodians report? Are custodians responsible for event set-up such as equipment and furniture?

Sample Mission Statement

"The mission of the XYZ School District Custodial Team is to provide an attractive, healthy, and safe, working and learning environment to facilitate greatness in our staff and students."

Custodial Activities

"Within school districts, custodial operations should reflect the needs of individual facility types, i.e., elementary schools, middle schools, high schools, technical schools, and ancillary buildings. Each type of facility requires a number of basic custodial services in support of the educational process; however, the requirements for middle and secondary/technical schools may be greatly expanded due to their size, complexity, and use patterns." [Florida DOE *Maintenance and Operations Administrative Guidelines for School Districts and Community Colleges*, 2010, pg 49]

As mentioned in the introduction, the most complete custodial plan is based on a component inventory, a quantification of building elements and equipment requiring custodial services. In order to streamline this effort, a good place to begin is with a list of custodial tasks. These can be developed from industry guidelines, samples from other school districts, or internal documents such as custodial job descriptions or existing checklists. Consider the following as a sample list which, on the left, covers a variety of custodial tasks pertinent to the common areas in a school:

Custodial Program

Sample Custodial Tasks	*Inventory Building Element*
Sweep/clean exterior walkways to 10ft from entries/exits	*Quantity of exterior walkways*
Vacuum entries/exits and/or wet-mop entries/exits	*Type/quantity of entry flooring*
Clean glazing (doors & sidelites) at all entry/exits, inside and out	*Quantity of glass at entries; height of glass at entries*
Vacuum all carpeted corridors	*Quantity of carpet in corridors*
Dry mop all hard surface corridors	*Quantity of hard surface in corridors*
Wet mop all hard surface corridors	*Quantity of hard surface in corridors*
Extract soiled areas on carpets	*N/A; as needed*
Remove stains and marks from hard surface floors	*N/A; as needed*
Clean all drinking fountains	*Quantity of drinking fountains*
Clean glazing at interior windows, window walls, displays	*Quantity of interior glazing*
Dust all equipment, sills, trims and hard surface furnishings	*Density of dusting surfaces per SF*

On the right side of the table are the associated building elements that would need to be inventoried in order to develop a custodial schedule for the building that was based on the type and frequency of custodial activity. An added benefit of having this component and quantity based inventory is the ability to use industry standards to develop staffing requirements. For example, if the inventory of glass in the facility totaled 350sf, and that amount needed daily cleaning, an industry standard of 525sf/hour would yield 40 minutes of direct cleaning time for that activity. The combination of all tasks would provide data for determining custodial FTEs needed for the facility.

In developing custodial activities, don't forget the plethora of non-cleaning related duties. These might include: recycling, snow removal, events and set-ups, re-lamping, pest control, mail pickup/delivery, supplies inventory/stocking, directing visitors, record keeping, and training.

Standards of Cleanliness

When developing the custodial program based on custodial activities—and especially when developing ~~time based~~time-based standards for the activity—the standard of cleanliness must be considered. In other words, how clean is clean? The Association of Physical Plant Administrators (APPA) has developed a widely recognized, and adopted, standard consisting of 5 levels, each with descriptive narratives. Under this standard, the target for most school spaces would be Level II "Ordinary Tidiness". A number of other industry and trade associations also have cleanliness standards that can be adopted and/or modified. Once adopted, these should be integrated into custodial program documents and schedules.

Procedures. Cleaning procedures by function (e.g., empty waste receptacle, clean chalkboard, etc.), to include scheduling (e.g., daily, weekly, etc.) in each area of the building. This

description is usually relatively broad and should include location, task at hand, and frequency for all areas of the building:

Methods and procedures. This depiction should give ample details on how to get the job done effectively. For instance, marker boards may require a specific solution to clean their surfaces; mirrors may require a specific cloth. The instructions should also warn personnel as to what not to do, such as using a particular solution on a specific surface. Gymnasium floors and countertops have been ruined while using the wrong cleaning agents. The following subjects should be covered at length in the custodial program:

Safety

Personnel Safety. Custodial personnel are exposed to a variety of health hazards such as chemicals, blood-borne pathogens, toxic substances, electrical shocks, trip and falls, etc. It is important that these employees be informed and trained on how to protect themselves and to conduct their work in the safest possible environment. The custodial program should include:

- when / how to use Personal Protective Equipment (PPE);
- how to deal with Hazardous Materials (HazMat) including Sharps and bio waste; and
- awareness of location and use of Material Safety Data Sheet (MSDS) and the "Right to Know."

Custodial Program

Equipment Needs

Care of cleaning equipment and use. The cleaning equipment must be stowed, maintained and operated properly. Custodial personnel should be well-versed and familiar on how to care for all of their equipment, including:

- buffers;
- personnel lifts;
- ladders;
- carts;
- mop buckets and presses;
- dust mops;
- wet mops;
- push brooms and corn brooms;
- vacuum cleaners;
- carpet extractors, etc.
- entrance, lobbies, and corridors;
- classrooms and laboratories;
- offices, lounges, and conference rooms;
- restrooms, locker rooms, showers and dressing areas;
- cafeterias and lunch areas; and
- gymnasiums and multipurpose rooms, etc.

Products

Selection and listing of school district prescribed cleaners. The list should be inclusive of all cleaners, as well as a brief description on use (e.g., spray cleaner; shower foam, etc.) and methodology (e.g., daily, on most hard surface; per manufacturer's instructions, etc.). The following are examples that could be included in the custodial program:

- all-purpose cleaner
- all-purpose degreaser
- glass cleaner;
- disinfectant;
- absorbing deodorant;
- scale and lime remover;
- mar and spray paint remover;
- gum remover aerosol;
- shower descaler;
- stainless steel cleaner;
- septic enzymes, etc.

As in the case for the Preventive Maintenance program, the custodial program will be utilized by custodial individuals with various educational backgrounds. The best means to ensure effective

communication is to keep the language simple and direct. If custodial personnel do not read English, the program should be translated in order to achieve proper results.

A good custodial program should also include random inspections. A list of *Standard for Clean Classroom* can be found in Appendix G. By using the standard, strong points and weaknesses can be identified, giving custodians an appraisal of what is getting done properly, and what needs to be improved upon.

