Bond Reimbursement and Grant Review Committee Meeting Agenda

September 5, 2019
2:00pm - 4:00pm

Teleconference – School Finance Conf. Room
801 W. Tenth Street, Juneau, Alaska

Audio Teleconference available through free online WebEx application. Meeting Number 805 422 471
Toll call-in number 1-650-479-3207 (US/Canada)

Chair: Elwin Blackwell, acting

Thursday, Sept. 5, 2019

Agenda Topics

2:00 – 2:05 PM — Committee Preparation
- Call-in, Roll Call, Introductions
- Chair's Opening Remarks
- Agenda Review/Approval

2:05 – 2:50 PM — Department Briefing
- FY2020 Funding
- Preventive Maintenance State-of-the-State

Publication Updates
- *Guide for School Facility Condition Surveys*

Briefing Paper – Geographic Cost Factors 2019

Briefing Paper – ASHRAE 90.1-2013

2:50 – 3:40 PM — Subcommittee Reports
- Design Ratios (Dale Smythe)
  - *Design Ratio Recommendations*
- Model School (Don Hiley)
  - *Model School Elements Evaluation*
  - *Standards Feasibility Study Review*
- Commissioning (Randy Williams)
  - *Credentialing Organizations Recommendation*
- School Space (Dale Smythe)

3:40 – 3:50 PM — BR&GR Calendar and Work Plan Review & Update
- Next Meeting Date

3:50 – 4:00 PM — Committee Member Comments

4:00 PM — Adjourn

THE STATE of ALASKA
GOVERNOR MIKE DUNLEAVY

Department of Education
& Early Development

FINANCE & SUPPORT SERVICES

801 West 10th Street, Suite 200
PO Box 110500
Juneau, Alaska 99811-0500
Telephone: 907.465.6906

To: Bond Reimbursement & Grant Review Committee
From: School Facilities
Date: September 5, 2019

DEPARTMENT BRIEFING

Preventive Maintenance Update (PM State-of-the-State)

The Preventive Maintenance State of the State Report was issued on August 15, 2019, and is included in the packet. For the current FY21 CIP cycle, 48 of 53 school districts have certified or provisionally certified preventive maintenance programs.

Districts that are not currently certified include:

- Aleutian Region
- Hydaburg City
- Lake & Peninsula
- Pelican
- Skagway

Districts granted provisional certification and that are working with the department to develop a full year of evidence of plan adherence include (those in **bold** are new since the July 18 meeting):

- Bristol Bay Borough
- **Chatham**
- Galena City
- **Lower Kuskokwim**
- **Lower Yukon**
- **Southwest Region**

Of the five district not certified, nor provisionally certified, one (Lake and Peninsula) submitted evidence of compliance addressing shortfalls; the remaining four did not. For Lake and Peninsula, their plan for compliance in the area of energy management did not appear to be possible within the July-to-June annual maintenance evaluation cycle.

Site visits for the upcoming fiscal year are scheduled to take place between September and April for the following school districts:

- Aleutians East Borough
- Cordova City
- Denali Borough
- Kake City
- Kashunamiut
- Kodiak Island Borough
- Kuspuk
- Nenana City
- Pribilof Island
- Yakutat Borough

FY2020 Project Funding

The FY2020 capital budget appropriated $7,400,000 for K-12 Major Maintenance. This provided sufficient funds for the priority #1 project, Barnette Magnet School Renovation Phase IV. The department has awarded a grant for that project at a state share amount of $7,365,723 and a participating share of 3,966.158. The department is working to ensure the appropriation is placed in the Major Maintenance Grant Fund to allow for management under AS 14.11.

The FY2020 operating budget appropriated $39,389,000 to the REAA Fund, half of which was vetoed. $19,694,500 will be placed in that fund for FY20. Two projects returned substantial funds that were not needed for project completion. $5,041,059 came from the project in Quinhagak and $10,000,000 came from the project in Kwethluk. These funds, combined with the approximately $1.5 million in available balance brought the FY20 fund availability to $36,285,953. From this balance the department has awarded grants for the priority #1 and #2 projects on the School Construction Grant Fund list. For the Eek K-12 School Renovation/Addition, a state share amount of $34,450,733 was awarded to complete funding for that project; local share was $703,076. For the Hollis K-12 School Replacement project, $672,793 was awarded for the Design phase; participating share was $13,730.

See the REAA & Small Municipality Fund Report for additional information on school construction list funding.

As debt reimbursement projects reach completion, the recipients may decide to pay down the bond principal or redirect the remaining project balance to a voter and DEED-approved project, per 4 AAC 31.064. Two municipal districts, Kenai and Anchorage, have received DEED approval to redirect prior voter-approved funds to new projects in 2019.

A sheet on the CIP grant request and funding history FY10-FY20 is included for reference.

Legislative Action

In the Second Special Session the Legislature passed HB 2001, an appropriation bill to ‘restore’ vetoed funds to capitalize the REAA fund with $19,694,500 and to allocate $48,910,250 for state aid for costs of school construction under AS 14.11.100; these amounts were again vetoed when the bill was signed on August 19. No CIP-related funding was included in SB 2002, the special session capital appropriation bill.

PM State-of-the-State

Report of DEED Maintenance Assessments and Related Data

AS OF 8/15/2019

District	Date of Last Visit	Year of Next Visit	Approved FAIS	Maintenance Management	Energy	Custodial	Training	R&R Schedule	Status	Maint. Program	Program Name	CIP Eligible
Alaska Gateway	3/30/2017	2022	Y	Y	Y	Y	Y	Y	6 of 6	W	Dude Solutions	Yes
Aleutian Region	7/19/2011	2016	Y	N	Y	Y	Y	Y	5 of 6	W	Dude Solutions	No
Aleutians East	12/17/2014	2020	Y	Y	Y	Y	Y	Y	6 of 6	W	MC*	Yes
Anchorage	1/23/2018	2023	Y	Y	Y	Y	Y	Y	6 of 6	W	Dude Solutions	Yes
Annette Island	12/3/2015	2021	Y	Y	Y	Y	Y	Y	6 of 6	W	Dude Solutions	Yes
Bering Strait	4/14/2019	2024	Y	Y	Y	Y	Y	Y	6 of 6	W	Dude Solutions	Yes
Bristol Bay Borough	1/18/2019	2024	Y	Y	Y^P	Y	Y	Y	6 of 6	W	MC*	Yes
Chatham	3/6/2017	2022	Y	Y	Y^P	Y	Y	Y	6 of 6	W	MC*	Yes
Chugach	1/26/2018	2023	Y	Y	Y	Y	Y	Y	6 of 6	W	MC*	Yes
Copper River	3/31/2017	2022	Y	Y	Y	Y	Y	Y	6 of 6	W	Dude Solutions	Yes
Cordova	1/13/2015	2020	Y	Y	Y	Y	Y	Y	6 of 6	W	Dude Solutions	Yes
Craig City	11/14/2016	2022	Y	Y	Y	Y	Y	Y	6 of 6	W	MC*	Yes
Delta/Greely	3/28/2017	2022	Y	Y	Y	Y	Y	Y	6 of 6	W	Dude Solutions	Yes
Denali Borough	3/24/2015	2020	Y	Y	Y	Y	Y	Y	6 of 6	W	MC*	Yes
Dillingham City	2/2/2016	2021	Y	Y	Y	Y	Y	Y	6 of 6	W	MC*	Yes
Fairbanks	3/27/2018	2023	Y	Y	Y	Y	Y	Y	6 of 6	W	Web Help Desk	Yes
Galena	3/22/2018	2023	Y	Y	Y^P	Y	Y	Y	6 of 6	W	MC*	Yes
Haines	11/17/2015	2021	Y	Y	Y	Y	Y	Y	6 of 6	W	Dude Solutions	Yes
Hoonah City	4/17/2017	2022	Y	Y	Y	Y	Y	Y	6 of 6	W	MC*	Yes
Hydaburg City	11/16/2016	2022	Y	N	Y	Y	N	Y	4 of 6	W	MC*	No
Iditarod Area	4/8/2019	2024	Y	Y	Y	Y	Y	Y	6 of 6	W	Dude Solutions	Yes
Juneau	11/3/2015	2021	Y	Y	Y	Y	Y	Y	6 of 6	L	TMA	Yes
Kake City	2/4/2015	2020	Y	Y	Y	Y	Y	Y	6 of 6	W	MC*	Yes
Kashunamiut	11/13/2014	2020	Y	Y	Y	Y	Y	Y	6 of 6	W	MC*	Yes
Kenai Peninsula	3/1/2018	2023	Y	Y	Y	Y	Y	Y	6 of 6	W	Dude Solutions	Yes
Ketchikan	12/2/2015	2021	Y	Y	Y	Y	Y	Y	6 of 6	W	Dude Solutions	Yes
Klawock City	12/19/2016	2022	Y	Y	Y	Y	Y	Y	6 of 6	W	MC*	Yes
Kodiak Island	10/29/2014	2020	Y	Y	Y	Y	Y	Y	6 of 6	W	Dude Solutions	Yes
Kuspuk	2/24/2015	2020	Y	Y	Y	Y	Y	Y	6 of 6	W	MC*	Yes
Lake & Peninsula	1/16/2019	2024	Y	Y	N	Y	Y	Y	5 of 6	W	Manager Plus	No
Lower Kuskokwim	3/25/2019	2024	Y	Y^P	Y^P	Y	Y^P	Y	6 of 6	W	Manager Plus	Yes
Lower Yukon	3/20/2019	2024	Y	Y	Y^P	Y^P	Y^P	Y	6 of 6	W	MC*	Yes
Mat-Su Borough	2/3/2017	2022	Y	Y	Y	Y	Y	Y	6 of 6	W	Dude Solutions	Yes
Nenana City	3/26/2015	2020	Y	Y	Y	Y	Y	Y	6 of 6	W	MC*	Yes
Nome City	4/28/2017	2022	Y	Y	Y	Y	Y	Y	6 of 6	W	Dude Solutions	Yes
North Slope Borough	5/21/2018	2023	Y	Y	Y	Y	Y	Y	6 of 6	W	Dude Solutions	Yes
Northwest Arctic	2/23/2016	2021	Y	Y	Y	Y	Y	Y	6 of 6	W	MC*	Yes
Pelican City	4/9/2018	2023	Y	Y	N	Y	N	Y	4 of 6	W	Dude Solutions	No
Petersburg City	1/7/2016	2021	Y	Y	Y	Y	Y	Y	6 of 6	W	Dude Solutions	Yes
Pribilof Island	4/23/2015	2020	Y	Y	Y	Y	Y	Y	6 of 6	W	MC*	Yes
Sitka City Borough	4/24/2017	2022	Y	Y	Y	Y	Y	Y	6 of 6	W	Dude Solutions	Yes
Skagway City	9/5/2018	2024	Y	N	N	Y	N	Y	3 of 6	W	Dude Solutions	No
Southeast Island	11/18/2016	2022	Y	Y	Y	Y	Y	Y	6 of 6	W	MPulse	Yes
Southwest Region	2/4/2016	2021	Y^P	Y	Y	Y	Y	Y	6 of 6	W	Dude Solutions	Yes
St Mary's	3/18/2019	2024	Y	Y	Y	Y	Y	Y	6 of 6	W	MC*	Yes
Tanana City	3/23/2018	2023	Y	Y	Y	Y	Y	Y	6 of 6	W	MC*	Yes
Unalaska City	12/18/2014	2020	Y	Y	Y	Y	Y	Y	6 of 6	W	Dude Solutions	Yes
Valdez City	4/18/2018	2023	Y	Y	Y	Y	Y	Y	6 of 6	W	MC	Yes
Wrangell City	1/8/2016	2021	Y	Y	Y	Y	Y	Y	6 of 6	W	MC*	Yes
Yakutat City	1/14/2015	2020	Y	Y	Y	Y	Y	Y	6 of 6	W	MC*	Yes
Yukon Flats	11/12/2018	2024	Y	N	N	Y	N	Y	3 of 6	W	MC*	No
Yukon-Koyukuk	11/15/2018	2024	Y	Y	Y	Y	Y	Y	6 of 6	W	Dude Solutions	Yes
Yupiit	4/7/2015	2020	Y	Y	Y	Y	Y	Y	6 of 6	W	MC*	Yes
In Compliance			53	49	49	53	49	53	47			47

Legend

N = Not in compliance
Y = In full compliance
Y^P = Provisional compliance
FAIS = Fixed Asset Inventory System

W= Web-based Computerized Maintenance Management System
L = Local Area Network (LAN) Computerized Maintenance Management System
* = Use MC (Maintenance Connection) through SERRC Service Contract
Bold - Site visit pending

"Year of Next Visit" dates are subject to change at the department's discretion. School Districts will be notified in a timely manner if scheduled visit dates listed on this report are altered.

Department of Education & Early Development
Division of Finance Support Services
REAA Fund

As of:
Monday, July 29, 2019

	FY2013	FY2014	FY2015	FY2016	FY2017	FY2018	FY2019	FY2020	Total
Deposits:									
REAA Fund Capitalization	35,512,300	35,200,000	39,921,078	38,789,000	31,230,000	40,640,000	39,661,000	19,694,500	280,647,878
Interest Earned (Actual as of 7/7/17)	118,206	368,142	383,180	-	-	-	-	-	869,528
Subtotal Deposits	35,630,506	35,568,142	40,304,258	38,789,000	31,230,000	40,640,000	39,661,000	19,694,500	281,517,406
REAA-funded Capital Project Funded Projects:									
Nightmute School Renovation/Addition	-	32,965,301							32,965,301
Kuinerramiut Elitnaurviate K-12 Renovation/Addition, Quinhagak	-	13,207,081						(5,041,059)	8,166,022
Kwethluk K-12 Replacement School	-	25,008,100	31,516,900					(10,000,000)	46,525,000
St. Mary's Andreafski High School Gym Construction	-	-	8,958,100						8,958,100
Bethel Regional High School Multipurpose Addition	-	-	-	-	7,129,765				7,129,765
Lewis Angapak K-12 School Renovation/Addition, Tuntutuliak	-	-	-	-	40,343,416	704,620			41,048,036
Jimmy Huntington K-12 Renovation/Addition, Huslia	-	-	-	-	15,394,787	980,000			16,374,787
Shishmaref K-12 School Renovation/Addition	-	-	-	-	-	16,184,008	490,000		16,674,008
J Alexie Memorial K-12 School Replacement, Atmautluak	-	-	-	-	-	3,261,667	39,556,086		42,817,753
Auntie Mary Nicoli Elementary School Replacement, Aniak	-	-	-	-	-	18,641,380			18,641,380
Eek K-12 School Renovation/Addition	-	-	-	-	-	-	2,481,373	34,450,733	36,932,106
St. Mary's Campus Upgrades Ph2	-	-	-	-	-	-	3,449,928		3,449,928
Hollis K-12 School Replacement	-	-	-	-	-	-	-	672,793	672,793
Subtotal REAA-funded Projects	-	71,180,482	40,475,000	-	62,867,968	39,771,675	45,977,387	20,082,467	*280,354,979*
Reconciliation of Available Funds:	**35,630,506**	**18,166**	**(152,576)**	**38,636,424**	**6,998,456**	**7,866,781**	**1,550,394**	***1,162,427***	***1,162,427***

CIP Grant Requests and Funding History FY10 to FY20

CIP Grant Requests

	FY2010	FY2011	FY2012	FY2013	FY2014	FY2015	FY2016	FY2017	FY2018	FY2019	FY2020
Total Applications	185	175	158	158	137	121	126	127	131	105	86
Percent of Districts Applying	73%	73%	72%	64%	66%	64%	66%	68%	70%	58%	51%
# Projects Reusing Scores	24	35	45	20	52	23	57	27	67	39	24
Major Maintenance	138	130	117	120	111	102	102	98	107	84	72
MM Total $ [*]	$269,627,387	$272,421,065	$275,132,938	$267,017,375	$253,682,082	$183,505,181	$172,195,526	$181,570,096	$164,887,094	$142,892,281	$114,437,031
School Construction	32	35	32	27	24	17	18	18	15	11	11
SC Total $ [*]	$453,149,071	$411,643,149	$313,999,772	$276,691,304	$284,133,432	$274,150,436	$230,920,120	$206,267,345	$123,294,419	$179,214,343	$190,238,739

Notes:

[*] Total $ is State Share

School Construction and Major Maintenance Funding

	FY2010	FY2011	FY2012	FY2013	FY2014	FY2015	FY2016	FY2017	FY2018	FY2019	FY2020
Grant Projects Funded	$42,443,481	$155,901,830	$87,765,592	$78,952,700	$94,171,539	$43,279,791	$56,728,592	$74,715,471 [1]	$53,177,429 [1]	$82,665,391 [1]	$42,489,249
Percent Grant $ Funded	5.9%	22.8%	14.9%	14.5%	17.5%	9.5%	14.1%	8.6%	17.3%	15.5%	13.9%
Debt Projects	$29,805,834 [2]	$90,251,551 [3]	$409,400,183 [3]	$78,525,000 [3]	$138,622,000 [3]	$13,353,394 [3]	$0	$0	$0	$0	$0

Notes:

Prepared August 26, 2019

Grant Projects Funded includes all reappropriated or reallocated funding, including grant funding from prior fiscal years.

[1] Includes AS 14.11.025 grants

[2] HB13,HB373 debt projects DEED & voter approved

[3] SB237 debt projects DEED & voter approved, effective 7/1/2010 - 12/31/2014

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

By: Tim Mearig
Facilities Manager

Phone: 465-6906

For: Bond Reimbursement & Grant Review Committee

Date: August 26, 2019

File: G:\SF Facilities\BR_GRCom\Papers\Publications\Condition Survey\Condition Survey Cvr Briefing Paper.docx

Subject: Guide for School Facility Condition Surveys – 2019 Ed.

B R I E F I N G P A P E R

Background

Department guidance on school facility condition surveys was originally published in 1995 as a paper only document titled *Education Facility Condition Survey*. This document was "borrowed" from a then-current member of the BR&GR Committee, Harley Hightower. In 1997, in collaboration with Mr. Hightower, the department published an updated electronic version of the document titled *Guide for School Facility Condition Surveys*. After 20 years of service, a draft update was started by the department's Facilities Manager in 2011 and worked on through 2012, but it was never finalized. A schedule for publications updates was created in 2016; that schedule aimed at an updated edition to this guide in late 2019. However, the current effort to update this publication is somewhat undefined and ambiguous.

Discussion

Facility condition surveys or condition assessments are the backbone of every capital project with the possible exception of those projects accomplishing 100% new work. Despite this truism, there is no industry consensus standard or single best-practice document for this work element. As mentioned in Background, the current 1997 document was less about what was intentional and more about what was available. As a result, of all the DEED handbooks and guidelines, the *Guide for School Facility Condition Surveys* has the least amount of actual guidance and functions, primarily, as tool for use if nothing else is available. In preparing for an update of the publication/tool, the following assessment frames the opportunities for improvement that may be available.

1997 Document Analysis

1. Provides an adequate tool but its use requires considerable patience and attention to detail, both in the field and in the office;
2. The room-by-room format can be cumbersome to use in larger schools and education related facilities;
3. Format and structure have no particular alignment with other DEED publications such as the Cost Model, CostFormat, LCCA Handbook, and other building system based documents;
4. The final record, with its checklist/tabular format, suggests robust data; however, due to the word processing-based platform, information doesn't translate to data or quantification (i.e., numbers of deficient components, square footage of deficient materials, etc.);

5. Though it provides opportunity for narrative descriptions of systems and conditions, the format drives a "check-the-box-and-done" mentality;
6. There is very little provision for documentation through photographs;
7. After 25+ years, some survey elements are dated, particularly in areas of infrastructure and technology but also playgrounds and other ancillary areas;
8. Could include specific provisions/tests for ADAAG accessibility instead of 'suggesting' a separate survey be done and attached;
9. Site Civil is limited and does not include questions specific to geotechnical issues.

Some of these items could be addressed in a typical 'update'. A first draft of such an update is provided in your packet. The more significant shortfalls, however, such as data-weakness, would require a migration of the tool to a different platform such as a database, or at a minimum a platform that would allow some computation, such as a spreadsheet. Either of these would require investment of significant time, effort, and possibly funding.

In 2011, the department's Facilities Manager began researching and developing an alternative tool in response to items three and five on the preceding deficiency list. This tool stayed with the common word processing-based platform but reoriented the information presented into a more narrative structure organized by building system. The basic structure within each section was to narrate: 1) a description of the existing system, 2) the code deficiencies noted during the survey, and 3) the recommendations for correcting deficiencies. Absent from this format is a designated location for costs, both detailed and aggregated. A sample of this document is provided in the packet.

Options

Option 1: Incremental Update

This option would provide an updated 2nd edition of the 1997 publication but use the same basic word processing checklist-based structure. Items five through nine of the 'opportunities' listing would be the focus of the update. Additional feedback could be sought regarding the content of each checklist and/or additional checklists.

Option 2: Conversion to Database or Spreadsheet

This option would develop a data-centric tool with input forms for the 'checklists' and a series of queries and reports to compile the survey conditions. This type of tool lends itself to continuous update and metrics such as Facility Condition Index (FCI). Although I think the department could create, with some time and training, a workable tool under this option, it's worth noting that there are several commercial software packages available which are oriented toward this condition assessment strategy.

Option 3: Switch to Narrative Template

This option would sunset the 1997 publication and provide a new condition survey tool with a more narrative structure. In developing this tool some enhanced features should be considered. Close alignment with the department's cost-oriented publications should be achieved. Specific consideration should be given to how photographic documentation could be incorporated. One caveat for this option would be a recognition that many design firms already have a similar narrative-style format they use to provide condition surveys for clients.

Recommendation(s)

The Facilities section has no preference among the presented options at this time. There may also be additional options such as development of both a checklist-based and narrative-based format but moving in all formats to better alignment with the department's building system based standard.

Guide for School Facility Condition Surveys

PRIMARY CONTRIBUTOR	~~Harley Hightower~~Tim Mearig, AIA Architect ~~LCMF, Inc.~~ Alaska Department of Education & Early Development ~~Anchorage~~ Juneau, Alaska
CONTRIBUTORS	~~Tim Mearig, AIA~~Larry Morris Architect Assistant Alaska Department of Education & Early Development Juneau, Alaska
	~~Edwin Crittenden, FAIA~~ ~~Educational Facilities Consultant~~ ~~Alaska Department of Education~~ ~~Anchorage, Alaska~~
	~~Michael Morgan, PMP~~ ~~Facilities Manager~~ ~~Alaska Department of Education~~ ~~Juneau, Alaska~~ Facilities Staff Alaska Department of Education & Early Development

ACKNOWLEDGEMENTS
Thanks to the Bond Reimbursement and Grant Review Committee members who reviewed the original publication in its draft form and a special thank-you to Harley Hightower for his contribution of the original format and his creation of the specific building system checklists.

Originally published in a limited quantity in June, 1995 by the State of Alaska, Department of Education as *Educational Facility Condition Survey*.

Table of Contents

Directions for Use

Introduction

This publication is provided for convenience to establish a minimum requirement for evaluating facilities. The use of this document is not mandatory. Other forms and documents providing this information are acceptable.

The condition survey should begin by reviewing of record documents and completion of a code analysis prior to the on-site survey. After the on-site inspection, the condition survey should describe the overall condition of the facility, the age and condition of the facility components, any code issues and cost estimates for any deficiencies in condition, age, or code. The condition survey should be able to assist the school district in developing a cost--effective plan for renovation of the facility or component replacement. The survey should also assist the district in communicating those needs to the public and/or government agencies.

It is anticipated that the condition survey will be accomplished by a team of professionals and/or tradespersons with the necessary expertise to assess the various areas. However, with the exception of the **Regulatory Data** section, most of the checklists could be utilized by experienced maintenance personnel which that districts may have on staff.

Formatting

This document is designed to be be not only a guide in developing a condition survey., Included is a general outline for a typical condition survey. Also included are checklists to assist in information gathering and inspections. describing areas of potential concern, but also a source of working checklists for use in actually performing a condition survey. AThe final condition survey should include checklists of facility components that can report may either be produced "manually" by filling out information directly on a paper copy or "electronically" by recording information ondownloading a the interactive copy of the electronic file and printing a paper copydirectly imputing inspection results. Instructions for using the checklists will beare included in aAppendix A.In either case, the checklist headers, footers and numbering should be adjusted to show the specific information obtained on the building assessed. Some checklist pages such as Exterior Doors and Interior Rooms are expected to be used many times in the report (i.e. one for each item or space). Sequential numbering for these checklists is provided by a letter suffix. If more than 26 checklists are needed for any one category, devise a supplemental numbering system which is workable for your report. Some sample pages of what a final report should look like follow these directions.

Section 1 - **Condition Survey Record** is self self-explanatory. The information matches much of that found in the CEFPI School Facility Appraisal Guide's **Building Data Record**.

Section 2 - **Regulatory Data**: Codes used for evaluating the facilities shall be referenced. The data listed in the form is not all inclusive and each facility requires analysis based on the particular design and construction. Any code information or discrepancies noted should be provided with code references including title, edition, chapter, section, paragraph, and sub-paragraph.

Survey, reports, and other documentation such as ADA Surveys, AHERA Surveys, Fire Marshal Inspection Reports, and similar documentation shall be referenced under this section of the survey and attached as an appendix if available. Results of these surveys and studies shall be considered in the recommendations and cost summary.

Section 3 - **Site Data**: This section provides for the evaluation of general site conditions as well as areas and equipment which support athletics and play. The latter portion addresses the civil engineering and utility requirements of the building. The use of this section is self--explanatory.

Section 4 - **Building Envelope/Structure**: Several forms work together to assess the complete architectural and structural exterior features and systems. In complex buildings, the building should be broken down into discrete areas (e.g. wings, etc.) and separate information obtained for each area. In addition, changes in materials or structural systems may require a separate form be generated. Use as many forms as is necessary.

Section 5 - **Interior Spaces**: This section is intended to capture all interior information on a room-by-room basis. Three basic types of forms are included: a form for a general room with standard amenities (e.g. classrooms, administrative offices, etc.), a form for general rooms with the addition of plumbing elements (e.g. science labs, art rooms, janitor rooms, etc.) and several forms customized for special use spaces including Corridors/Commons, Kitchens, Shops, Locker Rooms/Restrooms, Auditoriums and Gymnasiums. If additional special use forms are needed (for example, media center, etc.), create one from the other forms or request assistance from the Department's Facilities staff.

Section 6 - **Mechanical**: This section covers general mechanical systems found in various areas of a building. It also uses a form for Mechanical Rooms to gather significant information on the heating, cooling, and ventilation systems supplying the building's spaces. Information gathered in Section 5 will augment the information in this section. However, the basic principle is that Section 5 is limited to the visual aspects of the appurtenances of the mechanical systems whereas Section 6 will address the functionality and support for the appurtenance. This section also deals with some specific regulatory data not covered in Section 2

Section 7 - **Electrical**: This section covers electrical systems in similar fashion as Section 6 treats mechanical systems. Information gathered in Section 5 will augment the information in this section. Again, the basic principle is that Section 5 is limited to the visual aspects of the appurtenances of the electrical systems whereas Section 7 will address the functionality and support for the appurtenance. This section, too, deals with some specific regulatory data not covered in Section 2.

Findings and Cost

Upon completion of the condition survey, recommendations shall be provided for all discrepancies and upgrades described. Cost associated with each discrepancy and upgrade shall be provided. A condition survey submitted without costs associated with each discrepancy will be considered incomplete.– Each recommendation shall reference the corresponding item contained in the

Condition Survey by section, paragraph, and sub-paragraph designations. A sample page of a Recommendations narrative is included in the examples in the following section.

Supplement and Appendices

Supplements may be included in an Appendix to the Condition Survey report. Appendices may include subjects such as special inspections, engineering calculations, photographs, drawings, Estimate worksheets, and etc. Floor plans, with building area designations, room identification and door numbers used in the checklists are encouraged.

The checklists, as shown, are very limited in their provision of comment areas. Comments should be added and used as required to explain conditions and/or cover subjects that are not included in the evaluation form. When using the manual method, attach additional sheets. If the checklists in this document are modified electronically, extensive comments may simply be typed into the checklist form (see examples).

Disclaimer

This guide is not considered all inclusiveall-inclusive and should be added to based upon the design and construction of each facility and on the structure's condition. Subjects contained in this survey form that are not applicable may also be deleted.

Input is requested from users of this Condition Survey relative to its improvement.

The State of Alaska, Department of Education and Early Development provides this School Facility Condition Survey as a convenience and assumes no liability for its use.

Examples

Excerpts from a completed School Condition Survey are attached on the following five pages to show the examples of the evaluation and summary forms.

Site Data Cont. 3.3

5. Site Utilities

a. Water

Supply Source ■ Well ☐ River ☐ Lake ☐Lagoon
☐ Rainwater Collection ☐ Water Haul

Distance from Building ___220ft___

Condition ■ Good ☐ Fair ☐ Poor

b. Water Treatment Plant ☐ None ■ Provided

Type: Sediment Filter_ Capacity ___200gal._____

Condition ☐ Good ■ Fair ☐ Poor

c. Wastewater

Type ☐ Primary ■ Secondary ☐ Waste Storage/Haul

Discharge ■ Lagoon ☐ Holding Tank ☐ Other

Design Data Capacity________ Average Daily________ Daily Peak_______

Characteristics BODs5__________

d. Natural/LP Gas ■ None ☐ Provided

Serving ☐ Kitchen ☐ Home Economics ☐ Shop ☐ Other

Condition ☐ Good ☐ Fair ☐ Poor

e. Fuel Oil ☐ None ■ Provided

Capacity: 32,000gal. Duration (Days): 60 days

Distance (From Building): 155 feet

Condition ☐ Good ■ Fair ☐ Poor

f. Comments: Site utilities are well maintained though age is beginning to make this effort very difficult. No major difficulties in water supply have been experienced. Wastewater treatment is marginal; equipment replacement will be required within 5 years. Fuel oil represents some hazard with leaks at threaded pipe joints occurring during freeze/thaw cycles.

