Assessment of The Seismic Vulnerability of West Tennessee School Buildings

Christine Maurice Moore

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ASSESSMENT OF THE SEISMIC VULNERABILITY OF WEST TENNESSEE SCHOOL BUILDINGS

by

Christine Maurice Moore

A Thesis
Submitted in Partial Fulfillment of the
Requirements for the Degree of
Master of Science

Major: Civil Engineering

The University of Memphis
December 2019
ACKNOWLEDGMENTS

I would like to thank my co-advisors and committee members:

- Co-advisor: Dr. Charles Camp
- Co-advisor: Dr. Shahram Pezeshk
- Committee member: Dr. Chris Cramer

From handing me the initial list of schools to the submission of this document, they have truly been there for me every step of the way. I would like to thank the school directors, maintenance directors, and safety directors of each of the following school districts that participated in this study:

- Bradford Special School District
- Dyer County Schools
- Dyersburg City Schools
- Gibson County Special School District
- Humboldt City Schools
- Lauderdale County Schools
- Milan Special School District
- Obion County Schools
- Trenton Special School District
- Union City Schools

Accommodating researchers can be difficult, and many of these school districts immediately recognized the benefits this study could produce for their school buildings. I would like to thank the West TN Seismic Safety Commission (WTSSC) for funding this project. I would also like to thank my mom, my dad, my brother, and my husband (I love you, Andrew!) for their support, patience, and love throughout this process. Being the parent, spouse, or sibling of a graduate student is not easy, but they make it look like a breeze. I thank God for being my source of strength, perseverance, and all good things (James 1:17).
ABSTRACT

West Tennessee is considered a Moderately High to Very High Region of Seismicity according to the Federal Emergency Management Agency (FEMA), and within the New Madrid Seismic Zone (NMSZ). However, West Tennessee has been building large structures long before strides in earthquake engineering were made. FEMA hired the Applied Technology Council (ATC) to develop a procedure entitled the “Rapid Visual Screening (RVS) Method” to quickly determine if a structure is likely to suffer major damage in an earthquake or not. This is done by documenting aspects of the structure and its site and then calculating a score for the building. The score is compared to a cut-off score. If the score of the building is less than the pre-determined cut-off score, then the building is likely to collapse in the event of an earthquake resulting in a high risk of loss of life. The procedure is relatively inexpensive due to the lack of qualification necessary from the screener and the short time it takes to complete the survey. A more sophisticated government software called Hazus-MH (Hazard United States- Multi-Hazard) was developed to produce results with five damage categories: None, Slight, Moderate, Extensive, and Complete. Since Hazus-MH requires a significant amount of time to input data and find additional information from the site, it costs more to run an investigative team using Hazus-MH as opposed to the RVS Method. The West Tennessee Seismic Safety Commission has funded a project for The University of Memphis to assess the seismic resistance of West Tennessee school buildings and to investigate the correlations between the RVS Method and the results of the Hazus-MH software if any. If there is a strong correlation in data, then perhaps RVS Method is a reliable method to investigate buildings for earthquake resistance quickly.
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LIST OF VARIABLES

$B$ – lognormal standard deviation value

$MCE_R$ - Maximum Considered Earthquake Response

$N$ – Standard Blow Count

N.T.S. – Drawing is not to scale

$PGA$ – Peak Ground Acceleration

$PI$ – Plasticity Index of Soil

$P_{Li}$ – Plan Irregularity Score Modifier

$r$ – correlational coefficient

$S_a$ – Spectral Acceleration

$S_b$ – Basic Score

$S_{co}$ – Cut-off Score

$S_{LI}$ – Building Score, Level 1 Score

$S_{pb}$ – Post-Benchmark Score Modifier

$S_{pc}$ – Pre-Code Score Modifier

$S_s$ – Short-Period Spectral Acceleration, or 0.2 seconds Spectral Acceleration

$S_{soil}$ – Soil Type Score Modifier

$S_u$ – Undrained Shear Strength of the upper 100ft

$S_{L1}$ – Long-Period Spectral Acceleration, or 1.0 second Spectral Acceleration

$V_{LIM}$ – Moderate Vertical Irregularity Score Modifier

$V_{LIS}$ – Severe Vertical Irregularity Score Modifier

$V_{s30}$ – Shear Wave Velocity

$w$ – Moisture Content of Soil
1. INTRODUCTION

Study Region Characteristics

Earthquakes are of significant concern to residents of West Tennessee. In addition to the location of the infamous earthquakes of 1811 and 1812, West Tennessee is also in a highly seismically active area of the contiguous United States (see Figure 1, Figure A-1 of FEMA P-154 (2015)). This study focuses on 50 public schools, comprised of 85 public school buildings and/or significant additions in Tennessee, specifically in Dyer County, Gibson County, Lauderdale County, and Obion County. All four counties fall within the area of Figure 1 that is shaded in purple that is generally considered a “Very High” Region of Seismicity. The school sites and counties are shown in more detail in Figure 2.

Figure 1. Seismicity Regions (Contiguous United States)
Dyer County contains 17 (20%) of the studied structures and/or significant additions. The median household income in Dyer County is $44,386. In 2018, Dyer County had an estimated population of 37,320, which is a 2.6% decrease from the 2010 Census estimates. 17.7% of the population, or 6,606 people are between 5 and 18 years of age (U.S. Census Bureau, 2018). According to the Tennessee Report Card, the schools studied account for 6,815 students and teachers occupying the school buildings during each school year. 1,279,945 square feet of school buildings were studied in Dyer County.

Gibson County

Gibson County contains 43 (50.6%) of the studied structures and/or significant additions. The median household income in Gibson County is $41,315. In 2018, Gibson County had an estimated population of 49,045, which is a 1.3% decrease from the 2010 Census estimates.
17.9% of the population, or 8,779 people are between 5 and 18 years of age (U.S. Census Bureau, 2018). According to the Tennessee Report Card, the schools studied account for 10,169 students and teachers occupying the school buildings during each year. 1,602,837 square feet of buildings were studied in Gibson County.

**Lauderdale County**

Lauderdale County contains 14 (16.5%) of the studied structures and/or significant additions. The median household income in Lauderdale County is $35,551. In 2018, Lauderdale County had an estimated population of 25,825, which is a 7.2% decrease from the 2010 Census estimates. 16.8% of the population, or 4,338.6 people are between 5 and 18 years of age (U.S. Census Bureau, 2018). According to the Tennessee Report Card, the schools studied account for 4,706 students and teachers occupying the school buildings during each year. 744,257 square feet of school buildings were studied in Lauderdale County.

**Obion County**

Obion County contains 11 (12.9%) of the studied structures and/or significant additions. The median household income in Lauderdale County is $38,063. In 2018, Obion County has an estimated population of 30,267, which is a 4.8% decrease from the 2010 Census estimates. 16.0% of the population, or 4,843 people are between 5 and 18 years of age (U.S. Census Bureau, 2018). According to the Tennessee Report Card, the schools studied account for 5,479 students and teachers occupying the school buildings each year. 911,366 square feet of school buildings were studied in Obion County.

**Approach**

Rapid Visual Screening (RVS) is a method of evaluating buildings based on simple characteristics to inexpensively determine if it is resistant or vulnerable to seismic forces. RVS
was developed by the Applied Technology Council (ATC) for the Federal Emergency Management Agency (FEMA). Some advantages of RVS is that anyone with a background related to construction or engineering can be trained to screen buildings, which makes the process extremely inexpensive as opposed to hiring private structural engineering firms to retrofit a building without knowing how seismically vulnerable or resistant the building is. One disadvantage of the RVS method is that it can only come to one of two conclusions: The building either “may be seismically hazardous and should receive a detailed structural evaluation” or not. The conclusion is arrived upon by calculating a score for the building, $S_{LI}$, and comparing it to a cut-off score for the region, $S_{co}$. If the building’s score is above the cut-off score, the building is not considered potentially seismically hazardous. Another methodology used for this study is using Hazus-MH 4.2, which takes similar information collected from the RVS form, and computes probabilities that the surveyed building will fall into the following damage states: None, Slight, Moderate, Extensive, and Complete. A noticeable benefit in using Hazus-MH 4.2 over RVS for evaluating buildings is that there are clearly more detailed results. However, a major drawback of Hazus-MH 4.2 is that there are a much higher computation time and time used for data entry. The main objective of this study is to evaluate seismic vulnerability of the schools in the study and to develop a prioritized list of schools following both the RVS and Hazus-MH 4.2 approaches. Another objective of this study is to compare the RVS results with the Hazus-MH 4.2 results to see if using Hazus-MH 4.2 would be necessary for determining if a building needs a detailed structural evaluation. Many parties could benefit from this study in terms of prioritizing which school buildings should be considered for a more detailed structural engineering evaluation and retrofit versus which school buildings could be considered a storm
shelter location. A few of the school campuses have a tornado shelter that could also serve as a shelter in the event of an earthquake, as those buildings have also been screened.

**Literature Review**

While conducting this research, documents and papers were referenced to help better understand the problem and solutions. FEMA P-154 (2016) and its supporting documentation FEMA P-155 (2016) explain how to develop a Rapid Visual Screening (RVS) program and complete an RVS, as well as many resources for using RVS results for seismic advocacy. *Seismic Vulnerability Evaluation of Essential Facilities in Memphis and Shelby County, Tennessee* (Chang et al, 1995), *Assessment of the Seismic Vulnerability of the University of Memphis Main Campus Buildings* (Mize, 2006), *Assessment of the Seismic Vulnerability of Shelby County Mass Emergency Shelters* (Boling, 2009), and *Statistical Assessment of the Seismic Vulnerability of Mid-South Building Structures* (Assadollahi, 2010) are all previous projects including this type of research conducted in West Tennessee. They each serve unique purposes in addition to comparing the RVS Method and Hazus-MH software output. The Hazus-MH 2.1 Advanced Engineering Building Module (AEBM) Technical and User’s Manual (FEMA, 1999) and Earthquake Model: Hazus-MH 2.1 User Manual (FEMA, 1999) are tools developed to help researchers properly use Hazus-MH for earthquake loss estimation. Currently, those are the two most recent and relevant manuals available on FEMA’s website, despite Hazus-MH 4.1 being the most up-to-date version of the software.

**FEMA P-154**

FEMA 154 was first developed by the ATC for FEMA in 1988, then revised in 2002, and again in 2015 when the document was re-named FEMA P-154. Since 1988, several improvements have been made. One difference is the distinguishing of five regions of seismicity
is now recognized, as opposed to three in the first two editions. The first edition identified 12 Building Classifications, the second edition recognized 15 Building Classifications, and the most recent edition recognizes 17 FEMA Building Types, formerly called “Building Classifications.” Due to these changes, comparing this study to previous versions done before 2015 is not an apples-to-apples comparison. One must consider that a building previously under one building classification is now under a different FEMA building type, resulting in a different score.

**Previous Research**

Reviewing similar studies in this region helped notice the numerous changes made by ATC and FEMA over the last 20 years. There is more differentiation in geological information and structural information, and that is noticeable in the previous research material compared to now. This is the first study in West TN since the third edition of FEMA P-154 in 2016.

**Hazus Technical and User’s Manuals**

Hazus-MH 4.2 does not yet have a user or technical manual available for the earthquake hazard; nonetheless, the technical and user manuals for Hazus-MH 2.1 have proven to be helpful. FEMA also released a series of videos on Youtube.com in Summer 2019 that helped with selecting hazard maps, defining scenarios, and running analyses.

### 2. Methodologies

**Rapid Visual Screening (RVS)**

RVS is one of the two methodologies used in this study to assess the seismic vulnerability of structures. While FEMA P-154 details the gathering of the investigative team, the different ways of obtaining and collecting data, and how to use the results for seismic
advocacy, this section outlines the details of how this specific study was performed. For more details on alternative implementations of RVS, consult FEMA P-154.

To calculate the score for a building, $S_{L1}$, one must fill out the Level 1 Data Collection form. There are five versions of this form based on the level of seismicity. Once the form is selected, a basic score is determined from the FEMA building type; then, any score modifiers are added or subtracted from the basic score to result in the final Level 1 score or score for the building, $S_{L1}$. Appendix A shows the form for a building in a Very High region of seismicity, as well as the “Basic Score, Modifiers, and Final Level 1 Score, $S_{L1}$” section for each region of seismicity, and explains how the basic score and score modifiers change based on the region of seismicity of the building.

The RVS procedure is first begun by identifying which buildings to survey. It is ideal to know most or all the buildings at the beginning of the study so that preliminary research can be performed for all the buildings at once. Once most of the buildings are determined, pre-field planning may commence.

**Pre-field Planning Activities: Location, Region of Seismicity, and Soil Type**

Data collected during the pre-field planning activities are primarily found in the upper right portion of the Level 1 Data Collection Form shown in Appendix A, Figure A6. First, determine the Latitude and Longitude of each structure to at least six decimal places; this allows the user to distinguish between adjacent buildings.

While one can technically determine the level of seismicity by using the county-level maps shown in Figure 1, it is recommended to determine the region of seismicity by entering the following parameters into [https://seismicmaps.org/](https://seismicmaps.org/): The design code reference is “2013 ASCE
41”, the earthquake hazard level to “BSE-2N”, and the soil site classification is the soil site class “B”. The location can be determined by using the Latitude and Longitude of the site found previously. By inputting these various parameters, the maximum considered earthquake response, $MCE_R$, and spectral accelerations may be determined. The results from the USGS seismic maps may be interpreted using Table 1 (Table 2-2 FEMA P-154). This region determines which Level 1 Data Collection Form you choose. Once the form is selected, recording other identifying data such as the address, building name, and building use is helpful so that once site visits commence, one knows how to locate the building for the sidewalk survey. For the sites in this study, buildings were found to be in Moderately High, High, and Very High seismicity regions. If the original county-wide map were used, all buildings would have been in the Very High seismicity region. Taking extra measures, such as using the recommended procedure above, helps the screener avoid making overly conservative assumptions since the base score for each building significantly decreases with each higher level of seismicity on the Level 1 Data Collection forms.

Table 1. Seismicity Region from $MCE_R$ Spectral Acceleration Response

<table>
<thead>
<tr>
<th>Seismicity Region</th>
<th>Spectral Acceleration Response, $S_s$ (short-period, or 0.2 seconds)</th>
<th>Spectral Acceleration Response, $S_l$, (long-period, or 1.0 second)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>$S_s &lt; 0.250g$</td>
<td>$S_l &lt; 0.250g$</td>
</tr>
<tr>
<td>Moderate</td>
<td>$0.250g \leq S_s &lt; 0.500g$</td>
<td>$0.250g \leq S_l &lt; 0.500g$</td>
</tr>
<tr>
<td>Moderately High</td>
<td>$0.500g \leq S_s &lt; 1.000g$</td>
<td>$0.500g \leq S_l &lt; 1.000g$</td>
</tr>
<tr>
<td>High</td>
<td>$1.000g \leq S_s &lt; 1.500g$</td>
<td>$1.000g \leq S_l &lt; 1.500g$</td>
</tr>
<tr>
<td>Very High</td>
<td>$S_s \geq 1.500g$</td>
<td>$S_l \geq 1.500g$</td>
</tr>
</tbody>
</table>

After the region of seismicity for each building site is determined, the soil type may be determined. Use the following link to determine the shear wave velocity, $V_{s30}$, near each of the buildings: https://usgs.maps.arcgis.com/apps/webappviewer/index.html?id=8ac19bc334f747e486550f32837578e1. If the data is no longer available at the link provided, find other sources to
obtain the average shear wave velocity, average standard blow count, or average undrained shear strength of the upper 100 feet of soil to help deduce the site class of the soil surrounding each structure using Table 2, (Table 2-5 FEMA P-154 (2015)). The soil type only influences the score of the building if the soil type is A, B, or E. Surprisingly if the soil type is F, a detailed structural evaluation is recommended, but the score of the building is not affected. Soil type F is considered an “other hazard” present (FEMA, 2015). All the buildings in this study fall within soil type C or D.

### Table 2. Soil Type Definitions

<table>
<thead>
<tr>
<th>Soil Type/Site Class</th>
<th>Shear Wave Velocity1, $V_{s30}$</th>
<th>Standard Blow Count1, $N$</th>
<th>Undrained Shear Strength of the upper 100ft’, $S_u$</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Hard Rock</td>
<td>$V_{s30} &gt; 5000$ ft/s</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>B. Rock</td>
<td>$2500$ ft/s &lt; $V_{s30} &lt; 5000$ ft/s</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>C. Very Dense Soil and Soft Rock</td>
<td>$1200$ ft/s &lt; $V_{s30} &lt; 2500$ ft/s</td>
<td>$N &gt; 50$</td>
<td>$S &gt; 2000$ psf</td>
</tr>
<tr>
<td>D. Stiff Soil</td>
<td>$600$ ft/s &lt; $V_{s30} &lt; 1200$ ft/s</td>
<td>$15 &lt; N &lt; 50$</td>
<td>$1000$ psf &lt; $S_u &lt; 2000$ psf</td>
</tr>
<tr>
<td>E. Soft Clay Soil</td>
<td>$V_{s30} \leq 600$ ft/s</td>
<td>$N &lt; 15$</td>
<td>$S_u &lt; 1000$ psf</td>
</tr>
<tr>
<td>F. Poor Soil</td>
<td>Soils Requiring Site-Specific Evaluations</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>➢ Soils vulnerable to potential failure or collapse under seismic loadings, such as liquefiable soils, quick and highly sensitive clays, collapsible weakly-cemented soils.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>➢ Thicker than 10 feet of peat or highly organic clay</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>➢ Very high plasticity clays (25 feet with $PI &gt; 75$).</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>More than 120 feet of soft or medium stiff clays</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

During the pre-field planning activities, a few other decisions regarding RVS are made. Firstly, a cut-off score is determined. Chapter 2 of FEMA P-154 suggests a cut-off score of 2 to be used for most cases, so for this study, the cut-off score is 2.0 (FEMA, 2016). Additionally, the code year and benchmark year should be selected. In previous versions of FEMA P-154, the benchmark year is the only year of significance. However, the third edition of FEMA P-154
distinguishes between a code year and a benchmark year. The code year is the year that seismic codes were initially adopted and enforced locally, and the benchmark year is the year that seismic codes were significantly improved (FEMA, 2016). It was determined that West Tennessee only has a code year, and that is 1991 (Mize, 2006).

*Site Observations: FEMA Building Type and Score Modifiers*

Once the pre-field planning activities for a site are complete, the site visit may begin. The best department to contact at any facility is the maintenance office, or a plant manager if applicable. The maintenance offices generally have floor plans, evacuation maps, and reliable dates that buildings were constructed. The single most important characteristic of the building to determine is the FEMA building type.

Briefly mentioned earlier, and described in Appendix B, the FEMA building type is determined by the material the building is constructed with and the main seismic-resisting system in place. Materials that buildings could be constructed with are wood, steel, concrete, steel encased in concrete, and masonry. Seismic-resisting systems include moment frames, braced frames, and shear walls. Appendix B describes each FEMA building type in detail as well as the Hazus-MH 4.2 software-equivalent model building type. FEMA P-154 has guidance for screeners on how to identify the FEMA building type in Section 3.14 (FEMA, 2016). Once the FEMA building type is determined, the building has a basic score, $S_b$. For example, in Appendix A: Figure A6, the basic score for a W1 building in a Very High region of seismicity is 2.1. Once the basic score is determined, the building should be scoped for plan irregularities, vertical irregularities, and other score modifiers.

The basic score has score modifiers that lower or raise the basic score underneath it. The first score modifier addressed is the soil type score modifier, $S_{soil}$, since it can be determined
before the site visit. If the soil type is A or B, then it has a positive effect on the building’s score. Soil type E reduces the building’s score, and soil types C and D have no effect. The year the building was designed and/or constructed is extremely important; depending on how old or new the building is, the basic score can be lowered by 0.3 or raised by 2.0 in the Very High region of seismicity. The year the building was designed and/or constructed can be determined by the maintenance office, older staff members, or placards present at the entrance of the building or addition. If it is known when the building was constructed, a year is subtracted from that and is called the code year. The year the building was designed is that building’s code year, and it is compared to the code year for the region. If the building was built before the code year for the region, the building is considered pre-code, $S_{pc}$, and it is a negative score modifier. If the building is younger than the code year (or benchmark year, if applicable), then it is considered “post-benchmark” and it is a positive score modifier. Vertical irregularities and plan irregularities are the last set of score modifiers to discuss.

Vertical irregularities and plan irregularities are found at the site and are basic characteristics of the shape of the building that cause it to perform worse in an earthquake event as opposed to buildings without an irregularity present. Vertical irregularities are further subdivided into moderate and severe; while both are negative score modifiers, moderate vertical irregularities have a lower magnitude than severe vertical irregularities. The seven vertical irregularities found in buildings from FEMA P-154 Chapter 3 (2016) are: sloping site, unbraced cripple wall, weak and/or soft story, out-of-plane setback, in-plane setback, short column/pier, and split levels. Plan irregularities mostly deal with the symmetry of the building in the plan dimension. A list of the five plan irregularities found in buildings from FEMA P-154 Chapter 3 (2016) is: torsion, non-parallel systems, reentrant corner, diaphragm openings, and beams that do
not align with columns. Descriptions and of the vertical and plan irregularities are found in FEMA P-154.

**Post-Field Assessment**

After the site visit has been completed, the score for the building, $S_{L1}$, may be calculated by using Equation 1a:

$$S_{L1} = S_b + S_m$$  \hspace{1cm} (1a)

where $S_b$ is the basic score, and $S_m$ is the sum of the score modifiers. The sum of the score modifiers is calculated in Equation 1b:

$$S_m = V_{L1S} + V_{L1M} + P_{L1} + S_{pc} + S_{pb} + S_{soil}$$  \hspace{1cm} (1b)

where $V_{L1S}$ is the severe vertical irregularity score modifier, $V_{L1M}$ is the moderate vertical irregularity score modifier, $P_{L1}$ is the plan irregularity score modifier, $S_{pc}$ is the pre-code score modifier, $S_{pb}$ is the post-benchmark score modifier, and $S_{soil}$ is the soil type score modifier. Once the Level 1 Score is known, it is compared to the benchmark score of 2.0 to determine if the building needs a detailed structural evaluation. Then, the RVS data may be entered into a Microsoft Excel spreadsheet, and slightly modified to enter information into Hazus-MH 4.2.

**Hazus-MH 4.2 Analysis**

Hazus-MH 4.2 is a software application within ArcGIS used for risk estimation in the event of several natural disasters: earthquake, flood, hurricane, and tsunami. Hazus-MH 4.2 estimates the physical, social, and economic losses due to an earthquake event. This study primarily focuses on the damage states of the buildings after an earthquake event. While Hazus-MH 4.2 is a very powerful tool, it also has many limitations. The detail of a study performed in Hazus software used to be measured by Level 1, Level 2, and Level 3 analyses. Level 1 was all
default information, Level 2 included some building survey data (custom inventory) and some unique hazard information—such as soil type or local PGA, PGV, 0.3s spectral acceleration, and 1s spectral acceleration, and Level 3 included user-developed fragility curves (ESRI 2006). It was generally recommended to use Level 2 analysis since user-developed fragility curves are difficult to make and must be made individually for each building. So, even if a user-developed fragility curve was developed correctly, it would only show results for one individual building, yielding an insignificant sample size (number of observations less than 30). Since Level 3 analysis was not recommended, Hazus-MH 4.2 now splits analyses into two categories: Basic and Advanced. A basic analysis is based mainly on default (Hazus-provided) data. Some new information may be provided by the user, but the hazard is defined by Hazus. An advanced analysis includes any custom inventory that is not provided by Hazus but generally focus is given to hazard information collected by geologists and seismologists in the local area (FEMA 2019). It is also useful to have specific building inventory information collected by engineers for a more accurate building type information. This study considers only local probabilistic ground motion maps, so it is considered an advanced analysis. All the inventory in the study has been surveyed, so user-developed information is being used for all the building types, the number of stories, etcetera to be defined in Hazus-MH 4.2. For every piece of information desired, specific data input is required. CDMS was developed to validate data entering Hazus-MH 4.2 to ensure that all the necessary inputs are present.

**Comprehensive Data Management System (CDMS)**

CDMS is a tool that is downloaded and installed in conjunction with Hazus-MH 4.2 and exists only to help import data into and export data from Hazus-MH 4.2. First, a state database is downloaded from the FEMA website, and selected for the region. Then, data may be imported
into the repository from a Microsoft Excel spreadsheet, geodatabase, or shapefile file. Different hazards, “Hazus-MH Inventory Categories.” and “Hazus-MH Inventory Datasets (layers)” have different required inputs. Once the proposed input file, hazard, inventory category, and inventory dataset are selected, CDMS will display the required fields. The hazard for this study is “Earthquake.” The inventory category selected for this study is “Advanced Engineering Building Module (AEBM),” and the only inventory dataset under that category is also “AEBM.” There are four required fields: area (square feet), earthquake building type, earthquake design level, and occupancy type. Remember that the earthquake building type is not necessarily the FEMA building type; the designation for low-rise, mid-rise, and high-rise described in Appendix B must be used.

The earthquake design level is an indicator of how a building will perform based on the codes of that region. There are three seismic design levels: High-Code, Moderate-Code, and Low-Code. An additional category, Pre-Code, is applicable to all buildings constructed before 1941. While separating buildings into these categories may seem arbitrary, each of the categories is associated with a damage function within Hazus-MH 4.2. The earthquake design level is determined using Figure 3 and Table 3. Figure 3 is a map of the 1994 Uniform Building Code’s (UBC) seismic zones. Table 3 is a map within the Hazus-MH 2.1 User’s Manual.
From the figure above, the study region is within Zone 3. So, all buildings in this study are either Moderate-Code or Pre-Code according to Table 3, which is Table 2.2 in the Hazus-MH 2.1 AEBM Manual (FEMA 2012). Upon further inspection, 80 of the 85 buildings surveyed are considered Moderate-Code, and the 5 remaining are considered Pre-Code.

<table>
<thead>
<tr>
<th>UBC Seismic Zone (NEHRP Map Area)</th>
<th>Design Vintage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zone 4 (MA 7)</td>
<td>Post-1975</td>
</tr>
<tr>
<td>Zone 3 (MA 6)</td>
<td>High-Code</td>
</tr>
<tr>
<td>Zone 2B (MA 5)</td>
<td>Moderate-Code</td>
</tr>
<tr>
<td>Zone 2A (MA 4)</td>
<td>Low-Code</td>
</tr>
<tr>
<td>Zone 1 (MA 2/3)</td>
<td>Low-Code</td>
</tr>
<tr>
<td>Zone 0 (MA 1)</td>
<td>Pre-Code</td>
</tr>
</tbody>
</table>

Finally, the occupancy type should be determined. While there are many occupancy types to choose from, all buildings within this study are considered EDU1, which are all primary, elementary, and high school buildings. There are other recommended economic data that Hazus-
MH 4.2 will estimate based on the required parameters. CDMS will validate the data and allow the user to transfer data into the CDMS repository. Then, the user can return to the home screen and transfer the data into the statewide data set. Based on previous experiences, it is recommended to “Replace” the data in the statewide data-set rather than “Append” the data. This helps avoid duplicate entries. Once the data regarding the buildings are transferred to the statewide dataset, the user will now see the data input in all Hazus-MH 4.2 study regions in that state. Appendix C has a complete procedure for updating a study region using CDMS. Appendices F and L contain data necessary to run a Hazus-MH 4.2 AEBM Module.

Generating a Study Region

To create a study region, applicable hazard(s) must be selected. Since this study is only considering losses from earthquakes, only the earthquake hazard is selected. Only selecting applicable hazards helps reduce time to complete the analysis.

Study regions can be aggregated at the state, county, or census tract level for an earthquake hazard analysis. The smaller the aggregation level, the more detailed analysis is. The reason for this is economic status, living conditions, and population characteristics are recorded at the aggregation level chosen, so the smaller the aggregation level, the more variation in the population is represented (Hazus-MH 2.1 2012). This study aggregates at the census-tract level. To create the study region, the appropriate level of aggregation is selected, and then the applicable state, county, and census tracts are selected. Then, the study region is generated. To open the region, select “Open a Region.” The buildings should already be present in the inventory. In addition to seeing the usual ArcMap tabs, several tabs specific to Hazus-MH 4.2 will appear to be used for inventory validation, hazard selection, and viewing results.
Scenarios and Hazard Maps

When performing a seismic risk analysis, the user must create a scenario. A scenario includes options for indicating the seismic hazard map, liquefaction susceptibility map, landslide susceptibility map, fault rupture maps, then a soil type map, and water depth map. Once the scenario is created, the analysis can be run.

Hazus-MH 4.2 has five options for selecting hazard maps. There are two deterministic options: “Historical Epicenter Event” and “Arbitrary Event.” A historical epicenter event is one that is based on an earthquake in the area that has happened in the past. While it may sound like a great idea to use this option, there is no probabilistic evidence that the same exact magnitude and location of an earthquake will happen again. An arbitrary event is just as it sounds; it is a list of arbitrary magnitudes and locations of earthquakes that have been created for Hazus users. The remaining three options are a probabilistic hazard, a user-supplied hazard, and a USGS ShakeMap. A probabilistic hazard asks for the user to specify a return period in years and a magnitude driving the probabilistic event. A user-supplied hazard requires PGA, PGV, 0.3s spectral acceleration, and 1.0s spectral acceleration maps for the area of interest; the user-supplied hazard was chosen for the study region, as there is currently one local study that covers the entire study region with the required ground motion data supplied by Dhar and Cramer (2017) that has a grid spacing of 0.1°. The maps resulting from this study will be referred to as the “coarse ground motion maps” throughout this document. A more detailed ground motion map has been generated that covers only Dyer County TN with a grid spacing of 0.005°, resulting in four hundred data points for every data point that the 2017 study covers. These more detailed maps will be referred to as the “finer Dyer County ground motion maps” throughout this
document. Appendix D shows the user how to create Hazus-compatible ground motion maps from a text file. From the local ground motion data above, three cases are studied:

1. For Dyer, Gibson, Lauderdale, and Obion Counties, ground motion values with 2% in 50-year exceedance using coarse ground motion maps.
2. For Dyer County, ground motion values with 2% in 50-year exceedance using coarse ground motion maps.
3. For Dyer County, ground motion values with 2% in 50-year exceedance using finer Dyer County ground motion maps

Appendix E shows the ground motion maps used in this study. It should be noted that the same maps are used in both the first and second cases, so the second case is just a subset of the first. More detailed maps are used in the third case, so the results should be more accurate for the third case.

_Fragility Curves_

A fragility curve is made up of two components: the damage median and the lognormal standard deviation value, $\beta$ (FEMA-AEBM, 2012). The final fragility curve shows the probability of a structure falling into a damage state given a spectral displacement. First, the probability that a building will suffer slight, moderate, extensive, or complete damage given a spectral displacement is plotted; where each probability is equal to 0.5 is defined as the “damage state median”. An example of the damage state median points is shown in FEMA’s AEBM User and Technical Manual (2012), and Figure 4. After the damage state median is found, the slope is determined by the lognormal standard deviation value, $\beta$. 
The effect of the beta value is shown in Figure 5 (Figure 6.2 AEBM Manual) and reflected in Equation 2. Equation 2 calculates the vertical axis of a fragility curve, which is the probability of a damage state given a spectral displacement:

\[
P(ds|d_s) = \phi \left( \frac{1}{\beta} \ln \left( \frac{d_s}{\bar{d}_{s,ds}} \right) \right)
\]

where \( \phi \) is the standard normal cumulative distribution function (cdf), \( d_s \) is the spectral displacement, and \( \bar{d}_{s,ds} \) is the median spectral displacement where the building reaches a particular damage state.
The process above is completed four times for each building type and earthquake design level combination to yield the slight, moderate, extensive, and complete thresholds. Then, the fragility curve for the component type, building type, and earthquake design level is developed, and together it looks like Figure 6.

![Figure 6. Example Fragility Curve](image)

Fragility curves are automatically defined in Hazus according to the structure’s building type and seismic design level.

3. RESULTS

RVS Results

The basic score of a building is dependent upon the region of seismicity and building type. While the four counties all generally fall within the “Very High” region of seismicity when looking at Figure 1, using the more detailed procedure in the Methodologies Section determined that all buildings in the study fall within the “Moderately High” to “Very High” Regions of Seismicity. Figure 7 shows what region of seismicity each building falls within. 40 buildings are
within the “Very High” region, 36 buildings are within the “High” region, and 9 are within the “Moderately High” region.

Figure 7. Level of Seismicity Across Study Region

The result in Figure 7 makes sense because the western-most parts of Tennessee are closer to the New Madrid fault line. The FEMA Building Type also helps determine the basic score, $S_b$, of each building. Table 4 shows the distribution of FEMA Building Types. It is evident from Table 4 that overwhelmingly the greatest number of structures in this region for primary, elementary, and secondary schools are RM1, or reinforced masonry with a flexible diaphragm. A possible reason for this is that once a school system finds an ideal architect to use, the same architect is hired for multiple projects, and the older school plans are referred to create new school plans. This situation was found to occur in several school districts during this study.
Table 4. FEMA Building Types

<table>
<thead>
<tr>
<th>FEMA Building Type</th>
<th>Number of Structures</th>
<th>Percent of Structures</th>
</tr>
</thead>
<tbody>
<tr>
<td>C3</td>
<td>9</td>
<td>10.59%</td>
</tr>
<tr>
<td>PC1</td>
<td>3</td>
<td>3.57%</td>
</tr>
<tr>
<td>PC2</td>
<td>2</td>
<td>2.38%</td>
</tr>
<tr>
<td>S3</td>
<td>3</td>
<td>3.57%</td>
</tr>
<tr>
<td>S5</td>
<td>15</td>
<td>17.86%</td>
</tr>
<tr>
<td>RM1</td>
<td>49</td>
<td>58.33%</td>
</tr>
<tr>
<td>RM2</td>
<td>1</td>
<td>1.19%</td>
</tr>
<tr>
<td>URM</td>
<td>3</td>
<td>3.57%</td>
</tr>
</tbody>
</table>

The basic score of an RM1 building in a “Very High” region of seismicity is only 1.1. Recall that 2.0 is the selected cut-off score. Of the RM1 structures observed, less than 30% had a score higher than the cut-off score. Of the S5 and S3 structures observed, none of them had a score above the cut-off score.

The number of most importance in the RVS procedure is the overall score for each building, $S_{L1}$, as this is the number that indicates which buildings are more likely or less likely to collapse in the event of an earthquake. Table 5 shows the distribution of building scores.

Table 5. $S_{L1}$ Score Distribution

<table>
<thead>
<tr>
<th>Range of $S_{L1}$</th>
<th>Number of Structures</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.2-0.5</td>
<td>39</td>
</tr>
<tr>
<td>0.6-0.9</td>
<td>7</td>
</tr>
<tr>
<td>1.0-1.5</td>
<td>11</td>
</tr>
<tr>
<td>1.6-1.9</td>
<td>7</td>
</tr>
<tr>
<td>2.0-2.5</td>
<td>7</td>
</tr>
<tr>
<td>2.6-2.9</td>
<td>3</td>
</tr>
<tr>
<td>3.0-3.5</td>
<td>5</td>
</tr>
<tr>
<td>3.6-3.9</td>
<td>6</td>
</tr>
</tbody>
</table>
From Table 5, approximately 64 of the buildings are more likely to suffer extensive damage in the event of an earthquake, and 21 of the buildings are not likely to suffer extensive damage.

While Table 5 gives general information, what causes the buildings to have lower scores is more important. All buildings surveyed have an estimated design year found from either from a plaque in the building, older employees, or building plans. Table 6 shows the period structures were built, and the percentage of structures designed in that decade with a score above the cut-off score.

<table>
<thead>
<tr>
<th>Year Built</th>
<th>Number of Structures</th>
<th>Percent of Structures</th>
<th>Percent of Structures Above Cut-off Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1910-1919</td>
<td>1</td>
<td>1.18%</td>
<td>0.00%</td>
</tr>
<tr>
<td>1920-1929</td>
<td>0</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>1930-1939</td>
<td>1</td>
<td>1.18%</td>
<td>0.00%</td>
</tr>
<tr>
<td>1940-1949</td>
<td>4</td>
<td>4.71%</td>
<td>0.00%</td>
</tr>
<tr>
<td>1950-1959</td>
<td>6</td>
<td>7.06%</td>
<td>0.00%</td>
</tr>
<tr>
<td>1960-1969</td>
<td>4</td>
<td>4.71%</td>
<td>0.00%</td>
</tr>
<tr>
<td>1970-1979</td>
<td>17</td>
<td>20.00%</td>
<td>0.00%</td>
</tr>
<tr>
<td>1980-1989</td>
<td>12</td>
<td>14.12%</td>
<td>0.00%</td>
</tr>
<tr>
<td>1990-1999</td>
<td>16</td>
<td>18.82%</td>
<td>37.50%</td>
</tr>
<tr>
<td>2000-2009</td>
<td>14</td>
<td>16.47%</td>
<td>46.15%</td>
</tr>
<tr>
<td>2010-2019</td>
<td>10</td>
<td>11.76%</td>
<td>90.00%</td>
</tr>
</tbody>
</table>

According to Table 5, no buildings built before 1990 have a score above the cut-off score of 2.0.

Recall that 1991 is the code year and benchmark year for this region. So, clearly the post-benchmark score modifier seems to push many buildings over the threshold of 2.0. All building types in the “Very High” seismicity region have a basic score, $S_b$, below 2.0 (excluding W1 buildings), so it is impossible for the final building score, $S_L$, to surpass 2.0 unless a positive score modifier is present. The only positive score modifiers are the post-benchmark score modifier, $S_{pb}$, and some soil type score modifiers, $S_{soil}$. Since no buildings are located on a site
with soil type A or B, the only applicable positive score modifier for the study region is $S_{pb}$.

Figure 8 further shows the relationship between the year built and the building score, $S_{L1}$. The correlational coefficient between $S_{L1}$ and the year built is 0.64, which indicates a moderate correlation between the two variables. It can be deduced that the year built is the single-most deciding factor of which buildings are most likely to have a score above the cut-off score for this study region.