Another important tool for the developing the custodial ~~workforce~~ program is the *Master Custodial Schedule*. (see Appendix H). There are generally three elements considered when developing master custodial schedules: 1) service or task, 2) frequency, and 3) space use/type or location. In some master schedules, service/task and use/location are blended to help reduce duplication. Frequency of care, the element normally in the most prominent position in the schedule, is the backbone of the schedule. The most commonly used frequencies are: daily, weekly, monthly, annually, and as-needed. However, some plans add the additional frequencies of: nightly (if a day/night operation is used), semi-weekly, quarterly, semi-annually. Selecting appropriate frequencies is a balance of simplicity and effectiveness and should be indexed to the program's adopted Standard of Cleanliness. The format or organization of any particular custodial master schedule focuses on one of the three elements discussed previously. One focused on frequency will generally list daily tasks, followed by weekly tasks, then monthly, and so on. Types of tasks (e.g., vacuuming, or restocking) and space/locations (e.g., gymnasium, restroom) will be listed adjacent to each other as long as their frequency is the same. These are often presented as a matrix. A schedule focused on use/location will organize the schedule by areas or room types and list all the necessary tasks for that area and state the frequency as a suffix to each task. These types of schedules are most often presented in a 'paragraph' style. A third type focuses on stating the essential tasks one time and then aligning those tasks to the applicable use/location in a matrix. In this last type, frequency is presented with symbols which are defined in a legend. All three structures have their positives and negatives. The sample *Master Custodial Schedule* (Appendix H) uses the space-use/location focus. This tool is also available on the department's Facilities web page as a spreadsheet file.

A customized schedule, one edited to include the specific needs of the facility, should be developed from the master custodial schedule. Once developed, it should be displayed in each custodian's workplace. This, and other ideas are more fully developed in the following section, **Implementing a Custodial Program**.

Custodial Program

Implementing a Custodial Program

Introduction

Implementation of a custodial program requires gathering and deploying resources you have identified in the planning stage.

Custodial Program

Sustaining a Custodial Program

Introduction

[This is where we will discuss any maintenance management elements that respond to the cradle-to-grave/cradle-to-cradle life cycle of a building.]
Previously, this document established two principles for sustaining any maintenance or facility management program: 1) by integrating it with other operational practices of the organization, and 2) by making it sufficiently "visible" so that its absence will be missed (see page XX). Nowhere do these elements come so naturally to the forefront as in the area of custodial care. The year 2020 will likely be a benchmark for years to come on the integration of custodial programs into the core mission of schools. The heightened awareness of custodial protocols on occupant safety in the midst of the Covid-19 pandemic brought the facility professional responsible for this area to a seat at the leadership team table. So ingrained was a district's custodial program into school operations that schools literally could not open without an effective care and cleaning protocol against the virus that caused Covid-19. With regard to visibility, the custodial program, has always enjoyed the benefit of front-and-center awareness of all school users—whether students, staff, or the public. While these users may routinely bypass great custodial care without a thought or reaction, not so where that care is lacking. Unlike other facility programs, the custodial program is always on display; it's absence is nearly impossible to miss. This ensures a measure of sustainability.

Budgeting and Staffing

Performance Metrics

Evaluations, Inspections, & Education

Maintenance Training

Developing a Maintenance and Custodial Training Program

Introduction

Department regulations for maintenance training require:

> *(4) a maintenance training program that specifies training for custodial and maintenance staff and records training received by each person;*

The intention of statute and regulation is that there should be a program of continuous training for maintenance personnel, custodians, and their managers as part of ensuring maintained state financed facilities. Training in facility systems and operations assist a facility in reaching its expected life and insures the continued effectiveness of an educational facility as designed. This maintenance training is separate from the training mandated and provided by a school district's human resources (HR) department. It is specific to facility maintenance and custodial operations. The previously mentioned HR training is important; however, it is not a substitute for mandated training under these statutes and regulations.

Definition: Custodian

" one that guards and protects or maintains "

There are two common problems found when evaluating districts maintenance training programs. The first is that there are many cases of no planning being done. This is usually due to not establishing a training plan with set dates and schedules to perform training. Without a plan, training is forgotten or put off until another time. The second issue is that increased HR training has begun to encroach on maintenance training. Even when there is a scheduled day, or days, of training, the non-maintenance training utilizes this time due to its convenience.

A good training program, as part of an efficient maintenance program, interacts with all other aspects of the program: maintenance management, energy management, custodial, and capital planning. No part of a preventive maintenance program operates in a vacuum. Good custodial is actually one part of a balanced maintenance program and it will be included under the term "maintenance training" in this section.

Planning

The first thing to contemplate when developing a maintenance training program is, what is being maintained? This is where coordination with maintenance management and capital planning is important. Start with a list of school district facilities and assets, including O&M manuals and scheduled preventive maintenance items. Once the list is compiled of equipment, finishes, and other assets that school district personnel need training on, a school district can begin to plan. Training should include initial new hire training, training on new equipment and finishes, periodic re-training, and training review. Also, an essential part of a training program is recording who was trained and on what subject the training was on. Efficient training records list all types of training over the year and the personnel who attended each one, and separately

list each individual and each of the training that person received. One convenient way of recording this is through the maintenance management work order system.

HELPFUL HINT

Standardize to reduce training and inventory costs

Working with capital planning and maintenance to develop school district standards for materials and components will simplify operations, minimize variation of inventory parts, and reduce the makes and models of equipment needing training.

Having "training" as an available work order sub-group makes sorting efficient. Assigning a work order to each individual attending a training session and having those individuals code their time to that work order allows easy sorting by training or by individual. This method also captures hours and costs of training. This is not the only method of recording. There are other personnel management programs available for recording training. Just make sure that it shows facility-mandated training versus HR training. A paper record is not recommended, as this is less useful for long-term tracking of personnel training.

Maintenance Training

Implementing a Maintenance and Custodial Training Program

Introduction

Once maintenance and O&M requirements have been established, a school district can decide what and how much training is required and set in place its training program. Some things to consider are identifying fundamental training elements for new employees, and what items may require annual training versus every few years. Formulate how training will be conducted, as well as when, where, and by whom. See below for some factors to consider as you develop your program.

New Hires

After basic orientation of the duties expected of the assigned position, additional training should be planned depending on the position or craft.

Custodians

If custodians in the school district are only responsible for cleaning, a closer title would be janitor, then initial training in cleaning procedures and expectations are expected. Custodians are the first level of eyes-on for the maintenance program. They need to be trained on inspections and observations and how to initiate a work order based on any conditions requiring maintenance. If they are expected to perform some light maintenance, closer to the definition of a custodian, then additional training should be provided. For some school districts the additional training is performed by maintenance mechanics. A work order is initiated with a new hire for training in mechanical, electrical, or other trade. The assigned mechanic performs the training (e.g. filter changing, flushometers, etc.) and the time is recorded.

