SCHOOL HAZARD IDENTIFICATION & RISK MANAGEMENT IN ALASKA

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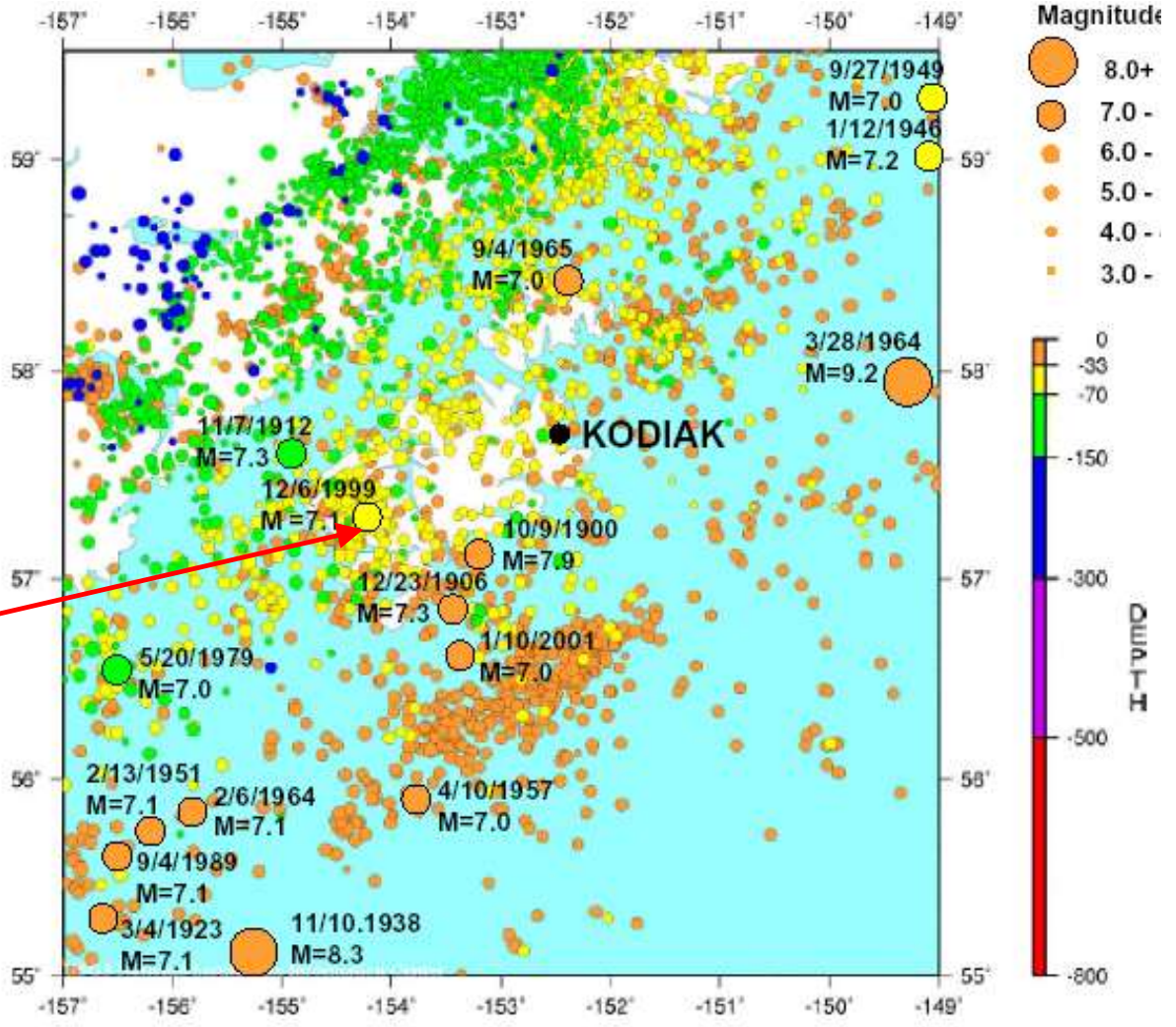
Alaska Capital Engineers / Alaska Professional Design Council:
Legislative Fly-In Luncheon
Juneau, AK – February 9, 2019

Kodiak Region Seismicity

Mw 7.1, 2 pm,
Dec. 6th, **1999**



Kodiak Region Seismicity - NEIC Catalogue
Magnitude 3.0 - 6.9 , 1973 - 2002; Magnitude 7.0 +, 1900 - 2002

Summer 1999, LKelly moves to Kodiak, & soon experiences first earthquake.
Mw 7.1, 2 pm, Dec. 6th, **1999**, weekday, school in session. (Local ground forces greater than 1964 earthquake.) Start working for USCG Facilities Engineering Division, Feb., **2000**.

2001-2003,
Dr. Gary Carver, paleo-seismologist/ geologist works with USCG to identify local seismic hazards.

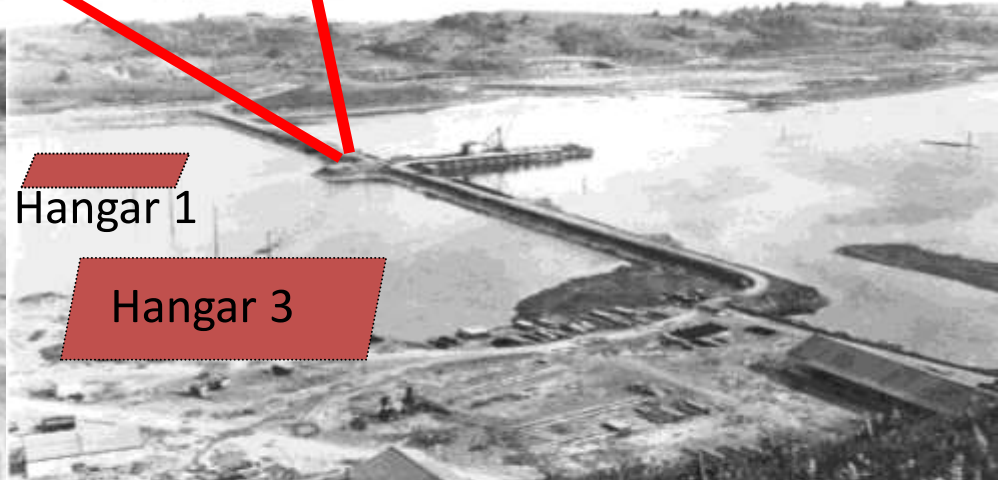
(Carver was one of the original geologist for Alyeska Pipeline.)

Figure 7. Hydraulic fill (dashed red lines) at the upper end of Womens Bay.

Hydraulic Fill Area, USCG Base Kodiak

(Hazard analysis reveals that recent seismic retrofits did not take liquefiable soils into consideration)

Figure 7. Hydraulic fill (dashed red lines) at the upper end of Womens Bay.



Historical Panoramic Photograph of Womens Bay, Kodiak, June 1940.

2003 Report to USCG

Gary Carver/William Lettis & Associates formally identify active fault at LORAN Station, Narrow Cape, Kodiak Island (Fault changes predicted ground motions in IBC).

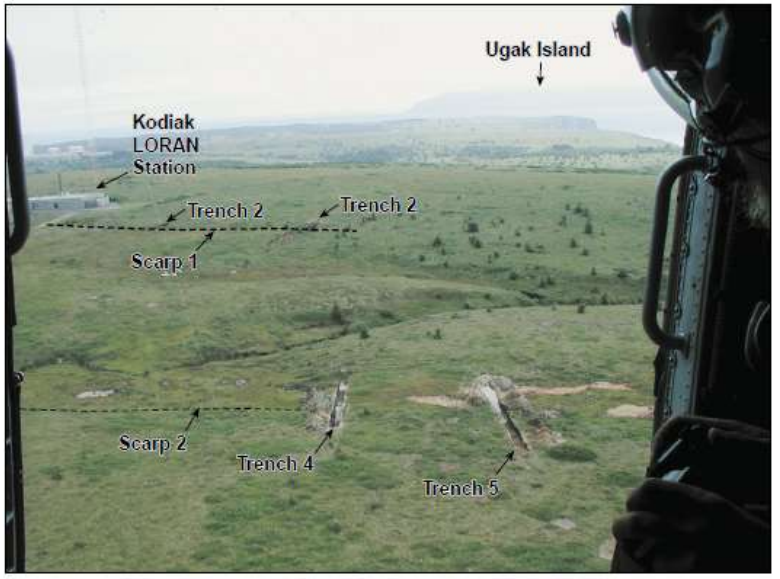


Photo 2. Oblique aerial view of Kodiak LORAN Station and trenches excavated across scarps 1 and 2. Trench 3, located immediately northeast (left) of Trench 1, was excavated after the aerial reconnaissance of the site.

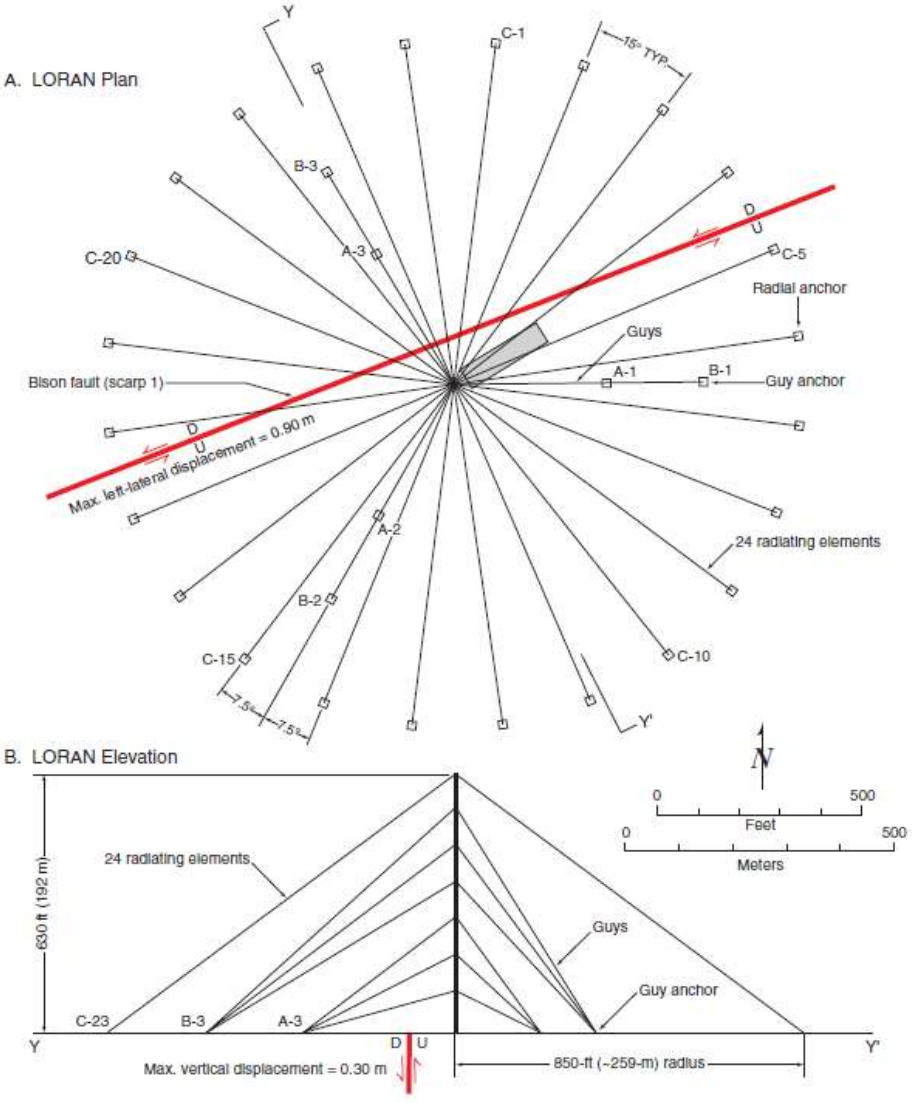
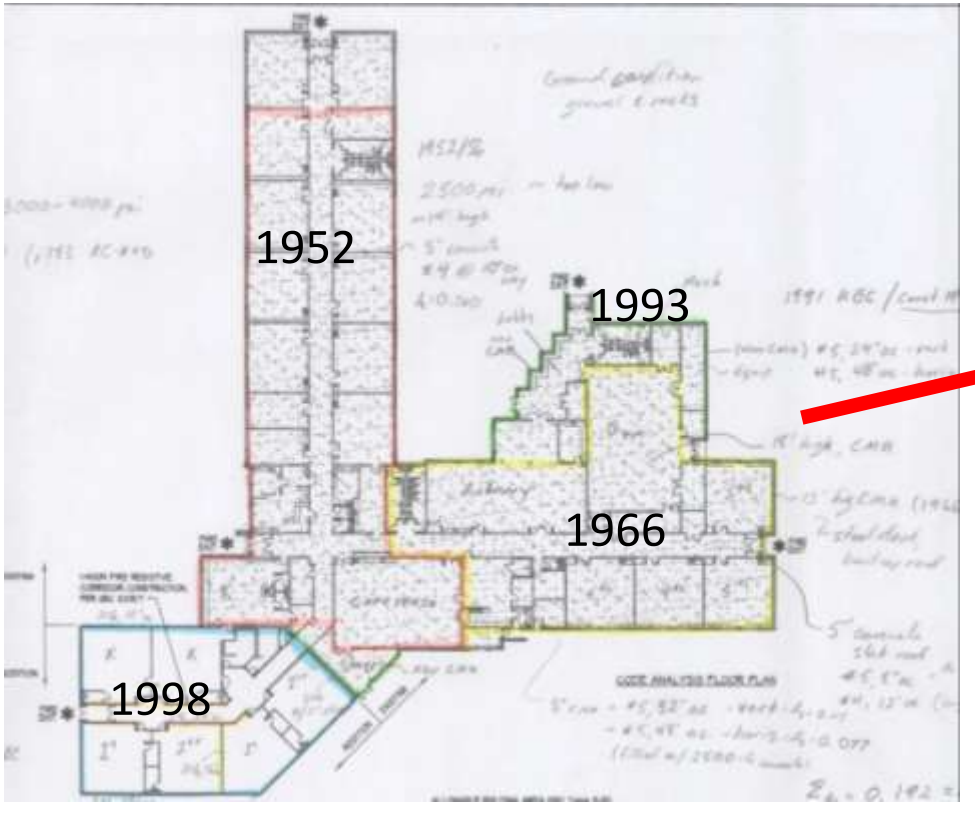


Figure 14. Plan and elevation designs for Kodiak LORAN guy and radial array and anchor system showing location of the Bison fault (scarp 1). Based on paleoseismic trenching of scarp 1, the maximum lateral component of slip (A) assuming a lateral-to-vertical slip ratio of 3:1 is 0.90 m. The maximum vertical component of slip (B) expected is 0.30 m (Table 3).