In addition to the year built, whether a building has irregularities has a significant impact on the score of the building. Table 7 shows the impact of the presence of irregularities on the overall score. From Table 7, approximately 45% of buildings surveyed had both a plan irregularity and a vertical irregularity. Of the 38 buildings, only one had a score above the cut-off. The one building that had both irregularities, but still had a score above the cut-off was a PC1 building in a “Moderately High” seismicity region designed post-benchmark with an $S_{L1}$ of 2.5. If the same exact building were constructed in the “High” seismicity region, the score would
have been reduced to 2.3, and in a “Very High” seismicity region 1.8. So, there are very few cases when a building with both irregularities could obtain a score above the cut-off score.

Table 7. Irregularities of Buildings

<table>
<thead>
<tr>
<th>Irregularity Type</th>
<th>Number of Structures</th>
<th>Percent of Structures Above Cut-off Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vertical only</td>
<td>12</td>
<td>16.67%</td>
</tr>
<tr>
<td>Plan only</td>
<td>16</td>
<td>56.25%</td>
</tr>
<tr>
<td>None</td>
<td>19</td>
<td>47.37%</td>
</tr>
<tr>
<td>Both</td>
<td>38</td>
<td>2.63%</td>
</tr>
</tbody>
</table>

The most common plan irregularity observed was a reentrant corner. A building with a reentrant corner is common even among modern buildings, so although strides have been made in earthquake engineering, buildings are still being designed with awkward plan dimensions. The most popular plan irregularity is a specific example of a reentrant corner, observed in the school buildings and some hospitals, it resembles a spider-like plan view of four or more separate hallways. Although this formation, shown in Figure 9, is convenient for hallway congestion, it is not safe seismically as it causes buildings to be subject to torsion.

Figure 9. Examples of Buildings with a Reentrant Corner
Hazus-MH 4.2 Results

The Advanced Engineering Building Module (AEBM) within Hazus-MH 4.2 yields damage state probabilities, predicted casualties, as well as predicted economic losses. The damage state probabilities are calculated for three different components: structural components (STR), nonstructural components sensitive to acceleration (NSA), and nonstructural components sensitive to drift (NSD). Structural components of a building consist of materials and systems resisting expected forces, such as beams and columns. Non-structural components sensitive to drift include architectural elements that would be affected by inter-story drifts, such as sheetrock, ceiling tiles, or glass panes inside windows and doors. Non-structural components sensitive to acceleration are items or systems that could be ripped from the structure, including air conditioning units, shelving units anchored to the wall, and sinks. Appendix G contains the damage state probabilities determined for each structure for each case. Appendix H contains the predicted casualties and economic losses. Table 8 shows an example of a building’s damage state probabilities for different components. One axiom in probability is that the probability of all possibilities will sum to 1.0 or 100%. For instance, a building is either damaged to a certain degree, completely damaged, or not damaged at all. So, if each different set of components will fall into one of the five damage states described, then each row of Table 8 (and all damage state probability tables) will sum to 1.0. Damage states have different descriptions for each structure type, but generally slight damage, moderate damage, extensive damage, and complete damage all have a clear connotation. If one is interested in knowing what damage states mean for different building types, the damage state definitions by building type are described in FEMA’s Hazus-MH 2.1 Earthquake Technical Manual (2012).
The Damage state probabilities for structural components (STR) are used to compute the Immediate Occupancy Factor, $IO$, and Major Damage Factor, $MD$, both developed by Boling (2009). $IO$ is the summation of the “None” and “Slight” damage state probabilities, and it represents the probability that a building may be occupied after an earthquake event. $MD$, or the probability that a building will suffer major damage, is the summation of the “Extensive” and “Complete” damage state probabilities for structural components.

One parameter based solely on occupancy type in Hazus-MH 4.2 is the “Percent Loss” of a structure according to damage state and component type. Since all the structures in this study have the same occupancy type, EDU1, all structures have the same Percent Loss Parameters shown in Table 9. The percent loss parameters are percentages of the building’s worth that would be required to replace or repair portions of the building if the building fell into that damage state. For example, if the building in Table 9 suffered moderate damage, 1.9% of the building’s cost would be required to repair structural components, an additional 3.2% of the building’s cost would be required to repair the non-structural components sensitive to acceleration, and another 4.9% of the building’s cost would be required to repair the non-structural components sensitive to drift. It should be noted that the percent loss parameter for the “None” damage state is intuitively zero (0) for all building types, because if a building suffers no damage, then zero money (or zero percent of the building’s worth) is required to fix and/or replace damaged materials. The percent loss parameters are used in conjunction with the corresponding damage

<table>
<thead>
<tr>
<th>Component</th>
<th>None</th>
<th>Slight</th>
<th>Moderate</th>
<th>Extensive</th>
<th>Complete</th>
</tr>
</thead>
<tbody>
<tr>
<td>STR</td>
<td>0.012</td>
<td>0.084</td>
<td>0.527</td>
<td>0.359</td>
<td>0.018</td>
</tr>
<tr>
<td>NSA</td>
<td>0.068</td>
<td>0.299</td>
<td>0.426</td>
<td>0.183</td>
<td>0.024</td>
</tr>
<tr>
<td>NSD</td>
<td>0.022</td>
<td>0.148</td>
<td>0.585</td>
<td>0.207</td>
<td>0.038</td>
</tr>
</tbody>
</table>
state probabilities to calculate the Building Replacement Cost Factor, \( BRC \), developed by McKenzie Boling (2009). An example calculation of the IO factor, MD Factor, and BRC Factor are shown below for Structure 1, HazusID = TN002548.

<table>
<thead>
<tr>
<th>EDU1 Repair Cost Ratios</th>
<th>Slight</th>
<th>Mod</th>
<th>Extensive</th>
<th>Complete</th>
</tr>
</thead>
<tbody>
<tr>
<td>STR</td>
<td>0.4</td>
<td>1.9</td>
<td>9.5</td>
<td>18.9</td>
</tr>
<tr>
<td>NSA</td>
<td>0.7</td>
<td>3.2</td>
<td>9.7</td>
<td>32.4</td>
</tr>
<tr>
<td>NSD</td>
<td>0.9</td>
<td>4.9</td>
<td>24.3</td>
<td>48.7</td>
</tr>
</tbody>
</table>

The IO Factor is calculated using equation 3:

\[
IO = P(N)_{STR} + P(S)_{STR} \tag{3}
\]

where \( P(N)_{STR} \) is the probability that the building’s structural components will suffer “None” damage, and \( P(S)_{STR} \) is the probability that the building’s structural components will suffer “Slight” Damage. For Structure 1, \( IO \) is calculated as:

\[
IO = 0.012 + 0.084 \tag{3a}
\]

\[
IO = 0.096 \tag{3b}
\]

Therefore, there is about a 9.6% chance that Structure 1 will be able to be occupied immediately after the described earthquake event in Hazus-MH 4.2. \( MD \) is calculated in a similar manner using Equation 4:

\[
MD = P(E)_{STR} + P(C)_{STR} \tag{4}
\]

where \( P(E)_{STR} \) is the probability that the building’s structural components will suffer “Extensive” damage, and \( P(C)_{STR} \) is the probability that the building’s structural components will suffer “Complete” Damage. Alternatively, \( MD \) can be calculated using \( IO \) as:

\[
MD = 1 - P(M)_{STR} - IO \tag{5}
\]
where $P(M)_{STR}$ is the probability that a building’s structural components will suffer “Moderate” damage.

For building 1, $MD$ is calculated as:

$$MD = 0.359 + 0.018$$ (4a)

$$MD = 0.377$$ (4b)

Therefore, there is a 37.7% chance that Structure 1 will suffer major damage. Finally, $BRC$ for Structure 1 is calculated as:

$$BRC = \sum_{i=1}^{3} BRC_i$$ (6)

where $i$ represents the systems STR, NSA, and NSD, and BRC for each group, $i$ is calculated as:

$$BRC_i = \sum_{j=1}^{5} P(j)_i * PL_{ij}$$ (7)

where $j$ represents the five damage states “None”, “Slight”, “Moderate”, “Extensive”, and “Complete”, also known as $N$, $S$, $M$, $E$, and $C$. So, $P(j)_i$ is the probability of the $j^{th}$ damage state in the $i^{th}$ component group, and $PL_{ij}$ is the percent loss parameter associated with the $i^{th}$ component group and $j^{th}$ damage state. So, $BRC_1$, $BRC_2$, and $BRC_3$ are calculated as follows:

$$BRC_{STR} = P(N)_{STR} * PL_{STR,N} + P(S)_{STR} * PL_{STR,S} + P(M)_{STR} * PL_{STR,M} + P(E)_{STR} * PL_{STR,E} + P(C)_{STR} * PL_{STR,C}$$ (7a)

$$BRC_{STR} = (0.012)0 + (0.084)0.4 + (0.527)1.9 + (0.359)9.5 + (0.018)18.9$$ (7b)

$$BRC_{STR} = 4.786$$ (7c)
Similarly, $BRC_{NSA} = 4.125$ and $BRC_{NSD} = 9.880$, and BRC for structure one is:

$$BRC = BRC_{STR} + BRC_{NSA} + BRC_{NSD}$$  \hspace{1cm} (6a)$$

$$BRC = 4.786 + 4.125 + 9.880$$  \hspace{1cm} (6b)$$

$$BRC = 18.791$$  \hspace{1cm} (6c)$$

So, based on the $BRC$ calculated for Structure 1, after the earthquake event it was subjected to in Hazus-MH 4.2, it will cost an estimated 18.791% of the structure’s cost to repair it.

The Pearson correlational coefficient, $r$, shows how closely two variables $x$ and $y$ are linearly related, and $r$ is calculated using:

$$r = \frac{\sum_{i=1}^{n}(z_{x_i}z_{y_i})}{n-1}$$  \hspace{1cm} (8)$$

where $n$ is the number of $(x,y)$ pairs. $z_{x_i}$ is the $z$-value for $x_i$ and $z_{y_i}$ is the $z$-value for $y_i$ from statistics, and the $z$-value is calculated using the formula:

$$z_a = \frac{a-\mu}{\sigma}$$  \hspace{1cm} (9)$$

Where $a$ is the $x_i$ or $y_i$ of interest, $\mu$ is the mean of all $a$, and $\sigma$ is the standard deviation of all $a$. $r$ ranges from -1 to +1. About 68% of all values of a dataset fall within one standard deviation of the mean, 95% fall within two standard deviations of the mean, and 99% fall within three standard deviations of the mean. A negative correlational coefficient indicates an inverse relationship between two variables, and a positive correlational coefficient indicates a positive correlation between to variables. If the magnitude (or absolute value) of $r$ is between 0 and 0.3, then there is no significant correlation between the two variables. If the absolute value of $r$ falls between 0.3 and 0.7, then there is a moderate correlation between the two variables. Then, it is
deduced that if $r$ falls between 0.7 and 1, then there is a strong correlation between the two variables. The correlational coefficient is commutative, so it does not differentiate between the dependent and independent variables. The correlational coefficient will be used to help identify relationships, if any, between resultant variables.

The results from this study are divided into the three separate cases discussed earlier: All four counties with the coarse ground motion maps, Dyer County TN with the coarse ground motion maps, and Dyer County TN with the finer Dyer County TN ground motion maps. $IO$, $MD$, and $BRC$ values will be presented and discussed for each case below. Then, the resultant variables are used to sort the structures from safest to least safe in Appendices F-H.

*Dyer, Gibson, Lauderdale and Obion County: Coarse Map Results*

Dyer, Gibson, Lauderdale, and Obion counties encompass the entire study region, so all 85 structures were analyzed in this case. The ground motion maps used for this case were the coarse maps developed on a 0.1° grid with PGA values ranging from 0.447g-1.600g. This dataset recorded many buildings with high Moderate, Extensive, and Complete damage state probabilities. Table 10 gives a summary of the variables calculated for this case.

<table>
<thead>
<tr>
<th>Table 10. Case 1: Summary of Result Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Variable</strong></td>
</tr>
<tr>
<td>Average, $\mu$</td>
</tr>
<tr>
<td>Standard Deviation, $\sigma$</td>
</tr>
<tr>
<td>Unique Values</td>
</tr>
</tbody>
</table>

From Table 10, the average $BRC$ and $MD$ are high, and the average $IO$ and $S_{L1}$ are low. This generally makes sense, because if there is more likely to be a lot of damage and almost half the cost of a structure is required to repair it, then it is likely that the structure will not be immediately occupied, thus a score below the cut-off score of 2.0 is also expected. While the
averages make sense, the standard deviations are high. For instance, \( \sigma = 31.228 \) for \( BRC \), meaning only 68% fall within 20% and 80%, indicating \( BRC \) is highly varied. The unique values are recorded to rank the structures later. Table 11 lists the correlational coefficient matrix which is used to analyze the relationships between the variables.

<table>
<thead>
<tr>
<th></th>
<th>( S_{LI} )</th>
<th>( BRC ) (%)</th>
<th>( IO )</th>
<th>( MD )</th>
</tr>
</thead>
<tbody>
<tr>
<td>( S_{LI} )</td>
<td>1</td>
<td>-0.287</td>
<td>-0.113</td>
<td>-0.124</td>
</tr>
<tr>
<td>( BRC ) (%)</td>
<td>-0.287</td>
<td>1</td>
<td>-0.673</td>
<td>0.910</td>
</tr>
<tr>
<td>( IO )</td>
<td>-0.113</td>
<td>-0.673</td>
<td>1</td>
<td>-0.871</td>
</tr>
<tr>
<td>( MD )</td>
<td>-0.124</td>
<td>0.910</td>
<td>-0.871</td>
<td>1</td>
</tr>
</tbody>
</table>

From Table 11, there is a strong positive relationship between \( BRC \) and \( MD \). There is also a strong negative relationship between \( MD \) and \( IO \), which is guaranteed since each has a direct influence over the other in Equation 5. There is a moderate inverse relationship between \( BRC \) and \( IO \). All relationships involving \( SL1 \) are considered insignificant. However, the relationship between \( S_{LI} \) and \( BRC \) is very close to the threshold of a moderate inverse correlation. These relationships described are shown graphically in Figures 10-12.

![Figure 10. Case 1: \( BRC \) vs. \( MD \)](image-url)
From Figure 10, as the probability of major damage increases, the estimated cost to repair the structure also increases. The strong correlation between BRC and MD is clearly visible in Figure 10. Intuitively, a BRC and IO should be inversely correlated.

![Figure 11. Case 1: BRC vs. IO](image)

From Figure 11, as the probability of immediate occupancy increases, the cost to repair the building decreases. Though the graph above shows a seemingly strong inverse correlation exists, the correlational coefficient, $r$, is -0.673, indicating a moderate inverse correlation. The primary reason for this is the large variation in BRC when IO is zero. For an IO = 0, BRC ranges anywhere from 55%-95%.
Figure 12. Case 1: $BRC$ vs. $S_{LI}$

Since $S_{LI}$ represents the resistance to earthquakes, all scores above 2.0 should have a lower $BRC$, and scores below 2.0 should have a higher $BRC$. However, $S_{LI}$ was determined using a different methodology (RVS) that is based on different, more basic assumptions related to the age of the building, the shape of the building, and general site conditions. So, it makes sense that there is not a strong correlation between two variables developed using different methods. However, it should be noted that the weaker correlation that does exist is negative, showing that generally a lower $S_{LI}$ results in a higher $BRC$. Appendix I shows the structures sorted using the variable with the largest number of unique values first, which is $BRC$. Any ties are broken with the variable with the second-most unique values, $MD$, followed by $S_{LI}$ and $IO$.

After the structures in this case were ranked, they were plotted over a map displaying the PGA values in Figure 13 to see if there is a relationship between the higher PGA values and the final rank of the structures.
Clearly, from Figure 13, there is a correlation between the PGA values and the rank of the building, even though the PGA value for the structure was not directly a sorting mechanism. The PGA values correspond very well to the level of seismicity shown in Figure 7 that helps determine $S_{L1}$, and the PGA values help directly calculated the probability that a building’s various components will fall into a certain damage state.

**Dyer County: Coarse Map Results**

Dyer County encompasses 17 of the structures surveyed. The ground motion maps used for this case were the coarse maps developed on a 0.1° grid with PGA values ranging from 0.69g-1.69g. This dataset is a subset of case 1, and thus the results are a subset of case 1. All structures in this area recorded “Complete” as the highest damage state probability for all components. Compared to the other three counties, Dyer county was subjected to the highest ground motions (most of the county was subjected to 1g-1.6g PGA values). Table 12 gives a summary of the variables calculated for this case.
Table 12. Case 2: Summary of Result Variables

<table>
<thead>
<tr>
<th></th>
<th>$S_{L1}$</th>
<th>BRC (%)</th>
<th>IO</th>
<th>$MD$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average, $\mu$</td>
<td>1.235</td>
<td>78.432</td>
<td>0</td>
<td>0.976</td>
</tr>
<tr>
<td>Standard Deviation, $\sigma$</td>
<td>0.865</td>
<td>14.069</td>
<td>0</td>
<td>0.021</td>
</tr>
<tr>
<td>Unique Values</td>
<td>8</td>
<td>5</td>
<td>1</td>
<td>5</td>
</tr>
</tbody>
</table>

There is significantly less variation in BRC, IO, and MD than in case 1. One possible reason for that is the fact that all the buildings are subjected to significantly higher ground motions than the remaining three counties. Since $IO = 0$ for all the Dyer County results, it is impossible to calculate a correlational coefficient between it and any other variable. Since these results are a subset of case 1, it is hypothesized that the correlations will be weaker. The correlational coefficient matrix is shown in Table 13.

Table 13. Case 2: Correlational Coefficient Matrix

<table>
<thead>
<tr>
<th></th>
<th>$S_{L1}$</th>
<th>BRC (%)</th>
<th>IO</th>
<th>$MD$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$S_{L1}$</td>
<td>1</td>
<td>-0.636</td>
<td>-</td>
<td>-0.606</td>
</tr>
<tr>
<td>BRC (%)</td>
<td>-0.636</td>
<td>1</td>
<td>-</td>
<td>0.995</td>
</tr>
<tr>
<td>IO</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>MD</td>
<td>-0.606</td>
<td>0.995</td>
<td>-</td>
<td>1</td>
</tr>
</tbody>
</table>

Although $r$ was unable to be calculated for $IO$ and any other variable, the existing correlational coefficients for this subset are higher than for case 1. There is a strong positive correlation between $MD$ and $BRC$. There is a moderate inverse correlation between $S_{L1}$ and $BRC$. There is also a moderate inverse correlation between $S_{L1}$ and $MD$. These results are shown in Figures 14-16.
Although there is clearly a strong positive correlation between $BRC$ and $MD$, as $r = 0.995$ for the pair, shown in Figure 14, recall that each variable only has 5 unique values.
While Figure 15 does not appear to display much of a correlation, it does show that the higher scoring buildings have relatively lower $BRC$ values compared to the lower scoring buildings.

![Graph showing correlation between RVS Building Score ($S_{LI}$) and MD](image)

Figure 16. Case 2: $S_{LI}$ vs. $MD$

Again, although there does not seem to graphically be a significant relationship between $S_{LI}$ and $MD$, the probability of major damage is generally lower for buildings with higher scores. The problematic part of the correlational coefficient for these specific pairs ($S_{LI}$, $BRC$, and $S_{LI}$, $MD$) is that even the buildings scoring above the benchmark of 2.0 still record $BRC$s upwards of 60% and $MD$s higher than 95%. So, although there is a correlation, $S_{LI}$ operates on different assumptions than the Hazus-MH software. Appendix J shows the structures sorted using the variable with the most unique values first, which is $BRC$. Any ties are broken with the variable with the second-most unique values, $MD$, followed by $S_{LI}$. Since all $IO$ are zero for this case, it does not affect the ranking.

**Dyer County: Finer Map Results**

Dyer County encompasses 17 of the structures surveyed. The ground motion maps used for this case were the finer maps developed on a 0.005° grid with PGA values ranging from 0.690g-
1.800g. All structures in this area recorded “Complete” as the highest damage state probability for all components. This is likely due to the higher ground motions. Table 14 gives a summary of the variables calculated for this case.

Table 14. Case 3: Summary of Result Variables

<table>
<thead>
<tr>
<th></th>
<th>( S_{L1} )</th>
<th>( BRC ) (%)</th>
<th>( IO )</th>
<th>( MD )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average, ( \mu )</td>
<td>1.235</td>
<td>81.434</td>
<td>0.000118</td>
<td>0.983</td>
</tr>
<tr>
<td>Standard Deviation, ( \sigma )</td>
<td>0.865</td>
<td>11.921</td>
<td>0.000332</td>
<td>0.017</td>
</tr>
<tr>
<td>Unique Values</td>
<td>8</td>
<td>14</td>
<td>2</td>
<td>9</td>
</tr>
</tbody>
</table>

The \( BRC \) and \( MD \) values are slightly higher for this case than for case 2. This makes sense because the ground motion values are higher for the finer maps than the coarse maps. The \( IO \) value is still relatively zero. The average \( S_{L1} \) is the same for this case as case 2, because \( S_{L1} \) does not change according to earthquake event. So, if the buildings surveyed are the same sample, \( S_{L1} \) will not change due to what earthquake event is considered. The correlational coefficient matrix for this case is shown in Table 15:

Table 15. Case 3: Correlational Coefficient Matrix

<table>
<thead>
<tr>
<th></th>
<th>( S_{L1} )</th>
<th>( BRC ) (%)</th>
<th>( IO )</th>
<th>( MD )</th>
</tr>
</thead>
<tbody>
<tr>
<td>( S_{L1} )</td>
<td>1</td>
<td>-0.579</td>
<td>-0.059</td>
<td>-0.443</td>
</tr>
<tr>
<td>( BRC ) (%)</td>
<td>-0.579</td>
<td>1</td>
<td>-0.533</td>
<td>0.965</td>
</tr>
<tr>
<td>( IO )</td>
<td>-0.059</td>
<td>-0.533</td>
<td>1</td>
<td>-0.719</td>
</tr>
<tr>
<td>( MD )</td>
<td>-0.443</td>
<td>0.965</td>
<td>-0.719</td>
<td>1</td>
</tr>
</tbody>
</table>

From Table 15, there is a strong positive correlation between \( BRC \) and \( MD \), and \( MD \) and \( IO \). There is a moderate inverse correlation between \( S_{L1} \) and \( BRC \), \( BRC \) and \( IO \), and \( MD \) and \( S_{L1} \).

Since there is very little variation in \( IO \) and \( BRC \), while \( S_{L1} \) is incredibly varied, a similar situation to case 2 occurs in which the structures with \( S_{L1} \) greater than 2 still have \( BRC \) greater than 60% and \( MD \) probabilities higher than 98%. So, while the correlations are in the right direction, there is clearly a disconnect between the RVS methodology and Hazus-MH 4.2
software. Appendix K shows the ranking structures according to the number of unique values.

So, the structures are first ranked by \( BRC \), then \( MD, S_{Lt} \), and \( IO \).

**Discussion and Conclusions**

This study was initially funded to locate the most seismically vulnerable buildings utilizing the RVS Method and the most up-to-date available local seismic data. After surveying each building, recording data, and running three Hazus-MH 4.2 advanced analyses, the buildings have been sorted from least seismically vulnerable to most seismically vulnerable. Appendix L gives the individual structure Level 1 Data Collection Forms for the 85 structures surveyed. Individual school building names have been removed. Table 16 gives results from Case 1 showing the distribution of structures that fall into the highest, upper, lower, and lowest quadrants of the total ranking from 1-76. Recall that although there are 85 structures, there are also ties that result in 76 ranks.

<table>
<thead>
<tr>
<th>Rank</th>
<th>Dyer</th>
<th>Gibson</th>
<th>Lauderdale</th>
<th>Obion</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-18</td>
<td>0.00%</td>
<td>25.58%</td>
<td>57.14%</td>
<td>0.00%</td>
</tr>
<tr>
<td>19-36</td>
<td>0.00%</td>
<td>34.88%</td>
<td>0.00%</td>
<td>27.27%</td>
</tr>
<tr>
<td>37-55</td>
<td>58.82%</td>
<td>13.95%</td>
<td>42.86%</td>
<td>27.27%</td>
</tr>
<tr>
<td>56-76</td>
<td>41.18%</td>
<td>25.58%</td>
<td>0.00%</td>
<td>45.45%</td>
</tr>
<tr>
<td>Total</td>
<td>100.00%</td>
<td>100.00%</td>
<td>100.00%</td>
<td>100.00%</td>
</tr>
</tbody>
</table>

Table 16 indicates that Obion County contains the highest percentage of seismically vulnerable schools, followed by Dyer County, Gibson County, and Lauderdale County. Hopefully, this table sheds some light on which counties need more immediate attention in terms of which school buildings to retro-fit first.
After utilizing both methods and calculating correlational coefficients between resultant variables from both methods, it has been determined that there is little correlation between the RVS method and Hazus-MH 4.2 software. Some reasons include that the underlying assumptions and required variables are different. Additionally, in the RVS method, there is no distinguishable difference between a structure with $S_{L1} = 0.2$ and a structure with $S_{L1} = 1.9$. According to RVS, both need “a more detailed structural evaluation,” so the RVS method was not initially developed to rank structures. However, there is a slight correlation between SL1 and the final ranking of the structures in Case 1:

![Figure 17. Case 1: $S_{L1}$ Versus Rank](image)

Although not a perfect correlation, the structures with a score of 2.0 or higher generally ranked better than structures with a score below 2.0.

After utilizing both methods, it is recommended that screeners use Hazus-MH 4.2 to rank structures from least seismically vulnerable to most seismically vulnerable, as RVS is not an extremely reliable indicator of seismic vulnerability for comparison of structures. The primary reason that RVS does not perform well for comparing structures is that it uses a “yes” or “no” approach for all parameters except for building type, soil type, and region of seismicity. In contrast, Hazus-MH 4.2 uses all categorical variables.
4. APPENDICES
Appendix A: Region of Seismicity’s Effect on Level 1 Data Collection Form

Figures A1-A5 show the “Basic Score, Modifiers, and Final Level 1 Score, $S_{L1}$” section of the Level 1 Data Collection form for the Low, Moderate, Moderately High, High, and Very High seismicity regions, respectively. Figure A6 shows the entire Level 1 Data Collection form for the “Very High” region of seismicity.

The top row of each table indicates the FEMA Building Type that describes the materials and construction methods used in the building that result in a basic score for the building against a collapse in the event of an arbitrary earthquake. For instance, the first FEMA building type on the form in Figure A1 is “W1”, which is a “light wood frame single- or multiple-family dwelling.” For more information on what each building type is, see Appendix B. As shown in Figure A1, the basic score for W1 is 6.2. (For a reference point, the generally accepted cut-off score is 2.0). When looking at Figure A2, the score for the W1 building decreases to 5.1. In Figures A3-A5, the basic score for a W1 structure continues the downward trend with 4.1, 3.6, and 2.1, respectively. Upon closer inspection of the Very High seismicity region represented in Figure A5, W1 is the only FEMA building type with a basic score above the cut-off score. The reason for the basic score of each building decreasing with each higher seismicity region is that intuitively, a building built in the same manner in a place subjected to higher seismic forces is more likely to collapse.
Figure A1. Basic Score and Modifiers for Low Seismicity Region

Figure A2. Basic Score and Modifiers for Moderate Seismicity Region

Figure A3. Basic Score and Modifiers for Moderately High Seismicity Region
Figure A4. Basic Score and Modifiers for High Seismicity Region

<table>
<thead>
<tr>
<th>FEMA BUILDING TYPE</th>
<th>Do Not Know</th>
<th>W1</th>
<th>W1A</th>
<th>W2</th>
<th>S1</th>
<th>S2</th>
<th>S3</th>
<th>S4</th>
<th>S5</th>
<th>S5 (URM INF)</th>
<th>C1</th>
<th>C2</th>
<th>C3</th>
<th>C3 (URM INF)</th>
<th>PC1</th>
<th>PC2</th>
<th>R1M</th>
<th>R1M2</th>
<th>R1M2 (RZ)</th>
<th>URM</th>
<th>MH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic Score</td>
<td>3.6</td>
<td>3.2</td>
<td>2.9</td>
<td>2.1</td>
<td>2.0</td>
<td>2.6</td>
<td>2.0</td>
<td>1.7</td>
<td>1.5</td>
<td>2.0</td>
<td>1.2</td>
<td>1.4</td>
<td>1.7</td>
<td>1.7</td>
<td>1.6</td>
<td>1.4</td>
<td>1.6</td>
<td>1.2</td>
<td>1.0</td>
<td>1.0</td>
<td>1.5</td>
</tr>
<tr>
<td>Severe Vertical Inequality, V1</td>
<td>-12</td>
<td>-12</td>
<td>-12</td>
<td>-12</td>
<td>-10</td>
<td>-10</td>
<td>-11</td>
<td>-10</td>
<td>-8</td>
<td>-8</td>
<td>-9</td>
<td>-9</td>
<td>-9</td>
<td>-9</td>
<td>-10</td>
<td>-10</td>
<td>-10</td>
<td>-10</td>
<td>-10</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Moderate Vertical Inequality, V1</td>
<td>-0.7</td>
<td>-0.7</td>
<td>-0.7</td>
<td>-0.6</td>
<td>-0.6</td>
<td>-0.7</td>
<td>-0.6</td>
<td>-0.5</td>
<td>-0.5</td>
<td>-0.6</td>
<td>-0.4</td>
<td>-0.6</td>
<td>-0.6</td>
<td>-0.6</td>
<td>-0.7</td>
<td>-0.6</td>
<td>-0.7</td>
<td>-0.6</td>
<td>-0.4</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Plan Irregularity, P1</td>
<td>-1.1</td>
<td>-1.0</td>
<td>-1.0</td>
<td>-0.8</td>
<td>-0.8</td>
<td>-0.7</td>
<td>-0.7</td>
<td>-0.6</td>
<td>-0.6</td>
<td>-0.6</td>
<td>-0.5</td>
<td>-0.5</td>
<td>-0.5</td>
<td>-0.5</td>
<td>-0.5</td>
<td>-0.5</td>
<td>-0.5</td>
<td>-0.5</td>
<td>-0.5</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Pre-Code</td>
<td>-1.1</td>
<td>-1.0</td>
<td>-0.9</td>
<td>-0.6</td>
<td>-0.6</td>
<td>-0.6</td>
<td>-0.6</td>
<td>-0.2</td>
<td>-0.4</td>
<td>-0.7</td>
<td>-0.1</td>
<td>-0.5</td>
<td>-0.5</td>
<td>-0.5</td>
<td>-0.3</td>
<td>-0.5</td>
<td>-0.5</td>
<td>-0.5</td>
<td>-0.1</td>
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<td>NA</td>
</tr>
<tr>
<td>Post-Benchmark</td>
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<td>1.9</td>
<td>2.2</td>
<td>1.4</td>
<td>1.4</td>
<td>1.1</td>
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<td>NA</td>
<td>2.0</td>
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<td>2.1</td>
<td>2.1</td>
<td>NA</td>
<td>1.2</td>
</tr>
<tr>
<td>Soil Type A or B</td>
<td>0.1</td>
<td>0.3</td>
<td>0.5</td>
<td>0.4</td>
<td>0.6</td>
<td>0.1</td>
<td>0.6</td>
<td>0.5</td>
<td>0.4</td>
<td>0.5</td>
<td>0.3</td>
<td>0.6</td>
<td>0.4</td>
<td>0.5</td>
<td>0.3</td>
<td>0.3</td>
<td>0.5</td>
<td>0.5</td>
<td>0.3</td>
<td>NA</td>
<td>0.3</td>
</tr>
<tr>
<td>Soil Type E (1-3 stories)</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
<td>0.1</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
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<td>0.2</td>
<td>0.2</td>
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<td>0.2</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Minimum Score, S2</td>
<td>1.1</td>
<td>0.9</td>
<td>0.7</td>
<td>0.7</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.3</td>
<td>0.3</td>
<td>0.3</td>
<td>0.3</td>
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<td>1.0</td>
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</tr>
</tbody>
</table>

Figure A5. Basic Score and Modifiers for Very High Seismicity Region

Figure A6 shows the entire Level 1 Data Collection form for the “Very High” region of seismicity. How to fill out this form is described in the Methodologies section under “RVS.”
Figure A6. Level 1 Data Collection Form
Appendix B: FEMA Building Type Descriptions and Compatible Hazus-MH 4.2 Types

FEMA over the years has continuously refined the number of recognized building types primarily from the original ATC-14 document (FEMA, 2015). Each of the 17 FEMA building types listed below also has a comparable Hazus-MH 4.2 building type, which is based on FEMA-178 (FEMA 2012). This is important in the screening process to ensure that each structure may be evaluated through both RVS and Hazus-MH 4.2. Otherwise, each site visit would require two separate on-site evaluations.

The only difference between Hazus-MH 4.2 and the Level 1 Data Collection form in terms of building type is that Hazus-MH 4.2 also distinguishes between low, medium, and high-rise buildings and the MH building type for Hazus does not include non-residential buildings, such as school portables. For instance, a 1-3 story S1 is an S1L in Hazus-MH 4.2. similarly, 4-7 story buildings are denoted by adding an “M,” and any building over 7 stories is denoted with an “H” after the conventional FEMA building type designation. Some buildings that are only developed at certain heights (for instance, all W1 buildings are 1-3 stories in height), do not include any height designation. So, there is no W1L, W1M, or W1H, only W1. All buildings in this study were 3 stories or less, so they are all classified as low-rise buildings. There is one MH building that was initially screened and subsequently removed from the study due to the inconsistency between RVS and the Hazus-MH 4.2 software. The following list of FEMA building types is directly from FEMA P-154 and the Hazus-MH 4.2 model building types, and descriptions are from Earthquake Model Hazus-MH 2.1 User Manual, published in 2016 and 2012, respectively:

1. **RVS:** W1 buildings are Light wood frame single- or multiple-family dwellings of one or more stories in height.
   **Hazus:** W1 are typically single- or multiple-family dwellings. The essential structural feature of these buildings is repetitive framing by wood rafters or joists on wood stud walls. Loads
are light and spans are small. These buildings may have relatively heavy masonry chimneys and may be partially or fully covered with masonry veneer. Most of these buildings, especially the single-family residences, are not engineered but constructed in accordance with “conventional construction” provisions of building codes. Hence, they usually have the components of a lateral force-resisting system even though it may be incomplete. Lateral loads are transferred by diaphragms to shear walls. The diaphragms are roof panels and floors which may be sheathed with wood, plywood or fiberboard sheathing. Shear walls are exterior walls sheathed with boards, stucco, plaster, plywood, gypsum board, particle board, or fiberboard, or interior partition walls sheathed with plaster or gypsum board.

2. **RVS:** W1A buildings are light wood frame multi-unit, multi-story residential buildings with plan areas on each floor of greater than 3,000 square feet.  
**Hazus:** Hazus does not recognize the difference between W1 and W1A buildings, so if the RVS screener/Hazus user encounters a W1A building in the field, consider it a W1 building in Hazus software.

3. **RVS:** W2 buildings are wood frame commercial and industrial buildings with a floor area larger than 5,000 square feet.  
**Hazus:** These buildings usually are commercial or industrial buildings with a floor area of 5,000 square feet or more and with few, if any, interior walls. The essential structural character of these buildings is framing by beams or major horizontally spanning members over columns. These horizontal members may be glued-laminated wood, solid-sawn wood beams, or wood trusses, or steel beams, or trusses. Lateral loads usually are resisted by wood diaphragms and exterior walls sheathed with plywood, stucco, plaster, or other paneling. The walls may have diagonal rod bracing. Large openings for storefronts and garages often require post-and-beam framing. Lateral load resistance on those lines may be achieved with steel rigid frames (moment frames) or diagonal bracing.

4. **RVS:** S1 buildings are steel moment-resisting frame buildings.  
**Hazus:** S1L, S1M, and S1H buildings have a frame of steel columns and beams. In some cases, the beam-column connections have very small moment resisting capacity but, in other cases, some of the beams and columns are fully developed as moment frames to resist lateral forces. Usually the structure is concealed on the outside by exterior walls, which can be of almost any material (curtain walls, brick masonry, or precast concrete panels), and on the inside by ceilings and column furring. Lateral loads are transferred by diaphragms to moment resisting frames. The diaphragms can be almost any material. The frames develop their stiffness by full or partial moment connections. The frames can be located almost anywhere in the building. Usually the columns have their strong directions oriented so that some columns act primarily in one direction while the others act in the other direction. Steel moment frame buildings are typically more flexible than shear wall buildings. This low stiffness can result in large inter-story drifts that may lead to relatively greater nonstructural damage.

5. **RVS:** S2 buildings are braced steel frame buildings.
**Hazus:** S2L, S2M, and S2H buildings are like steel moment frame buildings except that the vertical components of the lateral-force-resisting system are braced frames rather than moment frames.

6. **RVS:** S3 buildings are light metal buildings. 
   **Hazus:** S3 buildings are These buildings are pre-engineered and prefabricated with transverse rigid frames. The roof and walls consist of lightweight panels, usually corrugated metal. The frames are designed for maximum efficiency, often with tapered beam and column sections built up of light steel plates. The frames are built in segments and assembled in the field with bolted joints. Lateral loads in the transverse direction are resisted by the rigid frames with loads distributed to them by diaphragm elements, typically rod-braced steel roof framing bays. Loads in the longitudinal direction are resisted entirely by shear elements which can be either the roof and wall sheathing panels, an independent system of tension-only rod bracing, or a combination of panels and bracing.

7. **RVS:** S4 buildings are steel frame buildings with cast-in-place concrete shear walls. 
   **Hazus:** S4L, S4M, and S4H buildings have shear walls that are cast-in-place concrete and may be bearing walls. The steel frame is designed for vertical loads only. Lateral loads are transferred by diaphragms of almost any material to the shear walls. The steel frame may provide a secondary lateral-force-resisting system depending on the stiffness of the frame and the moment capacity of the beam-column connections. In modern “dual” systems, the steel moment frames are designed to work together with the concrete shear walls in proportion to their relative rigidities.