6. Miscellaneous

a. Satellite Dish ☐ None ■Provided

Condition ☐ Good ■ Fair ☐ Poor

b. Vehicle Storage Structure ■ None ☐ Provided

Type ________

Condition ☐ Good ☐ Fair ☐ Poor

Building Envelope/Structure 4.1

1. Foundation Type

a. Construction ☐ Reinforced Concrete ■ Timber Pile ☐ Steel Pile
☐ All Weather Wooden Concrete Footing
☐ Masonry On Concrete Footing
☐ Mud Sills ☐ Other:

b. Area of Building: Gymnasium addition in 1977 (Area B on attached floor plan diagram)

2. Components

a. Footing ■ N/A ☐ Provided ☐ Size/Material____________________

Condition:			
	Cracks	☐ Yes	☐ No
	Unsupported areas	☐ Yes	☐ No
	Rot/Decay	☐ Yes	☐ No
	Water Penetration	☐ Yes	☐ No

Comments: ____

b. Post/Pile ☐ N/A ■ Provided ■ Size/Material: Treated, 12" diameter

Condition:			
	Cracks	☐ Yes	■ No
	Heaving/Jacking	■ Yes	☐ No
	Rot/Decay	☐ Yes	■ No

Comments: Previous reports have questioned the reliability of the passive heat pumps that maintain the integrity of the permafrost and the structural requirements for the foundation. The thermoprobes were inspected as part of this condition survey with air temperatures as summarized in Appendix E.

Of the 63 thermoprobes, 13 were operating with indicated temperatures from +6.0 to +17.1 °F. Non-operating probes varied in indicated temperatures from -11.9 to +2.0 °F in the shade with one non-operating probe in the sun indicating +2.1°F. Temperatures were based on assumed emissivity of 0.95. Radiators had varying degrees of rust with accumulations of silt and organic matter caught between the fins; limiting air flow across the fins. These accumulations and rust reduce the heat transfer capacity to an estimated 30-85% of design capacity.

The lower end of the radiators had insufficient support, and, as a result, the upper end of the ¾ inch copper evaporator has a reverse grade on 13 units. Eleven non-operating units and two operating units had reverse grades. Reverse grades reduce the performance of the units to one-fourth of what it would be otherwise. Five units had kinked copper tubing which would further reduce heat transfer out of the ground. One radiator was lying on the ground without support. Thermocouples appear in good condition though female plugs require cleaning.

c. Stem wall ■ N/A ☐ Provided ☐ Size/Material____________________

Condition:				
	Cracks	☐ Yes	☐ No	
	Unsupported Areas	☐ Yes	☐ No	
	Rot/Decay		☐ Yes	☐ No
	Water Penetration	☐ Yes	☐ No	

Building Envelope/Structure. 4.1

FOUNDATIONS - PAGE 2

Comments: ______________________________

d. Water/Dampproof ■ N/A ☐ Provided ☐ Size/Material____________
Condition: ☐ Good ☐ Fair ☐ Poor

Comments: ______________________________

e. Insulation ■ N/A ☐ Provided ☐ Size/Material____________
Condition: ☐ Good ☐ Fair ☐ Poor

Comments: ______________________________

f. Flashings ■ N/A ☐ Provided ☐ Size/Material____________
Condition: ☐ Good ☐ Fair ☐ Poor

Comments: ______________________________

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Recommendations

General

Narrative information, recommendations and costs are discussed in the order that they are described in the preceding school facility condition survey forms. Each item is cross-referenced by the section, paragraph and subparagraph number to the survey forms.

Deficiencies Requiring Corrective Action

Item	*cf*	Recommendation	Cost
1. *Stack in Boiler Room*: Review of the record drawings indicate that the boiler stack extends through the roof structure in an unprotected manner. The UBC-91, Table 17A requires one-hour protection of vertical shafts and the UMC-91 requires one-hour protection of boiler stacks.	2.1, A, 13a	*Provide an enclosure for one-hour protection of the boiler stack where it penetrates the ceiling/roof structure.*	$6,500
2. *Draft Stops*: The UBC-91, Sec. 2516(f) requires draft stops in the attics for each 3000sf of area and not to exceed 60' horizontally. Review of record drawings indicates draft stops are not provided.	2.1, A, 13a	*Provide draft stops in accordance with UBC requirements.*	$12,000
3. *Unrated Corridor Walls*: The walls between the classroom and the multipurpose room and exit corridors are not constructed in accordance with one-hour requirements. The walls have one layer of 5/8" gypsum board on each side of framing, however, the gypsum board does not continue above the corridor ceiling. The ceiling is not fire rated.	2.1, A, 16b	*An additional layer of 5/8" gypsum board could be applied to the corridor ceiling or to the wall portions above the ceiling. The ceiling application is probably the most cost effective.*	$15,000

Item	*cf*	Recommendation	Cost
4. *Thermoprobe Inspection*: A detailed inspection of the passive heat pumps was conducted and the results are outlined in the condition survey.	4.1, 2b	*Reconditioning of the system for an anticipated 20 year life under 1a) or 50 years for 1b) as follows:* *1a) Clean all radiators of debris and rust on site, repaint, pressure test, repair where necessary and recharge with CO_2.* *1b) Remove all radiators, transport to Anchorage, sandblast, aluminum coat, fusion epoxy coat, return to site, reconnect to evaporators, pressure test and recharge with CO_2.* *2) Evaporators should be extended to raise bottom of radiator above floor level and should be checked for volume. Leaking probes may have ice accumulations in the evaporator which will permanently reduce evaporator capacity in a few probes.* *3) Thermocouples should be checked in late summer along with probe temperatures (from absolute pressures) to better define any subsurface water channels that may have developed during flooding.* *4) Clean thermocouple with a small caliberrifle brush.* *5) For raising the elevation of the building if 1a) is selected, evaporator copper tubing would be cut between the radiator and ground surface and sealed to prevent moisture infiltration. The exposed tubing and cap should be spray painted with reflective orange paint. They should also be protected during building lifting operations. After lifting is completed, evaporator cap would be removed, tubing extended, refinished radiators connected, units pressure tested, recharged and pressures maintained.*	Solution 1a: $58,700 Solution 1b: $93,690

Item	*cf*	Recommendation	Cost
5. *Seismic and Wind Design*: Based on the structural calculations attached as Appendix C, the structure appears adequate relative to seismic and wind design. The roof is slightly under-designed for current snow load criteria based on very conservative data.	4.1, 3	*Costs are not provided for corrective action on this data.*	Unk.
6. *Door 102 Smoke Gasketing and Latch*: Door requires tight-fitting door with smoke gasketing for conformance with UBC-91, Sec. 3305(g).	4.4a	*Provide smoke gasketing and latching hardware (panic hardware type on this door)*	$1,000
7. *Door 102A Smoke Gasketing and Latch*: Door requires tight-fitting door with smoke gasketing for conformance with UBC-91, Sec. 3305(g).	4.4b	*Provide smoke gasketing and latching hardware (panic hardware type on this door)*	$1,000

Appendix A – Condition Survey Forms

Condition Survey Record 1.1

Survey Information

Participants/Team

Contact Information

______________________________	____
______________________________	____
______________________________	____
______________________________	____

Dates of Survey: _______________ to _______________

District Information

District Name: ____

Address:____

____

____

Telephone: ____

Superintendent: ____

Maintenance Director: _____________________________________

Facility Information

Name of School: ____

Address: ____

____

____

Telephone: ____

Principal: ____

Plant Manager: ____

Original Construction	_____________GSF	_______________YR
1st Addition	_____________GSF	_______________YR
2nd Addition	_____________GSF	_______________YR
3rd Addition	_____________GSF	_______________YR

Gross Area: _______________________________________

Grades Served: _______________________________________

Comments:

A. UNIFORM BUILDING CODE DATA (19xx Edition)

1. OCCUPANCY CLASSIFICATION(S)______________

2. TYPE OF CONSTRUCTION____________________

3. LOCATION OF PROPERTY (SETBACK FROM PROPERTY LINE)

North	East	South	West
________	________	_______	_______

4. FIRE RESISTANCE OF EXTERIOR WALLS

	Provided	Allowed	Opening Protection
N	_________	_________	__________
S	_________	_________	__________
E	__________________	__________	
W	________	_________	__________

5. FLOOR AREA

Provided	Allowed
________	________

6. AREA SEPARATIONS

Required	Provided
________Hour	________Hour

7. HEIGHT/STORIES

Provided	Allowed
________	________

8. MIXED OCCUPANCY

$$\frac{\text{Actual Group X}}{\text{Allowable Group X}} + \frac{\text{Actual Group E}}{\text{Allowable Group E}} < 1 \quad \frac{X = \text{------ S.F}}{X = \text{------ S.F.}} + \frac{E = \text{----- S.F.}}{E = \text{----- S.F.}} < 1$$

9. SPECIAL HAZARDS

a. Labs, shops, and similar areas separated by one hour occupancy separations
☐ Provided ☐ Not Provided

b. Labs in excess of 200 square feet provided with two exits
☐ Provided ☐ Not Provided

c. Distance to exits in labs
Provided________ Allowed 75' Maximum

d. Exterior openings in boiler rooms
Protected ☐ Yes ☐ No / Distance from doors or windows _______feet

e. Boiler Room separated by one hour occupancy separation
☐ Provided ☐ Not Provided

10. FIRE ALARM REQUIRED

☐ Provided ☐ Not Provided

11. OCCUPANCY SEPARATIONS

a. Group E - Div.________/Group________Div._________

Required ________Hour Provided ________Hour

b. Group A - Div.________/Group________Div._________

Required ________Hour Provided ________Hour

12. AREA SEPARATIONS

Required For Each ___________Square Feet
Required ________(No.) Provided_________(No.)

13. FIRE RESISTIVE REQUIREMENT (For various occupancies)

a. Group E - Div.________/Group________Div._________

	Required	Provided
Exterior Bearing Walls	_________Hour	_________Hour
Interior Bearing Walls	_________Hour	_________Hour
Exterior None Bearing Walls	_________Hour	_________Hour
Structural Frame	_________Hour	_________Hour
Permanent Partitions	_________Hour	_________Hour
Shaft Enclosures	_________Hour	_________Hour
Floors & Ceiling/Floors	_________Hour	_________Hour
Exterior Doors & Windows	_________Hour	_________Hour
Stairway Construction	_________Hour	_________Hour

b. Group A - Div.________/Group________Div._________

	Required	Provided
Exterior Bearing Walls	_________Hour	_________Hour
Interior Bearing Walls	_________Hour	_________Hour
Exterior None Bearing Walls	_________Hour	_________Hour
Structural Frame	_________Hour	_________Hour
Permanent Partitions	_________Hour	_________Hour
Shaft Enclosures	_________Hour	_________Hour
Floors & Ceiling/Floors	_________Hour	_________Hour
Exterior Doors & Windows	_________Hour	_________Hour
Stairway Construction	_________Hour	_________Hour

14. DOORS (Analyze doors for ratings in area separations, occupancy separations, and rated exitways)

15. DRAFT STOPS

    ☐ Provided ☐ Not Provided

16. FIRE STOPS

    ☐ Provided ☐ Not Provided

17. EXITS (FROM BUILDING)

Number:__________	Required __________	Provided __________	
Distance:	__________	Required (Maximum)___	Provided __________
Width:	__________	Required __________	Provided __________

18. EXITS (GENERAL)

    (Analyze exits from each floor and each room)

19. PLUMBING FIXTURES

a.	Water Closets: _______	Required _________	Provided __________
b.	Lavatories: __________	Required _________	Provided __________
c.	Urinals: ____________	Required _________	Provided __________
d.	Drinking Fountains:___	Required _________	Provided __________

20. AUTOMATIC FIRE EXTINGUISHING SYSTEM

    (Analyze Requirements)

21. STAGES AND PLATFORMS

    (Analyze Requirements)

22. FIRE EXTINGUISHERS

    _________No. Required __________No. Provided

23. AUTOMATIC FIRE SUPPRESSION SYSTEM

    ☐ Required ☐ Not Required
    ☐ Provided ☐ Not Provided

B. <u>AHERA SURVEY</u>

Completed	☐Yes	☐No
Attached	☐Yes	☐No

C. <u>ADA SURVEY</u>

Completed	☐Yes	☐No
Attached	☐Yes	☐No

1. General Site Information

a. Area (Size of Site) __________ S.F. ________ Acres

b. Topography ☐ Flat ☐ Sloping ☐ Hilly
Drainage ☐ Good ☐ Fair ☐ Poor

c. Pavement ☐ None ☐ Concrete ☐ Asphalt
Condition ☐ Good ☐ Fair ☐ Poor

d. Side Walks ☐ None ☐ Concrete ☐ Asphalt
☐ Wood ☐ Gravel
Condition ☐ Good ☐ Fair ☐ Poor

e. Landscaping ☐ Well Maintained ☐ Average ☐ Not Maintained
Trees ☐ None ☐ Birch ☐ Alder ☐ Willow
☐ Spruce ☐ Cottonwood ☐ Black Spruce ☐ Other

f. Fencing ☐ None ☐ Chain Link ☐ Wood (Type)
Finish ☐ Galvanized ☐ Painted ☐ Semi Transparent Stain
☐Solid Body Stain ☐ Other
☐ Condition ☐ Fair ☐ Poor

g. Comments____

____

2. Athletic Fields

a. Softball Field ☐ None Number
Condition ☐ Good ☐ Fair ☐ Poor

b. Baseball Field ☐ None Number
Condition ☐ Good ☐ Fair ☐ Poor

c. Hockey Rink ☐ None Number
Condition ☐ Good ☐ Fair ☐ Poor

d. Football Field ☐ None Number
Condition ☐ Good ☐ Fair ☐ Poor

e. Softball Field ☐ None Number
Condition ☐ Good ☐ Fair ☐ Poor

f. Comments ____

____

3. Playground Equipment

a. Swings ☐ None Number
Condition ☐ Good ☐ Fair ☐ Poor

b. Slides ☐ None Number
Condition ☐ Good ☐ Fair ☐ Poor

c. Parallel Bars ☐ None Number
Condition ☐ Good ☐ Fair ☐ Poor

d. Balance Beam ☐ None Number
Condition ☐ Good ☐ Fair ☐ Poor

e. Horizontal Ladders ☐ None Number
Condition ☐ Good ☐ Fair ☐ Poor

f. Horizontal Bars ☐ None Number
Condition ☐ Good ☐ Fair ☐ Poor

g. Climbing Pole ☐ None Number
Condition ☐ Good ☐ Fair ☐ Poor

h. Merry-Go-Round ☐ None Number
Condition ☐ Good ☐ Fair ☐ Poor

i. Other ☐ None Number
Condition ☐ Good ☐ Fair ☐ Poor

j. Comments ____

____

4. Site Utility (Municipal or Utility Company Provided)

a. Water Service Line Size __________ Type __________
Condition ☐ Good ☐ Fair ☐ Poor

b. Sewer Waste Line Size __________ Type __________
Condition ☐ Good ☐ Fair ☐ Poor

c. Natural Gas Service Line Size __________ Type __________
Condition ☐ Good ☐ Fair ☐ Poor

d. Electricity ☐ Overhead ☐ Underground
Service _____Amps _______Volts _______Phase

e. Meter Number
Condition ☐ Good ☐ Fair ☐ Poor

f. Comments ____

5. Site Utilities (Site Generated/Provided)

a. Water
- Supply Source ☐ Well ☐ River ☐ Lake ☐ Lagoon
- ☐ Rainwater Collection ☐ Water Haul
- Distance from Building ___________
- Condition ☐ Good ☐ Fair ☐ Poor

b. Water Treatment Plant ☐ None ☐ Provided
- Type Capacity _________
- Condition ☐ Good ☐ Fair ☐ Poor

c. Wastewater
- Type ☐ Primary ☐ Secondary ☐ Waste Storage/Haul
- Discharge ☐ Lagoon ☐ Holding Tank ☐ Other
- Design Data Capacity_________ Average Daily_________ Daily Peak________
- Characteristics BODs5___________

d. Natural/LP Gas ☐ None ☐ Provided
- Serving ☐ Kitchen ☐ Home Economics ☐ Shop ☐ Other
- Condition ☐ Good ☐ Fair ☐ Poor

e. Fuel Oil ☐ None ☐ Provided
- Capacity Gallons Duration (Days)
- Distance (From Building)
- Condition ☐ Good ☐ Fair ☐ Poor

f. Comments ____

____

6. Miscellaneous

a. Satellite Dish ☐ None ☐Provided
- Condition ☐ Good ☐ Fair ☐ Poor

b. Vehicle Storage Structure ☐ None ☐ Provided
- Type _________
- Condition ☐ Good ☐ Fair ☐ Poor

FOUNDATIONS

1. Foundation Type

a. Construction
☐ Reinforced Concrete ☐ Timber Pile ☐ Steel Pile
☐ All Weather Wooden Concrete Footing
☐ Masonry On Concrete Footing
☐ Mud Sills ☐ Other:

b. Area of Building ____

____

2. Components

a. Footing		☐ N/A	☐ Provided	☐ Size/Material________	
Condition:	Cracks			☐ Yes	☐ No
	Unsupported areas			☐ Yes	☐ No
	Rot/Decay			☐ Yes	☐ No
	Water Penetration			☐ Yes	☐ No

Comments: ____

b. Post/Pile		☐ N/A	☐ Provided	☐ Size/Material________	
Condition:	Cracks			☐ Yes	☐ No
	Heaving/Jacking			☐ Yes	☐ No
	Rot/Decay			☐ Yes	☐ No

Comments: ____

c. Stem wall		☐ N/A	☐ Provided	☐ Size/Material________	
Condition:	Cracks			☐ Yes	☐ No
	Unsupported Areas			☐ Yes	☐ No
	Rot/Decay			☐ Yes	☐ No
	Water Penetration			☐ Yes	☐ No

Comments: ____

d. Water/Dampproof	☐ N/A	☐ Provided	☐ Size/Material________
Condition:	☐ Good	☐ Fair	☐ Poor

Comments: ____

e. Insulation	☐ N/A	☐ Provided	☐ Size/Material________
Condition:	☐ Good	☐ Fair	☐ Poor

Comments: ____

f. Flashings	☐ N/A	☐ Provided	☐ Size/Material________
Condition:	☐ Good	☐ Fair	☐ Poor

Comments: ____

STRUCTURAL FLOOR

1. Floor Structure Type

a. Construction
- ☐ Reinforced Concrete Slab On Grade
- ☐ Reinforced Structural Concrete Slab On Grade
- ☐ Concrete/Metal Deck/Metal Joists
- ☐ Plywood Deck On Wood Trusses
- ☐ Plywood Deck On Wood Joist
- ☐ Concrete Deck On Plywood On Wood Structure
- ☐ Other:

b. Area of Building ____

____

2. Components

a. Beams ☐ N/A ☐ Provided ☐ Size/Material____________________

Condition:			
	Cracks	☐ Yes	☐ No
	Unsupported ends	☐ Yes	☐ No
	Rot/Decay	☐ Yes	☐ No
	Deflection	☐ Yes	☐ No

Comments: ____

b. Joists ☐ N/A ☐ Provided ☐ Size/Material____________________

Condition:			
	Cracks	☐ Yes	☐ No
	Unsupported ends	☐ Yes	☐ No
	Rot/Decay	☐ Yes	☐ No
	Deflection	☐ Yes	☐ No

Comments: ____

c. Deck ☐ N/A ☐ Provided ☐ Size/Material____________________

Condition:			
	Cracks	☐ Yes	☐ No
	Deflection	☐ Yes	☐ No
	Rot/Decay	☐ Yes	☐ No

Comments: ____

d. Insulation ☐ N/A ☐ Provided ☐ Size/Material____________________

Condition: ☐ Good ☐ Fair ☐ Poor

Comments: ____

e. Vapor Barrier ☐ N/A ☐ Provided ☐ Size/Material_________________

Condition: ☐ Good ☐ Fair ☐ Poor

Comments: ____

Building Envelope/Structure 4.3x

EXTERIOR WALLS/COLUMNS

1. Exterior Wall Type

a. Construction ☐ Monolithic ☐ Post & Beam ☐ Light Frame

b. Material ☐ Concrete ☐ Masonry ☐ Steel
☐ Timber ☐ Wood ☐ Other:

c. Area of Building ____

____

2. Components

a. Exterior Cladding ☐ Concrete ☐ Masonry/Tile ☐ Metal. Panel
☐ Plaster ☐ Hardboard ☐ Wood Panel
☐ Wood (board) ☐ EIFS ☐ Other:

Condition:			
	Cracks/Gaps	☐ Yes	☐ No
	Adequate Flashing	☐ Yes	☐ No
	Rot/Decay	☐ Yes	☐ No
	Stains	☐ Yes	☐ No

Comments: ____

b. Exterior Trim ☐ Wood ☐ Hardboard ☐ Metal ☐ Other:

Condition:			
	Warping/Cracks	☐ Yes	☐ No
	Rot/Decay	☐ Yes	☐ No
	Stains	☐ Yes	☐ No

Comments: ____

c. Exterior Finish ☐ Paint ☐ Stain ☐ Clear Sealer

Condition:			
	Flaking	☐ Yes	☐ No
	Mold/Mildew	☐ Yes	☐ No
	Stains	☐ Yes	☐ No
	Deteriorated	☐ Yes	☐ No

Comments: ____

d. Insulation ☐ N/A ☐ Provided ☐ Size/Material____________________
Condition: ☐ Good ☐ Fair ☐ Poor

Comments: ____

e. Vapor Barrier ☐ N/A ☐ Provided ☐ Size/Material__________________
Condition: ☐ Good ☐ Fair ☐ Poor

Comments: ____

DOORS

1. Basic Information

a. Door No.__________ Size___________ Fire Rating________

b. Type ☐ Hinged Leaf ☐ Coiling ☐ Sectional ☐ Other:__________

2. Components

a. Door Unit ☐ Hollow Metal ☐ Aluminum ☐ Wood ☐ Other:__________

Condition:			
	Splits/Gaps	☐ Yes	☐ No
	Binding	☐ Yes	☐ No
	Rust/Decay	☐ Yes	☐ No
	Stains/Poor Finish	☐ Yes	☐ No

Comments: ____

b. Frame ☐ Hollow Metal ☐ Aluminum ☐ Wood ☐ Other:_________

Condition:			
	Loose	☐ Yes	☐ No
	Rust/Decay	☐ Yes	☐ No
	Stains/Poor Finish	☐ Yes	☐ No

Comments: ____

c. Weather-stripping ☐ N/A ☐ Provided ☐ Material______________________
Condition: ☐ Good ☐ Fair ☐ Poor

Comments: ____

d. Insulation ☐ N/A ☐ Provided ☐ Thickness/Material_______________
Condition: ☐ Good ☐ Fair ☐ Poor

Comments: ____

e. Hardware

Item	Provided	Type	Quantity	Condition: Good	Fair	Poor
Hinges	☐	___________	______	☐	☐	☐
Lockset	☐	___________	______	☐	☐	☐
Closer	☐	___________	______	☐	☐	☐
Kickplate	☐	___________	______	☐	☐	☐
Mullion	☐	___________	______	☐	☐	☐
Threshold	☐	___________	______	☐	☐	☐
Panic Bar	☐	___________	______	☐	☐	☐
Push/Pull	☐	___________	______	☐	☐	☐
Stop/Hold	☐	___________	______	☐	☐	☐

Comments ____

____

WINDOWS/LOUVERS

1. Basic Information

a. Window No.___________ Size____________ Fire Rating_________

b. Type ☐ Fixed ☐ Tilt/Turn ☐ Double Hung ☐ Single Hung
☐ Sliding ☐ Awning ☐ Combination ☐ Other:__________

2. Components

a. Glazing ☐ Single Pane ☐ Double Pane ☐ Triple Pane ☐ Wire
☐ Plastic ☐ Lexan ☐ Laminated ☐ Other:__________

Condition:

Breakage	☐ Yes	☐ No
Scratched/Unclear	☐ Yes	☐ No
Condensation	☐ Yes	☐ No
Poor Thermal Properties	☐ Yes	☐ No

Comments: ____

b. Frame ☐ Plastic ☐ Aluminum ☐ Wood ☐ Steel
☐ Alum. Clad ☐ Vinyl Clad ☐ Other:_________

Condition:

Binding	☐ Yes	☐ No
Rust/Decay	☐ Yes	☐ No
Stains/Poor Finish	☐ Yes	☐ No

Comments: ____

c. Weather-stripping ☐ N/A ☐ Provided ☐ Material________________________
Condition: ☐ Good ☐ Fair ☐ Poor

Comments: ____

e. Hardware

Item	Provided	Type	Quantity	Condition: Good	Fair	Poor
Hinges	☐	____________	_______	☐	☐	☐
Latches	☐	____________	_______	☐	☐	☐
Counter-weights	☐	____________	_______	☐	☐	☐
Other_________	☐	____________	_______	☐	☐	☐

Comments ____

3. Louvers

a. Material ☐ Steel ☐ Aluminum ☐ Wood ☐ Other:__________

Finish	☐	____________	_______	☐	☐	☐
Screen	☐	____________	_______	☐	☐	☐
Sealants	☐	____________	_______	☐	☐	☐
Other_________	☐	____________	_______	☐	☐	☐

Comments: ____

ROOF

1. Roof Structure Type

a. Construction
- ☐ Metal Deck on Metal Trusses/Joists
- ☐ Plywood or Lumber Deck On Wood Trusses/Joists
- ☐ Plywood or Lumber Deck on Metal Trusses/Joists
- ☐ Concrete on Metal Deck on Metal Trusses/Joists
- ☐ Other:___________________________________

b. Slope ________in 12

c. Area of Building: ____

2. Components

a. Beams		☐ Concrete	☐ Metal	☐ Wood	Other___________
Condition:	Unsupported Ends			☐ Yes	☐ No
	Rot/Decay			☐ Yes	☐ No
	Deflection			☐ Yes	☐ No

Comments: ____

b. Trusses/Joists		☐ Concrete	☐ Metal	☐ Wood	Other___________
Condition:	Unsupported Ends			☐ Yes	☐ No
	Rot/Decay			☐ Yes	☐ No
	Deflection			☐ Yes	☐ No

Comments: ____

c. Deck		☐ Concrete	☐ Metal	☐ Wood	Other___________
Condition:	Cracks			☐ Yes	☐ No
	Rot/Decay			☐ Yes	☐ No
	Deflection			☐ Yes	☐ No

Comments: ____

d. Roofing		☐ Preformed Metal Roofing	☐ Built Up	☐ Asphalt Shingle
		☐ Single Ply Membrane	☐ IRMA	☐ Other_________
Condition:	Failures/Splits/Cracks	☐ Yes	☐ No	☐ N/A
	Blistered	☐ Yes	☐ No	☐ N/A
	Corrosion	☐ Yes	☐ No	☐ N/A
	Deterioration	☐ Yes	☐ No	☐ N/A

Comments: ____

e. Penetrations	☐ Curbs	☐ Flashing Boots	☐ Pitch Pans	Other____________
Condition:	Deterioration	☐ Yes	☐ No	☐ N/A
	Corrosion	☐ Yes	☐ No	☐ N/A

Comments: ____

ROOF - PAGE 2

f. Insulation	☐ N/A	☐ Provided	☐ Size/Material___________________	
Condition:	☐ Good	☐ Fair	☐ Poor	

Comments: ____

g. Vapor Barrier	☐ N/A	☐ Provided	☐ Size/Material____________________	
Condition:	☐ Good	☐ Fair	☐ Poor	

Comments: ____

h. Roof Drains	☐ Interior	☐ Eave	☐ Gutter	☐ Other__________
Material	☐ Metal	☐ Wood	☐ Plastic	☐ Other__________
Condition: Missing Components		☐ Yes	☐ No	☐ N/A
Debris/Vegetation		☐ Yes	☐ No	☐ N/A
Corrosion		☐ Yes	☐ No	☐ N/A
Damage		☐ Yes	☐ No	☐ N/A

Comments: ____

INTERIOR ROOMS (TYPE 1 - STANDARD)

1. Basic Information

a. Room Number: ________________ Room Identification:_______________________________

b. Area (Size): ___________________ S.F.

c. Occupant Load: ________________

d. No. of Exits: Required _____ Provided _____

2. Room Enclosure

	Material	Finish
a. Walls	________________________	________________________
Condition	☐ Good ☐ Fair ☐ Poor	☐ Good ☐ Fair ☐ Poor

Comments: ____

	Material	Finish
b. Floor	________________________	________________________
Condition	☐ Good ☐ Fair ☐ Poor	☐ Good ☐ Fair ☐ Poor

Comments: ____

	Material	Finish
c. Base	________________________	________________________
Condition	☐ Good ☐ Fair ☐ Poor	☐ Good ☐ Fair ☐ Poor

