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Identifying Potential Earthquake Dangers To Alaska's Students and Schools

A Pilot Project Screening Matanuska-Susitna School District Buildings February 6, 2015

Study Conducted by: Sponsored by: BBFM Engineers, Inc.



The Federal Emergency Management Agency (FEMA)



The Department of Homeland Security (DHS)



The Earthquake Engineering Research Institute (EERI)



The Alaska Seismic Hazards Safety Commission (ASHSC)

Alaskan Seismicity:

Alaska among the is most seismically active areas on Earth. Over the past 50 years, the United States Geological Survey (USGS) recorded in the United States more than 3,000 earthquakes more powerful than magnitude 5, with approximately 80% of these occurring in Alaska. Further, of the twelve most powerful earthquakes America has ever experienced, ten were situated in Alaska. These include the 1964 Great Alaska Earthquake, which remains the second most powerful ever measured on Earth.



Sites of major earthquakes in the US

Alaska's intense seismicity is a result of plate tectonics. The Pacific Plate, moving north 2" to 3" per year, slides below the North American Plate at a fault called the Aleutian Megathrust. This tectonic collision and subduction is able to produce an earthquake up to magnitude 9.2, according to the Federal Emergency Management Agency (FEMA). Many other faults occur around the state, and

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though earthquakes associated with them are not as powerful, they may govern the nearby ground accelerations because of their close proximity.

The strength and duration of Alaska's 1964 earthquake shocked the scientific world, spurring an increase in research in plate tectonics and seismology. The Alaska Dispatch News has chronicled many of these changes in a March 23, 2014 article on the subject: "'The 1964 event changed the way we thought about earthquakes,' said Mike West, state seismologist with the [Alaska Earthquake Center] at the University of Alaska Fairbanks. 'It literally helped prove plate tectonics.'"

3-D Model of the Aleutian Megathrust sliding below the North American Plate



Alaskan seismicity: faults, earthquakes, and rupture zones

Building Codes:

Similarly, the 1964 Alaskan earthquake substantially changed the way building structures are designed. In 1973, the Uniform Building Code was modified to add many new, specific requirements. For example, descriptions of seismic force collectors within floors and roofs were added, as were new detailing requirements for seismic safety in regions of high seismicity. Design

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seismic forces for braced frames effectively doubled; unreinforced masonry and concrete were now prohibited for all structural elements in regions of high seismicity; gravity-only columns now needed to be designed to have sufficient strength when swaying dramatically during a seismic event.

Since then, building codes have continued to be modernized. In response to observations after other earthquakes, and informed by extensive testing, building code committees have continued to increase design seismic forces, establish more robust detailing requirements, and intensify inspection mandates. Schools in particular are now designed for an increased factor of safety because of their importance to their communities. Further, in some cases schools are designed to an even higher level of safety so they can be used as shelters following a major earthquake. Because of these changes and many others, buildings constructed today are much more earthquake-resistant than older buildings.

The fact that older buildings are less earthquake-resistant is significant to Alaskan schools because many of them were constructed before building code modernization began to improve the safety

of building construction. As a result, older school buildings are typically less earthquake-safe than newer ones. How much less safe depends on many factors, including age and type of structural system, structural irregularities, building location, and quality of construction. School districts and managers of facilities would benefit greatly from having good information readily available regarding the safety of their facilities. This would enable them to make informed decisions regarding timing and urgency of any further structural reviews and upgrades.



Government Hill Elementary School after the 1964 Earthquake

Rapid Evaluation of Facilities:

To that end, FEMA developed a rapid evaluation procedure outlined in their publication P-154, "Rapid Visual Screening of Buildings for Potential Seismic Hazards: A Handbook." This contains a method for evaluating structures' seismic performance very quickly and without great expense, referring to it as a "sidewalk survey." It takes into account the age and type of structure, building height, irregularities in the structure that decrease reliability, and whether it was constructed before the enforcement of design codes and the implementation of construction inspection. FEMA developed this method to provide a tool to give building owners and managers good, actionable information with minimal up-front cost. The second edition of FEMA P-154 is also available in a program called ROVER (Rapid Observation of Vulnerability and Estimation of Risk), which runs on mobile devices and uploads data and results wirelessly to a central server. An added advantage of ROVER is that the database it establishes can be used after a major earthquake. The database can contain both building plans as well as photographs of the building in its pre-earthquake condition.

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The way ROVER evaluates 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, and ROVER adds and subtracts 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: a score of 2 would indicate the building has roughly one chance in 100 of collapse during a major earthquake; a score of 3 would indicate one chance in 1000, and so on. 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.

Alaskan School Safety:

As stated in 2010 by the Western States Seismic Policy Council (WSSPC), "Every community is required to educate children, and it is the responsibility of governmental agencies to design and construct safe buildings to house them. While current building codes and construction practices have recognized the effects of earthquakes and provide state-of-the-art design considerations, many older school buildings were built before these principles were understood... These older buildings have not been properly graded or passed the test of seismic safety. Consequently, many students face significant seismic risk." The WSSPC is a non-profit consortium of eighteen member states and territories including Alaska.

After all, since children are required to attend school and parents lack specific information about the seismic safety of different structures, it is the responsibility of the government to ensure the schools provide a safe learning environment for Alaskan children. Again, schools may be used as emergency shelters after major earthquakes, further raising the importance of the building's successful performance during an earthquake.

According to the Alaska Department of Education, in the 2013-2014 school year there were more than 130,000 students in Alaska. School districts statewide accept as part of their mission to protect the safety of children and the facilities, whose replacement cost is many billions of dollars.

This Study:

This study was funded by FEMA and managed by the Earthquake Engineering Research Institute (EERI) and the Alaska Seismic Hazards Safety Commission (ASHSC). It is the goal of FEMA and of EERI to improve earthquake safety throughout the country, and for that purpose they are sponsoring pilot projects in various states to showcase the ease and value of rapid visual observation of schools.

Two goals reside at the core of this study: to show planners how quickly and cost effectively an initial assessment can be performed for schools using ROVER's rapid visual assessment program,

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and to rate a sampling of existing schools to provide the Matanuska-Susitna School District information crucial to their planning purposes. Any buildings of concern can then be prioritized for further study and/or upgrade, as appropriate.

ASHSC looked for a school district with older schools constructed with a variety of structural system types and found a willing participant in the Matanuska-Susitna School District, home to some 14% of Alaska's students. Bob Bechtold of the Matanuska Susitna Capital Planning Office prepared a list of schools and provided electronic drawings for each. In preparation for the review of the schools, BBFM Engineers obtained the software necessary to establish one office computer as the online server, which BBFM now maintains on behalf of ASHSC. BBFM also became familiar with the method of using phones and other portable devices to link up with the server and transfer information back and forth.

BBFM reviewed the following seven schools: Big Lake Elementary, Butte Elementary, Cottonwood Creek Elementary, Snowshoe Elementary, Swanson Elementary, Willow Elementary, and Wasilla High School. While still at the office, BBFM Engineers reviewed the available structural drawings and began an entry for each in the online server's database, inputting all available information: location in relation to known seismic faults, structural system type, year of construction, and more.

BBFM then visited these seven schools, photographing their current condition and noting any conditions not shown on the drawings and materials that, during an earthquake, could become falling hazards. This information was later entered into the online server. It should be noted that, seven although schools were reviewed, because several schools have a number of additions, the total structures number of separate reviewed comes to seventeen.



Cottonwood Creek Elementary School

Cost of this Study:

The total cost of this study was approximately \$18,500. Of this, BBFM Engineers was paid \$8500 for this study, resulting in a donated effort of approximately \$10,000. Of this, \$4275 was spent on setting up the server and becoming acquainted with the software. Another \$8145 was spent reviewing drawings, visiting the schools, and entering data into the server. Finally, a little over \$6000 was spent preparing this report.

Future rapid seismic evaluations will not need to include funds for setting up the server, becoming acquainted with software, or addressing most of the subject matter contained in this report. In fact, for remote schools with available structural drawings, school staff could provide the photographs electronically, eliminating even the need to send an engineer to the building. As a result, future studies could be performed for a very minimal cost, approximately \$600 to \$800 per original structure or addition, plus costs associated with transportation.

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For this pilot project, we chose to upload the available structural drawings for all the elementary schools. Using the ROVER server for this purpose was cumbersome, as each drawing had to be converted into a picture format and uploaded individually. While it would be very advantageous to have these drawings readily accessible after a major earthquake, a better solution would be for the drawings to be uploaded in a multi-page pdf format, which is the standard for the industry. Although ROVER cannot accept such files, it can accept a link to a file storage location on the cloud. While making file transfer more standard and efficient, this would also improve reliability, as the drawings would be stored farther from the disaster necessitating their use. Likewise, the ROVER site could also be located on the cloud to protect its database from the effects of a major earthquake.

Results of the Study:

Of the seventeen structures reviewed, the final scores range from 0.3 to 4.8. According to FEMA's guidelines, these should represent preliminary collapse probabilities of 50% and 0.002%, respectively. These probabilities are substantially impacted by building design and construction practices common at the time, which may differ from the practices used on these particular structures. Eight structures exhibited scores below 2.0, indicating further review is necessary. Additionally, a potential pounding/falling materials hazard was identified at a ninth structure. Here are the results for each school:

- 1) Big Lake Elementary School: 1963 Original Construction
 - Wood construction
 - Final score = 2.3; FEMA estimate of collapse risk: 0.5%
 - no additional review is indicated
- 2) Big Lake Elementary School: 1978 Addition
 - Wood construction
 - Final score = 4.7; FEMA estimate of collapse risk: 0.002%
 - no additional review is indicated
- 3) Big Lake Elementary School: 1983 Addition
 - Wood construction
 - Possible pounding with entry canopy
 - Final score = 2.3; FEMA estimate of collapse risk: 0.5%
 - Additional review is required for the possible pounding with the entry canopy
- 4) Butte Elementary School: 1978
 - Wood construction
 - Final score = 4.8; FEMA estimate of collapse risk: 0.002%
 - no additional review is indicated
- 5) Cottonwood Creek Elementary School: 1981
 - Wood construction
 - Final score = 4.8; FEMA estimate of collapse risk: 0.002%
 - no additional review is indicated

- 6) Snowshoe Elementary School: 1978
 - Wood construction
 - Final score = 4.8; FEMA estimate of collapse risk: 0.002%
 - no additional review is indicated
- 7) Swanson Elementary School: 1950's Original Construction
 - Lateral system appears to be concrete floors supported by plywood shear walls
 - Original construction was single story; later a second floor was added
 - Final score = 1.4; FEMA estimate of collapse risk: 4%
 - Additional review is required
- 8) Swanson Elementary School: 1958 Addition
 - Lateral system appears to be concrete floors supported by plywood shear walls
 - Original construction was single story; later a second floor was added
 - Final score = 1.4; FEMA estimate of collapse risk: 4%
 - Additional review is required
- 9) Swanson Elementary School: 1963 Addition
 - Lateral system appears to be concrete floors supported by plywood shear walls
 - Original construction was single story; later a second floor was added
 - Final score = 1.4; FEMA estimate of collapse risk: 4%
 - Additional review is required
- 10) Swanson Elementary School: 1994 Addition
 - Lateral system appears to be concrete floors supported by plywood shear walls
 - Original construction was single story; later a second floor was added
 - Final score = 3.2; FEMA estimate of collapse risk: 0.06%
 - Additional review is required
- 11) Willow Elementary School: 1961 Original Construction
 - Wood construction
 - Final score = 2.5; FEMA estimate of collapse risk: 0.3%
 - No additional review is indicated
- 12) Willow Elementary School: 1976 Addition
 - Masonry construction
 - Final score = 2.3; FEMA estimate of collapse risk: 0.5%
 - No additional review is indicated
- 13) Willow Elementary School: 1987 Addition
 - Masonry construction
 - Final score = 1.7; FEMA estimate of collapse risk: 2%
 - Additional review is required
- 14) Wasilla High School: 1974 Original Construction
 - Masonry and concrete shear walls construction

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- Final score = 1.6; FEMA estimate of collapse risk: 3% Additional review is required
- 15) Wasilla High School: 1979, West Classroom Addition
 - Steel braced frame and steel moment frame construction
 - Final score = 1.9; FEMA estimate of collapse risk: 1.3%
 - Additional review is required
- 16) Wasilla High School: 1979, Entry Addition
 - Steel frame tied to existing building construction
 - Final score = 1.6; FEMA estimate of collapse risk: 3%
 - Additional review is required
- 17) Wasilla High School: 1979, East Addition With Pool
 - Precast and masonry construction
 - Final score = 0.3; FEMA estimate of collapse risk: 50%
 - Additional review is required



 Schools Considered Safe (Less than 1% Chance of Collapse)

Schools with Unacceptable Seismic Risk (Greater than 1% Chance of Collapse)

With relatively little time or expense, this study has identified many structures that would be expected to perform well during a major earthquake, largely due to modern building code requirements and construction practices.

At the same time, this study also quickly and cost-effectively identified many other structures that may perform poorly during a major earthquake. The schools appear to pose a significant risk to students in the Matanuska-Susitna School District and to the communities they serve. Of the seventeen original buildings and additions, nine are indicated to pose unacceptable risks requiring further structural attention. In other words, 53% of the structures reviewed in this study pose an unacceptable risk of collapse during a major earthquake. The three largest contributors to a

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building's seismic risk are: a) common industry practices when the structure was built, b) type of structural system, and c) the presence of and type of structural irregularities.

The study of these schools in the Matanuska-Susitna School District indicates there would be great value in conducting a similar study statewide, where more than 500 public schools serve kindergarten through twelfth grade. It is the responsibility of school districts and school boards, as well as local and statewide governing bodies to reduce the risk earthquakes currently pose to students and facilities alike, and this rapid evaluation method would quickly and economically identify those structures requiring further attention.

In a December 17 interview aired by the Alaska Public Radio Network, Alaska Governor Bill Walker pointed out that the tightness of today's Alaskan economy requires policymakers to be particularly focused on our state's priorities, and that education is a high priority. Fortunately, structural review and upgrade is truly one area where "a stitch in time saves nine." Over time, the cost of not upgrading a deficient structure typically exceeds the cost of improving the structure before a major earthquake hits, and even more so when lives and disruption to society are factored in.

Effectiveness of Seismic Retrofit:

Various earthquakes have shown that seismic retrofits to a building can substantially improve its performance during a major earthquake. For example, the 2001 Nisqually Earthquake near Olympia, Washington produced peak ground accelerations 10% to 30% as strong as the acceleration due to gravity. Reviewing the aftermath, the California Seismic Safety Commission determined that "One hundred and one schools and buildings had been retrofitted for structural components and seven had been retrofitted for non-structural components in the Seattle Public Schools District when the Nisqually earthquake occurred. None of the districts schools suffered significant structural damage. Non-structural damage to colleges and universities included toppling

of bookcases and the localized flooding due to a ruptured water line. Some primary and secondary schools in Olympia and Seattle suffered limited structural (damaged beams and columns) and non-structural damage from strong ground shaking."



Nisqually earthquake damage at a building without seismic retrofit

A second example is 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

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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



Napa earthquake damage to a building without seismic retrofit

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."

For buildings shown to be vulnerable to collapse during earthquakes, seismic retrofit can substantially improve the buildings' performance during a major earthquake.

We urge planners and policymakers to implement a program to assess rapidly and inexpensively (only costing about \$600 to \$800 per structure plus transportation as needed) the vulnerability of schools to earthquakes, both for the safety of the students and to protect financial investments across the state. An added benefit of using the ROVER program is that it develops a database of critical information readily available after a major earthquake. We also encourage further structural review and possible seismic retrofit for the ten structures identified in this report as posing unacceptable seismic risk.