8. **RVS:** S5 buildings are steel frame buildings with unreinforced masonry infill walls. 
   **Hazus:** S5L, S5M, and S5H buildings are This is one of the older types of buildings. The infill walls usually are offset from the exterior frame members, wrap around them, and present a smooth masonry exterior with no indication of the frame. Solidly infilled masonry panels, when they fully engage the surrounding frame members (i.e. lie in the same plane), provide stiffness and lateral load resistance to the structure.

9. **RVS:** C1 buildings are concrete moment-resisting frame buildings. 
   **Hazus:** C1L, C1M, and C1H buildings are like steel moment frame buildings except that the frames are reinforced concrete. There is a large variety of frame systems. Some older concrete frames may be proportioned and detailed such that brittle failure of the frame members can occur in earthquakes, leading to partial or full collapse of the buildings. Modern frames in zones of high seismicity are proportioned and detailed for ductile behavior and are likely to undergo large deformations during an earthquake without brittle failure of frame members and collapse.

10. **RVS:** C2 buildings are concrete shear-wall buildings. 
    **Hazus:** C2L, C2M, and C2H buildings have vertical components of the lateral-force-resisting system that are concrete shear walls that are usually bearing walls. In older buildings, the walls often are quite extensive, and the wall stresses are low, but reinforcing is light. In newer buildings, the shear walls often are limited in extent, thus generation concerns about boundary members and overturning forces.
11. **RVS**: C3 buildings are concrete frame buildings with unreinforced masonry infill walls.  
**Hazus**: C3L, C3M, and C3H buildings are like steel frame buildings with unreinforced masonry infill walls except that the frame is of reinforced concrete. In these buildings, the shear strength of the columns, after cracking of the infill, may limit the semi ductile behavior of the system.

12. **RVS**: PC1 buildings are tilt-up buildings  
**Hazus**: PC1 buildings have a wood or metal deck roof diaphragm, which often is very large, that distributes lateral forces to precast concrete shear walls. The walls are thin but relatively heavy while the roofs are relatively light. Older buildings often have inadequate connections for anchorage of the walls to the roof for out-of-plane forces, and the panel connections often are brittle. Tilt-up buildings usually are one or two stories in height. Walls can have numerous openings for doors and windows of such size that the wall looks more like a frame than a shear wall.

13. **RVS**: PC2 buildings are precast concrete frame buildings  
**Hazus**: PC2L, PC2M, and PC2H buildings contain floor and roof diaphragms typically composed of precast concrete elements with or without cast-in-place concrete topping slabs. The diaphragms are supported by precast concrete girders and columns. The girders often bear on column corbels. Closure strips between precast floor elements and beam-column joints usually are cast-in-place concrete. Welded steel inserts often are used to interconnect precast elements. Lateral loads are resisted by precast or cast-in-place concrete shear walls. For buildings with precast frames and concrete shear walls to perform well, the details used to connect the structural elements must have sufficient strength and displacement capacity; however, in some cases, the connection details between the precast elements have negligible ductility.

14. **RVS**: RM1 buildings are reinforced masonry buildings with flexible floor and roof diaphragms.  
**Hazus**: RM1L and RM1M buildings have perimeter bearing walls of reinforced brick or concrete-block masonry. These walls are the vertical elements in the lateral-force-resisting system. The floors and roofs are framed either with wood joists and beams with plywood or straight or diagonal sheathing, or with steel beams with metal deck with or without a concrete fill. Wood floor framing is supported by interior wood posts or steel columns; steel beams are supported by steel columns.

15. **RVS**: RM2 buildings are reinforced masonry buildings with rigid floor and roof diaphragms.  
**Hazus**: RM2L, RM2M, and RM2H buildings have bearing walls similar to those of reinforced masonry bearing wall structures with wood or metal deck diaphragms, but the roof and floors are composed of precast concrete elements such as planks or tee-beams and the precast roof and floor elements are supported on interior beams and columns of steel or concrete (cast-in-place or precast). The precast horizontal elements often have a cast-in-place topping.

16. **RVS**: URM buildings are unreinforced masonry bearing-wall buildings
**Hazus:** URML and URMM buildings are These buildings include structural elements that vary depending on the building’s age and, to a lesser extent, its geographic location. In buildings built before 1900, the majority of floor and roof construction consists of wood sheathing supported by wood sub-framing. In large multistory buildings, the floors are cast-in-place concrete supported by the unreinforced masonry walls and/or steel or concrete interior framing. In unreinforced masonry constructed after 1950 wood floors usually have plywood rather than board sheathing. In regions of lower seismicity, buildings of this type constructed more recently can include floor and roof framing that consists of metal deck and concrete fill supported by steel framing elements. The perimeter walls, and possibly some interior walls, are unreinforced masonry. The walls may or may not be anchored to the diaphragms. Ties between the walls and diaphragms are more common for the bearing walls than for walls that are parallel to the floor framing. Roof ties usually are less common and more erratically spaced than those at the floor levels. Interior partitions that interconnect the floors and roof can have the effect of reducing diaphragm displacements.

17. **RVS:** MH buildings are manufactured housing. FEMA also includes non-residential buildings, such as school portables. **Hazus:** MH buildings are prefabricated housing units that are trucked to the site and then placed on isolated piers, jack stands, or masonry block foundations (usually without any positive anchorage). Floors and roofs of mobile homes usually are constructed with plywood and outside surfaces are covered with sheet metal. Hazus software does not include non-residential buildings, such as school portables.
Appendix C. Procedure for CDMS Data Entry

Data entry into CDMS is briefly described in the Methodologies Section of this document. However, below is a more thorough guide complete with screen captures and specific references. First, one needs to select the state to update or replace inventory. State databases are found on FEMA’s website at https://msc.fema.gov/portal/resources/hazus. The state databases are shown alongside downloading different versions of Hazus, but it is acceptable to just download a state database by itself. Save a copy of the statewide dataset separately from the one being modified. Once the database is saved, Open CDMS. CDMS is downloaded with Hazus, however it has its own icon and is opened separately from Hazus. The CDMS home screen is shown in Figure C1.

![Figure C1. CDMS Home Screen](image-url)
The home screen will have “Select a State” where “Tennessee” is shown in red in Figure C1. All of the following is useful for users seeking to run an AEBM module, and currently has a Microsoft Excel Spreadsheet to enter data into Hazus-MH 4.2. First, select the button that says “Import into CDMS Repository from File” as shown in Figure C1. Figure C2 will appear.

Choose the options shown in Figure C2. The required fields for the AEBM module will appear in the right pane. As shown in Figure C2, the required fields to run the AEBM module are the area of the structure in square feet, the earthquake building type (learn more in Appendix B), earthquake design level, and the Occupancy type. All of the required fields are discussed in detail in the Methodologies Section. Select the Microsoft Excel file that includes at least all four of the required fields, the latitude of the structure, and the longitude of the structure. If one is
updating previous inventory, be sure to include the Hazus ID to avoid having duplicate structures. Ensure only “Earthquake” is selected as the specified hazard. Figure C3 will appear.

Figure C3. Import into CDMS Repository Screen

Choose the options shown in Figure C3. Then select “Continue”. CDMS will then begin to validate the data. This process appears different for each file imported. However, there is a uniform process applied to each file. Refer to Figure C4 below.
As Figure C4 shows, CDMS automatically matches as many fields as it can detect. The fields in black are not required but are recognized by CDMS and Hazus as useful fields for plotting or other purposes. The fields marked in green are required to be present, but the user may leave them all empty (such is the case for this study). Hazus uses RS Means to estimate the economic parameters. The fields marked in red are required, and default values will not be estimated by Hazus. As one can see in Figure C4, although the user has specified an “EQ Design Level”, CDMS did not automatically detect the field as the “Earthquake Design Level” shown in red. So, the user must first click the source field in the left pane, the destination field in the right pane,
and finally click the “Add Match” button. Click “Continue.” The “Category Value Matching” window will appear for applicable fields, as shown in Figure C5.

![Figure C5. Category Value Matching Window](image)

The user is to match the source fields (specified in the excel spreadsheet) to the destination fields (CDMS Data Dictionary definitions). In the example above, “S3L” is not recognized, because according to Hazus all “S3” buildings are low-rise, so the official designation is “S3.” If CDMS did not go through the process in Figure C5, the user would have to detect and re-type all the “S3L” buildings as “S3”. However, using CDMS the user can match the “S3L” in the left pane to the S3 designation in the right pane, and CDMS will correct the designation for calculations in Hazus. This feature is what makes CDMS such a powerful tool for data entry. Continue for all fields. Finally, CDMS will notify the user that data has been imported into the CDMS repository. Select “OK.” The user is then returned to the home screen, and the data will be displayed in the top pane. The user may view, edit, or remove the data in the top pane. To use the data in Hazus,
the data must be transferred to the statewide dataset by pushing the appropriate button on the home screen. The user will specify to either “update” or “replace” the statewide inventory. Once the data has been transferred to the statewide dataset, it can only be removed if it is replaced. For example, if the dataset given contains 10 buildings, the user adds 6, but only wanted to add 5. The only way to remove the 6th building is by replacing all 16 buildings with the 5 buildings by importing 5 buildings and specifying to “replace” the statewide database. However, the original 10 buildings the dataset started with will be lost unless the user keeps a copy of the dataset saved separately.
Appendix D: Procedure for Creating Ground Motion Maps from Text File Compatible with Hazus-MH 4.2

A procedure for converting ground motion point data into a Hazus compatible map was first developed in 2009 for ArcMap v. 9.2 and Hazus-MH MR3 (Boling, 2009). This procedure shown below is revised for ArcMap v. 10.5.1 and Hazus-MH 4.2.

The data supplied for this study was in a text file with a grid spacing of 500 meters. The text file contained longitude, latitude, and a parametric value such as the spectral acceleration ($S_a$) or peak ground acceleration ($PGA$). The procedure can be broken down into three sections: Importing points into ArcMap, creating a fishnet, joining the points with the fishnet to create a usable map.

**Importing Points into ArcMap**

1. Start Microsoft Excel, navigate to the “Data” tab, and select “from Text/CSV” button.

2. When browsing for the file, select “All Files” (see Figure D1). Some text files, such as the one used in this example are 004 files, will not be found when searching for .txt files only.

![Figure D1. Importing Data into Microsoft Excel](image)

3. Once the file is selected, another window will come up asking how the data should be displayed and what sheet to use. After selecting appropriate options, the data will look...
like Figure D2. Label the top row of data if not already done. The parametric value (spectral acceleration, PGA, PGV, etcetera) must be labeled “ParamValue” for Hazus-MH to accept the map. The data does not have to have an ID column, as shown in Figure D2.

<table>
<thead>
<tr>
<th></th>
<th>ID</th>
<th>LONG</th>
<th>LAT</th>
<th>ParamValue</th>
</tr>
</thead>
<tbody>
<tr>
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<td>1</td>
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<td>0.797</td>
</tr>
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</tr>
</tbody>
</table>

Figure D2. Imported Text Data in Microsoft Excel

4. Save a Microsoft Excel file.

5. Open ArcMap. Select the “Add Data” button.

6. Search for the file created in Step 4 and select it. Select the appropriate sheet to import.

7. Right-click on the Layer added in step 2 in the Table of Contents in ArcMap. Select “Display XY Data.”

8. The Display XY Data window will appear as shown in Figure D3. Ensure the “X Field” is the longitude, the “Y Field” is the Latitude, and the “Z Field” is the parametric value that must be called “ParamValue” in Excel, so that the field will be called “ParamValue” in ArcMap. Select “Edit” underneath the “Coordinate System of Input Coordinates” section. Select the appropriate coordinate system. For this project, all coordinates are in WGS 1984. Select “OK.” There may be a warning that there is not an Object ID Field. Select “OK” anyways.
9. Now, the XY data is visible, and an Object ID Field is to be assigned. Right-click on the “Event Theme” created in Step 8. Go to “Data” then “Export Data.” The Export Data window will appear. Select the options shown in Figure D4. The Output shapefile or feature class location is not important if it can be located and used in a later step. Select “OK.”
10. Another window will appear, asking, “Do you want to add the exported data to the map as a layer?” select “Yes.” Another layer automatically labeled “Export_Output_#” will show up in the Table of Contents. This shapefile will be the one that is eventually joined with the fishnet created in the next section.

Creating a Fishnet in ArcMap


2. The Create Fishnet window will appear as shown in Figure D5. The location of the output feature class is not important if it may be located for a later step. Under Template Extent, choose the Export_Output_# file created in Step 10 under Importing Points into ArcMap. Then, to the Top and Bottom boxes, extend the point half of the grid spacing up and down, respectively. For instance, the top extent of the point data layer in this example is 36.245. the grid spacing is 500 meters (0.005° grid), and the extents in ArcMap go by the degree (or grid spacing). So, in order to create a map where the points from the point data fall in the middle of the box, half of 0.005 is added to the top extent location and subtracted from the bottom extent location. For example, 36.245 + (1/2)0.005 = 36.2475 is the new location of the top extent. Repeat to extend the left extent further left, right extent further right, and bottom extent further down. The origin coordinate boxes will automatically populate when the extents are populated. The cell width and height are the same as the grid spacing. The number of rows is calculated by subtracting the bottom extent from the top extent and dividing it by the grid height (0.005 for this example). The number of columns is calculated in a similar manner using the left and right extents and the cell width. Under geometry type, select polygon. Select “OK.”
3. The result of the previous step is shown in Figure D6. The newly created fishnet is a rectangular grid around the points that were imported. Now, right-click the file created in step 2. Go to data, then click export data. The familiar Export Data window will appear. Choose to export all features and use the same coordinate system as this layer’s source data. The output feature class location does not matter. A question will appear asking, “Do you want to add the exported data to the map as a layer?” select “Yes.” Export_output_##.shp” has now been created.
4. Finally, a projection must be added to the fishnet layer. Search for the “Define Projection” tool under Data Management Tools. Select it. Select the file created in step 3. The projection should be the same coordinate system used for the point data. There are now two files created from exporting the point layer and exporting the fishnet layer. Now, the point data and fishnet can be joined together.

**Joining the Point Data with the Fishnet to Create a Useable Map**

1. Right-click on the fishnet layer created in Step 4 of Creating a Fishnet in ArcMap. Go to Joins and Relates and Join…

2. The Join Data window will appear as shown in Figure D7. Choose the exported point data layer entitled “Export_output_#.” Under section 2, select the option “Each polygon will be given all the attributes of the point that is closest…” as shown in Figure D7. Select “OK.” The file created is “Join_output.shp”, and it will show up in the Table of Contents.
3. Search for the “Dissolve” tool under Data Management Tools. This command aggregates polygons that are adjacent and have the same attributes (for this example, the same ground motion data value). The Dissolve window is shown in Figure D8. For this example, the dissolve field is ParamValue, since that is what the user is dissolving with respect to. Select “OK.”
4. Open ArcCatalog. Find the desired location for a geodatabase. Right-click the location and create a “Personal Geodatabase.”

5. Find the dissolved file in ArcCatalog (NOT in the Table of Contents pane) created in step 3. Right-click, go to “Export,” then “To Geodatabase (single).” The Feature Class to Feature Class window shown in Figure D9 will appear. The “Input Features” is the dissolved file created in step 3. Select the new personal geodatabase created in step 4 as the “Output Location.” The “Output Feature Class” is the name of the new useable map being created.
Figure D9. Feature Class to Feature Class Window
Appendix E: Seismic Hazard Maps Used

This section includes seismic hazard maps used for this study. Each case used PGA, PGV, 0.3s spectral acceleration, and 1.0s spectral acceleration for a 2% in 50-year probability of exceedance. Figures E1-E4 show the maps used in case 1, which are the coarse ground motion maps. Figures E5-E8 show the ground motion maps used for case 2, which are the same maps used in case 1 but only considering structures within Dyer County. Figures E9-E12 show the ground motion maps used in case 3, which are the finer ground motion maps that were solely developed for Dyer County.
Figure E1. PGA Values (g), Coarse Ground Motion Maps, Entire Study Region

Figure E2. PGV Values (in/s), Coarse Ground Motion Maps, Entire Study Region
Figure E3. 0.3s $S_a$ Values (g), Coarse Ground Motion Maps, Entire Study Region

Figure E4. 1.0s $S_a$ Values (g), Coarse Ground Motion Maps, Entire Study Region
Figure E5. PGA Values (g), Coarse Ground Motion Maps, Dyer County

Figure E6. PGV Values (in/s), Coarse Ground Motion Maps, Dyer County
Figure E7. 0.3s $S_a$ Values (g), Coarse Ground Motion Maps, Dyer County

Figure E8. 1.0s $S_a$ Values (g), Coarse Ground Motion Maps, Dyer County
Figure E9. PGA Values (g), Fine Ground Motion Maps, Dyer County

Figure E10. PGV Values (in/s), Fine Ground Motion Maps, Dyer County
Figure E11. 0.3s $S_a$ Values (g), Fine Ground Motion Maps, Dyer County

Figure E12. 1.0s $S_a$ Values (g), Fine Ground Motion Maps, Dyer County
Appendix F: Ancillary Data from RVS

Similar data are used in both the development of SL1 and the Hazus-MH 4.2 output. Table F1 includes the two primary identifiers of each structure: the Hazus ID and the Structure Number. Table F1 also includes the location and other recorded aspects of each structure that are used in calculating a score for the building in RVS and for calculating damage losses in Hazus-MH 4.2.

Since this project is funded by the West Tennessee Seismic Safety Commission, in addition to the data collected to determine a score or damage state for each structure, additional information was also documented: the kitchen square footage and gymnasium square footage. Table F1 gives these ancillary data for each structure identified, and Table F2 gives these data for each school analyzed. It should be noted that some of the structures below are additions that, when added together, comprise one building. A result of that is that some buildings below have a “0” for the kitchen area or gym area. A “0” means that there is not a kitchen in that area of the building or no gym in that area of the building.

Table F1. Ancillary Building Data

<table>
<thead>
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Appendix G. Hazus-MH 4.2 Results: Damage State Probabilities

This appendix contains the damage state probabilities of each structure under each case. The damage state probabilities are used to calculated $BRC$, $IO$, and $MD$.

### Table G1. Damage State Probabilities: Case 1

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## Appendix H. Hazus-MH 4.2 Results: Ancillary Data

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### Appendix I: Case 1 Ranking

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Appendix J: Case 2 Ranking

Table J1. Case 2 Structures Ranked by Predicted Performance

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### Appendix K: Case 3 Ranking

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Appendix L. Level 1 Data Collection Form Results

Below are the Level 1 Data Collection forms for each structure studied and a few photographs of each structure studied in order of structure number. The Hazus ID and structure number are paired in Appendices F and H.
Rapid Visual Screening of Buildings for Potential Seismic Hazards
FEMA P-154 Data Collection Form

**Address:** 841 S. College St.  
Trenton, IN  38382

**Occupancy:** School  
**Use:** Elementary school

**Latitude:** 35.969943  
**Longitude:** -88.940351

**Total Floor Area (sq. ft.):** 17,250

**Year Built:** 1987

**Soil Type:** C  
**No. Stores:** Above Grade: 1  
**Below Grade:** 0

**Extirgularities:** Vertical (type/ waviness), Split level, mud

**Geologic Hazards:** liquefaction: Yes/ No  
Landslide: Yes/ No  
DNK: Yes/ No

**Exterior Falling Hazards:** Unbraced Chimneys  
Heavy Cladding or Heavy Veneer

**COMMENTS:** This portion has no plan irregularities  
Potential for pounding  
- Pre 1987 estimate 1982

---

**FEMA Building Type:** Do Not Know

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<th>C2</th>
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**FINAL LEVEL 1 SCORE, SL1:** 0.7 ≥ 0.3

**EXTENT OF REVIEW:**

- Exterior: Partial
- Drawings Reviewed: None
- Soil Type Source: Geologic Hazards Source: 
- Contact Person: Tony Kash

**OTHER HAZARDS:**

- Are There Hazards That Trigger a Detailed Structural Evaluation?
- Pounding potential (unless S2 > cut-off, if known)
- Falling hazards from taller adjacent building
- Geologic hazards or Soil Type F
- Significant damage/deterioration to the structural system

**ACTION REQUIRED:**

- Detailed Structural Evaluation Required
- Yes, unknown FEMA building type or other building
- Yes, score less than cut-off
- Yes, other hazards present
- No
- Detailed Nonstructural Evaluation Recommended? (check one)
- Yes, nonstructural hazards identified that should be evaluated
- No, nonstructural hazards exist that may require mitigation, but a detailed evaluation is not necessary
- No, no nonstructural hazards identified

---

Legend:
- MH = Manufactured Housing  
- RC = Reinforced concrete  
- DFM = Unreinforced masonry  
- SR = Steel frame  
- SW = Shear wall  
- RC = Reinforced concrete  
- URM = Unreinforced masonry  
- TM = Timber frame  
- ML = Masonry  
- RD = Rigid diaphragm  
- PD = Flexible diaphragm  

Where information cannot be verified, screener shall note the following: EST = Estimated or unreliable data  
DNK = Do Not Know
Structure 1, Building 1 Photographs

Joint between Structures 1 (Left) and 2 (Right)

Interior, Reinforced Masonry                                      Exterior
Rapid Visual Screening of Buildings for Potential Seismic Hazards
FEMA P-154 Data Collection Form

Address: 811 S. college St., Trenton, TN 38282
Zip: 38282

Other Identifiers:

Building Name: Elementary School
Use: Elementary School
Latitude: 35.969550
Longitude: -88.941584

S1: 1.186
S2: 0.143

Screener(s): CM
Date/Time: 3/15/2011 10:15AM

No. Stories: Above Grade: 0, Below Grade: 2
Year Built: 1987
Code Year: 2010
Total Floor Area (sq. ft.): 5,398

Occupancy: Assembly
Industrial
Commercial
Emer. Services
Residential
Office
Repository
Other

Additions: None

Soil Type:
Hazard Category: C
DNK: Yes

Geologic Hazards: Landslides: Yes/No

Adjacency: Pounding: Yes
Falling Hazards from Taller Adjacent Building: No

Irregularities: Vertical (hyperbolicity) Type: Split Level, Rodent corner

Exterior Falling Hazards: Unbraced Chimneys: Yes
Parapets: Yes

COMMENTS: L-shaped (plan irregularity) would have pounding potential, but isn’t an end building

BASIC SCORE, MODIFIERS, AND FINAL LEVEL 1 SCORE, S1:

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<tr>
<th>FEMA BUILDING TYPE</th>
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<th>W1</th>
<th>W2</th>
<th>S1 (KIP)</th>
<th>S2 (KIP)</th>
<th>S3 (CM)</th>
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FINAL LEVEL 1 SCORE, S1 ≥ 0.3:

EXTENT OF REVIEW

Exterior: Partial
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Drawings Reviewed: None

Geologic Hazards Source:

Other Hazards:

Detailed Structural Evaluation Required?

Yes, unknown FEMA building type or other building
Yes, score less than cut-off
Yes, other hazards present
No

Detailed Nonstructural Evaluation Required? (check one)

Yes, nonstructural hazards identified that should be evaluated
No, nonstructural hazards exist that may require mitigation, but a detailed evaluation is not necessary
No, no nonstructural hazards identified

ACTION REQUIRED

Legend:
MH = Moment-Resisting Frame
RG = Reinforced concrete
BR = Braced Frame
SW = Shear wall
URM = Unreinforced masonry
MHI = Manufactured Housing
RD = Rigid diaphragm
LMI = Light metal
RDI = Flexible diaphragm

Where information cannot be verified, screen er shall note the following: EST = Estimated or unreliable data OR DNK = Do Not Know
Structure 2, Building 1 Photographs

Joint between Structures 1 (Left) and 2 (Right)

Exterior
Rapid Visual Screening of Buildings for Potential Seismic Hazards
FEMA P-154 Data Collection Form

HIGH Seismicity

Address: 811 S. College St. Trenton, TN
Zip: 38382

Other Identifiers:

Building Name: Elementary School

Use: Elementary School

Latitude: 35.967889
Longitude: -88.441194

S1: 1.12
S2: 1.35
Screener(s): CM
Date/Time: 3/15/10, 10:15 AM

No. Stories: Above Grade: 1
Below Grade: 0
Year Built: 1965
Code Year: 1965

Total Floor Area (sq. ft.): 10,700

Additions: None

Occupancy: Assembly

Soil Type:
- A: Hard
- B: Avg
- C: Soft
- D: Poor

Geologic Hazards:
- Liquifaition: Yes
- Landslide: Yes

Adjacency:
- Pounding: Yes
- Falling Hazards: Yes

Exterior Falling Hazards:
- Unbraced Chimneys: Yes
- Heavy Cladding or Heavy Veneer

COMMENTS:

Pounding potential

SKETCH

Additional sketches or comments on separate page

BASIC SCORE, MODIFIERS, AND FINAL LEVEL 1 SCORE, S1

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<th>FEMA BUILDING TYPE</th>
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<tr>
<td>Soil Type A or B</td>
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</table>

Minimum Score, MIN: 1.1

FINAL LEVEL 1 SCORE, S1 = MIN + SW = 2.0

EXTENT OF REVIEW

Exterior: Yes
Interior: Yes
Drawings Reviewed: Yes
Soil Type Source: Yes
Geologic Hazards Source: Yes
Contact Person: Tony Kash

OTHER HAZARDS

Are There Hazards That Trigger A Detailed Structural Evaluation?
- Yes, unknown FEMA building type or other building
- Yes, score less than cut-off
- Yes, other hazards present

ACTION REQUIRED

Detailed Structural Evaluation Required?
- Yes, unknown FEMA building type or other building
- Yes, score less than cut-off
- Yes, other hazards present

Detailed Nonstructural Evaluation Recommended? (check one)
- Yes, nonstructural hazards identified that should be evaluated
- No, nonstructural hazards exist that may require mitigation, but a detailed evaluation is not necessary
- No, nonstructural hazards identified

Where information cannot be verified, screeners shall note the following: EST = Estimated or unreliable data

Legend:
- MK = Moment-resisting frame
- RC = Reinforced concrete
- PC = Pinned connections
- SW = Shear wall
- LU = Unreinforced masonry wall
- TU = Tilt up
- LM = Light metal
- RD = Rigid diaphragm

DNK = Do Not Know
Structure 3, Building 1 Photographs

Exterior, Structure 3 (Right) and Structure 4 (Left), Connected Behind Tree
**Rapid Visual Screening of Buildings for Potential Seismic Hazards**

**FEMA P-154 Data Collection Form**

**Address:** 811 S. College St., Trenton, NJ 38382

**Building Name:** Elementary School

**Use:** Educational

**Latitude:** 35.197035

**Longitude:** -88.940879

**Area:** 11,137

**Date/Time:** 3/15/10 10:15AM

**No. Stories:** Above Grade: 1

**Below Grade:** 0

**Total Floor Area** (sq. ft.): 12,880

**Year Built:** 1980

**Code Year:** 1980

**Occupancy:** Assembly

**Geologic Hazards:** Liquefaction: Yes

**Adjacency:** Pounding

**Irruqartilities:** Vertical (type/so1vity)

**Exterior Failing Hazards:** Unbraced Chimneys

**Soil Type:** A

**Soil Type Source:** Aerial

**Geologic Hazards Source:** Aerial

**Contact Person:** John Smith

**Comments:** Potential for pounding

---

### BASIC SCORE, MODIFIERS, AND FINAL LEVEL 1 SCORE, S_1

| FEMA Building Type | Do Not Know | W1 | W1A | W2 | W2A | S1 (M/FT) | S2 (BR) | S3 (L/X) | S4 (SU) | S5 (URM) | S6 (URM) | C1 (M/FT) | C2 (URM) | C3 (URM) | PC1 (F/U) | PC2 | RM1 (F/U) | RM2 (F/U) | URM | MH |
|--------------------|-------------|----|-----|----|-----|----------|---------|----------|---------|----------|----------|----------|---------|---------|---------|------|-------|-------|
| Basic Score        | 3.6         | 3.2| 2.9 | 2.1| 2.0 | 2.6      | 2.0     | 1.7      | 1.5     | 1.0      | 1.2      | 1.6      | 1.4     | 1.7     | 1.0     | 1.5 |
| Severe Vertical Irregularity, V_{i1} | -1.2 | -1.2| -1.2| -1.0| -1.0| -1.1     | -1.0    | -0.8     | -0.9    | -1.0     | -0.7     | -1.0    | -0.9    | -0.9    | -0.9    | NA   |
| Moderate Vertical Irregularity, V_{i2} | -0.7 | -0.7| -0.7| -0.6| -0.6| -0.7     | -0.6    | -0.5     | -0.5    | -0.6     | -0.4     | -0.6    | -0.5    | -0.5    | -0.5    | NA   |
| Plan Irregularity, P_{i1} | -1.1 | -1.0| -1.0| -0.8| -0.8| -0.9     | -0.7    | -0.6     | -0.6    | -0.8     | -0.5     | -0.7    | -0.6    | -0.7    | -0.6    | NA   |
| Pre-Codes          | 1.8         | 1.9| 2.2 | 1.4| 1.4 | 1.1      | 1.9     | 1.9      | 2.1     | 2.0      | 2.0      | 2.0      | 2.0     | 2.0     | 2.0     | 2.0 |
| Post-Benchmark     | 0.1         | 0.3| 0.5 | 0.4| 0.6 | 0.1      | 0.6     | 0.6      | 0.5     | 0.6      | 0.5      | 0.5      | 0.5     | 0.5     | 0.5     | 0.5 |
| Soil Type A or B   | 0.2         | 0.2| 0.1 | 0.2| 0.4 | 0.2      | 0.1     | 0.4      | 0.0     | 0.5      | 0.0      | 0.5      | 0.0     | 0.5     | 0.0     | 0.5 |
| Soil Type E (> 3 stories) | -0.3 | -0.6| -0.9| -0.6| -0.6| NA       | -0.6    | -0.6     | -0.5    | -0.7     | -0.3     | -0.4     | -0.6    | -0.6    | -0.6    | NA   |
| Minimum Score, S_{0,m} |   1.1 |   0.9|   0.7|   0.5|   0.5|   0.6     |   0.5    |   0.5     |   0.3    |   0.3     |   0.3     |   0.2     |   0.2    |   0.2    |   0.2    | 1.0 |

**FINAL LEVEL 1 SCORE, S_{1}**: 1.9

---

### EXTENT OF REVIEW

- **Exterior:** Yes
- **Interior:** No
- **Drawings Reviewed:** Yes
- **Geologic Hazards:** Aerial
- **Geologic Hazards Source:** Aerial
- **Contact Person:** John Smith

---

### OTHER HAZARDS

- **Are There Hazards That Trigger A Detailed Structural Evaluation?**
  - Pounding potential (unless S_2 > 1.0, if known)
  - Falling hazards from taller adjacent building
  - Geologic hazards or Soil Type F
  - Significant damage/deterioration to the structural system

---

### ACTION REQUIRED

- **Detailed Structural Evaluation Required?**
  - Yes, unknown FEMA building type or other building
  - Yes, score less than cut-off
  - Yes, other hazards present

- **Detailed Nonstructural Evaluation Recommended?**
  - Yes, nonstructural hazards identified that should be evaluated
  - No, nonstructural hazards exist that may require mitigation, but detailed evaluation is not necessary
  - No, no nonstructural hazards identified

---

**Where information cannot be verified, screener shall note the following:**

- **EST = Estimated or unreliable data**
- **DNK = Do Not Know**
Structure 4, Building 1 Photographs

Exterior, Structure 3 (Right) and Structure 4 (Left), Connected Behind Tree

Exterior

Exterior
**Rapid Visual Screening of Buildings for Potential Seismic Hazards**

**FEMA P-154 Data Collection Form**

**HIGH Seismicity**

**Level 1**

**Address:** 2065 US Hwy 48 Byp, S, Trenton, TN 38068  
**Zip:** 38068

**Other Identifiers:**

- **Building Name:**
- **Use:** MIDDLE SCHOOL
- **Latitude:** 35.16.3381
- **Longitude:** -88.12.4178
- **S1:** 1.16
- **S2:** 0.403
- **Screener(s):** CM
- **Date/Time:** 3/15/19 10:45 AM

**No. Stories:** Above Grade: 1  
Below Grade: 0  
Year Built: 1935 C EST

**Total Floor Area (sq. ft.):** 2,905

**Additions:** None  
Yes, Year(s) Built: 1935

**Occupancy:**
- Assembly
- Industrial
- Commercial
- Office
- Emergency Services
- Historic
- Government

**Soil Type:**
- A: Hard Rock
- B: Avg Dense Soils
- C: Dense Soils
- D: Soft Soils
- E: Poor Soils
- DNK: If DNK, assume Type D.

**Geologic Hazards:**
- liquefaction: Yes/No/DNK
- landslide: Yes/No/DNK
- surf. rupt.: Yes/No/DNK

**Adjacency:**
- No
- Pounding hazards from taller adjacent building

**Irregularities:**
- No
- Vertical (tapered body)
- Plan (type)

**Exterior Falling Hazards:**
- No
- Unbraced chimneys
- Heavy caddying or heavy veneer
- Parapets
- Appendages

**COMMENTS:**
- Split level (roofing heights)

---

**SKETCH**

---

**BASIC SCORE, MODIFIERS, AND FINAL LEVEL 1 SCORE, S1**

<table>
<thead>
<tr>
<th>FEMA BUILDING TYPE</th>
<th>Do Not Know</th>
<th>W1</th>
<th>W1A</th>
<th>W2</th>
<th>S1 (MIF)</th>
<th>S2 (BR)</th>
<th>S3 (LM)</th>
<th>S4 (MID)</th>
<th>S5 (GRD)</th>
<th>C1 (SM)</th>
<th>C2 (UM)</th>
<th>C3 (CM)</th>
<th>PC1</th>
<th>PC2</th>
<th>PC3</th>
<th>PC4</th>
<th>RM1</th>
<th>RM2</th>
<th>URM</th>
<th>MH</th>
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</tbody>
</table>

**FINAL LEVEL 1 SCORE, S1 = Sum:** 8.4

---

**EXTENT OF REVIEW**

- Exterior: Partial
- All Sides: Yes
- Aerial: No
- Visible: Yes
- Entered

- Drawings Reviewed: Yes
- No

- Soil Type Source: Geologic Hazards Source: Contact Person: Tony Bash

- Geologic Hazards: Liquefaction: Yes/No/DNK
- Landslide: Yes/No/DNK
- Surf. Rupt.: Yes/No/DNK

**OTHER HAZARDS**

- Are There Hazards That Trigger A Detailed Structural Evaluation?

- Pounding potential (unless S2 > cut-off, it known)

- Falling hazards from taller adjacent building

- Geologic hazards or Soil Type F

- Significant damage/alteration to the structural system

**ACTION REQUIRED**

- Detailed Structural Evaluation Required?

- Yes, unknown FEMA building type or other building
- Yes, score less than cut-off
- Yes, other hazards present
- No

- Detailed Nonstructural Evaluation Recommended? (check one)

- Yes, nonstructural hazards identified that should be evaluated
- No, nonstructural hazards exist that may require mitigation, but a detailed evaluation is not necessary
- No, nonstructural hazards identified

---

**LEVEL 2 SCREENING PERFORMED?**

- Yes, Level 2 Score, S2: 0
- No

- Nonstructural hazards?: Yes
- No

---

**Where information cannot be verified, screener shall note the following:**

EST = Estimated or unreliable data  
DNK = Do Not Know

---

**Legend:**

- M8 = Moment-resisting frame  
- RG = Rigid frame
- SW = shear wall
- URM = Unreinforced masonry wall  
- TU = Tilt-up
- LM = Light metal  
- HLF = Flexural diaphragm  
- RD = Dowel diaphragm
Structure 5, Building 2 Photographs

- Re-entrant Corner (1 Wing of Structure)
- Exterior of Structure
- Interior of Structure
- Interior of Structure
- Gymnasium, Exposed View of Roof
Rapid Visual Screening of Buildings for Potential Seismic Hazards
FEMA P-154 Data Collection Form

Address: 2064 US Hwy 45 Bypass
Trenton, TN 38382
Zip: 38382

Other Identifiers:

Building Name: High School
Use: High School
Latitude: 35° 41' 14.03"
Longitude: -88° 12' 47.92"

Sx: 1.16
Sy: 0.403

Screener(s): CM
Date/Time: 3/15 @ 11 AM

No. Stories: Above Grade: 0
Below Grade: 0
Year Built: 1979
Code Year: 1979

Total Floor Area (sq. ft.): 84,710

Occupancy: Commercial

Soil Type: C

Geologic Hazards: Liquidation: Yes
Landslide: Yes
Surf. Rupt: Yes

Adjacency: Pounding: No
Falling Hazards from Taller Adjacent Building: No
Irregularities: Vertical (type/extent): Split level
Plan (type): Wood

Exterior Fallong Hazards: Unbraced Chimneys
Heavy Cladding or Heavy Veneer: No
Parapets: Yes
Appertudes: No

COMMENTS:

SKETCH

BASICScore, MODIFIERS, AND FINAL LEVEL 1 SCORE, S1

<table>
<thead>
<tr>
<th>FEMA Building Type</th>
<th>Do Not Know</th>
<th>W1</th>
<th>W1A</th>
<th>W2</th>
<th>S1 (MW)</th>
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<th>C1 (MP)</th>
<th>C2 (EL)</th>
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<th>RM1</th>
<th>RM2</th>
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</tbody>
</table>

FINAL LEVEL 1 SCORE, S1 > Smw: 0.5

EXTENT OF REVIEW

Exterior: Yes
Partial: No
All Sides: Yes
Aerial: No

Drawings Reviewed:
None: Yes
Visible: No
Entered: No

Soil Type Source:
Geologic Hazards Source:
Contact Person: Tony Kosh

LEVEL 2 SCREENING PERFORMED?

Yes, Final Level 2 Score, S2: No
Nonstructural hazards?: No

OTHER HAZARDS

Are There Hazards That Trigger A Detailed Structural Evaluation?