Comments: ____

	Material	Finish
d. Ceiling	________________________	________________________
Condition	☐ Good ☐ Fair ☐ Poor	☐ Good ☐ Fair ☐ Poor

Comments: ____

3. Door Information

a. Door No.__________ Size: ___________ Fire Rating: __________

b. Type ☐ Hinged Leaf ☐ Coiling ☐ Sectional ☐ Other: ____________

c. Material ☐ Hollow Metal ☐ Aluminum ☐ Wood ☐ Other: ____________
Condition ☐ Good ☐ Fair ☐ Poor

Comments: ____

d. Frame Type ☐ Hollow Metal ☐ Aluminum ☐ Wood ☐ Other
Condition ☐ Good ☐ Fair ☐ Poor

Comments: ____

INTERIOR ROOMS (TYPE 1 - STANDARD) - PAGE 2

e. Hardware

Item	Provided	Type	Quantity	Condition Good	Fair	Poor
Hinges	☐	______	____	☐	☐	☐
Lockset	☐	______	____	☐	☐	☐
Closer	☐	______	____	☐	☐	☐
Kickplate	☐	______	____	☐	☐	☐
Mullion	☐	______	____	☐	☐	☐
Threshold	☐	______	____	☐	☐	☐
Panic Bar	☐	______	____	☐	☐	☐
Push/Pull	☐	______	____	☐	☐	☐
Stop/Hold	☐	______	____	☐	☐	☐
Power Hold	☐	______	____	☐	☐	☐
Smoke Gasket	☐	______	____	☐	☐	☐

Comments ____

4. Amenities

a. Window Coverings	☐ Yes	☐ No	
Type	☐ Drapes	☐ Blinds	☐ Other: ________
Condition	☐ Good	☐ Fair	☐ Poor
b. Chalkboards	☐ Yes	☐ No	☐ Quantity:________
Size	_____x_____	Material: ______________	
Condition	☐ Good	☐ Fair	☐ Poor
c. Casework	☐ Yes	☐ No	☐ Quantity:________
Size	_____x_____	Material: ______________	
Condition	☐ Good	☐ Fair	☐ Poor
d. Lockers	☐ Yes	☐ No	☐ Quantity:________
Size	_____x_____	Material: ______________	
Condition	☐ Good	☐ Fair	☐ Poor

Comments ____

5. Mechanical/Electrical

Item	Provided	Type	Quantity	Condition Good	Fair	Poor
Baseboard Units	☐	______	____	☐	☐	☐
Supply Air Grills	☐	______	____	☐	☐	☐
Return Air Grills	☐	______	____	☐	☐	☐
Lighting	☐	______	____	☐	☐	☐
Conv. Outlets	☐	______	____	☐	☐	☐
Television Outlets	☐	______	____	☐	☐	☐
Computer Outlets	☐	______	____	☐	☐	☐

Comments ____

INTERIOR ROOMS (TYPE 2 - DAMP)

1. Basic Information

a. Room Number: ___________ Room Name:_________________ Area (Size): ______________ sf.

b. Occupant Load: ___________ No. of Exits: Required: ______ Provided _______

2. Room Enclosure

	Material	Finish
a. Walls	________________________	________________________
Condition	☐ Good ☐ Fair ☐ Poor	☐ Good ☐ Fair ☐ Poor

Comments: ____

	Material	Finish
b. Floor	________________________	________________________
Condition	☐ Good ☐ Fair ☐ Poor	☐ Good ☐ Fair ☐ Poor

Comments: ____

	Material	Finish
c. Base	________________________	________________________
Condition	☐ Good ☐ Fair ☐ Poor	☐ Good ☐ Fair ☐ Poor

Comments: ____

	Material	Finish
d. Ceiling	________________________	________________________
Condition	☐ Good ☐ Fair ☐ Poor	☐ Good ☐ Fair ☐ Poor

Comments: ____

3. Door Information

a. Door No.__________ Size: ___________ Fire Rating: ___________

b. Type ☐ Hinged Leaf ☐ Coiling ☐ Sectional ☐ Other: ____________

c. Material ☐ Hollow Metal ☐ Aluminum ☐ Wood ☐ Other: ____________
Condition ☐ Good ☐ Fair ☐ Poor

Comments: ____

d. Frame Type ☐ Hollow Metal ☐ Aluminum ☐ Wood ☐ Other
Condition ☐ Good ☐ Fair ☐ Poor

Comments: ____

e. Hardware

Item	Provided	Type	Quantity	Condition: Good	Condition: Fair	Condition: Poor
Hinges	☐	____________	_______	☐	☐	☐
Lockset	☐	____________	_______	☐	☐	☐
Closer	☐	____________	_______	☐	☐	☐

INTERIOR ROOMS (TYPE 2 - DAMP) - PAGE 2

Item	Provided	Type	Quantity	Condition: Good	Condition: Fair	Condition: Poor
Kickplate	☐	____________	_______	☐	☐	☐
Mullion	☐	____________	_______	☐	☐	☐
Threshold	☐	____________	_______	☐	☐	☐
Panic Bar	☐	____________	_______	☐	☐	☐
Push/Pull	☐	____________	_______	☐	☐	☐
Stop/Hold	☐	____________	_______	☐	☐	☐
Smoke Gasket	☐	____________	_______	☐	☐	☐

Comments ____

4. Amenities

a.	Window Coverings	☐ Yes	☐ No	
	Type	☐ Drapes	☐ Blinds	☐ Other: ___________
	Condition	☐ Good	☐ Fair	☐ Poor
b.	Chalkboards	☐ Yes	☐ No	☐ Quantity:__________
	Size	______x______	Material: ___________________________	
	Condition	☐ Good	☐ Fair	☐ Poor
c.	Shelving Casework	☐ Yes	☐ No	☐ Quantity:__________
	Size	______x______	Material: ___________________________	
	Condition	☐ Good	☐ Fair	☐ Poor
d.	Cabinet Casework	☐ Yes	☐ No	☐ Quantity:__________
	Size	______x______	Material: ___________________________	
	Condition	☐ Good	☐ Fair	☐ Poor
e.	Lockers	☐ Yes	☐ No	☐ Quantity:__________
	Size	______x______	Material: ___________________________	
	Condition	☐ Good	☐ Fair	☐ Poor

Comments ____

5. Mechanical/Electrical

Item	Provided	Type	Quantity	Condition: Good	Condition: Fair	Condition: Poor
Baseboard Units	☐	____________	_______	☐	☐	☐
Supply/Return Grill	☐	____________	_______	☐	☐	☐
Sinks/Faucets	☐	____________	_______	☐	☐	☐
Faucets	☐	____________	_______	☐	☐	☐
Hoods	☐	____________	_______	☐	☐	☐
Lighting	☐	____________	_______	☐	☐	☐
Conv. Outlets	☐	____________	_______	☐	☐	☐
Television Outlets	☐	____________	_______	☐	☐	☐
Computer Outlets	☐	____________	_______	☐	☐	☐

Comments ____

CORRIDORS/COMMONS

1. Basic Information

a. Room Number: ____________ Room Name:__________________ Area (Size): _______________ sf.

2. Enclosure

	Material	**Finish**
a. Walls	____________________	____________________
Condition	☐ Good ☐ Fair ☐ Poor	☐ Good ☐ Fair ☐ Poor

Comments: ____

	Material	**Finish**
b. Floor	____________________	____________________
Condition	☐ Good ☐ Fair ☐ Poor	☐ Good ☐ Fair ☐ Poor

Comments: ____

	Material	**Finish**
c. Base	____________________	____________________
Condition	☐ Good ☐ Fair ☐ Poor	☐ Good ☐ Fair ☐ Poor

Comments: ____

	Material	**Finish**
d. Ceiling	____________________	____________________
Condition	☐ Good ☐ Fair ☐ Poor	☐ Good ☐ Fair ☐ Poor

Comments: ____

3. 1st Door Information

a. Door No.__________ Size: ____________ Fire Rating: ___________

b. Type	☐ Hinged Leaf	☐ Coiling	☐ Sectional	☐ Other: ____________
c. Material	☐ Hollow Metal	☐ Aluminum	☐ Wood	☐ Other: ____________
Condition	☐ Good	☐ Fair	☐ Poor	
d. Frame Type	☐ Hollow Metal	☐ Aluminum	☐ Wood	☐ Other
Condition	☐ Good	☐ Fair	☐ Poor	

Comments: ____

e. Hardware

Item	Provided	Type	Quantity	Condition Good	Fair	Poor
Hinges	☐	____________	_______	☐	☐	☐
Lockset	☐	____________	_______	☐	☐	☐
Closer	☐	____________	_______	☐	☐	☐
Kickplate	☐	____________	_______	☐	☐	☐
Mullion	☐	____________	_______	☐	☐	☐
Panic Bar	☐	____________	_______	☐	☐	☐
Push/Pull	☐	____________	_______	☐	☐	☐
Stop/Hold	☐	____________	_______	☐	☐	☐
Smoke Gasket	☐	____________	_______	☐	☐	☐

CORRIDORS/COMMONS - PAGE 2

4. 2nd Door Information

a. Door No.__________		Size: __________		Fire Rating: __________
b. Type	☐ Hinged Leaf	☐ Coiling	☐ Sectional	☐ Other: __________
c. Material	☐ Hollow Metal	☐ Aluminum	☐ Wood	☐ Other: __________
Condition	☐ Good	☐ Fair	☐ Poor	
d. Frame Type	☐ Hollow Metal	☐ Aluminum	☐ Wood	☐ Other
Condition	☐ Good	☐ Fair	☐ Poor	

Comments: ____

e. Hardware

Item	Provided	Type	Quantity	Condition: Good	Fair	Poor
Hinges	☐	________	_____	☐	☐	☐
Lockset	☐	________	_____	☐	☐	☐
Closer	☐	________	_____	☐	☐	☐
Kickplate	☐	________	_____	☐	☐	☐
Mullion	☐	________	_____	☐	☐	☐
Panic Bar	☐	________	_____	☐	☐	☐
Push/Pull	☐	________	_____	☐	☐	☐
Stop/Hold	☐	________	_____	☐	☐	☐
Smoke Gasket	☐	________	_____	☐	☐	☐

Comments ____

5. Amenities

a. Display Cases	☐ Yes	☐ No	
Type	☐ Recessed	☐ Freestanding	☐ Other: __________
Condition	☐ Good	☐ Fair ☐ Poor	
b. Lockers	☐ Yes	☐ No	☐ Quantity:__________
Size	_____x_____	Material: __________________	
Condition	☐ Good	☐ Fair	☐ Poor
c. Other: __________	☐ Yes	☐ No	☐ Quantity:__________
Size	_____x_____	Material: __________________	
Condition	☐ Good	☐ Fair	☐ Poor

Comments ____

6. Mechanical/Electrical

Item	Provided	Type	Quantity	Condition: Good	Fair	Poor
Supply/Return Grill	☐	________	_____	☐	☐	☐
Lighting	☐	________	_____	☐	☐	☐
Conv. Outlets	☐	________	_____	☐	☐	☐

Comments ____

KITCHEN

1. Basic Information

a. Room Number: ___________ Room Name: **Kitchen** Area (Size): ______________ sf.

2. Enclosure

	Material	**Finish**
a. Walls	________________	________________
Condition	☐ Good ☐ Fair ☐ Poor	☐ Good ☐ Fair ☐ Poor

Comments: ____

	Material	**Finish**
b. Floor	________________	________________
Condition	☐ Good ☐ Fair ☐ Poor	☐ Good ☐ Fair ☐ Poor

Comments: ____

	Material	**Finish**
c. Base	________________	________________
Condition	☐ Good ☐ Fair ☐ Poor	☐ Good ☐ Fair ☐ Poor

Comments: ____

	Material	**Finish**
d. Ceiling	________________	________________
Condition	☐ Good ☐ Fair ☐ Poor	☐ Good ☐ Fair ☐ Poor

Comments: ____

3. Door Information

a. Door No. (1st / 2nd) ________/________ Size: (1st / 2nd) __________/__________ Fire Rating: (1st / 2nd) _____/______

b. Type	☐ Hinged Leaf	☐ Coiling	☐ Sectional	☐ Other: ______________
c. Material	☐ Hollow Metal	☐ Aluminum	☐ Wood	☐ Other: ______________
Condition	☐ Good	☐ Fair	☐ Poor	
d. Frame Type	☐ Hollow Metal	☐ Aluminum	☐ Wood	☐ Other
Condition	☐ Good	☐ Fair	☐ Poor	

e. Hardware

Item	Provided	Type	Quantity	Condition: Good	Condition: Fair	Condition: Poor
Hinges	☐	____________	_______	☐	☐	☐
Lockset	☐	____________	_______	☐	☐	☐
Closer	☐	____________	_______	☐	☐	☐
Kickplate	☐	____________	_______	☐	☐	☐
Mullion	☐	____________	_______	☐	☐	☐
Panic Bar	☐	____________	_______	☐	☐	☐
Push/Pull	☐	____________	_______	☐	☐	☐
Stop/Hold	☐	____________	_______	☐	☐	☐
Smoke Gasket	☐	____________	_______	☐	☐	☐

Comments: ____

KITCHEN - PAGE 2

4. Amenities

a.	Casework/Shelves	☐ Yes	☐ No	
	Type	☐ Recessed	☐ Freestanding	☐ Other: ___________
	Condition	☐ Good	☐ Fair	☐ Poor
b.	Pantry	☐ Yes	☐ No	☐ Quantity:__________
	Size	______x______	Material: ___________________________	
	Condition	☐ Good	☐ Fair	☐ Poor
c.	Other: ________________	☐ Yes	☐ No	☐ Quantity:__________
	Size	______x______	Material: ___________________________	
	Condition	☐ Good	☐ Fair	☐ Poor

Comments ____

5. Equipment

Item	Provided	Description	Quantity	Condition: Good	Fair	Poor
Cold Storage Room	☐	____________________	_______	☐	☐	☐
Refrigeration System	☐	____________________	_______	☐	☐	☐
Shelving, Cold Storage	☐	____________________	_______	☐	☐	☐
Shelving, Dry Storage	☐	____________________	_______	☐	☐	☐
Refrigerator, Reach-in	☐	____________________	_______	☐	☐	☐
Freezer, Reach-in	☐	____________________	_______	☐	☐	☐
Mixer, 20-quart	☐	____________________	_______	☐	☐	☐
Mixer Stand, Mobile	☐	____________________	_______	☐	☐	☐
Work Table w/sink	☐	____________________	_______	☐	☐	☐
Wall Shelf w/spice rack	☐	____________________	_______	☐	☐	☐
Food Preparation Sink	☐	____________________	_______	☐	☐	☐
Wall Shelves	☐	____________________	_______	☐	☐	☐
Trash Container, Mob.	☐	____________________	_______	☐	☐	☐
3-Compartment Sink	☐	____________________	_______	☐	☐	☐
Tiered Shelf Unit, Mob.	☐	____________________	_______	☐	☐	☐
Ingredient Bin, Mobile	☐	____________________	_______	☐	☐	☐
Can Opener	☐	____________________	_______	☐	☐	☐
Hand Sink	☐	____________________	_______	☐	☐	☐
Exhaust Ventilator	☐	____________________	_______	☐	☐	☐
Convection Oven	☐	____________________	_______	☐	☐	☐
Range	☐	____________________	_______	☐	☐	☐
Equipment Stand	☐	____________________	_______	☐	☐	☐
Bulk Milk Dispenser	☐	____________________	_______	☐	☐	☐
Mobile Counter	☐	____________________	_______	☐	☐	☐
Disposable. Cup Disp.	☐	____________________	_______	☐	☐	☐
Exhaust Ventilator	☐	____________________	_______	☐	☐	☐
Serving/Work Counter	☐	____________________	_______	☐	☐	☐
Hot Food Well Unit	☐	____________________	_______	☐	☐	☐
Pass Through Shelf	☐	____________________	_______	☐	☐	☐
Microwave Oven	☐	____________________	_______	☐	☐	☐

SHOPS

1. Basic Information

a. Room Number: ___________ Room Name: _________________ Area (Size): ______________ sf.

2. Enclosure

	Material	Finish
a. Walls	________________________	________________________
Condition	☐ Good ☐ Fair ☐ Poor	☐ Good ☐ Fair ☐ Poor

Comments: ____

	Material	Finish
b. Floor	________________________	________________________
Condition	☐ Good ☐ Fair ☐ Poor	☐ Good ☐ Fair ☐ Poor

Comments: ____

	Material	Finish
c. Base	________________________	________________________
Condition	☐ Good ☐ Fair ☐ Poor	☐ Good ☐ Fair ☐ Poor

Comments: ____

	Material	Finish
d. Ceiling	________________________	________________________
Condition	☐ Good ☐ Fair ☐ Poor	☐ Good ☐ Fair ☐ Poor

Comments: ____

3. Door Information

a. Door No.__________ Size: ____________ Fire Rating: __________

b. Type	☐ Hinged Leaf	☐ Coiling	☐ Sectional	☐ Other: ____________
c. Material	☐ Hollow Metal	☐ Aluminum	☐ Wood	☐ Other: ____________
Condition	☐ Good	☐ Fair	☐ Poor	
d. Frame Type	☐ Hollow Metal	☐ Aluminum	☐ Wood	☐ Other
Condition	☐ Good	☐ Fair	☐ Poor	

e. Hardware

Item	Provided	Type	Quantity	Condition Good	Condition Fair	Condition Poor
Hinges	☐	____________	_______	☐	☐	☐
Lockset	☐	____________	_______	☐	☐	☐
Closer	☐	____________	_______	☐	☐	☐
Kickplate	☐	____________	_______	☐	☐	☐
Mullion	☐	____________	_______	☐	☐	☐
Panic Bar	☐	____________	_______	☐	☐	☐
Push/Pull	☐	____________	_______	☐	☐	☐
Stop/Hold	☐	____________	_______	☐	☐	☐
Smoke Gasket	☐	____________	_______	☐	☐	☐

Comments: ____

SHOPS - PAGE 2

4. Amenities

a.	Casework/Shelves	☐ Yes	☐ No	
	Type	☐ Recessed	☐ Freestanding	☐ Other: ___________
	Condition	☐ Good	☐ Fair	☐ Poor
b.	Chalkboards	☐ Yes	☐ No	☐ Quantity:__________
	Size	______x______	Material: ____________________________	
	Condition	☐ Good	☐ Fair	☐ Poor
c.	Dust Collection System	☐ Yes	☐ No	☐ Quantity:__________
	Size	______x______	Material: ____________________________	
	Condition	☐ Good	☐ Fair	☐ Poor
d.	Other: ________________	☐ Yes	☐ No	☐ Quantity:__________
	Size	______x______	Material: ____________________________	
	Condition	☐ Good	☐ Fair	☐ Poor

5. Mechanical/Electrical

Item	Provided	Type	Quantity	Condition: Good	Fair	Poor
HVAC	☐	____________	_______	☐	☐	☐
Lighting	☐	____________	_______	☐	☐	☐
220v. Power	☐	____________	_______	☐	☐	☐

Comments ____

6. Equipment

Item	Provided	Description	Quantity	Condition: Good	Fair	Poor
Drill Press	☐	______________________	_______	☐	☐	☐
Belt Sander	☐	______________________	_______	☐	☐	☐
Table Saw	☐	______________________	_______	☐	☐	☐
Band Saw	☐	______________________	_______	☐	☐	☐
Radial Arm Saw	☐	______________________	_______	☐	☐	☐
Lathe	☐	______________________	_______	☐	☐	☐
Work Benches	☐	______________________	_______	☐	☐	☐
Hand Tool Storage	☐	______________________	_______	☐	☐	☐
Welding Booth	☐	______________________	_______	☐	☐	☐
Welder	☐	______________________	_______	☐	☐	☐
Bench Grinder	☐	______________________	_______	☐	☐	☐
Air Compressor	☐	______________________	_______	☐	☐	☐
Parts Vat	☐	______________________	_______	☐	☐	☐
Power Tool Storage	☐	______________________	_______	☐	☐	☐

l. Comments ____

LOCKER ROOMS/RESTROOMS

1. Basic Information

a. Room Number: ___________ Room Name: _________________ Area (Size): ______________ sf.

2. Enclosure

	Material			Finish		
a. Walls	________			________		
Condition	☐ Good	☐ Fair	☐ Poor	☐ Good	☐ Fair	☐ Poor

Comments: ____

	Material			Finish		
b. Floor	________			________		
Condition	☐ Good	☐ Fair	☐ Poor	☐ Good	☐ Fair	☐ Poor

Comments: ____

	Material			Finish		
c. Base	________			________		
Condition	☐ Good	☐ Fair	☐ Poor	☐ Good	☐ Fair	☐ Poor

Comments: ____

	Material			Finish		
d. Ceiling	________			________		
Condition	☐ Good	☐ Fair	☐ Poor	☐ Good	☐ Fair	☐ Poor

Comments: ____

3. Door Information

a. Door No.__________		Size: ____________		Fire Rating: __________
b. Type	☐ Hinged Leaf	☐ Coiling	☐ Sectional	☐ Other: ___________
c. Material	☐ Hollow Metal	☐ Aluminum	☐ Wood	☐ Other: ___________
Condition	☐ Good	☐ Fair	☐ Poor	
d. Frame Type	☐ Hollow Metal	☐ Aluminum	☐ Wood	☐ Other
Condition	☐ Good	☐ Fair	☐ Poor	

e. Hardware

Item	Provided	Type	Quantity	Condition: Good	Fair	Poor
Hinges	☐	__________	______	☐	☐	☐
Lockset	☐	__________	______	☐	☐	☐
Closer	☐	__________	______	☐	☐	☐
Kickplate	☐	__________	______	☐	☐	☐
Mullion	☐	__________	______	☐	☐	☐
Panic Bar	☐	__________	______	☐	☐	☐
Push/Pull	☐	__________	______	☐	☐	☐
Stop/Hold	☐	__________	______	☐	☐	☐
Smoke Gaskets	☐	__________	______	☐	☐	☐

Comments: ____
____

LOCKER ROOM/RESTROOMS - PAGE 2

4. Amenities

a.	Toilet Partitions	☐ Floor mount	☐ Wall hung	☐ Ceil. Hung	☐ None
	Type	☐ Metal	☐ Laminate	☐ Solid Plastic	☐ Other: ___________
	Condition	☐ Good	☐ Fair	☐ Poor	Comments: _______________

a.	Toilet Accessories	☐ PTD/Receptacle	☐ Mirrors	☐ San. Napkin	☐ TP Dispenser
		☐ Soap Dispenser	☐ Hand Dryers	☐ Seat Covers	☐ Other: ___________
	Condition	☐ Good	☐ Fair	☐ Poor	

Comments ____

c.	Lockers	☐ Yes	☐ No	☐ Quantity:__________
	Size	______x______	Material: ___________________________	
	Condition	☐ Good	☐ Fair	☐ Poor

d.	Other: ________________	☐ Yes	☐ No	☐ Quantity:__________
	Size	______x______	Material: ___________________________	
	Condition	☐ Good	☐ Fair	☐ Poor

5. Mechanical/Electrical

Item	Provided	Type	Quantity	Condition		
				Good	Fair	Poor
Heat Grills/Covers	☐	____________	_______	☐	☐	☐
Exhaust Grills	☐	____________	_______	☐	☐	☐
Light Covers	☐	____________	_______	☐	☐	☐
Cover plates	☐	____________	_______	☐	☐	☐

Comments ____

6. Fixtures/Equipment

Item	Provided	Description	Quantity	Condition		
				Good	Fair	Poor
Urinals	☐	_______________________	_______	☐	☐	☐
Water Closets	☐	_______________________	_______	☐	☐	☐
Lavatories/Sinks	☐	_______________________	_______	☐	☐	☐
Drinking Fountains	☐	_______________________	_______	☐	☐	☐
Shower Compartments	☐	_______________________	_______	☐	☐	☐
Exhaust Fans	☐	_______________________	_______	☐	☐	☐
Hair Dryers	☐	_______________________	_______	☐	☐	☐
Drains/Grates	☐	_______________________	_______	☐	☐	☐
Gang Showers	☐	_______________________	_______	☐	☐	☐
Other: ____________	☐	_______________________	_______	☐	☐	☐
Other: ____________	☐	_______________________	_______	☐	☐	☐

Comments ____

____

AUDITORIUMS

1. Basic Information

a. Room Number: ____________ Room Name:__________________ Area (Size): _______________ sf.
b. Occupant Load: ____________ No. of Exits: Required: ______ Provided _______

2. Enclosure

	Material			Finish		
a. Walls	______________			______________		
Condition	☐ Good	☐ Fair	☐ Poor	☐ Good	☐ Fair	☐ Poor

Comments: ____

	Material			Finish		
b. Floor	______________			______________		
Condition	☐ Good	☐ Fair	☐ Poor	☐ Good	☐ Fair	☐ Poor

Comments: ____

	Material			Finish		
c. Base	______________			______________		
Condition	☐ Good	☐ Fair	☐ Poor	☐ Good	☐ Fair	☐ Poor

Comments: ____

	Material			Finish		
d. Ceiling	______________			______________		
Condition	☐ Good	☐ Fair	☐ Poor	☐ Good	☐ Fair	☐ Poor

Comments: ____

3. 1st Door Information

a. Door No.___________		Size: ____________		Fire Rating: ___________
b. Type	☐ Hinged Leaf	☐ Coiling	☐ Sectional	☐ Other: ____________
c. Material	☐ Hollow Metal	☐ Aluminum	☐ Wood	☐ Other: ____________
Condition	☐ Good	☐ Fair	☐ Poor	
d. Frame Type	☐ Hollow Metal	☐ Aluminum	☐ Wood	☐ Other
Condition	☐ Good	☐ Fair	☐ Poor	

e. Hardware

Item	Provided	Type	Quantity	Condition: Good	Fair	Poor
Hinges	☐	__________	_______	☐	☐	☐
Lockset	☐	__________	_______	☐	☐	☐
Closer	☐	__________	_______	☐	☐	☐
Kickplate	☐	__________	_______	☐	☐	☐
Mullion	☐	__________	_______	☐	☐	☐
Panic Bar	☐	__________	_______	☐	☐	☐
Push/Pull	☐	__________	_______	☐	☐	☐
Stop/Hold	☐	__________	_______	☐	☐	☐
Smoke Gasket	☐	__________	_______	☐	☐	☐

Comments: ____

AUDITORIUM - PAGE 2

4. 2nd Door Information

a. Door No.___________		Size: ____________		Fire Rating: ___________
b. Type	☐ Hinged Leaf	☐ Coiling	☐ Sectional	☐ Other: ____________
c. Material	☐ Hollow Metal	☐ Aluminum	☐ Wood	☐ Other: ____________
Condition	☐ Good	☐ Fair	☐ Poor	
d. Frame Type	☐ Hollow Metal	☐ Aluminum	☐ Wood	☐ Other
Condition	☐ Good	☐ Fair	☐ Poor	

Comments: ____

e. Hardware

Item	Provided	Type	Quantity	Condition: Good	Fair	Poor
Hinges	☐	____________	_______	☐	☐	☐
Lockset	☐	____________	_______	☐	☐	☐
Closer	☐	____________	_______	☐	☐	☐
Kickplate	☐	____________	_______	☐	☐	☐
Mullion	☐	____________	_______	☐	☐	☐
Panic Bar	☐	____________	_______	☐	☐	☐
Push/Pull	☐	____________	_______	☐	☐	☐
Stop/Hold	☐	____________	_______	☐	☐	☐
Smoke Gasket	☐	____________	_______	☐	☐	☐

Comments ____

5. Amenities

a. Seating	☐ Yes	☐ No	
Type	☐ Fixed	☐ Mobile	☐ Other: ____________
Condition	☐ Good	☐ Fair	☐ Poor
b. Projection/Sound Booth	☐ Yes	☐ No	☐ Quantity:___________
Size	______x______	Materials: ____________________	
Condition	☐ Good	☐ Fair	☐ Poor
c. Other: ________________	☐ Yes	☐ No	☐ Quantity:___________
Size	______x______	Material: ____________________	
Condition	☐ Good	☐ Fair	☐ Poor

Comments ____

6. Mechanical/Electrical

Item	Provided	Type	Quantity	Condition: Good	Fair	Poor
Supply/Return Grill	☐	____________	_______	☐	☐	☐
Light Covers	☐	____________	_______	☐	☐	☐
Cover Plates	☐	____________	_______	☐	☐	☐

Comments ____

GYMNASIUM

1. Basic Information

a. Room Number: ___________ Room Name:________________ Area (Size): ______________ sf.
b. Occupant Load: ___________ No. of Exits: Required: ______ Provided _______

2. Enclosure

	Material			Finish		
a. Walls	____________			____________		
Condition	☐ Good	☐ Fair	☐ Poor	☐ Good	☐ Fair	☐ Poor

Comments: ____

	Material			Finish		
b. Floor	____________			____________		
Condition	☐ Good	☐ Fair	☐ Poor	☐ Good	☐ Fair	☐ Poor

Comments: ____

	Material			Finish		
c. Base	____________			____________		
Condition	☐ Good	☐ Fair	☐ Poor	☐ Good	☐ Fair	☐ Poor

Comments: ____

	Material			Finish		
d. Ceiling	____________			____________		
Condition	☐ Good	☐ Fair	☐ Poor	☐ Good	☐ Fair	☐ Poor