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Earthquake Danger to Alaska's Students and Schools Appendix A

Scoring Sheets for ROVER

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Earthquake Danger to Alaska's Students and Schools

Appendix A Page 1

Big Lake Elementary School: 1963 Original Construction

3/16/2015

FEMA 154

Rapid Visual Screening of Buildings for Potential Seismic Risk **FEMA-154 Data Collection Form HIGH Seismicity** Address:3808 S Big Lake Rd Zip: 99652 Other Identifiers: No Stories: 2 Year Built: 1963 Screener: 1 Date: None Total Floor Area (sq. ft.): 57240 Building Name: Big Lake Elementary 1963 Original Construction Use: None No Sketch No Photograph Occupancy Soil Type Falling Hazard D E Stiff Soft Soil Soil Unreinforced Parapets Cladding Number of Persons A B C Hard Avg, Dense Rock Rock Soil С F Assembly Gov Office Poor Soil 11-100 0-10 Historic Other Commercia Residentia 101-1000 1000 1 Industrial 🖉 School Emer, Services Basic Scores, Modifiers, and Final Score, S S3 S4 S5 C1 (LM) (RC SW) (URM INF) (MRF) C2 (SW) S2 (BR) C3 (URM INF) PC1 (TU) **Building Type** URM W1 W2 PC2 (MRF) (FD) (RD) sic Score 3.6 1.5 Mid Rise(4-7 stories 0.4 NA NA 0.2 0.4 NA 0.4 0,4 0,4 0,2 NA 0.2 0,4 0.4 0.0 ligh Rise(>7 stories) 0.6 0.8 NA 0.8 0.8 0.6 0.8 0.3 NA NA 0.6 0.4 NA ertical Irregularity NA -1.0 -1.0 -1.5 -1.0 -10 -1.5 -1.0 NA -10 -1.0 -1.0 an irregularity 0.5 -0,5 -0.5 0.5 -0,5 -0,5 -0.5 -0,5 -0.5 0.5 -0.5 -0,5 0.5 Pre Code -1,2 -1,0 -1.0 -1.0 -0.8 -0.6 -0.8 -0.2 -0.2 -0.8 0.0 -1.0 -0.8 -0.2 -0.8 1.4 2.4 2.4 2.4 1.4 1.4 NA 1.6 NA 2.4 Post-Benchmark NA NA 2.8 2.6 NA Soil Type C -0.4 -0.4 -0.4 -0.4 -0.4 -0.4 -0.4 -0.4 -0.4 -0.4 -0.4 -0.4 -0.4 -0.4 -0.4 0.0 Soil Type D -0.6 -0.6 -0.4 -0.6 -0.6 -0.6 -0.6 -0.6 -0.6 0.0 0.0 -0,8 -1.2 -0.8 -0.8 Soil Type E -0.4 O -1.2 O -0.4 O -0.6 O -0.6 2.3 Final Scores Comments: Detailed ee 1978 Addition for photos and plans Evaluation Required BR = Braced Frame MRF = Moment-resisting frame FD = Flexible RC - Reinforced concrete Diaphragm RD = Rigid diaphragm SW = Shear Wall TU = Tilt Up URM INF = Unreinforced masaonry infil * = Estimated, subjective or unreliable data DNK - Do Not Know Diaphragm LM = Light Metal http://192.168.254.253:8000/Rover/worksheet/printable_site/16 1/1 Dennis L. Berry, PE Troy J. Feller, PE Colin Maynard, PE Scott M. Gruhn, PE

Big Lake Elementary School: 1978 Addition

2/20/2015

FEMA 154

Rapid Visual Screening of Buildings for Potential Seismic Risk FEMA-154 Data Collection Form HIGH Seismicity

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Building Type asic Score lid Rise(4-7 stories) igh Rise(>7 stories) ertical Irregularity Ian irregularity re=Code	W1 4.3 3. NA NA -25 -0.5	W2 .6 2 NA NA -2.0 -0.5 -1.0	S1 (MRF) 27 0.2 0.6 -1.0 -0.5	S2 (BR) 3.1 0.4 0.8 -1.5 -0.5	S3 S (LM) (RC 2.7 NA NA NA NA -0.5	4 S5 SW) (URM IN 1.7 0.4 0.4 0.8 0.8 -1.0 -1.0 -0.5 -0.5 -0.5 -0.5	C1 IF) (MRF) 24 0.4 0.6 -1.5 -0.5 -0.5	C2 (SW) 2.7 0.4 0.8 -1.0 -0.5	C3 (URM INF) 1.3 0.2 0.3 -1.0 -0.5	PC1 (TU) 2.5 NA NA NA -0.5	PC2 2.3 0.2 0.4 -1.0 -0.5	RM1 (FD) 2.7 0.4 NA -1.0 -0.5	RM2 (RD) 2.7 0.4 0.6 -1.0 -0.5	URM 1.5 0.0 NA -1.0 -0.5
Building Type asic Score lid Rise(4-7 stories) igh Rise(>7 stories) ertical Irregularity fan irregularity re=Code ost-Benchmark	W1 4.3 3. NA NA -25 -0,5 0,0 24	W2 .6 2 NA -2.0 -2.0 -1.0 -1.0	S1 (MRF) 27 0.2 0.6 -1.0 -0.5 -1.0	S2 (BR) 3.1 0.4 0.8 -1.5 -0.5 -0.8	S3 S (LM) (RC 27 NA NA NA -0,5 -0,6	4 S5 SW) (URM II 1-7 0.4 0.4 0.8 0.8 -1.0 -1.0 -0.5 -0.5 -0.8 -0.2 1.6 NA	C1 IF) (MRF) 24 0.4 0.6 -1.5 -0.5 -1.2 1.4	C2 (SW) 2.7 0.4 0.8 -1.0 -1.0 -1.0 -1.0 2.4	C3 (URM INF) 1.3 0.2 0.3 -1.0 -0.5 -0.5 -0.2 NA	PC1 (TU) 2.5 NA NA NA -0.5 -0.8	PC2 2.3 0.2 0.4 -1.0 -0.5 -0.8	RM1 (FD) 2.7 0.4 NA -1.0 0.5 -1.0 2.8	RM2 (RD) 2.7 0.4 0.6 -1.0 -0.5 -0.8 2.6	URM 1.5 0.0 NA -1.0 -0.5 -0.2 NA
Building Type asic Score lid Rise(4-7 stories) ligh Rise(>7 stories) ertical Irregularity lan irregularity re-Code ost-Benchmark	W1 4.3 3. NA NA -2.5 0.0 2.4	W2 .6 2 NA NA -2.0 -2.0 -1.0 2.4	S1 (MRF) 2.7 0.2 0.6 -1.0 -0.5 -1.0 1.4	S2 (BR) 3.1 0.4 0.8 -0.5 -0.5 -0.8 1.4	S3 S (LM) (RC 2.7 NA NA NA -0.5 -0.6 NA	4 S5 SW) (URM II 1.7 0.4 0.4 0.8 0.8 -1.0 -1.0 -0.5 -0.5 -0.8 -0.2 1.6 NA	C1 IF) (MRF) 2.4 0.4 0.6 -1.5 -0.5 -1.2 1.4	C2 (SW) 2.7 0.4 0.8 -1.0 -1.0 -1.0 2.4	C3 (URM INF) 1.3 0.2 0.3 -1.0 -0.5 -0.2 NA	PC1 (TU) 2.5 NA NA NA -0.5 -0.8 2,4	PC2 2.3 0.2 0.4 -1.0 -0.5 -0.8 NA	RM1 (FD) 2.7 0.4 NA -1.0 -1.0 0.5 -1.0 2.8	RM2 (RD) 2.7 0.4 0.6 -1.0 -0.5 -0.8 2.6	URM 1.5 0.0 NA -1.0 0.5 0.2 0.2 NA
Building Type Basic Score Aid Rise(4-7 stories) ligh Rise(>7 stories) 'ertical Irregularity fan irregularity 're-Code 'ost-Benchmark	W1 4.3 3 NA NA -25 0.0 24 0.0	W2 .6 2 NA .20 .0,5 .10 2,4 .0,4	S1 (MRF) 2.7 0.2 0.6 -1.0 -0.5 -1.0 1.4	S2 (BR) 3.1 0.4 0.8 -1.5 -0.5 -0.8 1.4	S3 S3 (RC 2.7 NA	4 S5 SW) (URM II 1.7 0.4 0.4 0.8 0.8 -1.0 -1.0 -0.5 -0.5 -0.8 -0.2 1.6 NA -0.4 -0.4	C1 (MRF) 24 0.4 0.6 -1.5 -0.5 -1.2 1.4 -0.4	C2 (SW) 2.7 0.4 0.8 -1.0 -1.0 -2.4 -1.0 -2.4	C3 (URM INF) 1.3 0.2 0.3 -1.0 -0.5 -0.2 NA	PC1 (TU) 2.5 NA NA NA -0,5 -0.8 2,4	PC2 2.3 0.2 0.4 -1.0 -0.5 -0.8 NA	RM1 (FD) 2.7 0.4 NA -1.0 -0.5 -1.0 2.8	RM2 (RD) 2.7 0.4 0.6 -1.0 -0.5 2.6 -0.8 2.6	URM 1.5 0.0 NA -1.0 -0.5 0.5 0.5 0.5 0.0 0.5 0.0 0.5 0.0 0.5 0.0 0.0
Building Type lasic Score lid Rise(4-7 stories) ligh Rise(>7 stories) 'ertical Irregularity fan irregularity re-Code 'ost-Benchmark oil Type C oil Type D	W1 4.3 NA NA -25 0.0 24 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	W2 .6 2 NA .20 .05 .10 24 .04 .04 .08	S1 (MRF) 27 0.2 0.6 -1.0 -1.0 -1.0 1.4 -0.4 -0.6	S2 (BR) 3.1	S3 S (LM) (RC 2.7 NA NA NA -0.5 -0.6 -0.4 -0.4	4 S5 SW) (URM II 1.7 0.4 0.4 0.8 0.8 -1.0 -1.0 -0.5 -0.5 -0.8 -0.2 1.6 NA -0.4 -0.4 -0.4 -0.4	C1 (MRF) 24 0.4 0.6 -1.5 -0.5 -1.2 -1.2 -1.4 -0.4 -0.4	C2 (SW) 2.7 0.4 0.8 -1.0 0.5 -1.0 2.4 -0.4 0.2	C3 (URM INF) 1.3 0.2 0.3 -1.0 -0.5 -0.2 NA -0.4 -0.4	PC1 (TU) 2.5 NA NA NA -0,5 -0,8 2,4	PC2 2.3 0.2 0.4 -1.0 -0.5 -0.8 NA 0.4 -0.4 -0.4	RM1 (FD) 2.7 0.4 NA -1.0 -0.5 -1.0 2.8 -0.4 -0.4 -0.6	RM2 (RD) 2.7 0.4 0.6 -1.0 -0.5 -0.8 2.6 -0.4 -0.4 -0.6	URM 1.5 0.0 NA -1.0 0.5 -0.2 NA 0.2 0.4 0.4 0.6
Building Type Basic Score Aid Rise(4-7 stories) ligh Rise(>7 stories) fertical Irregularity fan irregularity fan irregularity fre-Code 'ost-Benchmark 'oil Type C oil Type D oil Type E	W1 4.3 NA NA -25 0.00 24 0.00 0.00 0.00 0.00 0.00 0.00 0	W2 .6 2 NA -2.0 -0.5 -1.0 2.4 -0.4 -0.8 -0.8	S1 (MRF) 27 0.2 0.6 -1.0 -0.5 -1.0 1.4 -0.4 -0.6 -1.2	S2 (BR) 3.11 0.4 0.8 0.8 0.8 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5	S3 S3 (LM) (RC) (2.7 NA 2.7 NA	4 S5 SW) URM IN 1.7 0.4 0.4 0.8 0.8 -1.0 -1.0 -0.5 -0.5 -0.8 -0.7 1.6 NA -0.4 -0.4 -0.4 -0.4 -0.4 -0.4 -1.2 -0.8	C1 (MRF) 24 0.4 0.6 -1.5 -0.5 -1.2 1.4 -0.4 -0.4 -0.4 -0.4 -0.4	C2 (SW) 2.7 0.4 0.8 -1.0 0.5 -1.0 2.4 -1.0 2.4 -0.6 -0.6 -0.8	C3 (URMINF) 1.3 0.2 0.3 -1.0 -0.5 -0.2 NA -0.4 -0.4 -0.8	PC1 (TU) 2.5 NA NA NA -0.5 -0.8 2.4 -0.4 -0.4 -0.4	PC2 2.3 0.2 0.4 -0.5 -0.5 -0.8 NA -0.6 -0.6 -0.6	RM1 (FD) 2.7 0.4 NA -1.0 -0.5 -1.0 2.8 -1.0 2.8 -0.4 -0.6 -0.4	RM2 (RD) 2.7 0.4 0.6 -1.0 -0.5 -0.8 2.6 -0.4 -0.6 -0.6	URM 1.5 0.0 NA -1.0 -0.5 -0.2 NA 0.6 -0.6
Building Type Basic Score Aid Rise(4-7 stories) High Rise(>7 stories) Identical Irregularity Intercode Int	W1 4.3 NA NA .25 .00 .00 .24 .00 .00 .00 .00 .00 .00 .00 .00 .00 .0	W2 .6 NA -20 -0,5 -10 2,4 -0,4 -0,8 -0,8 -0,8 -0,8 -0,8 -0,8	S1 (MRF) 27 0.2 0.6 -1.0 -0.5 -1.0 1.4 -0.4 -0.6 -1.2	S2 (BR) 29 3.1 0.4 0.8 -1.5 -0.5 -0.8 1.4 -0.6 -0.6	S3 SC (LM) (RC 2.7 NA NA NA NA -0.5 -0.6 NA -0.4 -0.4 -0.4 -0.6 -0.4 -0.6	4 S5 SW) (URM II 1.7 0.4 0.4 0.8 0.8 -1.0 -1.0 -0.5 -0.5 -0.8 -0.7 1.6 NA -0.4 -0.4 -0.4 -0.4 -0.4 -0.4	C1 (MRF) 24 0.4 0.6 -1.5 -1.2 1.4 -0.6 -1.2 1.4 -0.6 -1.2	C2 (SW) 2.7 0.4 0.8 -1.0 -0.5 -1.0 2.4 -0.4 -0.6 -0.8	C3 (URM INF) 1.3 0.2 0.3 -1.0 -0.5 -0.2 NA -0.4 -0.4 -0.4 -0.8	PC1 (TU) 2.5 NA NA NA -0.5 -0.8 2.4 -0.4 -0.6 -0.4	PC2 2.3 0.2 0.4 -1.0 -0.5 -0.8 NA -0.4 -0.4 -0.4 -0.4 -1.2	RM1 (FD) 2.7 0.4 NA -1.0 0.5 -1.0 2.8 -0.4 -0.6 -0.4	RM2 ((RD) 2.7 0.4 0.6 -1.0 -0.5 2.6 2.6 -0.8 2.6 -0.6 -0.6	URM 1.5 0.0 NA -1.0 -0.5 0.2 NA -0.4 -0.4 -0.6
Building Type Basic Score Ald Rise(4-7 stories) High Rise(>7 stories) /ertical Irregularity Pre-Code Post-Benchmark Soil Type C Soil Type D Soil Type E Final Scores Comments:	W1 4.3 NA NA NA 2.5 4.0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	W2 .6 NA NA -2.0 -0.5 -1.0 2.4 -0.4 -0.8 -0.8 -0.8 4.7	S1 (MRF) 27 0.2 0.6 -1.0 -0.5 -1.0 1.4 -0.4 -0.6 -1.2	S2 (BR) 29 3.1 0.4 0.8 -1.5 -0.5 -0.8 -0.8 -0.8 -0.8 -0.8 -0.8 -0.8 -0.8	S3 S (LM) (RC 2.7 NA NA NA NA -0.5 -0.6 NA -0.4 -0.4 -0.6	4 S5 SW) (URM II 1.7 0.4 0.4 0.8 0.8 -1.0 -1.0 -0.5 -0.5 -0.8 -0.7 1.6 NA -0.4 -0.4 -0.4 -0.4 -0.4 -0.4	C1 (MRF) 24 0.4 0.6 -1.5 -0.5 -1.2 1.4 -0.6 -1.2 -1.2	C2 (SW) 2.7 0.4 0.8 -1.0 -0.5 -1.0 2.4 -0.4 -0.6 -0.8	C3 (URMINF) 1.3 0.2 0.3 -1.0 -0.5 -0.2 NA -0.4 -0.4 -0.4	PC1 (TU) 2.5 NA NA NA -0.5 -0.8 2.4 -0.4 -0.6 -0.6 -0.4 Detailed Evaluatio Requiree	PC2 2.3 0.2 0.4 -1.0 -0.5 -0.8 NA 0.4 -0.6 -0.8 -0.4 -0.6 -0.4 -1.2	RM1 ((FD) 2.7 0.4 NA -1.0 -0.5 -1.0 2.8 -0.4 -0.6 -0.4	RM2 ((RD) 2.7 0.4 0.6 -1.0 -0.5 -0.8 2.6 -0.4 -0.6 -0.6	URM 1.5 0.0 NA -1.0 -0.5 -0.2 NA -0.6 -0.6 -0.6
Building Type Basic Score Aid Rise(4-7 stories) digh Rise(>7 stories) /ertical Irregularity /re-Code /ost-Benchmark ioil Type C ioil Type C ioil Type D ioil Type E inal Scores Comments:	W1 4.3 NA NA -2.5 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	W2 6 2 NA NA -2.0 -0.5 -1.0 2.4 -0.4 -0.4 -0.8 -0.8 -0.8 -0.8 -0.8 -0.8 -0.8 -0.8 -0.8 -0.8 -0.8 -0.9 -0.5 -1.0 -0.5 -1.0 -0.5 -1.0 -0.5 -1.0 -0.5 -1.0 -0.5 -1.0 -0.5 -1.0 -0.5 -1.0 -0.5 -1.0 -0.5 -1.0 -0.5 -1.0 -0.5 -0.5 -1.0 -0.5 -0	S1 (MRF) 27 0.2 0.6 -1.0 -0.5 -1.0 1.4 -0.4 -0.4 -0.4 -1.2 R = Braced -1.2 -1.2	S2 (BR) 3.1 0.4 0.4 0.8 0.8 0.8 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5	S3 SC (LM) (SC 2.7 NA NA NA -0.5 -0.6 NA -0.6 -0.4 -0.4 -0.6 -0.4 -1.0	4 S5 SW) (URM II 1.7 0.4 0.4 0.4 0.8 0.8 -1.0 -1.0 -0.5 -0.5 -0.8 -0.2 1.6 NA -0.4 -0.4 -0.4 -0.4 -1.2 -0.6 sisting frame ancrete agm	C1 (MRF) 24 0.4 0.6 -1.5 -1.2 -1.2 -1.2 -1.2 -1.2 -1.2 -1.2 -1.2	C2 (SW) 2.7 0.4 0.8 -1.0 0.2 4 -0.5 -1.0 2.4 -0.6 -0.8 -0.8	C3 (C3) 1.3 0.2 0.3 -1.0 -0.5 -0.2 NA -0.4 -0.4 -0.4 -0.4 -0.8	PC1 (TU) 2.5 NA NA NA -0.5 -0.8 2.4 -0.4 -0.6 -0.6 -0.4 Detailed Evaluatio Required	PC2 2.3 0.2 0.4 -1.0 -0.5 -0.8 NA -0.4 -0.4 -0.6 -1.2	RM1 (FD) 2.7 0.4 NA -1.0 0.5 -1.0 2.8 -0.4 -0.6 -0.4	RM2 ((RD) 2.7 0.4 0.6 -1.0 0.5 -0.5 2.6 -0.8 2.6 -0.6 -0.6 -0.6	URM 1.5 0.0 NA -1.0 0.5 0.2 NA 0.6 -0.6 -0.6