Maintenance Technicians

Facility maintenance will be very new for many maintenance mechanics, even for journeymen. Most of these technicians have a background in construction, performing repairs in a facility environment is not the same. Add in the complexity of being in an educational facility with administration, teachers, and students, it can be a lot to adjust to. Initial training should include how to operate the work order system (including asset numbering) and procedures for working in a school. A very successful method many school districts use for this training is to have new people initially assigned to the preventive maintenance team. The extent of time varies from one turn of facilities to a set time like six months. This orients the person to all facilities and locations of components, operations in an active educational facility, and how to perform work orders, close work orders, and create new work orders.

Continuous Training

After maintenance management has assembled the list of maintenance training needs, decide if an item requires annual, semi-annual, or periodic training. Setting a schedule for the training that

avoids interfering with normal maintenance duties will help learning. One method is to have an annual in-service for employees just prior to a new school year. Depending on the size a school district, a strategy can be to have two days with half of the personnel on each day. This helps to keep the numbers manageable and maintains a maintenance personnel presence in the facilities. This becomes a good time for many training sessions with some hands-on training. Balance quantity of training with quality and avoid over-load. If an in-service is not possible or desired, the school district will need to arrange for the proper training either by going to each facility or having some version of a distributed gathering.

HELPFUL HINT

Train the Trainers

Example:
Custodians are tasked with replacing flushometers on the toilets. Have a maintenance technician train the lead custodian for a facility. When he is competent, have that person train the other custodians in the school under the technician's supervision. This will insure work is able to be performed onsite and the lead custodian has better retention of the skill. This will save time and money by not having a centrally based technician travelling to the facility.

Periodic Training

At times, a training need becomes apparent that is outside of normally scheduled training. This could be from the maintenance supervisor(s) seeing repetition of work orders for the same issue or periodic inspections by preventive maintenance staff or building personnel of conditions that need to be addressed. The training program should have built in allowances for investigating issues and arranging for appropriate training.

Opportunity Training

Shadowing a contracted maintenance technician or craftsman can provide another training opportunity for school district maintenance personnel. These visits may occur during regular inspections or as a result of a failed component.

Maintenance Training

Sustaining a Maintenance and Custodial Training Program

Introduction

As time passes, finishes and assets are replaced. A good training program must be agile -- ready for changes and to develop or update training as required. One way to stay ahead of the curve is to maintain contact with capital planning. As facilities are being planned for construction or renovation, be prepared to discuss specific items in the plan and what training each may require. Identify whether the items are part of the school district's standards and can be included as part of the normal training plan.

As part of project planning, ensure that adequate factory training is included in the project. This should be true factory-level training and not just an orientation showing where it is and how it works. Training should include all facets of maintenance including a list of recommended parts to keep on hand. For items like building automation and fire alarm systems, training should be full maintenance and programing to the level of a certified technician. This project-specific training is required if the project is funded or reimbursed through AS 14.11 state aid. Training requirements should be incorporated in the project's bid documents. Take this training as a time to refresh your long-term staff and as new training for recently added staff.

HELPFUL HINT

Let technology and the force make training easier and less expensive

Use videos from **YouTube** to assist in training. Many manufacturers and some individuals have posted videos of maintenance procedures. Keep a library, or create a playlist, for training and refresher courses.

Use **mobile video chat** program apps to use smartphones or tablets to communicate when performing maintenance.

Use the school's **distance learning assets** for training across the district when face-to-face is not required.

Part of sustaining a training program is to set a schedule for training that works into the foreseeable future. Review individual training histories and be ready to incorporate training that may be missing. A good time for this is during personnel annual reviews. Review any new items that will require a change in training.

A school district training plan should contain or perform the following:

- A written training plan that has training for new staff, annual training, and how the need for periodic training is addressed;
- Produce at any time the scheduled maintenance training for the next year;
- Produce and review an individual's training history;

Maintenance Training

- Produce and review the prior year's training activity and attendance; and
- An efficient training program can track training on the maintenance work order system to able to track training costs and individual training time.

Capital Planning

Developing a Capital Planning Program

Introduction

Department regulations for capital planning require:

> *(5) a renewal and replacement schedule that, for each school facility of permanent construction over 1,000 gross square feet, identifies the construction cost of major building systems, including electrical, mechanical, structural and other components; evaluates and establishes the life-expectancy of those systems; compares life-expectancy to the age and condition of the systems; and uses the data to forecast a renewal and replacement year and cost for each system.*

Of the five maintenance and facility management criteria outlined in regulation, the capital planning requirement is the longest; it uses the most words. In practice, however, it's been demonstrated that a single, relatively simple spreadsheet—for each facility—can accomplish all of the required elements. Most districts utilize the department-developed Renewal and Replacement Schedule spreadsheet file to document their capital planning efforts. Many districts, especially those being served by the Southeast Regional Resource Center (SERRC), have added functions to the department's basic tool. Two of those include: multiple linked worksheets to account for different ages and renewal cycles, and data updates following the completion of capital projects. That said, capital planning is so much more than simply managing renewal and replacement spreadsheets.

The most common deficiency in capital planning seen by the department during its site assessments is its lack of use. The required data can be produced but there is a starkly apparent lack of its relevance to district processes. While there is evidence that every district is doing some amount of capital renewal, little of it springs from, or is even related to, a cohesive plan. The impact of available capital planning data on district six-year CIP plans is noticeably absent. Moving from data to a program, from develop to implement is a challenge for districts of every size. Exacerbating the issue is value question, "What good does it do?" When there are economic issues that limit resources for capital renewal and deferred maintenance, it's not uncommon to develop the attitude that capital planning is efforts are wasted. This can prove to be shortsighted if and when funding becomes available and districts find themselves not in position for available funding. Even in times of lean funding, a capital renewal plan with prioritized needs based on data and metrics from a robust capital planning program can be of great value to building owners.

Planning

A school district cannot efficiently maintain their facilities through capital planning alone, nor can a school district manage and maintain their facilities properly without capital planning. Capital planning is, as the name implies, planning for future capital needs. But, in order to plan for those needs, the owner needs to identify the capital components, establish an expected life-span of the components, track repairs and maintenance performed during the life of the components, establish protocols for condition assessment of components, modify the life

expectancy based on condition, and plan for the eventual replacement or rehabilitation of the component.