Comments: ____

3. 1st Door Information

a. Door No.__________		Size: ___________		Fire Rating: __________
b. Type	☐ Hinged Leaf	☐ Coiling	☐ Sectional	☐ Other: ____________
c. Material	☐ Hollow Metal	☐ Aluminum	☐ Wood	☐ Other: ____________
Condition	☐ Good	☐ Fair	☐ Poor	
d. Frame Type	☐ Hollow Metal	☐ Aluminum	☐ Wood	☐ Other
Condition	☐ Good	☐ Fair	☐ Poor	

e. Hardware

Item	Provided	Type	Quantity	Condition: Good	Fair	Poor
Hinges	☐	___________	_______	☐	☐	☐
Lockset	☐	___________	_______	☐	☐	☐
Closer	☐	___________	_______	☐	☐	☐
Kickplate	☐	___________	_______	☐	☐	☐
Mullion	☐	___________	_______	☐	☐	☐
Panic Bar	☐	___________	_______	☐	☐	☐
Push/Pull	☐	___________	_______	☐	☐	☐
Stop/Hold	☐	___________	_______	☐	☐	☐
Smoke Gasket	☐	___________	_______	☐	☐	☐

Comments: ____

GYMNASIUM - PAGE 2

4. 2nd Door Information

a. Door No.___________		Size: ____________		Fire Rating: ___________
b. Type	☐ Hinged Leaf	☐ Coiling	☐ Sectional	☐ Other: ____________
c. Material	☐ Hollow Metal	☐ Aluminum	☐ Wood	☐ Other: ____________
Condition	☐ Good	☐ Fair	☐ Poor	
d. Frame Type	☐ Hollow Metal	☐ Aluminum	☐ Wood	☐ Other
Condition	☐ Good	☐ Fair	☐ Poor	

Comments: ____

e. Hardware

Item	Provided	Type	Quantity	Condition Good	Condition Fair	Condition Poor
Hinges	☐	__________	______	☐	☐	☐
Lockset	☐	__________	______	☐	☐	☐
Closer	☐	__________	______	☐	☐	☐
Kickplate	☐	__________	______	☐	☐	☐
Mullion	☐	__________	______	☐	☐	☐
Panic Bar	☐	__________	______	☐	☐	☐
Push/Pull	☐	__________	______	☐	☐	☐
Stop/Hold	☐	__________	______	☐	☐	☐
Smoke Gasket	☐	__________	______	☐	☐	☐

Comments ____

5. Amenities

a. Display Cases	☐ Yes	☐ No	
Type	☐ Recessed	☐ Freestanding	☐ Other: ___________
Condition	☐ Good	☐ Fair	☐ Poor
b. Bleachers	☐ Yes	☐ No	☐ Quantity:__________
Size	______x______	Material: ___________________	
Condition	☐ Good	☐ Fair	☐ Poor
c. Other: ________________	☐ Yes	☐ No	☐ Quantity:__________
Size	______x______	Material: ___________________	
Condition	☐ Good	☐ Fair	☐ Poor

Comments ____

6. Mechanical/Electrical

Item	Provided	Type	Quantity	Condition Good	Condition Fair	Condition Poor
Supply/Return Grill	☐	__________	______	☐	☐	☐
Light Covers	☐	__________	______	☐	☐	☐
Coverplates	☐	__________	______	☐	☐	☐

Comments ____

EXTERIOR ELEMENTS

1. Hose Bibbs ☐ Yes ☐ No
Freeze proof ☐ Yes ☐ No
Vacuum Breaker ☐ Yes ☐ No
Key Operated ☐ Yes ☐ No
Condition ☐ Good ☐ Fair ☐Poor

2. Sewer Cleanouts
Within 5' of Building ☐ Yes ☐ No
Condition ☐ Good ☐ Fair ☐Poor

3. Sprinkler System Exist? ☐ Yes ☐ No
FDC Exists? ☐ Yes ☐ No Capped ☐ Yes ☐ No
Labeled ☐ Yes ☐ No Near Main Entry ☐ Yes ☐ No

4. Air Inlets
More than 8' A/G ☐ Yes ☐ No Near Contaminants☐Yes ☐ No
More than 10' from exhaust ☐ Yes ☐ No Screened (3/4") ☐ Yes ☐ No
W/I 5' of PL ☐ Yes ☐ No
Above Boiler Room ☐ Yes ☐ No
Condition ☐ Good ☐ Fair ☐Poor

5. **Air Outlets**
Backdraft damper operational ☐ Yes ☐ No
3' from windows/openings ☐ Yes ☐ No
10' from inlets ☐ Yes ☐ No
W/I 5' of property line ☐ Yes ☐ No
Hooded? ☐ Yes ☐ No
Louvered? ☐ Yes ☐ No
Condition ☐ Good ☐ Fair ☐Poor

Comments ____

____

ROOF ELEMENTS

1. Roof Drains ☐ Yes ☐ No

Plugged	☐ Yes	☐ No	
Qty/Size main drain	_____Qty	_____Size	
Qty/Size overflow	_____Qty	_____Size	
2" weir at overflow?	☐ Yes	☐ No	
Roof sloped drain?	☐ Yes	☐ No	
Drains visible	☐ Yes	☐ No	
Roof drains insulated?	☐ Yes	☐ No	
Relief drain tied to main?	☐ Yes	☐ No	
Overflow piped with offsets per MOA to main	☐ Yes	☐ No	
Heat tape visible	☐ Yes	☐ No	
Condition	☐ Good	☐ Fair	☐Poor

Comments ____

____

2. Flues at Roof

Estimate height from appliance	__________		
Caps installed	☐ Yes	☐ No	
Guyed if >5' high?	☐ Yes	☐ No	
Within 10' of air inlet?	☐ Yes	☐ No	
Within 5' of property line?	☐ Yes	☐ No	
Rusted?	☐ Yes	☐ No	
Condition	☐ Good	☐ Fair	☐Poor

Comments ____

____

3. Access to Roof

Type (Stairs needed if>4 stories)	__________		
Size openings (2' min)	__________		
Lockable?	☐ Yes	☐ No	
Platform for sloped roof?	☐ Yes	☐ No	
Powerlines within 8' of roof?	☐ Yes	☐ No	
Condition	☐ Good	☐ Fair	☐Poor

Comments ____

____

MECHANICAL ROOM

1. Boilers/Burner

	1		2		3	
Make	______		______		______	
Model	______		______		______	
BTU Output	______		______		______	
Fuel Type	______		______		______	
LWCO Installed?	☐ Yes	☐ No	☐ Yes	☐ No	☐ Yes	☐ No
LWCO operational?	☐ Yes	☐ No	☐ Yes	☐ No	☐ Yes	☐ No
Operating Limit	☐ Yes	☐ No	☐ Yes	☐ No	☐ Yes	☐ No
Red Hi Limit operational?	☐ Yes	☐ No	☐ Yes	☐ No	☐ Yes	☐ No
Red Limited Man reset? (>400 MBH)	☐ Yes	☐ No	☐ Yes	☐ No	☐ Yes	☐ No
Disconnect installed	☐ Yes	☐ No	☐ Yes	☐ No	☐ Yes	☐ No
Gas shutoff present?	☐ Yes	☐ No	☐ Yes	☐ No	☐ Yes	☐ No
Relief Valve?	☐ Yes	☐ No	☐ Yes	☐ No	☐ Yes	☐ No
Size	______		______		______	
Piped To Floor	______		______		______	
Visual Inspection Leakage?	______		______		______	
Condition	☐ Good		☐ Fair		☐Poor	

2. Hydronic System

Filter/Strainer	☐ Yes	☐ No	
Air Separator/Purger	☐ Yes	☐ No	
Expansion Tank Type?	☐ Bladder	☐ Steel Tank	
waterlogged or MT?	______		
System Pressure	______PSIG		
Exp Tank at Pump Suction	☐ Yes	☐ No	
Min 8PSI @ Circulator Suction	☐ Yes	☐ No	
Hydronic medium	______		
Glycol fill system type	______		
Possible water cross connect?	☐ Yes	☐ No	
Double check at fill	☐ Yes	☐ No	☐ N/A
Number of Zones	______		
Condition	☐ Good	☐ Fair	☐Poor

3. Hot Water Heaters/Generators

	1	2	3
Make	______	______	______
Model	______	______	______
BTU Input	______	______	______
Fuel Type	______	______	______
Heating Media	______	______	______
Double walled	☐Yes☐No☐N/A	☐Yes☐No☐N/A	☐Yes☐No☐N/A
Relief Valve?	☐Yes☐No☐N/A	☐Yes☐No☐N/A	☐Yes☐No☐N/A

MECHANICAL ROOM - PAGE 2

Piped to Floor	☐Yes☐No☐N/A	☐Yes☐No☐N/A	☐Yes☐No☐N/A
Disconnect installed	☐Yes☐No☐N/A	☐Yes☐No☐N/A	☐Yes☐No☐N/A
Gas shutoff present?	☐Yes☐No☐N/A	☐Yes☐No☐N/A	☐Yes☐No☐N/A
Visual Inspection Leakage	______________	______________	______________
Corrosion?	______________	______________	______________
Condition	☐ Good	☐ Fair	☐Poor

4. Forced Air Furnace/Air Handler

	1	2	3
Tag	______________	______________	______________
Make	______________	______________	______________
Model	______________	______________	______________
BTU Input	______________	______________	______________
CFM Blower	______________	______________	______________
OSA at Inlet	______________	______________	______________
Filters Installed	______________	______________	______________
Filters condition	______________	______________	______________
R/A ducted?	______________	______________	______________
R/A open to room	______________	______________	______________
Mixing Box	______________	______________	______________
Dampers operational	______________	______________	______________
Flue clearance to Combustibles	______________	______________	______________
Fuel Gas Piping Size	______________	______________	______________
SOV	______________	______________	______________
Heater Exchanger Rusty, Cracked?	☐Yes☐No☐N/A	☐Yes☐No☐N/A	☐Yes☐No☐N/A

5. Combustion Air

Size? ______________ Vertical/Horizontal? ______________

Locations? ______________ Separate Ventilation System?______________

6. Fuel Oil Qty.

Burner Below Fuel?	☐Yes☐No☐N/A	☐Yes☐No☐N/A	☐Yes☐No☐N/A
2" Fill Pipe	☐Yes☐No☐N/A	☐Yes☐No☐N/A	☐Yes☐No☐N/A
Tigerloop?	☐Yes☐No☐N/A	☐Yes☐No☐N/A	☐Yes☐No☐N/A
Filter?	☐Yes☐No☐N/A	☐Yes☐No☐N/A	☐Yes☐No☐N/A
OSV (if fuel above)	☐Yes☐No☐N/A	☐Yes☐No☐N/A	☐Yes☐No☐N/A
Fusible SOV Valve	☐Yes☐No☐N/A	☐Yes☐No☐N/A	☐Yes☐No☐N/A
Fuel Leaks	☐Yes☐No☐N/A	☐Yes☐No☐N/A	☐Yes☐No☐N/A
Fuel Pipe Type	______________	______________	______________
Soldered Joints?	☐Yes☐No	☐Yes☐No	☐Yes☐No
Pipe Supports?	☐Yes☐No	☐Yes☐No	☐Yes☐No
Valves in F.O.R.	☐Yes☐No	☐Yes☐No	☐Yes☐No
Daytank	☐Yes☐No	☐Yes☐No	☐Yes☐No
Vent to Exterior	☐Yes☐No	☐Yes☐No	☐Yes☐No
Rapture Basin	☐Yes☐No	☐Yes☐No	☐Yes☐No
Overfill Protection	☐Yes☐No	☐Yes☐No	☐Yes☐No
Alarms	☐Yes☐No	☐Yes☐No	☐Yes☐No

MECHANICAL ROOM - PAGE 3

Condition ☐ Good ☐ Fair ☐Poor

Comments ____

____

7. **Heat Exchanger** ☐Provided ☐Not Provided
Type_______ Size________
Condition ☐ Good ☐ Fair ☐Poor

DUCTWORK

1. Fire Dampers

Fire Dampers @ Mechanical Room	☐Yes	☐No	☐Can't tell	☐N/A	
Fire Dampers @ 1 Hour assemblies	☐Yes	☐No	☐Can't tell	☐N/A	
OSA insulation present/type		☐Yes	☐No	☐Can't tell	☐N/A
Condition		☐ Good		☐ Fair	☐Poor

2. Return Air

Plenum return?	☐Yes	☐No	☐Can't tell	☐N/A
If Plenum return:				
Combustibles in plenum?	☐Yes	☐No	☐Can't tell	☐N/A
Wiring plenum rated?	☐Yes	☐No	☐Can't tell	☐N/A
Exhaust ducts in plenum?	☐Yes	☐No	☐Can't tell	☐N/A
Condition	☐ Good		☐ Fair	☐Poor
Ducted return system	☐Yes	☐No	☐Can't tell	☐N/A
If ducted return:				
Are all rooms served?	☐Yes	☐No	☐Can't tell	☐N/A
Adequate size?	☐Yes	☐No	☐Can't tell	☐N/A
Fire dampers A/R?	☐Yes	☐No	☐Can't tell	☐N/A
Corridor Return?	☐Yes	☐No	☐Can't tell	☐N/A
Condition	☐ Good		☐ Fair	☐Poor

3. Supply Air

All occupied spaces served?	☐Yes	☐No	☐Can't tell	☐N/A
Volume dampers on supply branches?	☐Yes	☐No	☐Can't tell	☐N/A
>6' flex duct?	☐Yes	☐No	☐Can't tell	☐N/A
Ducts in unconditioned spaces?	☐Yes	☐No	☐Can't tell	☐N/A
Diffusers dirty?	☐Yes	☐No	☐Can't tell	☐N/A
Fire dampers A/R?	☐Yes	☐No	☐Can't tell	☐N/A
Condition	☐ Good		☐ Fair	☐Poor

4. Description of Heating/Ventilating/Air Conditioning System

____

____

____

Comments ______________________________

____

TOILET ROOMS/SHOWERS

Locations ____________ ____________ ____________ ____________

1. Urinals:

Quantity	____________		____________		____________		____________	
Caulked	☐Yes	☐No	☐Yes	☐No	☐Yes	☐No	☐Yes	☐No
Operational	☐Yes	☐No	☐Yes	☐No	☐Yes	☐No	☐Yes	☐No
Caulked	☐Yes	☐No	☐Yes	☐No	☐Yes	☐No	☐Yes	☐No
HC Accessible (17" to Lip)	☐Yes	☐No	☐Yes	☐No	☐Yes	☐No	☐Yes	☐No
30 clear in front	☐Yes	☐No	☐Yes	☐No	☐Yes	☐No	☐Yes	☐No
Flush Valve <44"AFF	☐Yes	☐No	☐Yes	☐No	☐Yes	☐No	☐Yes	☐No
Condition	☐ Good		☐ Fair		☐Poor			

2. Water Closets:

Locations	____________		____________		____________		____________	
Quantity	____________		____________		____________		____________	
Floor/Wall mounted	____________		____________		____________		____________	
Seal to Wall/Floor wall or floor mounted (require wall mount if <59" deep stall)	☐Yes	☐No	☐Yes	☐No	☐Yes	☐No	☐Yes	☐No
18" wall to center	☐Yes	☐No	☐Yes	☐No	☐Yes	☐No	☐Yes	☐No
17"-19" floor to seat	☐Yes	☐No	☐Yes	☐No	☐Yes	☐No	☐Yes	☐No
33"-36" floor to flush	☐Yes	☐No	☐Yes	☐No	☐Yes	☐No	☐Yes	☐No
Flush valve <44" AFF	☐Yes	☐No	☐Yes	☐No	☐Yes	☐No	☐Yes	☐No
Flush valve handle toward wide side?	☐Yes	☐No	☐Yes	☐No	☐Yes	☐No	☐Yes	☐No
Grab bars side/back	☐Yes	☐No	☐Yes	☐No	☐Yes	☐No	☐Yes	☐No
Seat loose	☐Yes	☐No	☐Yes	☐No	☐Yes	☐No	☐Yes	☐No
Open front seat?	☐Yes	☐No	☐Yes	☐No	☐Yes	☐No	☐Yes	☐No
Elongated bowl?	☐Yes	☐No	☐Yes	☐No	☐Yes	☐No	☐Yes	☐No
Condition	☐ Good		☐ Fair		☐Poor			

3. Drinking Fountains:

Spout 36" AFF	☐Yes	☐No	☐Yes	☐No	☐Yes	☐No	☐Yes	☐No
4" high flow	☐Yes	☐No	☐Yes	☐No	☐Yes	☐No	☐Yes	☐No
Controls Front or side	☐Yes	☐No	☐Yes	☐No	☐Yes	☐No	☐Yes	☐No
Knee Space? 27" front/apron	☐Yes	☐No	☐Yes	☐No	☐Yes	☐No	☐Yes	☐No
30" wide	☐Yes	☐No	☐Yes	☐No	☐Yes	☐No	☐Yes	☐No
17"-19" deep	☐Yes	☐No	☐Yes	☐No	☐Yes	☐No	☐Yes	☐No
30"X48" for parallel	☐Yes	☐No	☐Yes	☐No	☐Yes	☐No	☐Yes	☐No
Condition	☐ Good		☐ Fair		☐Poor			

TOILET ROOMS/SHOWERS - PAGE 2

4. Lavs:

Locations	____________		____________		____________		____________	
Quantity	____________		____________		____________		____________	
HC Accessible								
34" floor to rim☐Yes	☐No	☐Yes	☐No	☐Yes	☐No	☐Yes☐No		
29" floor to apron bottom	☐Yes	☐No	☐Yes	☐No	☐Yes	☐No	☐Yes	☐No
30"X48" in front	☐Yes	☐No	☐Yes	☐No	☐Yes	☐No	☐Yes	☐No
Hot/Cold mix hose bibb near shower room? (School)	☐Yes	☐No	☐Yes	☐No	☐Yes	☐No	☐Yes☐No	
Temp of HW	__________deg. F.							
Condition	☐ Good		☐ Fair		☐Poor			

Comments ____

____

5. Shower Compartment

Locations	____________		____________		____________		____________	
ADA size 36"X36	☐Yes	☐No	☐Yes	☐No	☐Yes	☐No	☐Yes	☐No
ADA seat opposite control	☐Yes	☐No	☐Yes	☐No	☐Yes	☐No	☐Yes	☐No
17"X19" AFF	☐Yes	☐No	☐Yes	☐No	☐Yes	☐No	☐Yes	☐No
Controls 38"X48" AFF	☐Yes	☐No	☐Yes	☐No	☐Yes	☐No	☐Yes	☐No
Spray w/60" hose?	☐Yes	☐No	☐Yes	☐No	☐Yes	☐No	☐Yes	☐No
1/2 max curb?	☐Yes	☐No	☐Yes	☐No	☐Yes	☐No	☐Yes	☐No
Hot water (110 deg.)	☐Yes	☐No	☐Yes	☐No	☐Yes	☐No	☐Yes	☐No
Condition	☐ Good		☐ Fair		☐Poor			

6. Toilet Exhaust Fan:

Operational?	☐Yes	☐No	☐Yes	☐No	☐Yes	☐No	☐Yes	☐No
Operate with lights?	☐Yes	☐No	☐Yes	☐No	☐Yes	☐No	☐Yes	☐No
Ducted to outside ?	☐Yes	☐No	☐Yes	☐No	☐Yes	☐No	☐Yes	☐No
Condition	☐ Good		☐ Fair		☐Poor			

7. Janitor Closet:

Exhaust fan	☐Yes	☐No	☐Yes	☐No	☐Yes	☐No	☐Yes	☐No
Vacuum breaker @ faucet?	☐Yes	☐No	☐Yes	☐No	☐Yes	☐No	☐Yes	☐No
Condition	☐ Good		☐ Fair		☐Poor			

Comments ____

____

KITCHENS

1. Grease Hood

Type One Hour?	☐Yes	☐No		
Number of Hoods		________		
Duct in Shaft	☐Yes	☐No		
Hood 3" down /skirted from ceiling	☐Yes	☐No		
Duct 18" from combustibles?	☐Yes	☐No		
Outlet thru roof? 3' above? ☐Yes	☐No			
Accessible cleanouts?	☐Yes	☐No		
Welded steel ducts	☐Yes	☐No		
Fire extinguisher system?	☐Yes	☐No		
Manual activation system? ☐Yes	☐No			
Condition	☐ Good		☐ Fair	☐Poor

2. Vapor Hood

Provided @ steam kettle?	☐Yes	☐No	☐N/A	
Provided @ convection oven	☐Yes	☐No	☐N/A	
Provided @ dishwasher	☐Yes	☐No	☐N/A	
Condition	☐Good		☐Fair	☐Poor

3. Make Up Air

Interlocked w/grease hood?	☐Yes	☐No		
Direct fire?	☐Yes	☐No		
Condition	☐Good		☐Fair	☐Poor

4. Gas Piping @ Kitchen

Solenoid to fire system	☐Yes	☐No		
E-stop to fire system if electric	☐Yes	☐No		
Condition	☐ Good		☐ Fair	☐Poor

5. Hand Wash Sink

110 deg. hot water?	☐Yes	☐No		
Condition	☐ Good		☐ Fair	☐Poor

6. Dishwasher

180 deg. F final rinse or				
Hydrochloride at 75 deg. F				
120 deg. F min for chemical	☐Yes	☐No		
Floor sink drain	☐Yes	☐No		
Booster heater present?	☐Yes	☐No		
Condition	☐ Good		☐ Fair	☐Poor

KITCHENS - PAGE 2

7. Sinks

Food prep sink	☐Yes	☐No	
3 comp sink present		☐Yes	☐No
140 deg. F hot, LH side	☐Yes	☐No	
Grease trap used	☐Yes	☐No	
Condition	☐ Good	☐ Fair	☐Poor

8. Drains

Ice machine to floor sink	☐Yes	☐No	
3 comp sink	☐Yes	☐No	
Pop machine to floor sink	☐Yes	☐No	
Waitress station to floor sink	☐Yes	☐No	
Food prep sink to floor sink	☐Yes	☐No	
Condition	☐ Good	☐ Fair	☐Poor

Comments ____

____

ELECTRICAL SERVICE

1. Service Entrance

Overhead ☐Yes ☐No
Ground Resistance ____________OHMS
Ground rod used ☐Yes ☐No
Plumbing grounded? ☐Yes ☐No
Steel Frame/Piling Grounded ☐Yes ☐No
Meter# ____________ Meter Multiplier____________
Peak Demand ____________ Main Breaker Size__________
Make/Model ____________ Service Voltage_____________
Transformer Size ____________ XFMR Location_____________
Service Size (# & type of Conductors)___________
Insulation Type _____________
Condition ☐Good ☐Fair ☐Poor

Comments ____

____

2. Main Distribution Panel (MDP)

Neutrals/Grounds Separated
to Service ☐Yes ☐No
Feeder Size (Copper or Aluminum) ____________ Insulation Type____________
Buss Rating/MDP Ampacity ____________ Make/Model of MDP_________
Number of Poles ____________ Spare Capacity______________
Clearance in Front of Panel (36" min)____________
Overhead Breakers? ____________ Dry Type Transformers?__________
Voltage and KVA ____________ Make/Model____________
Separate grounding for
Transformers? ____________
Condition ☐Good ☐Fair ☐Poor

Comments ____

____

3. Sub Panels

Directory up-to-date?	☐Yes ☐No	☐Yes ☐No	☐Yes ☐No	☐Yes ☐No
Neutrals/Grds separate?	☐Yes ☐No	☐Yes ☐No	☐Yes ☐No	☐Yes ☐No
Open knockouts?	☐Yes ☐No	☐Yes ☐No	☐Yes ☐No	☐Yes ☐No
Feeder size	____________	____________	____________	____________
Breaker size (Main)	____________	____________	____________	____________
Overheated breakers	☐Yes ☐No	☐Yes ☐No	☐Yes ☐No	☐Yes ☐No
Make/Model	____________	____________	____________	____________
Condition	☐ Good	☐ Fair	☐Poor	

Comments ____

Electrical 7.2x

EXTERIOR ELEMENTS

1 Exterior

Outlets-Qty__________________		Lights-Entries	______________
Outlets-GFIC_________________		Lights-Parking Lot	______________
Outlets-WP, Condition________		(1/3 FC Min)	______________
		Lights-Play Areas	______________
		Lights-Type	______________
		Photocell switching?	______________
Condition	☐Good	☐Fair	☐Poor

Comments ____

2. Roof

GFI receptacle W/I 10 feet of Electrical equipment	☐Yes	☐No	☐N/A	
Disconnect on fans, HVAC	☐Yes	☐No	☐N/A	
Heat tape in roof drains?	☐Yes	☐No	☐N/A	
Conduits threaded on roof (No EMT)	☐Yes	☐No	☐N/A	
Overhead power lines >8' above roof?	☐Yes	☐No	☐N/A	
Penetrations sealed?	☐Yes	☐No	☐N/A	
Condition	☐Good		☐Fair	☐Poor

Comments ____

____

Electrical 7.3x

EMERGENCY SYSTEMS

1. Emergency Signage

2 Exit Signs in Exit Corridor? ☐Yes ☐No
Door Swings outward at Exit? ☐Yes ☐No
Flashing exit sign if electric? ☐Yes ☐No
Darkrooms or special occupancy? ☐Yes ☐No ☐N/A
Condition ☐Good ☐Fair ☐Poor

Comments ______________________________

2. Emergency Lights

Lighting each exit @ 1 F.C. ☐Yes ☐No
Lighting corridor @ 1 F.C. ☐Yes ☐No
Lighting at rooms ☐Yes ☐No
Condition ☐Good ☐Fair ☐Poor

Comments ______________________________

3. Fire Alarms Systems

Pull Stations 400' O.C. ☐Yes ☐No
Pull Stations @ exits ☐Yes ☐No
Pull Stations @ 48" AFF ☐Yes ☐No
Horn Strobes
All Classrooms - 60 DB Min. ___________DB Actual
All Corridors covered ☐Yes ☐No
80" Max off floor ☐Yes ☐No
Strobes in all areas of common use? ☐Yes ☐No
Strobes 75 cadels #5 minimum ☐Yes ☐No
Condition ☐Good ☐Fair ☐Poor

Comments ______________________________

____

4. Heat/Smoke Detectors

Heat in Boiler Room (190 deg.) ☐Yes ☐No ☐N/A
Heat in Janitor Closet ☐Yes ☐No ☐N/A
Heat Type in Toilet Room ☐Yes ☐No ☐N/A
W/I 15' of anywhere ☐Yes ☐No ☐N/A
More than 24" from S/A Diffuser ☐Yes ☐No ☐N/A
Fixed temp sensor in Entry ☐Yes ☐No ☐N/A
Condition ☐Good ☐Fair ☐Poor

Comments ______________________________

____

Electrical 7.4x

STANDARD ROOM ELECTRICAL

1. Interior Lighting

Voltage	☐277V	☐120V	☐Both
Photocell Switching?	☐Yes	☐No	
Lens Condition	☐Good	☐Poor	
Bulb/Type Condition	☐Good	☐Poor	
PCB Ballasts	☐Yes	☐No	
Lighting Levels (Average)			
Classrooms (50 FC Min)	___________	Food Prep Areas (50 FC Min) ___________	
Gyms (50 FC Min)	___________	Shop_______________	
Corridors (20 FC Min)	___________	Entries_______________	
Office (50 FC Min)	___________	Others_______________	
Condition	☐Good	☐Fair	☐Poor

Comments ____

____

2. Electrical Devices

Switches 48" mounting height (54" if side reach)	☐Yes	☐No	
Receptacles 15" minimum mounting Height	☐Yes	☐No	
Grounding type receptacle	☐Yes	☐No	
Use of extension cords or multiple plug taps?	☐Yes	☐No	
Condition	☐Good	☐Fair	☐Poor

Comments ____

____

SPECIAL PURPOSE ROOM ELECTRICAL

1. Wood Shops

Sawdust Collector?	☐Yes	☐No	☐N/A	
Explosion proof wiring in dust collection bag house	☐Yes	☐No	☐N/A	
Sawdust for equipment	☐Yes	☐No	☐N/A	
E stop for equipment	☐Yes	☐No	☐N/A	
Separated from other Rooms 1 Hour	☐Yes	☐No	☐N/A	
Condition	☐Good		☐Fair	☐Poor

Comments ______________________________

____

2. Auto/Machine Shops

GFCI for general receptacle	☐Yes	☐No	☐N/A	
Explosion proof wiring W/I 18" of floor	☐Yes	☐No	☐N/A	
Explosion proof wiring in any pit or depression	☐Yes	☐No	☐N/A	
E stop for machinery	☐Yes	☐No	☐N/A	
Condition	☐Good		☐Fair	☐Poor

3. Welding Shops

Disconnect W/I sight of welder or lockable?	☐Yes	☐No	☐N/A	
E stop for machinery	☐Yes	☐No	☐N/A	
Condition	☐Good		☐Fair	☐Poor

Comments ______________________________

____

4. Kitchen

GFI W/I 10' of sink?	☐Yes	☐No	☐N/A	
Lighting cleanable?	☐Yes	☐No	☐N/A	
Horn/Strobe?	☐Yes	☐No	☐N/A	
Condition	☐Good		☐Fair	☐Poor

Comments ______________________________

____

Alternative Format Guide for School Facility Condition Surveys

Facility Overview

School District:	
Facility:	
Inspection Date(s):	

Dates of Construction and Additions

	Date	GSF
Original Construction:		
Addition:		
Addition:		
Addition:		
	Total:	

*Confirm dates and GSF with DEED Facility Data Base

Renovations and System Replacement

Date	Description (including renovations as part of above additions)

Survey Team

Name	Firm

Notes

Civil/Site Overview

Synopsis

Water System

Description of Existing Systems

Code Deficiencies

Recommendations

Estimates

Wastewater System

Description of Existing Systems

Code Deficiencies

Recommendations

Estimates

Site Drainage

Description of Existing Systems

Recommendations

Estimates

Site Improvements

Descriptions of Existing conditions

Recommendations

Estimates

Architectural Overview

Synopsis

Exterior Enclosure

Description of Existing Systems

Recommendations

Estimates

Roofing

Description of Existing Systems

Recommendations

Estimates

Walls

Description of Existing Systems

Recommendations

Estimates

Windows and Doors

Description of Existing Systems

Recommendations

Estimates

Interior Overview

Description of Existing Systems

Recommendations

Estimates

Interior Doors and Glazing

Description

Code Deficiancies

Recommendations

Estimates

Interior Finishes and Casework

Description

Code Deficiancies

Recommendations

Estimates

Sturctural Overview

Synopsis

Superstructure System

Description of Existing Systems

Code Deficiencies

Recommendations and Estimates

Foundation System

Description of Existing Systems

Recommendations and Estimates

Mechanical Overview

EXAMPLE MECHANICAL NARRATIVE

The site was visited on Friday, August 5th, 2011 to inspect the mechanical systems for the facility. The building was inspected for conformance of the following adopted codes and standards:

2009	International Building Code (IBC)
2009	International Fire Code (IFC)
2009	International Mechanical Code (IMC)
2009	Uniform Plumbing Code (UPC)
2009	International Fuel Gas Code (IFGC)
2006	International Energy Conservation Code (IECC)
2005	Americans with Disabilities Act Guidelines (ADA)
2010	ASHRAE 62.1-2010 Ventilation for Acceptable Indoor Air Quality

Synopsis

The mechanical systems in the school varied in age and condition. The original school was constructed in 1956; there have been numerous renovation and addition projects. Many of the mechanical systems are nearing the end of their useful life expectancy and should be scheduled for replacement. Ventilation to the school is not provided in accordance with ASHRAE 62.1-2010. The following is a summary of recommendations to address mechanical deficiencies in the school:

1. Replace plumbing fixtures and piping throughout the building.
2. Replace heating piping and heating equipment throughout the building.
3. Upgrade boiler system; replace existing boilers with high efficiency condensing boilers. Replace heating pump system with variable speed pumping system.
4. Replace ventilation systems throughout the building.
5. Replace all pneumatic controls with DDC controls.