Lettis & Associates later become involved with school hazard identification in Kodiak. Revised ground forces from LORAN project quantified and incorporated into school analysis.

1499b Kodiak

*(Information excerpted from report to USCG, **2003**.*
Structural Engineer later examines Navy drawings of 1952 school, and identifies flaws in wood ledger board connecting concrete walls to roof.
Formal meeting held to notify school board and PTA, after confirming lack of retrofit with Borough Engineer.)



Peterson Elementary:
280 Students, 40 Staff

(Approx. 200 occupants are USCG family members.)

Peterson Elementary (Borough Property)

Age - This building was constructed by the Navy in the 1950s, and modified by 1966/1993/1998 additions which did not address structural rehabilitation of the original structure that comprises 45% of the total square footage of the building.

Tsunami is a minor threat with a foundation elevation of 48 feet. It was not inundated in 1964.

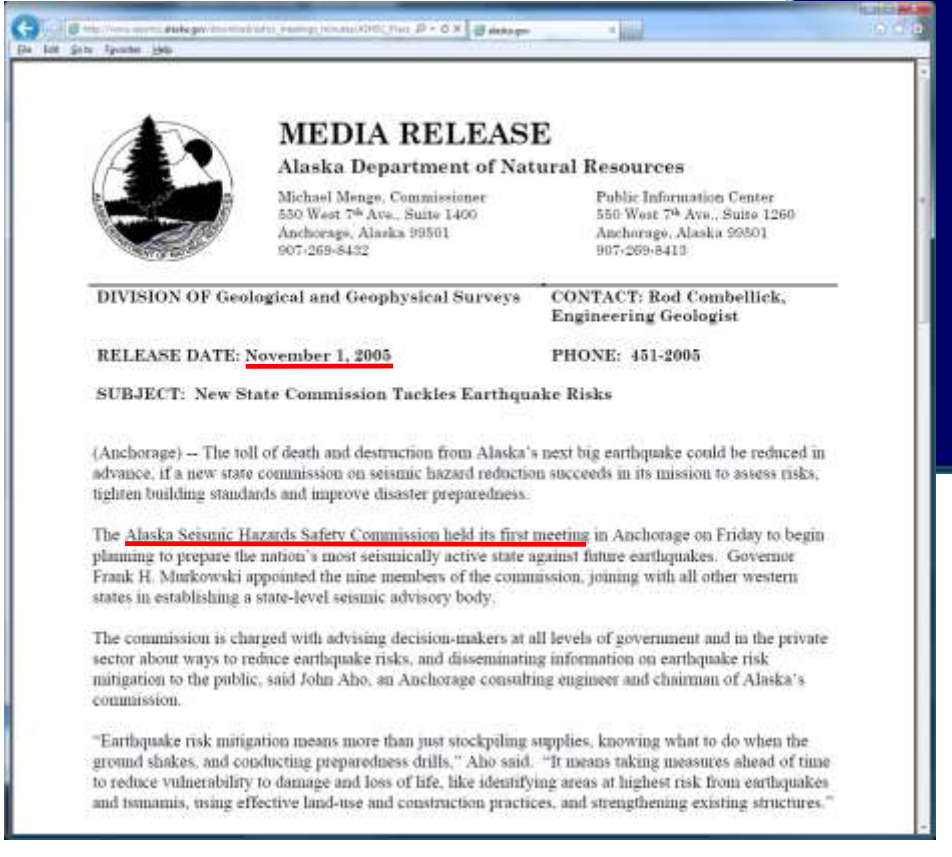
ASHSC Alaska Seismic Hazards Safety Commission

Fall 2005

First meeting held by the ASHSC.

www.seismic.alaska.gov

(11 Members, budget $10K/year)



MEDIA RELEASE

Alaska Department of Natural Resources

Michael Menge, Commissioner
550 West 7th Ave., Suite 1400
Anchorage, Alaska 99501
907-269-8432

Public Information Center
550 West 7th Ave., Suite 1260
Anchorage, Alaska 99501
907-269-8413

DIVISION OF Geological and Geophysical Surveys

CONTACT: Rod Combellick, Engineering Geologist

RELEASE DATE: November 1, 2005

PHONE: 451-2005

SUBJECT: New State Commission Tackles Earthquake Risks

(Anchorage) -- The toll of death and destruction from Alaska's next big earthquake could be reduced in advance, if a new state commission on seismic hazard reduction succeeds in its mission to assess risks, tighten building standards and improve disaster preparedness.

The Alaska Seismic Hazards Safety Commission held its first meeting in Anchorage on Friday to begin planning to prepare the nation's most seismically active state against future earthquakes. Governor Frank H. Murkowski appointed the nine members of the commission, joining with all other western states in establishing a state-level seismic advisory body.

The commission is charged with advising decision-makers at all levels of government and in the private sector about ways to reduce earthquake risks, and disseminating information on earthquake risk mitigation to the public, said John Aho, an Anchorage consulting engineer and chairman of Alaska's commission.

"Earthquake risk mitigation means more than just stockpiling supplies, knowing what to do when the ground shakes, and conducting preparedness drills," Aho said. "It means taking measures ahead of time to reduce vulnerability to damage and loss of life, like identifying areas at highest risk from earthquakes and tsunamis, using effective land-use and construction practices, and strengthening existing structures."

1/5 the size of the "Lower 48"

Pop. 735,000
25% under age 18

49th State, 1959

2006: Formal RVS of all USCG critical structures.

Liquefiable soils and tsunami inundation lines clearly mapped.

By 2014, USCG Base Kodiak had retrofitted 4 Barracks, demolished one and rebuilt another.

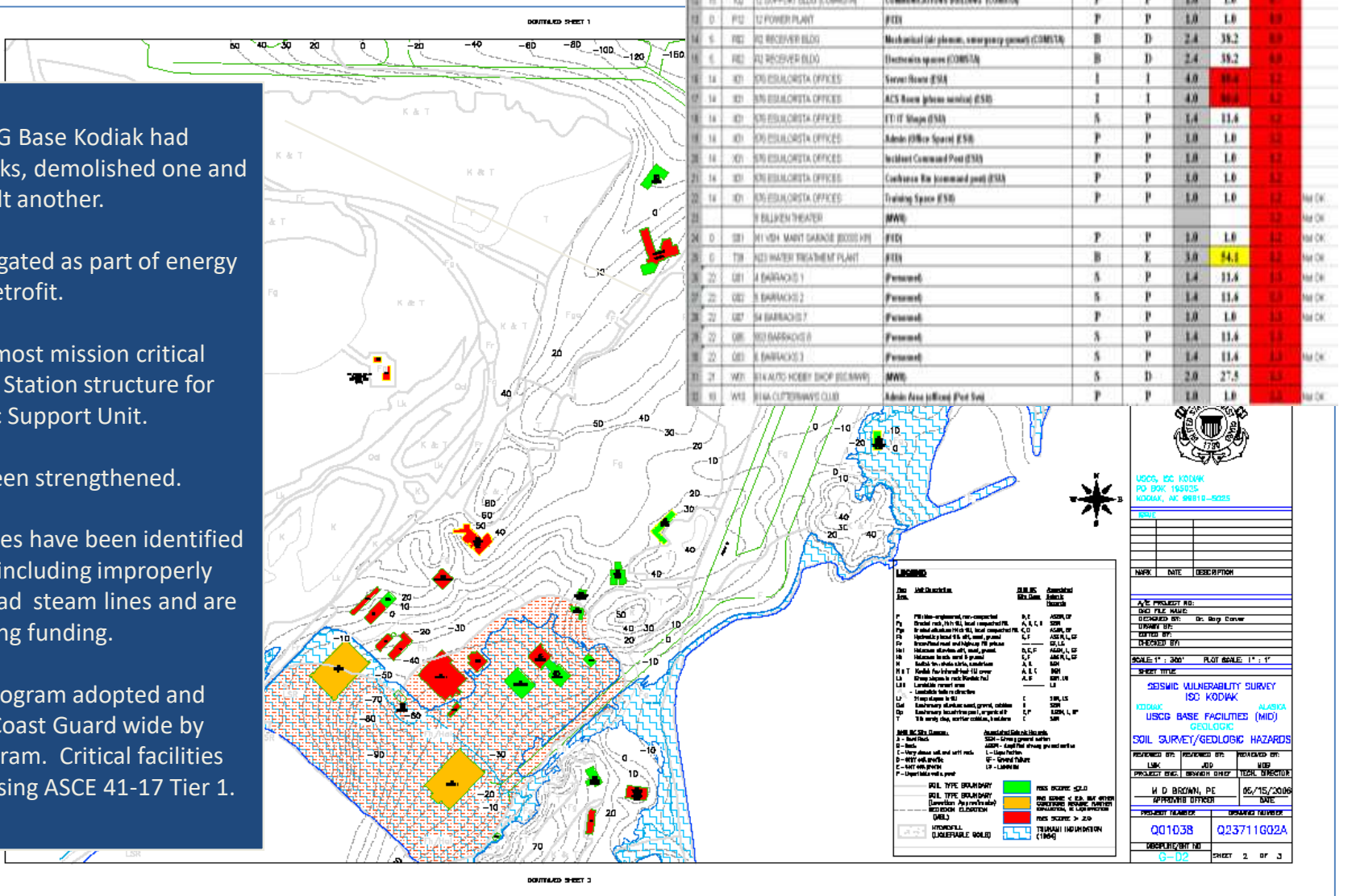
Bowling Alley mitigated as part of energy retrofit.

Retrofitted its most mission critical Communication Station structure for Electronic Support Unit.

Piers have been strengthened.

Non-structural issues have been identified in the Hangars, including improperly supported overhead steam lines and are awaiting funding.

In 2016, RVS program adopted and implemented Coast Guard wide by Engineering Program. Critical facilities being evaluated using ASCE 41-17 Tier 1.



2004-2009
KIBSD Seismically Retrofits Five Schools

2009 Kodiak Island Borough receives WSSPC Overall Award in Excellence for seismic retrofit of schools.

"Kodiak has done a truly exceptional job for a small community, from funding the bond to doing the risk assessment to developing a robust hazard mitigation plan, identifying the schools as a priority and then going forth and fixing the major problems - all in an exceptionally short time. I don't know of any community, of any size, that has done a better job and certainly none that has done more or even anywhere near as much on a per capita basis."
-Ken Goettel, Goettel & Associates, Inc., Oct. 10, 2008

Life Safety Risk

Hazard	Deaths per 1,000,000 people	Statistical Average Deaths Per Year
Vehicle Accident	186	
Middle School	469	0.100
Peterson School	400	0.021
Ouzinkie School	293	0.010
KHS Library	238	0.053
KHS Gym	30	0.001

Life Safety Risk

Hazard	US Deaths per Year	Deaths per 1,000,000 people
Tornado	44	0.18
Lightning	90	0.36
Flood	97	0.39
Assault by knife	2,074	8
Fire	3,380	14
Assault by firearm	11,829	47
Falls	16,257	65
Vehicle Accident	46,466	186

Middle school (old wings) Earthquake Life Safety Risk	
School day occupancy	213
Statistical Deaths per Year	0.0998
Deaths per 1,000,000	469
About 2.5 times vehicle death rate	

Key Findings

School	Cost	Benefits	BCR
Middle	$1,192,000	$8,010,000	6.72
Ouzinkie	$149,000	$975,000	7.55
Peterson	$509,000	$1,862,000	3.66
HS Library	$465,000	$4,453,000	9.59
HS Gym	$410,000	$417,000	1.02
Non-Structural	$363,000	-	
Total	**$3,088,000**	**$15,717,000**	**5.09**

Similar risk correlation to be added to revised FEMA 154 RVS (ATC-71, Fall 2014)

Why Identify and Mitigate????

Proof that Modern Seismic Codes in Schools Can Save Lives:

2008 China Sichuan Earthquake, Mw 7.9 (69,000 deaths, 7,000 schools collapsed)
These two modern school buildings performed well. All occupants survived.