- Pounding potential (unless S2 > cut-off, if known)
- Falling hazards from taller adjacent building
- Geologic hazards or Soil Type F
- Significant damage to the structural system

ACTION REQUIRED

Detailed Structural Evaluation Required?
Yes, unknown FEMA building type or other building
Yes, score less than cut-off
Yes, other hazards present
No

Detailed Nonstructural Evaluation Recommended? (check one)
Yes, nonstructural hazards identified that should be evaluated
No, nonstructural hazards exist that may require mitigation, but a detailed evaluation is not necessary
No, no nonstructural hazards identified
DNK

Legend:
MRF = Moment-resisting frame
BR = Braced frame
RC = Reinforced concrete
SW = Shear wall
UM = Unreinforced masonry wall
TU = Tilt-up
LM = Light metal
MH = Manufactured housing
PD = Ponderosa-dimension
RD = Rigid dimension
Structure 6, Building 3 Photographs

Exterior, Left of Foyer

Exterior, Right of Foyer

Vertical Irregularity

Masonry Covering Pipes

Exposed Roof
Rapid Visual Screening of Buildings for Potential Seismic Hazards
FEMA P-154 Data Collection Form

Level 1

VERY HIGH Seismicity

Address: 938 TN-210
Dyersburg, TN Zip: 38024

Other Identifiers: #

Building Name: Elementary School

Use: Elementary School

Latitude: 35.191104
Longitude: -89.328884

S1: 2.032
S2: 0.735

Screened by: CM
Date/Time: 5/13/09 AM

No. Stories: Above Grade: 2
Below Grade: 0

Total Floor Area (sq. ft.): 44,782

Additions: None, Yes, Year(s) Built: 1950

Occupancy: Assembly, Commercial, Industrial, Office

Soil Type: [ ] A, [ ] B, [ ] C, [ ] D, [ ] E, [ ] F, [ ] DNK

Geologic Hazards: Liquefaction: Yes/No, Landslide: Yes/No, DNK Surf. Rupt.: Yes/No

Adjoining: [ ] Pounding, [ ] Falling Hazards from Taller Adjacent Building

Ingress/Exgress: [ ] Vertical (type/severity), [ ] Plan (type)

Exterior Falling Hazards: [ ] Unbraced Chimneys, [ ] Heavy Cladding or Heavy Veneer

Comments:
- Steel columns here
- Steel reinforcements added about 10 yrs ago around windows

Additional sketches or comments on separate page

---

**Basic Score, Modifiers, and Final Level 1 Score, S1**

<table>
<thead>
<tr>
<th>FEMA Building Type</th>
<th>Do Not Know</th>
<th>W1</th>
<th>W1A</th>
<th>W2</th>
<th>S1</th>
<th>S2</th>
<th>S3</th>
<th>S4</th>
<th>S5</th>
<th>S6</th>
<th>C1</th>
<th>C2</th>
<th>C3</th>
<th>PC1</th>
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<td>Post-Booking</td>
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<td>0.7</td>
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<td>0.3</td>
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<td>0.2</td>
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</tbody>
</table>

**Final Level 1 Score, S1 = S2 + S5:**

0.7 + 0.3 = 1.0

**Level 2 Screening Performed?**
- [ ] Yes, Final Level 2 Score, S2: 0.3
- [ ] No

Nonstructural hazards? [ ] Yes, [ ] No

**Other Hazards**
- Are There Hazards That Trigger A Detailed Structural Evaluation?
- [ ] Yes
- [ ] No

**Action Required**
- Detailed Structural Evaluation Required?
- [ ] Yes, unknown FEMA building type or other building
- [ ] Yes, other hazards present
- [ ] No

**Detailed Nonstructural Evaluation Recommended?**
- [ ] Yes, nonstructural hazards identified that should be evaluated
- [ ] No, nonstructural hazards exist that may require mitigation, but a detailed evaluation is not necessary

Where information cannot be verified, screeners shall note the following: EST = Estimated or unreliable data OR DNK = Do Not Know

Legend:
- MH = Manufactured Housing
- RD = Flexible diaphragm
- URIM = Unreinforced masonry
- SW = Shear wall
- TU = Tilt-up
- URM = Unreinforced masonry
- WR = Wood frame
- P = Pinnacle (rigid diaphragm)
Structure 7, Building 3 Photographs

Added Reinforcement (1 of 2)

Gymnasium, Exposed Roof

Added Reinforcement (2 of 2)

Exposed Columns
### BASIC SCORE, MODIFIERS, AND FINAL LEVEL 1 SCORE, $S_1$

<table>
<thead>
<tr>
<th>FEMA BUILDING TYPE</th>
<th>Do Not Know</th>
<th>W1</th>
<th>W1A</th>
<th>W2</th>
<th>S1 (WFR)</th>
<th>S2 (CM)</th>
<th>S3 (LM)</th>
<th>S4 (PC)</th>
<th>S5 (ERU)</th>
<th>C1 (NR)</th>
<th>C2 (WFR)</th>
<th>C3 (ERU)</th>
<th>PC1 (TU)</th>
<th>PC2</th>
<th>RM1 (RD)</th>
<th>RM2 (RD)</th>
<th>URM</th>
<th>MH</th>
<th>MH</th>
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<tr>
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<td>1.8</td>
<td>1.5</td>
<td>1.4</td>
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<td>-0.9</td>
<td>-0.9</td>
<td>-0.9</td>
<td>-0.8</td>
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</tbody>
</table>

### FINAL LEVEL 1 SCORE, $S_1 = \sum S_i$:

$0.4 > 0.5$

### EXTENT OF REVIEW

| Exterior: | Partial | All Slides on | Aerial | | |
| Interior: | None | Visible | Entered | | |
| Drawings Reviewed: | Yes | No |

### Geologic Hazards Source:

- Mills Holland

### LEVEL 2 SCREENING PERFORMED?

- Yes, Final Level 2 Score, $S_2$, $\sum_S$:
  - No

### OTHER HAZARDS

- Yes, Nonstructural Hazards Identified: No
  - Significant damage/deterioration to the structural system

### ACTION REQUIRED

<table>
<thead>
<tr>
<th>Detailed Structural Evaluation Required?</th>
<th>Yes, unknown FEMA building type or other building</th>
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<tbody>
<tr>
<td>Yes, score less than cut-off</td>
<td>Yes, other hazards present</td>
</tr>
<tr>
<td>No</td>
<td>Detailed Nonstructural Evaluation Recommended? (check one)</td>
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<tr>
<td>Yes, nonstructural hazards identified that should be evaluated</td>
<td>No, nonstructural hazards exist that may require mitigation, but a detailed evaluation is not necessary</td>
</tr>
<tr>
<td>No</td>
<td>DNK</td>
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</table>

Legend:
- MW = Moment-resisting frame
- BR = Braced frame
- RC = Reinforced concrete
- SW = Shear wall
- DM = Unreinforced masonry wall
- TU = Till-up
- MH = Manufactured housing
- LM = Light metal
- FD = Flexible diaphragm
- PD = Pseudodynamic
Structure 8, Building 4 Photographs

Exterior views, Split Level

Steel Columns in Gym
### Rapid Visual Screening of Buildings for Potential Seismic Hazards

**FEMA P-154 Data Collection Form**

**Address:** 3200 Upper Finley Rd, Dyersburg, TN 38024

**Zip:** 38024

**Level 1**

**Very High Seismicity**

---

**Photograph**

---

**Sketch**

---

**BASIC SCORE, MODIFIERS, AND FINAL LEVEL 1 SCORE, \( S_{1f} \)**

<table>
<thead>
<tr>
<th>FEMA Building Type</th>
<th>Do Not Know</th>
<th>W1</th>
<th>W1A</th>
<th>W2</th>
<th>W2A</th>
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<th>S2 (BR)</th>
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**FINAL LEVEL 1 SCORE, \( S_{1f} \)**

\[ S_{1f} = S_{1f} \]

---

**EXTENT OF REVIEW**

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<tr>
<th>Exterior</th>
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<th>All Sides</th>
<th>Aerial</th>
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<tr>
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<td>Entered</td>
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<td>No</td>
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</tbody>
</table>

**Geologic Hazards Source:**

- Miles Holland

**LEVEL 2 SCREENING PERFORMED?**

- Yes, Final Level 2 Score, \( S_{2f} \)
- No

**OTHER HAZARDS**

- Are There Hazards That Trigger A Detailed Structural Evaluation?
  - Pounding potential (unless \( S_{2} > \) cut-off, if known)
  - Falling hazards from taller adjacent building
  - Geologic hazards or Soil Type F
  - Significant damage/deterioration to the structural system

**ACTION REQUIRED**

- Detailed Structural Evaluation Required?
  - Yes, unknown FEMA building type or other building
  - Yes, score less than cut-off
  - Yes, other hazards present
  - No

- Detailed Nonstructural Evaluation Recommended? (check one)
  - Yes, nonstructural hazards identified that should be evaluated
  - No, nonstructural hazards exist that may require mitigation, but a detailed evaluation is not necessary
  - No, no nonstructural hazards identified

---

**Legend:**
- MRI = Moment-resisting frame
- RC = Reinforced concrete
- URM = Unreinforced masonry wall
- MH = Manufactured Housing
- PD = Flexible diaphragm
- BR = Braced frame
- SW = Shear wall
- TI = Tieup
- LM = Light metal
- RD = Rigid diaphragm
Structure 9, Building 5 Photographs

Exterior, 1 Wing Shown

Interior, Masonry

Interior, Masonry and Possibly Steel
Rapid Visual Screening of Buildings for Potential Seismic Hazards
FEMA P-154 Data Collection Form

Address: 2372 Millsfield Hwy
Zip: 38024

Elementary School

Latitude: 36.0810198
Longitude: -89.379055
S: 2,444
S: 0.925
Screener(s): CM

No. Stories: Above Grade: 1
Below Grade: 0
Total Floor Area (sq. ft.): 71,175

Occupancy: Commercial

Soil Type: 

Geologic Hazards: Landslide

Advacency: 

Irregularities: 

Exterior Falling Hazards: 

COMMENTS: Actual storm shelter, masonry everywhere, columns sparse

FEMA BUILDING TYPE

Basic Score
Severe Vertical Irregularity, Vv
Moderate Vertical Irregularity, Vm
Plan Irregularity, PT
Pre-Codes
Post-Benchmark
Soil Type A or B
Soil Type E (1-3 stories)
Soil Type F (4+ stories)
Minimum Score, Min

W1
1.0
0.9
0.6
0.6
0.7
1.0
1.0
0.9
1.0
1.0

W2
1.0
0.8
0.4
0.4
0.7
1.0
1.0
0.9
1.0
1.0

W3
1.0
0.7
0.3
0.3
0.6
0.3
0.3
0.3
0.3
0.3

Final Level 1 Score, SL1 = \( 2.3 \times 0.3 = 0.7 \)

EXTENT OF REVIEW

Drawing Reviewed: Yes

Soil Type Source:

Geologic Hazards Source:

CONTACT PERSON:

OTHER HAZARDS

Are There Hazards That Trigger A Detailed Structural Evaluation?
- Pounding potential (unless \( S_2 > \) cut-off, if known)
- Falling hazards from taller adjacent building
- Geologic hazards or Soil Type F

ACTION REQUIRED

Detailed Evaluation Required:
- Yes, unknown FEMA building type or other building
- Yes, score less than cut-off
- Yes, other hazards present

Nonstructural Evaluation Recommended (check one)
- Yes, nonstructural hazards identified that should be evaluated
- No, nonstructural hazards exist that may require mitigation, but a detailed evaluation is not necessary

Legend:
- MRF = Moment-resisting frame
- RC = Reinforced concrete
- URM = Unreinforced masonry infill
- MH = Manufactured Housing
- FD = Flexible diaphragm
- LM = Light metal
Structure 10, Building 6 Photographs

Left Front Exterior, 1 Wing Shown

Interior, Masonry
### BASIC SCORE, MODIFIERS, AND FINAL LEVEL 1 SCORE, S1

| FEMA BUILDING TYPE | Do Not Know | W1 | W2 | W3 | S1 (MFR) | S2 (BR) | S3 (LM) | S4 (RC) | S5 | S6 | C1 (MRF) | C2 (RN) | C3 (URM INF) | PC1 (TU) | PC2 | RM1 (PD) | RM2 (PD) | URM | MH | C
|---------------------|-------------|----|----|----|---------|--------|--------|--------|----|----|---------|--------|-------------|--------|----|--------|--------|----|----|----
| Basic Score         | 1.0         | 1.0| 1.0| 1.0| 1.0     | 1.0    | 1.0    | 1.0    | 1.0| 1.5| 2.0     | 2.0    | 2.0          | 2.0    | 2.0| 1.0    | 1.0    | 1.0| 1.0| 1.0|
| Severe Vertical Irregularity, \( V_L \) | -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          | -0.5   | -0.5| -0.5   | -0.5   | -0.5| -0.5| -0.5|
| Moderate Vertical Irregularity, \( V_L \)  | -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          | -0.5   | -0.5| -0.5   | -0.5   | -0.5| -0.5| -0.5|
| Plan Irregularity, \( P_L \) | -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          | -0.5   | -0.5| -0.5   | -0.5   | -0.5| -0.5| -0.5|
| Pre-Code            | -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          | -0.5   | -0.5| -0.5   | -0.5   | -0.5| -0.5| -0.5|
| Post-Benchmark      | 1.0          | 1.0| 1.0| 1.0| 1.0    | 1.0    | 1.0    | 1.0    | 1.0| 1.0| 1.0    | 1.0    | 1.0          | 1.0    | 1.0| 1.0    | 1.0    | 1.0| 1.0| 1.0|
| Soil Type A or B    | 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          | 0.5    | 0.5| 0.5    | 0.5    | 0.5| 0.5| 0.5|
| Soil Type E (1-3 stories) | 0.0        | 0.0| 0.0| 0.0| 0.0    | 0.0    | 0.0    | 0.0    | 0.0| 0.0| 0.0    | 0.0    | 0.0          | 0.0    | 0.0| 0.0    | 0.0    | 0.0| 0.0| 0.0|
| Soil Type E (>3 stories) | -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| -0.4   | -0.4   | -0.4| -0.4| -0.4|
| Minimum Score, \( S_{MIN} \) | 0.7         | 0.7| 0.7| 0.7| 0.7    | 0.7    | 0.7    | 0.7    | 0.7| 0.7| 0.7    | 0.7    | 0.7          | 0.7    | 0.7| 0.7    | 0.7    | 0.7| 0.7| 0.7|

### FINAL LEVEL 1 SCORE, \( S_1 \geq S_{MIN} \):

\[ q = 0.9 \]

### EXTENT OF REVIEW

- Exterior: [ ] Partial
- Interior: [ ] None
- Drawings Reviewed: [ ] Yes

### OTHER HAZARDS

- Are There Hazards That Trigger a Detailed Structural Evaluation?
  - [ ] Pounding potential (unless \( S_1 > S_{MIN} \))
  - [ ] Falling hazards from taller adjacent buildings

### ACTION REQUIRED

- Detailed Structural Evaluation Required?
  - [ ] Yes, unknown FEMA building type or other building
  - [ ] Yes, score less than cut-off
  - [ ] Yes, other hazards present

- Detailed Nonstructural Evaluation Recommended? (check one)
  - [ ] Yes, nonstructural hazards identified that should be evaluated
  - [ ] No, nonstructural hazards exist that may require mitigation, but a detailed evaluation is not necessary

- No, nonstructural hazards identified

---

**Legend:**
- MFR = Moment-resisting frame
- RC = Reinforced concrete
- SRC = Shear wall
- URM = Unreinforced masonry
- LU = Load-bearing masonry
- RM = Rigid diaphragm
- MU = Manufactured housing
- LD = Light metal
- MD = Metal diaphragm
- DR = Diaphragm
- BR = Braced frame
- ER = Earthquake resistant
- RE = Reinforced earth
- PC = Piers and columns
- PP = Plant piping
- DD = Dead Dead
- GA = Geotechnical analysis
- CL = Coastal
- NS = Nonstructural
- L = Load
- PC = Piers
Structure 11, Building 7 Photographs

Exterior, 1 Wing Shown

Interior, Gymnasium, Arena-Style, Roof Exposed

Interior Column (Steel Encased)
Structure 12, Building 8 Photographs

Interior, Gymnasium, Arena-Style

Interior, Exposed Concrete Column
Rapid Visual Screening of Buildings for Potential Seismic Hazards
FEMA P-154 Data Collection Form

Address: 256 College St.  
Trimble, TN  Zip: 38589

Other Identifiers: 13

Building Name: Elementary School

Latitude: 36.5000 490  
Longitude: -89.1844 100

S1: 1.92  
S2: 0.72

Screener(s): CM  
Date/Time: 5/16/10 AM

No. Stories: Above Grade: 1  
Below Grade: 1  
Year Built: 1954 EST

Occupancy: Assembly  
Industrial  
Commercial  
Emer Services  
Residential

Total Floor Area (sq. ft.): 27,966.9  
Code Year: ________

Soil Type: A  
B  
C  
D

Geologic Hazards: Liquidsatisfaction: Yes/No/DNK
Landslide: Yes/No/DNK
Surf. Rupt: Yes/No/DNK

Irregularities: Soft Story Level

Exterior Falling Hazards: Unbraced Chimneys  
Freeze Heave

COMMENTS:

- Cripple wall present -> Soft Story
- Concrete pillars in basement only
- Steel beams on ground floor

Additional sketches or comments on separate page

Legend:
- MF = Moment-frame  
- RC = Reinforced concrete
- SW = Shear wall
- DMF = Unreinforced masonry frame
- TU = Tilt-up
- RH = Manufactured housing
- FM = Factory-built
- SD = Steel deck
- LF = Light frame
- PD = Plan indicates
- DNK = Do Not Know

Where information cannot be verified, screeners shall note the following:  
EST = Estimated or unreliable data  
DNK = Do Not Know
Rapid Visual Screening of Buildings for Potential Seismic Hazards
FEMA P-154 Data Collection Form

Level 1

VERY HIGH Seismicity

Address: 401 N York St
Newbern, TN Zip: 38459

Other Identifiers: 14

Building Name: Elementary School

Use: Education

Latitude: 35.018349
Longitude: -87.39074

S3: 2.1165
S1: 0.7544

Screener(s): CM
Date/Time: 5/16/10-3:01PM

No. Stories: Above Grade: 1
Below Grade: 0
Year Built: 1947-50
Code Year: 2012

Additions: None

Occupancy: Assembly Industrial Commercial
Office Utility

Soil Type: A

Geologic Hazards: Liquefaction: Yes

Adjacency: No Pounding

Irregularities: No Vertical Irregularity

Exterior Falling Hazards: Unbraced Chimneys

Comments:
Reinforced Masonry connected by walkway to "middle"
- no pounding issues
Lat: 36°11'47.483
Long: -89°13'59.485

FEMA BUILDING TYPE

<table>
<thead>
<tr>
<th>W1</th>
<th>W1A</th>
<th>W2</th>
<th>S1 (LM)</th>
<th>S2 (ER)</th>
<th>S3 (LM)</th>
<th>C1</th>
<th>C2 (LM)</th>
<th>C3 (LM)</th>
<th>PC1</th>
<th>PC2</th>
<th>RM1</th>
<th>RM2</th>
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</tbody>
</table>

Basic Score: Do Not Know

Severe Vertical Irregularity, V1: -0.8
Moderate Vertical Irregularity, V1: -0.8
Plan Irregularity, R1: -0.8
Post-Benchmark: 2.0
Soil Type A or B: 0.5
Soil Type E (1-3 stories): -0.2
Soil Type E (3+ stories): -0.4
Minimum Score, SAM: 0.7

FINAL LEVEL 1 SCORE, S1 = SLM: 2.1

EXTENT OF REVIEW

Exterior: [ ] Partial [ ] All Sides [ ] Aerial
Interior: [ ] None [ ] Visible [ ] Entered
Drawings Reviewed: [ ] Yes [ ] No
Geologic Hazards Source: [ ] Other
Contact Person: Miles Holland

LEVEL 2 SCREENING PERFORMED?

[ ] Yes, Final Level 2 Score, S2: 2
[ ] No
Nonstructural hazards? [ ] Yes [ ] No

OTHER HAZARDS

Are There Hazards That Trigger A Detailed Structural Evaluation?

[ ] Pounding potential (unless S2 > cut-off, if known)
[ ] Falling hazards from taller adjacent building
[ ] Geologic hazards or Soil Type F
Significant damage/deterioration to the structural system

ACTION REQUIRED

Detailed Structural Evaluation Required?

[ ] Yes, unknown FEMA building type or other building
[ ] Yes, score less than cut-off
[ ] Yes, other hazards present
[ ] No

Detailed Nonstructural Evaluation Recommended? (check one)

[ ] Yes, nonstructural hazards identified that should be evaluated
[ ] No, nonstructural hazards exist that may require mitigation, but a detailed evaluation is not necessary
[ ] No, nonstructural hazards identified

Where information cannot be verified, screeners shall note the following: EST = Estimated or unreliable data OR DNK = Do Not Know
Structure 14, Building 10 Photographs

Front Right Exterior, 1 Wing Shown

Interior Connection to Older Building

Masonry Walls
**Rapid Visual Screening of Buildings for Potential Seismic Hazards**

**FEMA P-154 Data Collection Form**

**Level 1**

**Very High Seismicity**

**Address:** 401 N. York St., Newport, KY 38050

**Other Identifiers:** 18

**Building Name:** Elementary School

**Location:** 89.120204, 38.963880

**Screener:** CM

**Date/Time:** 5/16/10

**No. Stories:** Above Grade: 3, Below Grade: 1

**Total Floor Area (sq. ft.):** 3,800

**Year Built:** 1973

**Code Year:** No

**Occupancy:** Assembly

**Building Type:** Industrial

**Use:** Office

**Irregularities:** Vertical (typology)

**Soil Type:** Soft Rock

**Geologic Hazards:** Landslide: Yes/No/Don't Know

**Adjacency:** Pounding: Yes/No/Don't Know

**Exterior Falling Hazards:** Unbraced Chimneys: Yes/No/Don't Know

**COMMENTS:**

- Conected by hallway to new - no pounding issues
- Steel I-beams throughout masonry
- Lat: 36.11.7.210 Long: -89.26.0.402

**BASIC SCORE, MODIFIERS, AND FINAL LEVEL 1 SCORE, S1**

<table>
<thead>
<tr>
<th>FEMA Building Type</th>
<th>Do Not Know</th>
<th>W1</th>
<th>W1A</th>
<th>W2</th>
<th>S1 (MFR)</th>
<th>S2 (BR)</th>
<th>S3 (LM)</th>
<th>S4 (RC)</th>
<th>S5 (LR)</th>
<th>S6 (MR)</th>
<th>C1</th>
<th>C2</th>
<th>C3 (URM)</th>
<th>PC1</th>
<th>PC2</th>
<th>RM1 (FC)</th>
<th>RM2 (SD)</th>
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**FINAL LEVEL 1 SCORE, S1:** 2.05

**EXTENT OF REVIEW**

- **Exterior:** Partial
- **Interior:** None
- **Drawings Reviewed:** Yes
- **Soil Type Source:** Visible

**OTHER HAZARDS**

- **Are There Hazards That Trigger a Detailed Structural Evaluation?**
- **Pounding potential (unless S2 > cut-off, if known):** Yes
- **Falling hazards from taller adjacent building:** Yes
- **Significant damage/deterioration to the structural system:** Yes

**ACTION REQUIRED**

- **Detailed Structural Evaluation Required?**
- **Yes, unknown FEMA building type or other building:** Yes
- **Yes, score less than cut-off:** Yes
- **Yes, other hazards present:** Yes

- **Detailed Nonstructural Evaluation Recommended? (check one)**
- **Yes, nonstructural hazards identified that should be evaluated:** Yes
- **No, nonstructural hazards exist that may require mitigation, but a detailed evaluation is not necessary:** No
- **No, nonstructural hazards identified:** Yes
Structure 15, Building 11 Photographs

Exterior, Outside Cafeteria

Interior, Split Level, Exiting Cafeteria

Interior, Cafeteria

Connection to New Hallway to Newer Building
Rapid Visual Screening of Buildings for Potential Seismic Hazards
FEMA P-154 Data Collection Form

Address: 401 N. York St, Newbern, TN 38059

Building Name: Elementary School Gymnasium

Latitude: 35°26'22"N  Longitude: 88°15'20"W

Date/Time: 5/6/19 10:30AM

No. Stories: Above Grade: 1  Below Grade: 1  Year Built: 1970

Total Floor Area (sq. ft.): 3,720

Occupancy: Assembly Commercial Err. Services Historic
Industrial Office Government
Utility Warehouse Residential, # Units

Soil Type: A

Geologic Hazards: Liquidation: Yes No DNK Landslide: Yes No Surf. Rupt.: Yes

Adjacency: Pounding Failing Hazards from Taller Adjacent Building

Regularities: Vertical (typology/geometry) Plan (type)

Exterior Falling Hazards: Unbraced Chmneys Heavy Cladding or Heavy Veneer
Parapets Appendages

COMMENTS:
- Steel col's W1 wood decking
- Concrete col's in basement
- Lat: 36.117892 Long: -89.264930

Level 1 Score, S1 = 1.0

EXTERIOR REVIEW
Contact: Miles Holland

OTHER HAZARDS
Are There Hazards That Trigger A Detailed Structural Evaluation?
- Pounding potential (unless S2 > cut-off, if known)
- Failing hazards from taller adjacent building
- Geologic hazards or Soil Type F

ACTION REQUIRED
Detailed Structural Evaluation Required?
- Yes, unknown FEMA building type or other building
- Yes, score less than cut-off
- Yes, other hazards present
- No

Detailed Nonstructural Evaluation Recommended? (check one)
- Yes, nonstructural hazards identified that should be evaluated
- No, nonstructural hazards exist that may require mitigation, but a
detailed evaluation is not necessary
- No, nonstructural hazards identified

Level 2 Screening Performed?
- Yes, Final Level 2 Score, S2 = 0.0
- No

Nonstructural hazards?
- Yes
- No

Legend:
LEH = Moment-resisting frame
BR = Braced frame
DO = Decorative concrete
UM = Unreinforced Masonry
URM = Unreinforced Masonry
NR = No resistance
BR = Braced frame
SU = Shear wall
Structure 16, Building 12 Photographs

Exterior, Ceiling Heights Consistent

Interior, Masonry and Steel Exposed

Interior, Concrete Pillars in Half-Basement Level
### BASIC SCORE, MODIFIERS, AND FINAL LEVEL 1 SCORE, $S_1$

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<th>Do Not Know</th>
<th>W1</th>
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<th>S2 (RT)</th>
<th>S3 (RP)</th>
<th>S4 (P)</th>
<th>S5 (PC)</th>
<th>C1 (DR)</th>
<th>C2 (DR)</th>
<th>C3 (P)</th>
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</table>

### FINAL LEVEL 1 SCORE, $S_1 = 0.6 > 0.2$

### EXTENT OF REVIEW
- Exterior: Partial
- Drawings Reviewed: Yes
- Geologic Hazards Source: Larry

### OTHER HAZARDS
- Are There Hazards that Trigger A Detailed Structural Evaluation?
  - [ ] Pounding potential (unless $S_1 > 0$)
  - [ ] Falling hazards from taller adjacent building
  - [ ] Geologic hazards or Soil Type F
  - [ ] Significant damage/degradation to the structural system

### ACTION REQUIRED
- Detailed Structural Evaluation Required?
  - [ ] Yes, unknown FEMA building type or other building
  - [ ] Yes, score less than cut-off
  - [ ] Yes, other hazards present
- Detailed Nonstructural Evaluation Recommended?
  - [ ] Yes, nonstructural hazards identified that should be evaluated
  - [ ] No, nonstructural hazards exist that may require mitigation, but a detailed evaluation is not necessary
  - [ ] No, no nonstructural hazards identified

### Where information cannot be verified, verifier shall note the following: EST = Estimated or unreliable data

**Legend:**
- MPK = Moment-resisting frame
- RD = Reinforced concrete
- SW = Shear wall
- URN INF = Unreinforced masonry infill
- TU = Till-up
- MH = Manufactured Housing
- PD = Peral Dia. Div.}

**Photograph:**

**Sketch:**

**Screening:**
- CM
- Date/Time: 5/21/09 AM

**Address:** 136 Hwy 95 S, Bradford, TN 38316
- Zip: 38316
- Phone: 7
- Building Name: Elementary school
- Latitude: 36.014899
- Longitude: -88.813244
- S1: 1.16
- S2: 0.37
- No. Stories: 1
- Year Built: 1955
- Code Year: 2017
- Total Floor Area: 13,420 sq. ft.
- Occupancy: Assembly
- Soil Type: C (clay)
- Geologic Hazards: Liquefaction: Yes
- Adjacency: Pounding: Yes
- Irregularities: Vertical (type/severity)

**Comments:**
- Likely VRM
- Pounding potential w/ building

**POSTSCREENING:**

**Contact Person:** Larry

**Level 2 Screening Performed:**
- Yes
Structure 17, Building 13 Photographs

Exterior, Numerous Filled-In Windows   Interior, Joint Between This and New Addition

Interior, Openings Filled in with Bricks
PHOTOGRAPH

SKETCH

Name: 3rd St.
Address: 136 Hwy 45 S
Bradford, TN Zip: 38316
Other Identifiers: 18
Building Name: Elementary School
Latitude: 36.025803
Longitude: -88.813324
S1: 0.957
S2: 0.317
Screener(s): CM
Date/Time: 5/21/2014

No. Stories: Above Grade: 1
Below Grade: 0
Year Built: 1950
Code Year: 
Total Floor Area (sq. ft.): 7800

Occupancy: Assembly
Commercial
Em. Services
Historic
Industrial
Ship
Office
Government
Warehouse
Residential

Additions: None
Year(s) Built: 1950, 1975, 1997

Soil Type: Soil Type D

Geologic Hazards: Liquefaction: Yes
Slope失败: Yes
Landslides: Yes
Surf. Rupt.: Yes

Adjacency: Pounding
Falling Hazards from Taller Adjacent Building

Irregularities: Vertical (type/severity)
Plan (type)

Exterior Falling Hazards:
Unbraced Chimneys
Heavy Cladding or Heavy Veneer
Parapets
Appendages

COMMENTS:
- "Cafeteria here"
- "Steel sloped ceiling over cafeteria"
- "Steel beams, steel, masonry"
- "Would consider pounding but not an end building"

Additional sketches or comments on separate page

FEMA BUILDING TYPE

Basic Score: 3.8
Severe Vertical Irregularity, V1: -1.2
Moderate Vertical Irregularity, V2: -0.7
Plan Irregularity, P1: -1.1
Pre-Code: -1.1
Post-Benchmark: 1.6
Soil Type A or B: 0.1
Soil Type E (1-3 stories): 0.2
Soil Type E (>3 stories): -0.3
Minimum Score, Sw: 1.1

FINAL LEVEL 1 SCORE, S1:

EXTENT OF REVIEW

Exterior: Yes
Interior: Yes

SOIL TYPE SOURCE:

Geologic Hazards Source:

CONTACT PERSON:

LEVEL 2 SCREENING PERFORMED?
- Yes, Final Level 2 Score, S2:
- No

OTHER HAZARDS

Are There Hazards That Trigger A Detailed Structural Evaluation?
- Yes
- No

ACTION REQUIRED

Detailed Structural Evaluation Required?
- Yes
- No

Detailed Nonstructural Evaluation Recommended?
- Yes
- No

LEGEND:
- MBR = Moment-resisting frame
- RC = Reinforced concrete
- URN INF = Unreinforced masonry wall
- UM = Manufactured Housing
- PD = Pudding damage
- WM = Wood frame
- SW = Shear wall
- TU = Tilt up
- LM = Light metal
- RD = Rigid diaphragm
- DMR = Diaphragm
- URM = Unreinforced masonry wall
- INF = Infilled wall
Structure 18, Building 13 Photographs

Interior, Connection Between This Structure and Addition

Interior, Mechanical Room, Exposed Ceiling
Rapid Visual Screening of Buildings for Potential Seismic Hazards
FEMA P-154 Data Collection Form

Address: 136 Hwy 45 S  
Bradford, TN  
Zip: 38136

Building Name: Elementary School
Use: Elementary School
Latitude: 36.075498  
Longitude: -88.813349
S: 1.097  
S: 0.574
Screener(s): CM  
Date/Time: 5/21/01

No. Stories: Above Grade: 1  
Below Grade: 0  
Year Built: 1975 EST

Total Floor Area (sq. ft.): 7300  

Occupancy: [ ] Assembly  
[ ] Commercial  
[ ] Industrial  
[ ] Office  
[ ] Warehouse  
[ ] Residential  
[ ] Retail  
[ ] Storage  
[ ] Government

Soil Type: [ ] A  
[ ] B  
[ ] C  
[ ] D  
[ ] E  
[ ] DNK

Geologic Hazards: Liquefaction: [ ] Yes/No  
Landslide: [ ] Yes/No  
Sinkage: [ ] Yes/No  
Surf. Rupt.: [ ] Yes/No

Adjacency: [ ] Pounding  
[ ] Falling Hazards from Taller Adjacent Building

Irregularities: [ ] Vertical (type/extent)  
[ ] Plan (type)

Exterior Falling Hazards:  
[ ] Unbraced Chimneys  
[ ] Heavy Cladding or Heavy Veneer  
[ ] Parapets  
[ ] Appenages  
[ ] Other:

Comments: Pounding potential

Additional sketches or comments on separate page

BASIC SCORE, MODIFIERS, AND FINAL LEVEL 1 SCORE, S1

<table>
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<tr>
<th>FEMA BUILDING TYPE</th>
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<th>W1A</th>
<th>W2</th>
<th>W3</th>
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FINAL LEVEL 1 SCORE, S1 = S1min

EXTENT OF REVIEW

Exterior: [ ] Partial  
[ ] All Sides  
[ ] Aerial

Interior: [ ] None  
[ ] Visible  
[ ] Entered

Drawings Reviewed: [ ] Yes  
[ ] No

Soil Type Source: [ ] Yes  
[ ] No

Geologic Hazards Source: [ ] Yes  
[ ] No

Contact Person:

OTHER HAZARDS

Are There Hazards That Trigger a Detailed Structural Evaluation?
[ ] Yes, unknown FEMA building type or other building  
[ ] Yes, score less than cut-off  
[ ] Yes, other hazards present

Nonstructural hazards: [ ] Yes  
[ ] No

Level 2 Screening performed?
[ ] Yes, Final Level 2 Score, S2  
[ ] No

Additional information:

ACTION REQUIRED

Detailed Structural Evaluation Required?
[ ] Yes  
[ ] No

Detailed Nonstructural Evaluation Recommended? (check one)
[ ] Yes  
[ ] No

Where information cannot be verified, screener shall note the following: EST = Estimated or unreliable data  
DNK = Do Not Know

Legend:
MRE = Moment-resisting frame  
BR = Braced frame  
SC = Shear wall  
UM = Unreinforced masonry wall  
LM = Light metal  
RD = Rigid diaphragm

Additional sketches or comments on separate page.
Connection Between this Portion (Left) and Older Portion, Visible Cracking

Exterior, Connection to Older Portion
Rapid Visual Screening of Buildings for Potential Seismic Hazards
FEMA P-154 Data Collection Form

Level 1
HIGH Seismicity

Address: 136 Hwy 45 S, Bradford, TN
Zip: 38326

Other Identifiers: 20

Building Name: Elementary School

Use: Elementary School

Latitude: 34.01075088
Longitude: -89.815780

S1: 1.091
S2: 0.379

Screener(s): CM
Date/Time: 5/21/2014 9PM

No. Stories: Above Grade: 1
Below Grade: 0
Year Built: 2014

Total Floor Area (sq. ft.): 13,560

Additions: None
Yes, Year(s) Built: 1955, 1955, 2014

Occupancy: Assembly
Commercial
Industrial
Office

Use: Elementary School

Soil Type: A
B
C
D
E
F
DNK
If DNK, assume Type C.