Big Lake Elementary School: 1983 Addition

2/20/2015

FEMA 154

Rapid Visual Screening of Buildings for Potential Seismic Risk FEMA-154 Data Collection Form HIGH Seismicity

	- Aburran J				5		Ad Zip Oti No Yei Sci Da To Bu Us	dress:3808 c: 99652 ner Identifi Stories: 2 ar Built: 19 reener: 1 te: None tal Floor A ilding Nar e: None	3 S Big L iers: 976 Area (sg. ne: Big	ake Rd f <u>t.): 57240</u> Lake	Elem	entar	×		
										Aurone Bag La	Ke Element				
	Oc	cupai	ncy					Soil T	уре	Dole tow-to-	12 11.30 40	Falli	ng Haz	ard	
Assembly	Govt	Off	fice	Numb	er of Perso	ons H	A B lard Ave	C Dense S	D E	F	Unrei Chim	nforced neys	Parap	oets 📃	Cladding
Commercial	Historic	Re	sidentia	0-10		11-100 R	lock Roc	k Soil S	Soil Soil	Soil	ther:		م مانم	t antor	
Emer. Services	Industria	🕙 Sci	hool	101-	1000	1000+)			ossib	e pour	iding a	t entry	CE
Building Type	W1	Wo	Ba s1	sic So s2	cores s3	, Mod	lifiers s5	, and F	inal :	core,	S PC1	PC2	RM1	RM2	URM
lasic Score 4.	.3 3.6	6 2	(MRF) 17	(BR) 2.9	(LM) 3.1	(RC SW) 27	(URM IN 1.7	F) (MRF) 2.4	(SW) 2.7	(URM INF) 1.3	(TU) 2.5	2.3	(FD) 2.7	(RD) 2.7	1.5
lid Rise(4-7 stories)	NA	NA	0.2	0.4	NA	0.4	0.4	0.4	0.4	0.2	NA	0.2	0.4	0.4	0.0
igh Rise(>7 stories)	NA	NA	0,6	0,8	NA	0.8	0.8	0.6	0.8	0.3	NA	0.4	NA	0.6	NA
ertical rregularity	-2.5	-2.0	-1.0	-1.5	NA	-1.0	-1.0	-1.5	-1.0	-1.0	NA	-1.0	-10	1000	-1.0
		1 .05	-0.5		242325	1.1.2.2.4							- 1.00	-1.0	
lan irregularity	-0,5	-0-5	-0,5	-0,5	-0,5	-0.5	=0,5	-0.5	.0,5	-0.5	-0,5	-0,5	.0.5	-1.0	-0,5
lan irregularity 're-Code	0.0	1.0	-1.0	-0.5	-0.5	-0.5	-0.5	-0.5 -1.2	-0.5	-0.5	-0,5	-0.5	-1.0	-1.0 -0.5	-0.5
fan irregularity 're-Code 'ost-Benchmark	0.0 0 2.4	-1.0 2.4	-1.0	-0.5 -0.8	-0_5	-0.5 -0.8	-0.5 -0.2 NA	-0.5 -1.2 1,4	-0.5 -1.0 2,4	-0_5 -0.2 NA	-0.5 -0.8	-0.5 -0.8 NA	-1.0 2.8	-1.0 -0.5 -0.8 2.6	-0,5 -0,2 -0,2
Nan irregularity 're-Code 'ost-Benchmark oil Type C	24 C	-1_0 2_4	-1.0 1.4	-0.5 -0.8 -0.8 1,4	0.5 0.6 NA	-0.5 -0.8 -0.8	-0.5 -0.2 NA	-0.5 -1.2 1.4	-0.5 -1.0 2.4	-0.5 -0.2 NA	-0.5 -0.8 2,4	-0.5 -0.8 -0.8 NA	-0.5 -1.0 2.8	-1.0 -0.5 -0.8 2.6	-0.5 -0.2 NA
flan irregularity 're-Code 'ost-Benchmark oil Type C oil Type D		-1,0 2,4 -0,4	-1.0 1.4	-0.8 -0.8 1,4	-0,5 -0.6 NA -0.4	-0.5 -0.8 1.6 -0.4	-0.5 -0.2 NA	-0.5 -1.2 1.4 -0.4	-0.5 -1.0 2,4	-0.5 NA	-0,5 -0,8 2,4	-0.5 -0.8 NA	-0.5 -1.0 2.8	-1.0 -0.5 -0.8 2.6	-0.5 -0.2 NA
fan irregularity re=Code ost-Benchmark oil Type C oil Type D oil Type E		-0,3 -1,0 2,4 -0,4 -0,8 -0,8	-0.3 -1.0 1.4 -0.4 -0.6 -1.2	-0.8 -0.8 1.4 -0.4 -0.6 -0.6	-0,5 -0,6 NA -0,4 -0,6 -0,6	-0.5 -0.8 1.6 -0.4 -0.6	-0.5 -0.2 NA -0.4 -0.4	-0,5 -1,2 1,4 -0,6 -0,6	-0,5 -1,0 2,4 -0,4 -0,6 -0,6	-0.5 -0.2 NA	-0.5 -0.8 2.4 -0.4 -0.6 -0.4	-0.5 -0.8 NA -0.4 -0.4 -0.6	-0.5 -1.0 2.8 -0.4 -0.6	-1.0 -0.5 -0.8 2.6 -0.4 -0.6 -0.6	-0.5 NA -0.2 NA -0.4 -0.4 -0.6
Nan irregularity 're-Code 'ost-Benchmark oil Type C oil Type D oil Type E inal Scores		-0,3 -1,0 2,4 -0,4 -0,8 -0,8 4,7	-1.0 1.4 -0.4 -0.6 -1.2	-0.8 -0.8 1,4 -0.4 -0.6 -1.2	-0,5 -0,6 NA -0,4 -0,4 -0,6	-0,5 -0,8 1,6 -0,4 -0,6 -1,2	-0.5 NA -0.2 -0.4 -0.4 -0.4	-0,5 -1,2 1,4 -0,4 -0,6 -1,2	-0.5 -1.0 2.4 -0.4 -0.6 -0.8	-0.5 -0.2 NA -0.4 -0.4 -0.4 -0.8	-0.5 -0.8 2.4 -0.4 -0.6 -0.4	-0.5 -0.8 NA -0.4 -0.6 -1.2	-0.5 -1.0 2,8 -0.4 -0.4 -0.4	-1.0 -0.5 -0.8 2.6 -0.4 -0.6	-0.5 NA -0.2 NA -0.4 -0.6 -0.6
Nan irregularity Pre-Code Post-Benchmark ioil Type C ioil Type D ioil Type E iinal Scores Comments:		-1.0 2.4 -0.4 -0.8 -0.8 4.7	-0,5 -1.0 1,4 -0.4 -0,6 -1,2	-0.8 1.4 -0.4 -0.6 -1.2	-0,5 -0,6 NA -0,4 -0,6 -1,0	-0,5 -0.8 1,6 -0.4 -0,6 -1,2	-0,5 -0.2 NA -0.4 -0,4 -0,4	-0,5 -1,2 1,4 -0,4 -0,6 -1,2	-0.5 -1.0 2.4 -0.6 -0.8	-0.5 -0.2 NA -0.4 -0.4 -0.8	-0,5 -0,8 2,4 -0,4 -0,6 -0,4	-0,5 -0,8 NA -0,4 -0,6 -1,2	-1.0 -0.5 2.8 -0.4 -0.6 -0.4	-1.0 -0.5 2.6 -0.8 -0.4 -0.6 -0.6	-0,5 NA -0.2 NA -0,4 -0,6
Man irregularity Pre-Code Post-Benchmark Soil Type C Soil Type D Soil Type E Final Scores Comments:		-1,0 2,4 -0,4 -0,8 -0,8 4,7	-0.4 -1.2	-0,5 -0,8 1,4 -0,4 -0,6 -1,2	-0,5 -0,6 NA -0,4 -0,4 -1,0	-0,5 -0,8 1,6 -0,4 -0,6 -1,2	-0.5 -0.2 NA -0.4 -0.4 -0.8	-0.5 -1.2 1.4 -0.4 -0.6 -1.2	-0,5 -1,0 2,4 -0,4 -0,6 -0,8	-0,5 -0,2 NA -0,4 -0,4 -0,4 -0,8	-0,5 -0.8 2,4 -0,4 -0,6 -0,4 Detailec Evaluatio Requirer	-0.5 -0.8 NA -0.4 -0.6 -1.2	-0,5 -0,5 2,8 -0,4 -0,4 -0,4	-1.0 -0.5 -0.8 2.6 -0.4 -0.6	-0.5 NA -0.4 -0.6
Man irregularity Pre-Code Post-Benchmark Soil Type C Soil Type D Soil Type E Final Scores Comments: * = Estimated, subjective or DNK - Do Not Know	- 4,5 C	-1.0 2.4 -0.4 -0.8 -0.8 4.7	1.0 - 1.0 - 1.4 - 0.4 - 0.6 - 1.2 - 1.2 - 1.2 - 1.2	-0,5 -0.8 1,4 -0,4 -0,4 -0,6 -1,2	-0,5 -0,6 NA -0,4 -0,4 -1,0 RF = Mom C - Reinfor D = Rigid c	ent-resistir ced concre liaphragm	-0,5 -0,2 NA -0,4 -0,4 -0,8	SW = Shear U = Til Ug URM INF =	-0,5 -1,0 2,4 -0,4 -0,6 -0,8 Wall Unreinforc	-0,5 -0,2 NA -0,4 -0,4 -0,8	-0.5 -0.8 2.4 -0.4 -0.4 -0.4 -0.4 Evaluatio Requires	-0.5 -0.8 NA -0.4 -0.4 -0.6 -1.2	-0.5 -1.0 2,8 -0.4 -0.4 -0.4	-1.0 -0.5 -0.8 2.6 -0.4 -0.6 -0.6	-0.5 -0.2 NA -0.4 -0.6 -0.6

Butte Elementary School: 1978

2/20/2015

FEMA 154

Rapid Visual Screening of Buildings for Potential Seismic Risk FEMA-154 Data Collection Form HIGH Seismicity

Address:4006 Butte Rd Zip: 99645 Other Identifiers: No Stories: 2 Year Built: 1978 Screener: 1 Date: None Total Floor Area (sq. ft.): 49550 Building Name: Butte Jse: None - P.-1. TTe: Butte Unreinforced Chimneys A B C Hard Avg. Dense Rock Rock Soil D Stiff Soil E Soft Soil F Poor Soil Number of Persons Office Parapets Cladding Assembly Govt 0-10 11-100 Historic Residentia Other Commercia 101-1000 1000+ 1 Industrial 🧭 School Emer. Services Basic Scores, Modifiers, and Final Score, S S3 S4 S5 C1 C2 (LM) (RC SW) (URM INF) (MRF) (SW) 3.1 2.7 1.8 2.4 2.7 S2 (BR) C3 (URM INF) Building Type W1 W2 (TU) URM (MRF) (FD) (RD) sic Score lid Rise(4-7 stories 0.4 NA 0.4 0.4 0.4 0.4 NA 0.2 0.2 NA 0.4 0.0 NΔ 0.2 e(>7 storie iah 0.6 0.8 NA 0.8 0.8 0.6 0.8 0.3 NA ertical Irregularity -1.5 NA -1.0 -1.0 -1.5 -1.0 -10 -1.0 -20 NA -1.0 -10 -1.0 an irregularity 0,5 -0,5 -0,5 0,5 -0,5 0,5 -0,5 -0,5 Code -1.2 -1.0 -1.0 -1.0 -0.8 -0.6 -0.8 -0.2 -0.2 -1_0 0.0 -0.8 -0.8 -0.8 -0.2 1.4 2.4 1,6 NA st-Benchmark 24 1,4 1,4 NA NA 2,4 NA 2.8 2.6 NA oil Type C -0.4 -0.4 -0.4 -0.4 -0.4 -0.4 -0.4 -0.4 -0.4 -0_4 0.0 -0.4 -0.4 -0.4 -0.4 -0,6 oil Type D -0,6 -0,6 -0,6 -0,6 -0,4 0.6 0.6 0.4 0.0 .0,8 0,6 -0,6 -0,6 -0,6 -1.2 -0.8 -0,4 oil Type E 0.0 -0.8 -1.2 -1.2 -1.0 -1.2 -0.8 -0.8 1.2 0.4 0.6 -0,6 4.8 nal S Detai Evaluation Required SW = Shear Wall TU = Tilt Up URM INF = Unreinforced masaonry infill BR = Braced Frame MRF = Moment-resisting frame FD = Flexible RC - Reinforced concrete = Estimated, subjective or unreliable data DNK - Do Not Know Diaphragm LM = Light Metal RD = Rigid diaphragm http://192.168.254.253:8000/Rover/worksheet/printable site/2 1/1 Dennis L. Berry, PE Troy J. Feller, PE Colin Maynard, PE Scott M. Gruhn, PE

BBFM Engineers

Earthquake Danger to Alaska's Students and Schools

Appendix A Page 5

Cottonwood Creek Elementary School: 1981

2/20/2015

FEMA 154

Rapid Visual Screening of Buildings for Potential Seismic Risk FEMA-154 Data Collection Form HIGH Seismicity