The first step in establishing a capital planning program is to identify what items the school district intends to include in its plan. Statute indicates electrical, mechanical, structural, and other components of facilities owned or operated by the school district; in other words, the physical buildings and grounds. This is the minimum to satisfy state statute, but a program that properly serves the school district should also include items like vehicles, grounds equipment, and other capitalized equipment. The planning part of the process is the most important part of establishing a capital planning program and needs to be thorough in the items to include. Under "grounds", is playground equipment included by components: play structures, swings, free standing slides, etc.? Should it also include paving and other hard surfaces? In mechanical, boilers and fans are obvious items, but consider pumps, VAV boxes, day tanks, expansion tanks, etc. As a school district begins planning, it needs to establish the criteria of what a capital component is and what is not.

The next step in establishing the program is uniquely identifying a component from others in order to track its condition and work already performed. The identifying asset number for a particular object should be assigned in the maintenance management program. Some parts of the identifying number and the record keeping of the item should be able to include and sort by the following items that are important to capital planning:

1. Location (facility, room, etc.);
2. Date placed in service;
3. Make, model;
4. Life expectancy, date of replacement, and date of review;
5. Estimated cost of replacement;
6. All work orders including repairs, PM inspections. Include descriptions and costs; and
7. Date removed from service and identifier of replacement.

There is much more information that a good maintenance program should have available, but these elements are critical for effective capital planning. The first is obvious, recording what school a component is associated with, additionally, identifying a specific room is helpful to physically locate the component; sorting by school also assists in evaluating capital needs by facility. Date in service and a component's make and model helps to establish expected life and when a school district can anticipate future needs. Date of review is when school district personnel begin to review the history of repairs and preventive maintenance inspections to possibly adjust the date of replacement. The date of replacement shows that it is no longer in service and including the new component identifier tracks what replaced the item.

Capital Planning

Implementing a Capital Planning Program

Introduction

Capital planning does not happen in a vacuum. The identification and scheduling of maintenance is performed through maintenance management. If it can have an effect on energy efficiency, then tracking performance is important. Many items involve custodial operations -- from being the on-site eyes to possibly changing filters or general cleaning. And finally, the proper training on maintaining the component has a large impact on whether the component meets, or possibly exceeds, the expected life. Below are steps and discussion on how to plan a school district's capital planning program, how to implement it, and how to sustain it into the future.

Once all of the capital components and equipment have been identified, tagged, and put into the maintenance management program, the day-to-day (or year-to-year) part begins. As the components start to reach their expected life, capital planning begins to review the records of repairs and inspections and makes adjustments to the replacement schedule. An example of the flow of information and decision making is as follows:

Boiler 001 at school ABC was installed with the construction of the school in 1990. Part of its O&M information is that it is expected to be replaced at 30 years and reviews to begin at 25 years. In 2015, the maintenance program puts the boiler on the review list and capital planning begins review. As part of the review, capital planning reviews the scheduled inspections performed twice a year and the scheduled cleaning, maintenance, and tuning performed once a year. Also reviewed are all repair work orders for scope of repairs, frequency, and costs. The boiler condition is discussed with the boiler technician(s) and maintenance manager. After discussion, it is decided whether the replacement should be done sooner, at the scheduled date, or if the boiler is in a condition that its useful life can be extended. At the same time the cost of replacement is adjusted to reflect the current cost of replacement. Review is performed again at 27 years.

If an asset is not performing well and does not appear to be able to meet its expected life, the technicians doing repairs and inspections can request an earlier review of the asset. The process of review starts and, if needed, a new replacement date is assigned and planned for.

After all scheduled reviews are performed, a report is produced for each facility that shows replacement needs for the next six years and the expected costs. The person(s) deciding on the final six-year capital improvement plan review the replacement report and put together projects for the plan that may combine related items or stand alone as a single project. In the example above, all three boilers are scheduled for replacement and one project is put forward for boiler replacements; it may include other equipment reaching replacement age, like pumps, expansion tanks, etc.

Capital Planning

Sustaining a Capital Planning Program

Introduction

As a school district's capital planning program matures, there will be upgrades, component replacements, new facilities, and maybe facilities being removed from the school district. Planning the process of managing the data for these instances will help to smoothly update the system. One challenge is when an asset is transferred from one facility to another. This is usually capitalized equipment that can be easily moved like vehicles, grounds equipment, or educational equipment such as smartboards. Scheduled PM inspections should catch that the equipment is not where it should be per the asset record. Once the asset is located, it can be reassigned in the record or returned.

Another situation is where an asset has reached its end of useful life and is not of a value to be considered a capital improvement project. An example would be a replacement of a heat circulation pump with a value of a few thousand dollars plus labor. When writing a work order for replacement, either to be performed in-house or by contractor, it is best to assign the new asset number in the work order and order both the pump and asset tag. When the work is complete, the out-of-service date is registered with the old asset and a placed-in-service date is registered to the new asset. The O&M manuals can be electronically made part of the new asset's file and the preventive maintenance schedule can be initiated.

HELPFUL HINT

Involve consultants in the asset replacement strategy

During design identify assets being replaced and assign the new asset numbers and include them in the equipment schedules. Example:

BOILERS

ID	Old Asset Number	New Asset Number	Manufacturer/Model	In-Service
B-1	03MC02OB01	03MC02OB03	Wiel-Mclain Model 886	06/02/1990
B-2	03MC02OB02	03MC02OB04	Wiel-Mclain Model 886	08/21/2018

This shows that the asset being retired is identified and the new asset number is assigned. For new construction, only the new asset number is shown.

When a large project replaces many assets, it is best to start early in planning and design stages to coordinate asset replacement strategies. At this point involving the consultants, the maintenance management, and capital planning will make the process smoother. Capital planning and the consultants identify which assets are being replaced and maintenance management assigns the new asset numbers and prepares the old assets for retirement in the system. As the project begins, the contractor submits documents on the proposed replacement/new assets. During submittal review, if the submittal is approved, maintenance management inputs data on make/model, preventive maintenance schedule, maintenance parts, and expected life from the submittal documentation. When O&M manuals are provided electronically, the manuals can be attached to the asset file in the CMMS.

Capital Planning

Capital asset management is not a stand-alone operation. It takes coordination with maintenance management, maintenance technicians, maintenance mangers, and the committee that creates and reviews capital improvements.

[BELOW ARE POTENTIAL AREAS OF CONTENT UNDER CONSIDERATION]

TOOLS -

1. Six-year plan: Department has basic template for use in documenting project priority, category, name/scope and cost.

2. DEED provides a basic spreadsheet tool (the Renewal and Replacement Schedule) to assist school districts in capital planning. It identifies 26 systems, calculates basics life expectancies, and estimates costs based on facility value (typically insurance appraisal value). Discussion of the plan should also include identification of funding sources. Projects anticipated to be funded with state aid will have a school district match component; what is the intended funding stream for the school district portion of the project costs? If all projects in first year of the six-year plan were to receive funding, will the school district be able to provide its required match?