Geologic Hazards: Liquifaction: Yes
Landslide: Yes
Surf. Rupt.: Yes

Adjacency: Pounding
Falling Hazards from Taller Adjacent Building

Irregularities: Vertical (type/severity)
Plan (type)

Exterior Falling Hazards:
Unbraced Chimneys
Parapets
Appurtenances

Other:

COMMENTS:

Rein. Walls
Conc. Plank Ceilings

SKETCH

PHOTOGRAPH

### BASIC SCORE, MODIFIERS, AND FINAL LEVEL 1 SCORE, S1

| FEMA Building Type | Do Not Know | WI | WTA | W2 | W3 | W4 | W5 | S1 | S2 | S3 | S4 | S5 | S6 | S7 | C1 | C2 | C3 | PC1 | PC2 | RMc | RM2 | URM | MH |
|--------------------|-------------|----|-----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|-----|-----|-----|-----|
| Basic Score | 3.6 | 3.2 | 2.9 | 2.1 | 2.6 | 2.0 | 1.7 | 1.5 | 2.0 | 1.2 | 1.9 | 1.4 | 1.7 | 1.7 | 1.0 | 1.5 |
| Severe Vertical Irregularity, V1 | -1.2 | -1.2 | -1.0 | -1.0 | -1.1 | -1.1 | -0.8 | -0.9 | -1.0 | -0.7 | -1.0 | -0.9 | -0.6 | -0.5 | -0.5 | -0.5 | -0.5 | -0.4 | -0.4 | -0.5 | -0.7 |
| Moderate Vertical Irregularity, V2 | -0.7 | -0.7 | -0.8 | -0.6 | -0.7 | -0.6 | -0.5 | -0.5 | -0.6 | -0.4 | -0.6 | -0.4 | -0.3 | -0.2 | -0.3 | -0.3 | -0.3 | -0.3 | -0.3 | -0.3 | -0.3 |
| Plan Irregularity, P1 | -1.1 | -1.1 | -1.0 | -1.0 | -0.9 | -0.7 | -0.6 | -0.7 | -0.6 | -0.5 | -0.7 | -0.6 | -0.5 | -0.4 | -0.5 | -0.5 | -0.5 | -0.5 | -0.5 | -0.5 | -0.5 |
| Pre-Collapse | -1.1 | -1.1 | -0.6 | -0.5 | -0.6 | -0.6 | -0.6 | -0.6 | -0.6 | -0.6 | -0.6 | -0.6 | -0.6 | -0.6 | -0.6 | -0.6 | -0.6 | -0.6 | -0.6 | -0.6 | -0.6 |
| Post-Benchmark | 1.6 | 1.6 | 2.2 | 1.4 | 1.1 | 1.9 | NA | 1.9 | 2.1 | 2.0 | 1.9 | 2.0 | 1.9 | 2.0 | 1.9 | 2.0 | 1.9 | 2.0 | 1.9 | 2.0 | 1.9 |
| Soil Type A or B | 0.1 | 0.3 | 0.5 | 0.4 | 0.6 | 0.1 | 0.6 | 0.6 | 0.4 | 0.5 | 0.3 | 0.4 | 0.5 | 0.4 | 0.5 | 0.4 | 0.5 | 0.4 | 0.5 | 0.4 |
| Soil Type E (1-3 stories) | 0.2 | 0.2 | 0.1 | -0.2 | -0.4 | 0.2 | -0.1 | -0.4 | 0.0 | 0.0 | -0.2 | -0.3 | -0.1 | -0.1 | -0.1 | -0.1 | -0.1 | -0.1 | -0.1 | -0.1 |
| Soil Type E (>3 stories) | -0.3 | -0.6 | -0.9 | -0.6 | -0.6 | -0.6 | NA | -0.6 | -0.4 | -0.6 | -0.7 | -0.3 | NA | -0.4 | -0.6 | -0.6 | -0.6 | -0.6 | -0.6 | -0.6 |

Minimum Score, \( S_{\text{MIN}} \): 2.1

Final Level 1 Score, \( S_{\text{L1}} \): $8.3 \geq S_{\text{MIN}}$

### EXTENT OF REVIEW

Exterior:
- Aerial
- Visible
- Aerial

Interior:
- Yes
- No

Soil Type:
- Aerial
- Visible

Geologic Hazards Source:
- Yes
- No

Contact Person:
- Larry

### LEVEL 2 SCREENING PERFORMED

- Yes, Final Level 2 Score, \( S_{\text{L2}} \):
- No

Nonstructural hazards:
- Yes
- No

### OTHER HAZARDS

- Are There Hazards That Trigger A Detailed Structural Evaluation?
  - Potentially bounding
  - Falling hazards from taller adjacent building
  - Geologic hazards or Soil Type E
  - Significant damage/deformation to the structural system

### ACTION REQUIRED

- Detailed Structural Evaluation Required?
  - Yes
  - No

- Detailed Nonstructural Evaluation Recommended?
  - Yes
  - No

Where information cannot be verified, screeners shall note the following: EST = Estimated or unreliable data

<table>
<thead>
<tr>
<th>Legend</th>
</tr>
</thead>
<tbody>
<tr>
<td>MRF = Moment-resisting frame</td>
</tr>
<tr>
<td>BR = Braced frame</td>
</tr>
<tr>
<td>LRM = Light-reinforced masonry</td>
</tr>
<tr>
<td>MH = Masonry housing</td>
</tr>
<tr>
<td>RD = Rigid diaphragm</td>
</tr>
</tbody>
</table>

Where information cannot be verified, screeners shall note the following: EST = Estimated or unreliable data

DNK = Do Not Know
Structure 20, Building 13 Photographs

Exterior

“Tornado Safe Room” Notice

Exterior of Addition
Rapid Visual Screening of Buildings for Potential Seismic Hazards
FEMA P-154 Data Collection Form

Level 1 HIGH Seismicity

Address: 126 HWY 45S, Bradford, TN
Zip: 38136

Other Identifiers:

Building Name: Elementary School Gym

Use: Elementary School Gym

Latitude: 36.0752
Longitude: -88.1813335

S1: 159.7
S2: 0.379

Screener(s): CM
Date/Time: 5/21/08 9AM

No. Stories: Above Grade: 1
Below Grade: 0

Year Built: 1985

Total Floor Area (sq. ft.): 4500 sf

Comments:

Steel beams & cols exposed
Masonry & metal wall
Exposed I-beam

FEMA BUILDING TYPE
Do Not Know W1 W1A W2 S1 (MR) S2 (BR) S3 (LH) S4 (URM) S5 (URM) C1 (MF) C2 (SW) C3 (URM) PC1 (TU) PC2 (MD) RM1 (ED) RM2 (ED) URM MH

Basic Score
3.6

Severe Vertical Irregularity, VlV
-1.2

Moderate Vertical Irregularity, VmV
-0.7

Plan Irregularity, Pl
-1.1

Pre-Codes
-1.1

Post-Demolition
1.6

S4 Type A or B
0.1

S4 Type E (1-3 stories)
0.2

S4 Type E (3+ stories)
-0.3

Minimum Score, Smin
1.1

FINAL LEVEL 1 SCORE, S1 ≥ Smin
1.8 ≥ 0.6

EXTENT OF REVIEW

Exterior: ❌ Partial  ❏ All Sides  ❏ Aerial

Interior:  ❏ None  ❏ Visible  ❏ Entered

Drawings Reviewed:  ❏ Yes  ❏ No

Soil Type Source:

Geologic Hazards Source:

Contact Person:

ACTION REQUIRED

Detailed Structural Evaluation Required?
Yes, unknown FEMA building type or other building
Yes, score less than cut-off
Yes, other hazards present
No

Detailed Nonstructural Evaluation Recommended? (check one)
Yes, nonstructural hazards identified that should be evaluated
No, nonstructural hazards exist that may require mitigation, but a detailed evaluation is not necessary
No, nonstructural hazards identified

OTHER HAZARDS

Are There Hazards That Trigger A Detailed Structural Evaluation?

- Potentially significant cutting, if known
- Falling hazards from taller adjacent building
- Geologic hazards or Soil Type F
- Significant damage or deterioration to the structural system

WHERE INFORMATION CANNOT BE VERIFIED, SCREENER SHALL NOTE THE FOLLOWING: EST = Estimated or unreliable data

Legend:
MR = Moment-resistant frame
BR = Braced frame
SW = Shear wall
URM = Unreinforced masonry
TU = Tilt-up
LM = Light metal
DNK = Do Not Know

Partially completed form with basic structural information and comments on the physical condition of the building. The form includes details on building types, materials, and potential hazards. The final level 1 score is calculated, and recommendations are made for further structural evaluation. The form is part of a larger assessment process for identifying buildings that may require seismic retrofitting.
Structure 21, Building 14 Photographs

Exterior, Half Masonry Half Steel Wall

Interior, Exposed Wall

Interior Gym/Theater, Wall and Ceiling Exposed
**FEMA P-154 Data Collection Form**

**Rapid Visual Screening of Buildings for Potential Seismic Hazards**

**Address:** 136 Old Hwy 45 South, Bradford, TN 38316

**Building Name:** High School

**Use:** School

**Latitude:** 36.075435

**Longitude:** -88.814958

**S1:** 1,049

**S3:** 0.379

**No. Stories:** Above Grade: 0, Below Grade: 0

**Year Built:** 1981

**Code Year:**

**Occupancy:** Assembly, Industrial, Commercial, Government, Ecnc Services, Historic, Shelter

**Soil Type:**

- Rock: Hard
- Rock: Avg
- Soil: Dense
- Soil: Soft
- Soil: Poor

**Geologic Hazards:**

- Liquefaction: Yes/No/DNK
- Landslide: Yes/No/DNK
- Surf. Rupt.: Yes/No/DNK

**Adjacency:**

- Pounding: Yes/No
- Falling Hazards: Yes/No

**Irregularities:**

- Vertical (Type/Severity): Yes/No

**Exterior Falling Hazards:**

- Unbraced Chimneys: Yes/No
- Heavy Cladding or Heavy Veneer: Yes/No

**COMMENTS:**

- Flex. diaphragm
- Storied wall
- Re-entrant corner LV connected building

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### BASIC SCORE, MODIFIERS, AND FINAL LEVEL 1 SCORE, $S_1$

<table>
<thead>
<tr>
<th>FEMA BUILDING TYPE</th>
<th>Do Not Know</th>
<th>W1</th>
<th>W1A</th>
<th>W2</th>
<th>W2A</th>
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</tbody>
</table>

### FINAL LEVEL 1 SCORE, $S_1 = S_m + S_{1A}$

$S_1 = 2.0$

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### EXTENT OF REVIEW

- Exterior: Yes
- Interior: No
- Drawings Reviewed: Yes
- Soil Type Source: Enter
- Geologic Hazards Source: Enter
- Contact Person: Enter

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### OTHER HAZARDS

- Are There Hazards That Trigger A Detailed Structural Evaluation?
  - Pounding potential (unless $S_2 > S_{1A}$, cut-off, if known)
  - Falling hazards from taller adjacent building
  - Geologic hazards or Soil Type F
  - Significant damage/degradation to the structural system

---

### ACTION REQUIRED

- Detailed Structural Evaluation Required?
  - Yes, unknown FEMA building type or other building
  - Yes, score less than cut-off
  - Yes, other hazards present
  - No

- Detailed Nonstructural Evaluation Recommended? (check one)
  - Yes, nonstructural hazards identified that should be evaluated
  - No, nonstructural hazards exist that may require mitigation, but a detailed evaluation is not necessary
  - No, no nonstructural hazards identified

---

### LEVEL 2 SCREENING PERFORMED?

- Yes, Final Level 2 Score, $S_2$
- No
- Nonstructural hazards?
  - Yes
  - No

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Legend:

- MR = Moment-resisting frame
- RS = Reinforced concrete
- SW = Shear wall
- URM INF = Unreinforced masonry infill
- ML = Manufactured Housing
- PS = Flexible diaphragm
- RD = Rigid diaphragm
- BR = Braced frame
- UR = Unreinforced masonry
- LM = Light metal
- CR = Concrete

Where information cannot be verified, scorer shall note the following: EST = Estimated or unreliable data or DKN = Do Not Know
Structure 22, Building 16 Photographs

Exterior, Side of Building

Exterior, Canopy

Interior, Ceiling and Walls Exposed
**Rapid Visual Screening of Buildings for Potential Seismic Hazards**

**FEMA P-154 Data Collection Form**

**Level 1 HIGH Seismicity**

**Address:** 136 Old Hwy 95 S  
**Bradford, TN**  
**Zip:** 38346

**Other Identifiers:** 23

**Building Name:** High School gym

**Latitude:** 35.87547  
**Longitude:** -88.814987

**S1:** 1.0495  
**S2:** 0.579

**Screener(s):** CM  
**Date/Time:** 5/12 0930AM

**No. Stories:** Above Grade: 1  
**Below Grade: 0**  
**Year Built:** 1975  
**Code Year:**

**Total Floor Area (sq. ft.):** 9775

**Additions:** None  
**Yes, Year(s) Built:**

**Occupancy:** Assembly  
**Industrial**  
**Office**  
**School**  
**Emerg. Services**  
**Historic**  
**Shelter**  
**Government**  
**Residential**  
**Utility**  
**Warehouse**  
**Other:**

**Soil Type:** A  
**B**  
**C**  
**D**  
**E**  
**F**  
**DNK**

**Geologic Hazards:** Liquefaction: Yes/No  
**DNK**  
**Landslide:** Yes/No  
**DNK**  
**Surf. Rupt:** Yes/No

**Adjacency:**  
**Pounding**  
**Falling hazards from taller adjacent building**

**Irrgularities:**  
**Vertical (type/severity)**

**Exterior Falling Hazards:**  
**Unbraced chimneys**  
**Heavy Cladding or heavy veneer**  
**Other:**

**COMMENTS:**

*Re-entrant corner of other building*

---

**SKETCH**

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**PHOTOGRAPH**

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**BASIC SCORE, MODIFIERS, AND FINAL LEVEL 1 SCORE, S1**

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<tr>
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<th>W1A</th>
<th>W2</th>
<th>S1</th>
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<td>1.1</td>
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</tbody>
</table>

**FINAL LEVEL 1 SCORE, S1 = Smin:** 0.3

---

**EXTENT OF REVIEW**

**Exterior:** Partial  
**Interior:** None  
**Aerial:**

**Drawings Reviewed:** Yes  
**No**  
**Visible**  
**Entered**

**Soil Type Source:**

**Geologic Hazards Source:**

**Contact Person:** Larry

---

**LEVEL 2 SCREENING PERFORMED?**

☐ Yes, Final Level 2 Score, S2  
☐ No

**Nonstructural hazards?**

☐ Yes  
☐ No

---

**OTHER HAZARDS**

**Are There Hazards that Trigger a Detailed Structural Evaluation?**

☐ Pounding potential (unless S2 > cut-off, if known)

☐ Falling hazards from taller adjacent building

☐ Geologic hazards or Soil Type F

☐ Significant damage deterioration to the structural system

---

**ACTION REQUIRED**

**Detailed Structural Evaluation Required?**

☐ Yes, unknown FEMA building type or other building

☐ Yes, score less than cut-off

☐ Yes, other hazards present

☐ No

**Detailed Nonstructural Evaluation Recommended? (check one)**

☐ Yes, nonstructural hazards identified that should be evaluated

☐ No, nonstructural hazards exist that may require mitigation, but a detailed evaluation is not necessary

☐ No, no nonstructural hazards identified

---

Where Information cannot be verified, screener shall note the following:  
**EST = Estimated or unreliable data**  
**DNK = Do Not Know**

---

**Legend:**

- MR = Moment-resisting frame
- RC = Reinforced concrete
- SW = Shear wall
- URM INF = Unreinforced masonry wall
- HM = Manufactured Housing
- PD = Piled diaphragm
- RD = Rigid diaphragm
Structure 23, Building 15 Photographs

Interior Walls, Masonry

Interior, Mechanical Room, Exposed Ceiling and Walls

Interior, Connection to Addition
Structure 24, Building 15 Photographs

Interior, Gymnasium, Walls and Ceiling Exposed
Rapid Visual Screening of Buildings for Potential Seismic Hazards
FEMA P-154 Data Collection Form

Address: 1100 S. Miles Ave, Unig City, TN Zip: 38261
Other Identifiers: 
Building Name: 
Use: Elementary School 
Latitude: 35.4115586 Longitude: -89.039859 
St: 1.484 S0: 0.519 
Screener(s): 0 cm Date/Time: 5/24/10 11AM 

No. Stories: Above Grade: 1 Below Grade: 0 Year Built: 1930 EST Total Floor Area (sq. ft.): 10,000 Code Year: 
Additions: None Yes, Year(s) Built: 1930 EST 
Occupancy: Assembly Commercial Emer. Services Historic Shelter Industrial Office Government 
Soil Type: A Rock B Avg C D den Dif F Soil 
Geologic Hazards: Liquidation: Yes No/DNK Landslide: Yes No/DNK Surf. Rupt: Yes No/DNK 
Adjacency: Pounding Falling Hazards: 
Irregularities: Vertical (type/severity) Plan (type) 
Exterior Falling: Unbraced Chimneys Heavy Cladding or Heavy Venerer 
Other: Parapets Appendages 

COMMENTS: RM

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<tr>
<th>FEMA BUILDING TYPE</th>
<th>Do Not Know</th>
<th>W1</th>
<th>W1A</th>
<th>W2</th>
<th>W2A</th>
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<th>S1 (MRI)</th>
<th>S2</th>
<th>S2 (MRI)</th>
<th>S3 (MRI)</th>
<th>C1</th>
<th>C2</th>
<th>C3 (MRI)</th>
<th>PC1</th>
<th>PC2</th>
<th>RM1</th>
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<th>URM</th>
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<td>-1.2</td>
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<td>Soil Type E (&gt;3 stories)</td>
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</table>

FINAL LEVEL 1 SCORE, S,L = -0.3

EXTENT OF REVIEW
Exterior: | Partial | All Sides | Aerial | Visible | No |
Interior: | Yes | No |
Drawings Reviewed: | Yes | No |
Soil Type Source: 
Geologic Hazards Source: Chuck Royd
Contact Person: 

OTHER HAZARDS
Are There Hazards That Trigger A Detailed Structural Evaluation?
- Pounding potential (unless S,L > cut-off, if known)
- Falling hazards from taller adjacent building
- Geologic hazards or Soil Type F
- Significant damage/deterioration to the structural system

ACTION REQUIRED
Detailed Structural Evaluation Required?
- Yes, unknown FEMA building type or other building
- Yes, score less than cut-off
- Yes, other hazards present
- No

Detailed Nonstructural Evaluation Recommended? (check one)
- Yes, nonstructural hazards identified that should be evaluated
- No, nonstructural hazards exist that may require mitigation, but a detailed evaluation is not necessary
- No, no nonstructural hazards identified

LEVEL 2 SCREENING PERFORMED?
- Yes, Final Level 2 Score, S,z = 0 Rating
- No
Nonstructural hazards? | Yes | No

Where information cannot be verified, screeners shall note the following:
EST = Estimated or unreliable data
DNK = Do Not Know

Legend:
MRI = Moment resisting frame
BR = Braced frame
RC = Reinforced concrete
URM FN = Unreinforced masonry fill
URM SP = Unreinforced masonry shell
MR = Masonry
URM TP = Unreinforced masonry wall
Structure 25, Building 17 Photographs

Exterior, Courtyard

Interior, Masonry Walls  Interior, Gymnasium, Exposed Walls and Ceiling
### Address:
1111 High School Dr.,
Union City, TN
Zip: 38261

**Other Identifiers:**
- 20

**Building Name:**
- Middle School

**Latitude:** 36.4186647
**Longitude:** -89.0448652
**S:** 0.44
**Sr:** 0.323

**Screener(s):** CM
**Date/Time:** 5/24/2010 10AM

**No. Stories:**
- Above Grade: 1
- Below Grade: 1

**Total Floor Area (sq. ft.):** 63,800
**Code Year:**
- Yes
- Year(s) Built: Unknown

**Occupancy:**
- Assemble
- Commercial
- EMS
- Office
- Historic
- Government
- Shelter
- Warehouse
- Residential

**Soil Type:**
- A
- B
- C
- D
- E
- F
- DNK

**Geologic Hazards:**
- Liquefaction: Yes
- Landslide: Yes
- Sulf. Rupt.: Yes

**Adjacency:**
- Pounding
- Falling Hazards from Taller Adjacent Building
- Re-Entrant corner

**Irregularities:**
- Vertical (type/severity)
- Plan (type)

**Exterior Falling Hazards:**
- Unbraced Chimneys
- Heavy Veneer
- Heavy Cladding or Heavy Veneer
- Unbraced Chimneys
- Heavy Veneer
- Apparatus

**COMMENTS:**
- Steel Ceiling (flex, diaphragm)
- RM
- Wood Ceiling in Areas

### BASIC SCORE, MODIFIERS, AND FINAL LEVEL 1 SCORE, $S_{1}$

| FEMA BUILDING TYPE | Do Not Know | W1 | W1A | W2 | S1 | S2 | S3 | S4 | S5 | C1 | C2 | C3 | PC1 | PC2 | RM1 | RM2 | URM | MH |
|--------------------|-------------|----|-----|----|----|----|----|----|----|----|----|----|-----|-----|-----|-----|-----|
| Basic Score        | 3.6         | 3.2| 2.6 | 2.1| 2.0| 2.1| 2.0| 2.6| 2.0| 1.7| 1.5| 2.0| 1.2 | 1.4 | 1.7 | 1.7 | 1.0 | 1.5 |
| Severe Vertical Irregularity, V$V$ | -1.2        | -1.2| -1.2| -1.0| -1.0| -1.1| -1.0| -0.8| -0.9| -0.9| -0.9| -0.9| -0.9 | -0.9 | -0.9 | -0.9 | -0.7 | NA  |
| Moderate Vertical Irregularity, V$V$ | -0.7        | -0.7| -0.7| -0.6| -0.6| -0.7| -0.6| -0.5| -0.5| -0.5| -0.5| -0.5| -0.5 | -0.5 | -0.5 | -0.5 | -0.4 | NA  |
| Plan Irregularity, P$P$ | -1.1        | -1.1| -1.1| -1.1| -1.0| -1.0| -1.0| -0.8| -0.9| -0.9| -0.9| -0.9| -0.9 | -0.9 | -0.9 | -0.9 | -0.8 | NA  |
| Pre-Code           | -1.1        | -1.1| -1.1| -1.1| -1.0| -1.0| -1.0| -0.8| -0.9| -0.9| -0.9| -0.9| -0.9 | -0.9 | -0.9 | -0.9 | -0.8 | NA  |
| Post-Benchmark     | 1.9         | 2.2| 2.2| 2.1| 1.9| 2.1| 1.9| 1.9| NA | NA | 1.9| 2.1 | NA  | 2.0 | 2.4 | 2.4 | 2.1 | NA  |
| Soil Type A or B   | 0.1         | 0.3| 0.5| 0.4| 0.6| 0.4| 0.6| 0.5| 0.5| 0.5| 0.3| 0.6 | 0.4 | 0.5 | 0.5 | 0.5 | 0.3 | NA  |
| Soil Type E (1-3 stories) | 0.2 | 0.2| 0.2| 0.1| 0.2| 0.1| 0.2| 0.1| 0.1| 0.1| 0.1| 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| Soil Type E (>3 stories) | -0.3 | -0.5| -0.5| -0.5| -0.6| -0.5| -0.5| -0.6| -0.6| -0.6| -0.6| -0.6 | -0.6 | -0.6 | -0.6 | -0.6 | -0.6 | NA  |
| Minimum Score, $S_{w}$ | 1.1         | 1.0| 0.7| 0.7| 0.6| 0.6| 0.6| 0.6| 0.6| 0.6| 0.6| 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |

### FINAL LEVEL 1 SCORE, $S_{1}$

- 0.920.3

### EXTENT OF REVIEW

- Exterior: All Sides
- Interior: Partial
- Drawings Reviewed: None
- Soil Type Source: Yes
- Soil Entred: No
- Geologic Hazards Source: Yes
- Contact Person: Chuck Rockey

### OTHER HAZARDS

- Are There Hazards That Trigger A Detailed Structural Evaluation?
- Pounding potential (unless $S_{2} >$ cut-off, if known)
- Falling hazards from taller adjacent building
- Geologic hazards or Soil Type F
- Significant damage/deterioration to the structural system

### ACTION REQUIRED

- Detailed Structural Evaluation Recommended?
- Yes, unknown FEMA building type or other building
- Yes, score less than cut-off
- Yes, other hazards present
- No

- Detailed Nonstructural Evaluation Recommended? (check one)
- Yes, nonstructural hazards identified that should be evaluated
- No, nonstructural hazards exist that may require mitigation, but a detailed evaluation is not necessary
- No, no nonstructural hazards identified

Where information cannot be verified, reviewer shall note the following: EST = Estimated or unreliable data OR DNK = Do Not Know

Legend:
- MCH = Moment-resisting frame
- RC = Reinforced concrete
- SW = Shear wall
- URM INF = Unreinforced masonry infill
- RH = Rigid frame
- LM = Light metal
Structure 26, Building 18 Photographs

Front Left Exterior, Primary Hallway That Wings Come From, All Sides Similar

Front Right Exterior, Primary Hallway That Wings Come From, All Sides Similar
**Rapid Visual Screening of Buildings for Potential Seismic Hazards**

**FEMA P-154 Data Collection Form**

**Level 1**

**HIGH Seismicity**

**Address:** 1305 E. High School Dr.

**Zip:** 38761

**Other Identifiers:**

- **Building Name:** High School
- **Use:**
- **Latitute:** 36.4114309
- **Longitude:** -89.043467
- **St:** (491)
- **S:** 0.522
- **Screener(s):** CM
- **Date/Time:** 5/24/00 10:30 AM

**No. Stories:** Above Grade: 2  Below Grade: 1

**Total Floor Area (sq. ft.):** 107,000

**Year Built:** 1972R

**Additions:**
- None
- Yes, Year(s) Built:

**Occupancy:**
- Assembly
- Commercial
- Emergency Services
- Historic
- Shelters
- Government

**Soil Type:**
- A
- C
- DNK

**Geologic Hazards:**
- Liquefaction: Yes
- No
- DNK

**Adacency:**
- Pounding
- Falling hazards from taller adjacent building

**Irregularities:**
- Vertical (type/severity): Severe
- Plan (type): N.E. oriented

**Exterior Falling Hazards:**
- Unbraced chimneys
- Heavy cladding or heavy veneer
- Apparandes
- Other:

**COMMENTS:**
- Also sloping site/severe
- Conc cols w/ masonry infill
- Arena type gym

---

**BASIC SCORE, MODIFIERS, AND FINAL LEVEL 1 SCORE, S1**

| FEMA BUILDING TYPE | Do Not Know | W1 | W1A | W2 | W2A | S1 | S2 | S3 | S4 | S5 | S6 | C1 | C2 | C3 | PC1 | PC2 | RM1 | RM2 | URM | MH |
|--------------------|-------------|----|-----|----|-----|----|----|----|----|----|----|----|----|----|-----|-----|-----|-----|-----|
| Basic Score        | 3.6         | 3.2| 2.9 | 2.1| 2.8 | 2.6| 2.0| 1.7| 1.6| 2.0| 1.2| 1.8| 1.4| 1.7| 1.7 | 1.0 | 1.5 |
| Severe Vertical Irregularity, V1r | -1.2       | -1.2| -1.2| -1.0| -1.0| -1.1| -1.0| -0.8| -0.9| -1.0| -0.9| -0.9| -0.9| -0.9 | -0.9 | -0.7 | NA  | NA  |
| Moderate Vertical Irregularity, V2r | -0.7       | -0.7| -0.7| -0.5| -0.6| -0.6| -0.6| -0.5| -0.5| -0.5| -0.5| -0.5| -0.5| -0.5 | -0.5 | -0.4 | NA  | NA  |
| Plan Irregularity, P1r | -1.1       | -1.1| -1.1| -0.8| -0.7| -0.9| -0.7| -0.6| -0.6| -0.6| -0.6| -0.6| -0.7| -0.7 | -0.6 | -0.6 | -0.4 | NA  | NA  |
| Pre-Benchmark       | 1.6         | 1.9| 2.2| 1.4| 1.4| 1.1| 1.9| NA | 1.6| 2.1| 1.9| 1.9| 2.0| 2.0 | 2.1 | 2.1 | 1.2 | NA  |
| Soil Type A or B    | 0.1         | 0.3| 0.6| 0.4| 0.6| 0.1| 0.6| 0.5| 0.6| 0.4| 0.5| 0.3| 0.6| 0.4 | 0.5 | 0.3 | 0.6 | NA  |
| Soil Type E (1-3 Stories) | 0.2 | 0.2| 0.2| -0.2| -0.4| 0.2| 0.1| 0.4| 0.0| 0.0| 0.2| 0.3| 0.1| 0.1 | 0.1 | 0.1 | -0.2 | NA  |
| Soil Type E (>3 Stories) | -0.3 | -0.6| -0.6| -0.6| -0.6| NA | 0.6| -0.6| -0.0| -0.0| -0.0| -0.7| -0.3| NA | 0.4 | 0.4 | 0.4 | 0.6 |

**Minimum Score, Smin:** 1.1

**FINAL LEVEL 1 SCORE, S1 = Smin + SWAC**

**EXTENT OF REVIEW**

- Exterior:
  - Partial
  - All Sides
  - Aerial
  - Visible
  - Entered
  - No

- Interior:
  - Yes
  - Aerial
  - No

- Drawings Reviewed:
  - Yes
  - No

- Geologic Hazards Source:
  - Yes
  - No

- Geologic Hazards Source:
  - Chuck Ready

**OTHER HAZARDS**

- Are There Hazards That Trigger A Detailed Structural Evaluation?
- Yes
- No

**ACTION REQUIRED**

- Detailed Structural Evaluation Required? (check one)
  - Yes
  - No

**LEVEL 2 SCREENING PERFORMED?**

- Yes, Final Level 2 Score, S2
- No

- Nonstructural hazards:
  - Yes
  - No

Where information cannot be verified, screener shall note the following:

**EST** = Estimated or unreliable data

**DNK** = Do Not Know

**Legend:**
- MRF = Moment resisting frame
- SR = Shear wall
- BR = Braced frame
- BRMFR = Braced frame reinforced masonry
- URM = Unreinforced masonry
- TU = Tie up
- LM = Light metal
- SH = Shear wall
- SD = Seismic diaphragm
Structure 27, Building 19 Photographs

Out-of-Plane Setback

Concrete Columns Exposed

Split Level
Structure 28, Building 20 Photographs

Exterior View

Tilt-Wall
Rapid Visual Screening of Buildings for Potential Seismic Hazards
FEMA P-154 Data Collection Form

MODERATELY HIGH Seismicity

Address: 227 N, 2nd St.
Medina, TN
Zip: 38355

Other Identifiers: LQ

Building Name: Elementary School

Use: Elementary School

Latitude: 35.80°3856
Longitude: -88.47°5067

S1: 0.289
S2: 0.313

Screened(s): CM
Date/Time: 5/13/10 AM

No. Stories: Above Grade: 1
Below Grade: 0
Year Built: 1928 0 5/13/10

Additions: None

Total Floor Area (sq. ft.): 113,350
Code Year:

Occupancy: Assembly
Industrial
Commercial
Emer. Services
Educational
Office

Soil Type: A
B
C
D
E
DNK

Geologic Hazards: Liquefaction: Yes/No/DNK
Landslide: Yes/No/DNK
Surf. Rupt: Yes/No/DNK

Adjacency: Pounding
Falling Hazards from Taller Adjacent Building

Irregularities: Vertical (type/severity)
Plan (type)
Re-entrant Corner

Exterior Falling Hazards: Unbraced Chimneys
Heavy Cladding or Heavy Veneer

COMMENTS:
Reinforced Masonry

SKETCH

BASIC SCORE, MODIFIERS, AND FINAL LEVEL 1 SCORE, S1

| FEMA BUILDING TYPE | Do Not Know | W1 | W1A | W2 | W2 | W3 | S1 | S2 | S3 | S4 | S5 | S6 | C1 | C2 | C3 | PC1 | PC2 | PC3 | RM1 | RM2 | URM | MH |
|--------------------|-------------|----|-----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|-----|-----|-----|
| Basic Score        |             | 4.1| 3.7 | 3.2| 2.3| 2.2| 2.9| 2.2| 2.0| 1.7| 2.1| 1.4| 1.8| 1.5| 1.8| 1.2| 2.2 |
| Severe Vertical Irregularity, $V_{VR}$ |             | -1.3| -1.3| -1.1| -1.1| -1.0| -1.0| -1.0| -0.9| -0.9| -0.9| -0.9| -0.9| -0.9| -0.9| -0.9| -0.9| -0.9 |
| Moderate Vertical Irregularity, $V_{VR}$ |             | -0.8| -0.8| -0.8| -0.7| -0.6| -0.6| -0.6| -0.6| -0.6| -0.6| -0.6| -0.6| -0.6| -0.6| -0.6| -0.6| -0.6 |
| Plan Irregularity, $P_L$ |             | -1.3| -1.2| -1.1| -0.9| -0.8| -1.0| -0.8| -0.7| -0.7| -0.7| -0.9| -0.6| -0.7| -0.7| -0.7| -0.7| -0.7 |
| Pre-Codes |             | -0.8| -0.9| -0.9| -0.5| -0.5| -0.7| -0.6| -0.2| -0.4| -0.4| -0.4| -0.4| -0.4| -0.4| -0.4| -0.4| -0.4 |
| Post-Benchmark |             | 1.5| 1.9| 2.3| 1.4| 1.4| 1.0| 1.9| NA| 1.9| 2.1| NA| 2.1| 2.1| 2.1| 2.4| 2.1| 2.1 |
| Soil Type A or B |             | 0.3| 0.5| 0.5| 0.6| 0.9| 0.3| 0.9| 0.9| 0.6| 0.8| 0.7| 0.7| 0.7| 0.7| 0.7| 0.7| 0.7 |
| Soil Type E (1-3 stories) |             | 0.0| -0.1| -0.1| -0.4| -0.5| 0.0| -0.4| -0.5| -0.2| -0.2| -0.4| -0.5| -0.3| -0.4| -0.3| -0.4| -0.3 |
| Soil Type E (4-3 stories) |             | -0.5| -0.8| -1.2| -0.7| -0.7| NA| -0.7| -0.6| -0.8| -0.6| -0.4| NA| -0.5| -0.6| -0.7| -0.7| -0.7 |
| Minimum Score, $S_{min}$ |             | 1.6| 1.2| 0.6| 0.5| 0.5| 0.5| 0.5| 0.3| 0.3| 0.3| 0.3| 0.3| 0.3| 0.3| 0.3| 0.3| 0.3 |

FINAL LEVEL 1 SCORE, $S_{L1}$ ≥ $S_{min}$: 3.0 ≥ 0.5

EXTENT OF REVIEW

Exterior: Partial
All Sides
Aerial

Interior: None
Visible
Entered

Drawings Reviewed: None
Yes
No

Soil Type Source:

Geologic Hazards Source:

Contact Person: Chad Jackson

OTHER HAZARDS

Are There Hazards That Trigger $A$ Detailed Structural Evaluation?