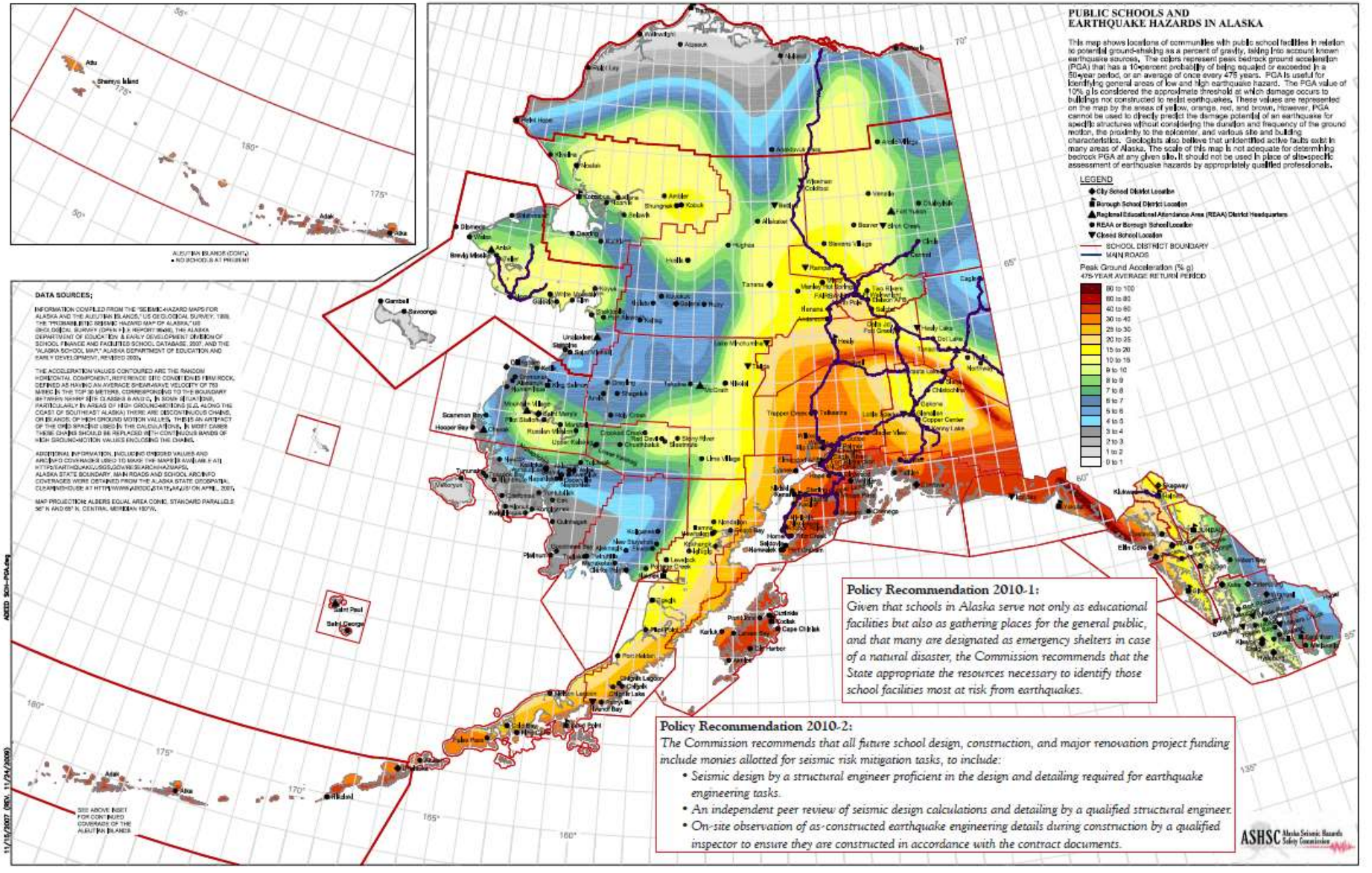
Fault Surface Rupture

(Note buildings in background collapsed into rubble.)

Diligence Building – almost intact
(5-10 year old construction)

Learning Building – basically intact
(10-15 year old construction)

2010 Map of Schools and Earthquake Hazards appear in ASHSC Annual Report. Presented to members of Legislature by John Aho (ASHSC) and Sam Kito (ADEED)

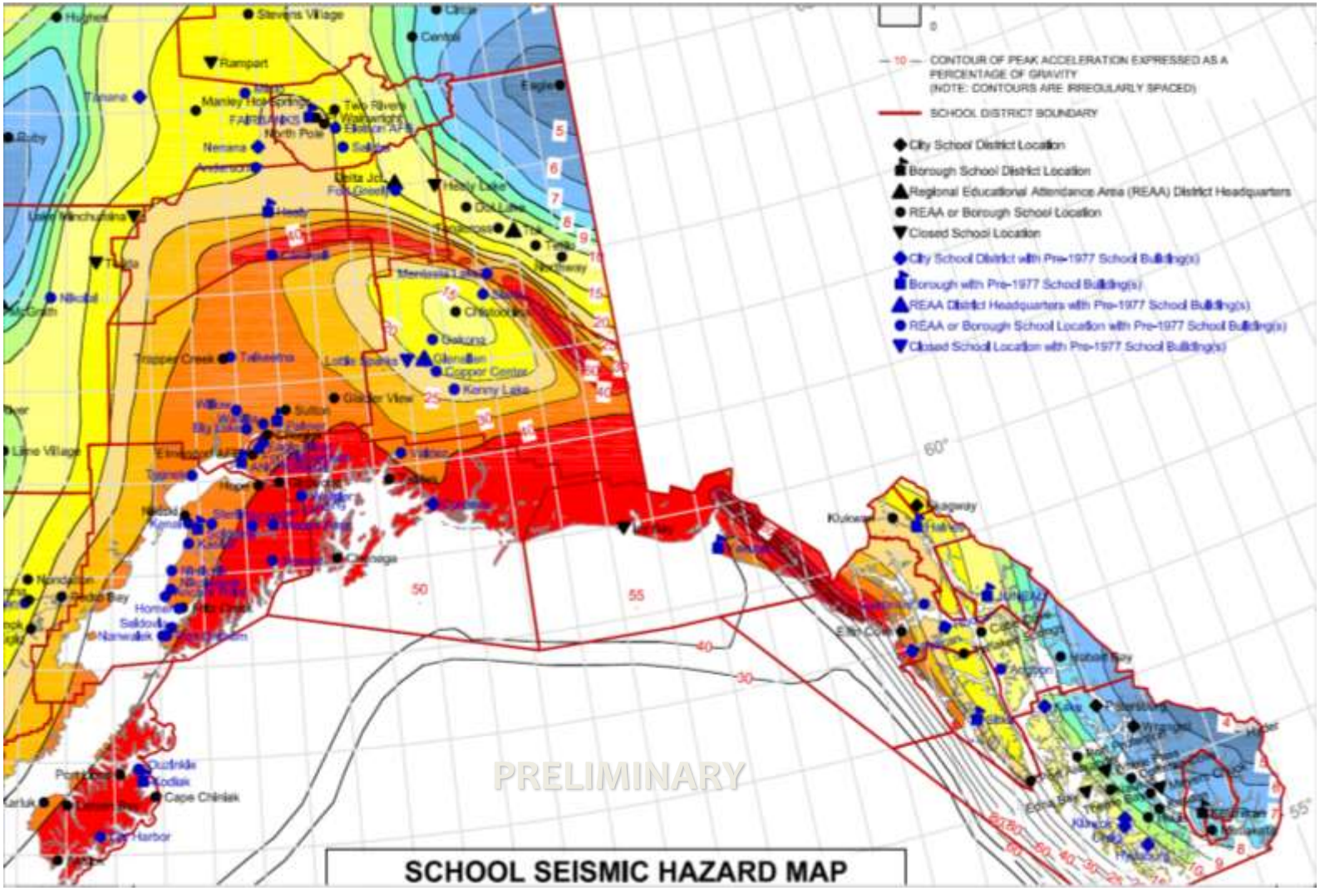


ASHSC Alaska Seismic Hazards Safety Commission

DETAILS OF REGION WITH HIGHEST SEISMIC HAZARDS, AND ASHSC PLAN FORWARD

- Recognition of Problem
- Identification of Structures at Risk
- Prioritization of Mitigation
- Final Determination of Remediation Projects

Communities with Highest Potential Peak Ground Acceleration & Educational Facilities Built Prior to 1976



Spring 2011
Mw 9.0 Earthquake and Tsunami in Japan

"High dwellings are the peace and harmony of our descendants," the stone slab reads. "Remember the calamity of the great tsunamis. Do not build any homes below this point.“ - 600+ year old marker, ANEYOSHI, JAPAN

Through history, this community elected to not allow construction below this marker. Consequently, their homes were spared by the March 11, 2011 tsunami.

In a neighboring community, a school had been constructed 500 feet from the ocean’s edge… the children attending that school were not found.

NOTE: In some communities these markers were submerged.

2012 – After trial period, ADEED officially incorporates seismic work as a line item for school improvement projects.
(Result of partnership of ASHSC/ADEED from 2009-2012)

Application for Funding
Capital Improvement Project by Grant
or
State Aid for Debt Retirement

FY 2016

For each funding request submit one original and three complete copies of this application and two copies of each attachment.

For instructions on completing this application, please refer to the department's Capital Project Information and References website at:

http://education.alaska.gov/facilities/FacilitiesCIP.html

(Note: The department will only score ten projects from each district during a single rating period)

School District: _____

Community: _____

School Name: _____

Project Name: _____

TYPE OF PROJECT AND FUNDING REQUEST

1. Type of funding requested *(Choose only one funding source.)*
   ☐ Grant Funding ☐ Aid for Debt Retirement (Bonding)

2a. **Primary** purpose of project *(Choose only one category, per AS 14.11.013 for grant projects, or AS 14.11.100(j)(4) for debt retirement projects). The department will change a project category as necessary to reflect the primary purpose of the project.*[1]

School Construction:	Major Maintenance:
☐ Health and life-safety (Category A, this category is not available for debt retirement)	☐ Protection of structure (Category C, this category is not available for debt retirement)
☐ Unhoused students (Category B; Category A for debt retirement)	☐ Building code deficiencies (Category D; Category B for debt retirement)
☐ Improve instructional program (Category F; Category D for debt retirement)	☐ Achieve operating cost savings (Category E; Category C for debt retirement)

b. Phases of project to be covered by this funding request *(Indicate all applicable phases)*
   ☐ Planning (Phase I) ☐ Design (Phase II) ☐ Construction (Phase III)

[1] The department's authority to assign a project to its correct category is established in AS 14.11.013(c)(1) and in AS 14.11.013(a)(1) under its obligation to verify a project meets the criteria established by the Bond Reimbursement & Grant Review Committee under AS 14.11.014(b)

Alaska Department of Education & Early Development

COST ESTIMATES

18. Complete the following tables using the Department of Education & Early Development's 13th **Edition** Cost Model or an equivalent cost estimate. Completion of the tables is **mandatory**. (30 points possible)

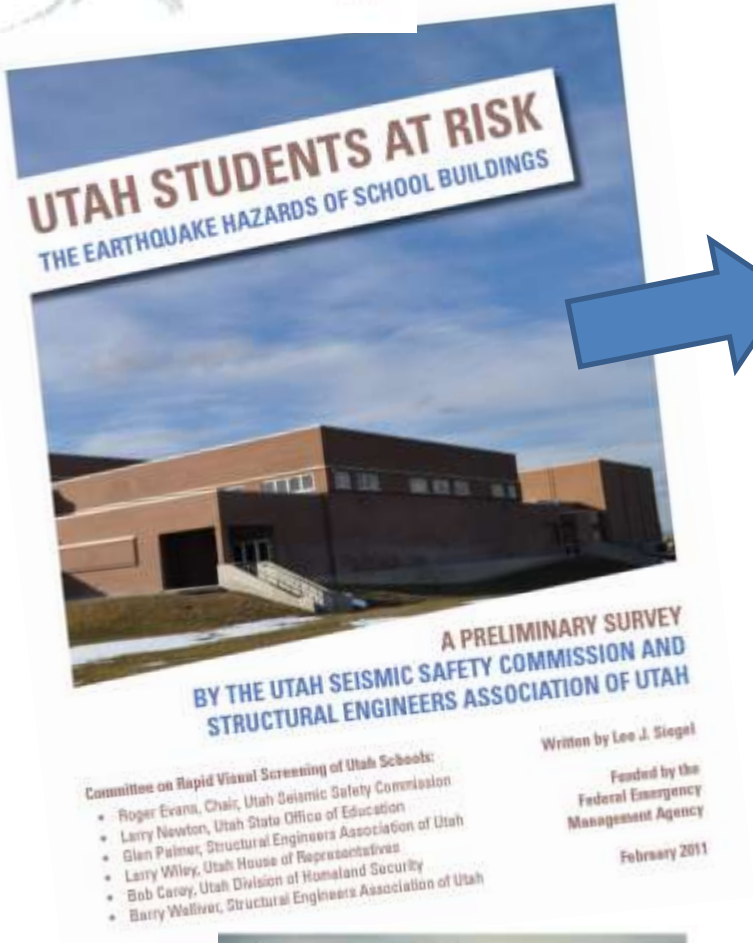
(Percentages are based on construction cost. See Appendix C for additional information. If your project exceeds the recommended percentages, you must provide a detailed justification for each item exceeding the percentage. The total of all additive percentages should not exceed 130%, if the additive percentages exceed 130% a detailed explanation must be provided or the department will adjust the percentages to meet the individual and overall percentage guidelines)

Table 1. TOTAL PROJECT COST ESTIMATE

Project Budget Category	Maximum % without justification	I Prior AS 14.11 Funding	II Current Project Request	III % of Total Construction Cost	IV Project Total
CM - By Consultant [1]	2 - 4%				
Land [2]					
Site Investigation [2]					
Seismic Hazard [7]					
Design Services	6 - 10%				
Construction [3]					
Equipment & Technology [2,5]	up to 10%				
District Administrative Overhead [4]	up to 9%				
Art [6]	0.5% or 1%				
Project Contingency	5%				
Project Total					

1. *Percentage is established by AS 14.11.020(c) for consultant contracts (Maximum allowed percentage by total project cost: $0-$500,000 – 4%; 500,001- $5,000,000 – 3%; over $5,000,000 – 2%).*
2. *Include only if necessary for completion of this project. Amounts included for Land and Site Investigation costs need to be supported in the Project Description (Question 17), and supporting documentation should be provided in the attachments.*
3. *Attach detailed construction cost estimate and life cycle cost if new-in-lieu-of-renovation.*
4. *Includes district/municipal/borough administrative costs necessary for the administration of this project; This budget line will also include any in-house construction management cost.*
5. *Equipment and technology costs should be calculated based on the number of students to be served by the project. See the department's publication, Guidelines for School Equipment Purchases for calculation methodology (2005). The department will accept a 5% per year inflation rate (from the base year of 2005) added to the amounts provided in the Guideline. Technology is included with Equipment.*
6. *Only required for renovation and construction projects over $250,000 that require an Educational Specification (AS 35.27.020(d)).*
7. *Costs associated with assessment, design, design review, and special construction inspection services associated with seismic hazard mitigation of a school facility. This amount needs to be provided by a design consultant, and should not be estimated based on project percentage.*

ASHSC Alaska Seismic Hazards Safety Commission



Government Hill Elementary School after the 1964 Earthquake

Alaska Seismic Hazards Safety Commission- Pilot Program: Rapid Visual Screening of Alaska School Buildings