Ē	4	141 14					Ad Zij Ot No Ye Sc Da To Bu Us	dress:800 b: 99654 her Identifi Stories: 2 ar Built: 19 reener: 1 te: None tal Floor A ilding Nan e: None	N Sewar ers: 81 rea <u>(sq.</u> ne: Co 1	d Meridia <u>ft.): 53390</u> ttonwo	ood Ci	reek			
								lame Conte creener I pointe 2014	hwood (Treek 53		I,			
Assembly Commercial Erner, Services	Govt Historic Industri	CCUPAI Off Re al Sci	ncy fice sidential	Numt 0-10	eer of Pers	ons 11-100 F 1000+	A B lard Avg Rock Roc	Soil Ty C Dense S k Soil S	/pe D E tiff Soff oil Soil	F Poor Soil C	Unrei Chim Dther:	Fallin	ng Haz	zard Dets	Cladding
Ellini. Services	- industria		Ba	sic S	cores	s, Moc	lifiers	, and F	inal s	Score,	S PC1		RM1	RM2	
Building Type asic Score	W1 4.3 3	W2 L7 2	(MRF) ≧7	(BR) 2.9	(LM) 3.1	(RC SW) 2.7	(URM IN 1.8	F) (MRF)	(SW)	(URM INF)	(TU) 2.5	PC2 2.3	(FD) 2.7	(RD) 27	URM 1.6
the man and man and the								2.4	2.7						
id Rise(4-7 stories)	NA	NA	0.2	0.4	NA	0.4	0.4	2.4	2.7	0.2	NA	0.2	0.4	0.4	0.0
id Rise(4-7 stories) gh Rise(>7 stories)	NA NA		0.2	0.4		0.4	0.4	2.4	2.7 0.4	0.2 0.3	NA NA	0.2	0.4	0.4	0.0
id Rise(>7 stories) igh Rise(>7 stories) artical Irregularity	NA NA -2.5	NA NA -2.0	0.2	0.4	NA NA NA	0.4 0.8 0.1.0	0.4	2.4 0.4 0.6 -1.5	2.7 0.4 0.8 -1.0	0.2 0.3	NA NA NA	0.2 0.4	0.4 NA	0.4 0.6	0.0 NA
ia Rise(4-7 stories) igh Rise(>7 stories) artica l I rregularity an irregu la rity	NA NA -2.5	NA NA -2.0	0.2 0.6 -1.0	0.4 0.8 -1.5 -0.5	NA NA NA -0.5	0.4 0.8 -1.0	0.4 0.8 0.10 -0.5	24 0.4 0.6 -1.5	2.7 0.4 0.8 -1.0	0.2 0.3 -1.0	NA NA NA NA -0,5	0.2 0.4 -1.0	0.4 NA -1.0	0.4 0.6 -1.0	0.0 NA
ia Rise(+-/ stories) igh Rise(>7 stories) ertica l I rregularity an irregu la rity e=Code	NA NA -2.5 -0.5	NA NA -2.0 -0.5	0.2 0.6 -1.0 -0.5 -1.0	0.4 0.8 -1.5 0.5 -0.8	NA NA NA -0,5	0.4 0.8 -1.0 -0.5 -0.8	0.4 0.8 -1.0 -0.5 -0.2	2.4 0.4 0.6 -1.5 -0.5 -1.2	2.7 0.4 0.8 -1.0 -0.5 -1.0	0.2 0.3 -1.0 -0.5	NA NA NA -0,5	0.2 0.4 -1.0 -0.5 -0.8	0.4 NA -1.0 -0.5 -1.0	0.4 0.6 -1.0 -0.5 -0.8	0.0 NA -1.
ia Rise(+7 stories) igh Rise(>7 stories) artica l I rregularity an irregu l arity re-Code ost-Benchmark	NA NA -2.5 -0.5 0.0 2.4	NA NA -2.0 -1.0 -1.0 2,4	0.2 0.6 -1.0 -0.5 -1.0 -1.0 1.4	0.4 0.8 -1.5 -0.5 -0.8 -0.8	NA NA NA -0,5 -0,6 NA	0.4 0.8 -1.0 -0.5 -0.8 1.6	0.4 0.8 -1.0 -0.5 -0.2 NA	2.4 0.4 0.6 -1.5 -0.5 -1.2 -1.2	2.7 0.4 0.8 -1.0 -0.5 -1.0 2.4	0.2 0.3 -1.0 -0.5 -0.2 NA	NA NA NA -0,5 -0,8 2,4	0.2 0.4 -1.0 -0.5 -0.8 NA	0.4 NA -1.0 -0.5 -1.0 2.8	0.4 0.6 -1.0 -0.5 -0.8 2.6	0.0 NA -1. -0. -0. NA
ia Rise(=/ stores) igh Rise(>7 stories) artical Irregularity an irregularity re-Code sst-Benchmark jil Type C	NA NA -2.5 -0.5 0.0 2.4	NA NA -2.0 -0.5 -1.0 2.4	0.2 0.6 -1.0 -0.5 -1.0 1.4	0.4 0.8 -1.5 -0.5 -0.8 1.4	NA NA NA -0.5 -0.6 NA	0.4 0.8 -1.0 -0.5 -0.8 1.6	0.4 0.8 -1.0 -0.5 -0.2 NA	2.4 0.4 0.6 -1.5 -0.5 -1.2 1.4 -0.4	2.7 0.4 0.8 -1.0 -0.5 -1.0 2.4	0.2 0.3 -1.0 -0.5 -0.2 NA	NA NA NA -0,5 -0,8 2,4	0.2 0.4 -1.0 -0.5 -0.8 NA	0.4 NA -1.0 -0.5 -1.0 2.8	0.4 0.6 -1.0 -0.5 -0.8 2.6	0.0 NA -1. 0 -0. NA NA
ia Kise(4/ stories) igh Rise(>7 stories) an irregularity ian irregularity :e-Code sst-Benchmark sil Type C sil Type D	NA NA -2.5 -0.5 0.0 2.4	NA NA -2.0 ✓ -0.5 -1.0 ✓ 2.4 -0.4 ✓ -0.8	0.2 0.6 -1.0 -0.5 -1.0 1.4 -0.4 -0.4	0.4 0.8 -1.5 -0.5 -0.8 1.4 -0.4 -0.4 -0.6	NA NA NA -0.5 -0.6 NA -0.6 NA -0.4	0.4 0.8 -1.0 -0.5 -0.8 1.6 -0.4 -0.4	0.4 0.8 -1.0 -0.5 0.2 NA	2.4 0.4 0.6 -1.5 -0.5 -1.2 1.4 -0.4 -0.4 -0.6	2.7 0.4 0.8 -1.0 -1.0 -1.0 -1.0 2.4 -1.0 -1.0 -1.0 -1.0 -1.0 -1.0 -1.0 -1.0	0.2 0.3 -1.0 -0.5 -0.2 NA	NA NA NA -0,5 -0,8 2,4	0.2 0.4 -1.0 -0.5 -0.8 NA -0.4 -0.4	0.4 NA -1.0 -0.5 -1.0 2.8 -0.4 -0.4	0.4 0.6 -1.0 -0.5 -0.8 2.6 -0.4 -0.4	0.0 NA -1.1 -0.2 NA -0.2 NA -0.2 NA -0.2 NA
Id Rise(4/ stores) igh Rise(>7 stories) an irregularity e-Code ist-Benchmark il Type C il Type D iil Type E	NA NA -2.5 -0.5 0.0 2.4 0.0 0.0 0.0 0.0	NA NA -20 ✓ -0,5 -1,0 ✓ 2,4 -0,4 ✓ -0,8 — -0,8	0.2 0.6 -1.0 -0.5 -1.0 1.4 -0.4 -0.6 -1.2	0.4 0.8 -1.5 -0.5 -0.8 1.4 -0.4 -0.4 -0.6 -1.2	NA NA 0.5 0.6 0.6 0.6 0.6 0.6 0.0 0.6 0.0 0.6 0.0 0.6 0.0 0.0	0.4 0.8 -1.0 -0.5 -0.5 1.6 -0.4 -0.4 -0.6 -1.2	0.4 0.8 -1.0 -0.5 -0.2 NA -0.4 -0.4 -0.4 -0.4	2.4 0.4 0.6 -1.5 -0.5 -1.2 1.4 -0.4 -0.4 -0.6 -1.2	2.7 0.4 0.8 -1.0 -0.5 -1.0 2.4 -0.4 -0.4 -0.6 -0.8	0.2 0.3 -1.0 -0.5 -0.2 NA -0.4 -0.4 -0.8	NA NA NA -0,5 -0,8 2,4 -0,4 -0,4 -0,6 -0,6 -0,4	0.2 0.4 -1.0 -0.5 -0.8 NA -0.4 -0.4 -0.6 -1.2	0.4 NA -1.0 -0.5 -1.0 2.8 -0.4 -0.4 -0.6 -0.4	0.4 0.6 -1.0 -0.5 -0.8 2.6 -0.4 -0.4 -0.6 -0.6	0.0 NA -1.1 -0. 0 -0. NA NA -0. 0 -0. 0 -0.
Id Kise(4/ stories) igh Rise(>7 stories) ertical Irregularity lan irregularity re-Code ost-Benchmark oil Type C oil Type D oil Type E inal Scores	NA NA -2.5 -0.5 0.0 2.4 0.0 0.0 0.0	NA NA -2.0 -0.5 -1.0 2.4 -0.4 -0.8 -0.8 -0.8 4.8	0.2 0.6 -1.0 -0.5 -1.0 1.4 -0.4 -0.6 -1.2	0.4 0.8 -1.5 -0.5 -0.8 1.4 -0.4 -0.6 -1.2	NA NA -0,5 -0,6 NA -0,4 -0,6 -0,6 -1,0	0.4 0.8 -1.0 -0.5 -0.8 1.6 -0.4 -0.6 -1.2	0.4 0.8 -1.0 -0.5 -0.2 NA -0.4 -0.4 -0.4	24 0.4 0.5 -0.5 -0.5 -1.2 1.4 -0.4 -0.6 -1.2	2.7 0.4 0.8 -1.0 -1.0 2.4 -0.4 -0.6 -0.8	0.2 0.3 -1.0 -0.5 -0.2 NA -0.4 -0.4 -0.4 -0.8	NA NA NA -0,5 -0,8 2,4 -0,4 -0,6 -0,4	0.2 0.4 -1.0 -0.5 -0.8 NA -0.4 -0.6 -1.2	0.4 NA -1.0 -0.5 -1.0 2.8 -0.4 -0.6 -0.4	0.4 0.6 -1.0 -0.5 -0.8 2.6 -0.4 -0.6 -0.6	0.0 NA -1.1 -0 0.0 NA -0 0.0 -0 -0 -0
IIG RUSO(4-/ STOTES) Iigh Rise(>7 stories) Iertical Irregularity Ien irregularity re-Code ost-Benchmark oil Type C oil Type D oil Type E inal Scores comments:	NA NA -25 -05 24 24 00 00 00	NA NA -2.0 ✓ -0,5 -1.0 ✓ 2,4 -0,4 -0,8 -0,9	0.2 0.6 -1.0 -0.5 -1.0 1.4 -0.4 -0.6 -1.2	0.4 0.8 -1.5 -0.5 -0.8 1.4 -0.4 -0.4 -0.6 -1.2	NA NA -0,5 -0,6 NA -0,4 -0,4 -0,6 -1,0	0.4 0.8 -1.0 -0.5 1.6 -0.4 -0.4 -0.6 -1.2	0.4 0.8 -1.0 -0.5 -0.2 NA -0.4 -0.4 -0.4 -0.8	2.4 0.4 0.6 -1.5 -0.5 -1.2 1.4 -0.4 -0.4 -0.4 -1.2	2.7 0.4 0.8 -1.0 -0.5 -1.0 2.4 -0.4 -0.4 -0.8	0.2 0.3 -1.0 -0.5 -0.2 NA -0.4 -0.4 -0.4	NA NA NA -0.5 -0.8 2.4 -0.4 -0.4 -0.4 -0.4 Detailec	0.2 0.4 -1.0 -0.5 -0.8 NA -0.4 -0.4 -0.6 -1.2	0.4 NA -1.0 -1.0 2.8 -0.4 -0.4 -0.4	0.4 0.6 -1.0 -0.5 -0.8 2.6 -0.4 -0.6 -0.6	0.0 NA -1.0 -0.1 -0.1 NA -0.4 -0.4 -0.4
Itigh Rise(=/ stories) tigh Rise(>7 stories) fertical Irregularity Pre-Code Post-Benchmark Soil Type C Soil Type D Soil Type E Tinal Scores Comments:	NA NA -25 -0,5 0,0 2,4 0,0 0,0 0,0	NA NA -2.0 -0.5 -1.0 ✓ 2.4 -0.4 ✓ -0.8 -0.8 -0.8 4.8	0.2 0.6 -1.0 -0.5 -1.0 1.4 -0.4 -0.6 -1.2	0.4 0.8 -1.5 -0.5 -0.8 1.4 -0.4 -0.4 -1.2	NA NA -0,5 -0,6 NA -0,6 -0,6 -1,0	0.4 0.8 -1.0 -0.5 1.6 -0.8 1.6 -0.4 -0.6 -1.2	0.4 0.8 -1.0 -0.5 -0.2 NA -0.4 -0.4 -0.8	24 0.4 0.5 -1.5 -0.5 -1.2 1.4 -0.4 -0.4 -0.6 -1.2	2.7 0.4 0.8 -1.0 -0.5 -1.0 2.4 -0.4 -0.4 -0.8	0.2 0.3 -1.0 -0.5 -0.2 NA -0.4 -0.4 -0.8	NA NA NA -0,5 -0,8 2,4 -0,4 -0,6 -0,6 -0,4 Detailed Require	0.2 0.4 -1.0 -0.5 -0.8 NA -0.4 -0.6 -1.2	0.4 NA -1.0 -0.5 -1.0 2,8 -0.4 -0.6 -0.4	0.4 0.6 -1.0 -0.5 -0.8 2.6 -0.4 -0.6 -0.6	0.0 NA -1.0 -0.2 NA -0.4 -0.4 -0.6
III RISE(4-/ stories) Iigh Rise(>7 stories) fertical Irregularity fan irregularity re-Code iost-Benchmark ioil Type C ioil Type C ioil Type D ioil Type E inal Scores comments: = Estimated, subjective NK - Do Not Know	NA NA -2.5 0.0 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0	NA NA -2.0 -1.0 2.4 -0.4 -0.4 -0.8 -0.8 -0.8 4.8 4.8	0.2 0.6 -1.0 -0.5 -1.0 1.4 -0.4 -0.6 -1.2 -1.2 -1.2 -1.2 -1.2	0.4 0.8 -1.5 -0.5 -0.5 1.4 -0.4 -0.4 -1.2	RF = Monor	0.4 0.8 -1.0 -0.5 -0.8 1.6 -0.4 -0.4 -0.6 -1.2	0.4 0.8 -1.0 -0.5 -0.2 NA -0.4 -0.4 -0.4	24 0.4 0.5 -1.5 -0.5 -1.2 1.4 -0.4 -0.4 -0.4 -1.2 SW = Shear TU = Tilt Up URM INF = 1	2.7 0.4 0.8 -1.0 -0.5 -1.0 2.4 -0.4 -0.4 -0.6 -0.8	0.2 0.3 -1.0 -0.5 -0.2 NA -0.4 -0.4 -0.4 -0.8	NA NA NA -0,5 -0,8 2,4 -0,4 -0,6 -0,4 Detailed Evaluatio Required	0.2 0.4 -1.0 -0.5 -0.8 NA -0.4 -0.4 -1.2	0.4 NA -1.0 -0.5 -1.0 2.8 -0.4 -0.4	0.4 0.6 -1.0 -0.5 -0.8 2.6 -0.4 -0.6 -0.6	0.0 0.0 0
Itigh Rise(=/ stories) Itigh Rise(>7 stories) fertical Irregularity Pre-Code Pre-C	NA NA -2.5 0.0 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0	NA NA -20 -20 -2,0 -1,0 2,4 -0,4 -0,4 -0,8 -0,8 -0,8 -0,8 -0,8 -0,8 -0,8 -0,8	0.2 0.6 -1.0 -0.5 -1.0 1.4 -0.4 -0.6 -1.2 Pitesida -1.2 <	0.4 0.8 -1.5 -0.5 -0.8 1.4 -0.4 -0.4 -1.2	RF = Mon C - Reinfor D = Rigid	0.4 0.8 -1.0 -0.5 -0.8 1.6 -0.4 -0.4 -1.2	0.4 0.8 -1.0 -0.5 -0.2 NA -0.4 -0.4 -0.4 -0.8	24 0.4 0.6 -1.5 -0.5 -1.2 1.4 -0.4 -0.4 -0.4 -0.4 -0.4 -1.2 UPM INF = 1	2.7 0.4 0.8 -1.0 -1.0 2.4 -0.4 -0.4 -0.4 -0.4 -0.4 -0.8	0.2 0.3 -1.0 -0.5 -0.2 NA -0.4 -0.4 -0.4 -0.8	Infill	0.2 0.4 -1.0 -0.5 -0.8 NA -0.4 -0.6 -1.2	0.4 NA -1.0 -0.5 -1.0 2.8 -0.4 -0.4	0.4 0.6 -1.0 -0.5 -0.8 2.6 -0.4 -0.6	0.0 0 0 0 0 0 0 0 0 0 0 0 0

Snowshoe Elementary School: 1978

2/20/2015

FEMA 154

Rapid Visual Screening of Buildings for Potential Seismic Risk FEMA-154 Data Collection Form

HIGH Seismicity Address:2001 West Fairview Loop Zip: 99654 Other Identifiers: No Stories: 2 Year Built: 1978 Screener: 2 Date: None Total Floor Area (sq. ft.): 50510 Building Name: Snowshoe Elementary Jse: None * Unreinforced Chimneys A B C Hard Avg. Dense Rock Rock Soil D Stiff Soil E Soft Soil F Poor Soil Number of Persons Office Parapets Cladding Assembly Govt 0-10 11-100 Historic Residentia Other Commercia 101-1000 1000+ 1 Industrial 🧭 School Emer. Services Basic Scores, Modifiers, and Final Score, S S2 (BR) S3 S4 S5 C1 C2 C3 (LM) (RC SW) (URM INF) (MRF) (SW) (URM INF) 31 27 1.8 24 2.7 1.4 PC1 (TU) Building Type W1 W2 URM (RD) 2.7 (MRF) (FD) sic Score lid Rise(4-7 stories 0.4 NA 0.4 0.4 0.4 0.4 0_2 NA 0.2 NA 0.2 0.4 0.0 NΔ 0.4 0.6 0.6 0,8 NA 0_8 0.8 0.8 0.3 NA NA rtical Irregularity -10 -1.5 NA -1.0 -1.0 -1.5 -1.0 -1.0 -20 NA -10 -10 -1.0 an irregularity -0,5 -0,5 -0,5 0.5 -0.5 -0,5 -0.5 -0.5 -0,5 -0,5 -1.2 -1.0 Code -0.8 -0.6 -0.8 -0.2 -1.0 -1.0 -0.2 -0.8 -0.8 -1.0 0.0 -0.8 -0.2 14 24 2,4 1.4 NA 1.6 NA st-Benchmark 24 1,4 NA NA 2.8 2.6 NA oil Type C -0.4 -0.4 -0.4 -0.4 -0.4 -0.4 -0.4 -0.4 -0.4 -0.4 0.0 -0.4 -0.4 -0.4 -0.4 ✓ _0,8 □ _0,6 □ _0,6 □ _0,6 □ _0,6 □ _0,4 -0,6 oil Type D 0.6 0.6 0.4 0.0 -0,6 -0,6 -0,6 -0.6 -1.2 -0.8 -0,4 -1,2 -0,4 -0,6 oil Type E 0.0 -0.8 -1.2 -1.2 -1.0 -1.2 -0.8 -0.8 -0,6 nal Scores 4.8 Detai oppears to have same floor plan as Cottonwood Creek Evaluation Required BR = Braced Frame MRF = Moment-resisting frame FD = Flexible RC - Reinforced concrete SW = Shear Wall TU = Tilt Up URM INF = Unreinforced masaonry infill = Estimated, subjective or unreliable data DNK - Do Not Know Diaphragm LM = Light Metal RD = Rigid diaphragm http://192.168.254.253:8000/Rover/worksheet/printable site/4

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Troy J. Feller, PE

Colin Maynard, PE

Scott M. Gruhn, PE

Earthquake Danger to Alaska's Students and Schools

Appendix A Page 7

Swanson Elementary School: 1950's Original Construction

3/16/2015

FEMA 154

Rapid Visual Screening of Buildings for Potential Seismic Risk **FEMA-154 Data Collection Form**

HIGH Seismicity Address:609 N Gulkana St Zip: 99645 Other Identifiers: No Stories: 2 Year Built: 1955 Screener: 2 Date: None Total Floor Area (sq. ft.): 50135 Building Name: Swanson 1950's, 1958, 1963 Use: None Occupancy Falling Hazard vpe Unreinforced Chimneys A B Hard Avg. Rock Rock Number of Persons С D Office E E Parapets Cladding Assembly Govt Dense Soil Stiff Soil Soft Soil Poor 0-10 11-100 Historic Residentia Other 1 101-1000 1000+ Industrial 🖉 School Emer. Services Basic Scores, Modifiers, and Final Score, S
 S3
 S4
 S5
 C1
 C2

 (LM)
 (RC SW)
 (URM INF)
 (MRF)
 (SW)