Plumbing Systems

Description of Existing Systems

Domestic water and sanitary sewer service is provided to the school by ???. The storm drainage system is connected to ??? <or drains to ???>.

The condition of the plumbing piping is fair to poor. The piping varies in age, it is our understanding that only small sections of the original piping have been replaced. Most of the piping has met or exceeded the typical life expectancy of the domestic water piping. The waste piping is buried and was not available for inspection. The underground piping should be flushed and inspected with a camera to review the condition of the piping.

The plumbing fixtures vary in condition from fair to poor. With the exceptions of the fixtures or valves that have been replaced for routine maintenance, the fixtures are from the original construction or additions to the school. The fixtures vary in age from 30 to 50 years old and are at the end of their useful life expectancy. ADA Accessibility is limited to a few restrooms. Additionally, the fixtures are not water conserving fixtures; water usage at the school could be significantly reduced with the replacement of the fixtures.

Code Deficiencies

Recommended Action

Replace plumbing piping and fixtures building wide. Typical life expectancy for plumbing fixtures is 30 years; the fixtures have met or are near the end of their useful life. Install new water conserving plumbing fixtures and provide upgrades for ADA compliance. Some architectural modifications will be required to provide for more ADA compliant bathrooms. Inspect underground plumbing with camera and repair or replace piping as required. Plumbing piping and fixture replacement in the north wing would be the first priority as this is the oldest piping in the building.

Estimate

Fire Protection Systems

Description of Existing Systems

The fire protection system is a wet sprinkler system installed during the summer of 2009. The system is in good condition.

Code Deficiencies

Recommendation Action

No fire protection upgrades are recommended at this time. Routine testing and inspections in accordance with NFPA 25 should be performed to ensure reliable operation of the sprinkler system.

Heating Systems

Description of Existing Systems

There are two boiler systems in the school. One boiler system is located in the 1983 addition and serves the gymnasium, kitchen, MPR and 1983 classroom addition. The second boiler system is located in the original 1955 boiler room on the east side of the building near the IMC and serves the areas of the school built in 1956, 1957 and 1960.

The boiler system in the 1983 addition consists of two gas-fired cast iron boilers. The boilers are Burnham PF-505 boilers rated at 786,000 BTU/hr gross output each. The boilers were installed in 1983 during the school addition. The boilers are in fair condition for their age but are nearing the end of their useful life expectancy. The boilers are directly piped to the primary heating system pumps, with a three way valve on the supply header that operates to temper heating supply water to the building. The piping as configured does not provide for even flow to each boiler and does not provide minimum return water protection or minimum flow to the boilers. The piping configuration can lead to condensation of flue gases due low temperature, and uneven system heating as each boiler receives part of the flow regardless of boiler operation.

The boiler system in the 1955 boiler room consists of two gas-fired cast iron boilers. The boilers are Burnham PF-510 boilers rated at 1,612,000 BTU/hr gross output each. The date of installation for the boilers is not known, they are approximately 25 years old. The boilers are in fair condition for their age but are nearing the end of their useful life expectancy. Boiler circulation pumps were installed on the boilers in 2003 to provide minimum flow through the boilers.

Both of the boiler systems utilize compression tanks for the heating system that do not have external bladders. These tanks have a tendency to become water logged and do not provide as good of expansion compensation as current bladder style tanks.

The hydronic piping in the building consists of steel and copper piping. The distribution piping in the 1956, 1957 and 1960 areas of the school have exceeded their useful life expectancy. The piping in the 1974 and 1983 additions had sings of leakage but appeared to be in fair condition.

Heating for the school is provided by a combination of in-floor heating, cabinet unit ventilators, perimeter fin tube and heating coils in the air handling units. Miscellaneous unit heaters and cabinet unit heaters are located throughout the school to provide heating to utility areas and vestibules.

The heating system equipment and piping is not seismically restrained in accordance with the IBC. Seismic restraint requirements have increased since the installation of the heating system. The piping insulation in the fan rooms has been damaged and should be repaired/replaced.

Code Deficiencies

Recommended Action

Both of the boiler systems, main system heating pumps and associated piping should be scheduled for replacement. The boilers are nearing the end of their typical life expectancy. The boilers should be scheduled for replacement with high efficiency boilers as they are near the end of their useful life expectancy. The boilers should be consolidated to a single location with only one boiler room and two boilers, to reduce maintenance requirements. Upgrading the boilers to high efficiency condensing boilers with variable speed pumping system would provide significant energy savings over the existing boiler system. Additionally, the existing boiler systems are prone to thermal shock issues, high efficient boilers are designed to operate with low water temperatures eliminating concerns with thermal shock. The heating system pumps, air separator and compression tanks should be replaced with the boilers as they are also near the end of their life expectancy of 30 years.

The heating piping and terminal heating equipment has exceeded its typical life expectancy and should be replaced. The distribution piping and terminal units are approximately 28 to 55 years old.

Seismic restraint for the heating piping and equipment throughout the building should be installed in accordance with the 2009 edition of the IBC. Repair or replace the damaged piping insulation in the fan rooms.

Estimate

Ventilation Systems

Description of Existing Systems

Ventilation for the school is provided by air handling units and cabinet unit ventilators. The ventilation systems in the school are not capable of providing the current ASHRAE 62.1-2007 ventilation rates.
The classroom and office areas in the 1956, 1957 and 1960 areas are ventilated by a central air handling unit located in a fan room adjacent to the boiler room. The air handling unit is a constant volume, built up unit with mixing box and filters. The air handling unit utilizes the corridor as a return air path which is no longer allowed by the IMC. The unit has exceeded its useful life expectancy and does not meet current building codes.

The classrooms in the 1972 addition are ventilated by cabinet unit ventilators. The ventilators draw fresh outside air in low to the ground. The intakes are subject to blockage from snow, and there is the potential for intake of fumes from vehicles in the parking lots depending on wind direction. The path for the relief/exhaust air for classrooms is through the corridor to central relief air fans. Utilizing the corridor as the relief air path is a code violation. The unit ventilators are in fair to poor condition and have exceed their useful life expectancy.

The multi-purpose room and gymnasium are ventilated by constant volume air handling units.
The air handling units that serves the MPR is from the 1974 addition. Two air handling units serve the gym, the units were installed in the 1983 addition. Supply air ductwork is routed above the ceilings to ceiling diffusers in the MPR and gym. The MPR return air is by ceiling return air plenum open to the fan room. The gym return air is ducted back to the two air handling units. The MPR unit has exceeded it useful life expectancy. The gymnasium air handling units are nearing the end of their useful life expectancy and should be scheduled for replacement.

Ventilation for bathrooms is provided by a combination of central and local exhaust fans. The exhaust airflow rates for the bathrooms are below current code requirements. Most of the exhaust fans have met or are exceeding their useful life expectancy.

The kitchen in the elementary school does not have a hood above the convection oven. The kitchen is ventilated by a roof mounted exhaust fan. The kitchen ventilation system does not comply with ventilation codes. The combustion air systems for the boilers are engineered systems with boiler room ventilation fans and relief air/combustion air opening.

The ventilation system equipment and ductwork is not seismically restrained in accordance with the 2009 edition of the IBC. Seismic restraint requirements have increased since the installation of the ventilation systems. The insulation tape on the ductwork insulation in the fan rooms is failing off and should be replaced.

Code Deficiencies

Recommendations

Perform a building wide ventilation upgrade to replace ventilation equipment that is at or beyond its useful life expectancy. Install new ventilation equipment to comply with ASHRAE 62.1-2007. Install new Type 2 hood for the kitchen with exhaust fan sized for the equipment served. Install seismic restraint for the ventilation equipment and ductwork in accordance with the 2006 edition of the IBC.

Estimate

Control Systems

Description of Existing Systems

The controls systems used in the building are a combination of direct digital control (DDC) controls and pneumatic controls systems. Direct digital control (DDC) control systems are installed for the boilers, air handling units and for building monitoring, but pneumatic actuators are still utilized on the valve and dampers. The individual classroom and office controls are primarily pneumatic. The pneumatic system has exceeded its useful life expectancy and should be replaced. Typical life expectancy for pneumatic control systems is 20 to 30 years.

Recommendations

The pneumatic controls should be replaced with a building wide DDC system in accordance with ASD Standards. The DDC system will provide better occupant comfort, will allow for night setback thermostat operation to decrease energy use and will allow for remote monitoring of the school mechanical systems.

Estimate

Electrical Overview

Synopsis

Power Distribution System

Description of Existing Systems

Code Deficiencies

Recommendations and Estimates

Wiring and Devices

Description of Existing Systems

Code Deficiencies

Recommendations and Estimates

Lighting System

Description of Existing Systems

Interior

Exterior

Lighting Controls

Recommendations and Estimates

Teleommunications and Data Systems

Description of Existing Systems

Recommendations and Estimates

Fire Alarm Systems

Description of Existing Systems

Code Deficiencies

Recommendations and Estimates

Intercom, Master Clock, Bell Systems

Description of Existing Systems

Recommendations and Estimates

Television Distribution Systems

Description of Existing Systems

Recommendations and Estimates

Security Systems

Description of Existing Systems

Recommendations and Estimates

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

By: Tim Mearig
Facilities Manager

Phone: 465-6906

For: Bond Reimbursement & Grant Review Committee

Date: August 26, 2019

File: G:\SF Facilities\BR_GRCom\Papers\Publications\Cost Model

Subject: 2019 Geographic Area Cost Factors Update

B R I E F I N G P A P E R

Background

In May 2017, the department solicited service from HMS, Inc. to prepare a matrix of applicable geographic area cost factors (GACFs) and to apply those factors to a few test districts. Prior to this effort, the last revisions to the Program Demand Cost Model's GACFs occurred in 2008. Following the completion of this phase one task, the department again contracted with HMS, Inc. in October 2018 to complete a full update of the cost model's GACFs. A final draft of those factors was provided to the department in December 2018 and was presented and reviewed by the BR&GR Committee at the December 12, 2018 meeting. A public comment period on the draft document followed as did a detailed review and comment process within the department. Substantive changes were made to the components of the GACFs as a result of those comments. This paper is to highlight those changes for the Committee and to propose options for next steps.

Discussion

In the December 2018 draft, the consultant presented geographic area cost factors based on 18 elements in seven groups. The final version uses the same seven groups but increases the measured elements to 27, most of them associated with the Risk Factor category. The table below shows these minor differences:

Factor Category	2018 Elements	2019 Elements	Change
General Requirements	Freight	Freight	
	Fuel	Fuel	
	Per Diem	Per Diem	
	Crew Rotation	Duration	
	Equipment	Equipment	
Labor Adjustment	Regional Wages	Regional Wages	
Labor Productivity	Temperature	Temperature	
	Precipitation	Precipitation	
	Topography	Topography	
	Site Soils	Site Soils	
	Weather Days	Wind	☑
Architectural Factors	Envelope Upgrades	Envelope Upgrades	
Structural Factors	Snow Loads	Snow Load	☑
	Wind Load	Wind Load	☑

Factor Category	2018 Elements	2019 Elements	Change
	Seismic Load	Seismic Load	☑
		Weight v. Capacity	☑
Mechanical Factors	Size/Complexity	Equipment Size/Cost	☑
		Distribution Size/Cost	☑
Risk Factor	Anticipated Bidders	Limited Bidder Pool	☑
	Weather Days	Weather Days	☑
		Local Jurisdiction Volatility	☑
		Deteriorated Site Conditions	☑
		Property Loss Impact	☑
		Site Access Restriction	☑
		Project Labor Restrictions	☑
		Project Owner Volatility	☑
		Increased Material Margins	☑

Labor Productivity Changes

The December 2018 factors depended almost entirely on a US Army Corps of Engineers "weather days" chart for Alaska communities/zones. However, this risk-mitigation publication was determined to be too extreme in its factors for normal productivity adjustments. In responding to DEED comments, and their own concerns, the consultant researched additional published climate and productivity measurement documents. Factors for topography and soils were available but weather-related adjustments, particularly from wind, were not found. At the department's encouragement, the consultant established an expert judgment-based, productivity analysis for those areas. The resulting factor adjusted the base costs for labor between -2% and +18%. At the extremes, this factor is the second largest impact of the seven factors.

Structural Factor Changes

The December 2018 structural factor ranged from -1.46% to +18.99%. Review comments suggested the upper range was too high for this single-focus element based solely on the resulting additional weight of structural steel. The 2019 structural factor ranges from -1.31% to +6.2%. After further consultation with structural engineers, a more accurate load factor for wind, snow, and seismic loads was developed along with a factor for a capacity to weight ratio.

Mechanical Factor Changes

In the December 2018 version of the GACFs, the mechanical factor was based on a sampling of past school projects from HMS's 6000+ project inventory. Anchorage projects were compared with available rural projects and a rough-order-magnitude change was determined. The down-side of this approach was the inability to measure a specific response to climate and the assumption that all projects in the selection set were "mechanically equal". Review comments identified abnormalities in the factors assigned to various regions that couldn't be easily explained. Fortunately, the consultant was working on a companion project for energy modeling in the four BEES climate zones and this modeling effort provided some empirical data on HVAC response to geographic regions of the state. The 2019 Mechanical Factor measures boiler system increases by climate zone, based on energy modeling, and used the costs associated with those increases to extrapolate total mechanical system cost, one for equipment, and a second for distribution systems. The December 2018 mechanical factor ranged from +1.32% to +10.96%. The 2019 mechanical factor ranges from -0.34% to 0%. This may, in time, prove to be an over correction.

Risk Factor Changes

A majority of the development effort between the December 2018 and current 2019 factors came in the area of Risk Factors. Absent a solid rubric and risk assessment metric, the 2018 factors only included two factors: number of bidders and weather. The resulting GACF for risk ranged from -2.95% to +18.42%. Although the factor seemed to have a respectable range and reasonable granularity between the low and high elements, with only two elements, it felt incomplete. In rethinking and researching, the consultant proposed use of a Monte Carlo-based probability analysis as the primary risk calculator. Upon agreement, having established that as the appropriate assessment tool, a framework of risk elements, cost impact ranges, and qualitative probabilities was vetted. The resulting risk factor is a statistical probability of how nine specific factors could impact projects in various geographic locations. The more robust factor now ranges from +0.64% to +9.34% with the Anchorage base providing the least risk.

Options

The GACFs are part of the DEED Program Demand Cost Model for Alaskan Schools. This publication is on the BR&GR's 'approval' list as a document closely tied to the CIP process.

Option 1

Approve the developed 2019 geographic area cost factors for use in the DEED Cost Model, 19th edition, when released next April.

Option 2

Issue the developed 2019 geographic area cost factors for a period of additional public comment and return the proposed factors, with any changes, to the Committee for further action.

Option 3

Refer the developed 2019 geographic area cost factors to an existing subcommittee, or newly established subcommittee for additional detailed internal review and return the proposed factors, with any changes, to the Committee for further action.

Option 4

Same as Option 1 but with the additional provision that the consultant's recommendation (p. 13) be implemented that the GACFs be updated *by contract* after one year of use, and every two years thereafter.

Recommendation(s)

Exercise Option 4 to approve use of the 2019 version in next year's cost model and formally update them as part of the contract for the 20th Edition.

PROGRAM DEMAND COST MODEL
GEOGRAPHIC AREA COST FACTOR
Historical Comparison - As of Aug 2019

Geographic Area	6th Ed 1996 Jun-96	7th Ed 1997 Aug-97	8th Ed 1999 Dec-98	9th Ed 2001 Apr-01	9th Ed 2003 Jun-03	9th Ed 2004 Jun-04	10th Ed 2005 Jan-05	10th Ed 2006 Jan-05	11th Ed 2007 Mar-07	% change 2007 to 2008	11th Ed 2008 Mar-08	11th Ed 2009 Apr-09	12th Ed 2010 Apr-10	12th Ed 2011 Apr-11	12th Ed 2012 Apr-12	13th Ed 2013 Apr-13	13th Ed 2014 Apr-14	14th Ed 2015 Apr-15	15th Ed 2016 Apr-16	16th Ed 2017 Apr-17	17th Ed 2018 Apr-18	% change 2018 to 2019	June 2019 Final	DRAFT 18th Ed 2019 Dec-18	Index Change Dec 18-Jun 19
Alaska Gateway	*121.90*	*121.90*	123.90	118.45	118.45	118.45	122.70	122.70	122.70	*2.04%*	125.20	125.20	125.20	125.20	125.20	125.20	125.20	125.20	125.20	125.20	125.20	*-6.35%*	117.25	129.55	-12.30
Aleutian Region	138.20	138.20	149.50	149.50	149.50	149.50	149.50	149.50	149.50	*3.34%*	154.50	154.50	154.50	154.50	154.50	154.50	154.50	154.50	154.50	154.50	154.50	*5.70%*	163.31	163.92	-0.61
Aleutians East Borough	121.90	121.90	126.20	126.20	126.20	126.20	126.20	126.20	126.20	*1.98%*	128.70	128.70	128.70	128.70	128.70	128.70	128.70	128.70	128.70	128.70	128.70	*6.25%*	136.74	126.08	10.66
Anchorage	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	-	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	*0.00%*	100.00	100.00	0.00
Annette Island	*118.90*	*118.90*	121.90	121.90	121.90	121.90	121.90	121.90	121.90	*2.05%*	124.40	124.40	124.40	124.40	124.40	124.40	124.40	124.40	124.40	124.40	124.40	*4.30%*	129.75	121.23	8.52
Bering Strait	*176.50*	*176.50*	176.50	161.09	161.09	161.09	161.09	161.09	176.20	*2.84%*	181.20	181.20	181.20	181.20	181.20	181.20	181.20	181.20	181.20	181.20	177.53	*-11.69%*	156.78	160.48	-3.70
Bristol Bay Borough	*138.20*	*138.20*	126.20	126.20	126.20	126.20	126.20	126.20	126.20	*1.98%*	128.70	128.70	128.70	128.70	128.70	128.70	128.70	128.70	128.70	128.70	128.70	*4.99%*	135.12	138.74	-3.62
Chatham	*130.40*	*130.40*	121.90	121.90	121.90	121.90	121.90	121.90	121.90	*2.05%*	124.40	124.40	124.40	124.40	124.40	124.40	124.40	124.40	124.40	124.40	124.40	*2.06%*	126.96	117.21	9.75
Chugach	*111.40*	*111.40*	107.50	107.50	107.50	107.50	107.50	107.50	107.50	*0.93%*	108.50	108.50	108.50	108.50	108.50	108.50	108.50	108.50	108.50	108.50	108.50	*27.65%*	138.50	137.05	1.45
Copper River	*110.90*	*110.90*	110.90	112.90	112.90	112.90	112.90	112.90	112.90	*0.89%*	113.90	113.90	113.90	113.90	113.90	113.90	113.90	113.90	113.90	113.90	113.90	*-0.30%*	113.56	125.12	-11.56
Cordova City	*118.90*	*118.90*	107.50	107.50	107.50	107.50	107.50	107.50	107.50	*0.93%*	108.50	108.50	108.50	108.50	108.50	108.50	108.50	108.50	108.50	108.50	108.50	*29.92%*	140.96	146.01	-5.05
Craig City	*118.90*	*118.90*	111.40	111.40	111.40	111.40	111.40	111.40	111.40	*0.90%*	112.40	112.40	112.40	112.40	112.40	112.40	112.40	112.40	112.40	112.40	112.40	*14.23%*	128.40	114.97	13.43
Delta/Greely	*110.90*	*110.90*	110.90	114.90	114.90	114.90	117.13	117.13	117.13	*2.13%*	119.63	119.63	119.63	119.63	119.63	119.63	119.63	119.63	119.63	119.63	119.63	*-2.02%*	117.21	125.54	-8.33
Denali Borough	*110.90*	*110.90*	110.90	114.90	114.90	114.90	117.13	117.13	117.13	*2.13%*	119.63	119.63	119.63	119.63	119.63	119.63	119.63	119.63	119.63	119.63	119.63	*-1.94%*	117.31	125.02	-7.71
Dillingham City	*138.20*	*138.20*	111.40	131.04	131.04	131.04	131.04	131.04	131.04	*1.91%*	133.54	133.54	133.54	133.54	133.54	133.54	133.54	133.54	133.54	133.54	133.54	*-1.08%*	132.10	141.79	-9.69
Fairbanks North Star Borough	105.00	105.00	105.00	105.00	105.00	105.00	105.00	105.00	105.00	*0.00%*	105.00	105.00	105.00	105.00	105.00	105.00	105.00	105.00	105.00	105.00	111.83	*-5.39%*	105.80	113.24	-7.44
Galena City	*136.80*	*136.80*	136.80	136.80	136.80	136.80	136.80	136.80	136.80	*1.83%*	139.30	139.30	139.30	139.30	139.30	139.30	139.30	139.30	139.30	139.30	139.30	*3.37%*	144.00	146.09	-2.09
Haines Borough	*118.90*	*118.90*	111.40	111.40	111.40	111.40	111.40	111.40	111.40	*0.90%*	112.40	112.40	112.40	112.40	112.40	112.40	112.40	112.40	112.40	112.40	112.40	*1.15%*	113.69	113.04	0.65
Hoonah City	*130.40*	*130.40*	121.90	121.90	121.90	121.90	121.90	121.90	121.90	*2.05%*	124.40	124.40	124.40	124.40	124.40	124.40	124.40	124.40	124.40	124.40	124.40	*1.01%*	125.66	129.67	-4.01
Hydaburg City	*130.40*	*130.40*	121.90	121.90	121.90	121.90	121.90	121.90	121.90	*2.05%*	124.40	124.40	124.40	124.40	124.40	124.40	124.40	124.40	124.40	124.40	124.40	*5.64%*	131.41	121.06	10.35
Iditarod Area	--	--	149.50	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Iditarod Area - *Yukon River Village*	*136.80*	*136.80*	--	138.05	138.05	138.05	138.05	138.05	138.05	*3.62%*	143.05	143.05	143.05	143.05	143.05	143.05	143.05	143.05	143.05	143.05	143.05	*2.50%*	146.62	158.37	-11.75
Iditarod Area - *Kuskokwim River Village*	*162.10*	*162.10*	--	149.50	149.50	149.50	149.50	149.50	149.50	*3.34%*	154.50	154.50	154.50	154.50	154.50	154.50	154.50	154.50	154.50	154.50	154.50	*-2.69%*	150.34	158.63	-8.29
Iditarod Area - *Landlocked Village*	*136.80*	*136.80*	--	154.73	154.73	154.73	156.90	156.90	156.90	*2.55%*	160.90	160.90	160.90	160.90	160.90	160.90	160.90	160.90	160.90	160.90	160.90	*-4.67%*	153.39	166.68	-13.29
Juneau City/Borough	101.60	101.60	101.60	103.60	103.60	103.60	103.60	103.60	103.60	-	103.60	103.60	103.60	103.60	103.60	103.60	103.60	103.60	103.60	103.60	103.60	*10.51%*	114.49	110.91	3.58
Kake City	*130.40*	*130.40*	121.90	121.90	121.90	121.90	121.90	121.90	121.90	*0.82%*	122.90	122.90	122.90	122.90	122.90	122.90	122.90	122.90	122.90	122.90	122.90	*7.04%*	131.55	128.38	3.17
Kashunamuit	*162.10*	*162.10*	162.10	147.36	147.36	147.36	147.36	147.36	147.36	*3.39%*	152.36	152.36	152.36	152.36	152.36	152.36	152.36	152.36	152.36	152.36	152.36	*3.45%*	157.61	169.82	-12.21
Kenai Peninsula - Kenai/Soldotna	98.60	98.60	98.60	98.60	98.60	98.60	98.60	98.60	98.60	-	98.60	98.60	98.60	98.60	98.60	98.60	98.60	98.60	98.60	98.60	98.60	*6.47%*	104.98	112.11	-7.13
Kenai Peninsula - Homer Area	104.50	104.50	104.50	104.50	104.50	104.50	104.50	104.50	104.50	*0.96%*	105.50	105.50	105.50	105.50	105.50	105.50	105.50	105.50	105.50	105.50	105.50	*3.11%*	108.78	118.12	-9.34
Kenai Peninsula - Remote Villages	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	**138.50**	--	--
Ketchikan Gateway Borough	109.80	109.80	109.80	109.80	109.80	109.80	109.80	109.80	109.80	*0.91%*	110.80	110.80	110.80	110.80	110.80	110.80	110.80	110.80	110.80	110.80	110.80	*9.21%*	121.01	111.95	9.06
Klawock City	*130.40*	*130.40*	121.90	121.90	121.90	121.90	117.90	117.90	121.90	*2.05%*	124.40	124.40	124.40	124.40	124.40	124.40	124.40	124.40	124.40	124.40	124.40	*3.18%*	128.36	115.16	13.20
Kodiak Island Borough - Kodiak	111.40	111.40	111.40	111.40	111.40	111.40	111.40	111.40	111.40	*0.90%*	112.40	112.40	112.40	112.40	112.40	112.40	112.40	112.40	112.40	112.40	112.40	*12.50%*	126.45	125.29	1.16
Kodiak Island Borough - *Village*	--	--	121.90	121.90	121.90	121.90	121.90	121.90	121.90	*2.05%*	124.40	124.40	124.40	124.40	124.40	124.40	124.40	124.40	124.40	124.40	124.40	*11.84%*	139.13	137.87	1.26
Kuspuk	*136.80*	*136.80*	162.10	149.00	149.00	149.00	149.00	149.00	149.00	*3.36%*	154.00	154.00	154.00	154.00	154.00	154.00	154.00	154.00	154.00	154.00	154.00	*-1.66%*	151.45	161.16	-9.71
Lake & Peninsula	--	--	121.90	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lake & Peninsula - Gulf of Alaska Village	*121.90*	*121.90*	--	121.90	121.90	121.90	121.90	121.90	121.90	*2.05%*	124.40	124.40	124.40	124.40	124.40	124.40	124.40	124.40	124.40	124.40	124.40	*25.68%*	156.34	153.96	2.38
Lake & Peninsula - *Bristol Bay Village*	--	--	--	131.04	131.04	131.04	131.04	131.04	131.04	*3.82%*	136.04	136.04	136.04	136.04	136.04	136.04	136.04	136.04	136.04	136.04	136.04	*15.22%*	156.75	157.84	-1.09
Lake & Peninsula - *Landlocked Village*	*138.20*	*138.20*	--	154.73	136.80	136.80	154.73	154.73	154.73	*3.88%*	160.73	160.73	160.73	160.73	160.73	160.73	160.73	160.73	160.73	160.73	160.73	*-4.46%*	153.56	158.13	-4.57
Lower Kuskokwim - Bethel	151.10	151.10	151.10	137.36	137.36	137.36	137.36	137.36	151.10	*3.31%*	156.10	156.10	156.10	156.10	156.10	156.10	156.10	156.10	156.10	156.10	156.10	*-17.31%*	129.08	131.63	-2.55
Lower Kuskokwim - Villages	162.10	162.10	162.10	147.36	147.36	147.36	147.36	147.36	162.10	*3.08%*	167.10	167.10	167.10	167.10	167.10	167.10	167.10	167.10	167.10	167.10	167.10	*-7.50%*	154.56	166.01	-11.45