Summer 2014

Alaska Seismic Hazards Safety Commission- Pilot Program: Rapid Visual Screening of Alaska School Buildings

Alaska Seismic Hazards Safety Commission	
Address:	PO Box 25517 Juneau, AK 99802
Contact:	Laura W. Kelly, PE
Phone:	(907) 463-2424
E-Mail:	Laura.W.Kelly@uscg.mil

Earthquake Engineering Research Inst.	
Address:	499 14th St, Suite 220 Oakland, CA 94612-1934
Contact:	Jay Berger, Executive Director
Phone:	(510) 451-0905
E-Mail:	JBerger@eeri.org

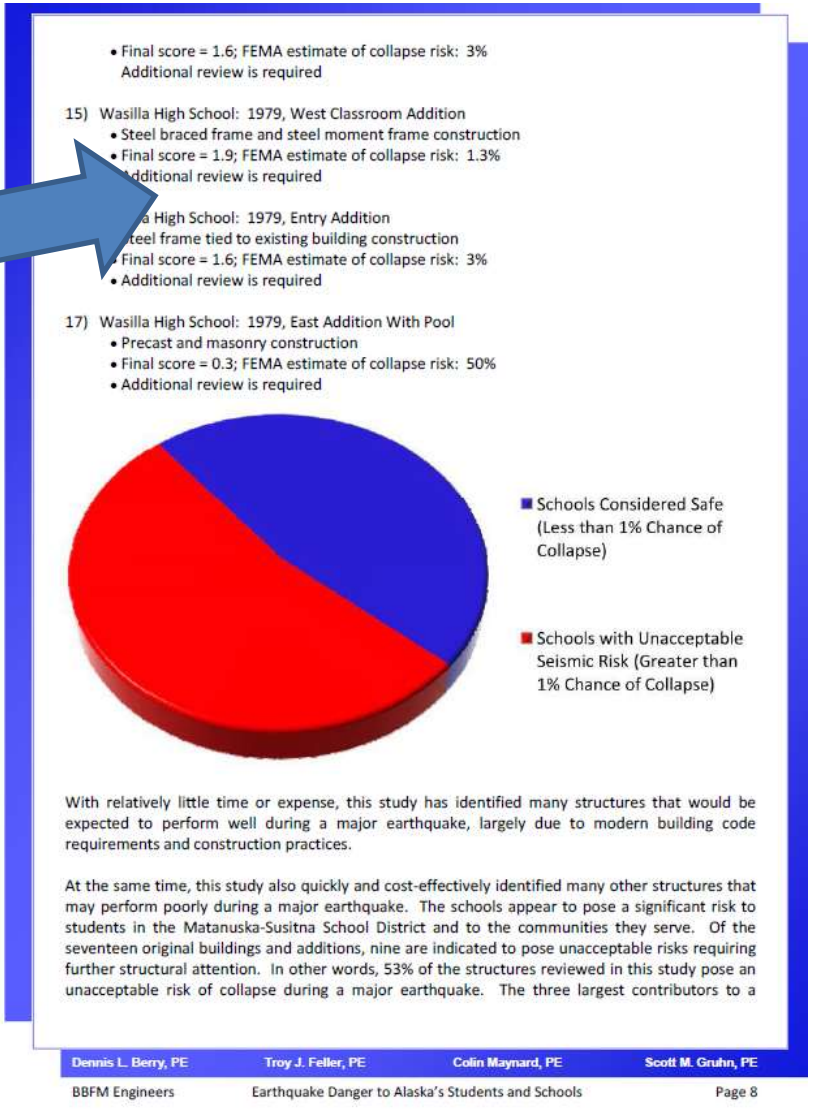
Project Name:	**ASHSC Pilot Program: Rapid Visual Screening of Alaska School Buildings**		
Effective:	6/2/2014	**Ending:**	1/2/2015
Description:	The Alaska Seismic Hazards Safety Commission (ASHSC) respectfully requests the Earthquake Engineering Research Institute (EERI) to hire a consultant with an Alaska PE license to set up and implement a pilot program for conducting Rapid Visual Screenings (RVS) of Alaska schools using FEMA 154/ROVER. As part of a pilot study, identify and work with a supportive school district in or near Anchorage, AK, and screen as many at-risk schools as feasible (approximately 5-10) within allotted budget. Develop protocol for collecting, managing, and reporting final results. Make recommendations for implementing on a district-by-district basis, and potentially at the state-wide level.		

Project Scope/Deliverables	
1.	Work with the ASHSC to identify a school district willing to participate in a RVS pilot study. The school district must be located in Anchorage or on the adjoining road system in order to minimize travel & per diem costs. Though not required, it is preferred that as-built drawings for the school buildings be available in advance, to improve speed and reliability of screening. Upon request, the ASHSC can provide a map of Alaska school districts and seismic hazards, student attendance numbers, and database of school building information sorted by local peak ground motions, and year of construction.
2.	Purchase a laptop and/or mobile device for installation, operation, collection and management of FEMA 154/ROVER software/data. Provide to ASHSC upon completion of pilot study for future use and data collection/management. FEMA ROVER software is free of cost. Upon request, the ASHSC can provide information describing ROVER software applications.
3.	Perform RVS of approximately 5-10 schools considered at-risk. If schools are newly constructed and meet modern seismic code, do not screen. Screener shall have an Alaska Professional Engineering license and a strong background in structural and earthquake resistant design. Experience with RVS/ROVER preferred.
4.	Compile results in a final report. Final product shall serve as a Proof of Concept, and establish protocols and a cost basis for future work. Refer to the Utah Seismic Safety Commission's pilot test in Salt Lake City as a model. Intent is to utilize final product as an example for justifying and performing RVS in other Alaska school districts. Final report may also be used to persuade state legislators to fund a RVS program on a state-wide basis, or to obtain future grant funding. See Attachment 1, "Utah Students at Risk" by the Utah Seismic Safety Commission.

Estimated Budget	Terms	Cost
Consutlting (including travel & per diem)	40 hours @ $150/hr	$6,000
Hardware (laptop computer/portable device/setup)	1 lump sum	$1,000
Software (ROVER) - Free from FEMA	No Cost	$0
Final Report	5 Hard Copies, 1 Digital CD	$500
	Total Cost:	**$7,500**

Pilot RVS – Mat-Su School District (14% of Alaska's student base)

February 2015



7 Schools/15 Structures evaluated

Big Lake Elementary (including 2 additions)
Butte Elementary
Cottonwood Creek
Snowshoe Elementary
Swanson Elementary (including 3 additions)
Willow Elementary (including 2 additions)
Wasilla High School (including 3 additions)

Cost of this Study:
The total cost of this study was approximately $18,500. Of this, BBFM Engineers was paid $8,500 for this study, resulting in a donated effort of approximately $10,000. Of this, $4,275 was spent on setting up the server and becoming acquainted with the software. Another $8,145 was spent reviewing drawings, visiting the schools, and entering data into the server. Finally, a little over $6,000 was spent preparing this report.

Pilot study proved that an RVS for a school structure in Alaska could be performed for approximately $600 to $800 per original structure or addition, plus costs associated with transportation.

The method used by FEMA P-154 to evaluate a building is quite straightforward. It establishes an initial score for each type of structural system (wood shear walls, steel braced frame, and so forth), with a higher score indicating greater reliability. A given building's initial score is then modified (up or down) based on other factors, including the number of stories, vertical structural irregularities, plan structural irregularities, probable soil type, whether it was designed and constructed before codes were generally enforced, and whether it was designed and constructed under substantially modern codes. The user enters the building information, adding and subtracting from the initial score to obtain the final score. FEMA carefully selected the scores and modifications so the final score could carry some readily understandable information. The Third Edition of FEMA 154 notes, in section 5.2:

> Fundamentally, the final S score is an estimate of the probability (as described in Chapter 1) if an earthquake occurs with ground motions called the risk-targeted maximum considered earthquake, MCE_R, as described in Chapter 2...
> A final score, S, of 3 implies there is a chance of 1 in 10^3, or 1 in 1,000, that the building will collapse if such ground motions occur. A final score, S, of 2 implies there is a chance of 1 in 10^2, or 1 in 100, that the building will collapse if such ground motions occur.

BBFM Engineers makes no statement about these probabilities except to note FEMA's intent in developing the scoring process. Typically a final score below 2.0 is taken as indication that a more detailed investigation is warranted, although that value can be adjusted at the outset of an evaluation project as desired by the owner of the facilities.

Importantly, these scores and risks do not take into account actual member strengths or actual connection reliability, only what is common for similar structural types of similar age. Therefore, the actual building safety may be substantially different from what the scores may indicate. Accordingly, buildings with low scores are noted as requiring further structural investigation to determine whether structural upgrade is warranted. These scores can be used appropriately to identify and rank buildings for their vulnerability to earthquake damage.

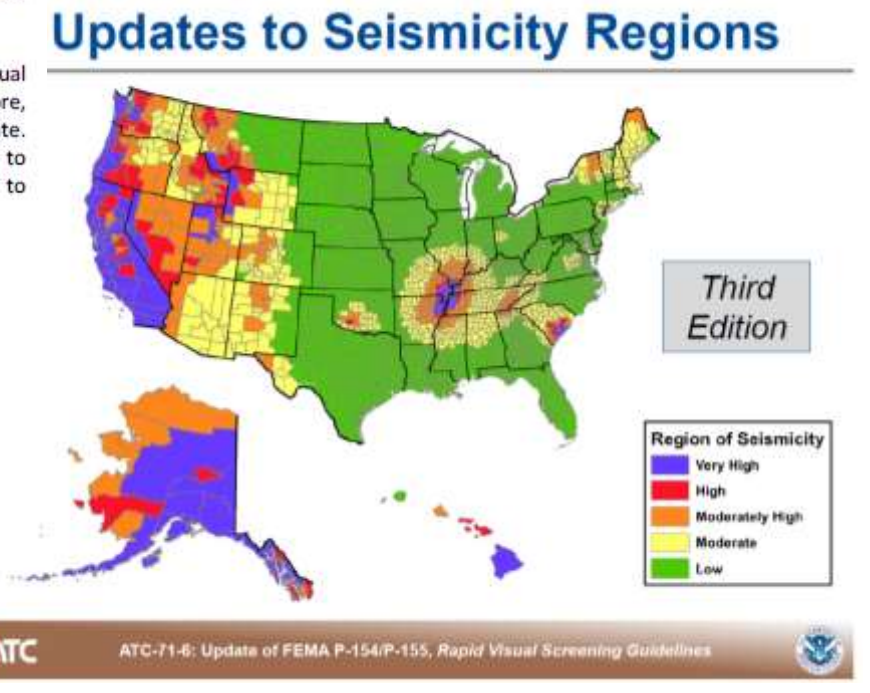


Table 2-3 RVS Benchmark Years for FEMA Building Types (based on ASCE/SEI 41-13)

FEMA Building Type		Model Building Seismic Design Provisions		
		National Building Code/ Standard Building Code	Uniform Building Code	International Building Code
W1	Light wood frame single- or multiple-family dwellings of one or more stories in height	1993	1976	2000
W1A	Light wood frame multi-unit, multi-story residential buildings with plan areas on each floor of greater than 3,000 square feet	[1]	1997	2000
W2	Wood frame commercial and industrial buildings with a floor area larger than 5,000 square feet	1993	1976	2000
S1	Steel moment-resisting frame buildings	[1]	1994[2]	2000
S2	Braced steel frame buildings	[1]	1997	2000
S3	Light metal buildings	[1]	[1]	2000
S4	Steel frame buildings with concrete shear walls	1993	1994	2000
S5	Steel frame buildings with unreinforced masonry infill walls	[1]	[1]	2000
C1	Concrete moment-resisting frame buildings	1993	1994	2000
C2	Concrete shear wall buildings	1993	1994	2000
C3	Concrete frame buildings with unreinforced masonry infill walls	[1]	[1]	2000
PC1	Tilt-up buildings	[1]	1997	2000
PC2	Precast concrete frame buildings	[1]	[1]	2000
RM1	Reinforced masonry buildings with flexible floor and roof diaphragms	[1]	1997	2000
RM2	Reinforced masonry buildings with rigid floor and roof diaphragms	1993	1994	2000
URM	Unreinforced masonry bearing wall buildings	[1]	[1]	[1]
MH	Manufactured housing	[3]	[3]	[3]

[1] No benchmark year.

[2] Steel moment-resisting frame shall comply with the 1994 UBC Emergency Provisions, published September/October 1994.

[3] The model building codes in this table do not apply to manufactured housing. In California, relevant requirements appeared in the Mobile home Parks Act, the California Health and Safety Code, and the California Code of Regulations. They evolved between 1985 and 1994; the year 1995 is recommended here as the benchmark year for California. In other states, the U.S. Department of Housing and Urban Development's Installation Standards required tie-downs after October 2008. The year 2009 is recommended here as the benchmark year for states other than California.

2015 RVS – Kenai Peninsula Borough School District (7% of Alaska's student base)

October, 2015

Cost of this Study:
The total cost of this study was $21,250, at a cost of performed for just $500 to $700 per structure.