Pounding potential (unless $S_{L1} > 0.5$, cut-off, if known)
Falling hazards from taller adjacent building
Geologic hazards or Soil Type F
Significant damage/deterioration to the structural system

ACTION REQUIRED

Detailed Structural Evaluation Required?
Yes, unknown FEMA building type or other building
Yes, score less than cut-off
Yes, other hazards present
No

Detailed Nonstructural Evaluation Recommended? (check one)
No, nonstructural hazards exist that may require mitigation, but detailed evaluation is not necessary
No, nonstructural hazards identified

Where information cannot be verified, see screen shall note the following: EST = Estimated or unreliable data
DNK = Do Not Know

Legend:
W1 = Wall-type frame
W1A = Wood frame
W2 = Steel frame
W3 = Masonry
S1 = Shear wall
S2 = Reinforced masonry
S3 = Reinforced concrete
S4 = Masonry
S5 = Reinforced concrete
S6 = Masonry
C1 = Concrete
C2 = Masonry
C3 = Masonry
PC1 = Pre-Cast
PC2 = Pre-Cast
PC3 = Pre-Cast
RM1 = Reinforced masonry
RM2 = Reinforced masonry
URM = Unreinforced masonry
MH = Masonry
MRH = Masonry
MRH = Masonry
MRH = Masonry
MRH = Masonry
MRH = Masonry
Structure 29, Building 21 Photographs

Exterior View, Apparent Wall System

Interior, Reinforced Masonry
Rapid Visual Screening of Buildings for Potential Seismic Hazards

FEMA P-154 Data Collection Form

**MODERATELY HIGH Seismicity**

**Address:** 100-102 Hornet Dr., Medina, TN 38355

**Zip:** 38355

**Other Identifiers:**
- **Building Name:** High School
- **Use:** Industrial
- **Latitude:** 38.80030
- **Longitude:** -89.80383
- **S1:** 0.721
- **S2:** 0.322
- **Screener(s):** CM
- **Date/Time:** 5/3/2009 AM

**No. Stories:** Above Grade: 2, Below Grade: 0

**Year Built:** 2004

**Code Year:**

**Additions:**
- None
- Yes, Year(s) Built: Continuously

**Occupancy:**
- Assembly
- Commercial
- Industrial
- Office
- Retail
- Warehouse
- Residential

**Soil Type:**
- Not applicable

**Geologic Hazards:**
- liquefaction: Yes/No/DNK
- Landslide: Yes/No/DNK
- Surf. Rupt.: Yes/No/DNK

**Adjacency:**
- Pounding
- Falling Hazards from Taller Adjacent Building

**Irrigation:**
- Vertical (type/erosion)
- Plan (type)

**Exterior Falling Hazards:**
- Unbraced Chimneys
- Parapets
- Heavy Cladding or Heavy Veneer
- Appendages

**COMMENTS:**

- Tilt Wall construction

---

**BASIC SCORE, MODIFIERS, AND FINAL LEVEL 1 SCORE, S1**

<table>
<thead>
<tr>
<th>FEMA Building Type</th>
<th>Do Not Know</th>
<th>W1</th>
<th>W2</th>
<th>W3 (MSP)</th>
<th>S1 (LR)</th>
<th>S2 (SR)</th>
<th>S3 (LM)</th>
<th>S4 (RD)</th>
<th>S5 (sLM)</th>
<th>C1 (MPR)</th>
<th>C2 (WR)</th>
<th>C3 (sLM)</th>
<th>PC1</th>
<th>PC2</th>
<th>PC3</th>
<th>RM1</th>
<th>RM2</th>
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<th>MH</th>
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<td>-1.3</td>
<td>-1.1</td>
<td>-1.0</td>
<td>-1.2</td>
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<td>Minimum Score, SMin</td>
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</tbody>
</table>

**FINAL LEVEL 1 SCORE, S1 ≥ SMin:** 1.5

---

**EXTENT OF REVIEW**

- Exterior: Partial
- Interior: None
- Drawings Reviewed: None
- Soil Type Source: Geologic Hazards Source:
- Contact Person: Chris Jackson

**OTHER HAZARDS**

- Are There Hazards That Trigger A Detailed Structural Evaluation?
  - Pounding potential (unless S2 > cut-off, if known)
  - Falling hazards from taller adjacent building
  - Geologic hazards or Soil Type F
  - Significant damage/deterioration to the structural system

**ACTION REQUIRED**

- Detailed Structural Evaluation Required?
  - Yes, unknown FEMA building type or other building
  - Yes, score less than cut-off
  - Yes, other hazards present
  - No
  - Detailed Structural Evaluation Recommended?
    - Yes
  - No

**Legend:**
- MR = Moment-Resisting frame
- RC = Reinforced concrete
- DR = Braced frame
- SW = Shear wall
- LMR = Unreinforced masonry infill
- TU = Tilt up
- FT = Flexural diaphragm
- ML = Light metal
- RD = Rigid diaphragm

Where information cannot be verified, screener shall note the following: EST = Estimated or unreliable data OR DNK = Do Not Know
Structure 30, Building 22 Photographs

Exterior View

Interior, Exposed Ceiling in Gymnasium

Exterior, Split Level, Out-of-Plane Setback
**Rapid Visual Screening of Buildings for Potential Seismic Hazards**

**FEMA P-154 Data Collection Form**

**Level 1**

**VERY HIGH Seismicity**

**Address:** 84 TN-188

**Zip:** 38382

**Other Identifiers:** 31

**Building Name:** Elementary School

**Latitude:** 35.918988

**Longitude:** -89.124160

**S1:** 1.511

**S2:** 0.532

**Screener(s):** CM

**Date/Time:** 5/13/20

**No. Stories:** Above Grade: 1

**Below Grade:** 0

**Year Built:** 1940

**Code Year:**

**Additions:** None

**Occupancy:** Assembly

**Use:** School

**Soil Type:** A

**Geologic Hazards:** Liquefaction: Yes/No/DK

**Soil:** Hard

**Adjacency:** Pounding

**Type:** Vertical (type/extent)

**Ground Hazard:** Split level

**Irregularities:**

- Vertical (type/extent)
- Split level

**Exterior Failing Hazards:** Chimneys

**COMMENTS:**

- Split level
- Masonry response: H55 cols
- Pounding my addition

**SKETCH**

**PHOTOGRAPH**

**BASIC SCORE, MODIFIERS, AND FINAL LEVEL 1 SCORE, S1**

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<th>FEMA BUILDING TYPE</th>
<th>Do Not Know</th>
<th>W1</th>
<th>W1A</th>
<th>W2</th>
<th>S1 (MRF)</th>
<th>S2 (BR)</th>
<th>S3 (LX)</th>
<th>S4 (RC SCM)</th>
<th>S5 (URM)</th>
<th>S6 (URM)</th>
<th>C1 (MRF)</th>
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<th>RM1</th>
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**EXTENT OF REVIEW**

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<th>Partial</th>
<th>All Sides</th>
<th>Aerial</th>
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</thead>
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<td>Entered</td>
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<tr>
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<td>No</td>
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<tr>
<td>Soil Type Source</td>
<td>Yes</td>
<td>No</td>
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<tr>
<td>Geologic Hazards Source</td>
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</tr>
<tr>
<td>Contact Person</td>
<td>Chuck Jackson</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**OTHER HAZARDS**

- Are There Hazards That Trigger A Detailed Structural Evaluation?
  - Pounding potential (unless S1 > cut-off, if known)
  - Falling hazards from taller adjacent building
  - Significant damage due to seismic effects

**ACTION REQUIRED**

- Detailed Structural Evaluation Required?
  - Yes, unknown FEMA building type or other building
  - Yes, score less than cut-off
  - Yes, other hazards present
  - No

- Detailed Nonstructural Evaluation Recommended? (check one)
  - Yes, nonstructural hazards that should be evaluated
  - No, nonstructural hazards exist that may require mitigation, but a detailed evaluation is not necessary
  - No, no nonstructural hazards identified

**Legend:**

<table>
<thead>
<tr>
<th>MH = Manufactured Housing</th>
<th>PC1 = PCSI</th>
<th>RM1 = RMSI</th>
<th>URM = URM</th>
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<tbody>
<tr>
<td>MR = Moment-Resisting Frame</td>
<td>HC = Reinforced Concrete</td>
<td>RM = Reinforced Masonry</td>
<td>LM = Light Metal</td>
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<tr>
<td>BI = Braced Frame</td>
<td>SW = Shear Wall</td>
<td>TR = Tilt-Up</td>
<td>PD = Piled Foundation</td>
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<tr>
<td>LI = Light Interior</td>
<td>LI = Light Interior</td>
<td>TR = Tilt-Up</td>
<td>PD = Piled Foundation</td>
</tr>
</tbody>
</table>

*Where information cannot be verified, screeners shall note the following: EST = Estimated or unreliable data OR DNK = Do Not Know*
Structure 31, Building 23 Photographs

Exterior, Joint between Structures 31 and 32

Gymnasium

Interior, Damage to Masonry
Rapid Visual Screening of Buildings for Potential Seismic Hazards
FEMA P-154 Data Collection Form

Address: 84 TN - 188
Trenton, TN Zip: 38382

Other Identifiers: 32

Building Name: Elementary School

Use: School

Latitude: 35.9842
Longitude: -89.1234

S1: 1.8
S2: 0.8
Screeners: CM
Date/Time: 5/13 8:30 AM

No. Stories: Above Grade: 1
Below Grade: 0
Year Built: 1914

Total Floor Area (sq. ft.): 14,400

Occupancy: Assembly
Commercial
Industrial
Office
Residential

Soil Type: A
B
C
D
E
F
DNK

Geologic Hazards: LIQUEFACTION: Yes/No
SALT FUNNELLING: Yes/No
SURF. RUPTURE: Yes/No

Adjacency: Pounding
Falling Hazards from Taller Adjacent Building

Irregularities: Vertical (type and severity)
Plan (type)

Exterior Falling Hazards:
Unbraced Chimneys
Parapets
Appendages

COMMENTS:
Reinforced Masonry

---

**SKETCH**

---

**PHOTOGRAPH**

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**BASIC SCORE, MODIFIERS, AND FINAL LEVEL 1 SCORE, \( S_1 \)**

<table>
<thead>
<tr>
<th>FEMA BUILDING TYPE</th>
<th>Do Not Know</th>
<th>W1</th>
<th>W1A</th>
<th>W2</th>
<th>W2A</th>
<th>S1 (MRT)</th>
<th>S2 (SR)</th>
<th>S3 (LM)</th>
<th>S4 (RC)</th>
<th>S5 (URM)</th>
<th>C1 (MRT)</th>
<th>C2 (SR)</th>
<th>C3 (URM)</th>
<th>PC1 (TU)</th>
<th>PC2</th>
<th>RM1 (R3)</th>
<th>RM2 (R5)</th>
<th>URM</th>
<th>MH</th>
</tr>
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<tbody>
<tr>
<td>Basic Score</td>
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<td>2.1</td>
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<td>1.6</td>
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</tr>
</tbody>
</table>

Minimum Score, \( S_{MIN} \): 0.7

**FINAL LEVEL 1 SCORE, \( S_1 = S_{MIN} \):** 0.7

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**EXTENT OF REVIEW**

Exterior: ☐ Partial ☑ All Sides ☐ Aerial
Interior: ☐ None ☑ Visible ☐ Entered

Drawings Reviewed: ☐ Yes ☑ No

Geologic Hazards Source:
Contact Person: Chad Jackson

**LEVEL 2 SCREENING PERFORMED?**

☑ Yes, Final Level 2 Score, \( S_2 \): 2
☐ No

Nonstructural hazards:

Yes ☑ No ☐

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**OTHER HAZARDS**

Are There Hazards That Trigger A Detailed Structural Evaluation?

☐ Pounding potential (unless \( S_2 > S_1 \))
☐ Falling hazards from taller adjacent building
☐ Geologic hazards or Soil Type F
☐ Significant damage/deterioration to the structural system

**ACTION REQUIRED**

Detailed Structural Evaluation Required?

☑ Yes, unknown FEMA building type or other building
☐ Yes, score less than cut-off
☑ Yes, other hazards present
☐ No

Detailed Nonstructural Evaluation Recommended (check one):

☐ Yes, nonstructural hazards identified that should be evaluated
☐ No, nonstructural hazards exist that may require mitigation, but a detailed evaluation is not necessary
☐ No, nonstructural hazards identified

Where information cannot be verified, screeners shall note the following: EST = Estimated or unreliable data DR = DNK = Do Not Know

Legend:
MR = Moment-resisting frame
BR = Bordered frame
SW = Shear wall
TU = Tilt up
DNM = Unreinforced masonry wall
MR = Manufactured Housing
PC = Precast concrete
LH = Light metal
RD = Rapid diagnosis

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Structure 32, Building 23 Photographs

Exterior, Joint between Structures 31 and 32

Previous Exterior of Structure 31, Column Added to Support Addition of Structure 32
Rapid Visual Screening of Buildings for Potential Seismic Hazards
FEMA P-154 Data Collection Form

VITAL INFORMATION

- Address: 56 Nebo Yorkville Rd.
- Yorkville, TN
- Zip: 38269
- Other Identifiers: S3
- Building Name: Elementary School
- Use: School
- Latitude: 36.08742
- Longitude: -89.119842
- S1: 1.796
- S2: 0.602

**SCREENING INFORMATION**

- No. Stories: Above Grade: 1
- Below Grade: None
- Year Built: 1940
- Code Year: 1980
- Cooperative: Yes
- Abandoned: No
- Condition: Good
- Material: Wood
- Story Height: 10 ft
- Average Story Height: 10 ft
- Number of Stories: 1

**SOIL INFORMATION**

- Soil Type: A
- Ground Vibration: 1
- Building Design: Standard
- Story Height: 1 story
- Story Height: 1 story
- Code Year: 1980
- Cooperative: Yes

**LOSS INFORMATION**

- Loss Type: Structural
- Loss Value: $500,000
- Loss Probability: 1 in 50

**COMMENTS**

- Masonry, wooden ceiling
- Steel columns
- Sloping site

**RISK RATING**

- Very High Seismicity
- Level 1

**BASIC SCORE, MODIFIERS, AND FINAL LEVEL SCORE, S1**

<table>
<thead>
<tr>
<th>FEMA BUILDING TYPE</th>
<th>Do Not Know</th>
<th>W1</th>
<th>W1A</th>
<th>W2</th>
<th>W3</th>
<th>S1 (MM)</th>
<th>S2 (BR)</th>
<th>S3 (LM)</th>
<th>S4 (RC)</th>
<th>S5 (URM)</th>
<th>C1 (MRP)</th>
<th>C2 (SW)</th>
<th>C3 (URM INF)</th>
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<th>RM1 (RS)</th>
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<td>Soil Type A or B</td>
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</tbody>
</table>

**FINAL LEVEL 1 SCORE, S1**

- S1: 0.7

**EXTENT OF REVIEW**

- Exterior: Partial
- Interior: Visible
- Drawings Reviewed: Yes
- Soil Type Source: Not Available
- Geologic Hazards Source: Not Available
- Contact Person:

**OTHER HAZARDS**

- Are There Hazards That Trigger A Detailed Structural Evaluation?
  - Yes: 1.2
  - No: 0.0
- Detailed Structural Evaluation Required?
  - Yes: 1.0
  - No: 0.0

**ACTION REQUIRED**

- Detailed Structural Evaluation Recommended?
  - Yes: 1.0
  - No: 0.0

**SUMMARY**

- Final Level 1 Score: 0.7
- Final Level 2 Score: 0.7
- Nonstructural hazards: Yes
- Structural hazards: No

Legend:
- MRE = Moment-resisting frame
- RC = Reinforced concrete
- URM INF = Unreinforced masonry (wall)
- MH = Manufactured Housing
- PD = Pendle diaphragm
- BR = Braced frame
- SW = Shear wall
- TJ = TN up
- LM = Light metal

Where information cannot be verified, screeners shall note the following: EST = Estimated or unreliable data OR DINK = Do Not Know
Structure 33, Building 24 Photographs

Exterior

Interior, Encased Steel Columns

Interior, Sloping Site
Structure 34, Building 25 Photographs

Exterior

Exterior
Structure 35, Building 25 Photographs

Masonry, Visibly Aged

Updated Section (Covered Older Large Window Opening)
Rapid Visual Screening of Buildings for Potential Seismic Hazards
FEMA P-154 Data Collection Form

**Address:** 108 W. Knox St, **BUTTERFIELD, TN** 38369
**Zip:** 38369

**Other Identifiers:** 36

**Building Name:** SLA

**Use:** Elementary School

**Latitude:** 31°12'15"N  **Longitude:** -88°7'56"W

**S:** 1.401  **S:** 0.490

**Screened:** CM  **Date/Time:** 5/20 10:30 AM

**No. Stories:** Above Grade: 1  **Below Grade: 0**

**Total Floor Area (sq. ft.):** 13500

**Code Year:**

**Additions:**

- **Occupancy:** Assembly
- **Commercial**
- **Industrial**
- **Office**
- **Warehouse**
- **Residential**
- **# Units:**

**Soil Type:**

- **Hard Rock**
- **Top Soil**
- **Bottom Soil**

**Geologic Hazards:** Liquefaction: Yes/No DNK  Landslide: Yes/No DNK  Surf. Rupt.: Yes/No DNK

**Adjacency:**

- **Pounding**
- **Falling Hazards**
- **Taller Adjacent Building**

**Irregularities:**

- **Vertical (type/severity)**
- **Plan (type)**

**Exterior Falling Hazards:**

- **Unbraced Chimneys**
- **Heavy Cladding or Heavy Vein**
- **Appendages**

**COMMENTS:**
- Masonry inside
- Brick facade
- Pillars (probably steel)

**SKETCH**

- this form
- other form

**PHOTOGRAPH**

---

### BASIC SCORE, MODIFIERS, AND FINAL LEVEL 1 SCORE, \( S_L \)

<table>
<thead>
<tr>
<th>FEMA BUILDING TYPE</th>
<th>Do Not Know</th>
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<th>W1A</th>
<th>W2</th>
<th>S1 (N/W)</th>
<th>S2 (S/S)</th>
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<th>S4 (URB)</th>
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<th>C3</th>
<th>PC1</th>
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**Minimum Score, \( S_{min} \):** 1.1

**FINAL LEVEL 1 SCORE, \( S_L \):** 1.78

---

### EXTENT OF REVIEW

- **Exterior:** Partial
- **Interior:** None
- **Drawings Reviewed:** Yes
- **Soil Type Source:**
- **Geologic Hazards Source:**
- **Contact Person:** Chad Jackson

---

### OTHER HAZARDS

- Are There Hazards That Trigger A Detailed Structural Evaluation?
- Pounding potential (unless \( S_L > S_2 \))
- Falling hazards from taller adjacent building
- Geologic hazards or Soil Type F
- Significant damage/deterioration to the structural system

### ACTION REQUIRED

- Detailed Structural Evaluation Required?
- Yes, unknown FEMA building type or other building
- Yes, score less than cut-off
- Yes, other hazards present
- No

- Detailed Nonstructural Evaluation Recommended? (check one)
- Yes, nonstructural hazards identified that should be evaluated
- No, nonstructural hazards exist that may require mitigation, but a detailed evaluation is not necessary
- No, no nonstructural hazards identified

Where information cannot be verified, screenee shall note the following: EST = Estimated or unreliable data  DNK = Do Not Know

**Legend:**
- MRF = Moment-resisting frame
- RC = Reinforced concrete
- SW = Shear wall
- LU = Unreinforced masonry
- MS = Masonry sheathing
- RC = Reinforced concrete
- RD = Rigid diaphragm

---

**SKETCH**

- this form
- other form

---

**PHOTOGRAPH**

---
Structure 36, Building 26 Photographs

Interior, Steel Encased Columns (one-room building)
### Rapid Visual Screening of Buildings for Potential Seismic Hazards

**FEMA P-154 Data Collection Form**

#### Level 1

**HIGH Seismicity**

**Address:** 108 N. Knox St, Rutherford, TN 38369

**Other Identifiers:** 37

**Building Name:** Elementary School

**Use:** Kindergarten

**Latitude:** 36.163931

**Longitude:** -88.9887883

**Identification:** 1.401

**Soil:** 0.140

**Screener(s):** CM

**DateTime:** 3/20 10:30 AM

**No. Stories:** Above Grade: 0

**Below Grade: 0

**Year Built:** 1959

**Total Floor Area (sq. ft.):** 12,800

**Code Year:** 0

**Additions:** None

**Occupancy:** Assembly

**Commercial:** Industrial

**Office:** Warehouses

**Residential:** Public

**Soil Type:**
- Hard Rock
- Avg Rock
- Dome Soil
- Soft Soil
- Poor Soil

**Geologic Hazards:** Liquefaction: Yes/No

**Adjacent:** Pounding

**Falling Hazards from Taller Adjacent Building:**

**Irruption:** Vertical (Type/Severity)

**Exterior Falling Hazards:** Unbraced Chimneys

**Other:**

---

**COMMENT:** GYM, STEEL FRAME, STEEL TRUSS CEILING

---

### BASIC SCORE, MODIFIERS, AND FINAL LEVEL 1 SCORE, S_L1

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<th>S2 (BR)</th>
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#### FINAL LEVEL 1 SCORE, S_L1

S_L1 = Smin = 0.5

---

### EXTENT OF REVIEW

**Exterior:** Partial

**Interior:** None

**Drawings Reviewed:** Yes

**Soil Type Source:** Geologic Hazards Source

**Geologic Hazards Source:**

**Contact Person:** [Name]

---

### OTHER HAZARDS

Are There Hazards That Trigger A Detailed Structural Evaluation?

- Yes
- No

- Pounding potential (unless S_L1 > cut-off, if known)

- Falling hazards from taller adjacent building

- Geologic hazards or Soil Type F

- Significant damage or deterioration to the structural system

---

### ACTION REQUIRED

**Detailed Structural Evaluation Required?**

- Yes
- No

**Yes, score less than cut-off**

**Yes, other hazards present**

---

**Detailed Nonstructural Evaluation Recommended?**

- Yes, nonstructural hazards identified that should be evaluated

- No, nonstructural hazards exist that may require mitigation, but a detailed evaluation is not necessary

---

**Additional sketches or comments on separate page**

---

**Where Information cannot be verified, screener shall note the following:**

- EST = Estimated or unreliable data
- DNK = Do Not Know

---

**Legend:**
- MRE = Moment-resisting frame
- RC = Reinforced concrete
- SW = Shear wall
- URM = Unreinforced masonry wall
- MHC = Manufactured Housing
- PD = Flexible diaphragm
- RD = Rigid diaphragm
Structure 37, Building 27 Photographs

Gymnasium, Steel Truss System at Roof

Steel Columns Exposed
Rapid Visual Screening of Buildings for Potential Seismic Hazards
FEMA P-154 Data Collection Form

Address: 322 E. College St.
Dyer, TN
Zip: 38330

Other Identifiers: 38

Building Name: Middle School

Latitude: 36°06'69"N
Longitude: -88°19'25.83"

S| = 1.356
S| = 0.475

Screener(s): CM
Date/Time: 7/14 @ 10:30 AM

No. Stories: Above Grade: 1
Below Grade: 0
Year Built: 1946
Code Year: 0

Additions: None

Occupancy: Assembly

Geologic Hazards: Liquefaction: Yes/No/UNK
Landslide: Yes/No/UNK
Surf. Rupt.: Yes/No/UNK

Adjacency: Pounding
Falling Hazards from Taller Adjacent Building

Irregularities: Vertically (type/severity)

Exterior Falling Hazards: Unbraced Chimneys

Comments:

SKETCH

* Masonry, unreinforced

BASIC SCORE, MODIFIERS, AND FINAL LEVEL 1 SCORE, S1

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<tr>
<td>Soil Type E (≥3 stories)</td>
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</tr>
</tbody>
</table>

EXTENT OF REVIEW

Exterior: Partial
All Sides
Aerial
Contact Person: Chad Jackson

OTHER HAZARDS

Are There Hazards That Trigger A Detailed Structural Evaluation?

□ No
□ Cut-off, if known

□ Falling hazards from taller adjacent building

□ Geologic hazards or Soil Type F

Are There Additional Nonstructural Hazards?

□ Yes
□ No

ACTION REQUIRED

Detailed Structural Evaluation Required?

□ Yes, unknown FEMA building type or other building
□ Yes, score less than cut-off
□ Yes, other hazards present

Nonstructural Evaluation Recommended? (check one)

□ Yes, nonstructural hazards identified that should be evaluated
□ No, nonstructural hazards exist that may require mitigation, but a detailed evaluation is not necessary
□ No, nonstructural hazards identified

Where information cannot be verified, screener shall note the following: EST = Estimated or unreliable data OR DNK = Do Not Know

Legend:
MR = Moment-resisting frame
RC = Reinforced concrete
LM = Light metal
MRF = Manufactured Housing
BR = Braced frame
SW = Shear wall
LMF = Light metal frame
SU = Slab on grade
RD = Rigid diaphragm
TU = Tilt-up
TJ = Tilt-up
Structure 38, Building 28 Photographs

Interior, Aged Masonry

Exterior, Structure 38 Right and 39 Left
Structure 39, Building 28 Photographs

Interior, Joint between Structures 38 and 39

Exterior, Structure 38 Right and 39 Left
Rapid Visual Screening of Buildings for Potential Seismic Hazards
FEMA P-154 Data Collection Form

Level 1
HIGH Seismicity

Address: 322 E. College St., ZTPJ
Zip: 38330

Other Identifiers: 40

Building Name: Elementary/Primary School

Use: Educational

Latitude: 36.08942
Longitude: -88.988267

S1: 1.356
S2: 0.495

Screener(s): CM
Date/Time: 7/4/01 10:53 AM

No. Stories: Above Grade: 4
Below Grade: 0
Year Built: 1956
Code Year: 1958

Additions: None

Occupancy: Education Services

Soil Type: A

Geologic Hazards: Liquefaction: Yes

Adjacency: Pounding

Irregularities: Vertical Type: Split Level, Foundation

Exterior Falling Hazards: Unbraced Chimneys

COMMENTS:
Masonry unreinforced

SKETCH

Additional sketches or comments on separate page

BASIC SCORE, MODIFIERS, AND FINAL LEVEL 1 SCORE, S1

<table>
<thead>
<tr>
<th>FEMA Building Type</th>
<th>Do Not Know</th>
<th>W1</th>
<th>W1A</th>
<th>W2</th>
<th>S1 (NAT)</th>
<th>S2 (SAR)</th>
<th>S4 (PC)</th>
<th>S5 (URM NAT)</th>
<th>C1 (MPF)</th>
<th>C2 (URM INF)</th>
<th>C3 (URM INF)</th>
<th>PC1 (TC)</th>
<th>PC2</th>
<th>RM1 (RE)</th>
<th>RM2 (SE)</th>
<th>URM</th>
<th>MH</th>
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<td>0.4</td>
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<td>-0.4</td>
<td>0.2</td>
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<td>-0.4</td>
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<td>-0.1</td>
<td>-0.1</td>
<td>-0.2</td>
<td>-0.4</td>
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<td>0.3</td>
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<td>0.3</td>
<td>0.2</td>
<td>1.0</td>
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</table>

FINAL LEVEL 1 SCORE, S1 ≥ Smin

EXTENT OF REVIEW

Exterior: Partial
Interior: None
Constructions Reviewed: Yes

OTHER HAZARDS

Are There Hazards That Triggers A Detailed Structural Evaluation?

- Pounding potential
- Falling hazards from taller adjacent building
- Geologic hazards or Soil Type F
- Significant damage/deterioration to the structural system

ACTION REQUIRED

Detailed Structural Evaluation Required?

- Yes, unknown FEMA building type or other building
- Yes, score less than cut-off
- Yes, other hazards present

Detailed Nonstructural Evaluation Required?

- Yes, nonstructural hazards identified that should be evaluated
- No, nonstructural hazards identified that may require mitigation, but a detailed evaluation is not necessary
- No, nonstructural hazards identified

Where information cannot be verified, screener shall note the following: EST = Estimated or unreliable data DNK = Do Not Know

Legend:
BR = Braced frame
RC = Reinforced concrete
LWM = Light wood frame
UMM = Unreinforced masonry
MR = Masonry
PC = Precast concrete
SM = Shear walls
SL = Steel moment resisting frame
MRM = Moment resisting frame
Structure 40, Building 29 Photographs

Exterior, Gym @ Left End, Not Pictured

Exterior, Corner of Structure

Plan View, Structure 40 is L-shape and Green Roof Portion

Structure 41 has a Hallway and Breezeway Connection to Main Building
Structure 41, Building 29 Photographs

Plan View, Structure 40 is L-shape and Green Roof Portion

Structure 41 has a Hallway and Breezeway Connection to Main Building
**Rapid Visual Screening of Buildings for Potential Seismic Hazards**

**FEMA P-154 Data Collection Form**

**Address:** 130 Trenton Hwy

**Zip:** 38330

**Other Identifiers:** Dyers, TN

**Building Name:**

**Use:** High School

**Latitude:** 36.024991

**Longitude:** -88.966588

**S1:**

**S2:**

**Screener(s):**

**Data/Time:**

---

**PHOTOGRAPH**

---

**SKETCH**

---

**BASIC SCORE, MODIFIERS, AND FINAL LEVEL 1 SCORE, S1:**

| FEMA BUILDING TYPE | Do Not Know | W1 | W1A | W2 | W3 | S1 | S2 | S4 | S5 | S6 | S7 | C1 | C2 | C3 | PC1 | PC2 | PC3 | RM1 | RM2 | URM | MH |
|--------------------|-------------|----|-----|----|----|----|----|----|----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|
| Basic Score        |             | 3.8| 3.2 | 2.9| 2.1| 2.1| 2.0| 2.6| 2.0| 1.7| 1.5| 2.0| 1.2| 1.6| 1.4 | 1.7 | 1.7 | 1.0 | 1.5 |
| Severe Vertical Irregularity, V1 |             | -1.2| -1.2 | -1.0| -1.0| -1.1| -1.0| -0.6| -0.9| -1.0| -0.7| -1.0| -0.9| -0.9 | -0.9 | -0.9 | -0.7 | NA |
| Moderate Vertical Irregularity, V2 |             | -0.7| -0.7 | -0.6| -0.6| -0.7| -0.6| -0.5| -0.5| -0.5| -0.5| -0.5| -0.5| -0.5 | -0.5 | -0.5 | -0.5 | NA |
| Plan Irregularity, P |             | -1.1| -1.0 | -0.8| -0.7| -0.9| -0.7| -0.6| -0.6| -0.6| -0.6| -0.6| -0.6 | -0.6 | -0.6 | -0.6 | -0.6 | NA |
| Pre-Code           |             | -1.1| -1.0 | -0.9| -0.6| -0.6| -0.8| -0.6| -0.4| -0.7| -0.5| -0.5| -0.5 | -0.5 | -0.5 | -0.5 | -0.5 | NA |
| Post-Benchmark     |             | 1.6| 1.9 | 2.2| 1.4| 1.4| 1.1| 1.9| NA | 1.9 | 2.1 | NA | 2.0 | 2.4 | 2.1 | NA | 1.2 | 1.2 |
| Soil Type A or B   |             | 0.1| 0.3 | 0.5| 0.4| 0.6| 0.1| 0.6| 0.6 | 0.6 | 0.5 | 0.4 | 0.6 | 0.5 | 0.3 | 0.6 | 0.4 | 0.3 | 0.3 |
| Soil Type E (1-3 stories) |             | 0.2| 0.2 | 0.2| -0.2| -0.4| 0.2 | -0.1| -0.4 | 0.0 | 0.0 | -0.2 | -0.3 | -0.1 | -0.1 | -0.1 | -0.4 | -0.4 |
| Soil Type E (> 3 stories) |             | -0.3| -0.6 | -0.9|-0.6| -0.6| NA | -0.6| -0.4| -0.5| -0.7| -0.3 | NA | -0.4 | -0.6 | -0.2 | NA |
| Minimum Score, Sum |             | 1.1| 0.9 | 0.7| 0.5| 0.5| 0.5 | 0.5 | 0.5 | 0.3 | 0.3 | 0.3 | 0.2 | 0.2 | 0.3 | 0.3 | 0.3 | 0.3 | 1.0 |

**FINAL LEVEL 1 SCORE, S1:**

\[ \sum = 0.2 > 0.3 \]

---

**EXTENT OF REVIEW**

<table>
<thead>
<tr>
<th>Extent of Review</th>
<th>Partial</th>
<th>All Sides</th>
<th>Aerial</th>
</tr>
</thead>
</table>

**Drawings Reviewed:** Yes

**Soil Type Source:**

**Geologic Hazards Source:**

**Contact Person:** Chad Jackson

---

**OTHER HAZARDS**

**Are There Hazards That Trigger A Detailed Structural Evaluation?**

- Pounding potential (unless S2 > cut-off, if known)
- Falling hazards from taller adjacent building
- Geologic hazards or Soil Type F
- Significant damage/deterioration to the structural system

---

**ACTION REQUIRED**

**Detailed Structural Evaluation Required?**

- Yes, unknown FEMA building type or other building
- Yes, score less than cut-off
- Yes, other hazards present
- No

**Detailed Nonstructural Evaluation Recommended? (check one)**

- Yes, nonstructural hazards identified that should be evaluated
- No, nonstructural hazards exist that may require mitigation, but a detailed evaluation is not necessary
- No, no nonstructural hazards identified

---

**LEVEL 2 SCREENING PERFORMED?**

- Yes, Final Level 2 Score, S2
- No

**Nonstructural hazards?**

- Yes
- No

---

**Legend:**

- MFR = Moment-resisting frame
- RC = Reinforced concrete
- BR = Bearing frame
- SM = Steel frame
- TM = Tilt-up
- MU = Masonry Unit
- MT = Modular frame
- MH = Manufactured Housing
- PD = Pile driven
- DR =Diaphragm
- DD = Diaphragm
- LM = Light metal
- HD = Rigid diaphragm
- RM = Rigid frame
- DD = Diaphragm
- SM = Steel frame
- TM = Tilt-up
- MU = Masonry Unit
- MT = Modular frame
- MH = Manufactured Housing
- PD = Pile driven
- DR = Diaphragm
- LM = Light metal
- HD = Rigid diaphragm

**Where information cannot be verified, screener shall note the following:**

- EST = Estimated or unreliable data
- DKN = Do Not Know
Structure 42, Building 30 Photographs

Interior, Ground-Level Entries at Both Gym Floor and at Top of Bleachers

(Split Level)

Joint Between Structure 42 (White Façade into Page) and Structure 44 (Stairs Out of Page)
Structure 43, Building 30 Photographs

Structure 43 is a One Hallway Addition to Structure 42

Concrete Column Exposed
**Rapid Visual Screening of Buildings for Potential Seismic Hazards**

**FEMA P-154 Data Collection Form**

**Address:** 130 Trenton Hwy

**Other Identifiers:**

**Building Name:**

**Use:** High School

**Latitude:** 39.9024149

**Longitude:** -88.9465283

**S1:** 0.71

**S2:** 0.71

**Screener(s):** CM

**DateTime:** 7/19/10: 11:45AM

**No. Stories:** Above Grade: 1

**Total Floor Area (sq. ft.):** 78,300

**Year Built:** 1979

**Code Year:** 1979

**Occupancy:** Assembly

**Soil Type:** Type A

**Geologic Hazards:** liquefaction: Yes/No/DNK

**Adjacency:** Pounding: No

**Irregularities:** Vertical (type/steepness): NC

**Exterior Falling Hazards:** Unbraced Chimneys: No

**COMMENTS:**

C3 as same as original

---

**BASIC SCORE, MODIFIERS, AND FINAL LEVEL 1 SCORE, S1**

<table>
<thead>
<tr>
<th>FEMA Building Type</th>
<th>Do Not Know</th>
<th>W1</th>
<th>W1A</th>
<th>W2</th>
<th>S1 (NMP)</th>
<th>S2 (NMP)</th>
<th>S3 (LM)</th>
<th>S4 (LR)</th>
<th>S5 (UP)</th>
<th>C1 (MP)</th>
<th>C2 (IP)</th>
<th>C3 (UP)</th>
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<th>PC2</th>
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<th>R2M</th>
<th>URN</th>
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<td>2.1</td>
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<td>-0.3</td>
<td>-0.1</td>
<td>-0.1</td>
<td>-0.2</td>
<td>-0.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soil Type E (&gt;3 stories)</td>
<td>-0.3</td>
<td>-0.6</td>
<td>-0.9</td>
<td>-0.6</td>
<td>-0.8</td>
<td>NA</td>
<td>-0.6</td>
<td>-0.4</td>
<td>-0.7</td>
<td>-0.3</td>
<td>NA</td>
<td>-0.4</td>
<td>-0.5</td>
<td>-0.6</td>
<td>-0.2</td>
<td>NA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimum Score, ( S_{MN} )</td>
<td>1.1</td>
<td>0.9</td>
<td>0.7</td>
<td>0.5</td>
<td>0.5</td>
<td>0.6</td>
<td>0.5</td>
<td>0.5</td>
<td>0.3</td>
<td>0.3</td>
<td>0.2</td>
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<td>0.3</td>
<td>0.3</td>
<td>0.2</td>
<td>1.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**FINAL LEVEL 1 SCORE, \( S_1 \), \( 0.3 \geq S_1 \):**

**EXTENT OF REVIEW**

<table>
<thead>
<tr>
<th>Exterior:</th>
<th>Partial</th>
<th>All Sides</th>
<th>Aerial</th>
<th>None</th>
<th>Visible</th>
<th>Entered</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drawings:</td>
<td>Yes</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Geologic Hazards: Source:**

**Contact Person:** Chad Jackson

**LEVEL 2 SCREENING PERFORMED?**

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
</table>

**OTHER HAZARDS**

<table>
<thead>
<tr>
<th>Are There Hazards That Trigger A Detailed Structural Evaluation?</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pounding potential (unless ( S_{2} ) &gt; cut-off, if known)</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Falling hazards from taller adjacent building</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Geologic hazards or Soil Type F</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Significant damage/deleteriation to the structural system</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

**ACTION REQUIRED**

<table>
<thead>
<tr>
<th>Detailed Structural Evaluation Required?</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes, unknown FEMA building type or other building</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Yes, score less than cut-off</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Yes, other hazards present</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Detailed Nonstructural Evaluation Recommended?</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Yes, nonstructural hazards identified that should be evaluated</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>No, nonstructural hazards exist that may require mitigation, but a detailed evaluation is not necessary</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>No, no nonstructural hazards identified</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

**Where information cannot be verified, screeners shall note the following:**

EOT = Estimated or unreliable data

**Legend:**

- MRF = Moment-resisting frame
- RC = Reinforced concrete
- LM = Manufactured Housing
- BR = Braced frame
- SW = Shear wall
- UFH = Unreinforced masonry wall
- TD = Tilt-up
- LD = Light metal
- PD = Pseudio diaphragm
- RD = Rigid diaphragm
Structure 44, Building 30 Photographs

Joint Between Structure 42 (White Façade into Page) and Structure 44 (Stairs Out of Page)

Interior, Split Level
Rapid Visual Screening of Buildings for Potential Seismic Hazards
FEMA P-154 Data Collection Form

Level 1
HIGH Seismicity

Address: 130 Trenton Hwy
Den, IN Zip: 38330

Other Identifiers:
Building Name: High School
Use: High School
Latitude: 38°02'33.94" Longitude: -88°16'41.94"
Sn: 12.796 Sn: 0.497
Screener(s): CM

No. Stories: Above Grade: 4 Below Grade: 0
Year Built: 1979
Total Floor Area (sq. ft.): 45,600
Additions: None

Occupancy: Assembly Commercial Emer. Services Historic Shelter Government
Industrial Office

Soil Type: A Rock B Avg C Dense D Soft E Poor F Soil

Geologic Hazards: Liquefaction: Yes No DNK Landslide: Yes No DNK Surf. Rupt.: Yes No DNK

Adjacency:

Irregularities:

Exterior Falling Hazards:

COMMENTS:

* Masonry, conc., calcs throughout

BASIC SCORE, MODIFIERS, AND FINAL LEVEL 1 SCORE, S1:

<table>
<thead>
<tr>
<th>FEMA BUILDING TYPE</th>
<th>Do Not Know</th>
<th>W1</th>
<th>W1A</th>
<th>W2</th>
<th>S1 (MIT)</th>
<th>S2 (BR)</th>
<th>S4 (PC)</th>
<th>S5 (URM)</th>
<th>C1 (MIT)</th>
<th>C2 (BR)</th>
<th>C3 (URM)</th>
<th>PC1</th>
<th>PC2</th>
<th>R1M</th>
<th>R2M</th>
<th>URM</th>
<th>MH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic Score</td>
<td>3.6</td>
<td>3.2</td>
<td>2.9</td>
<td>2.1</td>
<td>2.0</td>
<td>2.6</td>
<td>2.0</td>
<td>1.7</td>
<td>1.5</td>
<td>2.0</td>
<td>1.2</td>
<td>1.6</td>
<td>1.7</td>
<td>1.7</td>
<td>1.0</td>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td>Severe Vertical Irregularity, V1</td>
<td>-1.2</td>
<td>-1.2</td>
<td>-1.2</td>
<td>-1.0</td>
<td>-1.6</td>
<td>-1.1</td>
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<td>-0.9</td>
<td>-1.0</td>
<td>0.7</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>Moderate Vertical Irregularity, V2</td>
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<td>-0.7</td>
<td>-0.7</td>
<td>-0.6</td>
<td>-0.6</td>
<td>-0.7</td>
<td>-0.6</td>
<td>-0.6</td>
<td>-0.6</td>
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<td>0.5</td>
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</tr>
<tr>
<td>Plan Irregularity, P1</td>
<td>-1.1</td>
<td>-1.0</td>
<td>-1.0</td>
<td>-0.8</td>
<td>-0.7</td>
<td>-0.7</td>
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<tr>
<td>Pre-Codex</td>
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<td>0.5</td>
<td>0.5</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>Post-Benchmark</td>
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<td>0.0</td>
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<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>Soil Type A or B</td>
<td>0.1</td>
<td>0.3</td>
<td>0.5</td>
<td>0.4</td>
<td>0.5</td>
<td>0.1</td>
<td>0.6</td>
<td>0.5</td>
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<td>NA</td>
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<tr>
<td>Soil Type E (1-3 stories)</td>
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<td>0.1</td>
<td>0.2</td>
<td>0.4</td>
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<td></td>
</tr>
<tr>
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<td>0.3</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
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<td></td>
</tr>
</tbody>
</table>

FINAL LEVEL 1 SCORE, S1 ≥ SMM: 4.9

EXTENT OF REVIEW

Exterior: ☑ Partial ☐ All Sides ☑ Aerial
Interior: ☐ None ☑ Visible ☑ Entered
Drawings Reviewed: ☑ Yes ☐ No

Geologic Hazards Source: N/A
Contact Person: [Handwritten]

OTHER HAZARDS

Are There Hazards That Trigger A Detailed Structural Evaluation?
☐ Pounding potential (unless S1 > cut-off, if known)
☐ Falling hazards from taller adjacent building
☐ Geologic hazards or Soil Type F
☐ Significant damage to the structural system