3. TIPS for presenting to the school board or capital planning committee.
   Not helpful to only have "emergent districtwide" projects. (In "compliance" area of Preventive Maintenance Handbook, note that application scores may be marked down in "capital planning" if no specific out-years projects are identified.)

4. STATUTES
   Specific statute, AS 14.08.101(7), requiring school board approval of six-year plan.

Additional Considerations

Managing Contracted Staff and Privatized Activities

[Content to be developed.]

Evaluating Your Maintenance Program

[Content to be developed.]

Environmental Safety

[Content to be developed.]

—remain as good as new for as long as practicable?”

Portable Devices in the Maintenance Work Flow

[Content to be developed.]

Electronic Operations & Maintenance Manuals

[Content to be developed.]

Notes

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Appendices

Appendix A

Sample Systems and Components Inventory List

Vehicular ~~Systems~~Surfaces

- Parking lots
- Roads/drives
- Curbs/gutters
- ~~Fire lanes~~Signage

Pedestrian Surfaces

- Walkways
- Plazas
- Boardwalks

Elevated Decks, Stairs & Ramps

- Elevated Boardwalks
- Elevated Playdecks
- Stairs/railings
- Ramps

Site Walls

- Retaining walls
- Decorative walls

Landscaping & Irrigation

- Turf/Lawn
- Planting/Bedss
- Mulch
- Boulders
- Irrigation and controls

Fencing and Gates

- Posts
- Fencing
- Gates
- Vehicle Gates
- Bollards/Staples

Site Furnishings & Equipment

- Benches/tables
- Signs
- Flagpoles
- Planters
- Waste receptacles
- Bike racks

Playgrounds & Playfields

- Playgrounds
- Sports fields
- Hard surface courts
- Ice Rinks
- Playdecks
- Play structures
- Fall protection
- Markings/paintings

Other Site Improvements

- Sledding hills
- Snowmelt systems
- Water features

Freestanding Shelters

- Foundations
- Superstructure
- Enclosure
- Electrical components

Attached Shelters

- Foundations
- Superstructure
- Enclosure
- Electrical components

Support Buildings

- Foundations
- Superstructure
- Enclosure
- Mechanical components
- Electrical components

~~Site Utilities~~Water System

- Wells
- Tanks
- Pumps
- Piping/valves

Appendix A - Sample Systems and Components Inventory List

- Treatment system~~s~~

~~Site Utilities~~**Sanitary Sewer**

- Tanks
- Lift Stations/pumps
- Piping/valves
- Treatment system

~~Site Utilities~~**Storm Water**

- Piping
- Culverts
- Swales
- Catchments
- Fencing
- Treatment system

~~Site Utilities~~**Fuel Systems**

- Foundations
- ~~Fuel t~~Tanks
- ~~Fuel distribution p~~Piping/valves
- Containment
- Fencing

~~Site Utilities~~**Heating/Cooling Piping & Utilidors**

- Piping
- Valves
- Insulation,
- Utilidors
- Vaults

~~Site Utilities~~**Electrical Service & Distribution**

- Poles
- Transformers
- Switchgear
- Conduit
- Feeders

~~Site Utilities~~**Data/Comm Service & Distribution**

- Conduit
- Cable/wiring
- Satellite dishes
- Foundations
- Equipment

~~Site Utilities~~**Lighting & Equipment**

- Pole~~-mounted lighting~~s
- Fixtures
- Devices
- Panels
- Conduit/feeders

~~Site Utilities~~**Security Systems**

- Poles
- Devices
- Conduit
- Cable

~~Foundation and Substructure~~**Continuous & Column Footings**

- Reinforcement
- Concrete
- Insulation

Foundation ~~and Substructure~~Walls & Treatment

- Reinforcement
- Concrete
- Dampproofing
- Insulation

Foundation ~~and Substructure~~Drainage

- Pipe
- Geotextile

~~Foundation and Substructure~~**Structural & Nonstructural Slabs**

- Reinforcement
- Concrete
- Joints
- Finish

~~Foundation and Substructure~~**Trench, Pit, and Pad**

- Reinforcement
- Concrete
- Embedments

Appendix A - Sample Systems and Components Inventory List

~~Foundation and Substructure~~Underslab Elements

- Vapor barrier
- Insulation
- Pipe
- Geotextile

~~Foundation and Substructure~~Piling & Pile Cap

- Pile
- Thermopile
- Pile caps

~~Foundation and Substructure~~Caissons

- Piers
- Pile caps

~~Foundation and Substructure~~Grade Beams

- Reinforcement
- Concrete
- Insulation

~~Foundation and Substructure~~Arctic Foundation Systems

- Thermosyphons
- Refrigeration
- Insulation

~~Foundation and Substructure~~Other Special Foundations

- Underpinning
- Vibro-replacement

~~Superstructure~~Lower & Main Floors

- Beams
- Joists
- Decking
- Topping
- Soffit
- Insulation
- Coatings

~~Superstructure~~Upper Floors

- Columns
- Beams
- Joists
- Decking
- Topping
- Coatings

~~Superstructure~~Ramps

- Columns
- Beams
- Joists
- Decking
- Topping
- Coatings

~~Superstructure~~Pitched Roofs

- Columns
- Beams
- Rafters
- Trusses
- Decking
- Bracing

~~Superstructure~~Flat Roofs

- Columns
- Beams
- Rafters
- Trusses
- Decking
- Bracing

~~Superstructure~~Special Roofs

- Pneumatic structures
- Domes

~~Superstructure~~Stair Structure

- Columns
- Landings
- Stringers
- Treads
- Risers
- Toppings

~~Superstructure~~Stair Railings

- Guardrail
- Railing

Appendix A - Sample Systems and Components Inventory List

- Balusters
- Supports
- Coatings

~~Superstructure~~Ladders & Steps

- Ladders
- Steps
- Coatings

Exterior Walls ~~Systems~~

- Framing
- Sheathing
- Insulation
- Siding
- Vapor/Air barriers
- Vents

~~Exterior Wall Systems~~Fascias & Soffits

- Framing
- Sheathing
- Insulation
- Siding
- Vapor/Air barriers
- Vents

~~Exterior Wall Systems~~Curtainwalls & Non-bearing Walls

- Framing
- Mullions/Rails
- Connectors
- Insulation
- Siding
- Barriers
- Interior substrate

~~Exterior Wall Systems~~Windows

- Frames
- Glazing
- Exterior sills
- Flashings
- Coatings/sealants
- Vandal-proofing