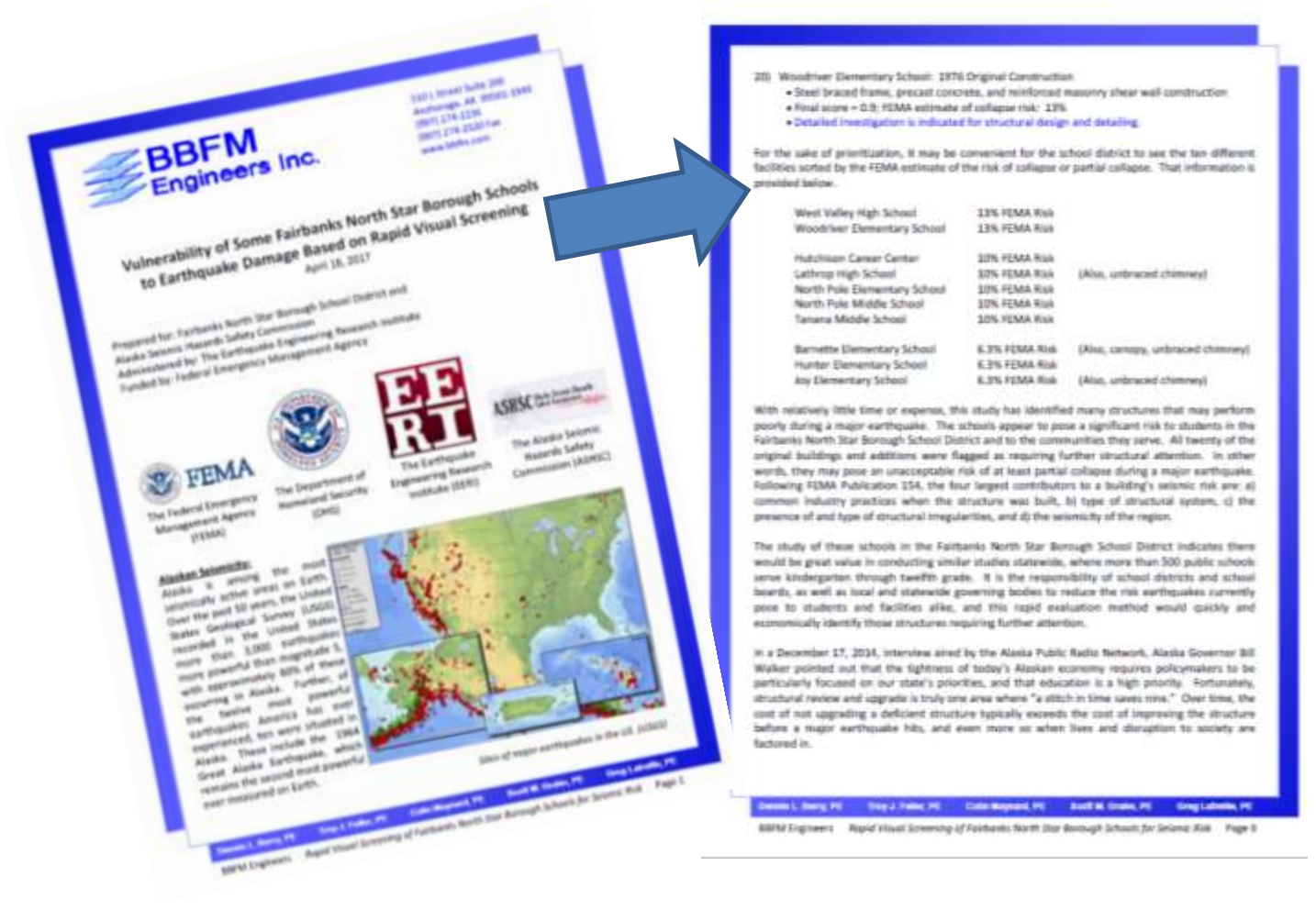
Schools located in Anchor Point, Cooper Landing, Homer, Kenai, Moose Pass, Nikolaevsk, Ninilchik, Homer, Kenai, Seward, Soldotna, Sterling, Seldovia, Kasilof.

In total, we reviewed 15 schools comprised of 47 structures, including original construction and additions. Nineteen of the 47 warrant a more detailed evaluation, while further review of the remaining 28 schools is not indicated.
In other words, 40% of the structures reviewed in this study may pose an unacceptable risk of at least partial collapse during a major earthquake.

ASHSC Alaska Seismic Hazards Safety Commission

2017 RVS – Fairbanks North Star Borough School District (13,840 students -10.5% of Alaska's student base)

April, 2017



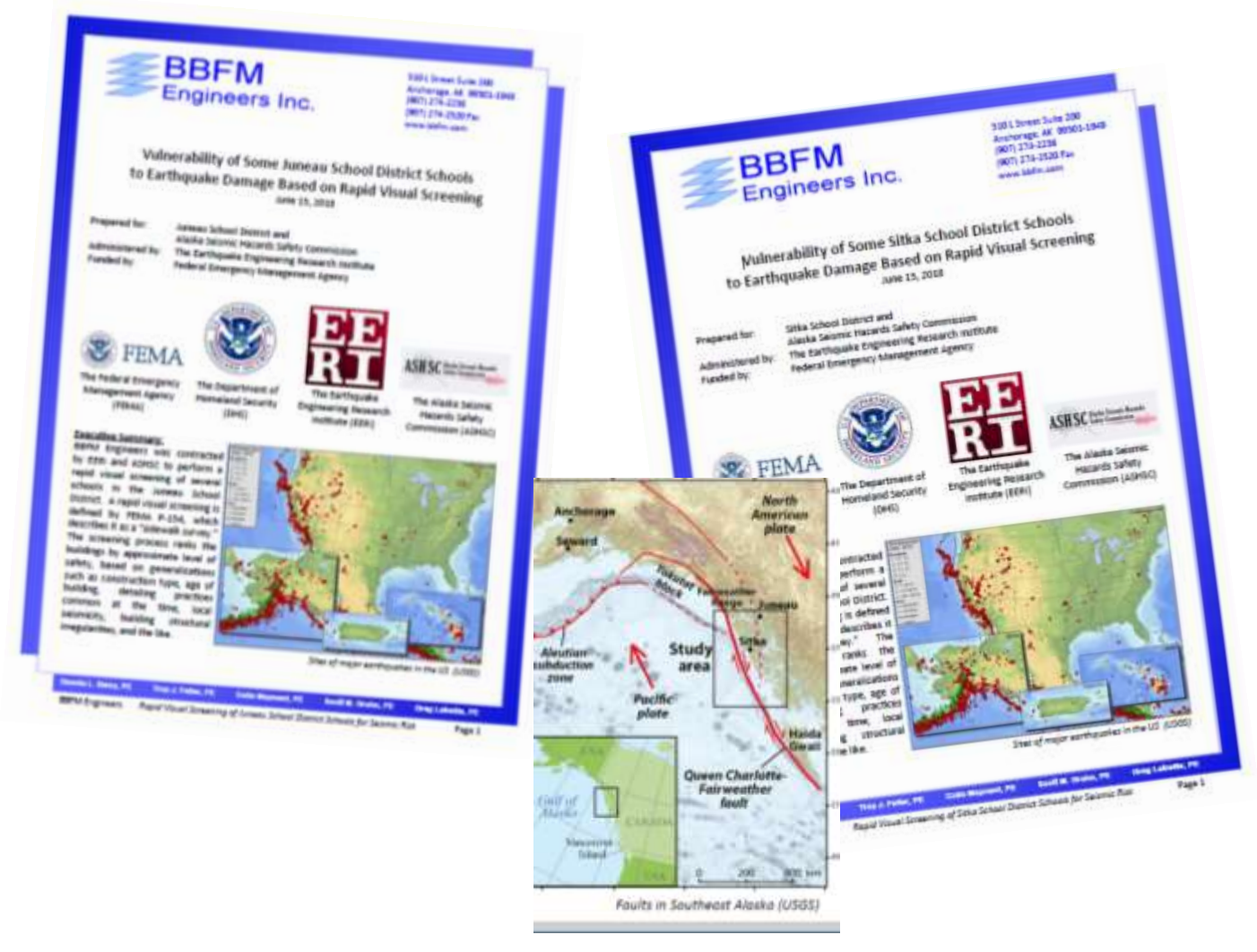
Cost of this Study:
The total cost of this study was $21,250, at a cost of performed for just $500 to $1200 per structure.

Barnette Elementary
Hunter Elementary
Hutchison Career Center
Joy Elementary
Lathrop High School
North Pole Elementary
North Pole Middle School
Tanana Middle School
West Valley High School
Woodriver Elementary

In total, we reviewed 10 schools comprised of 20 structures, including original construction and additions. All 20 warrant a more detailed evaluation. In other words, 100% of the structures reviewed in this study may pose an unacceptable risk of at least partial collapse during a major earthquake with a 7 of the schools having 10% or higher risk of significant structural damage.

ASHSC Alaska Seismic Hazards Safety Commission

2018 RVS – Juneau School District (4,778 students, about 3.6% of Alaska's student base) & Sitka School District (1,306 students, about 1.0% of Alaska's student base)



June, 2018

Cost of this Study:
The total cost of this study was $27,000, at a cost of performed for just $1000 to $2000 per structure including travel from Anchorage.

Juneau :
Dzantiki Heeni MS
Floyd Dryden MS & addition
Gastineau Elem. & 2 additions
Mendenhall River Community Sch.
Riverbend Elementary
Yakoosge Alt. HS & addition

Sitka:
Baranof Elementary & addition
Blatchley MS
Keet Gooshi Heen Elementary

We reviewed 9 structures (6 in Juneau, 4 in Sitka), involving 14 separate screenings for original construction and additions. All but 1 warranted a more detailed evaluation.
In other words, 93% of the structures reviewed in this study may pose an unacceptable risk of at least partial collapse during a major earthquake with a 8of the schools having 10% or higher risk of significant structural damage.

ASHSC Alaska Seismic Hazards Safety Commission

What CA school retrofits prevented during a M6 EQ.

Sept. 2014

Napa earthquake damage to a building without seismic retrofit

Recent example of a successful school retrofit program was demonstrated during the magnitude 6 earthquake that struck Napa, California in 2014, producing peak ground accelerations of 60% to 100% as strong as the acceleration due to gravity. The earthquake and its aftershocks injured 90 people and caused approximately $1 billion of damage.

Engineering News-Record reported on September 3, 2014:
The epicenter of the American Canyon quake was at the heart of the Napa school district's 30 campuses. Subsequently, three architectural and engineering teams assessed "every room in every school" and observed no structural damage following the quake, says Mark Quattrocchi, principal of Kwok Quattrocchi Architects and one of the survey team members… The schools performed so well because they are built or retrofitted according to much stricter seismic codes than commercial and residential buildings.

"There was no structural damage to any school in the district, even the ones built to older codes in the 1940s, 1950s and 1960s," says Quattrocchi. "Part of this is because seismic upgrades at the schools are treated the same as building an entirely new facility," he adds. Schools fared well for three reasons: seismic building codes that are more stringent than those for commercial buildings, methodical reviews by the Division of the State Architect and "full-time" state inspection on school construction sites, Quattrocchi says."

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SOME ALASKA COMMUNITIES ARE BEHIND….

IDENTIFICATION

- Recognition of Problem
- Identification of Structures at Risk
- Prioritization of Mitigation
- Final Determination of Remediation Project

From: eeri-sesi-network@googlegroups.com [mailto:eeri-sesi-network@googlegroups.com] On Behalf Of zoe@eeri.org
Sent: Wednesday, May 03, 2017 3:47 PM
To: EERI SESI Network
Subject: [EERI SESI Network] **$125 million in grants have been awarded to Oregon schools**

Hello all,

A quick update on school earthquake safety in Oregon:

The Oregon seismic retrofit grants for schools were awarded on April 21st with $125 million in total.

* 100% state funding for projects up to $1.5 million, with districts providing matching funds for projects above $1.5 million

* 100 projects funded for 55 school districts.

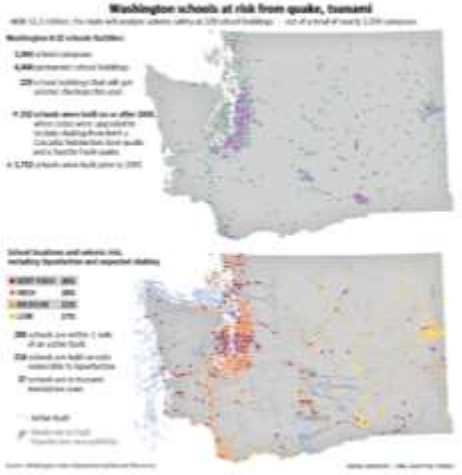
ASHSC Alaska Seismic Hazards Safety Commission

March, 2018

WASHINGTON FUNDS $1.2M OF PRELIMINARY SEISMIC ASSESSMENTS OF 220 SCHOOLS, ALONG WITH MORE COMPREHENSIVE ANALYSES & RETROFIT PLANS FOR 20 OF THOSE BUILDINGS

Some Washington schools will get seismic checkups

Originally published March 29, 2018 at 6:00 am



"Oh wow! We got some money": New funding tackles long-neglected earthquake concerns, such as school safety and old brick buildings.

Share story

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Email

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By Sandi Doughton
Seattle Times science reporter

Washington Gov. Jay Inslee likes to joke that a major earthquake isn't allowed to strike during his time in office.

But Inslee acknowledged Wednesday that seismic upheaval is inevitable in Washington, as he and members of his administration outlined preliminary steps to help reduce the death and devastation when that day comes.

The recently approved capital budget includes $1.2 million that is the first money ever specifically earmarked by the Legislature for seismic evaluations of public schools. The budget also includes $200,000 for a statewide survey of old brick buildings — called unreinforced masonry — that are prone to topple in earthquakes.

"This is a long way from fixing the problem," Inslee told a group gathered at the state Capitol to discuss disaster resilience. "But at least it will allow us to wrap our arms around the challenges we have in our school buildings and our unreinforced masonry buildings."

More than 70 percent of Washington's public schools are located in areas of high or very high seismic risk, said Corina Forson, chief hazard geologist at the Washington Department of Natural Resources. And 88 percent of schools across the state were constructed before 2005, when building codes were strengthened to fully incorporate all types of earthquakes expected to rock the region in the future.

Perhaps the most precariously situated schools are the 37 built in low-lying coastal areas, where towering tsunamis could barrel ashore less than 30 minutes after a quake on the submarine fault called the Cascadia Subduction Zone.

That includes all but one campus in the Aberdeen School District.

"We are at risk of major damage and loss of life," Superintendent Alicia Henderson told the governor.

The $1.2 million will cover preliminary seismic assessments for 220 school buildings, along with more comprehensive analyses and retrofit plans for 20 of those buildings, Forson said.

But it will take another $10 million to $15 million for preliminary evaluations of all the state's at-risk school buildings, she added.

Most Read Local Stories

1. The end is near for emissions testing in Washington state
2. Howard Schultz is above the political fray — so high above he often doesn't vote | Danny Westneat
3. These are Washington's safest and least safe cities, according to crime stats
4. 'The cars just disappeared': What happened to the 90,000 cars a day the viaduct carried before it closed?
5. West Coast's biggest starfish vanishing amid disease, warming oceans, study finds

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ALASKA CAN CATCH UP….