ACTION REQUIRED

Detailed Structural Evaluation Required?
☐ Yes, unknown FEMA building type or other building
☐ Yes, score less than cut-off
☐ Yes, other hazards present
☐ No

Detailed Nonstructural Evaluation Recommended? (check one)
☐ Yes, nonstructural hazards identified that should be evaluated
☐ No, nonstructural hazards exist that may require mitigation, but a detailed evaluation is not necessary
☐ No, nonstructural hazards identified

Legend:
☐ MRF = Moment-resisting frame ☐ RC = Reinforced concrete ☐ DMN Inf = Unreinforced masonry infill
☐ BR = Braced frame ☐ SW = Shear wall ☐ TU = Tilt up
☐ LA = Manufactured Housing ☐ PD = Pile driver
☐ R = Rigid frame ☐ DNK = Do Not Know

Where information cannot be verified, screener shall note the following: EST = Estimated or unreliable data OR DNK = Do Not Know
Structure 45, Building 30 Photographs

Interior, Split Level, Concrete Columns Exposed
**Rapid Visual Screening of Buildings for Potential Seismic Hazards**
**FEMA P-154 Data Collection Form**

**Address:** 101A Tommy Wade Dr., Kenton, TN 38223

**Other Identifiers:** 64

**Building Name:** Elementary School

**Latitude:** 34.92852

**Longitude:** -89.09828

**Ss:** 1.5745

**Ss:** 0.516

**Screener(s):** CM

**Date/Time:** 7/24 @ 11AM

**No. Stories:** Above Grade: 1

**Below Grade:** 0

**Year Built:** 2002

**Total Floor Area (sq. ft.):** 17,700

**Code Year:** 2003

**Additions:** None

**Yes, Year(s) Built:** 2002

**Occupancy:** Assembly

**Industrial:** No

**Commercial:** No

**Human Services:** No

**Finance:** No

**Historic:** No

**Shelter:** No

**Government:** Yes

**Said to be School:** Yes

**Utility:** No

**Residential:** No

**# Units:** 0

**Soil Type:**

- A: Hard Rock
- B: Avg Rock
- C: Avg Soil
- D: Soft Soil
- E: Soft Soils
- F: Poor Soils

**DNK:** If DNK, assume Type D.

**Geologic Hazards:** Liquefaction: Yes

**Landslide:** Yes

**Surf Rupt:** Yes

**Adjacency:**

- Pounding
- No Falling Hazards from Taller Adjacent Building

**Irregularities:**

- Vertical (type/severity)
- Plan (type)

**Exterior Falling Hazards:**

- Unbraced Chimneys
- Heavy Cladding or Heavy Veneer
- Parapets
- Appendages

**COMMENTS:** Masonry, reinforced

---

**SKETCH**

- Additional sketch or comments on separate page

---

### BASIC SCORE, MODIFIERS, AND FINAL LEVEL 1 SCORE, $S_I$

<table>
<thead>
<tr>
<th>FEMA Building Type</th>
<th>Do Not Know</th>
<th>WI</th>
<th>WIA</th>
<th>W2</th>
<th>S1 (NWF)</th>
<th>S2 (BR)</th>
<th>S3 (LM)</th>
<th>S4 (NWF)</th>
<th>S5 (NWF)</th>
<th>C1 (NWF)</th>
<th>C2 (NWF)</th>
<th>C3 (URM)</th>
<th>PC1</th>
<th>PC2</th>
<th>RM1 (FO)</th>
<th>RM2 (FO)</th>
<th>URM</th>
<th>MH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic Score</td>
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<td>3.8</td>
<td>3.2</td>
<td>2.6</td>
<td>2.1</td>
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<td>1.7</td>
<td>1.5</td>
<td>2.0</td>
<td>1.2</td>
<td>1.8</td>
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<td>Severe Vertical Irregularity, $V_{SI}$</td>
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<td>-1.3</td>
<td>-1.3</td>
<td>-1.2</td>
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<td>-0.9</td>
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<td>-0.7</td>
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<td>1.5</td>
</tr>
<tr>
<td>Moderate Vertical Irregularity, $V_{MI}$</td>
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<td>-0.7</td>
<td>-0.7</td>
<td>-0.7</td>
<td>-0.6</td>
<td>-0.6</td>
<td>-0.7</td>
<td>-0.6</td>
<td>-0.5</td>
<td>-0.5</td>
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<td>NA</td>
<td>0.6</td>
<td>0.6</td>
</tr>
<tr>
<td>Plan Irregularity, $P_{PI}$</td>
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<td>-1.1</td>
<td>-1.0</td>
<td>-1.0</td>
<td>-0.8</td>
<td>-0.8</td>
<td>-0.9</td>
<td>-0.7</td>
<td>-0.6</td>
<td>-0.5</td>
<td>-0.5</td>
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<td>-0.5</td>
<td>-0.4</td>
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<td>0.7</td>
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<tr>
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<td>-0.9</td>
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<td>-0.1</td>
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<tr>
<td>Post-Benchmark</td>
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<td>2.2</td>
<td>1.4</td>
<td>1.4</td>
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<td>2.4</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
</tr>
<tr>
<td>Soil Type A or B</td>
<td></td>
<td>0.1</td>
<td>0.3</td>
<td>0.5</td>
<td>0.4</td>
<td>0.6</td>
<td>0.1</td>
<td>0.6</td>
<td>0.5</td>
<td>0.4</td>
<td>0.5</td>
<td>0.3</td>
<td>0.5</td>
<td>0.4</td>
<td>0.5</td>
<td>0.5</td>
<td>0.3</td>
<td>0.3</td>
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<tr>
<td>Soil Type E (1-3 Stories)</td>
<td></td>
<td>0.2</td>
<td>0.2</td>
<td>0.1</td>
<td>-0.2</td>
<td>-0.4</td>
<td>0.2</td>
<td>-0.1</td>
<td>-0.4</td>
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<td>0.2</td>
<td>0.3</td>
<td>0.1</td>
<td>0.1</td>
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<td>-0.4</td>
</tr>
<tr>
<td>Soil Type E (4-3 Stories)</td>
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<td>-0.4</td>
<td>-0.6</td>
<td>-0.2</td>
<td>NA</td>
<td></td>
</tr>
</tbody>
</table>

**Minimum Score, $S_{MIN}$:** 3.1

**FINAL LEVEL 1 SCORE, $S_I = 3.1$**

---

### EXTENT OF REVIEW

- Exterior: Aerial
- Interior: None
- Drawings Reviewed: Yes
- Soil Type: Source: Geologic Hazards Source: 
- Contact Person: Chad Jackson

---

### OTHER HAZARDS

- Are There Hazards That Trigger an Instructed Structural Evaluation?
  - Pounding potential (unless $S_I > 3.1$, if known)
  - Falling hazards from taller adjacent building
  - Geologic hazards or Soil Type F
  - Significant damage/deterioration to the structural system

---

### ACTION REQUIRED

- Detailed Structural Evaluation Required?
  - Yes, unknown FEMA building type or other building
  - Yes, score less than cut-off
  - Yes, other hazards present

- Detailed Nonstructural Evaluation Recommended?
  - Yes, nonstructural hazards identified that should be evaluated
  - Yes, nonstructural hazards exist that may require mitigation, but a detailed evaluation is not necessary
  - No, no nonstructural hazards identified

---

**Legend:**
- BWF = Moment-resisting frame
- PC = Prefabricated concrete
- BR = Braced frame
- SW = Shear wall
- URM INF = Unreinforced masonry infill
- MR = Manufactured housing
- PD = Plate diaphragm
- LM = Light metal
- RD = Rigid diaphragm

Where information cannot be verified, screeners shall note the following: EST = Estimated or unreliable data

**OR**

DNK = Do Not Know
Structure 46, Building 31 Photographs

Structure 46 Lower Roof, Structure 47 Higher Roof
Rapid Visual Screening of Buildings for Potential Seismic Hazards
FEMA P-154 Data Collection Form

Address: 
101A Tommy Wade Dr.
Kenton, TN
Zip: 38283

Other Identifiers:

Building Name: Elementary School/Sheriff Station

Use: Elementary School/Sheriff Station

Latitude: 38.189552
Longitude: -89.008474

Screen(s): CM
Date/Time: 7/17/2011 AM

No. Stories: Above Grade: 1
Below Grade: 0
Year Built: 2007
Code Year: 2012

Total Floor Area (sq. ft.): 4,789

Additions: None
Yes, Year(s) Built: 2007

Occupancy: Assembly

Emer. Services

Commercial

Industrial

Office

Education

Warehouse

Residential

Government

S: 0.816

Soil Type: A

C

D

E

F

DNK

If DNK, assume Type D

Liquefaction: Yes/No

DNSF: Yes/No

Sulf. Rept: Yes/No

Soil Adjacency:

Pounding

Falling Hazards from Taller Adjacent Building

Irregularities:

Plan (type)

Vertical (type/severity)

Unbraced Chimneys

Parapets

Other

Exterior Falling Hazards:

Heavy Cladding or Heavy Veneer

COMMENT:

Masonry reinforced

SKETCH

BASIC SCORE, MODIFIERS, AND FINAL LEVEL 1 SCORE, S_L

FEMA BUILDING TYPE | Do Not Know
--- | ---
W1 | W1A | W2 | W3 | S1 (N/F) | S2 | S3 (URM) | S4 | S5 | S6 | C1 | C2 | C3 (URM) | C4 | C5 | C6 | PC1 | PC2 | PC3 | PC4 | PC5 | PC6 | PC7 | RM1 (RD) | RM2 (RD) | URM | MH
Basic Score | 3.5 | 3.2 | 2.9 | 2.1 | 2.0 | 2.8 | 2.0 | 1.7 | 1.5 | 2.0 | 1.2 | 1.6 | 1.4 | 1.7 | 1.0 | 1.5
Severely Vertical Irregularity, Vr | -1.2 | -1.2 | -1.2 | -1.0 | -1.0 | -1.1 | -1.0 | -0.8 | -0.9 | -1.0 | -0.7 | -1.0 | -0.9 | -0.9 | -0.7 | NA
Moderate Vertical Irregularity, Vm | -0.7 | -0.7 | -0.7 | -0.6 | -0.6 | -0.7 | -0.8 | -0.5 | -0.6 | -0.4 | -0.6 | -0.4 | -0.5 | -0.5 | -0.4 | NA
Plan Irregularity, Pn | -1.1 | -1.0 | -1.0 | -0.8 | -0.7 | -0.9 | -0.7 | -0.7 | -0.6 | -0.5 | -0.7 | -0.6 | -0.5 | -0.5 | -0.4 | NA
Pre-Code | -1.1 | -1.0 | -1.0 | -0.9 | -0.7 | -0.8 | -0.7 | -0.6 | -0.6 | -0.5 | -0.5 | -0.4 | -0.4 | -0.3 | 0.0 | NA
Post-Benchmark | 1.5 | 1.9 | 2.2 | 1.4 | 1.4 | 1.1 | 1.9 | NA | 1.8 | 2.1 | NA | 2.0 | 2.4 | 2.1 | 1.2 | NA
Soil Type A or B | 0.1 | 0.3 | 0.6 | 0.4 | 0.6 | 0.1 | 0.6 | 0.5 | 0.4 | 0.5 | 0.3 | 0.6 | 0.4 | 0.5 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3
Soil Type E (1-3 stories) | 0.2 | 0.2 | 0.1 | -0.2 | -0.4 | 0.2 | -0.2 | -0.4 | 0.0 | 0.0 | -0.2 | -0.3 | -0.1 | -0.1 | -0.2 | -0.4
Soil Type E (4+ stories) | -0.3 | -0.6 | -0.9 | 0.0 | -0.6 | -0.6 | NA | -0.6 | -0.4 | -0.5 | -0.7 | -0.3 | NA | -0.4 | -0.6 | NA | -0.4 | -0.6 | NA | -0.4 | -0.6 | NA
Minimum Score, S_MIN | 1.1 | 0.2 | 0.7 | 0.5 | 0.5 | 0.6 | 0.5 | 0.5 | 0.3 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.3 | 0.2 | 0.3 | 0.2 | 0.2 | 0.3 | 0.2 | 1.0

FINAL LEVEL 1 SCORE, S_L = 3.8

EXTENT OF REVIEW

Exterior: Owner
Interior: None
Drawings Reviewed: Yes
Soil Type Source: Geologic Hazards Source
Geologic Hazards Source:

LEVELE 2 SCREENING PERFORMED?

Yes, Final Level 2 Score, S_L | No
Nonstructural hazards? Yes | No

OTHER HAZARDS

Are There Hazards That Trigger A Detailed Structural Evaluation?

Pounding potential (unless S_L > cut-off, if known)
Falling hazards from taller adjacent building
Geologic hazards or Soil Type F
Significant damage/deterioration to the structural system

ACTION REQUIRED

Detailed Structural Evaluation Required?

Yes, unknown FEMA building type or other building
Yes, score less than cut-off
Yes, other hazards present
No

Detailed Nonstructural Evaluation Recommended? (check one)

Yes, nonstructural hazards identified that should be evaluated
No, nonstructural hazards exist that may require mitigation, but a detailed evaluation is not necessary
No, no nonstructural hazards identified

Where information cannot be verified, screen shall note the following: EST = Estimated or unreliable data
DO = DNK = Do Not Know

Legend:
BR = Braced frame
RC = Reinforced concrete
URM INF = Unreinforced masonry infill
MR = Manufactured housing
DR = Diaphragm
UP = Unreinforced masonry
RM = Residential
M = Masonry
BR = Braced frame
RC = Reinforced concrete
URM INF = Unreinforced masonry infill
MR = Manufactured housing
DR = Diaphragm
UP = Unreinforced masonry
RM = Residential
M = Masonry
BR = Braced frame
RC = Reinforced concrete
URM INF = Unreinforced masonry infill
MR = Manufactured housing
DR = Diaphragm
UP = Unreinforced masonry
RM = Residential
M = Masonry
BR = Braced frame
RC = Reinforced concrete
URM INF = Unreinforced masonry infill
MR = Manufactured housing
DR = Diaphragm
UP = Unreinforced masonry
RM = Residential
M = Masonry
Structure 47, Building 31 Photographs

Structure 46 Lower Roof, Structure 47 Higher Roof
Rapid Visual Screening of Buildings for Potential Seismic Hazards
FEMA P-154 Data Collection Form

Level 1
HIGH Seismicity

Address: 1012A Tammy Wade Dr, Kenton, IN Zip: 38233
Other Identifiers: 48
Building Name: Elementary School
Use: School
Latitude: 36.188247
Longitude: -89.007514
S1: 1.775 S2: 0.516
Screener(s): 0 0 cm Date/Time: 7/24/011 AM
No. Stories: Above Grade: 0 Below Grade: 0 Year Built: 2012 0 EST
Additions: None Yes, Years Built: 
Total Floor Area (sq. ft.): 4000 Code Year: 
Occupancy: Cashier Office School
Industry: Commercial
Facilities: None
Util: Warehouse
Residential, # Units: 
Soil Type: A B C D E F Type DNK
Hard Rock Avg. Dens. Soft Soil
Geologic Hazards: Liquefaction: Yes No DNK Landslide: Yes No DNK Surf. Rupt: Yes No DNK
Adjacency: None
Pounding: None Falling Hazards from Taller Adjacent Building
Adjacencies: None Falling Hazards: None
Rigorous: None
Exterior Falling Hazards: None
Unbraced Chimneys: None Heavy Cladding or Heavy veneer
Irregularities: None Parapets: None
Exterior: None
Other: None

COMMENTS:
Manufactured building
Light steel

SKETCH

PHOTOGRAPH

BASIC SCORE, MODIFIERS, AND FINAL LEVEL 1 SCORE, S1

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<th>W1A</th>
<th>W2</th>
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FINAL LEVEL 1 SCORE, S1 = S1

EXTENT OF REVIEW
Exterior: Partial
Interior: None
Drawings Reviewed: Yes
Soil Type Source: Geologic Hazards: No
Geologic Hazards Source: Contact Person:

OTHER HAZARDS
Are There Hazards That Trigger A Detailed Structural Evaluation?
☐ Pounding potential (unless S2 > cut-off, if known)
☐ Falling hazards from taller adjacent building
☐ Geologic hazards or Soil Type F
☐ Significant damage/deterioration to the structural system

ACTION REQUIRED
Detailed Structural Evaluation Required?
☐ Yes, unknown FEMA building type or other building
☐ Yes, score less than cut-off
☐ Yes, other hazards present

Detailed Nonstructural Evaluation Recommended? (check one)
☐ Yes, nonstructural hazards identified that should be evaluated
☐ No, nonstructural hazards exist that may require mitigation, but a detailed evaluation is not necessary
☐ No, no nonstructural hazards identified

LEVEL 2 SCREENING PERFORMED?
☐ Yes, Final Level 2 Score, S2
☐ No
Nonstructural hazards?
☐ Yes
☐ No

Where information cannot be verified, screener shall note the following:
EST = Estimated or unreliable data
DNK = Do Not Know

Legend:
MHR = Moment-resisting frame
RC = Reinforced concrete
LM = Light metal
UM = Unreinforced masonry
TU = Tilt-up
RC = Rigid diaphragm
BR = Braced frame
SW = Shear wall
UMH = Unreinforced masonry

Additional sketches or comments on separate page.
Structure 48, Building 32 Photographs

Exterior Views, Single Rectangular Manufactured Building
Rapid Visual Screening of Buildings for Potential Seismic Hazards
FEMA P-154 Data Collection Form

Level 1

Address: 9155 Tibbs St., Englewood, FL
Zip: 34024

Other Identifiers: Building Name: Elementary School
Use: Educational

Latitude: 56.003286.13 Longitude: -88.3764164
S: 2.7575 S: 0.836

Screener(s): CM Date/Time: 6/10

No. Stories: Above Grade: 1 Below Grade: 0 Year Built: 1961
Total Floor Area (sq. ft.): 21,700 Code Year: 1961
Additions: None Yes, Years Built: 1965, 1992

Occupancy: Assembly Commercial Emer. Services Historic Shelter
Industrial Office Government

Utilities: Residential
Soil Type: A Hard Rock B Avg. Rock C Dense Soil D Soft Soil E Poor Soil

Geologic Hazards: Liquefaction: Yes/NoDNK Landslide: Yes/NoDNK Surf. Rupt: Yes/NoDNK

Adjacency: Pounding falling Hazards from Taller Adjacent Building

Irregularities: Unknown

Exterior Falling Hazards: Unbraced Chimneys Heavy Cladding or Heavy Veneer

COMMENTS:
- Masonry red iron roof (flexible diaphragm)
- Solid concrete basement

SKETCH

PHOTOGRAPH

Additional sketches or comments on separate page

BASIC SCORE, MODIFIERS, AND FINAL LEVEL 1 SCORE, S₁₇

<table>
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<tr>
<th>FEMA BUILDING TYPE</th>
<th>Do Not Know</th>
<th>W1</th>
<th>W1A</th>
<th>W2</th>
<th>W3</th>
<th>W4</th>
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<th>S2 (BR)</th>
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FINAL LEVEL 1 SCORE, S₁₇ ≥ S₉: 2.3 ≥ 0.3

EXTENT OF REVIEW

Exterior: Partial All Sides Aerial
Interior: None Visible Entered
Draughts Reviewed: Yes No
Soil Type Source: Geologic Hazards Source: Contact Person: [Blank]

OTHER HAZARDS

- Are There Hazards That Trigger a Detailed Structural Evaluation?

- Pounding Potential (unless S₉ > cut-off, if known)

- Falling hazards from taller adjacent building

- Geologic hazards or Soil Type F

- Significant damage/interferon to the structural system

ACTION REQUIRED

Detailed Structural Evaluation Required?
- Yes, unknown FEMA building type or other building
- Yes, score less than cut-off
- Yes, other hazards present
- No

Detailed Nonstructural Evaluation Recommended? (check one)
- Yes, nonstructural hazards identified that should be evaluated
- No, nonstructural hazards exist that may require mitigation, but a detailed evaluation is not necessary
- No, nonstructural hazards identified

Where Information cannot be verified, screen must note the following: EST = Estimated or unreliable data OR DNK = Do Not Know
Structure 49, Building 33 Photographs

Plan View, Bottom Hallway is Structure 49

Exterior

Interior, Split Level

Connection from Structure 49 to 50
Rapid Visual Screening of Buildings for Potential Seismic Hazards
FEMA P-154 Data Collection Form

Level 1

VERY HIGH Seismicity

Address: 725 Tipton St
Dyersburg, TN
Zip: 38024

Other Identifiers:

Building Name:
Use:
Latitude: 35° 41' 34" N
Longitude: -89° 37' 40" W
Ss: 2.745
S: 0.836
Screener(s):
Date/Time:

No. Stories: Above Grade: 1
Below Grade: 0
Year Built: 1964

Additions: None

Occupancy:
Assembly
Commercial
Industrial
Office
Utility
Warehouse
Residential

No. of Stories: 1

Soil Type:
A
B
C
D
E
F
DNK

Geologic Hazards:
Liquefaction: Yes/No
Sandslide: Yes/No
Surf: Yes/No

Adjacency:
Pounding
Falling Hazards from Taller Adjacent Building

Irregularities:
N/A

Exterior Falling Hazards:
Unbraced Chimneys
Parapets
Appendages

COMMENTS:
* Split Level (raised ceiling)

SKETCH

PHOTOGRAPH

BASIC SCORE, MODIFIERS, AND FINAL LEVEL 1 SCORE, S1.5

<table>
<thead>
<tr>
<th>FEMA BUILDING TYPE</th>
<th>Do Not Know</th>
<th>W1</th>
<th>W1A</th>
<th>W2</th>
<th>W3</th>
<th>S1 (MM)</th>
<th>S2 (BR)</th>
<th>S3 (LM)</th>
<th>S4 (RC)</th>
<th>S5 (URM)</th>
<th>S6 (URM)</th>
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</table>

FINAL LEVEL 1 SCORE, S1.5 = 0.7

EXTENT OF REVIEW

Exterior: Partial
Interior: None
Drawings Reviewed: Yes
Geologic Hazards Source: None
Contact Person: R. Baker

OTHER HAZARDS

Are There Hazards That Trigger A Detailed Structural Evaluation?

- Pounding (potential unless Ss > cut-off, if known)
- Failing hazards from taller adjacent building
- Geologic hazards or Soil Type F

ACTION REQUIRED

Detailed Structural Evaluation Required?

- Yes, unknown FEMA building type or other building
- Yes, score less than cut-off
- Yes, other hazards present
- No

Detailed Nonstructural Evaluation Recommended? (check one)

- Yes, nonstructural hazards identified that should be evaluated
- No, nonstructural hazards exist that may require mitigation, but a detailed evaluation is not necessary
- No, no nonstructural hazards identified

Where information cannot be verified, screeners shall note the following: EST = Estimated or unreliable data OR DNK = Do Not Know
Structure 50, Building 33 Photographs

Plan View, Middle Hallways are Structure 50

Previous Courtyards Filled-in to Build Library and Gym

Connection from Structure 49 to 50
Structure 51, Building 33 Photographs

Plan View, Top Hallway is Structure 51

Interior, Reinforced Masonry
Rapid Visual Screening of Buildings for Potential Seismic Hazards
FEMA P-154 Data Collection Form

Level 1

Address: 400 Frank Maynard BLVD
Dyerburg, TN
Zip: 38054
Other Identifiers: 52
Building Name: Middle School
Latitude: 36.033128
Longitude: -89.353331
Ss: 2.189
Sc: 0.801
Screener(s): CM
Date/Time:

No. Stories: Above Grade: □ Below Grade: □ Year Built: 2000
Total Floor Area (sq. ft.): 18,000
Code Year:
Additions: □ None  □ Yes, (Year) Built:
Occupancy: □ Commercial  □ Industrial  □ Emer. Services  □ Historic  □ Shelter
□ Residential  □ Government
Soil Type: □ A  □ B  □ C  □ D  □ E  □ F  □ DK
□ Hard Rock  □ Avg Rock  □ Danza  □ Stiff Soil  □ Soft Soil  □ Poor Soil
□ DNK, assume Type D.
Geologic Hazards: □ Liquefaction: Yes/No/DNK  □ Landslide: Yes/No/DNK  □ Surf. Rupt.: Yes/No/DNK
Adjacency: □ Pounding  □ Falling Hazards from Taller Adjacent Building
Exterior Falling Hazards: □ Unbraced Chimneys  □ Heavy Cladding or Heavy Veneer
□ Parapets  □ Appendages  □ Other:

COMMENTS:
• Split level @ gym (change in roof height)
• Masonry, reinforced
• Non-parallel systems

Additional sketches or comments on separate page

BASIC SCORE, MODIFIERS, AND FINAL LEVEL 1 SCORE, $S_L$

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<th>FEMA BUILDING TYPE</th>
<th>Do Not Know</th>
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<th>W2</th>
<th>W3</th>
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<th>S4 (PC SW)</th>
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FINAL LEVEL 1 SCORE, $S_L = S_{MIN}$

1.9203

EXTENT OF REVIEW

Exterior: □ Partial  □ All Sides  □ Aerial
Interior: □ None  □ Visible  □ Entered
Drawings Reviewed: □ Yes  □ No
Soil Type Source:
Geologic Hazards Source:
Contact Person: Brad Baker

LEVEL 2 SCREENING PERFORMED?
□ Yes, Final Level 2 Score, $S_2$  □ No
Nonstructural hazards? □ Yes  □ No

OTHER HAZARDS

Are there Hazards that Trigger A Detailed Structural Evaluation?
□ Pounding potential (unless $S_L > S_u$)
□ Falling hazards from taller adjacent building
□ Geologic hazards or Soil Type F
□ Significant damage to the structural system

ACTION REQUIRED

Detailed Structural Evaluation Required?
□ Yes, unknown FEMA building type or other building
□ Yes, score less than cut-off
□ Yes, other hazards present
□ No

Detailed Nonstructural Evaluation Recommended? (check one)
□ Yes, nonstructural hazards identified that should be evaluated
□ No, nonstructural hazards exist that may require mitigation, but a detailed evaluation is not necessary
□ No, nonstructural hazards identified  □ DNK

Where information cannot be verified, screener shall note the following: EST = Estimated or unreliable data  OR  DNK = Do Not Know

Legend:
 $MFR$ = Moment-resisting frame  $RC$ = Reinforced concrete  $URM$ INF = Unreinforced masonry wall
 $BR$ = Braced frame  $SW$ = Shear wall  $TO$ = Tilt-up  $ILM$ = Manufactured Housing
 $URR$ INF = Unreinforced concrete wall  $PS$ = Prestressed diaphragm  $RD$ = Rigid diaphragm
Structure 53, Building 35 Photographs

Plan View, Building Layout

Exterior Aerial View
Rapid Visual Screening of Buildings for Potential Seismic Hazards
FEMA P-154 Data Collection Form

Level 1

Address: 125 US-51
Dyersburg, TN Zip: 38024

Other Identifiers:
Building Name: High School
Use: School
Latitude: 36.055556 Longitude: -89.884744
Sq.: 2,340
3: 0.876

Screener(s): CM
Date/Time:

No. Stories: Above Grade: 2 Below Grade: 1 Year Built: 1922 EST
Total Floor Area (sq. ft.): 22,500
Code Year:
Additions: None Yes, Year(s) Built: DK
Occupancy: Assembly Industrial Commercial Emer Services
Industrial Office School
Utility Warehouse Residential, # Units:

Soil Type: □ A □ B □ C □ D □ E □ F □ DK (assum, assume Type D.
Geologic Hazards: Liquefaction: Yes/No/DK
Landslide: Yes/No/DK
Surf. Rupt.: Yes/No/DK

Adjacency: □ Pounding □ Falling Hazards from Taller Adjacent Building

Irregularities: □ Vertical (type/fe:2121)
Plan (type):

Extensive Falling Hazards:
□ Unbraced Chimneys
□ Heavy Cladding or Heavy Veneer
□ Parapets
□ Appendages
□ Other:

COMMENTS:
• Concrete columns throughout

PHOTOGRAPH

SKETCH

BASIC SCORE, MODIFIERS, AND FINAL LEVEL 1 SCORE, $S_L$

<table>
<thead>
<tr>
<th>FEMA BUILDING TYPE</th>
<th>Do Not Know</th>
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<th>S2</th>
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FINAL LEVEL 1 SCORE, $S_L = S_M + S_X$

EXTENT OF REVIEW
Exterior: □ Partial □ All Sides □ Aerial
Interior: □ None □ Visible □ Entered
Drawings Reviewed: Yes □ No
Geologic Hazards Source:
Contact Person: Brad Baker

OTHER HAZARDS
Are There Hazards That Trigger A Detailed Structural Evaluation?
□ Yes, cut-off, if known
□ No

ACTION REQUIRED
Detailed Structural Evaluation Required?
□ Yes, unknown FEMA building type or other building
□ Yes, score less than cut-off
□ Yes, other hazards present
□ No

Detailed Nonstructural Evaluation Recommended? (check one)
□ Yes, nonstructural hazards should be evaluated
□ No, nonstructural hazards exist that may require mitigation, but a detailed evaluation is not necessary
□ No, nonstructural hazards identified

LEVEL 2 SCREENING PERFORMED?
□ Yes, Final Level 2 Score, $S_2$ □ No
Nonstructural hazards?
□ Yes □ No

Where information cannot be verified, screener shall note the following: EST = Estimated or unreliable data DK = Do Not Know

Legend:
MR = Moment-resisting frame
BR = Braced frame
RC = Reinforced concrete
TU = Tilt up
BRC = Unreinforced masonry wall
LM = Manufactured Housing
RD = Rigid diaphragm
Structure 54, Building 36 Photographs

First Floor Plan View

Second Floor Plan View

Interior, Split Level

Interior, Exposed Concrete System

Exterior, Out-of-Plane Setback
Structure 55, Building 37 Photographs

Exterior

Interior, Reinforced Masonry, Flexible Roof System

Interior, Flexible Roof System
Structure 56, Building 38 Photographs

Plan View

Interior, Split Level in Library
Structure 57, Building 39 Photographs

Plan Views

Exterior, Split Level

Interior, Split Level
**Address:** 2546 Jefferson St, Replx, IN 38063

**Building Name:** N/A

**Latitude:** 38.493566666666664

**Longitude:** -89.530585

**S1:** 1.5

**S2:** 0.537

**Screener(s):** CM

**Date/Time:** 6/3

**No. Stories:** Above Grade: 7, Below Grade: 0

**Year Built:** 1946

**Occupancy:** Assembly, Industrial, Office

**Soil Type:** A, B, C, D, E

**Geologic Hazards:** liquefaction: Yes/NoDNK, landslide: Yes/NoDNK, surf.rupt: Yes/NoDNK

**Adjacency:** Pounding, Failing Hazards from Taller Adjacent Building

**Irregularities:** Vertical (type/severity), Plan (type)

**Exterior Falling Hazards:** Unbowed Chimneys, Heavy Cladding or Heavy Veneer

**COMMENTS:** TPO flexible roof, non-parallel systems (plan Irreg.)

**BASIC SCORE, MODIFIERS, AND FINAL LEVEL 1 SCORE, S1f:**

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<th>S2 (BR)</th>
<th>S3 (LH)</th>
<th>S4 (RC)</th>
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**FINAL LEVEL 1 SCORE, S1f = -0.6 = -0.3:**

**EXTENT OF REVIEW:**

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<tr>
<th>Exterior</th>
<th>Interior</th>
<th>Drawings Reviewed</th>
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<td>O. Yock</td>
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**LEVEL 2 SCREENING PERFORMED?**

- Yes, Final Level 2 Score, S2: 0.0
- No, Nonstructural hazards: Yes

**OTHER HAZARDS:**

- Are There Hazards That Trigger A Detailed Structural Evaluation? Yes
- Pounding Potential (unless S2 > cut-off, if known)
- Falling hazards from taller adjacent building
- Geologic hazards or Soil Type F
- Significant damage/deterioration to the structural system

**ACTION REQUIRED:**

- Detailed Structural Evaluation Required?
  - Yes, unknown FEMA building type or other building
  - Yes, score less than cut-off
  - Yes, other hazards present
  - No

- Detailed Nonstructural Evaluation Recommended? (check one)
  - Yes, nonstructural hazards identified that should be evaluated
  - No, nonstructural hazards exist that may require mitigation, but a detailed evaluation is not necessary
  - No, nonstructural hazards identified

**Legend:**
- MHI = Moment-resisting frame
- RC = Reinforced concrete
- BR = Bored beam
- SW = Shear wall
- LRM = Light reinforced masonry
- URM = Unreinforced masonry
- MH = Manufactured housing
- PD = Flexible diaphragm
- TD = Tilt-up
Structure 58, Building 40 Photographs

First Floor Plan View

Second Floor Plan View

Exterior, Out-of-Plane Setback

Interior, Split Level

Exterior, Split Level
Structure 59, Building 40 Photographs

Joints Between Structure 58 and 59

Cracks in Structure, Evidence of Pounding and Deterioration/Settling
Rapid Visual Screening of Buildings for Potential Seismic Hazards
FEMA P-154 Data Collection Form

Address: 254 S. Jefferson St.  Zip: 38063
Other Identifiers: 05
Building Name: Ripley 1 TN
Use: High School/Site
Latitude: 38°13'56"S  Longitude: -89°53'7"W
S1: 1534  S2: 0.537
Screener(s): CM  Date/Time: 6/11

No. Stories: Above Grade: 2  Below Grade: 0  Year Built: 2019 EST  Code Year: 
Total Floor Area (sq. ft.): 13,000
Additions: [ ] None  [ ] Yes, Year(s) Built:
Occupancy: Assembly  Commercial  Industrial  Office  Emer. Services  Historic  Shelter  School  Government  Warehouse  Residential  # Units:

Soil Type: [ ] A  [ ] B  [ ] C  [ ] D  [ ] E  [ ] F  [ ] DNK
Geologic Hazards: Liquidation: [ ] Yes  [ ] No  DNK  Surf. Rupt.: [ ] Yes  [ ] No

Adjacency:  [ ] Pounding  [ ] Failing Hazards from Taller Adjacent Building
Irregularities: [ ] Vertical (type/severity)  [ ] Plan (type)
Exterior Falling Hazards: [ ] Unbraced Chimneys  [ ] Heavy Cladding or Heavy Veneer
[ ] Parapets  [ ] Appendages  [ ] Other:

COMMENTS:
"Conc. (12" thick) + Columns
Safety windows
Gutted & Re-done older building (1980's)
"

Additional sketches or comments on separate page

BASIC SCORE, MODIFIERS, AND FINAL LEVEL 1 SCORE, S1

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FINAL LEVEL 1 SCORE, S1 = Smax:

EXTENT OF REVIEW

Exterior: [ ] Partial  [ ] All Sides  [ ] Aerial
Interior: [ ] None  [ ] Visible  [ ] Entered
Drawings Reviewed: [ ] Yes  [ ] No
Soil Type Source: [ ] Yes  [ ] No
Geologic Hazards Source: [ ] Yes  [ ] No
Contact Person: [ ] Yes  [ ] No
LEVEL 2 SCREENING PERFORMED?

[ ] Yes, Final Level 2 Score, S2 = X  [ ] No
Nonstructural hazards: [ ] Yes  [ ] No

OTHER HAZARDS

Are There Hazards That Trigger A Detailed Structural Evaluation?

[ ] Pounding potential (unless S1 > cut-off, if known)
[ ] Failing hazards from taller adjacent building
[ ] Geologic hazards or Soil Type F
[ ] Significant damage/deterioration to the structural system

ACTION REQUIRED

Detailed Structural Evaluation Required?

[ ] Yes, unknown FEMA building type or other building
[ ] Yes, score less than cut-off
[ ] Yes, other hazards present
[ ] No

Detailed Nonstructural Evaluation Recommended? (check one)

[ ] Yes, nonstructural hazards identified that should be evaluated
[ ] No, nonstructural hazards exist that may require mitigation, but a detailed evaluation is not necessary
[ ] No, no nonstructural hazards identified

Where information cannot be verified, screener shall note the following: EST = Estimated or unreliable data  DNK = Do Not Know

Legend:
LRF = Moment-resisting frame
RU = Reinforced concrete
UMR = Unreinforced masonry wall
TU = Tilting up
MU = Manufactured Housing
DG = Flexible diaphragm
NA = Not Applicable

Where: LRF = Moment-resisting frame
RU = Reinforced concrete
UMR = Unreinforced masonry wall
TU = Tilting up
MU = Manufactured Housing
DG = Flexible diaphragm
NA = Not Applicable
Structure 60, Building 41 Photographs

Plan View of Floors 1 and 2

12” Thick Concrete Walls and Exposed Concrete Columns, Safety Windows
Rapid Visual Screening of Buildings for Potential Seismic Hazards
FEMA P-154 Data Collection Form

Address: 254 Jefferson St. Zip: 58068

Other Identifiers:

Building Name: 
Use: High School
Latitude: 38.036034 Longitude: -104.337853
Ss: 1.3
Sr: 0.334
Screener(s): CM
Date/Time: 6/11

No. Stories: Above Grade: 2 Below Grade: 0 Year Built: 1949 EST Code Year: 
Total Floor Area (sq. ft.): 2,400

Additions: □ None □ Yes, Year(s) Built: 

Occupancy: □ Assembly □ Commercial □ Emer Services □ Historic □ Shelter
□ Industrial □ Office □ Government □ Residential, # Units: □ Warehouse

Soil Type: □ A □ B □ C □ D □ E □ F □ DNK
□ Hard □ Avg □ Dense □ Stiff □ Soft □ Poor □ Soil □ Soil □ Soil

Geologic Hazards: □ Liquefaction: Yes/No □ DNK □ Landslide: Yes/No □ DNK □ Surf. Rupt.: Yes/No □ DNK

Adjacency: □ Pounding □ Falling Hazards from Tower Adjacent Building

Irregularities: □ Vertical (type/severity) □ Plan (type)

Exterior Falling Hazards: □ Unbraced Chimneys □ Heavy Cladding or Heavy Veneer □ Parapets □ Appendages

COMMENTS:

- Reinforced Masonry
- Flexible Roller TPO Roof

SKETCH

PHOTOGRAPH

BASIC SCORE, MODIFIERS, AND FINAL LEVEL 1 SCORE, S_{t1}

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<th>W2</th>
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<th>S2 (DVR)</th>
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<th>S4 (RC DN)</th>
<th>S5 (URM DN)</th>
<th>C1 (MRF)</th>
<th>C2 (SW)</th>
<th>C3 (URM IF)</th>
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FINAL LEVEL 1 SCORE, S_{t1} ≥ S_{min}:

0.5 ≥ 0.3

EXTENT OF REVIEW

Exterior: □ Partial □ All Sides □ Aerial
Internal: □ None □ Visible □ Entered
Drawings Reviewed: □ Yes □ No

Drainage Hazards Source:

Contact Person: 

LEVEL 2 SCREENING PERFORMED?