 3.1
 2.7
 1.8
 2.4
 2.7
 C3 PC1 (URM INF) (TU) 1.4 2.5 **S1** S2 **Building Type** W1 W2 URM (MRF) (BR) (FD) asic Score 3.7 Mid Rise(4-7 stories) 0.4 0.4 0.0 NA 0.2 0.4 NA 0.4 0.4 0.2 NA 0.2 0.4 0.4 NA 0.8 0.8 High Rise(>7 storie 0,6 0,8 0.6 0.8 0.4 NA 0.3 NA NA 0.6 NA -1.5 NA -1.0 -1.0 -1.5 -1.0 Vertical Irregularity -2.0 -1.0 -1_0 NA -1.0 -1.0 -1.0 -1.0 -0.5 an irregularity -0.5 -0.5 -0.5 -0.5 -0.5 -0.5 -0.5 -0.5 -0.5 -0.5 -0.5 -0.5 -1,2 -1,0 Pre-Code -1.0 -0.8 -0.6 -0.8 -0.2 -0.2 -0.8 -0.8 -1.0 -0.8 -0.2 -1.0 0.0 1,4 2,4 NA ost-Benchma 2.4 1.4 1.4 NA 1.6 NA 2.4 24 NA 2.8 2.6 NA oil Type C -0,4 -0,4 -0,4 -0,4 -0,4 -0,4 -0.4 -0.4 -0.4 -0,4 -0,4 -0,4 -0,4 -0,4 0.0 0.0 2 -0.8 -0.6 -0.6 -0.6 -0.4 -0.6 -0.6 -0.4 -0.6 -0.4 -0.6 -0.6 -0.6 -0.6 -0.6 -0.6 -0.6 Soil Type D oil Type E Final Scores 1.4 Detailed Evaluation Required 1 BR = Braced Frame MRF = Moment-resisting frame FD = Flexible RC - Reinforced concrete Diaphragm RD = Rigid diaphragm SW = Shear Wall TU = Tilt Up URM INF = Unreinforced masaonry infill * = Estimated, subjective or unreliable data DNK - Do Not Know Diaphragm LM = Light Metal http://192.168.254.253:8000/Rover/worksheet/printable_site/5 Dennis L. Berry, PE Troy J. Feller, PE Colin Maynard, PE Scott M. Gruhn, PE

BBFM Engineers

Earthquake Danger to Alaska's Students and Schools

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Swanson Elementary School: 1958 Addition

3/16/2015

FEMA 154

Rapid Visual Screening of Buildings for Potential Seismic Risk FEMA-154 Data Collection Form **HIGH Seismicity**

								Addres Zip: 99 Other I No Sto Year B Screen Date: N Total F Buildin Use: N	ss:609 645 dentifi ries: 2 uilt: 19 er: 2 lone loor A ng Nar one	N Gulka iers: 555 Area (sq. ne: Sv	na St . ft.): 501: /anso	³⁵ n 19	50'	s, 19	58, 1	963		
				r u u				Namus Scree Dote	2. Swor ener. 2 2014-1	1 150n Seh 2-12 21 52	GOL							
<u> </u>	(Decupa	ancy					S	oil T	ype				Fallir	ng Ha	zard		
Assembly	Govt		Office	Num	ber of Per	sons	A Hard A	B vg. De	C onse S	D E itiff Sof	F t Poor		Unrein Chimn	forced	Para	apets	Clado	ling
Commercial	Histor	ic 🛄 F	Residentia	0-1	1-1000	11-100	Rock R	ock S	Soil S	Soil Soi	Soil	Other:						
Emer. Services	Indust	trial 🖄 S	ichoo l	10	-1000	1000+						22						
Building Type	W 1	W2	S1 (MRF)	ISIC 3	S3	S, MO S4 (RC S)	difiei S	rs, a 5 INF\	C1	C2	C3	, S P	C1	PC2	RM1 (ED)	RM2	UR	M
Basic Score Mid Rise(4-7 stories)	4.3	3.7	2.7	2.9	3.1	2.7	1.8	2.	4	2.7	1.4	2.5	3	2.3	2.7	2.7	1.6	
High Rise(>7 stories)	NA		0.2	0.4	NA		4 0.	4	0.4	0.4	0.2		NA	0.2	0.4	0.4		20
Vertical Irregularity	NA	NA	0.6	0,8	NA	- Q.	8 0.	,8	0,6	0,8	0.3	100	NA	0.4	NA	0,6		NA
Plan irregularity	-2,5	-2.0	-1.0	-1.6		1 1	.0	1_0	-1.5	-1.0	-1_0		NA	-1.0	-1.0) -1.		-1_0
Pre-Code	-0.5		-0.5	-0.6	-0.5	, <u> </u>	.5(1.5	-0.5	-0.5	-0.5		-0.5	-0.5	-0.6	5 -0.	5	-0.5
Post-Benchmark	0.0	=1,0	-1.0	-0.8	-0,6		.8	0.2	-1,2	-1.0	-0.2		0.8	-0.8	-1,0)0	8	0.2
	2.4	2,4	1.4	1.4	NA	1.	5 N	A	1.4	2.4	NA	- 625	24	- NA	2.8	2.6		NA
Soil Type C	0_0	-0,4	-0,4	-0,4		. 🔲 🛯	4 🔲 4	4	-0,4	-0,4	-0,4		-0.4	-0.4	-0,4		4 🔲 .	0.4
Soil Type D	0.0	-0.8	-0.6	-0.6		; 📃 -0	.6 🔲 -(1.4	-0.6	-0.6	-0.4		-0.6	-0.6	-0.6	; 🔲 -0.	6 🗌 .	-0.6
Soil Type E	0.0	-0.8	-1.2	-1.2	e 🗐 -1.0) 🗐 -1	.2 🗌 -(1.8	-1.2	-0.8	-0.8		-0.4	-1.2	-0.4	, 🔲 -a.	6 🔲 .	-0.6
Final Scores		1.4																
Comments:												De Eva Rei	tailed luatior quired	1				
* = Estimated, subjective DNK - Do Not Know	e or unreliat	ole data E F C	3R = Brace FD = Flexib Diaphragm .M = Light∤	d Frame le Metal	MRF = Ma RC - Reinfa RD = Rigid	ment-resia proed cond diaphragr	sting frame crete n	SW TU URI	= Shear = Tilt Up MINF =	Wa ll Unreinford	ed masaon	ry infi ll						_
tp://192.168.254.253:8	000/Rove	er/worksh	eet/printa	able_site	/5													1/
Dennis L. Berry	/, PE		Т	roy J.	Feller,	PE			Со	lin Ma	ynard,	PE			Sc	ott M.	Gruh	ın, Pl

Earthquake Danger to Alaska's Students and Schools

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Swanson Elementary School: 1963 Addition

3/16/2015

FEMA 154

Rapid Visual Screening of Buildings for Potential Seismic Risk FEMA-154 Data Collection Form **HIGH Seismicity**

								Adc Zip: Oth No Yea Scr Tot: Bui Use	dress:609 : 99645 er Identi Stories: r Built: eener: 2 e: None al Floor Iding Na : None	9 N Gu fiers: 2 1955 Area (s me: S	lkana sq. ft.	St): 5013 NSOI	5 n 19	950	's, 19	958	, 19	963		
				į					ame Swo reener. ofe 2014-	inson 9 12-12-21	ichaa 5213							表		
	(Decupa	ancy						Soil 1	уре					Falli	ing	Haz	ard		
Assembly	Govt		Office	Num	ber of Per	sons	A Hard Rock	B Avg. Rock	C Dense Soil	D Stiff Soil	E Soft Soil	F Poor Soil	Other	Unrei Chim	nforced neys		Parap	ets 📃	Cladd	ling
Emer. Services	Indust	nc 🧰 A	choo l	10	1-1000	1000+				1			other							
10.00000 1000	0745525	70.5.5%	Ba	sic S	core	s, Mo	odifi	iers,	and	Fina	I So	ore	,s	0.1	Vi sebu 1	р		DM2	5000	
Building Type Basic Score	W1 4.3	W2 3.7	(MRF) 2.7	(BR) 2.9	(LM) 3.1	(RC S	W) (U 1.8	RM INF) (MRF) 24	(SV 2.7	v) (l 1.4	URMINI 4	F) (2.5	TU)	PC2 23	(F	D)	(RD)	UR 1.6	M
Mid Rise(4-7 stories)	NA NA		0.2	0.4		. 🔳 o	4	0.4	0.4		0.4	0.2		NA	0.2		0.4	0.4		0.0
High Rise(>7 stories)	NA	NA	0.6	0.8	NA	. 🔳 o	.8	0.8	0,6		0,8	0_3		NA	0.4		NA	0,6		NA
Vertical Irregularity	-2.5	-2.0	-1.0	-1.5	; 🔲 NA		1.0	-1.0	-1.	s 🔟 .	-1.0	-1.0	1	NA	.1.0	, 🗐	-1.0	-1.0		-1.0
Plan irregularity	-0.5	✓ -0.5	-0.5	-0.5		, 🔳 .	0.5	-0.5	-0.	s 🔟 .	-0.5	-0.5		-0.5	-0.5	; 🗐	-0.5	-0.6		-0.5
Pre-Code	0.0	✓ -1,0	-1.0	-0.8		, 🔲 .	0,8	-0,2		2 🔟 .	1.0	-0_2		-0.8	.0.8	, 🔲	-1,0	-0.8		0.2
Post-Benchmark	2.4	2,4	1.4	1.4	NA		.6	NA	14		24	NA		24	NA		2,8	2,6		NA
Soil Turne C	<u>n</u>	0		- m				1 ass		1	ens T	- Sauce	1	1.000	1		lenna	m		
Soil Type C	0_0	-0,4	-0,4	-0,4	-0,4		0,4	-0.4	-0,-		-0.4	-0_4		-0.4	-0.4		-0,4	-0.4	1	0.4
Soil Type D	0.0	-0.8	-0.6	-0.6	-0.6	;	0.6	-0.4	-0.0		-0.6	-0.4		-0.6	-0.6		-0.6	-0.6		-0.6
	0.0	-0.8	-1.2	-1.2	-1.0		1.2	-0.8	-1.	2 .	-0.8	-0_8		-0.4	-1.2	2	-0.4	-0.6		-0.6
Final Scores		1.4																		_
Comments:													Eva Re	etailed duatio quired	n d					
* = Estimated, subjective DNK - Do Not Know	e or unre l iat	ale data E F C L	8R = Brace 5D = Flexib Diaphragm M = Light f	d Frame I le I Metal	vIRF = Mo RC - Reinfi RD = Rigid	ment–res orced cor I diaphrag	isting fra crete m	ame	SW = Shea TU = Tilt U URM INF	arWa ll Ip ≖Un reinn	forced r	masaonn	y infi ll							_
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Dennis L. Berry	y, PE		Т	roy J.	Feller,	PE			C	olin N	layn	ard,	PE				Sco	tt M.	Gruh	ın, P

Earthquake Danger to Alaska's Students and Schools

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Swanson Elementary School: 1994 Addition

3/16/2015

FEMA 154

Rapid Visual Screening of Buildings for Potential Seismic Risk FEMA-154 Data Collection Form HIGH Seismicity

								Add Zip: Othe No : Year Scree Date Tota Buil	Iress:609 99645 er Identi Stories: r Built: 1 eener: 1 e: None al Floor Iding Na : None	N Gu fiers: 2 994 Area me:	(sq. Sw	na St ft.): 5013 anso i	5 n 199	94					
		No	Sketch									No	o Pho	togr	aph				
Assembly	Govt Histor	Occupa c ric F	ancy Office tesidentia	Num	iber of Pei	rsons 11-100	A Hard Rock	B Avg. Rock	Soil T C Dense Soil	ype D Stiff Soil	E Soft Soil	F Poor Soil	Other:	F nreinfo himney	allir ^{rcod} s	ng Ha	az ard		Claddin
Emer. Services	Indus	trial 🗹 S	ichool	10 ¹	1-1000	1000+	-			et a c			c						
Building Type	W1	W2	S1 (MRF)	SIC 3 S2 (BR)	S3 (LM)	S, INI S4 (RC S	W) (UR	S5 MINE	C1	C (S	2 W)	COTE C3	PC	1	PC2	RM1 (FD)	RI (R	M2 D)	URM
Basic Score	4.3	3.7	2.7	2.9	3.1	2.7	1.8		2.4	2.7		1.4	2.5	2.3		2.7	2.7	⁻ 1	.6
lich Rise(47 stories)	NA		0.2	0.4	N/		L4 🔛	0.4	0.4	100	0.4	0.2		A	0_2	0.4		0.4	0.0
ign Rise(>7 scories)	NA	NA	0.6	0_8	NA		18	0_8	0,6	and a	0,8	0_3		A	0.4	NA		0,6	NA
ertical fregularity	-2.5	5 -2.0	-1_0	-1.5	NA	۱ <u> </u>	1.0	-1.0	-1.6		-1_0	-1_0		A	-1_0	-1 .	0	-1_0	-12
an irregulanty	-0.4	5 -0.5	-0.5	-0.5	-0.	5 -	0.5	-0.5	-0.5		-0.5	-0.5	3	0.5	-0.5	-0.	5	-0.5	-0.
re-Code	0_0	-1,0	-1.0	-0_8	-0,	6 -	0.8	0.2	-1,2		1.0	-0_2		0.8	0.8	-1,	0	0.8	-0.
Ust-Dencimark	2.4	2,4	1.4	1.4	N/		.6	NA	1.4	1002	24	NA	100 2	4	NA	2.8		2.6	NA
oil Type C	0.0	-0,4	_0.4	-0,4		4 🔲 .	0,4	-0.4	-0,4		-0.4	-0.4	0.	0,4	-0.4	-0,-	4	0.4	-0.
oil Type D	0.0	-0.8	-0.6	-0.6	-0.	6 🔲 -	0.6	-0.4	-0.6		-0.6	-0.4	. 🖸 -	0.6	-0.6	-0.	6	-0.6	-0.
oil Type E	0.0	-0.8	-1-2	-1.2	. 🗐 -1.	o 🗐 -	1.2	-0_8	-1.2		-0.8	-0.8		0.4	-1.2	-0.4	4	-0.6	-0.
inal Scores				3.2															
Comments: See Swanson School	for images	1											Deta Evalu Requ	ailed ation Jired					
* = Estimated, subjectiv DNK - Do Not Know	re or unre l ia	ble data E F C L	BR = Braced D = Flexibl Diaphragm M = Light M	l Frame I e I Ietal	MRF = Mc RC - Rein RD = Rigio	oment-res forced cor d diaphrag	isting fran Increte gm	me <u>t</u>	SW = Shea TU = Tilt U URM INF =	r Wa ll p • Unreir	nforce	ed masaonr	y infi ll						
://192.168.254.253:8	3000/Rov	er/worksh	eet/printa	ble_site	/8														
ennis L. Berr	y, PE		Tr	oy J.	Feller	, PE			Co	olin I	May	ynard,	PE			Sc	ott N	1. G	ruhn