Geographic Area	6th Ed 1996 Jun-96	7th Ed 1997 Aug-97	8th Ed 1999 Dec-98	9th Ed 2001 Apr-01	9th Ed 2003 Jun-03	9th Ed 2004 Jun-04	10th Ed 2005 Jan-05	10th Ed 2006 Jan-05	11th Ed 2007 Mar-07	% change 2007 to 2008	11th Ed 2008 Mar-08	11th Ed 2009 Apr-09	12th Ed 2010 Apr-10	12th Ed 2011 Apr-11	12th Ed 2012 Apr-12	13th Ed 2013 Apr-13	13th Ed 2014 Apr-14	14th Ed 2015 Apr-15	15th Ed 2016 Apr-16	16th Ed 2017 Apr-17	17th Ed 2018 Apr-18	% change 2018 to 2019	June 2019 Final	DRAFT 18th Ed 2019 Dec-18	Index Change Dec 18-Jun 19
Lower Yukon	*162.10*	*162.10*	169.10	147.36	147.36	147.36	147.36	147.36	162.10	*3.08%*	167.10	167.10	167.10	167.10	167.10	167.10	167.10	167.10	167.10	167.10	167.10	*-2.26%*	163.32	188.34	-25.02
Lower Yukon - Inland River Villages	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	**167.50**	--	--
Mat-Su Borough - Palmer - Willow	97.00	97.00	97.00	99.00	99.00	99.00	99.00	99.00	99.00	*0.00%*	99.00	99.00	99.00	99.00	99.00	99.00	99.00	99.00	99.00	99.00	99.00	*-0.08%*	98.92	102.31	-3.39
Mat-Su Borough - *Other Areas*	--	--	104.50	104.50	104.50	104.50	104.50	104.50	104.50	*0.96%*	105.50	105.50	105.50	105.50	105.50	105.50	105.50	105.50	105.50	105.50	105.50	*0.99%*	106.54	116.34	-9.80
Nenana City	*110.90*	*110.90*	107.50	109.50	109.50	109.50	114.00	114.00	114.00	*2.19%*	116.50	116.50	116.50	116.50	116.50	116.50	116.50	116.50	116.50	116.50	116.50	*-5.30%*	110.32	122.92	-12.60
Nome City	*159.70*	*159.70*	159.70	145.18	145.18	145.18	145.18	145.18	151.10	*3.31%*	156.10	156.10	156.10	156.10	156.10	156.10	156.10	156.10	156.10	156.10	156.10	*-13.61%*	134.85	139.01	-4.16
North Slope Borough - Barrow	165.80	165.80	165.80	150.73	150.73	150.73	150.73	150.73	165.80	*3.62%*	171.80	171.80	171.80	171.80	171.80	171.80	171.80	171.80	171.80	171.80	171.80	*-10.71%*	153.40	171.71	-18.31
North Slope Borough - Villages	177.20	177.20	177.20	161.09	161.09	161.09	161.09	161.09	177.20	*2.82%*	182.20	182.20	182.20	182.20	182.20	182.20	182.20	182.20	182.20	182.20	182.20	*-12.64%*	159.17	197.16	-37.99
North Slope Borough - *Atqasuk/Pt. Lay*	--	--	194.90	177.18	177.18	177.18	177.18	177.18	194.90	*2.57%*	199.90	199.90	199.90	199.90	199.90	199.90	199.90	199.90	199.90	199.90	199.90	*-14.21%*	171.49	199.28	-27.79
Northwest Arctic - Kotzebue	159.70	159.70	159.70	145.18	145.18	145.18	145.18	145.18	145.18	*3.44%*	150.18	150.18	150.18	150.18	150.18	150.18	150.18	150.18	150.18	150.18	150.18	*-3.34%*	145.17	147.64	-2.47
Northwest Arctic - *Villages*	176.50	176.50	176.50	160.45	--	--	160.45	160.45	176.50	*2.83%*	181.50	181.50	181.50	181.50	181.50	181.50	181.50	181.50	181.50	181.50	181.50	--	--	168.01	--
Northwest Arctic - Villages w/ Barge	--	--	--	--	161.09	161.09	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	159.17	--	--
Northwest Arctic - Villages w/o Barge	--	--	--	--	165.00	165.00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	171.49	--	--
Pelican City	130.40	130.40	121.90	121.90	121.90	121.90	121.90	121.90	121.90	*2.05%*	124.40	124.40	124.40	124.40	124.40	124.40	124.40	124.40	124.40	124.40	124.40	*9.23%*	135.88	126.30	9.58
Petersburg Borough	*109.80*	*109.80*	109.80	109.80	109.80	109.80	109.80	109.80	109.80	*0.91%*	110.80	110.80	110.80	110.80	110.80	110.80	110.80	110.80	110.80	110.80	110.80	*15.78%*	128.28	125.13	3.15
Pribilof Island	*138.20*	*138.20*	149.50	156.50	156.50	156.50	159.70	159.70	159.70	*3.13%*	164.70	164.70	164.70	164.70	164.70	164.70	164.70	164.70	164.70	164.70	164.70	*-12.78%*	143.65	142.83	0.82
Sitka City/Borough	*109.80*	*109.80*	109.80	109.80	109.80	109.80	109.80	109.80	109.80	*0.91%*	110.80	110.80	110.80	110.80	110.80	110.80	110.80	110.80	110.80	110.80	110.80	*8.44%*	120.15	105.30	14.85
Skagway Borough	*109.80*	*109.80*	109.80	109.80	109.80	109.80	109.80	109.80	109.80	*0.91%*	110.80	110.80	110.80	110.80	110.80	110.80	110.80	110.80	110.80	110.80	110.80	*2.60%*	113.68	116.14	-2.46
Southeast Island	130.40	130.40	121.90	120.69	120.69	120.69	120.69	120.69	120.69	*2.07%*	123.19	123.19	123.19	123.19	123.19	123.19	123.19	123.19	123.19	123.19	123.19	*3.78%*	127.85	119.43	8.42
Southwest Region	*138.20*	*138.20*	149.50	135.91	135.91	135.91	135.91	135.91	135.91	*3.68%*	140.91	140.91	140.91	140.91	140.91	140.91	140.91	140.91	140.91	140.91	140.91	*8.01%*	152.20	162.02	-9.82
St. Mary's City	*162.10*	*162.10*	162.10	147.36	147.36	147.36	147.36	147.36	154.75	*3.23%*	159.75	159.75	159.75	159.75	159.75	159.75	159.75	159.75	159.75	159.75	159.75	*-8.96%*	145.44	160.15	-14.71
Tanana City	110.90	110.90	107.50	138.05	138.05	138.05	132.15	132.15	132.15	*1.89%*	134.65	134.65	134.65	134.65	134.65	134.65	134.65	134.65	134.65	134.65	134.65	*-2.50%*	131.29	145.44	-14.15
Unalaska City	121.90	121.90	116.50	126.20	126.20	126.20	135.00	135.00	135.00	*3.70%*	140.00	140.00	140.00	140.00	140.00	140.00	140.00	140.00	140.00	140.00	140.00	*-9.26%*	127.04	125.81	1.23
Valdez City	*104.50*	*104.50*	104.50	104.50	104.50	104.50	108.30	108.30	108.30	*0.92%*	109.30	109.30	109.30	109.30	109.30	109.30	109.30	109.30	109.30	109.30	109.30	*17.21%*	128.11	144.36	-16.25
Wrangell City/Borough	*109.80*	*109.80*	109.80	109.80	109.80	109.80	109.80	109.80	109.80	*0.91%*	110.80	110.80	110.80	110.80	110.80	110.80	110.80	110.80	110.80	110.80	110.80	*13.85%*	126.15	121.04	5.11
Yakutat Borough	118.90	118.90	111.40	114.40	114.40	114.40	114.40	114.40	114.40	*0.87%*	115.40	115.40	115.40	115.40	115.40	115.40	115.40	115.40	115.40	115.40	115.40	*23.54%*	142.57	145.23	-2.66
Yukon Flats	--	--	136.80	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Yukon Flats - *Village on Road System*	*119.90*	*119.90*	--	120.45	120.45	120.45	120.45	120.45	120.45	*2.08%*	122.95	122.95	122.95	122.95	122.95	122.95	122.95	122.95	122.95	122.95	122.95	*-3.12%*	119.11	128.23	-9.12
Yukon Flats - Village on River	*136.80*	*136.80*	--	136.80	136.80	136.80	136.80	136.80	136.80	*3.65%*	141.80	141.80	141.80	141.80	141.80	141.80	141.80	141.80	141.80	141.80	141.80	*9.16%*	154.79	162.59	-7.80
Yukon Flats - *Landlocked Village*	*136.80*	*136.80*	--	154.73	154.73	154.73	154.73	154.73	154.73	*3.23%*	159.73	159.73	159.73	159.73	159.73	159.73	159.73	159.73	159.73	159.73	159.73	*-0.81%*	158.43	169.73	-11.30
Yukon-Koyukuk	--	--	149.50	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Yukon-Koyukuk - *Village on Road System*	*110.90*	*110.90*	--	120.45	120.45	120.45	120.45	120.45	120.45	*2.08%*	122.95	122.95	122.95	122.95	122.95	122.95	122.95	122.95	122.95	122.95	122.95	*-1.07%*	121.64	129.44	-7.80
Yukon-Koyukuk - *Village on Yukon River*	*136.80*	*136.80*	--	136.80	136.80	136.80	136.80	136.80	136.80	*3.65%*	141.80	141.80	141.80	141.80	141.80	141.80	141.80	141.80	141.80	141.80	141.80	*0.00%*	141.80	167.60	-25.80
Yukon-Koyukuk - Village on Koyukuk River	*136.80*	*136.80*	--	149.50	149.50	149.50	149.50	149.50	149.50	*3.34%*	154.50	154.50	154.50	154.50	154.50	154.50	154.50	154.50	154.50	154.50	154.50	*11.01%*	171.51	183.05	-11.54
Yupiit	162.10	162.10	162.10	147.36	147.36	147.36	147.36	147.36	147.36	*3.39%*	152.36	152.36	152.36	152.36	152.36	152.36	152.36	152.36	152.36	152.36	152.36	*-4.50%*	145.51	147.10	-1.59

Geographic Area Cost Factors Study

Final Report prepared for DEED

July 2, 2019
HMS Inc.

Geographic Area Cost Factors Study

Final Report

Prepared for

Tim Mearig
Project Director
Alaska Department of Education and Early Development
PO Box 110500, Juneau, AK 99811 – 0500

Prepared by

Alexander Mannion, Project Estimator
Kent Gamble, Principal
HMS Inc. 4103 Minnesota Drive, Anchorage AK 99503
Tel. 907.561.1653

Ref. HMS Inc. Job #18086

Date
July 2, 2019

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LIST OF EQUATIONS

List of Acronyms

ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers
BEES	Building Energy Efficiency Standard
DEED	Department of Education and Early Development
FICA	Federal Insurance Contributions Act
FUTA	Federal Unemployment Tax Act
GACF	Geographic Area Cost Factors
STD	Standard Deviation

1 INTRODUCTION

The State of Alaska, Department of Education and Early Development (DEED) has used the *Program Demand Cost Model* developed by HMS Inc., to verify and bench-mark costs of new and existing school construction projects. For the development of the *Program Demand Cost Model,* the geographic cost factor was designed to modify the overall cost of the project to provide a more accurate analysis of cost within the state of Alaska.

The development of the factors was an iterative process, with an initial analysis of the scope of the factors developed by HMS in 2017, and then working with DEED to focus the scope and the accuracy of the Geographic Factors. This document contains the methodology, assumptions and analysis performed by HMS for each component of the Geographic Area Cost Factors (GACF). It is the intent of this report to provide a transparent and realistic set of criteria that can be reviewed and updated as additional information becomes available. The updated geographic cost factors for all locations is in Appendix A.

1.1 PURPOSE

With the GACF impacting the cost for the Program Demand Model so significantly it was essential for DEED to have a vetted and fully developed set of transparent, repeatable and scalable factors. To develop the realistic cost burdens of each location additional design/construction criteria was considered; structural and thermal requirements, shortages of skilled labor throughout Alaska (particularly in remote communities), high costs of freight and travel, long equipment rental durations, complicated logistics, and increased risks anticipated by contractors. When designing a project in rural Alaska, it is necessary to consider support for imported labor, additional material to cover loss and damage. Scheduling delays in resources or funding by a matter of weeks can delay construction an entire year in some locations throughout Alaska.

1.2 HISTORY OF GEOGRAPHIC AREA COST FACTORS

The original geographic cost factors were developed by Cliff Hitchins of HMS Inc., for the Department of Education and Early Development in 1978 and were most recently updated in 2008. The utilization of these factors is critical when developing programmatic costs in the challenging landscape that is Alaska construction. The cost factors were originally developed utilizing approximately 20 criteria to incorporate averages of material, freight, equipment costs, and Title 36 labor rates, among many other factors. HMS Inc. was tasked to create a clearly defined methodology and more accurate estimate of the costs associated with the varied locations within the state.

1.3 SCOPE OF PROJECT

Alaska has a land area of 570,380 square miles, with widely variable terrain including over 188,000 square miles of permafrost covered terrain. Annual temperatures for individual locations also vary greatly, with low average annual temperatures of 9.3°F in the north, to averages close to 40°F in the south and along the coast. In addition, there are large climate and weather variations throughout the state, and differing levels of development in infrastructure. To account for this, HMS Inc. has developed an inclusive list of geographic cost factors for the many locations throughout the state with very different conditions affecting the cost of construction.

Several key factors were recognized by local construction and design professionals as affecting the cost of construction an appreciable amount in direct relation to the location of a construction project. General requirements vary from site to site, as well as local costs, and labor productivity. Climate may also affect requirements for structural, architectural, and mechanical design. The cost model allows the incorporation of structural, architectural, and mechanical factors based on requirements for any given location. It was important to analyze rate and factor data for geographical location and makeup of workforce incorporated into the geographic cost factor.

Costs reviewed but omitted from the development of the geographical cost factor include those associated directly with site preparation, site earthwork, site improvements, and site infrastructure. In the design of the *Program Demand Cost Model* these costs are captured in the model by the user inputs, and include anticipated dewatering, shoring, excavating, grading, landscaping, support structures and storm drainage

To develop the individual components of the geographical cost factor, contractors, architects, engineers, and freight handlers were contacted to provide their expertise and experience in Alaska construction. Other sources including publications, reports, and websites were used to further define the cost and percentages associated with factors. To develop the conceptual cost of a school in a location, these factors and considerations were all applied to the model school developed by HMS Inc., as well as the *Program Demand Cost Model.*

2 GENERAL REQUIREMENTS

For the purpose of developing the geographic cost factors, general requirements also include on site general conditions. General requirements and conditions include the site requirements and facility costs associated with a specific project. Administrative requirements can include the cost of submittals, scheduling, inspection, and project documentation. Facility costs can include site management, safety, utilities, project engineers, and other management costs.

General requirements were modified based upon location and include Mobilization, Demobilization, Bonds, and Insurances. Throughout the state of Alaska, highly variable general requirements include freight, crew travel, per diem, equipment, utilities, and fuel. In estimating rural costs, HMS Inc. modified the general requirements of the Model School Building Escalation Study to adjust for location. Freight was the largest increase, followed by travel and per diem for crew, which factored round trip tickets, three-week rotations, and man days on site. Fuel was also locally costed. Fuel costs as indicated for individual locations are based primarily on the Alaska Fuel Price Report dated July 2017 and escalated to current pricing based on the percentage of rise in fuel prices experienced in Anchorage, Alaska, between the date the Alaska Fuel Price Report was published and November 19, 2018. When specific locations were not available in the Alaska Fuel Price Report, a similar location was used. For locations in the North Slope Borough, no fuel subsidies are assumed or included. Community costs for utilities are based on the percentage delta between the Anchorage baseline and the cost for fuel at the subject location, as most remote utilities rely heavily on fuel driven devices.

Freight costs have been calculated based on the delivery of a standard material and equipment package to the referenced sites (Appendix B). Alaska Marine Lines provided budgetary freight quotes to hub locations and the appropriate factors to use for movement of the freight from the hub to the location in question, as necessary. Air freight rates have been assumed at locations where this is typical for freight delivery. See air freight location breakdown in Appendix B. Freight costs do not take into consideration standby time for weather, including barge standby time. It is assumed that contractor risk will provide for this.

The number of man days, utilized for both the calculation of per diem costs and crew rotation air fares, was based on the number of man hours for performance of work for each Uniformat Elemental Category and assumes a similar duration for the purpose of determination of man days regardless of location. Drop in crew productivity and the associated delays are discussed elsewhere in this report. Determination of the percentage of imported crew assumes no more than a 90% imported crew at the most remote locations, 0% imported crew at urban centers, and between 20% and 80% imported crew at the balance of sites throughout the state depending on the availability of local work force as judged by the authors of this report. Per diem rates, where possible, have been taken from the Department of Defense per diem rates for Alaska 2019.

The equipment costs indicated are based on a standardized list anticipated for use on a project as represented by the model school. Equipment includes a flatbed truck, two pick-up trucks, an all-wheel drive articulated boom lift, a scissor lift, a reach type forklift, and a backhoe/loader. The actual equipment used on any given project will vary from this list, however this equipment package serves for development of equipment costs for the purpose of this study. Costs are based on published rates from United Rentals in Anchorage, Alaska. Equipment rates shown in the general requirements cost factor table include costs for part-time mechanic work and are adjusted based on project duration. As such, the standardized equipment package costs will not correspond with the cost indicated for equipment on the general requirements cost factor table.

3 LABOR RATE ADJUSTMENT

There are two Title 36 wage rates for the State of Alaska, and the divide is illustrated in Figure 1.

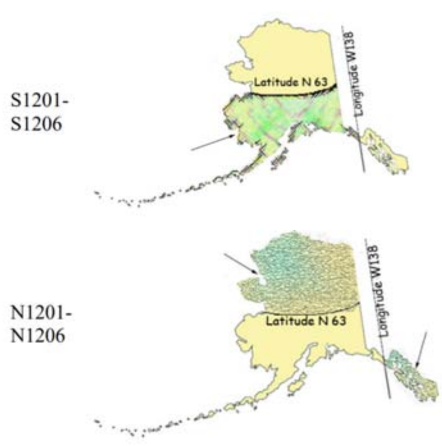

Figure 1. Labor Classification Clarification. *This figure shows the regions separating the two Title 36 labor rates used within the state of Alaska. (Development, 2006)*

With Anchorage as a baseline, the corresponding S1201-S1206 region of the state was set as the base cost for labor. To determine the local costs an overall weight factor was used to adjust the labor cost portion (42.4%) of the Model School Building Escalation Study. The weight factors took into account the total percentage of the job each component of local cost affected, and subsequently adjusted the differences by locations.

Title 36 labor rates are modified within the Model School Bldg. Escalation Study spreadsheet to include FICA and Medicare, FUTA, ESC, Workers' Comp, Taxes, Insurance, and Fringe benefits along with the published Base Hourly rates. Comparing the rates from two regions it was determined that labor cost would increase 1.3% for the N1201-N1206 region of the state based on the standard time wage rate. This along with a weighted factor of 0.422 adjusted the overall project cost 0.55% at any location within the N1201-N1206 region of the state.

4 LABOR PRODUCTIVITY

Labor productivity is the measure of output for construction tasks and is impacted by various factors. The time to construct the structure, move materials on site, and even arrive to the construction site are all costs that the contractor must consider when bidding jobs throughout Alaska. For the geographic considerations and impacts on labor productivity, HMS Inc. evaluated several key metrics.

4.1 LABOR SCORE

For each location, mean temperature, annual precipitation and wind speed data was used to develop a weather-related score, along with general topography and assumed ground/soil type.

$$(Temp + Wind + Precip.) + Topo. + Soil = Score$$

Equation 1 - Labor Score

Temperature was considered as degrees Fahrenheit below 40 as a percentage difference from the base (Anchorage). Wind utilized data gathered during the evaluation of the structural factor and as a percentage difference from the base while precipitation also considered percentage difference from the base. However, with precipitation ranges being extreme, it was determined by HMS to utilize only 20% of the difference for precipitation for developing the score. This was judged qualitatively from experience during construction.

Topography and Soil type consideration were considered on a general scale of either flat/hilly or dry/wet. Each of these considerations added either 0.5 or 1.0 points to the Risk Score.

4.2 PRODUCTIVITY ADJUSTMENT FACTOR

The final scores for each location ranged from 0.95 through 2.91 as seen in Table 1. To model the impacts of weather and other geographic impacts on productivity the scores were plotted logarithmically as shown in Figure 2, with the score of one equal to 100% (or the base).

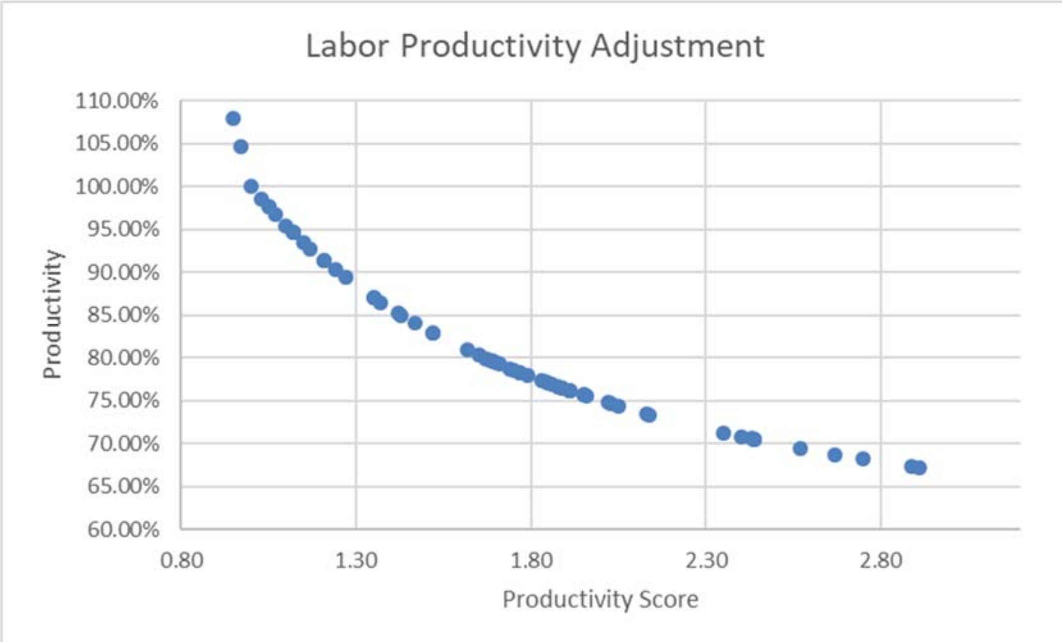

Figure 2 - Labor Productivity Adjustment

Productivity Score	Productivity Adjustment	Productivity Score	Productivity Adjustment
0.95	107.9%	1.75	78.6%
0.97	104.6%	1.77	78.2%
1	100.0%	1.77	78.2%
1.03	98.5%	1.79	77.9%
1.05	97.6%	1.83	77.3%
1.05	97.6%	1.84	77.2%
1.07	96.7%	1.85	77.0%
1.1	95.5%	1.86	76.9%
1.12	94.6%	1.88	76.6%
1.12	94.6%	1.88	76.6%
1.12	94.6%	1.89	76.5%
1.15	93.5%	1.89	76.5%
1.17	92.7%	1.91	76.2%
1.21	91.3%	1.91	76.2%
1.21	91.3%	1.91	76.2%
1.24	90.3%	1.95	75.6%
1.27	89.4%	1.95	75.6%
1.35	87.0%	1.96	75.5%
1.35	87.0%	2.02	74.8%
1.37	86.5%	2.03	74.6%
1.42	85.2%	2.05	74.4%

Productivity Score	Productivity Adjustment	Productivity Score	Productivity Adjustment
1.43	85.0%	2.13	73.5%
1.47	84.0%	2.14	73.4%
1.52	82.9%	2.35	71.3%
1.52	82.9%	2.4	70.8%
1.62	80.9%	2.43	70.6%
1.65	80.3%	2.44	70.5%
1.67	79.9%	2.44	70.5%
1.68	79.8%	2.44	70.5%
1.69	79.6%	2.57	69.5%
1.69	79.6%	2.67	68.7%
1.7	79.4%	2.75	68.2%
1.71	79.2%	2.89	67.3%
1.74	78.7%	2.91	67.2%

Table 1 - Labor Productivity Adjustment

4.3 Productivity Impacts on Cost Factor

With the productivity for each location calculated, HMS Inc. applied this percentage to the labor cost of project. Table 2 contains all the statistics associated with the productivity factor, with the range of adjustment between (-1% through +18%) construction cost due to negative geographic factors as compared to Anchorage, higher wind speeds, colder temperatures, precipitation, poor soil types and hilly environments.

Productivity Factor Statistics	
Average	109.85
Min	99.52
Max	118.38
Mode	101.96
STD	5.73

Table 2 - Productivity Factor Statistics

5 Architectural Factors

Exterior enclosures and roof systems are typically designed differently in far north regions, or rural regions as opposed to urban settings. This is not just for added insulation and durability, but also to provide a simplified construction methodology for use in remote locations.

The model school was developed using a standard model for exterior walls and roof design in Anchorage, Alaska. There are four Building Energy Efficiency Standard (BEES) Zones and two ASHRAE Climate Zones in the state of Alaska. For the purpose of this study, the standard climate one cost assumed was Anchorage. To adjust for the cost of exterior envelope, a second standard envelope was developed utilizing structurally insulated panels, both for higher R value and ease of construction in remote areas. The costs were then compared to create the average of 2.25%

increase in cost for schools in Zone 8. Options for building envelopes are based primarily on the two ASHRAE climate zones, as local designers consulted did not feel that design variations based on the BEES zones would significantly impact the area factors and that BEES driven changes were somewhat discretionary with regard to architectural factors. See mechanical factors for additional information.

6 Structural Factor

With structural design loads varying from location to location, there was a need to develop a methodology for accounting for the variance. In coordination with Reid Middleton, a matrix of Snow, Wind and Earthquake loads for each location was developed. An adjustment factor for all the loads was then determined with the assumption that the load capacity of the steel frame was not linearly correlated to the weight of the steel members.

6.1 Location Load Factors

In consultation with Reid Middleton, a matrix with all the Snow, Wind and Earthquake loads for all studied locations was developed. All loads were then compared to Anchorage as the basis of design to develop the increase or decrease in snow, wind or seismic factors for design. See Appendix G.

6.2 Load Capacity Factor

With the understanding that the weight of the steel would not directly correlate with the capacity of the members, an equation was developed to adjust the steel weight of the frame in relation to the load factor previously developed. The primary axis moment capacity was compared to the weight of several W-beam steel members. The members that were chosen were determined to be representative of typical sizing of W-beams in single story, simple frame school construction. As shown in Figure 3, the moment capacity does not correlate linearly to the weight of the member.

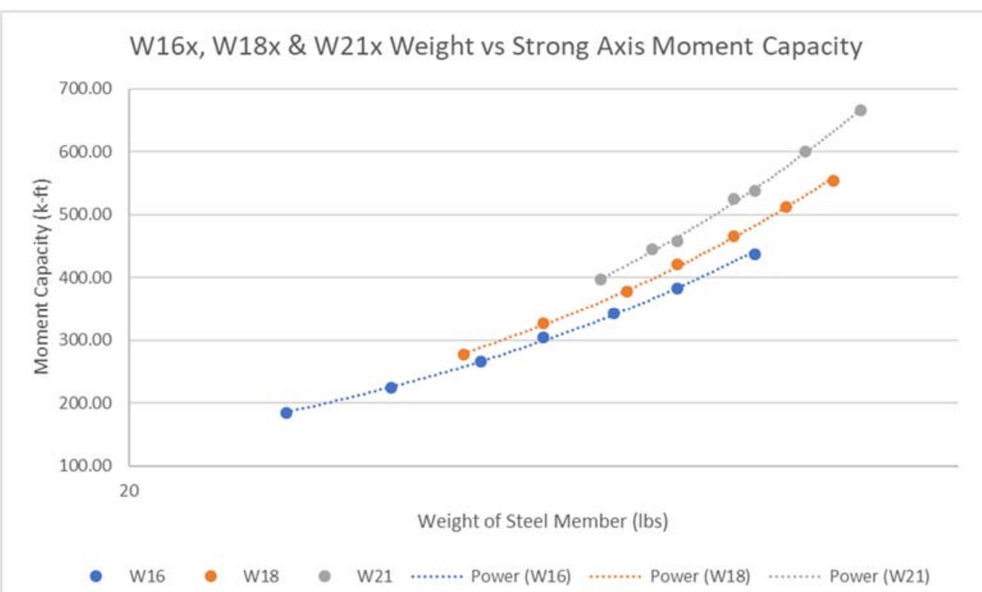

Figure 3 - Steel Weight vs Moment Capacity

W16x			50 ksi Steel	
LB/LF	Zx (in^3)	Fy (ksi)	Strong Axis Bending	
26	44.2	50	184.17	k*ft
31	54	50	225.00	k*ft
36	64	50	266.67	k*ft
40	73	50	304.17	k*ft
45	82.3	50	342.92	k*ft
50	92	50	383.33	k*ft
57	105	50	437.50	k*ft

Table 3 W16 Primary Moment Capacity

Averaging the capacities of the three steel sections, an adjustment for the capacity as compared to the weight of steel was developed, as shown in Figure 4. The adjustment was then applied to all the geographically determined structural loads.