~~Exterior Wall Systems~~Storefronts

- Framing
- Glazing
- Flashings
- Closures/sealants

~~Exterior Wall Systems~~Structural Window Walls

- Columns
- Frames,
- Glazing
- Exterior sills
- Flashings
- Closures/sealants

~~Exterior Wall Systems~~Translucent Panels

- Panel assembly
- Exterior sills
- Flashings

~~Exterior Wall Systems~~Personnel Doors

- Frames
- Doors
- Lites
- Latch assembly
- Openers
- Thresholds
- Flashings
- Finish

~~Exterior Wall Systems~~Special Doors

- Frames
- Doors
- Openers
- Lock assembly
- Flashing
- Finish

~~Exterior Wall Systems~~Louvers, Screens & Shading Devices

- Louvers
- Screens
- Trellis
- Shades/shelfs

Appendix A - Sample Systems and Components Inventory List

~~Exterior Wall Systems~~**Balcony Elements**
- Walls
- Grills
- Guardrails
- Handrails

Other Exterior ~~Wall Systems~~Accessories
- Signage
- Decorations

~~Roof Systems~~**Pitched Roofing**
- Underlayment/barriers
- Roofing
- Flashing
- VTR assembly
- Insulation
- Fascia

~~Roof Systems~~**Gutters & Downspouts**
- Gutters
- Membranes
- Downspouts
- Hangers

~~Roof Systems~~**Flat Roofing**
- Underlayment/barriers
- Roofing
- Flashing
- VTR assembly
- Insulation
- Copings

~~Roof Systems~~**Roof Drains & Piping**
- Drains
- Scuppers
- Leaders
- Insulation

~~Roof Systems~~**Skylights**
- Fixed/operable Skylights
- Curbs
- Flashing
- Hardware

~~Roof Systems~~**Roof Hatches**
- Hatches
- Curbs
- Flashing
- Hardware

~~Roof Systems~~**Roof Decks, Walls & Railings**
- Decking/paving
- Protection
- Supports
- Walls
- Railings

Other Roof ~~Systems~~Accessories
- Snow guards
- Tie-offs
- Pipe supports

~~Interior Construction~~**Fixed Partitions**
- Framing
- Substrates/sheathing
- Blocking
- Insulation

~~Interior Construction~~**Soffits & Ceilings**
- Framing
- Substrates/sheathing
- Blocking
- Insulation

~~Interior Construction~~**Operable Partitions**
- Partition
- Support structure
- Factory finishes

~~Interior Construction~~**Demountable Partitions**
- Partition
- Support structure
- Factory finishes

~~Interior Construction~~**Glazed Partitions**
- Frames
- Glazing

Appendix A - Sample Systems and Components Inventory List

- Glass block
- Trims

~~Interior Construction~~Railings & Screens

- Railing assemblies
- Visual screens

~~Interior Construction~~Personnel Doors

- Frames
- Doors
- Integral lites
- Hardware
- Trims
- Finish

~~Interior Construction~~Special Doors

- Frames
- Doors
- Hardware
- Finish

~~Interior Construction~~Windows & Sidelites

- Frame
- Glazing
- Stops

~~Interior Construction~~Access Floors

- Framing/stands
- Floor panels
- Factory finishes

~~Interior Construction~~Platforms & Stages

- Framing
- Sheathing/panels
- Accessories

~~Interior Construction~~Floor Finishes

- Finish material
- Trims
- Wall base
- Transitions

~~Interior Construction~~Wall Finishes

- Finish material
- Trims

~~Interior Construction~~Ceiling Finishes

- Framing/supports
- Finish material
- Trim

~~Interior Construction~~Other Finishes

- Finish material
- Transitions

Interior ~~Construction~~Specialties

- Toilet partitions/accessories
- Lockers
- Boards
- Protective Guards
- Signage

~~Interior Construction~~Casework/Millwork

- Cabinets
- Cubbies
- Wardrobes
- Counters
- Display case
- Trim

~~Interior Construction~~Seating

- Framing
- Finish
- Accessories

~~Interior Construction~~Window Coverings

- Drapes
- Blinds
- Blackout shades

~~Specialties~~

- ~~Toilet partitions~~
- ~~Display boards~~
- ~~Projection screens~~
- ~~Display cases~~
- ~~Lockers~~
- ~~Flag poles~~

~~Conveying Systems~~Passenger Elevator

- Cab

Appendix A - Sample Systems and Components Inventory List

- Rails
- Machinery
- Appurtenances

~~Conveying Systems~~Lifts & Other Conveyors

- Cab/enclosure
- Rails
- Machinery
- Appurtenances

~~Conveying Systems~~Elevators & Lifts

- Cab/enclosure
- Rails
- Machinery
- Appurtenances

~~Conveying Systems~~Hoists & Cranes

- Structure/rails
- Hoist/crane
- Appurtenances

~~Conveying Systems~~Other Systems

- Structure/rails
- Enclosure
- Appurtenances

Plumbing ~~Systems~~Fixtures

- Fixture
- Rough-in
- Valves/stops
- Mounts
- Trims

Plumbing ~~Systems~~Piping

- Pipe
- Fittings
- Hangers
- Insulation

Plumbing ~~Systems~~Equipment

- Pumps
- Tanks
- Traps
- Hot water generators
- Treatment

~~Plumbing Systems~~Waste & Vent Piping

- Pipe
- Fittings
- Cleanouts
- Supports
- Insulatiuon

~~Plumbing~~ Special Systems

- Equipment
- Piping
- Fittings

Heating ~~Systems~~Equipment

- Boilers
- Furnaces
- Burners
- Flue
- Expansion tank
- Media

Heating Distribution Systems

- Pipe
- Fittings
- Valves
- Pumps
- Insulation
- Strainers

~~Air Handling Systems~~Ventilation Equipment

- Air handling units
- Supply/Return fans
- Exhaust fans
- Coils
- VAVs
- Terminal units

~~Air Handling~~Ventilation Distribution Systems

- Ducting
- Insulation
- Diffusers

Appendix A - Sample Systems and Components Inventory List

- Damper/Silencers

Cooling ~~Systems~~Equipment

- Air Conditioning units
- Make-up units
- Coils
- Refrigerant

Cooling Distribution Systems

- Pipe
- Fittings
- Valves
- Gauges
- Insulation

~~Cooling Systems~~Heat Recovery System

- Heat Recovery units
- Fans

~~Mechanical Controls~~Control Systems

- Head End
- Direct Digital Control points
- Wiring
- Sensors
- Gauges

~~Fire Protection/Suppression Systems~~Riser & Equipment

- Riser
- Backflow device
- Headers
- Valves

~~Fire Protection/Suppression Systems~~Sprinklers & Piping

- Pipe
- Fittings
- Heads
- Hangers/Bracing

~~Fire Protection/~~Special Suppression Systems

- Tanks
- Valves
- Piping
- Controls

Fuel Supply (Gas & Oil)