BBFM Engineers

Willow Elementary School: 1961 Original Construction

							AZCANYSCT EU	Address:3 (ip: 99688 Other Iden Io Stories (ear Built: Greener: Date: None (otal Floo Building N Jse: None	1706 Par tifiers: 1961 2 r Area (lame:	ks Highwa sq, ft,): 347 Villow 1	y 57 I 961				
		No S	iketch												
										N	o Photo	ograph			
	C)ccupa	ncy					Soil	Туре			Falli	ng Haz	zard	
Assembly Commercial Emer. Services	Govt Historia	c Cf Re rial Sc	fice sidential	Num 0-1 101	ber of Pers 0 1-1000	ions 11-100 1000+	A Hard A Rock R	B C vg_ Dense ock Soil	D Stiff Soil	E F Soft Poor Soil Soil	Other:	einforced nneys	Para;	pets 🦲	Clladding
			Ba	sic S	s3	s, Mo st		s, and	Fina		PC1	PC2	RM1	RM2	URM
Building Type	W1	W2	(MRF)		1/	2.8	1.9		20	15	20	2.4	2.8	2.8	1.7
Building Type asic Score id Rise(4-7 stories)	W1 4.4	W2 3.8 2	(MRF) 28	3.0	3.2	8.		2.5			2.6			0.4	
Building Type asic Score id Rise(4-7 stories) gh Rise(>7 stories)	W1 4.4 NA	W2 3.8 1 NA	(MRF) 28 0.2	3.0 0.4	3.2 NA	0 a	4 🛛 0. 8 🗍 0.	2.5 4 0 8 0	.4 🕘	14 0.2 18 0.3		0.2	0.4	0.4	0.0
Building Type asic Score id Rise(4-7 stories) 'gh Rise(>7 stories) rtical Irregularity	W1 4.4 NA NA -2.5	W2 3.8 2 NA NA	(MRF) 2.8 0.2 0.6 0.6	3.0 0.4 0.8 0.8	3.2 NA	a a -1	.4 0. .8 0.	2.5 4 0 8 0 .0 0 -	.4 0	1.4 0.2 1.8 0.3		0.2	0.4 NA	0.4	0.0
Building Type asic Score id Rise(4-7 stories) igh Rise(>7 stories) ertical Irregularity an irregularity	W1 4.4 NA NA -2.5 -2.5	W2 3.8 2 NA NA -2.0 2.5	(MRF) 2.8 0.2 0.6 -1.0	(BK) 3.0 0.4 0.8 -1.5 -0.5	3.2 NA NA NA		4 0 0. 8 0 0. 1.0 0 -1	2.5 4 0 8 0 .0 -	.4 0 i .6 0 i 1.5 0 i	1.4 0.2 1.8 0.3 1.0 -1.0	26 NA NA NA 5 0 0.5	0.2	0.4 NA -1.0	0.4	0.0 NA
Building Type asic Score id Rise(4-7 stories) gh Rise(>7 stories) ertical Irregularity an irregularity e=Code	W1 4.4 NA 0 NA -2.5 -0.5	W2 3.8 2 NA NA -2.0 -2.5 -1.0	(MRF) 28 0.2 0.6 -1.0 -0.5 -1.0	3.0 0.4 0.8 -1.5 -0.5 -0.8	3.2 NA NA NA 0.5		.4 0. .8 0. 1.0 0-1 0.5 0-0	2.5 4 0 8 0 .0 - .5 0 -	.4 0 i .6 0 i 1.5 0 i 0.5 0 i	1.0 0.2 1.0 0.3 1.0 0.1.0 0.5 0.0	26 NA NA 5 - 0.5 2 - 0.5	0.2 0.4 -1.0 -0.5	0.4 NA -1.0 -0.5	0.4 0.6 -1.0 -0.5	0.0 NA -1. -0.
Building Type asic Score id Rise(4-7 stories) igh Rise(>7 stories) ertical Irregularity an irregularity re-Code ost-Benchmark	W1 4.4 NA -2.5 -0.5 -0.0 0.0 2.4	W2 3.8 2 NA -2.0 -2.0 -1.0 2,4	(MRF) 2.8 0.2 0.6 -1.0 -0.5 -1.0 -1.0 1.4	3.0 0.4 0.8 -1.5 -0.5 -0.8 -0.8 1,4	3.2 NA NA NA -0.5 NA		4 0. 8 0. 1.0 -1 1.5 0.0 0.8 0.0	2.5 4 0 0 8 0 0 .0 - .5 0 - .2 0 - A 1	.4 0 i .6 0 i 1.5 0 . 1.2 0 i .4 0 i	1.4 0.2 1.8 0.3 1.0 -1.0 0.5 -0.2 1.0 -0.2 1.0 -0.2 1.0 NA	2.6 NA NA 5 2 2.0.5 2.0.8	0.2 0.4 -1.0 -0.5 -0.8 NA	0.4 NA -1.0 -0.5 -1.0 2.8	0.4 0.6 -1.0 -0.5 -0.8 -0.8	0.0
Building Type asic Score lid Rise(4-7 stories) igh Rise(>7 stories) ertical Irregularity lan irregularity re-Code ost-Benchmark oil Type C	W1 4.4 NA -25 -25 -0.5 0.0 2,4	W2 3.8 2 NA NA -2.0 -0.5 -1.0 2.4	(MRF) 28 0.2 0.6 -1.0 -1.0 -1.0 1.4	0.4 0.4 0.8 -1.5 -0.5 -0.8 1,4	3.2 NA NA -0.5 NA -0.6 NA		4 0. 8 0. 1.0 -1 1.5 0-0 1.8 0-0 1.8 0-0 1.8 0-0	2.5 4 0 8 0 .0 - .5 - .2 - A 1 1	2.6 .4 .6 .5 .25 .25 .25 .4 .25 .25 .25 .25 .25 .25 .25 .25	1.4 0.2 1.8 0.3 1.0 -1.0 0.5 -0.5 1.0 -0.3 2.4 NA	2.6 NA NA 5 2 2,4 2,4	0.2 0.4 -1.0 -0.5 -0.8 NA	0.4 NA -1.0 -0.5 -1.0 2.8	0.4 0.6 -1.0 0.5 -0.5 0.5 2.6	0.0 NA -1.1 -0.3 -0.3 NA
Building Type asic Score lid Rise(4-7 stories) ertical Irregularity lan irregularity re=Code ost=Benchmark oil Type C oil Type D	W1 4.4 NA -25 -0,5 0,0 2,4 0,0	W2 3.8 3 NA NA -2.0 -2.0 -2.0 2.4 -2.4 -0.4 -0.8	(MRF) 28 0.2 0.6 -1.0 -0.5 -1.0 1.4 -0.4	0.4 0.4 0.8 -1.5 -0.5 -0.8 1,4 -0.4	3.2 NA NA NA 0.05 NA -0.6 NA		4 0. 8 0. 1.0 -1 0.5 0.0 0.8 0.0 0.8 0.0 0.8 0.0 0.8 0.0 0.8 0.0 0.8 0.0 0.0 0.0 0	2.5 4 0 8 0 .0 - .5 - .2 - A 1 1.4 - .4 -	2.6 4 0 1 1.6 0 1 1.5 0 . 1.2 0 . 1.4 0 . 1.4 0 . 1.5 0 .	1.4 0.2 1.8 0.3 1.0 -1.0 0.5 -0.5 1.0 -0.5 1.0 -0.5 0.4 -0.4 0.4 -0.4 0.4 -0.4	2.6 NA NA 5 -0.5 2.4 2.4	0.2 0.4 -1.0 -0.5 -0.8 NA	0.4 NA -1.0 -0.5 -1.0 2.8 -0.4	0.4 0.6 -1.0 -0.5 -0.8 2.6	0.0 00 NA NA -1.1 00 -0.1 -0.1 00 -0.1 NA
Building Type asic Score id Rise(4-7 stories) igh Rise(>7 stories) ertical Irregularity lan irregularity re-Code ost-Benchmark oil Type C oil Type D oil Type E	W1 4.4 NA -25 -05 0.0 2,4 0.0 2,4	W2 3.8 NA NA -2.0 -2.0 -2.0 -2.0 -2.0 -2.4 -0.4 -0.4 -0.8 -0.8 -0.8	(MRF) 2.8 0.2 0.6 -1.0 -0.5 -1.0 1.4 -0.4 -0.4 -0.6 -1.2	3.0 0.4 0.8 0.4 0.8 0.4 0.8 0.4 0.8 0.8 0.4 0.8 0.4 0.8 0.4 0.8 0.4 0.8 0.4 0.8 0.4 0.8 0.4 0.8 0.4 0.8 0.4 0.8 0.4 0.8 0.4 0.8 0.9 0.9 0.9 0.9 0.9 0.9 0.9 0.9	3.2 NA NA NA -0.5 -0.6 NA -0.4 -0.4 -0.4		.4 0 0. .8 0 0. 1.0 -1 1.0 -1 0.4 0-0 0.4 0-0 0.4 0-0 0.4 0-0 0.4 0-0	2.5 4 0 8 0 .0 - .5 - .2 - A 1 .4 - .8 - .8 -	2.6 .4 0 1 1.5 0 . 1.5 0 . 1.2 0 . .4 0 . .4 0 . .4 0 . .4 0 .	1.0 0.2 1.0 -1.0 0.5 -0.4 1.0 -0.3 1.0 -0.3 1.0 -0.3 0.4 -0.4 0.4 -0.4 0.4 -0.4 0.4 -0.4 0.6 -0.4 0.8 -0.5	2,6 NA NA NA 5 2 2,4 2,4 2,4 4 4 4 4 4 4 4 4 4 4 4 4 4	0.2 0.4 -1.0 -0.5 -0.8 NA -0.4 -0.4 -0.4 -0.4 -0.4 -1.2	0.4 NA -1.0 -0.5 -1.0 2.8 -0.4 -0.4 -0.4	0.4 0.6 -1.0 -0.5 2.6 2.6 -0.4 -0.4 -0.6 -0.6	0.0 NA -1.1 -0.1 -0.1 NA -0.1 NA -0.1 -0.1 -0.1 -0.1 -0.1 -0.1 -0.1 -0.1
Building Type asic Score lid Rise(4-7 stories) igh Rise(>7 stories) ertical Irregularity an irregularity re-Code ost-Benchmark oil Type C oil Type D oil Type E inal Scores	W1 4.4 NA NA -25 0.0 24 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	W2 3.8 NA NA -2.0 2.4 -1.0 2.4 -0.4 -0.8 -0.8 -0.8 2.5	(MRF) 2.8 0.2 0.6 -1.0 -1.0 1.4 -0.4 -0.4 -1.2	3.0 0.4 0.8 -1.5 -0.5 -0.5 1.4 -0.6 -1.2	3.2 NA NA Constantantantantantantantantantantantantant		.4 0 0. .8 0 0. 1.0 -1 0.5 0 -0 0.8 0 -0 0.8 0 -0 0.4 0 -0 0.4 0 -0 0.4 0 -0	2.5 4 0 8 0 .0 - .5 - .2 - A 1 1 .4 - .8 -	2.6 .4 .6 1.5 .5 .1.2 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4	1.0 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0	26 NA NA 0 NA 5 -0.5 2 -0.8 2.4 4 -0.4 4 -0.4	0.2 0.4 -1.0 -0.5 -0.5 -0.8 NA NA -0.4 -0.6 -0.6 -0.6	0.4 NA -1.0 -0.5 2.8 -0.4 -0.6 -0.4	0.4 0.6 -1.0 -0.5 2.6 -0.8 2.6 -0.4 -0.6	0.0 NA -1.1 -0.1 -0.1 -0.1 -0.1 -0.1 -0.1 -0.1
Building Type asic Score lid Rise(4-7 stories) lertical Irregularity fan irregularity re-Code ost-Benchmark oil Type C oil Type D oil Type E inal Scores	W1 4.4 NA -25 -05 24 24 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	W2 3.8 NA NA -2.0 -2.0 2.4 -0.4 -0.8 -0.8 2.5	(MRF) 25 0.2 0.2 0.6 -1.0 -1.0 1.4 -0.4 -0.6 -1.2	3.0 0.4 0.8 -1.5 -0.5 -0.8 1.4 -0.6 -1.2	3.2 NA NA NA -0.5 NA -0.6 NA -0.6 NA -0.6 NA -0.6 NA -0.6 NA		4 0. 8 0, 1.0 -1 0.5 -0 0.8 -0 0.8 -0 0.8 -0 0.4 -0 0.4 -0 0.4 -0 0.4 -0 0.4 -0 0.4 -0 0.5 -0 0.	2.5 4 0 8 0 .0 - .5 .5 .2 - .4 4 - .4 .8 -	2.6 4 1.5 1.5 1.2 4 1.2 1.4 1.2 1.4 1.2 1.2 1.2 1.2 1.2 1.2 1.4 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5	1.0 0.2 1.4 0.2 1.8 0.3 1.0 -1.1 0.5 -0.1 1.0 -0.2 2.4 NA 0.4 -0.4 0.4 -0.4 0.6 -0.4 0.8 -0.4	26 NA NA NA S -0,5 2,4 -0,8 2,4 -0,4 3 -0,4 3 -0,4 3 -0,4 Require Require	d on odd	0.4 NA -1.0 -0.5 -1.0 2,8 -0.4 -0.6 -0.4	0.4 0.6 -0.5 2.6 2.6 -0.4 -0.6	0.0 NA -1.(-0.2 -0.2 NA -0.4 -0.4 -0.4

Earthquake Danger to Alaska's Students and Schools

Colin Maynard, PE

Troy J. Feller, PE

Willow Elementary School: 1976 Addition

2/20/2015

FEMA 154

Rapid Visual Screening of Buildings for Potential Seismic Risk FEMA-154 Data Collection Form HIGH Seismicity

						Ad Zip Oti No Ye Sc Da To Bu Us	dress:317 b: 99688 her Identif Stories: 2 ar Built: 1 reener: 1 te: None tal Floor / ilding Na e: None	06 Parks ? 976 Area (sq, me: Wil	Highwa <u>,</u> ft.): 347 Iow 1	57 1 976				
							Hame Wilk	July School	01					Duck 1
	Oc	cupancy					Soil T	уре			Falli	ng Ha	zard	
Assembly	Govt	Office	Num	per of Person	ns H	A B lard Avg	C Dense	D E Stiff Sof	F t Poor	Unre Chim	inforced ineys	Para	pets 📃	Cladding
Commercia	Historic	Residen	tial 0-1	0 1 1	1-100 R	lock Roc	k Soil	Soil Soi	Soil	Other:				
Emer. Services	Industria	ᢞ School	101	-1000 - 1	000+				0.000	1				
	11111		Basic S	cores,	Mod	lifiers	, and I	Final 3	Score	PC1		RM1	RM2	
Building Type Basic Score	W1 4.5 3.2	W2 (MR 9 2_9	F) (BR) 3.1	(LM) 3.3 2	RC SW)	(URM IN 2.2	F) (MRF) 2.5	(SW) 2.9	(URM IN 1.8	IF) (TU) 2.7	2.5	(FD) 2.9	(RD) 2.9	2_0
Mid Rise(4-7 stories)	NA (.2 0.4	NA	0.4	0.4	0.4	0.4	0.2	NA	0.2	0.4	0.4	0.0
High Rise(>7 stories)	🔲 NA 🚺		.6 0.8	NA	0.8	0,8	0,6	0.8	0.3	NA	0.4	NA	0.6	
/ertical Irregularity	-2.5	-2.0	1.0 🗍 -1.5		-1.0	-1.0	-1-5	-1.0	-1.0		-1-0	-1.0		-1.0
an irregularity			0,5 -0.5	0.5	-0.5	-0.5			.0.5	-0.5			-0.5	.0.5
Pre-Code	0.0	-10 O-	1.0 -0.8	-0.6	-0.8	-0.2	-1.2	-1.0	-0.2	-0.8	-0.8		-0.8	-0.2
Post-Benchmark	24	24	4 14	NA	1.6	NA	1.4	2.4	NA	2.4	NA	2.8	2.6	NA
	-			-	-						-		-	-
Soil Type C	0.0	-0.4 -	0.4 -0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4
ioil Type D	Q.0	-0.8	0,6 -0,6	-0,6	-0,6	-0,4	-0.6	-0,6	-0.4	-0,6	-0,6	-0,6	-0,6	-0,6
Soil Type E	0. 0	-0.8 -	1.2 -1.2	-1.0	-1.2	-0.8	-1-2	-0.8	-0.8	-0,4	-1.2	-0.4	-0_6	-0.6
inal Scores												2.3		
Comments:										Detaile	4			
										Evaluatio Require	on d			
				2.27220110.0767047										
* = Estimated, subjective DNK - Do Not Know	⊧or unreliable≀	data BR = Bri FD = File Diaphrae LM = Lig	aced Frame N exible F pm F ht Metal	IRF = Mome C - Reinforc D = Rigid dia	nt-resistir ed concre aphragm	ng frame te	SW = Shear TU = Tilt U URM INF =	r Wa ll p Unreinforc	ed masaon	ry infi ll				
	000	uorkohoot/er												
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Willow Elementary School: 1987 Addition

2/20/2015

FEMA 154

Rapid Visual Screening of Buildings for Potential Seismic Risk FEMA-154 Data Collection Form HIGH Seismicity

							Ad Ziş Oti No Ye Sc Da To Bu Us	Idress:317 : 99688 her Identi Stories: ar Built: 1 reener: 1 te: None tal Floor ilding Na e: None	706 Parks 1 2 1987 Area (sq ime: Wi	. ft,): 347 ∎ow 1	y 57 1987				
		No	Sketch)						N	o Photo	ograph			
		Occur	anev					Soil T	Vne		r	Falli	na Ha	zard	
Assembly			Office	Num	ber of Pers	sons	A B	c	D E	F	Unr	einforced	Para	pets	Claddin
Commercial	Hist	oric	Residentia	• •	10	11-100	Hard Avg Rock Roc	k Soil	Stiff Soil So	ft Poor I Soil	Other:	nneys			
Emer. Services	Indi	ustrial 📝	School	10	1-1000	1000+			1						
1000 Miles M. 1977	200.02		B	asic S	core	s, Mo	difiers	, and	Final	Score	e, S	10000			
Building Type lasic Score	W1 4.4	W2 3.8	51 (MRF) 2.8	(BR) 3.0	(LM) 3.2	(RC SW 2.8	(URM IN 1.9	C1 F) (MRF) 2.5	(SW) 2.8	(URM IN 1.5	PC1 NF) (TU) 2.6	PC2 2.4	(FD) 2.8	(RD) 2.8	URM 1.7
liah Rise(>7 stories)			0.2	0.4	NA	0.4	0.4	0.4	0.4	0.2	NA	0.2	0.4	0.4	0.0
/ertical Irregularity	n.								5					-10	
an irregularity	Ō.	15	5	5			5		5 0 0.				.0.5	-0.5	
re-Code		.0	0 -1.0				3 -0.2		2 -1.0		2 -0.8		-1.0	-0.8	
ost-Benchmark	2	4 24	1.4	1,4	NA	1.6	NA	1.4	2.4	NA	2,4	NA	2,8	2,6	8 N
oil Type C	1111111111111					Π.									
ioil Type D			8	6 - 0.4			• -0.4	-04	· · · · · · · · · · · · · · · · · · ·		-0.4		-0.4 	-0.4	
oil Type E			8	2 0 -1,2	2		2 0 0.8	13	2 0 0.8		s -0,4	1.2	-0.4	0.6	
inal Scores	-3-64				unrefe								1.7		
Comments:											Detaile	d			
See Willow 1961 for P	Photos										Evaluati Require	on ed			
* = Estimated, subjecti DNK - Do Not Know	ive or un rel	iable data	BR = Brac FD = Flexi Diaphragm LM = Light	ed Frame ble Metal	MRF = Mor RC - Reinfo RD = Rigid	ment-resis rrced conci diaphragm	ting frame rete	SW = Shea TU = Tilt U URM INF =	ar Wa l Ip = Unreinford	ced masaor	ary infi ll				
://192.168.254.253	:8000/Ro	wer/works	heet/print	table_site	/9										

Wasilla High School: 1974 Original Construction

3/16/2015

FEMA 154

Rapid Visual Screening of Buildings for Potential Seismic Risk FEMA-154 Data Collection Form HIGH Seismicity