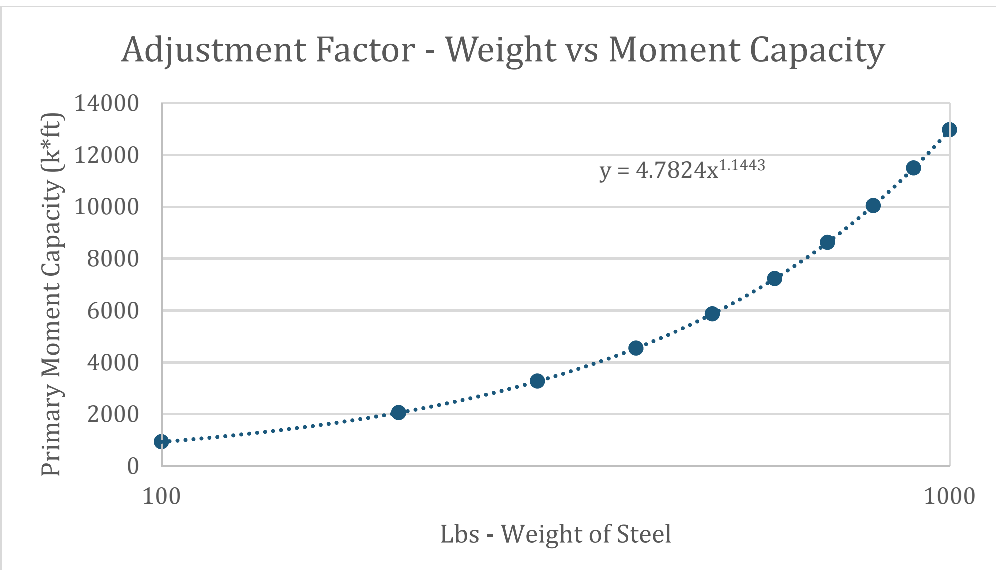

Figure 4. Structural Load Capacity Adjustment

6.3 Structural Adjustment Factor

After adjusting the load factors with the capacity equation developed; Table 4 shows the resulting analysis of the final structural factors. With the average location requiring a 1.83% increase in construction cost due to the increased steel requirements, and the largest impact a 6.20% increase in overall cost due to the additional steel reinforcement required. Appendix H contains the full list of structural factors for each location.

Average	101.83
Min	98.69
Max	106.20
Mode	99.06
STD	1.94

Table 4. Structural Factor Statistics

7 Mechanical Factors

The Mechanical Factor considers the HVAC impact due to climate and weather changes for each of the four BEES zones as the only cost driver. Commonly when developing conceptual costs for equipment, parametric estimating is utilized. HMS Inc. used data gathered during an Energy Modeling Study to evaluate the potential sizes of equipment in relation to climate demands and modeled the cost of the HVAC system using both parametric techniques for the equipment sizing, and capacity factors for the terminal equipment and piping of the system.

7.1 Analysis of HVAC Systems

Analysis of boiler sizing for the BEES zones was conducted by Coffman Engineers during a concurrently developed energy modeling study for building ratios throughout Alaska. Table 5 contains all the boiler sizing for separate building iterations developed in each of the four BEES zones. While climate zones 7&8 were within 1% of the average boiler size, Zones 9 and 6 were (+/-) 10% respectively from the average.

Boiler Size in BTUH			
Zone 6	Zone 7	Zone 8	Zone 9
1121	1253	1265	1385
1011	1146	1245	1350
1121	1253	1265	1385
1148	1270	1277	1407
1152	1248	1256	1368
1176	1242	1248	1396
1111	1245	1255	1366
1120	1253	1265	1384
1120	1253	1266	1385
1121	1253	1265	1385
1121	1252	1264	1386
1164	1301	1358	1449
1164	1301	1304	1389
1334	1514	1528	1714
1140	1257	1262	1374
1112	1256	1265	1408
1111	1255	1262	1403
1138.059	1267.765	1285.294	1407.882
-10.72%	-0.55%	0.83%	10.44%

Table 5. Boiler Sizing per BEES Zone

7.2 MECHANICAL ADJUSTMENT FACTOR

Figure 5 shows the range of boiler size as related to labor and install cost utilizing RS Means as a source of cost. Utilizing the chart, the boiler cost was increased or decreased 10% based on the boiler cost from the model school for locations 9 and 6. Changes to boiler sizing has a downstream effect on multiple equipment and material systems throughout the building. For the cost analysis; boilers, pumps, terminal heating equipment and piping (with associated valves and insulation) were size adjusted to alter the cost of the HVAC system.

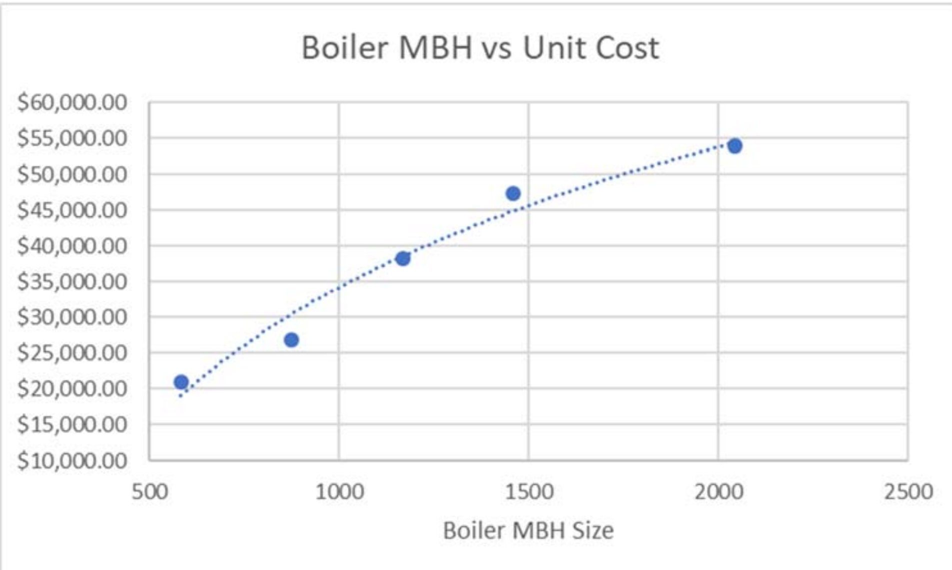

Figure 5. Boiler Size vs Cost for Parametric Estimate

8 RISK FACTOR

To develop realistic cost, various potential risks associated with regions and areas throughout Alaska had to be considered. Risks are not certainties however, and to model the probability and potential cost impacts of risks for each location Monte Carlo or random sampling was used to determine the percentage of cost to include to cover risk throughout the state. Each location was evaluated by DEED and HMS Inc. for the potential risks, probability of occurrence and final cost impact as compared to the potential risk for the base model (Anchorage).

8.1 GEOGRAPHIC RELATED RISKS

Nine risks were considered for all locations throughout Alaska. Appendix K contains all the risks and the associated cost impacts.

1. Local Jurisdiction Volatility
   Risk Description - Potential for construction scope creep due to local community stakeholders (utilities, AHJs, local councils, etc.), including indecision, additional desires, community user wants, etc.
2. Deteriorated Site Conditions
   Risk Description - Anticipated conditions related to site stability and usability not realized at the time of construction.

3. Property Loss Impact
   Risk Description - Contractor acknowledgement of miscellaneous loss to property over the duration of the job.
4. Site Access Restrictions
   Risk Description - Anticipated conditions related to site access not defined at the time of bidding.
5. Limited Bidder Pool
   Risk Description - This is a project owner risk. Location has potential for less than optimal number of bidders leading to increased cost.
6. Weather Days
   Risk Description - Severe weather conditions abnormal to the region or time of year which could delay completion and increase costs.
7. Project Labor Restrictions
   Risk Description - Contractor anticipation of access to labor skills and quantity sufficient to complete the work within normal productivity ranges.
8. Project Owner Volatility
   Risk Description - Levels of project execution experience among owners/teams that cause unforeseen impacts to a contractor's anticipated schedule and efficiency.
9. Increased Materials Margins
   Risk Description - Contractor adjustments to challenges of effectively buying-out a job with 100% accuracy. Includes market volatility.

The nine risks were evaluated for their potential cost impact, and the range shown in Table 6 shows the cost impact range for each risk.

Cost Impact Ranges	Min	Mode	Max
Low	0.25%	1.0%	1.5%
Med	0.5%	2.0%	3.0%
High	1.0%	3.5%	6.0%

Table 6. Risk Cost Impact Ranges

8.2 Probability of Risk

HMS Inc. along with DEED reviewed each location for the probability of the risks in section 8.1. Appendix K contains the full spreadsheet of all locations and risk probabilities. Table 7 is the likelihood of the risk occurring based on High, Medium, Low or None.

Qualitative Probability	
High	70%
Med	50%
Low	30%
None	0%

Table 7. Risk Probability Ranges

8.3 Analysis of Risk

With nine risks and, four probabilities of the risk occurring and 68 locations, there were 2,448 risk inputs analyzed utilizing a random probability methodology. For each location the analysis was run 5,000 times to develop a quantitative risk cost contingency. Appendix K contains the results of the analysis, while Appendix J contains the adjusted risk factor based on Anchorage as the baseline.

Table 8 contains the statistics associated with the total construction cost impact of the risk factor. Through analysis it was determined that the impact of construction risk would increase the cost of construction projects on average 5.48% throughout Alaska, with the most risk likely in locations having a 9.34% increase in construction cost.

Risk Factor Statistics	
Average	105.48
Min	100.00
Max	109.34
Mode	105.24
STD	2.47

Table 8. Risk Factor Statistics

9 Conclusions and Recommendations

Using the *Program Demand Cost Model* and the *Model School Building Escalation Study* along with consultation from local architects, engineers and contractors, HMS Inc. has developed a methodology to consider in 67 unique cost factors to adjust the geographical area cost factors from 2008 to 2019. Foundations and certain unique site concerns are omitted from the overall factor and are considered and accounted for when using the *Program Demand Cost Model.* For more information, please refer to the foundation and site options presented in the latest *Program Demand Cost Model*.

9.1 Geographic Adjustment Factor

This is an estimate of geographic area cost factors based several component factors. The cost factors are based on an institutional building in Alaska using a standard AIA or similar contract. This is merely a guide; actual costs will vary. This study represents only a collection of costs normally found on some construction projects, rather than the custom requirements of a project. This is not an index. This is a geographic area cost factor which includes not merely cost changes and logistical consideration, but also design criteria and how it may be applied in select locations. The calculation used in developing these cost factors are based on reasonable assumptions. Village-to-village costs can vary widely. When using this geographic cost factor, consider how the location for which the estimate is being prepared is different from surrounding places. Regional cost factors are based on general and approximate calculations for anticipated conditions generally found in the area and logistic considerations.

9.2 Comparison of Past and Current Factors

As discussed in Section 1.2, the original geographic factors were developed in 1978 and last updated in 2008. When comparing the new and old factors, the averages and the curve associated with the distribution of cost factors shown in Figure 6 are similar, however there are differences in the extremes. While the old factor had locations at up to +99.9% over the base cost, the current factors max is +83.81% over the base cost, which is a more realistic cost delta in 2019 with better construction means and methods, more competitive freight options, and a better understanding of construction risks in the rural regions of the state.

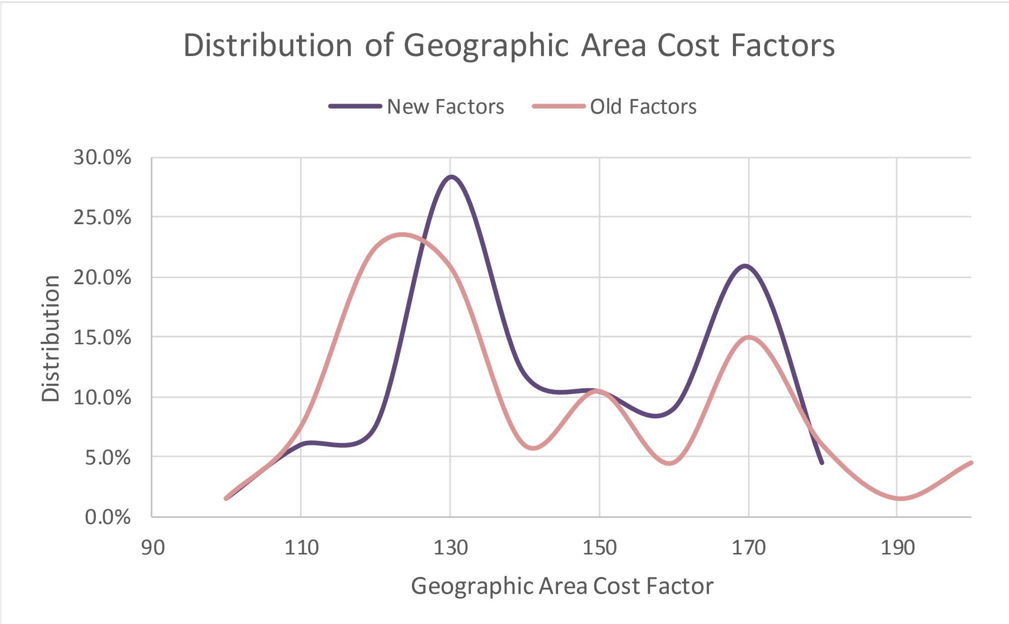

Figure 6. Distribution of Geographic Area Cost Factors

Old Factor Statistics		New Factor Statistics	
Average	133.60	Average	135.97
Min	98.60	Min	98.92
Max	199.90	Max	183.81
Median	124.40	Median	133.47
STD	23.67	STD	19.29

Table 9. Comparison of Old and New GACF

While considering the changes from the previous cost factors or current variations in locations, it is important to review and understand the methodologies outlined in this report. Adjustments may be considered to individual locations, but the causes for adjustment should be delineated based on changes that can be documented and adjusted within the established methodology in order to ensure consistent determination of the revised factors from location to location.

9.3 Recommendations

Design and construction costs throughout the state continue to change rapidly. Temperatures in Alaska are rising at a significantly higher rate than the rest of country. Loss of permafrost and sea level driven coastal erosion are necessitating significant changes to both construction methodologies and site selection criteria. Travel, freight, and fuel costs vary year-to-year along with logistical and general requirement costs for construction throughout the state. With this, it is recommended that this study be updated in one year to incorporate feedback that becomes available through the first year of use. Following this, an update every two years is recommended.

10 REFERENCES

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Weather Days Master for SCR-36 Monthly Anticipated Adverse Weather Delay Work Days Based on a 5-Day Work Week.

11 APPENDICES

A) Table No. 1 Geographic Area Cost Factors 2019
B) General Requirements Back-Up
C) General Requirement Factors Complete
D) Labor Rate Adjustment
E) Labor Productivity Factors Complete
F) Architectural Factors Complete
G) Structural Loads
H) Structural Factors Complete
I) Mechanical Factors Complete
J) Adjusted Risk Factor Table
K) Complete Risk Factor Analysis
L) Equipment Package Location Breakdown

Alaska Department of Education & Early Development

TABLE NO. 1

GEOGRAPHIC AREA COST FACTOR
June 2019

	INDEX	PERCENTAGE
Alaska Gateway	117.25	17.25%
Aleutian Region	163.31	63.31%
Aleutians East Borough	136.74	36.74%
Anchorage (Base)	100.00	0.00%
Annette Island	129.75	29.75%
Bering Strait (North of Nome/Offshore Villages)	156.78	56.78%
Bristol Bay Borough	135.12	35.12%
Chatham	126.96	26.96%
Chugach	138.50	38.50%
Copper River	113.56	13.56%
Cordova City	140.96	40.96%
Craig City	128.40	28.40%
Delta/Greely	117.21	17.21%
Denali Borough	117.31	17.31%
Dillingham City	132.10	32.10%
Fairbanks North Star Borough	105.80	5.80%
Galena City	144.00	44.00%
Haines Borough	113.69	13.69%
Hoonah City	125.66	25.66%
Hydaburg City	131.41	31.41%
Iditarod Area		
Yukon River Village	146.62	46.62%
Kuskokwim River Village	150.34	50.34%
Landlocked Village	153.39	53.39%
Juneau City/Borough	114.49	14.49%

TABLE NO. 1

GEOGRAPHIC AREA COST FACTOR
June 2019

	INDEX	PERCENTAGE
Kake City	131.55	31.55%
Kashunamuit	157.61	57.61%
Kenai Peninsula Borough		
Kenai/Soldotna	104.98	4.98%
Homer Area	108.78	8.78%
* Remote Villages	138.50	38.50%
Ketchikan Gateway Borough	121.01	21.01%
Klawock City	128.36	28.36%
Kodiak Island Borough		
Kodiak	126.45	26.45%
Village	139.13	39.13%
Kuspuk	151.45	51.45%
Lake & Peninsula Borough		
Gulf of Alaska Village	156.34	56.34%
Bristol Bay Village	156.75	56.75%
Landlocked Village	153.56	53.56%
Lower Kuskokwim		
Bethel	129.08	29.08%
Villages	154.56	54.56%
Lower Yukon	163.32	63.32%
* Lower Yukon Inland River/Villages	167.50	67.50%
Mat-Su Borough		
Palmer - Wasilla	98.92	-1.08%
Other Areas	106.54	6.54%
Nenana City	110.32	10.32%
Nome City	134.85	34.85%
North Slope Borough		
Barrow	153.40	53.40%
Villages	180.86	80.86%
Atqasuk/Pt. Lay	183.81	83.81%
Northwest Arctic Borough		
Kotzebue	145.17	45.17%
Villages with Barge Service	159.17	59.17%
* Villages without Barge Service	171.49	71.49%

TABLE NO. 1

GEOGRAPHIC AREA COST FACTOR
June 2019

	INDEX	PERCENTAGE
Pelican City	135.88	35.88%
Petersburg Borough	128.28	28.28%
Pribilof Island	143.65	43.65%
Sitka City/Borough	120.15	20.15%
Skagway Borough	113.68	13.68%
Southeast Island	127.85	27.85%
Southwest Region	152.20	52.20%
St. Mary's City	145.44	45.44%
Tanana City	131.29	31.29%
Unalaska City	127.04	27.04%
Valdez City	128.11	28.11%
Wrangell City/Borough	126.15	26.15%
Yakutat City/Borough	142.57	42.57%
Yukon Flats		
Village on Road System	119.11	19.11%
Village on River	154.79	54.79%
Landlocked Village	158.43	58.43%
Yukon-Koyukuk		
Village on Road System	121.64	21.64%
Village on Yukon River	157.50	57.50%
Village on Koyukuk River	171.51	71.51%
Yupiit	145.51	45.51%

NOTES:

This is an estimate of geographic area cost factors based on averages for materials, freight, equipment costs, and current Title 36 labor rates. The cost factors are based on an institutional building in Alaska using a standard AIA contract or similar contract. This is merely a guide, actual costs will vary.

This is only a guide and not necessarily correct for any specific need. It represents only a collection of costs normally found on some construction projects, rather than the custom requirements of a particular project.

TABLE NO. 1

GEOGRAPHIC AREA COST FACTOR
June 2019

	INDEX	PERCENTAGE

This is not an index. This is a geographic area cost factor which includes not merely cost changes and logistical consideration, but also design criteria and how it is applied in different locations. Such design considerations would normally include standard concrete footings used mostly in Southcentral and Southeastern Alaska, to piling requirements in arctic and sub-arctic, however, as this is a line item in the cost model, it has not been included in these calculations.

The calculation used in developing these cost factors are based on reasonable assumptions. For example, barge freight is mostly included rather than air freight for all materials and equipment. It is also assumed that local labor can be used to the fullest general availability, rather than all imported workers.

* This indicates approximate values for areas included after the compilation of data for the 2019 study was completed. These locations should be refined in the next update.

State of Alaska **Department of Education & Early Development**

Bond Reimbursement & Grant Review Committee

By: Larry Morris
Architect Assistant

Phone: 465-1858

For: Bond Reimbursement & Grant Review Committee

Date: August 26, 2019

File: G:\SF Facilities\BR_GRCom\Papers\ASHRAE 90.1\ASHRAE90.1-2010 Update.docx

Subject: Update Energy Efficiency Standard from ASHRAE 90.1-2010 to 90.1-2013 or 2016

B R I E F I N G P A P E R

Background

In 2010, the legislature passed SB 237 (ch. 93, SLA 2010), requiring the department to institute an energy code for construction and renovations of school facilities. In 2012, the Bond Reimbursement & Grant Review Committee (BRGR) recommended to the state board of education that the American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE) Standard 90.1 version 2010 (90.1-2010) be adopted as the state's energy efficiency standard for school capital projects with state-aid. The recommended energy standard was adopted by the board and became regulation in 2013.

In the six years since adoption, ASHRAE has updated 90.1 every three years with versions 2013, 2016, and 2019 (under development). The question is; does the department also update its energy efficiency code? And, if so, to 2013 or 2016?

Discussion

Most all codes are updated on a tri-annual cycle and 90.1 is one of the codes on this schedule. However, adoption of new standards for 90.1 requires a cost/benefit analysis to determine if the newer standard achieves energy cost reductions at least comparable to the cost of instituting the new standard. Attached are listings of the changes from 2010 to 2013 and from 2013 to 2016.

The significant changes affecting Alaska (zones 7 & 8) school construction are:

2010 to 2013

Envelope

1. Reduces areas requiring daylight controls

HVAC

1. Increases efficiency standards for water-to-air heat pumps (GSHP)
2. Increased efficiency standards for AC units
3. Reduces occupancy thresholds for demand controlled ventilation (classrooms are 50)
4. Increases use of heat recovery
5. Adds controls to Vestibule heat
6. Boiler turn downs over 1 million BTUs

7. Requires boiler flow isolation

Power and Lighting

1. Increases spaces for plug load control and requires labeling
2. Requires some sub-metering
3. Increases areas requiring lighting controls
4. Requires functional testing of lighting controls (commissioning)

<u>2013 to 2016</u>

Envelope

1. Modifies threshold for heated space
2. Adds verification for envelope components (commissioning)
3. Lowers U-factors for vertical fenestrations
4. Lowers U-factors for doors

HVAC

1. Changes threshold for economizers for computer rooms
2. Increases requirement for VAVs in ventilation
3. Lowers threshold for VFDs on relief/return fans
4. Requires insulation for 8' of branch piping in SWH systems
5. Requires replacement equipment to meet new efficiency requirements
6. Requires fault detection on DX equipment with economizers

Power and Lighting

1. Adds occupancy/controls to egress lighting
2. Parking lot lights to have sensors to reduce output by 50% when un-occupied
3. Reduces power allowances for interior and exterior lighting
4. Increases motor efficiencies

There are other changes as itemized in the report, but the above items appear to be the most likely to affect school construction in Alaska.

Additional discussion is that Alaska Department of Transportation and Public Facilities (DOTPF) has its energy efficiency policy set in statute:

> **AS 44.42.067 Retrofits and new construction for energy efficiency; energy efficiency report**.
> (a) Not later than January 1, 2020, the department shall work with other state agencies to retrofit at least 25 percent of all public facilities, starting with those it determines are the least energy efficient, if the department determines that retrofitting the public facilities will result in a net savings in energy costs to the state within 15 years after completion of the retrofits for a public facility and if funding for the retrofits is available.
> (b) A retrofit or deferred maintenance of a public facility performed under this section, to the extent feasible, shall meet or exceed the most recently published edition of the ASHRAE/IESNA Standard 90.1, Energy Standard for Buildings Except for Low-Rise

Residential Buildings, as published by the American Society of Heating, Refrigerating and Air-Conditioning Engineers.

(c) New construction of a public facility under this section shall meet or exceed the most recently published edition of the ASHRAE/IESNA Standard 90.1, Energy Standard for Buildings Except for Low-Rise Residential Buildings, as published by the American Society of Heating, Refrigerating and Air-Conditioning Engineers. . . .

DOTPF and DEED are the two largest providers of facility construction and renovations in the state, and there are occasions where DOTPF provides construction services for DEED-owned properties. There could be some considerations to having the same energy code for the two departments.

Options

Option 1

Option 1 would be to not make any recommendations to revise the energy code and remain with ASHRAE 90.1-2010 as its code under the regulation.

Option 2

Option 2 would be to recommend to the State Board of Education to revise the energy code to ASHRAE 90.1-2013.

Option 3

Option 3 would be to place recommend to the State Board of Education to revise the energy code to ASHRAE 90.1-2016.

Recommendation(s)

I recommend that the committee recommend to the Board of Education the adoption of ASHRAE 90.1-2016 as the department's energy code. This recommendation would make the department current with DOTPF until 2019 edition is adopted. At that point, the department would only be one cycle behind the current code and not two or three code cycles behind. The total of all changes for the two code cycles are not large and many of those are currently being used as part of current construction practices.

Highlights of 90.1-2013 Changes from 90.1-2010

This document highlights most of the changes between 90.1-2010 and 90.1-2013 but is not a complete list. Please refer to the Standard or to the BECP 90.1-2013 training materials for specific details of the changes.