MITIGATION

- NEHRP provides Federal Grants (100% small grants, 75% matching for large grants)
- Reauthorized Dec 11, 2018
- Bill initiated by Senators Diane Feinstein and Lisa Murkowski

- On December 11th, President Trump signed *S. 1768, the National Earthquake Hazards Reduction Program* (NEHRP), which reauthorizes the federal program to improve the nation's earthquake preparedness for five years. The legislation is the first reauthorization of the NEHRP in 15 years and the program has operated without an authorization since October of 2009.

In addition to reauthorizing the program, the bill:

- Removes outdated language related to earthquake prediction and instead emphasizes the continued • development of earthquake early warning systems through the Advanced National Seismic System.
- Requires the production of a set of maps showing active faults and folds, liquefaction susceptibility, and other hazards that can be induced by an earthquake, such as landslides.
- Reduces various administrative burdens for federal agencies that are disruptive to the essential mission of the program and improves data sharing between agencies.
- Enhances coordination among federal agencies, and with state agencies.
- Provides clear direction to the four federal agencies charged with overseeing NEHRP – the National Institute of Standards and Technology, the Federal Emergency Management Agency, the U.S. Geological Survey, and the National Science Foundation – to continue working with states and private sector experts on performance-based design features.
- Directs the Federal Emergency Management Agency to implement a grant program to assist states with incorporating earthquakes in their hazard reduction portfolios.
- Directs the completion of a comprehensive assessment of the nation's earthquake risk reduction progress, as well as areas that require more funding, and evaluation of resulting hazards such as tsunamis or landslides.

https://www.murkowski.senate.gov/press/release/feinstein-murkowski-earthquake-resilience-bill-signed-into-law-

ASHSC Alaska Seismic Hazards Safety Commission

NOV 30, 2018

ANCHORAGE MUNICIPALITY GENERALLY SET POSITIVE EXAMPLE BY ADDRESSING STRUCTURAL RETROFITS PRIOR TO M7.0 EARTHQUAKE

(COULD IMPROVE NON-STRUCTUAL ISSUES SUCH AS CEILING TILES AND NON-LOADBEARING WALLS)

December 3: Status of ASD Schools

School status may change as building conditions are further assessed/repaired

Green Count	Yellow Count	Red Count	TBD Count
12	84	1	2
Green Staff Ready to begin process of ensuring site is prepared to receive and educate students	**Yellow** Damaged, repairs and cleaning in progress	**Red** Seriously damaged, unsafe to occupy	**TBD**
Alaska Native Cultural Charter	Abbott Loop Elementary	Eagle River Elementary	Alaska Middle College
Aquarian Charter	ACT Alternative		Chugiak Elementary
Family Partnership Charter	Airport Heights Elementary		
Girdwood K-8	Alpenglow Elementary		
Huffman Elementary	Aurora Elementary		
Kincaid Elementary	AVAIL Secondary		
Mt. Spurr Elementary	Bartlett High		
Nunaka Elementary	Baxter Elementary		
PAIDEA Charter	Bayshore Elementary		
Steller Secondary	Bear Valley Elementary		
Turnagain Elementary	Begich Middle		
Willow Crest Elementary	Benny Benson/Crossroads/SEARCH Secondary		
	Birchwood ABC		
	Bowman Elementary		
	Campbell STEM Elementary		
	Central Middle		
	Chester Valley Elementary		
	Chinook Elementary		
	Chugach Optional Elementary		
	Chugiak High		
	Clark Middle		
	College Gate Elementary		
	Creekside Park Elementary		
	Denali Montessori Elementary		
	Dimond High		
	Eagle Academy Charter		
	Eagle River High		
	East High		
	Fairview Elementary		
	Fire Lake Elementary		
	Frontier Charter		
	Gladys Wood Elementary		
	Goldenview Elementary		
	Government Hill Elementary		
	Gruening Middle		

Sheet1

Gruening Middle School (1984) and Eagle River Elementary (1961) to remain closed through 2019-20 school year.

Temporary supports prop up the walls at Eagle River Elementary School, which was severely damaged in the Nov. 30 earthquake. On Tuesday, the Anchorage School District announced both Eagle River Elementary and Gruening Middle School will be closed for the 2019-20 school year. (Star photo by Matt Tunseth)

ASHSC Alaska Seismic Hazards Safety Commission

NOV 30, 2018

MAT-SU FAIRED WELL, BUT RESIDENTIAL CODE ENFORCEMENT MORE LAX

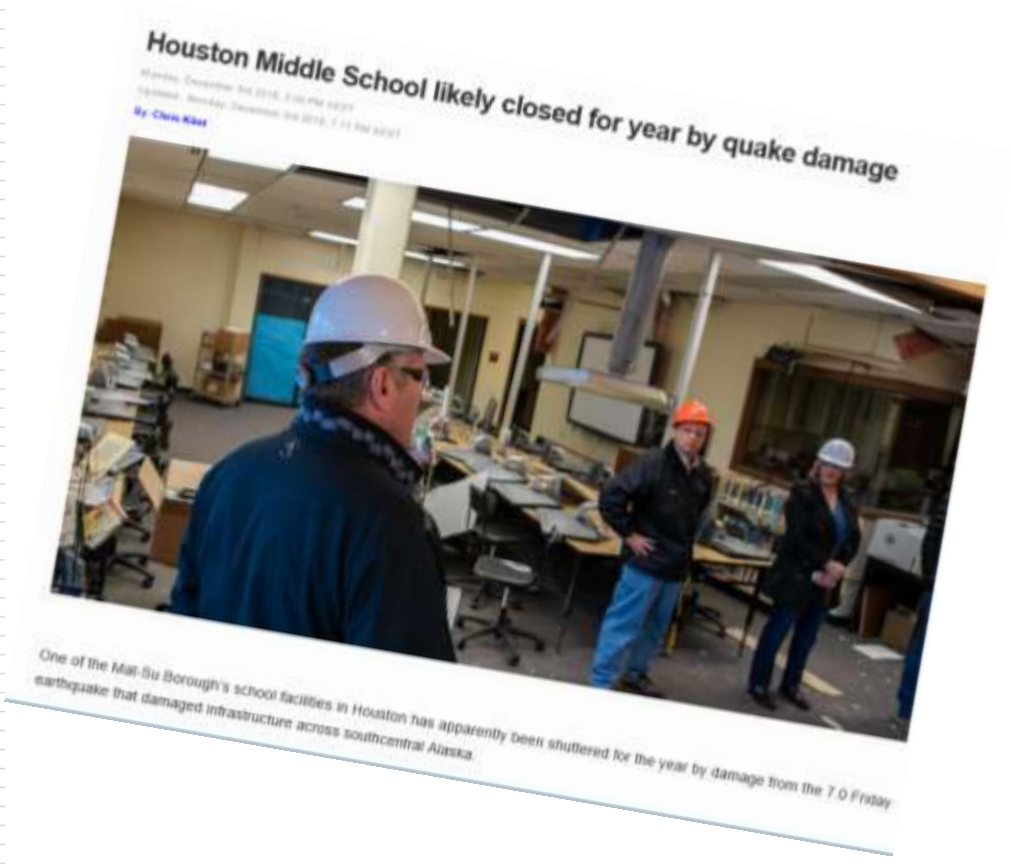
(COULD ALSO IMPROVE NON-STRUCTUAL ISSUES SUCH AS CEILING TILES AND NON-LOADBEARING WALLS AS WELL AS INDEPENDENT PEER REVIEW OF DESIGNS AND CONSTRUCTION INSPECTION BY QUALIFIED ENGINEERS)

)

Mat-Su Borough School District School and Site Status (last updated 12/6 11:30am)

The status listed below is based on the information that is available at the time of the update. This information is subject to change. As we experience additional seismic activity, buildings status may change and projected openings may be delayed.

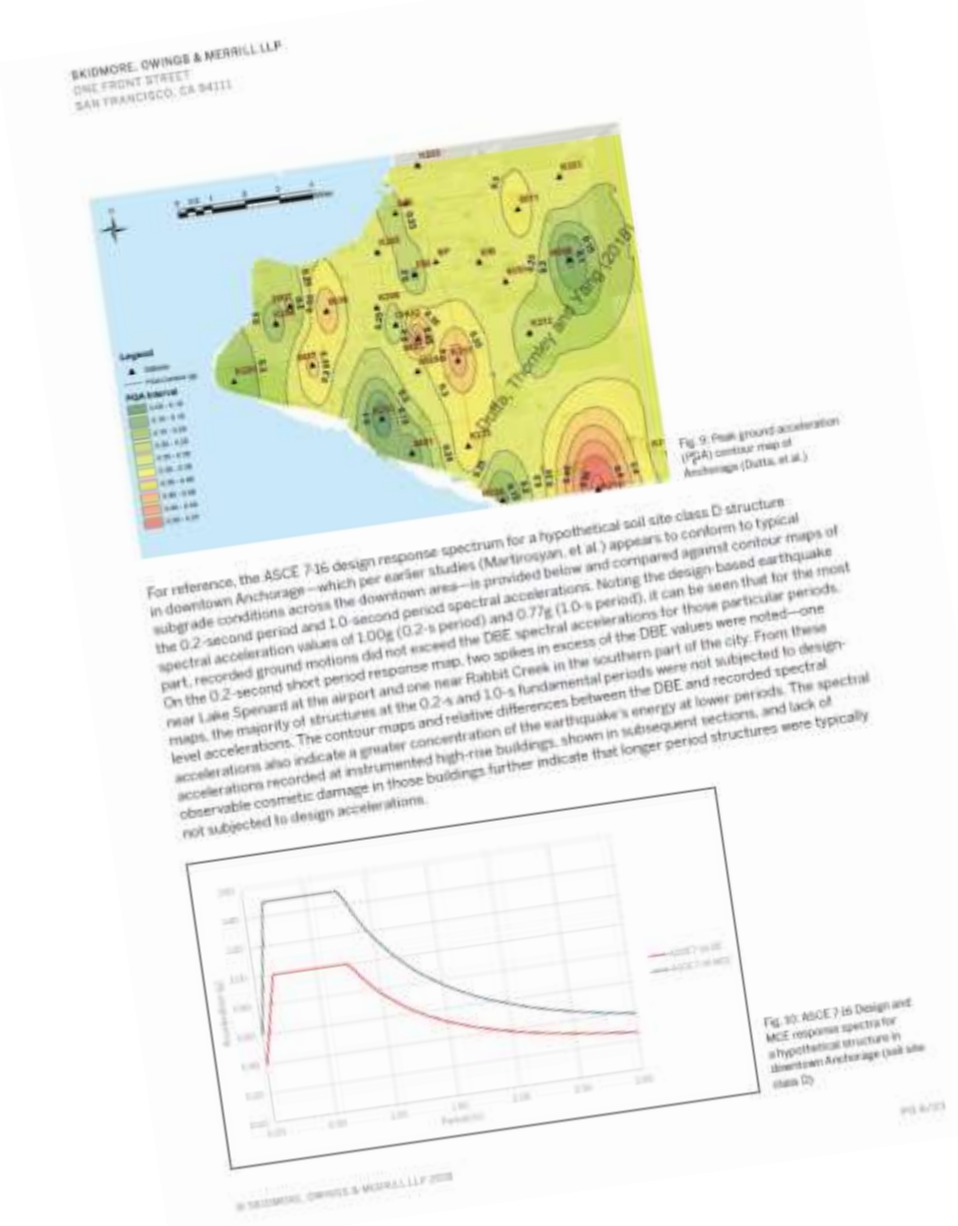
School/Site	Status	Date & Time Updated
Academy Charter School	Open for Staff on Wednesday, December 5, 2018	12/4/2018 12:30 PM
Administration Building	Open for Staff on Monday, December 3, 2018	12/3/2018 2:00 PM
American Charter Academy School	Open for Staff on Wednesday, December 5, 2018	12/4/2018 12:30 PM
Beryozova School	Open for Staff and Students on Monday, December 3, 2018	12/3/2018 2:00 PM
Big Lake Elementary School	**Open for Staff on Monday, December 10, 2018Open for Stud**	**12/6/2018 11:30 AM**
Birchtree Charter School	Open for Staff on Wednesday, December 5, 2018	12/4/2018 12:30 PM
Burchell High School	Open for Staff on Wednesday, December 5, 2018	12/4/2018 12:30 PM
Butte Elementary School	Open for Staff on Wednesday, December 5, 2018	12/3/2018 2:00 PM
Career Tech High School	Open for Staff on Wednesday, December 5, 2018	12/3/2018 2:00 PM
Colony High School	**Pending Final Inspection and Approval of the**	**12/6/2018 11:30 AM**
Colony Middle School	**Pending Final Inspection and Approval of the**	**12/6/2018 11:30 AM**
Cottonwood Creek Elementary School	Open for Staff on Wednesday, December 5, 2018	12/3/2018 2:00 PM
Dena'ina Elementary School	**Open for Staff on Monday, December 10, 2018Open for Stud**	**12/6/2018 11:30 AM**
Finger Lake Elementary School	**Pending Final Inspection and Approval of the**	**12/6/2018 11:30 AM**
Fronteras Spanish Immersion Charter School	Open for Staff on Wednesday, December 5, 2018	12/3/2018 2:00 PM
Glacier View School	Open for Staff and Students on Monday, December 3, 2018	12/3/2018 2:00 PM
Goose Bay Elementary School	**Open for Staff on Monday, December 10, 2018Open for Stud**	**12/6/2018 11:30 AM**
Houston High School	**Open for Staff on Monday, December 10, 2018**	**12/6/2018 11:30 AM**
Houston Middle School	Students and Staff will report to Houston High School.	**12/6/2018 11:30 AM**
Iditarod Elementary School	Open for Staff on Wednesday, December 5, 2018	12/4/2018 12:30 PM
Knik Elementary School	**Open for Staff on Monday, December 10, 2018Open for Stud**	**12/6/2018 11:30 AM**
Larson Elementary School	Open for Staff on Wednesday, December 5, 2018	12/4/2018 2:30 PM
Machetanz Elementary School	Open for Staff on Wednesday, December 5, 2018	12/3/2018 2:00 PM
Mat-Su Central School	**Both Palmer and Wasilla locations.**	**12/6/2018 1:35 PM**
Mat-Su Day School	Open for Staff on Wednesday, December 5, 2018	12/3/2018 2:00 PM
Mat-Su Middle College	Open for Staff on Wednesday, December 5, 2018	12/3/2018 2:00 PM
Mat-Su Secondary School	Open for Staff and Students on Monday, December 3, 2018	12/3/2018 2:00 PM
Meadow Lakes Elementary School	Open for Staff on Wednesday, December 5, 2018	12/4/2018 12:30 PM
Midnight Sun Charter School	Open for Staff on Wednesday, December 5, 2018	12/4/2018 2:30 PM
Nutrition Services Building	Open for Staff on Monday, December 3, 2018	12/3/2018 2:00 PM
Operation & Maintenance Building	Open for Staff on Monday, December 3, 2018	12/3/2018 2:00 PM
Palmer High School	Open for Staff on Wednesday, December 5, 2018	12/3/2018 2:00 PM
Palmer Junior Middle School	Open for Staff on Wednesday, December 5, 2018	12/4/2018 12:30 PM
Pioneer Peak Elementary School	Open for Staff on Wednesday, December 5, 2018	12/4/2018 12:30 PM
Redington Jr/Sr High School	**Open for Staff on Monday, December 10, 2018Open for Stud**	**12/6/2018 11:30 AM**
Shaw Elementary School	Open for Staff on Wednesday, December 5, 2018	12/4/2018 12:30 PM
Sherrod Elementary School	Open for Staff on Wednesday, December 5, 2018	12/3/2018 2:00 PM
Snowshoe Elementary School	Open for Staff on Wednesday, December 5, 2018	12/3/2018 2:00 PM
Su Valley Jr/Sr High School	Open for Staff and Students on Monday, December 3, 2018	12/3/2018 2:00 PM
Sutton Elementary School	Open for Staff on Wednesday, December 5, 2018	12/3/2018 2:00 PM
Swanson Elementary School	Open for Staff on Wednesday, December 5, 2018	12/3/2018 2:00 PM
Talkeetna Elementary School	Open for Staff and Students on Monday, December 3, 2018	12/3/2018 2:00 PM
Tanaina Elementary School	Open for Staff on Wednesday, December 5, 2018	12/4/2018 12:30 PM
Teeland Middle School	Open for Staff on Wednesday, December 5, 2018	12/3/2018 2:00 PM
Trapper Creek Elementary School	Open for Staff and Students on Monday, December 3, 2018	12/3/2018 2:00 PM
Twindly Bridge Charter School	Open for Staff on Wednesday, December 5, 2018	12/4/2018 12:30 PM
Valley Pathways School	Open for Staff on Wednesday, December 5, 2018	12/4/2018 12:30 PM
Warehouse Building	Open for Staff on Monday, December 3, 2018	12/3/2018 2:00 PM
Wasilla High School	**Open for Staff on Monday, December 10, 2018Open for Stud**	**12/6/2018 11:30 AM**
Wasilla Middle School	**Open for Staff on Monday, December 10, 2018Open for Stud**	**12/6/2018 11:30 AM**
Willow Elementary School	Open for Staff and Students on Monday, December 3, 2018	12/3/2018 2:00 PM