						Ad Zip Ott No Yea Sci Da To Bu Bu	dress:701): 99654 her Identif Stories: 2 ar Built: 1 reener: 1 te: None tal Floor / ilding Nat e: None	E Boga fiers: 2 974 Area (sq me: Wa	rd Rd . ft.): 212 asilla	²⁰⁶ High	1974			
	No	Sketch					Name: W Screene Date: 20	/asilla r: 1 15-03-1	High 19 7 00:15:	74				
	Occupa	ancy					Soil T	vpe		1	Falli	ng Ha	zard	
Assembly G Commercial H	Govt C	Office Residentia	Numt	oer of Person	ons 11-100 F 1000+	A B Hard Avg Rock Roc	C Dense S k Soll S	D E Stiff So Soil So	F ft Poor il Soil	Other:	Inreinforced Chimneys	Para	pets 🔲	Cladding
		0222	cio S	coros	Mor	lifiers		Final	Score	. S				
Building Type N lasic Score 4.3 Nid Rise(4-7 stories)	W1 W2 3.7 NA NA	Ba (MRF) 2.7 0.2	SIC 3 (BR) 29 0.4	S3 (LM) 3.1 NA	S4 (RC SW) 2.7 0.4	S5 (URM IN 1.8 0.4	, and 1 C1 F) (MRF) 24 0.4	C2 (SW) 2.7	C3 (URM II 1.4 0.2	PC NF) (TI 2.5	C1 PC2 2.3 NA 0.2	RM1 (FD) 2.7	RM2 (RD) 2.7	URM 1.6
Building Type N sasic Score 4.3 Iid Rise(4-7 stories) ligh Rise(>7 stories) ertical Irregularity	W1 W2 3.7 NA NA NA NA -2.5 -2.0	Ba S1 (MRF) 2.7 0.2 0.6 -1.0	SIC 3 (BR) 2.9 0.4 0.8 -1.5	S3 (LM) 3.1 NA NA	S4 (RC SW) 2.7 0.4 0.8 -1.0	S5 (URM IN 1.8 0.4 0.8 -1.0	F) (MRF) 24 0,4 0,6 -1.5	C2 (SW) 2.7 0.4 0.8	C3 (URM) 1.4 0.2 0.3 0.3	PC NF) (TI 2.5	C1 PC2 2.3 NA 0.2 NA 0.4 NA 0.4	RM1 (FD) 2.7 0.4 NA	RM2 (RD) 2.7 0.4 0.6 -1.0	URM 1.6 0.0 NA -1.0
Building Type 1 asic Score 4.3 lid Rise(4-7 stories) igh Rise(>7 stories) ertical Irregularity lan irregularity	W1 W2 3.7 NA NA NA NA -2.5 -2.0 -0.5 -0.5	Ba S1 (MRF) 2.7 0.2 0.6 -1.0 -0.5	S2 (BR) 2.9 0.4 0.8 -1.5 -0.5	S3 (LM) 3.1 NA NA NA -0.5	S4 (RC SW) 2.7 0.4 0.8 -1.0 -0.5	S5 (URM IN 1.8 0.4 0.8 -1.0 -0.5	C1 F) (MRF) 24 0.4 0.6 -1.5	C2 (SW) 2.7 0.4 0.8 0.8	C3 (URM 14 0.2 0.3 0 -1.0 5 -0.6	PC NF) (TI 2.5	21 PC2 2.3 NA 0.2 NA 0.4 NA 0.4 NA 0.4	RM1 (FD) 2.7 0.4 NA -1.0 5 -0.5	RM2 (RD) 2.7 0.4 0.6 -1.0 -0.5	URM 1.6 0.0 NA -1.0 -0.5
Building Type 1 asic Score 4.3 lid Rise(4-7 stories) 1 igh Rise(>7 stories) 1 ertical Irregularity 1 lan irregularity 1 re-Code 1 ost-Benchmark 1	W1 W2 3.7 NA NA NA NA -2.5 -2.0 -0.5 -0.5 0.0 -1.0 2.4 2.4	Ba S1 (MRF) 2.7 0.2 0.6 -1.0 -0.5 -1.0	S2 (BR) 2.9 0.4 0.8 -1.5 -0.5 -0.5	S3 (LM) 3.1 NA NA NA -0.5 -0.6	S4 (RC SW) 2.7 0.4 0.8 -1.0 -0.5 -0.8	S5 (URM IN 1.8 0.4 0.8 -1.0 -0.5 -0.2	C1 C1 C1 C24 0.4 0.6 -1.5 -0.5 -1.2 -1.	C2 (SW) 2.7 0.4 0.8 0.8 0.8 0.4 0.8 0.4 0.8 0.8 0.4 0.8 0.4 0.8 0.4 0.8 0.8 0.4 0.8 0.4 0.8 0.4 0.8 0.4	C3 (URM 11-4 0.2 0.3 0) -1.0 5 -0.6 0) -0.5	PC P	PC2 PC2 2.3 0.2 NA 0.2 NA 0.4 NA -1.0 -0.5 -0.5 -0.8 -0.8 2.4 NA	RM1 (FD) 2.7 0.4 NA -1.0 5 -1.0 5 -1.0	RM2 (RD) 2.7 0.4 0.6 -1.0 -0.5 -0.5 -0.8	URM 1.6 0.0 NA -1.0 -0.5 -0.2 NA
Building Type 1 asic Score 4.3 lid Rise(4-7 stories) 1 ligh Rise(>7 stories) 1 ertical Irregularity 1 lan irregularity 1 lan irregularity 1 e-Code 2 sst-Benchmark 1	W1 W2 3.7 NA NA NA NA -2.5 -2.0 -0.5 -0.5 0.0 -1.0 2.4 2.4	S1 (MRF) 2.7 0.2 0.6 -1.0 -0.5 -1.0 1.4	Sic C 3 S2 (BR) 2.9 0.4 0.4 0.8 -1.5 0.0.8 0.4 1.4 1.4	S3 (LM) 3.1 NA NA -0.5 -0.6 NA	S4 (RC SW) 2.7 0.4 0.8 -1.0 -0.5 -0.8 1.6	S5 (URM IN 1.8 0.4 0.4 0.8 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4	C1 F) (MRF) 2.4 0.4 0.6 -1.5 -0.5 -1.2 1.4	C2 (SW) 2.7 0.4 0.8 0.8 0.4 0.8 0.4 0.8 0.4 0.8 0.4 0.8 0.4 0.8 0.4 0.8 0.4 0.8 0.8 0.4 0.8 0.8 0.4 0.8 0.8 0.8 0.8 0.8 0.8 0.8 0.8 0.8 0.8	C3 (URM II 1.4 0.2 0.3 0 -1.0 5 -0.5 0 -0.5 NA	PC P	PC2 PC2 2.3 0.2 NA 0.4 NA -1.0 -0.5 -0.5 -0.8 -0.8 2.4 NA	RM1 (FD) 2.7 0.4 NA 1 -1.0 5 -0.5 5 -1.0 2.8	RM2 (RD) 2.7 4 0.4 0.6 -0.5 -0.5 -0.8 2.6	URM 1.6 0.0 NA -1.0 -0.5 -0.5 NA
Building Type 1 tasic Score 4.3 Iid Rise(4-7 stories) 1 ligh Rise(>7 stories) 1 iertical Irregularity 1 fan irregularity 1 fan irregularity 1 re-Code 1 ost-Benchmark 1 oil Type C 1 oil Type D	W1 W2 3.7 NA NA NA NA -2.5 -2.0 -0.5 -0.5 0.0 -1.0 2.4 2.4 0.0 -0.4	S1 (MRF) 27 0.2 0.6 -1.0 -0.5 -1.0 1.4	Si C 2 (BR) 2.9 0.4 0.8 -1.5 -0.5 -0.5 -0.8 1.4	S3 (LM) 3.1 NA NA -0.5 -0.6 NA	S4 (RC SW) 27 0.4 0.8 -1.0 -0.5 -0.5 -0.8 1.6	S5 (URM IN 1.8 0.4 0.8 -1.0 -0.5 -0.5 -0.2 NA	, and the second	C2 (SW) 2.7 0.4 0.8 0.8 0.8 0.4 0.8 0.4 0.8 0.4 0.8 0.4 0.8 0.4 0.8 0.4 0.8 0.4 0.8 0.4 0.8 0.8 0.4 0.8 0.8 0.4 0.8 0.8 0.4 0.8 0.8 0.8 0.8 0.4 0.8 0.8 0.8 0.8 0.8 0.8 0.8 0.8 0.8 0.8	C3 (URM II 1.4 0.2 0.3 0 -1.0 5 -0.5 -0.5 -0.5 NA NA	PC NF) (TI 2.5 0 0 5 0 1 0 1 0 1 0 1 0 1 0 1 0	PC2 PC2 2.3 NA 0.2 NA 0.4 0.4 NA -1.0 -0.5 -0.5 -0.5 -0.8 -24 NA -0.4	RM1 (FD) 2.7 0.4 NA -1.0 5 -0.5 5 -0.5 5 -0.5 5 -0.5 5 -0.5 5 -0.5 5 -0.5 5 -0.4	RM2 (RD) 2.7 0.4 0.6 -1.0 -0.5 0.4 0.6 -0.5 0.4 0.6 0.5 0.4 0.6 0.5 0.2 0.6 0.5 0.2 0.6	URM 1.6 0.0 NA -1.0 -0.5 -0.2 NA -0.2 NA -0.2 NA
Building Type 1 asic Score 4.3 lid Rise(4-7 stories) 1 igh Rise(>7 stories) 1 ertical Irregularity 1 lan irregularity 1 re-Code 1 ost-Benchmark 1 oil Type C 1 oil Type D 1 oil Type E	W1 W2 3.7 NA NA -2.5 -2.0 -0.5 -0.5 0.0 -1.0 2.4 2.4 0.0 -0.4 0.0 -0.8 0.0 -0.8	S1 (MRF) 2.7 0.2 0.6 -1.0 -0.5 -1.0 1.4 -0.4 0.6 1.4	Sic C (BR) 29 0.4 0.8 -1.5 -0.8 1.4 -0.4 0.6 0.4	S3 (LM) 3.1 NA NA -0.5 -0.6 NA -0.4 -0.4	S4 (RC SW) 27 0.4 0.8 -1.0 -0.5 -0.8 1.6 -0.4 -0.4	S5 (URM IN 1.8 0.4 0.8 -1.0 -0.5 -0.2 NA -0.4 -0.4 -0.4	, and the second	C2 (SW) 2.7 0.4 0.8 5 -1.0 5 -1.0 5 -0.4 2.4 -1.0 2.4 -0.4 5 -0.5 -0.4 5 -0.5 -0.4 5 -0.5 -0.	C3 (URM 14 1.4 0.2 0.3 0) -1.0 5 -0.5 0) -0.2 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	PC P	PC2 PC2 2.3 NA 0.2 NA 0.4 0.4 NA -1.0 -0.5 -0.5 -0.5 -0.8 -0.4 -0.4 -0.4 -0.6 -0.6 -0.6	RM1 (FD) 27 0.4 NA 1 -1.0 5 -0.5 5 -1.0 2.8 -1.0 2.8 -0.4 5 -0.5 5 -0.5 5 -0.5 5 -0.5 5 -0.5 5 -0.5	RM2 (RD) 27 0.4 0.6 -0.5 -0.5 -0.8 2.6 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0	URM 1.6 0.0 NA -1.0 -0.5 -0.2 NA -0.4 -0.4 -0.6
Building Type 1 asic Score 4.3 lid Rise(4-7 stories) 1 igh Rise(>7 stories) 1 ertical Irregularity 1 lan irregularity 1 lan irregularity 1 ost-Benchmark 1 oil Type C 1 oil Type D 1 oil Type E 1 inal Scores	W1 W2 3.7 NA NA NA NA -2.5 -2.0 -0.5 -0.5 0.0 -1.0 2.4 2.4 0.0 -0.8 0.0 -0.8	S1 (MRF) 2.7 0.2 0.6 -1.0 -0.5 -1.0 1.4 -0.4 -0.6 -1.2	SIC 22 (BR) 2.9 0.4 0.8 -1.5 -0.5 -0.8 0.4 -1.5 -0.5 -0.8 1.4 0.4 -0.4 0.8 -1.5 -0.5 -0.5 -0.8 0.4 -1.5 -0.5 -0.5 -0.5 -0.5 -0.5 -0.5 -0.5 -0	S3 (LM) 3.1 NA NA -0.5 -0.6 NA -0.4 -0.4 -0.6 -1.0	S4 (RC SW) 2.7 0.4 0.8 -1.0 -0.5 -0.8 1.6 -0.4 -0.4 -0.6 -1.2	S5 (URM IN) 1.8 0.4 0.8 -1.0 -0.5 -0.2 NA -0.4 -0.4 -0.4 -0.4	, and the second	C2 (SW) 2.7 0.4 0.8 5 -1.0 5 -1.0 5 -2.4 -2.4 -0.6 5 -0.6 5 -0.6 5 -0.6 5 -0.6 5 -0.6 5 -0.6 5 -0.6 5 -0.6 5 -0.6 5 -0.6 5 -1.0 5 5 -1.0 5 5 5 5 -1 5 5 5 5 5 5 5 5 5 5 5 5 5 5	C3 (URM II 14 0.2 0,3 0, -1.0 5 -0.4 0, -0.4 1, -0.4 5 -0.4 1, -0.4 5 -0.4 1, -0.4 5 -0.4 1, -0.4 1, -	PC P	PC2 PC2 2.3 2.4 NA 0.2 NA 0.4 -0.5 -0.5 -0.8 -0.8 2.4 NA -0.4 -0.4 -0.4 -0.4	RM1 (FD) 2.7 0.4 NA 0 -1.0 5 -0.5 5 -1.0 2.8 -1.0 2.8 -0.4 5 -0.4 -1.0 2.8 -1.0 2.8 -1.0 2.8 -1.0 2.7 -1.0 5 -1.0 -1.0 5 -1.0 -1.0 5 -1.0 -1.0 -1.0 -1.0 -1.0 -1.0 -1.0 -1.0	RM2 (RD) 2.7 0.4 0.6 -0.5 -0.8 2.6 0.4 -0.4 -0.6 -0.6 -0.6	URM 1.6 0.0 NA -1.0 -0.5 -0.2 NA -0.2 NA -0.6 -0.6 -0.6 -0.6 -0.6
Building Type 1 Basic Score 4.3 Aid Rise(4-7 stories) 1 High Rise(>7 stories) 1 High Rise(Tories) 1 High Rise	W1 W2 3.7 NA NA -2.5 -2.0 -0.5 -0.5 0.0 -1.0 2.4 2.4 0.0 -0.8 0.0 -0.8 NA NA	S1 (MRF) 2.7 0.2 0.6 -1.0 -0.5 -1.0 1.4 -0.6 -1.2	SIC (BR) S2 (BR) 2.9 0.4 0.8 -1.5 -0.5 -0.8 1.4 -0.6 -1.2 -0.6 -1.2	S3 (LM) 3.1 NA NA -0.5 -0.6 NA -0.4 -0.6 -1.0	S4 (RC SW) 2.7 0.4 0.8 -1.0 -0.5 -0.8 1.6 -0.4 -0.6 -1.2	S5 (URM IN) 1.8 0.4 0.8 -1.0 -0.5 -0.2 NA -0.4 -0.4 -0.4 -0.4	, and C1 C1 C1 (MRF) 24 0.4 0.6 -1.5 -0.5 -1.2 1.4 -0.6 -1.2	C2 (SW) 2.7 0.4 0.8 0.8 0.1.0 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0	C3 (URM 14 1.4 0.2 0,3 0,-1.0 5,-0.5 0,-0.2 0,0,000,000,0000,000,0000000,000000000	PC P	PC2 2.3 NA 0.2 NA 0.4 NA -1.0 -0.5 -0.5 -0.8 -0.8 -0.4 -0.4 -0.6 -0.6 -0.4 -1.2 :ailed	RM1 (FD) 2.7 0.4 NA 0 -1.0 5 -0.5 8 -1.0 2.8 2.8 4 -0.4 5 -0.6 2.8 4 -0.4 5 -0.6 2.8 1.6	RM2 ((RD) 2.7 0.4 0.6 -1.0 -0.5 0.4 0.6 0.6 0.6 0.6 0.6	URM 1.6 0.0 NA -1.0 -0.5 -0.2 NA -0.6 -0.6 -0.6
Building Type 1 Basic Score 4.3 Aid Rise(4-7 stories) 4 High Rise(7 stories) 4 fertical Irregularity 4 fertical Irregularity 4 in irregularity 4 irre-Code 4 irre-Code 4 irregularity 4 irre-Code 4 irregularity 4 irre-Code 4 irregularity 4 irre-Code 4 irregularity 4 irre-Code 4 irregularity 4 irre-Code 4 irregularity 4 irregularity 4 irre-Code 4 irregularity 4	W1 W2 3.7 NA NA NA NA -2.5 -2.0 -0.5 -0.5 0.0 -1.0 2.4 2.4 0.0 -0.8 0.0 -0.8 0.0 -0.8 0.0 -0.8 0.0 -0.8	S1 (MRF) 2.7 0.2 0.6 -1.0 -0.5 -1.0 1.4 -0.4 -0.4 -0.4 -1.2 -0.4 -1.2 -0.4 -1.2 -0.5 -1.0 -0.5 -0.5 -0.5 -0.5 -0.5 -0.5 -0.5 -0	SIC 2 (BR) 2.9 0.4 0.8 -1.5 -0.5 -0.8 1.4 -0.4 -0.6 -1.2 -0.5 -0.8 -1.5 -0.	S3 (LM) 3.1 NA NA -0.5 -0.6 NA -0.4 -0.6 -0.4 -0.6 -1.0 S	S4 (RC SW) 2.7 0.4 0.8 -1.0 -0.5 -0.8 1.6 -0.4 -0.6 -1.2	S5 (URM IN) 1.8 0.4 0.8 -1.0 -0.5 -0.2 NA -0.4 -0.4 -0.4 -0.4 -0.8	, and (MRF) C1 (MRF) 24 0.4 0.6 -1.5 -0.5 -1.2 1.4 -0.4 -1.2 SW = Shear SW = Shear SW = Shear U = Tilt UJ URM INF =	C2 (SW) 2.7 0.4 0.8 0.8 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4	C3 (URM P 14 0.2 0.3 0 -1.0 5 -0.6 0 -0.2 0 -0.2 0 0 -0.2 0 0 -0.2 0 0 -0.2 0 0 -0.2 0 0 -0.2	Det Evalu Req	1 PC2 2.3 NA 0.2 NA 0.4 NA -1.0 -0.5 -0.5 -0.8 -0.8 -0.4 -0.4 -0.4 -1.2 ailed ustion uired	RM1 (FD) 27 0.4 NA 0 -1.0 5 -0.5 3 -1.0 2.8 -1.0 2.8 -1.0 2.8 -1.0 2.8 -1.0 2.8 -1.0 2.8 -1.0 2.8 -1.0 2.8 -1.0 2.7 -0.4 -1.0 -0.4 -1.0 -0.4 -1.0 -0.4 -1.0 -0.4 -1.0 -0.4 -1.0 -0.4 -1.0 -0.4 -1.0 -0.4 -1.0 -0.4 -1.0 -0.4 -1.0 -0.4 -1.0 -0.4 -1.0 -0.4 -1.0 -0.5 -1.0 -0.4 -1.0 -0.5 -1.0 -0.4 -1.0 -0.5 -1.0 -0.5 -1.0 -0.4 -1.0 -0.5 -1.0 -1.0 -1.0 -1.0 -1.0 -0.5 -1.0 -1.0 -1.0 -0.5 -1.0 -1.0 -1.0 -1.0 -0.5 -1.0 -1.0 -1.0 -1.0 -1.0 -1.0 -1.0 -1.0	RM2 2.7 0.4 0.6 -0.5 -0.8 2.6 -0.4 -0.6	URM 1.6 0.0 NA -1.0 -0.5 0.2 NA -0.4 0.6 0.6