- Tanks
- Valves
- Piping
- Controls

Dust Collection Systems

- Tank
- Stand
- Fans
- Ducting
- Controls

Compressed Air & Vacuum Systems

- Tanks
- Mounts
- Fans
- Ducting
- Controls
- Outlets

Other Special Mechanical Systems

- Equipment
- Piping/ducting
- Grills

~~Power Generation and Transmission~~Main Distribution Panels & Swichgear

- Main Distribution Panel enclosure
- Disconnect
- CT Enclosure
- Bus
- Fuses

~~Power Distribution Systems~~Panels & Motor Control Centers

- Switchboards
- Panelboards
- Motor control centers

~~Power Distribution Systems~~Transformers

- Transformer

Appendix A - Sample Systems and Components Inventory List

~~Power Distribution Systems~~**Conduit & Feeders**

- Conduit
- Hangers/supports
- Fittings
- Wires

Lighting ~~Systems~~Fixtures

- Interior Fixtures
- Building Mounted Fixtures
- Exit/emergency
- Trims

Lighting ~~Systems~~Controls

- Control Panel
- Switches
- Occupancy sensors

~~Lighting Systems~~**Conduit & Wiring**

- Conduit
- Fittings
- Wiring

Devices & Connections

- Outlets
- Disconnects
- Sensors/timers
- Motor connections

Conduit & Wiring

- Conduit
- Fittings
- Wiring

~~Signal Systems~~**Fire Alarms**

- Devices
- Panels
- Conduit
- Wiring

~~Signal Systems~~**Data & Communications**

- Equipment
- Devices/connections
- Conduit/tray
- Wiring

~~Signal Systems~~**Security Systems**

- Headend
- Detectors
- Closed circuit television
- Access control
- Conduit/tray
- Wiring

~~Signal~~ **Clock Systems**

- Clocks
- Controls
- Conduit/tray
- Wiring

~~Signal~~ **Intercom Systems**

- Headend
- Interties
- Speakers
- Wiring

~~Signal~~ **Other Special Systems**

- Equipment
- Devices
- Conduit/tray
- Wiring

Power Generation & Distribution

- Generators
- Switchgear
- Panels
- Conduit
- Feeders

Electrical Heating Systems

- Baseboards
- Unit Heaters
- Radiator
- Radiant Heat
- Controls

Grounding Systems

- Grounding
- Lightning Protection

Appendix A - Sample Systems and Components Inventory List

~~Equipment~~Food Service and Kitchen Equipment

- Cookikkng Equipment
- Refer/Freezer
- Tables/counters

~~Equipment~~Athletic Equipment

- Basketball goals
- Inserts
- Ropes
- Bars
- Mat hoists

~~Equipment~~Career & Technology Equipment

- Woodworking
- Metal/welding
- Small engine
- Robotics

~~Equipment~~Science Equipment

- Casework
- Equpment

~~Equipment~~Library Equipment

- Stacks
- Shelves
- Desks
- Chairs

Theater Equipment

- Lighting
- Rigging
- Sound system
- Curtains

Art Equipment

- Kilns
- Sinks

Loading Dock Equipment

- Bumpers
- Levelers

Other Equipment

- OT/PT

~~Equipment~~Fixed Furnishings

- Classroom
- Administration
- Workrooms
- Assembly

~~Equipment~~Mats

- Mats
- Grates

~~Equipment~~Other Furnishings

- Window shades

~~Equipment~~Packaged Utility Modules

- Foundation
- Superstructure
- Enclosure
- Mechanical
- Electrical

~~Equipment~~Swimming Pool

- Foundation
- Superstructure
- Enclosure
- Mechanical
- Electrical

~~Equipment~~Greenhouse

- Foundation
- Framing
- Panels
- Mechanical
- Electrical

Appendix B

Anticipated Life Expectancies (Renewal Schedule)

System Life and Cost Data Sheet

	System Life Expect
Site Improvements	25
Site Utilities	40
Foundation/Substruct.	50
Superstructure	50
Exterior Wall System	25
Exterior Windows	30
Exterior Doors	20
Roof Systems	20
Interior Partitions	50
Interior Doors	30
Interior Floor Finishes	15
Interior Wall Finishes	25
Interior Ceiling Finishes	25
Specialties	40
Conveying Systems	40
Plumbing piping	30
Plumbing Fixtures	30
Fire Protect./Suppres.	30
HVAC Distribution	40
HVAC Equipment	30
HVAC Controls	20
Electrical Serv./Gen.	40
Electrical Distribution	50
Electrical Lighting	25
Special Electrical	15
Equip and Furnishings	25

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Appendix C

Facility Funding Formulas

[To Be Developed]

Appendix D

Checklists

District Preventative Maintenance Program Review

District:
Review Year: Site Visit Date:

Item	Requirement	Approved	Comments
	Maintenance Management		
A1	Provide copies of work orders of varying types and status.	☐	
A2	Report: Total maintenance labor hours collected on work orders by type of work (scheduled, corrective, operations support, etc.) vs. labor hours available—by month for previous 12 months.	☐	
A3	Report: Scheduled and completed work orders—by month for previous 12 months.	☐	
A4	Report: Number of incomplete work orders sorted by age (30, 60, 90 days, etc.) and status (deferred, awaiting materials, scheduled, etc.)—by month for the previous 12 months.	☐	
A5	Report: Comparison of scheduled maintenance work order hours to unscheduled maintenance work order hours—by month for previous 12 months.	☐	
A6	Report: Monthly trend data for unscheduled work orders showing both hours and numbers of work orders—by month for the previous 12 months.	☐	
A7	Report: Planned maintenance activity report—by facility for next 3 months.	☐	
A8	Report: Completed maintenance activity (work orders) including labor and material costs—by facility for previous 3 months.	☐	
	Energy Management		
B1	Provide a written energy management plan.	☐	
B2	Reports: Consumption data for each building, each utility [e.g., fuel oil, electricity, natural gas, LPG, water, etc.]—by month for the previous 12 months.	☐	
	Custodial Program		
C1	Provide a written custodial plan that is building-specific and describes both the frequency (schedule) and level of custodial care for each facility.	☐	
	Maintenance Training		
D1	Provide a schedule of planned training for both custodial and maintenance personnel—for the current or upcoming school year.	☐	
D2	Provide a record of training describing type and duration of training—by individual for current school year.	☐	
	Renewal and Replacement (R&R) Schedules		
E1	Provide a Renewal/Replacement Schedule (detailed to at least EED's 26 systems) for each permanent building over 1000sf.	☐	
E2	Provide information that supports that the data in the R&R schedules was developed based on system condition assessments.	☐	
	Fixed Asset Inventory System (FAIS)		
F1	Report: Report of fixed asset, date acquired, location and estimated period of service.	☐	