ASHSC Alaska Seismic Hazards Safety Commission

NOV 30, 2018

THE RECENT ANCHORAGE EARTHQUAKE COULD HAVE BEEN WORSE



SKIDMORE, OWINGS & MERRILL LLP
ONE FRONT STREET
SAN FRANCISCO, CA 94111

Fig. 9: Peak ground acceleration (PGA) contour map of Anchorage (Dutta, et al.)

For reference, the ASCE 7-16 design response spectrum for a hypothetical soil site class D structure in downtown Anchorage—which per earlier studies (Martirosyan, et al.) appears to conform to typical subgrade conditions across the downtown area—is provided below and compared against contour maps of the 0.2-second period and 1.0-second period spectral accelerations. Noting the design-based earthquake spectral acceleration values of 1.00g (0.2-s period) and 0.77g (1.0-s period), it can be seen that for the most part, recorded ground motions did not exceed the DBE spectral accelerations for those particular periods. On the 0.2-second short period response map, two spikes in excess of the DBE values were noted—one near Lake Spenard at the airport and one near Rabbit Creek in the southern part of the city. From these maps, the majority of structures at the 0.2-s and 1.0-s fundamental periods were not subjected to design-level accelerations. The contour maps and relative differences between the DBE and recorded spectral accelerations also indicate a greater concentration of the earthquake's energy at lower periods. The spectral accelerations recorded at instrumented high-rise buildings, shown in subsequent sections, and lack of observable cosmetic damage in those buildings further indicate that longer period structures were typically not subjected to design accelerations.

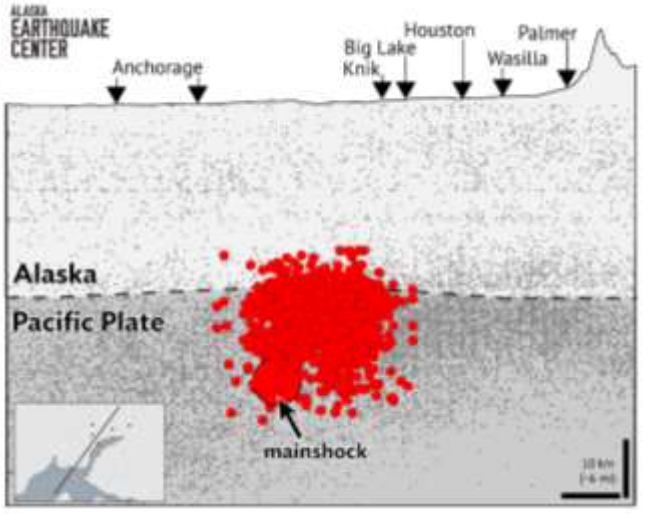
Fig. 10: ASCE 7-16 Design and MCE response spectra for a hypothetical structure in downtown Anchorage (soil site class D)

A contour map by Dutta, et al, indicates PGAs in the 0.2g - 0.5g range.

"From these maps, the majority of structures at the 0.2-s and 1.0-s fundamental periods were not subjected to [respective] design level accelerations [1.00g and 0.77g]."

"PRELIMINARY OBSERVATIONS IN THE AFTERMATH OF THE NOVEMBER 30, 2018 ANCHORAGE, ALASKA EARTHQUAKE"
By Samantha Walker, PE and Patrick Murren, SE
SKIDMORE, OWINGS & MERRILL LLP

From EERI Clearinghouse:
http://www.learningfromearthquakes.org/2018-11-30-anchorage-alaska/



Fri., Nov 30, 8:29 local AKST
7.0M EQ,
29 miles deep,
10 miles from
downtown Anchorage

ASHSC Alaska Seismic Hazards Safety Commission

LESSONS LEARNED:

Earthquakes remain our greatest teacher and exert the most influence. Human nature allows us to rapidly forget; natural disasters spur short periods of action. Clearly document information & efforts – easy to forget.

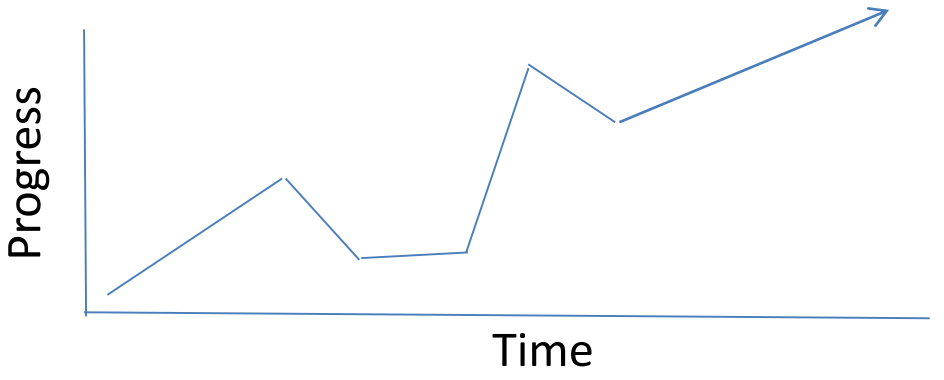
Hidden seismic hazards exist, many of which have yet to be identified – especially in Alaska.

Foster and maintain professional relationships. Encourage professional development and dialog. Encourage inter-agency and cross-state communication.

The average US citizen thinks they don't need to worry about the next earthquake – they assume our codes and engineers have already made everything safe.

Do not underestimate the ability of others to help (or occasionally hinder). Educators, eager students and pro-active PTA members are great allies. Understand that some upper-level leaders will cite concerns over wide-spread alarm and unfunded mandates. Partner with the Departments of Education and School Districts.

The path to success is not always upward or linear. Anticipate sudden successes, unforeseen set-backs, and seeming lack of progress. Be persistent; a worthy idea will succeed over time.



Identification, Funding, Staffing & Project Implementation

IDENTIFICATION

- Recognition of Problem
- Identification of Structures at Risk
- Prioritization of Mitigation
- Final Determination of Remediation Project

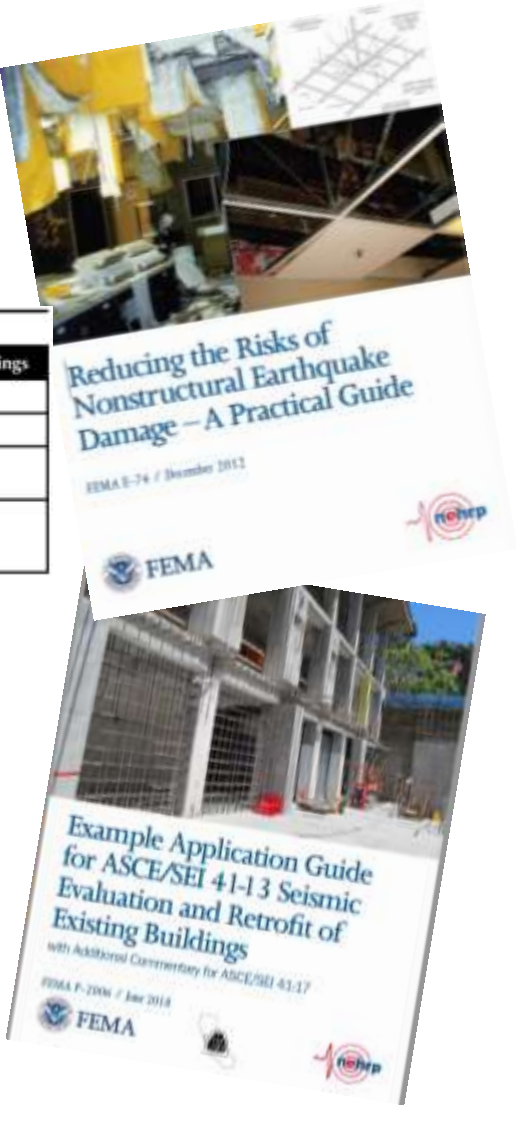


Table 2-2 Comparison of Seismic Evaluation Methods

Evaluation Method	Undamaged Buildings	Earthquake-Damaged Buildings
Rapid Evaluation	FEMA P-154[1]	ATC-20[4] Rapid
Quick Evaluation	ASCE 41-13 Tier 1	ATC-20 Detailed
Intermediate Evaluation	ASCE 41-13 Tier 2	FEMA 352[5] ATC-52-4[6]
Detailed Evaluation	ASCE 41-13 Tier 3 FEMA P-807[2] FEMA P-58[3]	FEMA 306[7] ATC-52-4

Determination of Identification Strategy

Rapid Visual Screening

- Geologic Hazards
- Building Information
- Age
- Type (15 types/ combinations)
- Materials
- Lateral Force Resisting System
- Layout
- Non-Structural Concerns
- Falling Hazards
- Emergency Utility Services
- Occupancy

ASCE Tier 1 Screening

- Building Description (size, materials, age, layout, structural composition)
- Site Visit, As-Built Drawing Verification
- Level of Performance Determination
- Level of Seismicity
- Building Type
- Benchmark Evaluation for Bldg. Type
- Basic Structural Evaluation
- Supplemental Evaluation Based On Bldg. Type
- Geologic Site Hazards & Foundation Evaluation
- Basic Nonstructural Evaluation
- Intermediate Nonstructural Evaluation

Other

- Structural
  - Fragility & Damage State Curves
- Non-Structural
  - Within the Building Envelope Exits, Fuel Systems, Ceiling Tiles, Books, Computers, etc.
  - Geologic Investigation
    - Ground Motion
    - Tsunami
    - Active Faults
    - Liquefaction
    - Landslide
    - Differential Settlement
  - Geotechnical
    - Site Soils
    - Groundwater Table
    - Slope Stability
    - Foundations

ASHSC Alaska Seismic Hazards Safety Commission

Identification, Funding, Staffing & Project Implementation

FUNDING

- Federal
  - FEMA Hazard Mitigation Grant Program (HMGP) – Post Disaster

Federal HMGP funds made available following a disaster can provide a federal share of up to 75% of the costs of an approved project.
The remaining 25% must be met through non-federal funds such as local government funds, community development block grants, etc.