BBFM Engineers

Wasilla High School: 1979, West Classroom Addition

3/16/2015

FEMA 154

Rapid Visual Screening of Buildings for Potential Seismic Risk FEMA-154 Data Collection Form MODERATE Seismicity

Wasilla High School: 1979, Entry Addition

3/16/2015

FEMA 154

Rapid Visual Screening of Buildings for Potential Seismic Risk FEMA-154 Data Collection Form HIGH Seismicity

					١٨	ddross-701	E Bogar	d Rd					
						ip: 99654 Other Identified o Stories: Fear Built: 1 Creener: 1 Pate: None otal Floor Building Na Use: None	fiers: 1 979 Area (sq. me: Wa	ft.): 400 silla H	ligh 19)79, E	ntry	Addn	
		No Sketch				Name: W Screene Date: 20	Vasilla I r: 1 15-03-17	High 1974	9. Entry 5	Addn			
	Oc	cupancy				Soil T	vpe			Fallii	na Haz	ard	
Assembly Commercial	Govt Historic	Office Residentia	Number o	of Persons 11-100 0 🕑 1000+	A E Hard Av Rock Ro	3 C vg. Dense ock Soll	D E Stiff Sof Soil Soil	F Poor Soil (Unrei Chim Other:	nforced neys	Parap	oets 📄 1974 s	Cladding
Building Type		W2 S1	S2	S3 S4	S5	C1	CIERCE I	C3	PC1	DCA	RM1	RM2	122212
lasic Score hid Rise(4-7 stories) hid Rise(>7 stories) fertical Irregularity fan irregularity fan irregularity fre-Code evost-Benchmark foil Type C foil Type D foil Type E inal Scores Comments:	4.3 3.7 NA 0 -2.5 0.0 2.4 0.0 0.0 0.0	(MRF) 7 2.7 NA 0.2 NA 0.6 -2.0 -1.0 -0.5 -0.5 -1.0 -1.0 2.4 1.4 -0.4 -0.4 -0.8 -0.6 -0.8 -1.2	2(9K) 3(1 0,4 0,8 -1,5 -0,5 -0,5 -0,8 1,4 -0,4 -0,4 -1,2	-1.0 -1	VV) (DK II 1.8 0.4 0.4 0.5 0.6 0.8 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4	INF) (MRF) 2.4 4 0.4 3 0.6 .0 -1.5 .5 -0.5 .2 -1.2 A 1.4 4 -0.4 4 -0.6 .8 -1.2	(SW) 2.7 0.4 0.8 0.6 0.5 0.4 0.8 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4	(URMINF 1.4 0.2 0.3 -1.0 -0.5 -0.2 NA -0.4 -0.4 -0.8) (TU) 2.5 NA NA NA NA -0.5 -0.8 2.4 -0	- 0.2 2.3 0.2 0.4 - 1.0 - 0.5 - 0.8 NA - 0.4 - 0.6 - 1.2 - 1.2	(FD) 2.7 0.4 NA -1.0 2.8 -0.4 -0.4 -0.4 -0.4 1.6	(RD) 27 0.4 0.6 -1.0 -0.5 -0.8 2.6 -0.4 -0.6 -0.6	URM 1.6 0.0 NA -1.1 -0.1 0.0 0.0 0.0 0.0 0.0 0.0 0.0
Sasic Score Aid Rise(4-7 stories) Aigh Rise(>7 stories) Aigh Rise(>7 stories) Aigh Rise(>7 stories) Aigh Rise(>7 stories) Aigh Rise(>7 stories) Aigh Rise(>7 stories) Aight Regularity Aight Regularity Aight Regularity Aight Regularity Aight Rise(>7 stories) Aight Regularity Aight Regula	4.3 3.7 NA 0 -2.5 0 -0.5 0 0.0 0 2.4 0 0.0 0 0.0 0 0.0 0 0.0 0	(MRF) 2.7 NA 0.2 NA 0.2 NA 0.2 NA 0.2 NA 0.2 NA 0.2 -0.5 -0.5 -1.0 -1.0 2.4 1.4 -0.4 -0.4 -0.8 -0.6 -0.8 -1.2 data BR = Brace Flexib Diaphrase LM = Light A	dFrame MRF le RC -1 RD = Metal	Implementation Implementation NA Implementation -0.5 Implementation -0.6 Implementation -0.4 Implementation -0.4 Implementation -0.4 Implementation -0.4 Implementation -0.4 Implementation Implementation Implementation Implementation <t< td=""><td>vv) (0 0 1 1 8 1.8 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4</td><td>INF) (MRF) 2.4 4 0.4 3 0.6 0 -1.5 5 -0.5 2 -1.2 A 1.4 4 -0.6 8 -1.2 SW = Shea TU = Tit U URM INF =</td><td>(SW) 2.7 0.4 0.8 0.6 0.5 0.4 0.8 0.6 0.2 0.4 0.8 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4</td><td>(URMINF 1.4 0.2 0.3 -1.0 -0.5 -0.2 NA -0.4 -0.4 -0.8</td><td>) (TU) 2.5 NA NA NA A A A A A A A A A A A A A</td><td>2.3 0.2 0.4 -1.0 -0.5 -0.8 NA -0.6 -1.2</td><td>(FD) 2.7 0.4 NA -1.0 2.8 -0.5 -1.0 2.8 -0.4 -0.6 -0.4 1.6</td><td>(RD) 27 0.4 0.6 -1.0 -0.5 -0.8 2.6 -0.4 0 -0.6 -0.6</td><td>URM 1.6 0.0 NA -1.1 -0.1 -0.1 -0.1 -0.1 -0.1 -0.1 -0.1</td></t<>	vv) (0 0 1 1 8 1.8 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4	INF) (MRF) 2.4 4 0.4 3 0.6 0 -1.5 5 -0.5 2 -1.2 A 1.4 4 -0.6 8 -1.2 SW = Shea TU = Tit U URM INF =	(SW) 2.7 0.4 0.8 0.6 0.5 0.4 0.8 0.6 0.2 0.4 0.8 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4	(URMINF 1.4 0.2 0.3 -1.0 -0.5 -0.2 NA -0.4 -0.4 -0.8) (TU) 2.5 NA NA NA A A A A A A A A A A A A A	2.3 0.2 0.4 -1.0 -0.5 -0.8 NA -0.6 -1.2	(FD) 2.7 0.4 NA -1.0 2.8 -0.5 -1.0 2.8 -0.4 -0.6 -0.4 1.6	(RD) 27 0.4 0.6 -1.0 -0.5 -0.8 2.6 -0.4 0 -0.6 -0.6	URM 1.6 0.0 NA -1.1 -0.1 -0.1 -0.1 -0.1 -0.1 -0.1 -0.1
3asic Score Aid Rise(4-7 stories) Aigh Rise(>7 stories) Aigh Rise(>7 stories) Aigh Rise(>7 stories) Aigh Rise(>7 stories) Aigh Rise(>7 stories) Aigh Rise(>7 stories) Aight Regularity Aight Regularity	4.3 3.7 NA 0 -2.5 0 -0.5 0 0.0 0 2.4 0 0.0 0 0 0.0 0 0 0 0	(MRF) 2.7 NA 0.2 NA 0.2 NA 0.2 NA 0.2 NA 0.2 NA 0.2 -0.5 -0.5 -1.0 -1.0 2.4 1.4 -0.4 -0.4 -0.8 -0.6 -0.8 -1.2 tata BR = Brace FD = Flexib Dipirping LM = Light N	29 3.1 0.4 0.8 -1.5 -0.5 -0.5 -0.8 1.4 -0.6 -1.2 dFrame MRF le RC -1 RD = Metal	Moment-res Reinforced con Rigid diaphrag	W) (0.4 1.8 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4	INF) (MRF) 2.4 4 0.4 3 0.6 0 -1.5 5 -0.5 2 -1.2 A 1.4 4 -0.6 8 -1.2 SW = Shea TU = Tit U URM INF =	(SW) 2.7 0.4 0.8 0.5 0.5 0.5 0.4 0.8 0.6 0.2 0.4 0.8 0.4 0.8 0.4 0.8 0.4 0.8 0.4 0.8 0.4 0.8 0.4 0.8 0.4 0.8 0.4 0.8 0.4 0.8 0.4 0.4 0.8 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4	(URMINF 1.4 0.2 0.3 -1.0 -0.5 -0.2 NA -0.4 -0.4 -0.8) (TU) 2.5 NA NA NA 0.4 2.4 2.4 2.4 2.4 2.4 0.46 0.46 0.46 0.46 0.46 0.46 0.46 0.	2.3 0.2 0.4 -1.0 -0.5 -0.8 NA -0.6 -1.2	(FD) 2.7 0.4 NA -1.0 2.8 -0.5 -1.0 2.8 -0.4 -0.6 -0.4 1.6	(RD) 27 0.4 0.6 -1.0 -0.5 -0.8 2.6 -0.6 -0.6	URM 1.6 0.0 NA -1.1 -0.1 -0.1 -0.1 -0.2 -0.2 -0.2 -0.2 -0.2 -0.2 -0.2 -0.2

Wasilla High School: 1979, East Addition With Pool

3/16/2015

FEMA 154

Rapid Visual Screening of Buildings for Potential Seismic Risk FEMA-154 Data Collection Form

HIGH Seismicity Address:701 E Bogard Rd Zip: 99654 Other Identifiers: No Stories: 2 Year Built: 1979 Screener: 1 Date: None Total Floor Area (sq. ft.): 212206 Building Name: Wasilla High 1979, East Addn with Pool Use: Nor No Sketch Name: Wasilla High 1979. East Addn with Pr Screener: 1 Date: 2015-03-17 00:46:21 Occupancy Soil Type Falling Hazard Number of Persons D E Stiff Soft Soil Soil Unreinforced Parapets Cladding A B C Hard Avg, Dense Rock Rock Soil С E Assembly Govt Office Poor 11-100 0-10 Historic Other. Commercia Residentia 101-1000 1000+ 1 Industrial 🕙 School Emer, Services Basic Scores, Modifiers, and Final Score, S S2 (BR) S3 S4 S5 C1 C2 (LM) (RC SW) (URM INF) (MRF) (SW) 1 27 1.8 24 27 C3 PC1 (URM INF) (TU) 1.4 2.5 **Building Type** URM W1 W2 PC2 (MRF) (FD) (RD) asic Score 37 27 1.6 Mid Rise(4-7 storie 0,4 NA NA 0,2 0.4 NA 0.4 0.4 0.4 0.2 NA 0,2 0,4 0,4 0,0 High Rise(>7 stories) 0.6 0.8 NA 0.8 0.8 0.6 0.8 0.3 NA 0.4 NA 0.6 NA ertical Irregularity -1.5 NA -1.0 -1.0 -1.5 -1.0 -20 -1.0 -1.0 · -1.0 -1.0 NA -1.0 -0.5 -0.5 Plan irregularity 0.5 -0,5 -0,5 -0,5 -0.5 0.5 -0.5 0.5 -0,5 -0,5 -0.5 0,5 re Code -1.0 -1.0 -0.8 -0.6 -0.8 -0.2 -1.2 -1.0 -0-2 -0.8 -0.8 -1.0 -0.8 -0.2 0-0 24 24 14 14 NA 16 NA 1.4 2.4 NA 2.4 Post-Benchmark NA 2.8 2.6 NA Soil Type C -0.4 -0.4 -0.4 -0.4 -0.4 -0.4 -0.4 -0.4 -0.4 -0.4 -0.4 0_0 -0.4 -0.4 -0.4 -0.4 Soil Type D 0 0.0 0 -0.8 0 -0.6 0 -0.6 0 -0.6 0 -0.6 0 -0.4 -0.6 -0.6 -0.4 -0.6 -0.6 -0.6 -0.6 -0.6 ■ _{1,2} ■ _{-0,8} ■ _{-0,8} Soil Type E -0.4 -1.2 -0.4 -0.6 -0.6 0.3 Final Scores comments: Detailed Evaluation Required 1 BR = Braced Frame MRF = Moment-resisting frame FD = Flexible RC - Reinforced concrete Diaphragm RD = Rigid diaphragm SW = Shear Wall TU = Tilt Up URM INF = Unreinforced masaonry infill * = Estimated, subjective or unreliable data DNK - Do Not Know Diaphragm LM = Light Meta http://192.168.254.253:8000/Rover/worksheet/printable_site/13 1/1 Dennis L. Berry, PE Troy J. Feller, PE Colin Maynard, PE Scott M. Gruhn, PE



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Earthquake Danger to Alaska's Students and Schools Appendix B

BBFM's Experience with ROVER

BBFM Engineers spent a significant amount of time setting up the ROVER server on our computer. We had trouble finding the user manual—it turns out that it's on the web site under "documentation," but that site's interconnectivity could be substantially improved so it's much more expedient to find things. Additionally, some of the web site contains outdated information, such as the information on ROVER being a "thick client" (where the mobile device stores the information until it is synchronized with the server) and the server being "optional."

Because we have a firewall protecting our company's software, we placed the server on a computer outside our firewall but still connected to our same internet router. Our desktop computers could access the server using its IP address, but that same IP address would not work for mobile devices. Ultimately we determined that this IP address was internal to our network and is not the one seen from outside. Once we determined the IP address as seen from outside our office, we were able to use our mobile devices to connect to the ROVER server. I noticed that in the "View Worksheet" screen, all three falling hazards become indicated if the user checks only the chimneys. Conversely, if the user checks parapets or cladding but not chimneys, no falling hazards are indicated in the "View Worksheet" screen. I again notified the software developer, and I was told they were able to duplicate the problem and that they were working on it.

While we were trying to set up the server, we also explored using an app named Rover ATC 2.0, but ultimately we did not use this. It had a number of glitches in it that prevented it from being useful. Initially, its display was so small as to be unreadable, and the text could not be enlarged. When I contacted the software developer, they were able to duplicate the error and ultimately fix it.

Once the server was installed and accessible, we made use of the structural drawings supplied to us. We entered all the data we could from our desktop: building type, number of stories, vertical and plan irregularities, soil type, and whether the building was pre-code or post-benchmark. We then visited the elementary school sites in a single day, taking photographs and noting items that weren't clear in the drawings. Several of these structures would have been indicated as requiring further study if we had truly conducted a "sidewalk survey" without consulting the drawings.

While we could have uploaded photographs directly to the ROVER server from our mobile devices,

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we chose to transfer them to our desktop computers later, and from there to the server, because that would be faster and require less attention while onsite.

With respect to photographs, ROVER could use some work. Each photograph has to be uploaded individually, with a series of several clicks. It would be a tremendous improvement if ROVER would allow many photographs to be selected for upload at one time. It was taking at least 30 seconds to upload a single photograph, so a site with ten or twenty photographs ends up taking far too long for a simple file transfer process. Further, we noticed our ROVER server slowing down as we uploaded photos for more and more schools. Where initially upload required about 30 seconds, toward the end, upload required more than a minute. It appears the server does not accommodate large numbers of photographs well.

It should be noted that many of the photographs we uploaded were jpeg files of the structural design drawings. We believe these are quite important to have in the database. After an earthquake, it can help inspectors tremendously to know crucial details about the structural system, such as where braces or moment frames are, etc. Yet the only way ROVER allows design drawings to be uploaded is in jpeg format. This is a great weakness in the program. Design drawings are very commonly saved in multi-page pdf format, so ROVER should accommodate that file type. Instead, we saved each page of the design drawings into jpeg format and uploaded them to the database as photographs. Needless to say, this was cumbersome and time-consuming for us, and it will be less convenient for others referring to the database in the future.

Another simple improvement to ROVER would be for it to indicate the benchmark year for particular system types in the "post-benchmark" row. Without that, the user needs to keep that list on hand, which may not be convenient in the field.

Finally, we note that ROVER is based on the second edition of FEMA P-154. The third edition is now available, and it has some significant improvements to the scoring procedure. We assume ROVER will be updated to follow the third edition; it is important that, as servers are updated, their structures' scores will be revised automatically to correspond to the third edition's process. Some characteristics, such as pounding, are covered by the third edition but not the second, so to keep the database current would still require some additional manpower.

Now that we have set up our ROVER server, we have agreed to maintain it for the foreseeable future, both for the buildings described in this report and for buildings that may be evaluated in the future.

On the whole, we believe that this rapid visual screening program can be very helpful in improving public safety in the context of major earthquakes, and we hope this pilot project is followed by similar studies statewide.

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