ENVELOPE

- Changes references from clerestory to roof monitor *(Chapter 5)*
- Adds low-e requirements for storm window retrofits *(5.1.3)*
- Clarifies roof insulation requirements, differentiating between roof recovering (on top of existing roof covering) and replacement of roof covering *(5.1.3)*
- Relaxes air leakage requirements for high-speed doors for vehicle access and material transport *(5.4.3.2)*
- Adds specific vestibule requirements for large spaces *(5.4.3.4)*
- Requires roof solar reflectance and thermal emittance testing to be in accordance with CRRC-1 Standard *(5.5.3.1)*
- Reduces the area threshold at which skylights and daylighting controls are required *(5.5.4.2.2)*
- Terms - Modifies daylighting definitions

HVAC

- Equipment Efficiencies
    - Added commercial refrigerators, freezers, and refrigeration equipment
    - Modified minimum efficiency standards for water-to-air heat pumps (water loop, ground water, and ground loop). Proposed cooling EERs and heating COPs are more stringent.
    - Increased minimum efficiency standards for single-package vertical air conditioners and single-package vertical heat pumps
    - Modified minimum efficiency requirements for evaporatively cooled air conditioners greater than or equal to 240,000 Btu/h and less than 760,000 Btu/h and heating type-other
    - Increases the minimum efficiency of open circuit axial fan cooling towers and adds a requirement for all types of cooling towers (minimum efficiency requirements apply to the tower including the capacity effect of accessories which affect thermal performance)

    - Increases SEER and HSPF for air-cooled three-phase commercial air conditioners and heat pumps below 65,000 Btu/h (effective 1/1/2015)
    - Increases cooling efficiency for PTACs
    - Adds efficiency requirements for evaporative condensers with ammonia refrigerants
    - Increases air- and water-cooled chiller efficiencies and exempts water-cooled positive displacement chillers with leaving condenser temperature ≥ 115°F
    - Increases IEER requirements for air-cooled air conditioners and heat pumps and EER requirements for water and evaporatively cooled air conditioners and heat pumps
    - Re-establishes product class for SDHV air conditioners and heat pumps and adds efficiency requirements at <65,000 Btu/h below level of current federal standards
    - Increases boiler efficiency for residential sized (NAECA covered) equipment, <3,000 Btu/h
- Changes optimum start requirement from > 10,000 cfm to any DDC system and adds a requirement that outside air temperature be used in optimum algorithms *(6.4.3.3.3)*
- Establishes limits on using electric or fossil fuel to humidify or dehumidify between 30% and 60% RH except certain applications and requires deadband on humidity controls *(6.4.3.6)*
- Reduces occupancy threshold for demand controlled ventilation from greater than 40 people per 1000 ft^2 to equal to or greater than 25 people per 1000 ft^2 with exemptions for certain occupancies *(6.4.3.8)*
- Reduces the system size and outdoor air thresholds at which energy recovery is required
- Adds control requirements for heating systems in vestibules *(6.4.3.9)*
- Eliminates contingency on DDC system existence for setpoint overlap restrictions, humidification and dehumidification controls, VAV fan control setpoint reset, multiple-zone VAV system ventilation optimization control, hydronic system differential pressure reset by valve position. Instead, it specifies for what system types or sizes DDC is required and minimal functional requirements for DDC systems. *(6.4.3.10)*
- Adds mandatory and prescriptive requirements for walk-in coolers and freezers and refrigerated display cases *(6.4.5 and 6.4.6)*
- Revises high limit shutoff for air economizers *(6.5.1.1.3)* and adds sensor accuracy requirements *(6.5.1.1.6)*
- Relaxes design requirements for waterside economizers for computer rooms *(6.5.1.2.1)*

- Requires humidifiers mounted in the airstream to have an automatic control valve shutting off preheat when humidification is not required, and insulation on the humidification system dispersion tube surface *(6.5.2.4)*
- Added new definition (FEG = Fan Efficiency Grade) and requires each fan has an FEG of 67 or higher as defined by AMCA 205-10 *(6.5.3.1.3)*
- Modified requirement for static pressure sensor location and control requirements for setpoint reset for systems with DDC of individual zones *(6.5.3.2.2)*
- Requires fractional horsepower motors ≥1/12 hp to be electronically-commutated motors or have a minimum 70% efficiency in accordance with 10 CFR 4321 and requires adjustable speed or other method to balance airflow *(6.5.3.5)*
- Establishes minimum turndown for boilers and boiler plants with design input power of at least 1,000,000 Btu/h *(6.5.4.1)*
- Expands the requirements for fan speed control for both chilled water and unitary direct expansion systems and enhances the requirements for integrated economizer control and defines DX unit capacity staging requirements *(6.5.4.3)*
- Addresses fan power limitation pressure drop adjustment credits and adds deductions from allowed fan power for systems without any central heating or cooling as well as systems with electric resistance heating. *(6.5.3.1)* Sound attenuation credit is modified to be available only when there are background noise criteria requirements.
- Establishes chiller and boiler fluid flow isolation requirements so there is no flow through the equipment when not in use *(6.5.4.3)*
- Revises night setback requirements and removes exceptions for climate zones
- Requires VAV dual maximum damper position when DDC system is present and clarifies dual maximum sequence
- Deletes sizing requirements for pipes >24 inches in diameter
- Modified heat rejection equipment (cooling tower) requirements to require that VSD controlled fans operate all fans at the same speed instead of sequencing them, and that open-circuit towers with multiple cells operate all cells in parallel down to 50% of design flow *(6.5.5.4)*
- Reduces design supply fan air flow rate for which energy recovery is required for systems that operate more than 8000 hours per year *(6.5.6.1)*
- Reduces the limits on hot gas bypass as a means of cooling capacity control *(6.5.9)*

- Adds requirements for door switches to disable or reset mechanical heating or cooling when doors without automatic door closers are left open *(6.5.10)*

- Added power usage effectiveness (PUE) as an alternative compliance methodology for data centers *(6.6.1)*

POWER AND LIGHTING

- Increases the spaces where plug shutoff control is required. Clarifies the application of this requirement for furniture systems, lowers the threshold for turn off from 30 to 20 minutes, states a labeling requirement to distinguish controlled and uncontrolled receptacles and restricts the use of plug-in devices to comply with this requirement *(8.4.2)*

- Specifies requirements for installation of basic electrical metering of major end uses to provide basic reporting of energy consumption data to building occupant (8.4.3)

- Nominal efficiencies established in accordance with 10 CFR 431 test procedure for low-voltage dry-type transformers *(8.4.4)*

- Adds control requirements for lighting alterations for interior and exterior applications *(9.1.2)*

- Eliminates the exception for wattage used in spaces where lighting is specifically designed for those with age-related eye conditions or other medical conditions related to the eye, where special lighting or light levels might be needed *(9.2.2.3)*

- Changes the criterion for applying automatic daylighting control for sidelighting and toplighting to a controlled lighting power basis and provides characteristics for the required photo controls *(9.4.1.1)*

- Adds control requirements for secondary sidelighting areas *(9.4.1.1)*

- Requires the use of certain lighting controls in more space types *(9.4.1.1)*

- Reduces the amount of time after occupants vacate a space for lights to be automatically reduced or shut off *(9.4.1.1)*

- Modifies requirements for automatic lighting control for guestroom type spaces. Exceptions to this requirement are lighting and switched receptacles controlled by captive key systems. *(9.4.1.3)*

- Includes loading docks as a tradable surface *(Table 9.4.2.2)*

- Adds more specific requirements for the functional testing of lighting controls, specifically occupancy sensors, automatic time switches and daylight controls *(9.4.3)*

- Updates LPDs in Table 9.5.1 – Building Area Method and Table 9.6.1 – Space-by-Space *(Tables 9.5.1 and 9.6.1)*
- Modifies Table 9.6.2 to include continuous dimming in secondary sidelighted areas, which is now based on an installed wattage rather than area of the space. Eliminates the need for effective aperture calculation. *(Table 9.6.2)*
- Adds a section for submittals *(9.7)*
- *Terms* - Deletes the term clerestory and adds roof monitor and clarifies the definition and changes references from clerestory to roof monitor. Revises several definitions related to daylighting.

ASHRAE Standard 90.1-2016 Code Change Review Summary

Department of Energy (DOE) provides a qualitative and quantitative analysis of impacts of code changes for every code development cycle. The qualitative analysis determines code change addenda applicable to prescriptive and performance code compliance methods that has direct impact on energy use. Furthermore, the qualitative analysis identifies which of the code changes result in an increase or decrease in energy use. This section is summary of the qualitative analysis extracted from the Energy Savings Analysis report for ASHRAE Standard 90.1-2016 (US DOE, 2017).

Summary of code changes addenda included in ASHRAE Standard 90.1-2016 are provided in Table *2*. This table summarizes the number of codes changes for each of the various sections of the code and the number of addenda items that directly impact building energy use.

Table 1 Number of code changes addenda in ASHRAE Standard 90.1 - 2016

Section	Number of Addenda	Number of Addenda with Energy Impact
5. Building Envelope	19	9
6. Heating Ventilation and Air Conditioning	43	26
7. Service Water Heating	4	1
8. Power	2	1
9. Lighting	18	11
10. Other Equipment	3	1
11. Appendices C and G	29	1
12. Normative References	1	1
Various	2	0
Total	121	51

There are 121 code changes addenda included in ASHRAE Standard 90.1 – 2016. Of the 121 code changes addenda, 51 addenda items were identified to have impacts on energy use. And 21 out of the 51 addenda items were identified suitable for the quantitative analysis using simulations (US DOE, 2017). The code change addenda that has energy impacts are provided in Table 2. The 21 addenda items will be quantitatively analyzed to determine the ASHRAE 90.1-2016 code energy impact on the state of Florida.

References:

US DOE 2017. Energy Savings Analysis: ANSI/ASHRAE/IES Standard 90.1-2016. US Department of Energy. Office Energy Efficiency and Renewable Energy. Report. October 2017. https://www.energycodes.gov/sites/default/files/documents/02222018_Standard_90.1-2016_Determination_TSD.pdf. Accessed February, 2018.

Table 2 Commercial Code Change Summary for ASHRAE 90.1- 2016

Addendum	Code Sections Affected	Code Change Summary Between ASHRAE 90.1-2013 and ASHRAE 90.1-2016	Impact on Energy Use	Included in quantitative Analysis	Discussion
a	3.2, 5.1.2.1	Modifies the definition of conditioned space and modifies the heated space criteria table	Decreases Energy Use	No	Lowers the threshold for spaces to be considered heated resulting in a requirement for additional insulation. Excluded from quantitative analysis because the prototype space classifications are held constant from one edition of the standard to the next.
d	6.3.2, 6.4.3.3	Requires deeper thermostat setback for networked guestrooms or those unoccupied for more than 16 hours/day. Also requires ventilation to be turned off when guestrooms are unoccupied.	Decreases Energy Use	Yes	Increases stringency of hotel/motel guest room control.
e	9.1.2	Increases requirements for alterations to existing building lighting systems.	Decreases Energy Use	No	Excluded from quantitative analysis because the analysis considers new construction only and this applies only to existing buildings.
f	9.4.1.1	Changes an exception to the automatic daylight control requirements for daylight areas under skylights from visible transmittance to effective aperture.	Decreases Energy Use	No	Changes an exception that increases stringency. Excluded from quantitative analysis because typical designs as represented by the prototypes do not qualify for the exception.
i	6.5.1	Eliminates separate cooling capacity thresholds for requiring an economizer in computer rooms. Computer rooms will be required to follow the same thresholds as comfort cooling applications.	Decreases Energy Use	Yes	Smaller computer rooms will now need economizers.
j	6.5.3.3	Requires variable air volume (VAV) system ventilation optimization even when energy recovery ventilator (ERV) is installed.	Decreases Energy Use	Yes	Removes the ventilation optimization exception for ERV, making the requirement more stringent.
l	4.2.4, 4.2.5, 5.2.1, 5.2.9 (new section)	Adds verification requirements for envelope components, including insulation, fenestration, doors, and air leakage.	Decreases Energy Use	No	Excluded from quantitative analysis because the analysis does not take credit for verification or commissioning.

Table 2 Commercial Code Change Summary for ASHRAE 90.1- 2016 (continued)

Addendum	Code Sections Affected	Code Change Summary Between ASHRAE 90.1-2013 and ASHRAE 90.1-2016	Impact on Energy Use	Included in quantitative Analysis	Discussion
n	Tables 6.8.1-9, 6.8.1-10	Modifies integrated energy efficiency ratio (IEER) values for air-cooled variable refrigerant flow (VRF) air conditioners and heat pumps above 65,000 Btu/h. The new IEERs are between 15% and 20% more stringent.	Decreases Energy Use	No	Excluded from quantitative analysis because typical designs, as represented by the established prototypes, do not include VRF systems.
q	Table 6.5.3.1-2	Allows only the following systems to use the fan power allowance for fully ducted return and/or exhaust systems: (1) systems required to be fully ducted by code or accredited standards; (2) systems required to maintain air pressure differentials between adjacent rooms.	Decreases Energy Use	No	Reduces fan energy through improved efficiency in other components in designs that utilize ducted return or exhaust by choice. Excluded from quantitative analysis because typical designs as represented by prototypes do not utilize this extra return or exhaust duct credit.
s	6.5.2.1	Relieves parallel fan powered box and dedicated outdoor air system (DOAS) with direct digital control (DDC) from requirements c & d in exception 2 of Section 6.5.2.1.	Decreases Energy Use	No	Increases energy use because it allows some designs to avoid a requirement for two stages of heating. Excluded from quantitative analysis because typical designs as represented by the prototypes do not include perimeter heating or parallel fan-powered terminal units.
u	6.5.7	Applies transfer air requirements more broadly than to just kitchen exhaust systems, and clarifies the sources of transfer air.	Decreases Energy Use	Yes	Makes transfer air requirements more stringent.
v	5.5.4.5	Deletes exception 2 of the fenestration orientation requirement for obstructions to south-facing glazing.	Decreases Energy Use	No	Deletes the exception increasing stringency. Excluded from quantitative analysis because obstructions are not modeled in the prototypes.
w	Multiple, Chapters 3, 4, 5, 6, 9, 12, Appendices A, B, D, E, G, Reference Standard Reproduction Annex (new)	Refers 90.1 to new climatic data based on Standard 169-2013 resulting in changes to climate zone assignments for some locations, the creation of a new climate zone 0, and the addition of criteria for climate zone 0. Adds method for rating the solar reflectance index of walls with glass spandrel area and adjusts criteria for minimum skylight area in climate zone 0.	Increases Energy Use	Yes	This change indirectly affects how climate zones are defined and applied through Standard 90.1. For example, the recent update shifted a relatively small number of locations to warmer climate zones where they were typically subject to less stringent requirements, therefore increasing energy use in those instances. Impacts some counties in south Florida.

Table 2 Commercial Code Change Summary for ASHRAE 90.1- 2016 (continued)

Addendum	Code Sections Affected	Code Change Summary Between ASHRAE 90.1-2013 and ASHRAE 90.1-2016	Impact on Energy Use	Included in quantitative Analysis	Discussion
ac	A9.4	Allows the use of the R-value of an airspace in enclosed cavities with or without insulation (Appendix A). Expands the R-value table in Appendix A (based on Chapter 26 of the 2009 Handbook of Fundamentals).	Decreases Energy Use	No	Sets criteria limiting when the R-value of air spaces may be included in calculations. Excluded from quantitative analysis because it did not change opaque envelope U-factors if assemblies modeled in the prototypes.
ag	6.4.3.9	Limits mechanical cooling to 85°F for vestibules, except when the vestibule is tempered with transfer air or heated with recovered energy.	Decreases Energy Use	No	Limits cooling setpoint in vestibules. Excluded from quantitative analysis because typical designs as represented by the prototypes do not include vestibules with cooling.
ah	9.4.1.1	Clarifies that all lighting, including egress lighting on emergency circuits, shall be turned off when the space is unoccupied with 0.02 W/sf in exception.	Decreases Energy Use	Yes	Increases application of controls for emergency lighting.
ai	5.5.4.1, Tables 5.5-0 through 5.5-8	Prescribes lower solar heat gain coefficient (SHGC) for vertical fenestration in climate zone 0 and lower U-factors for vertical fenestration in climate zones 4 through 8.	Decreases Energy Use	Yes	Requires more stringent window U-factor and SHGC.
aj	6.5.3.2.1, 6.5.3.2.4	Requires return and relief fans larger than 0.5 hp to have variable frequency drive (VFD) control, to maintain building pressure, and to avoid disabling of economizer operation.	Decreases Energy Use	No	Ensures proper pressurization that allows economizers to function more efficiently. Excluded from quantitative analysis because return and relief fans are not explicitly modeled in the prototypes.
ak	6.5.4.1, 6.5.4.3	Addresses a number of issues with hydronic section (6.5.4.1) including removal of the pump power threshold, limiting Section 6.5.4.1 to heating and cooling hydronic systems only, lowering the flow limit exception, and other changes.	Decreases Energy Use	No	Increases application of variable flow hydronic systems and reduces the required minimum flow. Excluded from quantitative analysis because the requirement is standard practice that was already assumed in the prototypes.
al	5.4.3.2	Prescribes air leakage criteria for metal coiling doors in semi-heated spaces.	Decreases Energy Use	Yes	Adds coiling door air leakage requirements.

Table 2 Commercial Code Change Summary for ASHRAE 90.1- 2016 (continued)

Addendum	Code Sections Affected	Code Change Summary Between ASHRAE 90.1-2013 and ASHRAE 90.1-2016	Impact on Energy Use	Included in quantitative Analysis	Discussion
am	9.4.1.2	Increases the parking garage lighting reduction from 30% to 50% in response to no occupancy, specifies a 50% reduction in lighting power in response to the presence of daylighting, and removes a duplicate exception.	Decreases Energy Use	No	Excluded from quantitative analysis because the prototypes do not include parking garages.
as	9.4.1.4	Requires luminaires in parking areas with input power greater than 78W and mounting height less than 24 ft to reduce power by 50% in response to occupancy.	Decreases Energy Use	Yes	Adds parking lot occupancy controls, thereby reducing parking lot lighting use.
aw	6.5.61	Clarifies and limits the exceptions to exhaust air energy recovery requirements (6.5.6.1).	Decreases Energy Use	No	Excluded from quantitative analysis because the exceptions are not used by typical designs as represented by the prototypes.
ay	5.4.3.1.3	Allows non-adhered single-ply roof membranes to qualify as an air barrier material.	Increases Energy Use	No	Increases energy use because it potentially increases heat loss through fluttering. Excluded from quantitative analysis because single-ply non-adhered roofing membranes are not included in the prototypes.
bc	Tables 5.5.0 through 5.5.8	Lowers U-factor criteria for doors.	Decreases Energy Use	Yes	
bi	6.5.2.6	Limits ventilation air heating (DOAS systems).	Decreases Energy Use	No	Limits simultaneous heating and cooling. Excluded from quantitative analysis because the DOAS system in the Large Hotel prototype already meets this requirement.
bj	6.5.4.7	Establishes minimum chilled water coil selection delta T.	Decreases Energy Use	Yes	Reduces pumping energy.
bk	6.5.3.4	Specifies control of fans in fan powered parallel VAV boxes	Decreases Energy Use	No	Includes several control strategies that reduce energy use in fan powered terminal units. Excluded from quantitative analysis because typical design as represented by the prototypes does not employ parallel fan-powered terminal units.

Table 2 Commercial Code Change Summary for ASHRAE 90.1- 2016 (continued)

Addendum	Code Sections Affected	Code Change Summary Between ASHRAE 90.1-2013 and ASHRAE 90.1-2016	Impact on Energy Use	Included in quantitative Analysis	Discussion
bn	6.3.2, 6.5.3.6	Sets maximum outdoor air ventilation design requirements for heat recovery.	Decreases Energy Use	No	Limits outdoor air ventilation, or requires mitigation to make up for increased ventilation. Excluded from quantitative analysis because prototype OA is set at ASHRAE Standard 62.1 limits and is already below the maximum.
bs	Table 6.8.1-10	Increases water-cooled VRF efficiencies.	Decreases Energy Use	No	Excluded from quantitative analysis because typical designs as represented by the prototypes do not include VRF systems.
bt	Table 8.4.4	Updates transformer efficiency requirements.	Decreases Energy Use	No	Excluded from quantitative analysis because transformers are a federally-regulated product.
by	7.4.3	Requires insulation of the first 8 ft of branch piping from recirculating SWH systems.	Decreases Energy Use	Yes	Reduces heat loss from SWH branch piping.
ca	6.5.2.2.1	Reduces the threshold for variable flow heat rejection device fans from 7.5 to 5 hp. Eliminates the exception for climate zones 1 and 2.	Decreases Energy Use	Yes	
cb	6.4.4.1.2, Tables 6.8.2-1, 6.8.2-2, 6.8.2	Increases ductwork insulation requirements.	Decreases Energy Use	No	Increases required duct insulation. Excluded from quantitative analysis because duct heat loss is not accounted for in the prototypes.
ce	Tables 6.5.6.1-1 and 6.5.6.1-2	Raises minimum threshold for energy recovery.	Decreases Energy Use	Yes	Raises minimum exhaust air energy recovery threshold.
cf	6.1.1.3.1	Requires replacement HVACR equipment to meet most Section 6 requirements.	Decreases Energy Use	No	Requires replacement equipment to be more energy-efficient. Excluded from quantitative analysis because analysis considers new construction only.
cg	9.4.2	Reduces exterior lighting power allowances.	Decreases Energy Use	Yes	
ch	Tables 9.5.1 and 9.6.1	Reduces interior lighting power allowances.	Decreases Energy Use	Yes	

Table 2 Commercial Code Change Summary for ASHRAE 90.1- 2016 (continued)

Addendum	Code Sections Affected	Code Change Summary Between ASHRAE 90.1-2013 and ASHRAE 90.1-2016	Impact on Energy Use	Included in quantitative Analysis	Discussion
ci	5.5.4.5	Modifies fenestration orientation requirements.	Decreases Energy Use	Yes	Increases stringency of fenestration orientation requirements.
cq	6.5.5.2.1	Bases variable speed thresholds for heat rejection fans on motor power, including service factor.	Decreases Energy Use	Yes	Includes service factor in the heat rejection VFD threshold, effectively lowering the threshold.
cv	3.2, 10.4.1, Tables 10.8.1, 10.8.2, and 10.8.3	Increases motor efficiencies.	Decreases Energy Use	No	Excluded from quantitative analysis because motors are a federally regulated product not captured in determination.
cy	3.2, 6.4.1.1, Table 6.8.1-14	Adds definition for indoor pool dehumidifier and moisture removal efficiency. Adds new table with efficiency requirements and rating conditions.	Decreases Energy Use	No	Adds new requirements for pool dehumidifiers. Excluded from quantitative analysis because typical designs as represented by the prototypes do not include indoor pools.
dd	6.5.4.2, Table 6.5.4.2	Reduces the threshold for variable flow pumping requirements for chilled water pumps and adds requirement for heating water pumps.	Decreases Energy Use	Yes	
dg	5.4.3.2	Establishes leakage requirements for glazed, power-operated sliding and folding doors. Provides default U-factors for unlabeled metal coiling and other metal non-swinging doors.	Increases Energy Use	No	Allows higher air leakage for glazed, power-sliding and folding doors. Excluded from quantitative analysis because typical designs as represented by the prototypes do not include these doors.
dk	TABLE 6.8.1-7	Increases the minimum efficiency for axial fan closed circuit cooling towers.	Decreases Energy Use	No	Excluded from quantitative analysis because closed circuit cooling towers are not included in the prototypes.
do	9.4.1	Adds efficacy requirements for lighting installed in dwelling units.	Decreases Energy Use	Yes	Requires high efficiency dwelling unit lighting.
dp	9.4.1.1	Adds exception to restriction on automatic energizing of lighting for open office spaces.	Decreases Energy Use	No	Allowing the use of available advanced control systems that were previously not possible to install without the exception. Excluded from quantitative analysis because the exception is not used by typical designs as represented by the prototypes.

Table 2 Commercial Code Change Summary for ASHRAE 90.1- 2016 (continued)

Addendum	Code Sections Affected	Code Change Summary Between ASHRAE 90.1-2013 and ASHRAE 90.1-2016	Impact on Energy Use	Included in quantitative Analysis	Discussion
dq	9.6.2	Reduces retail display lighting adder.	Decreases Energy Use	Yes	
dr	3.2, 9.6.2	Reduces decorative lighting adder.	Decreases Energy Use	No	Excluded from quantitative analysis because the prototypes do not include decorative lighting.
du	6.5.1	Requires water-side economizers for chilled water systems including non-fan systems, such as radiant cooling or passive chilled beam systems.	Decreases Energy Use	No	Expands the application of economizers which reduces the reliance on mechanical cooling for more systems. Excluded from quantitative analysis because typical designs do not include radiant cooling or passive chilled beams.
el	6.3.2, 6.4.3, 6.4.3.12	Adds fault detection requirements for DX equipment with economizers.	Decreases Energy Use	No	Allows fault detection to notify operators that systems are malfunctioning. Excluded from quantitative analysis because the analysis does not take credit for verification or commissioning.

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

Model School

S U B C O M M I T T E E   R E P O R T

August 26, 2019

Mission Statement

To provide minimum criteria and expectations to test the performance of a school's mechanical, electrical, plumbing, fuel, controls and envelope systems; to promote energy efficiency of the school and save operational costs over the life of the building.

Current Members

Don Hiley
Jim Estes
Dana Menendez, ASD
Tim Mearig, DEED
Sharol Roys, DEED

Status Update

Recommendations from 2017 Report to the Legislature:

1) *Enhance the Cost Model for possible use as a cost limit standard to include: a) defining/updating geographic cost factors, b) adding detail to the 4.XX Site Work elements, and c) adding detail to the 11.XX Renovation elements.*

Task 1: Prepare scope, issue an RFQ, award and manage the update.

Status: Cost Model enhancement has been completed by HMS. The 18th Edition is much more complete than previous versions, and now provides more flexibility in the variety of projects that can be estimated. Some usability and functionality issues were found after delivery, but have now been resolved. The updated version is available to public online.

Task 2: Develop regulations, as needed, to establish the Cost Model as a cost limit for projects.

Status: Subcommittee to prepare analysis of need and make recommendation to BR&GR. This has not yet been scheduled. Issues found in the latest version illustrate the difficulty in broadening the Cost Model's scope, and will likely take at least one or two more iterations to work out issues needed to complete this task.

The subcommittee recommended transfer of the committee work plan elements listed below from the subcommittee to the department:

1.1.1	Cost Model As Cost Control Tool		May 18-Dec 20
1.1.1.1.	Analyze, Recommend Cost Model As Cost Control	Dept	Jul 2019

1.1.1.2.	Draft Regulation Language For Cost Control Use	Dept	Jan 2020
1.1.1.3.	Review Draft Reg Language, Recommend To State Board	Committee	Mar 2020
1.1.1.4.	Manage Regulation Development and Implementation	Dept	Dec 2020

Geographic Factors - Subcommittee received and reviewed new geographic factors for the Cost Model. To be shared with the full Committee at September meeting. Department to compare changes made since this was first presented at the December meeting. Does this need further public review?

2) *Establish a process of reviewing model school elements within the Cost Model so that those updates become researched, vetted, and intentional.*

Task 1 & 2: Develop a best-practice strategy for updating model school elements in conjunction with HMS, Inc.. Analyze effectiveness of BR&GR vs. consultant vetting.

Status: Subcommittee and department staff provided a great deal of input and feedback into development of the 18th Edition. More user feedback is anticipated as this version is put into practice during the FY21 CIP cycle. The department will keep the committee apprised of feedback received. Committee should maintain current roll of reviewing model school element changes proposed in each new edition.

Procedures for Updating the Model School File – Need direction: would the Committee support contracting out review of the model file if funding was available annually? Would the Committee support review of the file by a volunteer organization (e.g. A4LE)? These may not be mutually exclusive.

3) *Develop Model Alaskan School standards by building system (ref. DEED Cost Format) needed to ensure cost effective school construction.*

Task 1: Complete outline-level standards for remaining seven systems.

Status: Department has not produced additional draft sections for subcommittee review.

Task 2: Conduct an independent feasibility and cost/benefit analysis on developing outline standards into comprehensive state-level model school standards.

Status: A contract was awarded to the McDowell Group to conduct the feasibility study, which was completed and delivered on July 5, 2019. Along with Department staff and BRGR Committee members, a number of people in state and provincial governments in the US and Canada were interviewed as part of the study. These interviews looked not only the implementation, but also the motivation in adopting standards by these different entities. School equity and efficiency/sustainability appear to be at least as much, if not greater factors in developing standards as cost savings for many.

The study provided good information about potential costs for developing and implementing a standard, either by Department staff or by contracting much of the work out to a consultant. The assumption has been made that implementation of a standard would likely result in cost savings due to relatively low cost to develop and update the standard versus the amount spent on school construction and renovation. A tool was developed, along with the report, to aid in putting together a cost benefit analysis.

Subcommittee discussed the need for more review and input by members of the design community in relation to standards that was somewhat lacking in feasibility study. One of the major questions to be addressed is what level of detail is appropriate in the standards? Subcommittee plans to review examples of standards currently in use by other entities to see how detailed they get in various areas, and seek input to try determine what the level of detail should be for Alaska.

Other issues discussed by the subcommittee, but not resolved, include:

- The cost/benefit analysis is not complete. Information required to make use of the tool provided will take more time and effort to gather.
- Not much input from outside A/E professionals to this point.
- Not much discussion of the downsides of their standards, if any, by other entities. What were pitfalls/lessons learned?
- What is the appropriate level of detail for the standards? Some areas possibly more specific or general than others. Are performance based standards more appropriate for some things?
- Can the standard be maintained over time and not become outdated?
- How do standards integrate with other codes adopted by the state and/or municipalities?
- How do the building systems standards integrate with other aspects of the cost effective construction mandate?

Task 3: Review analysis and publish a handbook or regulations as recommended.

Status: Pending. Anticipated cost of $50,000 is not funded.

4) *As part of describing a Model School, identify school elements that do not further the core educational mission of the school.*

Task 1: Review current Topic Paper and include in Report to Legislature.

Status: Completed January 2018.

Task 2: DEED to develop regulations that define non-core amenities based on legislative direction.

Status: No current action. DEED could use the Legislative Proposal process to advance. Subcommittee would need to make recommendations to Committee. BR&GR recommendations to department.

Schedule

No subcommittee meetings currently scheduled.

Commissioning

SUBCOMMITTEE REPORT

August 27, 2019

Mission Statement

To provide minimum criteria and expectations to test the performance of a school's mechanical, electrical, plumbing, fuel, controls and envelope systems; to promote energy efficiency of the school and save operational costs over the life of the building.

Current Members

Randall Williams PE, PDC Engineers, Chair
William Glumac, UIC Construction
Wayne Marquis, DEED

Industry Partners

Craig Fredeen, Cold Climate Engineering
JaDee Moncur, Support Services of Alaska

Status Update

Recommendations from 2017 Report to the Legislature:

1) *Set standards for which projects require/receive commissioning.*

   Status: Completed.

2) *Set standards for commissioning agents.*

   Status: In Progress.

   DEED drafted a questionnaire for credentialing organizations to show whether their certifications meet the basic requirements listed in regulation. Chair reviewed the questionnaire and approved for use by DEED staff when contacting potential organizations.

   Desired Credentialing Criteria:

   a. Create a commissioning plan, checklists, and functional performance tests for each commissioned system
   b. Coordinate the commissioning team for mechanical, electrical, fuel oil, controls, and building envelope systems
   c. Coordinate the work of the construction contractor, school district, and design team as it pertains to the commissioning process
   d. Witness the functional performance testing

e. Assist in resolution of issues found during commissioning
f. Verify the training of owner maintenance personnel on commissioned systems

Short list of organizations to contact, with candidate certifications:

a. National Environmental Balancing Bureau (NEBB);
    i. Systems Commissioning Administrator (SCA);
b. AABC Commissioning Group (ACG);
    i. Certified Commissioning Authority (CxA);
c. International Certification Board/Testing, Adjusting, and Balancing Bureau (ICB/TABB),
    i. Certified Commissioning Supervisor;
d. Building Commissioning Association (BCA);
    i. Certified Commissioning Professional (CCP);
e. Association of Energy Engineers (AEE).
    i. Certified Building Commissioning Professional (CBCP);
f. University of Wisconsin.
    i. Qualified Commissioning Process Provider (QCxP);
g. American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE).
    i. Commissioning Process Management Professional (CPMP).

3) *Develop system-specific commissioning criteria for use in scope of services.*

Task 1: Develop outline-level standards; get BR&GR approval.

Status: Presented to committee 12/4/17 with "envelope" criteria in draft. Subcommittee to finalize all and present to BR&GR.

Task 2: Conduct an independent feasibility and cost/benefit analysis of creating comprehensive commissioning standards for Alaska school projects.

Status: Currently not funded. Subcommittee could meet to develop a study scope as directed.

Task 3: Review analysis and publish a handbook or regulations as recommended.

Status: Pending.

Schedule

No subcommittee meetings currently scheduled.