  - FEMA Pre-Disaster Mitigation Program (PDM)
    - » Mitigation planning: $1M cap on Federal share, not to exceed 3 years
    - » Mitigation projects: $3M cap on Federal share, not to exceed 3 years
    - » Information dissemination activities not to exceed 10%, must directly relate to planning or project sub-application
    - » Applicant management costs not to exceed 10%
    - » Sub-applicant management costs not to exceed 5%
  - US Senators
  - US Representatives
- State
  - School Facilities Capital Improvement Project Grant (Dept. of Education)
  - State Capital Projects
    - » State Senators
    - » State Representatives
  - Governor
- Local
  - Bonds
  - Maintenance
  - Special Capital Projects/Special Funds (Sale of Shuyak Island)
  - General Fund (Mill Rate/Property Taxes/Severance Taxes/Intergovernmental Sources)
  - Local Government Representatives
  - Local Government Employees
- Private (In-Kind Donations)
  - Services
  - Materials/Supplies
  - Benefactors

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Identification, Funding, Staffing & Project Implementation

STAFFING

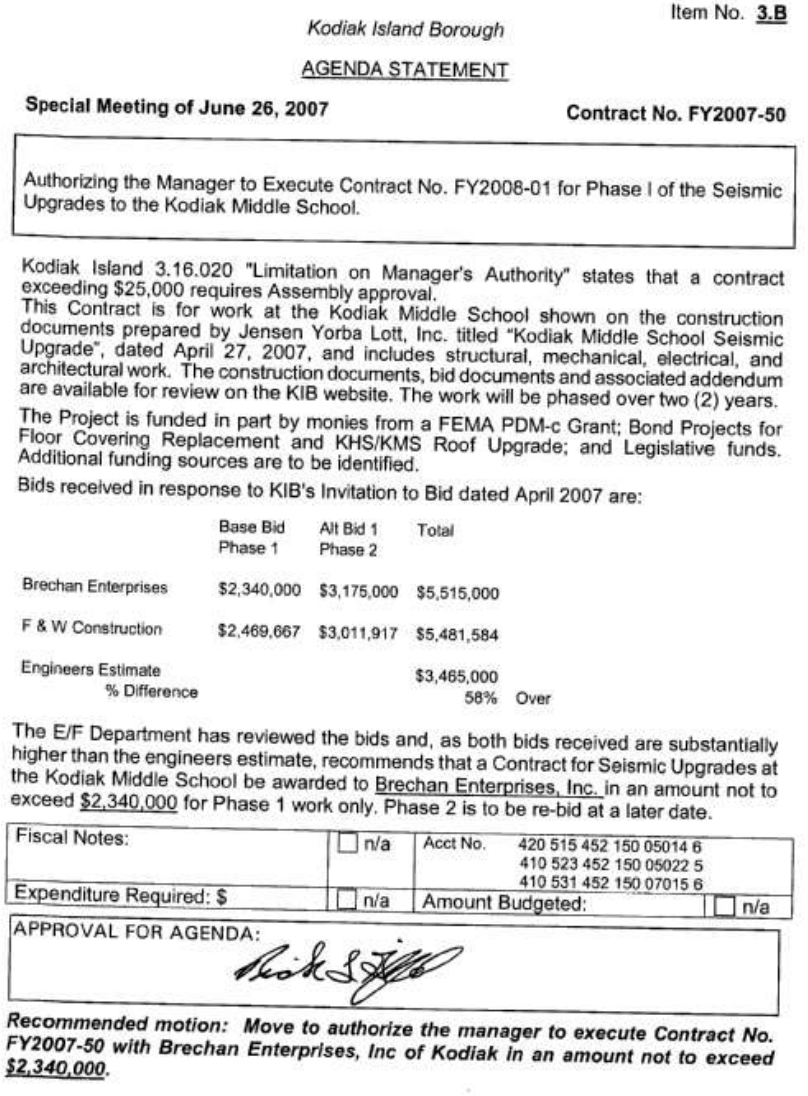
- **Local Government**
  - Credentials
  - Time Commitment
  - Specialized Hire Considerations
  - Points of Contact
    - » Finance
    - » Record drawings (digital?)
    - » Building Access
    - » Public Meetings & Outreach
    - » Project Management (Identification, Mitigation Grants, Construction)
- **Municipal/School Building Managers**
  - Engineers (Large Districts)
  - Architects (Large Districts)
  - Finance
  - Maintenance
- **Private Contract**
  - Evaluation
    - » Geologic
    - » Geotechnical
    - » Structural
  - Grant Application
  - Design
  - Construction
  - Inspection

ASHSC Alaska Seismic Hazards Safety Commission

Identification, Funding, Staffing & Project Implementation

PROJECT IMPLEMENTATION

- **Seismic Only**
- **Combined**
  - Maintenance Upgrade (Roof, Mechanical, Electrical)
  - Energy Efficiency
  - Expansion
- **Phased/Unphased**
- **Unanticipated Issues**
  - Existing Conditions
    - » Lead (paint, plumbing, etc.)
    - » Asbestos (flooring, insulation, roofing, etc.)
    - » Non-Code Compliant Electric, Plumbing, Fire, Fuel/Heat
    - » Unknown Existing Conditions (Structural/Non-Structural)
  - Funding Difficulties
    - » Long Stretches of Time between Identification & Construction
    - » Multiple Agencies
    - » Rising Construction Costs
    - » Unaccounted Local Cost Factors



Item No. **3.B**

Kodiak Island Borough

AGENDA STATEMENT

Special Meeting of June 26, 2007 **Contract No. FY2007-50**

Authorizing the Manager to Execute Contract No. FY2008-01 for Phase I of the Seismic Upgrades to the Kodiak Middle School.

Kodiak Island 3.16.020 "Limitation on Manager's Authority" states that a contract exceeding $25,000 requires Assembly approval.
This Contract is for work at the Kodiak Middle School shown on the construction documents prepared by Jensen Yorba Lott, Inc. titled "Kodiak Middle School Seismic Upgrade", dated April 27, 2007, and includes structural, mechanical, electrical, and architectural work. The construction documents, bid documents and associated addendum are available for review on the KIB website. The work will be phased over two (2) years.

The Project is funded in part by monies from a FEMA PDM-c Grant; Bond Projects for Floor Covering Replacement and KHS/KMS Roof Upgrade; and Legislative funds. Additional funding sources are to be identified.

Bids received in response to KIB's Invitation to Bid dated April 2007 are:

	Base Bid Phase 1	Alt Bid 1 Phase 2	Total
Brechan Enterprises	$2,340,000	$3,175,000	$5,515,000
F & W Construction	$2,469,667	$3,011,917	$5,481,584
Engineers Estimate			$3,465,000
% Difference			58% Over

The E/F Department has reviewed the bids and, as both bids received are substantially higher than the engineers estimate, recommends that a Contract for Seismic Upgrades at the Kodiak Middle School be awarded to Brechan Enterprises, Inc. in an amount not to exceed $2,340,000 for Phase 1 work only. Phase 2 is to be re-bid at a later date.

Fiscal Notes:	☐ n/a	Acct No.	420 515 452 150 05014 6 410 523 452 150 05022 5 410 531 452 150 07015 6
Expenditure Required: $	☐ n/a	Amount Budgeted:	☐ n/a

APPROVAL FOR AGENDA:

Recommended motion: Move to authorize the manager to execute Contract No. FY2007-50 with Brechan Enterprises, Inc of Kodiak in an amount not to exceed $2,340,000.

Thank You!

Artwork by

Eustace Ziegler (1881-1969), Alaskan Frontier Artist

(My great grandfather's brother.)

Note: Numerous pieces of his artwork were lost in the 1964 Valdez tsunami when the local museum was destroyed. Some of his surviving works can be seen at the Anchorage Museum and the State Capitol Building and State Museum in Juneau.

Questions? E-mail: **Laura.W.Kelly@uscg.mil**

Timeline –
Personal Reference (Important for long-range projects/goal)

Year	EQ	US Coast Guard (USCG)	Kodiak Island Borough (KIB)	Alaska Seismic Hazards Safety Commission (ASHSC)
1999	M7.1, Kodiak, AK Dec 6, 1999	LKelly moves to Kodiak, experiences first earthquake. Mw 7.0, 2 pm, Dec. 6th (weekday, school in session). (Local ground forces greater than 1964 earthquake.)		
2000		LKelly starts work in Kodiak Facilities Engineering Division as Federal Employee. Largest USCG Base with 75 commercial facilities, 2000 residents, waterfront to waterfront steam plants than any first piers.		
2001		Meet with Gary Carver, & invite him to present to USCG April, 2002.		
2002	M7.0, Denali, AK, Nov 2, 2002	USCG contractor Gary Carver for Hazard Identification Project. (Ground shaking, active faults, liquefiable soils, slope and ground failure, tsunami inundation.) Completed Spring 2003. Numerous problems identified. Nov. 3, 2002 Denali earthquake, M7.0	Carver/Kelly notify Borough of Peterson Elementary findings. (Carver discovers LKelly rec'd Alaska PE, and encourages proactive involvement.) Carver meets regularly with Borough, PTA, and School Boards with LKelly attending critical meetings.	House Bill 53 Establishes ASHSC.
2003		New active fault identified at Spruce Cape LORAN site near State Rocket Launch Facility.	LKelly volunteers in High School earth science classes. Meet with students to discuss seismic risk, careers associated with risk mitigation, and help assess local schools using RVS.	
2004	M9.1, Sumatra, Indonesia, Sept 29, 2004		Local bond narrowly passes by 11 votes to evaluate schools for seismic risk. Staffing and PDM applications made with Legislative Approval, 2004-2006.	
2005			School Seismic Vulnerability Assessment, William Lettis & Associates, G&E Engineering (John Eidinger) and Gaottel & Assoc. (Ken Gaottel)	Official appointment of 9 members to ASHSC by Gov. Murkowski. First meeting October, 2005. Original members include 3 from Kodiak (Carver, Kelly, and Kodiak City Mngr-Freed).
2006		RVS for all USCG structures (non-residential) in Kodiak. Incorporated with Mission Dependency Indexing. All waterlines now being replaced with HDPE to improve performance in event of an earthquake.	RFP for Seismic Upgrades (Kodiak Middle School and High School), $2.1 Million. Five school retrofit projects continue through 2009.	ASHSC extended to 2012, added language to include tsunamis, added two more members (11 total) - funding remains $10K per year. Standing committees include Focus on Schools. Write white paper on School Seismic Safety Legislation.
2007				Draft Map - At-Risk Schools in Alaska. Presentation "Successful Implementation of Seismic Mitigation for Schools, Sept., 2007"
2008	M7.9, Sichuan, China, May 12, 2008		Peterson Elementary retrofitted.	Contact Commissioner Larry LeDoux, Alaska Dept. of Education & Early Development (ADEED). Request appointment of representative (Sam Kito III) to ASHSC. Year of May 12, 2008 Sichuan China Mw 7.9 earthquake.
2009		LKelly, USCG Engineer of the Year; award includes recognition for seismic vulnerability studies and serving on the ASHSC.	KIBSD receives WSSPC Overall Award in Excellence for seismic mitigation of schools, Feb., 2009.	Utah State Office of Education, School Finance Director, Larry Newton – Jan 7, 2008 (presents Legislation model) Kito, ADEED, joins ASHSC School Committee. Obtain data base of schools and year of construction. Jahr Ahaf Sam Kito presentation to the State of Alaska Senate Education and Finance Committees, Juneau, AK. Map discussed.
2010	M7.0, Haiti, Jan 12, 2010		New police station construction completed. Old fire station remains concern.	Collaboration with ADEED results in developing new capital improvement project application form that specifically addresses seismic issues. Enters trial period. Yumei Wang, Oregon DOGAMI, presents information on Oregon's Seismic Rehabilitation Grant Program. Publish map of Public Schools and Earthquake Hazards in Alaska in ASHSC Annual Report, Feb., 2010.
2011			Bud Carrick, KIB, joins ASHSC.	
2012	M9.0, Honshu, Japan, Apr 11, 2012	USCG supports LKelly participation in revision of FEMA 154 RVS as part of working group/review panel. 2012-2013. Final release ATC-71, Fall, 2014.		--Recommended ADEED CIP changes formally implemented. Dr. Christine Theodorapoulos, Univ. of Oregon speaks to ASHSC about Oregon's achievements regarding seismic risk mitigation for schools and emergency facilities. -- Meet with Alaska PTA. --Kito leaves ADEED.
2013		USCG supports LKelly transfer to Juneau. In close proximity to other USCG engineers, ADEED, Prof. Engineering organizations, and Legislature.		Apply for HMPG funding for RVS of schools -- funding cut. PTA addresses concern to Legislative Issues, stating their support for structurally sound school building throughout the state of Alaska, for the safety of our children, parents, teachers and community members.
2014		Seismic awareness in Kodiak results in complete retrofit of 4 Barracks buildings, an RFP for retrofitting the most critical building on base (Com Sta), and backlog of other mitigation projects - improperly braced overhead steam pipes in Hangars, replace cast iron waterline crossings, strengthen piers, etc. Bauling alley structurally retrofitted during energy upgrade.		--ASHSC extended to 2020. Kito joins AK House of Representatives. --Working with EERI on pilot program for RVS screening of Alaska schools. Modeling Utah's "Schools at Risk" RVS program. --Suggest policy recommendation to incorporate RVS into Univ. of Alaska Engineering curriculum.
2015		LKelly promoted GS-13 Supervisory Engineer, CEU Juneau, for maintenance of USCG share facilities, from Ketchikan to Katzebu. Building 576 Commr retrofit complete.	Bud Carrick, KIB, retires. Gary Carver retires from private sector, but remains on ASHSC.	--UAF: AK's Next Big Earthquake work group, Nov, 2015. --Final Report - Pilot Study-Matanuska-Susitna School Dist- Feb, 2016. 17 bldgs/10 recommended for further review. (Cost $18,500 - BBFM paid $8500, donated $10,000) Feb 6, 2015. --Final Report-RVS Study- Kenai Peninsula Borough- Dec 2015: 15 Schools, 47 structures, 19 recommended for further review. $21,250, $500/$700 per school, Dec 1, 2015.
2016		USCG implements RVS for CA, OR, WA and remainder of AK, using Kodiak as example.	Duane Dvorak, KIB, joins ASHSC.	Preparing to screen Fairbanks. Hoping to partner with UAF, and include campus facilities.
2017	M6.1-M6.2, Hainer May 1, 2017	Draft all hazards study complete; undergoing final review. Highest risk facilities to be prioritized for mitigation.		June 1, final RVS due for Fairbanks North Star Borough Schools.
2018	M7.9, Kodiak Jan 23, 2018	Earthquake generated tsunami evacuation alerts, but no tsunami was generated.		
2018				RVS for Juneau and Sitka - $30K
2018	M7.0, Anchorage Nov 30, 2018			Significant damaging earthquake. All students safe, but several schools permanently closed. Non-structural damage very disruptive.