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Appendix D - Checklists

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Page 1

(a) For a district to be eligible for state aid under AS 14.11.011, the chief school administrator of the district must certify, on a form provided by the department, that the district has, and is in compliance with, a facility management program that addresses the following five elements of facility management, including maintenance management:

(1) a maintenance management program that is a formal system that records maintenance activities on a work order basis and tracks the timing and costs, including labor and materials, of maintenance activities in sufficient detail to produce reports of planned and completed work;

Mandatory

- ☐ Show that your system for can recording all maintenance activities on a work order basis and how a work order is handled from its creation to completion?
- ☐ Show your maintenance personnel performed no activities this week or this month not recorded on a work order?
- ☐ Show a record of your work orders that track all of your maintenance activities according to typical categories such as preventive, routine, emergency and operations?
- ☐ Generate a report of your planned maintenance activity for the next quarter that shows the timing (i.e., schedule) and anticipated costs, including labor and materials, of that work?
- ☐ Produce a report covering the previous three months of all maintenance activities and their costs, including labor and materials broken out by typical maintenance categories such as preventive, routine, emergency and operations?
- ☐ Show a report of planned versus completed maintenance activity for each facility by work order?

Best Practice

- ☐ Show that assets are identified for tracking purposes to the component level?
- ☐ Demonstrate how the data collected is used in the day-to-day management program?

(2) an energy management plan that includes recording energy consumption for all utilities on a monthly basis for each building;

Mandatory

- ☐ Produce a monthly record of energy consumption for each utility by building?
- ☐ Demonstrate that each building over 1000 square feet is separately measured each month.
- ☐ (If this is not practical at every site, tell what you do instead.)

Appendix D - Checklists

4 AAC 31.013 PREVENTIVE MAINTENANCE AND FACILITY MANAGEMENT COMPLIANCE TEST Page 1

Best Practice

- ☐ Show comparison of energy consumption in each building over multi-year period.
- ☐ Identify causes of increased or decrease energy consumption.

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(3) a custodial program that includes a schedule of custodial activities for each building based on type of work and scope of effort;

Mandatory

- ☐ Produce a copy of your written custodial plan at each site showing a schedule of custodial activities?
- ☐ Show that your plan for each building includes the type of work (i.e., the activity needed for each surface or equipment item) and the scope of effort (i.e., the frequency of care for each type of work)?

Best Practice

- ☐ Demonstrate the district's plan has been made available to all custodial staff, principals, and management personnel?
- ☐ Demonstrate how the plan transfers to custodial work being done at the site?
- ☐ Show that the program has included in a scope of effort the quantity (e.g., square feet of carpet, number of toilet fixtures, etc.)?
- ☐ Custodial plan shows areas of each custodians responsibility.

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(4) a maintenance training program that specifies training for custodial and maintenance staff and records training received by each person; and

Mandatory

- ☐ Show a written training plan or training schedule that addresses annual training goals?
- ☐ Produce a schedule of planned training for the coming year?
- ☐ Produce a record of training activities by individual custodian and maintenance staff?
- ☐ Show training records for last year?

Best Practice

- ☐ Track maintenance training through work orders on CMMS?

Appendix D - Checklists

4 AAC 31.013 PREVENTIVE MAINTENANCE AND FACILITY MANAGEMENT COMPLIANCE TEST
Page 1

(5) a renewal and placement schedule that, for each school facility of permanent construction over 1,000 gross square feet, identifies the construction cost of major building systems, including electrical, mechanical, structural and other components; evaluates and establishes the life-expectancy of those systems; compares life-expectancy to the age and condition of the systems; and uses the data to forecast a renewal and replacement year and cost for each system.

Mandatory

- ☐ Provide a Renewal & Replacement (R&R) Schedule for each permanent building over 1000 square feet in size?
- ☐ Demonstrate that major building systems are identified at least at the level of the 26 systems used on the DEED renewal and replacement schedule?
- ☐ Show information that supports the data in the R&R schedule was developed based on on-site assessments?

Best Practice

- ☐ Show how these schedules are being used by the district to formulate capital plans?
- ☐ Show, for buildings with major additions of different ages, that separate R&R schedules have been created?
- ☐ Demonstrate that the R&R schedules are updated each year?
- ☐ Provide a site-by-site or districtwide forecast of renewal cost by fiscal year?

Appendix E

Definitions

Component

A part of a system in the school facility.

Component Repair or Replacement

The unscheduled repair or replacement of faulty components, materials, or products caused by factors beyond the control of maintenance personnel.

Custodial Care

The day to day and periodic cleaning, painting, and replacement of disposable supplies to maintain the facility in safe, clean and orderly condition.

Deferred Maintenance

Custodial care, routine maintenance, or preventive maintenance that is postponed for lack of funds, resources, or other reasons.

Major Maintenance

Facility renewal that requires major repair or rehabilitation to protect the structure and correct building code deficiencies, and shall exceed $25,000 per project, per site. It must be demonstrated, using evidence acceptable to the department that (1) the school district has adhered to its regular preventive, routine and/or custodial maintenance schedule for the identified project request, and (2) preventive maintenance is no longer cost effective.

Preventive Maintenance

The regularly scheduled activities that carry out the diagnostic and corrective actions necessary to prevent premature failure or maximize or extend the useful life of a facility and/or its components. It involves a planned and implemented program of inspection, servicing, testing and replacement of systems and components that is cost effective on a life-cycle basis.

Renewal or Replacement

A scheduled and anticipated systematic upgrading of a facility system or component to rehabilitate it to a renewed functioning standard.

System(s)

An assembly of components created to perform specific functions in a school facility, such as a roof system, mechanical system or electrical system.

Note: The above definitions are those adopted by the Bond Reimbursement and Grant Review Committee April 18, 1997.

Appendix F

Bibliography of Maintenance Publications

[To Be Developed]

Appendix G

Standard for a Clean Classroom

[To Be Developed]

Appendix H

Master Custodial Schedule

[To Be Developed]