□ Yes, Final Level 2 Score, S_{r2} □ No Nonstructural hazards?

□ Yes □ No

OTHER HAZARDS

Are There Hazards That Trigger A Detailed Structural Evaluation?

□ Pounding potential (unless S_{r2} > cut-off, if known)
□ Falling hazards from taller adjacent building
□ Geologic hazards or Soil Type F
□ Significant damage or deterioration to the structural system

ACTION REQUIRED

Detailed Structural Evaluation Required?

□ Yes, unknown FEMA building type or other building
□ Yes, score less than cut-off
□ Yes, other hazards present
□ No

Detailed Nonstructural Evaluation Recommended? (check one)

□ Yes, nonstructural hazards identified that should be evaluated
□ No, nonstructural hazards exist that may require mitigation, but a detailed evaluation is not necessary
□ No, nonstructural hazards identified

Where information cannot be verified, screeners shall note the following: EGT = Estimated or unreliable data DRK = Do Not Know

Legend:
□ BR = Braced frame □ RC = Reinforced concrete □ MN = Manufactured Housing □ URM = Unreinforced masonry
□ TU = Tilt-up □ SW = Shear wall □ PD = Flexible diaphragm □ LM = Light metal
□ NR = Moment-resisting frame □ SW = Shear wall □ RS = Rigid diaphragm
□ SH = Shear wall □ FR = Flexible diaphragm □ DR = Diaphragm
□ BR = Braced frame □ RC = Reinforced concrete □ MN = Manufactured Housing □ URM = Unreinforced masonry
□ TU = Tilt-up □ SW = Shear wall □ PD = Flexible diaphragm □ LM = Light metal
□ NR = Moment-resisting frame □ SH = Shear wall □ FR = Flexible diaphragm □ DR = Rigid diaphragm
Structure 61, Building 42 Photographs

Exterior

Interior, Split Level
Structure 62, Building 43 Photographs

Exterior

Interior, Concrete in between Windows

Interior, Cracks
Rapid Visual Screening of Buildings for Potential Seismic Hazards
FEMA P-154 Data Collection Form

**Address:** 3009 Charles Griggs St.
**Zip:** 38063
**Other Identifiers:**

**Building Name:** Middle School

**Latitude:** 35.71.86.95
**Longitude:** -89.55.58.58

**S1:** 1.58.3
**S2:** 1.61.0

**Screener(s):** CM

**No. Stories:** Above Grade: 1
**Below Grade: 0
**Year Built:** 1947 EST

**Additional:** Yes, Year(s) Built:

**Occupancy:** Assembly

**Soil Type:** Hard Rock

**Geologic Hazards:** liquefaction: Yes

**Adjacency:** None

**Irregularities:** Vertical (type/extent)加固

**Exterior Failing Hazards:** Unbraced Chimneys

**COMMENTS:** Masonry reinforced

**Additional sketches or comments on separate page:**

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### BASIC SCORE, MODIFIERS, AND FINAL LEVEL 1 SCORE, $S_{L1}$

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</tbody>
</table>

### EXTENT OF REVIEW

<table>
<thead>
<tr>
<th>Exterior:</th>
<th>Partial</th>
<th>All Sides</th>
<th>Aerial</th>
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</thead>
<tbody>
<tr>
<td>Interior:</td>
<td>None</td>
<td>Visible</td>
<td>Entered</td>
</tr>
<tr>
<td>Drawings Reviewed:</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
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</table>

### OTHER HAZARDS

**Are There Hazards That Trigger A Detailed Structural Evaluation?**

<table>
<thead>
<tr>
<th>Pounding potential (unless $S_{L1} &gt;$ cut-off, if known)</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Falling hazards from taller adjacent building</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Geologic hazards or Soil Type F</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

### ACTION REQUIRED

**Detailed Structural Evaluation Required?**

<table>
<thead>
<tr>
<th>Yes, unknown FEMA building type or other building</th>
<th>Yes, score less than cut-off</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes, other hazards present</td>
<td>No</td>
</tr>
</tbody>
</table>

**Detailed Nonstructural Evaluation Recommended? (check one)**

| Yes, nonstructural hazards identified that should be evaluated | No, no nonstructural hazards identified |

---

Legend:
- MFR = Moment-resisting frame
- RC = Reinforced concrete
- SW = Shear wall
- URM INF = Unreinforced masonry wall
- TF = Till up
- MH = Manufactured Housing
- PD = Flexible diaphragm
- RD = Rigid diaphragm

Where information cannot be verified, screeners shall note the following: EST = Estimated or unreliable data OR DNK = Do Not Know
Structure 63, Building 44 Photographs

Plan View

Interior, Split Level
Rapid Visual Screening of Buildings for Potential Seismic Hazards

FEMA P-154 Data Collection Form

Level 1

VERY HIGH Seismicity

Address: 601 Cameron St.
Halls, TN
Zip: 38040

Other Identifiers: 64

Building Name: Elementary School

Latitude: 35.882508
Longitude: -89.404275

Screened: CM
Date/Time: 6/21

No. Stories: Above Grade: 1
Below Grade: 0

Total Floor Area (sq. ft): 61,949

Year Built: 1978
Code Year: 1996

Occupancy: Assembly

Additions: None

Year(s) Built: 1996

Geologic Hazards: liquefaction: No/Yes

Adjacency: Pounding

Soil Type: A

Exterior Falling Hazards: Unbraced Chimeres

Soil Type: C

Structural: Rigid

Minimum Soil, Sm: 0.7

Basic Score

Severe Vertical Irregularity, V1: 0.2

Moderate Vertical Irregularity, V2: 0.1

Plan Irregularity, P1: 0.1

Pre-Codes: 0.1

Post-Benchmark: 0.1

Soil Type A or B: 0.1

Soil Type E (1-3 stories): 0.1

Soil Type E (4-3 stories): 0.1

Minimum Score, Sm: 0.7

Extensive Review

Exterior: Partial

Interior: None

Drawings Reviewed: Yes

Soil Type Source: Yes

Geologic Hazards Source: Yes

LEAVE PERSON: Donnie York

ACTION REQUIRED

Where information cannot be verified, screener shall note the following:

EST = Estimated or unreliable data
DNK = Do Not Know
Structure 64, Building 45 Photographs

Plan View

Interior
Structure 65, Building 45 Photographs

Interior, Sloping Site

Interior, Gymnasium, Flexible Diaphragm Roof
Structure 66, Building 46 Photographs

Structure 66 is Green Portion

Interior, Evidence of Split Level

Exterior
Address: 800 W. Tigue St.
Halls, TN 38040

Other Identifiers: 67

Building Name: High School

Use: School

Latitude: 35.8477162
Longitude: -89.404695

Sc: 1.085
S: 0.147

Screeener(s): [Names]
Date/Time: 6/11

No. Stories: Above Grade: 1
Below Grade: 0
Year Built: 1947

Additions: None
Yes, Year (s) built: 1947

Occupancy: Assemble
Commercial
Emergency Services
Industrial
Office
Residential

Soil Type: [Descriptions]

Geologic Hazards: Liquefaction: Yes/No, DNK
Landslide: Yes/No, DNK
Surf. Rupt.: Yes/No, DNK

Adjacency: Pounding
Falling Hazards from Taller Adjacent Building

Irregularities: No
Parallelity

Exterior Falling Hazards: Unbraced Chimneys
Heavy Creding or Heavy Venter
Parapets
Appendages
Other:

COMMENTS:
BUR, Asphalt, flexible roof
Reinf. Masonry

BASIC SCORE, MODIFIERS, AND FINAL LEVEL 1 SCORE, $S_{1}$

<table>
<thead>
<tr>
<th>FEMA BUILDING TYPE</th>
<th>Do Not Know</th>
<th>W1</th>
<th>W2</th>
<th>W3</th>
<th>W4</th>
<th>W5</th>
<th>W6</th>
<th>W7</th>
<th>W8</th>
<th>W9</th>
<th>S1 (MVP)</th>
<th>S2 (BR)</th>
<th>S3 (LM)</th>
<th>S4 (RC)</th>
<th>S5 (RVM)</th>
<th>S6 (RVM)</th>
<th>C1 (MBF)</th>
<th>C2 (SAW)</th>
<th>C3 (EMA)</th>
<th>PC1</th>
<th>PC2</th>
<th>RM1 (TD)</th>
<th>RM2 (SD)</th>
<th>URM</th>
<th>MH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic Score</td>
<td>2.1</td>
<td>1.9</td>
<td>1.8</td>
<td>1.5</td>
<td>1.4</td>
<td>1.8</td>
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<td>1.0</td>
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<td></td>
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<tr>
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<td>-0.9</td>
<td>-0.9</td>
<td>-0.8</td>
<td>-0.8</td>
<td>-0.7</td>
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<td></td>
</tr>
<tr>
<td>Moderate Vertical Irregularity, V$_{2r}$</td>
<td>-0.6</td>
<td>-0.6</td>
<td>-0.5</td>
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<tr>
<td>Soil Type E (&gt; 3 stories)</td>
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</tr>
</tbody>
</table>

Minimum Score, $S_{1}$ = 0.5

FINAL LEVEL 1 SCORE, $S_{1} \geq S_{min}$

EXTENT OF REVIEW

Exterior: Partial
All Sides
Aerial

Interior: None
Visible
Entered

Drawings Reviewed: Yes
No

Geologic Hazards Source:

Contact Person: Donnie York

OTHER HAZARDS

Are There Hazards That Trigger A Detailed Structural Evaluation?

- Pounding potential (unless $S_{1} >$ cut-off, if known)
- Falling hazards from taller adjacent building
- Geologic hazards or Soil Type F
- Significant damage to the structural system

ACTION REQUIRED

Detailed Structural Evaluation Required?

- Yes, unknown FEMA building type or other building
- Yes, score less than cut-off
- Yes, other hazards present
- No

Detailed Nonstructural Evaluation Recommended? (check one)

- Yes, nonstructural hazards identified that should be evaluated
- No, nonstructural hazards exist that may require mitigation, but a detailed evaluation is not necessary
- No, nonstructural hazards identified

Legend:

- DFR = Moment-resisting frame
- BR = Beam-frame
- SW = Shear wall
- SME = Unreinforced masonry wall
- MRM = Manufactured Frame
- TU = Tilt-up
- LM = Light metal
- RD = Rapid displacement
Structure 67, Building 46 Photographs

Structure 67 is Yellow Portion

Exterior
**Rapid Visual Screening of Buildings for Potential Seismic Hazards**

**FEMA P-154 Data Collection Form**

**Level 1**

**Very High Seismicity**

**Address:** 4604 N. Tipton St.,
Long Beach, IN 46360, Zip: 46360

**Other Identifiers:**

**Building Name:** High School

**Latitude:** 38.9140294
**Longitude:** -87.4051795

**Ss:** 1,735
**Sr:** 0.617

**Screener(s):** CM
**Date/Time:** 6/11

**No. Stories:** Above Grade: -
Below Grade: 0
**Year Built:** 1960

**Total Floor Area (sq. ft.):**

**Additions:** None

**Occupancy:**
- Assembly
- Commercial
- Industrial
- Office
- Retail
- Warehouse
- Residential

**Soil Type:**
- A: Hard Rock
- B: Clay
- C: Silt
- D: Sand
- E: Gravel
- F: Poor Soil

**Geologic Hazards:**
- Liquefaction: Yes
- DNK: Assume Type D

**Adjacency:**
- Split Level
- R-TV: Centrally

**Exterior Falling Hazards:**
- Unbraced Chimneys
- Heavy Cladding or Heavy Veneer
- Parapets
- Appendages

**COMMENTS:**
- Reinforced Masonry
- Flexible Gym

---

**BASIC SCORE, MODIFIERS, AND FINAL LEVEL 1 SCORE, S_L**

<table>
<thead>
<tr>
<th>FEMA Building Type</th>
<th>Do Not Know</th>
<th>W1</th>
<th>W1A</th>
<th>W2</th>
<th>S1 (WFR)</th>
<th>S2 (SH)</th>
<th>S3 (LM)</th>
<th>S4 (RC)</th>
<th>S5 (SA)</th>
<th>C1 (MR)</th>
<th>C2 (SA)</th>
<th>C3 (UM)</th>
<th>PC1 (TU)</th>
<th>PC2 (TU)</th>
<th>RM1 (RD)</th>
<th>RM2 (RD)</th>
<th>URM</th>
<th>MH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic Score</td>
<td>2.1</td>
<td>1.9</td>
<td>1.8</td>
<td>1.6</td>
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<td>0.9</td>
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<tr>
<td>Moderate Vertical Irregularity, V_{MR}</td>
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<tr>
<td>Post-Benchmark</td>
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</tr>
<tr>
<td>Soil Type A or B</td>
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<td>0.4</td>
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</tr>
<tr>
<td>Soil Type E (3 stories)</td>
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<td>-0.2</td>
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<tr>
<td>Minimum Score, S_min</td>
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<td></td>
</tr>
</tbody>
</table>

**FINAL LEVEL 1 SCORE, S_L = S_min: 0.3**

**EXTENT OF REVIEW**

- Exterior: N
- Interior: N
- Drawings Reviewed: N
- Soil Type Source: N
- Geologic Hazards Source: N
- Contact Person: Donnie Young

**LEVEL 2 SCREENING PERFORMED?**
- Yes, Final Level 2 Score, S_L: 0.3
- Nonstructural hazards: N

**OTHER HAZARDS**

**ACTION REQUIRED**

- Detailed Structural Evaluation Required?
  - Yes, unknown FEMA building type or other building
  - Yes, score less than cut-off
  - Yes, other hazards present
  - No

- Detailed Nonstructural Evaluation Recommended? (check one)
  - Yes, nonstructural hazards identified
  - No, nonstructural hazards exist that may require mitigation, but a detailed evaluation is not necessary
  - No, nonstructural hazards identified

**Legend:**
- MFR = Moment-resisting frame
- RC = Reinforced concrete
- BR = Braced frame
- SW = Shear wall
- LRM INF = Unreinforced masonry infill
- TU = Tilt-up
- MH = Manufactured Housing
- FD = Flexible diaphragm
- LD = Light diaphragm
- RD = Rigid diaphragm

**Where information cannot be verified, screeners shall note the following:**

**EST = Estimated or unreliable data**

**DNK = Do Not Know**
Structure 68, Building 46 Photographs

Structure 68 is Red Portion
Rapid Visual Screening of Buildings for Potential Seismic Hazards
FEMA P-154 Data Collection Form

V. HIGH Seismicity

Address: 8800 N. Tigner St
Halts, TN
Zip: 38040

Other Identifiers:

Building Name: High School
Use: School
Latitude: 35.8949373
Longitude: -89.1057473
S: 1.325
S: 0.617

Screen(s): CM
Date/Time: 6/11

No. Stories: Above Grade: 2
Below Grade: 0
Year Built: 1997 EST
Code Year:

Total Floor Area (sq. ft.): 172,915

Occupancy: Assembly
Commercial
Industrial
Office
Utility

Soil Type:
A
B
C
D
E
F
DNK

Geologic Hazards:
Liquefaction: Yes/No
DNK

Adjacency:
Pounding: No
Falling Hazards from Taller Adjacent Building: No

Irregularities:
Vertical (type/severity):
Split Level/ma

Exterior Falling Hazards:
Unbraced Chimneys: No
Heavy Cladding or Heavy Veneer: No

COMMENTS:
Lat: 35, 880,824
Long: -89,104,591
ITP (flexible) Roof
start gravel 3-ply roof
RMI

FEMA BUILDING TYPE
Do Not
Know
W1
W1/A
W2
S1 (MR)
S2 (BR)
S3 (LM)
S4 (DC)
S5 (URM)
C1 (MR)
C2 (BR)
C3 (LM)
C4 (DC)
PC1 (TU)
PC2
RM1 (FD)
RM2 (RC)
URM

Basic Score
Severe Vertical Irregularity, V1:
-0.6
-0.5
-0.4
-0.3
-0.2
-0.1
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0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0

Minimum Score: 0.5

FINAL LEVEL 1 SCORE, SL1:

EXTENT OF REVIEW
Exterior: Partial
Interior: None

Drawings Reviewed: Yes

SOIL TYPE SOURCE:
Geologic Hazards Source:

Contact Person: Donna York

OTHER HAZARDS
Are There Hazards That Trigger A Detailed Structural Evaluation?

ACTION REQUIRED
Detailed Structural Evaluation Required?

Detailed Nonstructural Evaluation Recommended?

WHERE INFORMATION CANNOT BE VERIFIED, REVIEWER SHALL NOTE THE FOLLOWING: EST = Estimated or unreliable data
DNK = Do Not Know

Legend:
MR = Moment-resisting frame
BR = Braced frame
DC = Reinforced concrete
URM = Unreinforced masonry
RH = Reinforced masonry infill
MD = Puddled masonry
TM = Timber frame
W = Wood frame
LM = Light metal
FD = Flexible diaphragm
RC = Rigid diaphragm

Nonstructural hazards: Yes
Nonstructural hazards: No

Where information cannot be verified, reviewer shall note the following: EST = Estimated or unreliable data
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Legend:
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Nonstructural hazards: Yes
Nonstructural hazards: No

Where information cannot be verified, reviewer shall note the following: EST = Estimated or unreliable data
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Nonstructural hazards: Yes
Nonstructural hazards: No

Where information cannot be verified, reviewer shall note the following: EST = Estimated or unreliable data
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Nonstructural hazards: Yes
Nonstructural hazards: No

Where information cannot be verified, reviewer shall note the following: EST = Estimated or unreliable data
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FD = Flexible diaphragm
RC = Rigid diaphragm

Nonstructural hazards: Yes
Nonstructural hazards: No

Where information cannot be verified, reviewer shall note the following: EST = Estimated or unreliable data
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RH = Reinforced masonry infill
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TM = Timber frame
W = Wood frame
LM = Light metal
FD = Flexible diaphragm
RC = Rigid diaphragm

Nonstructural hazards: Yes
Nonstructural hazards: No

Where information cannot be verified, reviewer shall note the following: EST = Estimated or unreliable data
DNK = Do Not Know
Structure 69, Building 47 Photographs

Plan View

Exterior

Interior, Split Level
Rapid Visual Screening of Buildings for Potential Seismic Hazards
FEMA P-154 Data Collection Form

Level 1

Address: 528 US-51 N. Troy, TN
Zip: 38260

Other Identifiers: 40

Building Name: High School
Use:

Latitude: 35°34'31"N Longitude: -89°15'58"W

Sc: 1.821 S: 0.652

Screener(s): CM Date/Time: 5/11

No. Stories: Above Grade: 2 Below Grade: 0 Year Built: 2006

Total Floor Area (sq. ft.): 188,000 Code Year: 2011

Additions: None Yes, Year(s) Built: 2011

Occupancy: Assembly Commercial Emer. Services
Industrial Office School

Utility: Warehouse Residential, # Units:

Soil Type: A B C D E F DNK

Geologic Hazards: Liquifaction: Yes/No/DNK Landslide: Yes/No/DNK Surf. Rupt.: Yes/No/DNK

Adjacency: Pounding Failing Hazards from Taller Adjacent Building

Irregularities: Vertical type/severity OSF/severe split level Modern
c E-re-entrant corner

Exterior Falling Hazards: Unbraced Chimneys Heavy Cladding or Heavy Veneer

Parapets Appendages

Other:

COMMENTS:
Steel Frame

SKETCH

PHOTOGRAPH

BASIC SCORE, MODIFIERS, AND FINAL LEVEL 1 SCORE, S1

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<th>FEMA BUILDING TYPE</th>
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<th>W1A</th>
<th>W2</th>
<th>S1 (MI)</th>
<th>S2 (IR)</th>
<th>S3</th>
<th>S4 (SC)</th>
<th>S5 (URM, IBC)</th>
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<th>C2 (SC)</th>
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</table>

FINAL LEVEL 1 SCORE, S1 ≥ Smin: -0.2 ≥ 0.5

EXTENT OF REVIEW

Exterior: Partial All Sides Aerial
Interior: None Visible Entered

Drawings Reviewed: Yes No

Geologic Hazards Source:
Contact Person: [Name]

OTHER HAZARDS

Are There Hazards That Trigger A Detailed Structural Evaluation?
No

Yes, cut-off, if known

Pounding potential (unless S1 > cut-off, if known)

Falling hazards from taller adjacent building

Geologic hazards or Soil Type F

Significant damage to/recordation to the structural system

ACTION REQUIRED

Detailed Structural Evaluation Required?
Yes, unknown FEMA building type or other building
Yes, score less than cut-off
Yes, other hazards present
No

Detailed Nonstructural Evaluation Recommended? (check one)
Yes, nonstructural hazards identified that should be evaluated
No, nonstructural hazards exist that may require mitigation, but a detailed evaluation is not necessary
No, no nonstructural hazards identified

Where information cannot be verified, screener should note the following: EST = Estimated or unreliable data DNK = Do Not Know

Legend:
MR = Moment-resisting frame
BR = Braced frame
RC = Reinforced concrete
URM = Unreinforced masonry wall
TU = Tilt up
LM = Light metal
RD = Rigid diaphragm
Structure 70, Building 48 Photographs

Exterior, Split Level

Interior, Steel Framing Exposed

Firewall Between Structures 70 and 71
### Rapid Visual Screening of Buildings for Potential Seismic Hazards

**FEMA P-154 Data Collection Form**

**Level 1**

**VORY HIGH Seismicity**

**Address:** 528 Us-S1N, Yre-Kev, CA 3820

**Building Name:** High School

**Latitude:** 38.41381

**Longitude:** -114.55416

**Copy:** CM

**Date/Time:** 5/31

**No. Stories:** Above Grade: 2, Below Grade: 0

**Total Floor Area (sq. ft.):** 37,638

**Year Built:** 2011

**Occupancy:** Assembly, Commercial, Educational, Public, Residential, Historic, Government

**Soil Type:** D, E

**Geologic Hazards:** Liquidation: Yes, No, DNK

**Exterior Falling Hazards:** Unbraced Chimneys, Heavy Cladding or Heavy Veneer

**Comments:**

### BASIC SCORE, MODIFIERS, AND FINAL LEVEL 1 SCORE, SLF

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<th>FEMA BUILDING TYPE</th>
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<th>W1A</th>
<th>W2</th>
<th>S1 (BR)</th>
<th>S3 (LM)</th>
<th>S4 (RC SW)</th>
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<td>Soil Type A (1-3 stories)</td>
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<td>Soil Type B (1-3 stories)</td>
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</tbody>
</table>

**FINALE LEVEL 1 SCORE, SLF ≥ SW1:** 0.7

### EXTENT OF REVIEW

**Exterior:** Partial

**Interior:** All Sides

**Drawings Reviewed:** Yes

**Soil Type Source:** Entered

**Geologic Hazards Source:** Yes

### OTHER HAZARDS

**Are There Hazards That Trigger A Detailed Structural Evaluation?** Yes

**If Yes, what is the triggering hazard?** Nonstructural hazards

**If Yes, other hazards present** No

**Detailed Nonstructural Evaluation Recommended?** Yes

### ACTION REQUIRED

**Detailed Structural Evaluation Required?** Yes, unknown FEMA building type or other building

**If Yes, score less than cut-off** No

**If Yes, other hazards present** No

**If Yes, other hazards present** No

**Detailed Nonstructural Evaluation Recommended?** Yes, nonstructural hazards identified that should be evaluated

**If Yes, nonstructural hazards exist that may require mitigation, but a detailed evaluation is not necessary** No

**If No, nonstructural hazards identified** No

---

**Legend:**
- **MR = Moment-resisting frame**
- **RC = Reinforced concrete**
- **SM = Shear wall**
- **UMR = Unreinforced masonry wall**
- **MH = Manufactured Housing**
- **PR = Pile foundation**
- **LD = Light steel**
- **RD = Rigid diaphragm**

**Where information cannot be verified, screener shall note the following:** EST = Estimated or unreliable data DNK = Do Not Know
Structure 71, Building 48 Photographs

Interior, Steel Columns Encased (Left) and Exposed (Right)

Firewall Between Structures 70 and 71
Rapid Visual Screening of Buildings for Potential Seismic Hazards
FEMA P-154 Data Collection Form

**VERY HIGH Seismicity**

Address: 1285 N. Highway 45 Bypass
Union City, TN 38261

**PHOTOGRAPH**

**SKETCH**

- **Comments:** Reinforced Masonry

**BASIC SCORE, MODIFIERS, AND FINAL LEVEL 1 SCORE, \( S_{L1} \)**

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</table>

**FINAL LEVEL 1 SCORE, \( S_{L1} \geq S_{\text{MIN}} \):**

\[ S_{L1} = 0.1 \geq 0.3 \]

**EXTENT OF REVIEW**

- Exterior: Partial
- Interior: None
- Drawings Reviewed: Yes
- Soil Type Source: Yes
- Geologic Hazards Source: No
- Contact Person: Phil Graham

**LEVEL 2 SCREENING PERFORMED?**

- Yes, Final Level 2 Score, \( S_{L2} \): No
- Nonstructural hazards? Yes

**OTHER HAZARDS**

- Are There Hazards that Trigger a Detailed Structural Evaluation?
- Pounding potential (unless \( S_{L} \) > cut-off, if known)
- Falling hazards from taller adjacent building
- Significant damage/deterioration to the structural system
- Geologic hazards or Soil Type F

**ACTION REQUIRED**

- Detailed Structural Evaluation Required?
  - Yes, unknown FEMA building type or other building
  - Yes, score less than cut-off
  - Yes, other hazards present
  - No
- Detailed Nonstructural Evaluation Recommended? (check one)
  - Yes, nonstructural hazards identified that should be evaluated
  - No, nonstructural hazards exist that may require mitigation, but a detailed evaluation is not necessary
  - No, no nonstructural hazards identified
  - DNK

**Legend:**
- MRF = Moment-resisting frame
- RCR = Reinforced concrete
- FR = Frame
- SW = Shear wall
- URM = Unreinforced masonry fill
- MH = Manufactured Housing
- PD = Plokkid diaphragm
- LD = Ledge diaphragm
- URW = Unreinforced masonry wall
- TU = Tieup
- LI = Light insanity
- DM = Detail mark

Where information cannot be verified, screenee shall note the following: EST = Estimated or unreliable data DNK = Do Not Know
Structure 72, Building 49 Photographs

Plan View

Flexible Diaphragm Roof

Small Hallway Addition
### BASIC SCORE, MODIFIERS, AND FINAL LEVEL 1 SCORE, S₁

<table>
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<tr>
<th>FEMA BUILDING TYPE</th>
<th>Do Not Know</th>
<th>W1</th>
<th>W1A</th>
<th>W2</th>
<th>S₁ (N/W)</th>
<th>S₂ (BR)</th>
<th>S₃ (LM)</th>
<th>S₄ (SP)</th>
<th>S₅ (SMF)</th>
<th>C₁</th>
<th>C₂ (NF)</th>
<th>C₃ (URM)</th>
<th>PC₁</th>
<th>PC₂</th>
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</table>

### FINAL LEVEL 1 SCORE, S₁ ≥ Sₘₕₚ

\[ 0.6 > 0.5 \]

### EXTENT OF REVIEW

- Exterior: ☑ Partic Parial ☑ All Sides ☑ Aerial
- Interior: ☑ None ☑ Visible ☑ Entered
- Drawings Reviewed: ☑ Yes ☑ No
- Soil Type Source: ☑ Yes ☑ No
- Geologic Hazards Source: Contact Person: Phil Graham

### OTHER HAZARDS

- Are There Hazards That Trigger A Detailed Structural Evaluation?
  - Pounding potential (unless S₂ > cut-off, if known)
  - Falling hazards from taller adjacent building
  - Geologic hazards or Soil Type F
  - Significant damage/destruction to the structural system

### ACTION REQUIRED

- Detailed Structural Evaluation Required?
  - Yes, unknown FEMA building type or other building
  - Yes, score less than cut-off
  - Yes, other hazards present
  - No

### LEVEL 2 SCREENING PERFORMED?

- ☑ Yes, Final Level 2 Score, S₂
- ☑ No

- ☑ Nonstructural hazards? ☑ Yes ☑ No

- ☑ No nonstructural hazards identified ☑ DK

### Where information cannot be verified, scheduler shall note the following: EST = Estimated or unreliable data DK = Do Not Know

---

**Legend:**
- BR = Braced frame
- SC = Shear wall
- SM = Shear mem
- URM = Unreinforced masonry
- R = Reinforced concrete
- TM = Tilt-up
- M = Manufactured housing
- D = Ductile
- FR = Flexible diaphragm
- P = Partial
- L = Light steel
Structure 73, Building 50 Photographs

Plan View

Interior, Split Level
Rapid Visual Screening of Buildings for Potential Seismic Hazards
FEMA P-154 Data Collection Form

Level 1
HIGH Seismicity

Address: 209 John C. Jones
South Fulton, IN 38257

Other Identifiers: 14

Building Name: Elementary School

Latitude: 36°48'56"N
Longitude: -88°57'49"W

S1: 1.199
S2: 0.410

Screener(s): CM

No. Stories: Above Grade: 1
Below Grade: 0
Year Built: 1980
Code Year: 1980

Total Floor Area (sq. ft.): 5,600

Occupancy: Assembly

Soil Type: MI

Geologic Hazards: Liquefaction: Yes

Adjacency: Pounding: No

Irregularities: Vertical irregularity: None
Plan irregularity: None

Exterior Falling Hazards: Unbraced chimneys: No

COMMENTS:
Reinforced Masonry

BASIC SCORE, MODIFIERS, AND FINAL LEVEL 1 SCORE, S1

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<th>FEMA Building Type</th>
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<th>W2</th>
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<th>S2 (MRF)</th>
<th>S3 (UMF)</th>
<th>S4 (ERM)</th>
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<th>C3</th>
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</table>

Minimum Score, S\text{MIN} = 1.1

FINAL LEVEL 1 SCORE, S1 = S\text{MIN} = 1.1

EXTENT OF REVIEW
Exterior: \[\checkmark\] Partial \[\checkmark\] All Sides \[\checkmark\] Aerial
Interior: \[\checkmark\] None \[\checkmark\] Visible

Other HAZARDS
Are There Hazards That Trigger A Detailed Structural Evaluation?
- Yes
- No

Detailed Structural Evaluation Required?
- Yes, unknown FEMA building type or other building
- Yes, score less than cutoff
- Yes, other hazards present
- No

Detailed Nonstructural Evaluation Recommended? (check one)
- Yes, nonstructural hazards identified that should be evaluated
- No, nonstructural hazards exist that may require mitigation, but a detailed evaluation is not necessary
- No, no nonstructural hazards identified

ACTION REQUIRED
- Detailed Structural Evaluation Required?
- Detailed Nonstructural Evaluation Required?
Rapid Visual Screening of Buildings for Potential Seismic Hazards
FEMA P-154 Data Collection Form

Address: 1130 E. Hwy 22
Union City, TN 38261
Zip: 38261

Other Identifiers: FE

Building Name: Elementary School
Use: Educational

Latitude: 34.497604
Longitude: -89.133471

S1: 1.687
S2: 0.598

Screener(s): CM
Date/Time: 12/05/2012

No. Stories: Above Grade: 1
Below Grade: 0
Year Built: 1947

Total Floor Area (sq. ft.): 72,000
Code Year: 1982

Additions: None

Occupancy: Assembly
Industrial Office
Commercial
Enter. Services
School

Utility Warehouse
Residential

Soil Type: A

Geologic Hazards: liquefaction: Yes/No/DNK Landslide: Yes/No/DNK Surf. Rupt.: Yes/No/DNK

Adjacency: Pounding
Falling Hazards from Taller Adjacent Building

Irregularities:
- Vertical (type/severity): Split level/roof
- Plan (type): Re-entrant corner

Exterior Falling Hazards:
- Unbraced Chimneys
- Heavy Cladding or Heavy Veneer
- Parapels
- Appandages
- Other

COMMENTS:
- SBC
- 20 g c. Steel costs under every only

PHOTOGRAPH

ADDITION (2012)

SKETCH

SKETCH

BASIC SCORE, MODIFIERS, AND FINAL LEVEL 1 SCORE, S1:

<table>
<thead>
<tr>
<th>FEMA BUILDING TYPE</th>
<th>Do Not Know</th>
<th>WI</th>
<th>WTA</th>
<th>W2</th>
<th>S1 (MPF)</th>
<th>S2 (ER)</th>
<th>S3 (LM)</th>
<th>S4 (RC)</th>
<th>S5 (LR)</th>
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<th>C2 (SW)</th>
<th>C3 (URM) (er)</th>
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<th>RM2 (RD)</th>
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FINAL LEVEL 1 SCORE, S1 ≥ S2: 0.1 ≥ 0.3

EXTENT OF REVIEW

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<td>Geologic Hazards:</td>
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<td>Contact Person:</td>
<td>Phil Graham</td>
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OTHER HAZARDS

Are There Hazards That Trigger A Detailed Structural Evaluation?

- Pounding potential (unless S2 > cut-off, if known)
- Falling hazards from taller adjacent building
- Geologic hazards or Soil Type F
- Significant damage/deterioration to the structural system

ACTION REQUIRED

Detailed Structural Evaluation Required?

- Yes, unknown FEMA building type or other building
- No, score less than cut-off
- Yes, other hazards present
- No

Detailed Nonstructural Evaluation Recommended? (check one)

- Yes, nonstructural hazards identified that should be evaluated
- No, nonstructural hazards exist that may require mitigation, but a detailed evaluation is not necessary
- No, no nonstructural hazards identified

Legend:
- B = Moment-resisting frame
- R = Reinforced concrete
- SW = Shear wall
- URM (MI) = Unreinforced masonry wall
- MTR (MI) = Manufactured Housing
- PD = Piling/Driftline
- LD = Light metal
- SD = Single diaphragm
- DD = Double diaphragm
Structure 75, Building 52 Photographs

Plan View

Interior, Reinforced Masonry
### Rapid Visual Screening of Buildings for Potential Seismic Hazards

#### FEMA P-154 Data Collection Form

**Address:** 365 N. Shallow Pk., Hornbeck, LA 38222

**Level 1 VERY HIGH Seismicity**

**Other Identifiers:** 96

**Building Name:** Elementary School

**Latitude:** 33.394829  **Longitude:** -89.307989

**S1:** 2.539  **S3:** 0.862

**Screener(s):** GM

**Date/Time:**

---

**No. Stories:** Above Grade: 1  **Below Grade: 0**

**Year Built:** 1985  **Code Year:** 2014-2015

**Total Floor Area (sq. ft.):** 5,600

**Additions:** None  **Yes, Years Built:**

**Occupancy:** Assembly  **Commercial Services:**

**Use:** Industrial  **Service:**

**Emerg. Services:** Historic  **Shelter**

**Warehouse:** Government

**Residential, # Units:**

**Soil Type:**

- [ ] A
- [ ] B
- [ ] C
- [ ] D
- [ ] E
- [ ] F
- [ ] DNK

**Geologic Hazards:** Landslide, Yes/No/DNK; Sinkhole, Yes/No/DNK; Subsidence, Yes/No/DNK

**Adjacency:** Split level

**Irregularity:**

- [ ] Vertical (two story)
- [ ] Plan (type)

**Exterior Falling Hazards:** Unbraced chimneys, Yes/No

**Other:**

---

**COMMENTS:**

RM

---

**SKETCH**

[Sketch of the building with marked features]

---

**BASIC SCORE, MODIFIERS, AND FINAL LEVEL 1 SCORE, S1**

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<th>S2 (BR)</th>
<th>S3 (LM)</th>
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**FINAL LEVEL 1 SCORE, S1 = S1**

0.1 0.3

---

**LEVEL 2 SCREENING PERFORMED?**

- [ ] Yes, Level 2 Score, S2
- [X] No

**Other HAZARDS**

**ACTION REQUIRED**

**Detailed Structural Evaluation Required?**

- [ ] Yes, unknown FEMA building type or other building
- [ ] Yes, score less than cut-off
- [ ] Yes, other hazards present
- [ ] No

**Detailed Nonstructural Evaluation Recommended? (check one)**

- [ ] Yes, nonstructural hazards identified that should be evaluated
- [ ] No, nonstructural hazards exist that may require mitigation, but a detailed evaluation is not necessary
- [X] No, nonstructural hazards identified

---

**Legend:**

- [ ] MRF = Moment-Resisting Frame
- [ ] RC = Reinforced Concrete
- [ ] SW = Shear Wall
- [ ] URM INF = Unreinforced Masonry Infill
- [ ] TJ = T-Joist
- [ ] TU = Truss
- [ ] RM = Manufactured Housing
- [ ] PD = Ponderosa Diaphragm
- [ ] LM = Light Metal
- [ ] RD = Rigid Diaphragm
Plan View

Interior, Reinforced Masonry
Structure 77, Building 54 Photographs

Exterior, Two of 5 Wings

Interior, Reinforced Masonry
Rapid Visual Screening of Buildings for Potential Seismic Hazards
FEMA P-154 Data Collection Form

Level 1
HIGH Seismicity

Address: 2600 Viking Dr, Humboldt, TN 38343
Zip: 38343

Other Identifiers: 98

Building Name: High School

Use: High School

Latitude: 35° 8' 40" N
Longitude: 88° 9' 06" W

S1: 1.04
S2: 0.35

Screener(s): CM
Date/Time:

No. Stories: Above Grade: 1  Below Grade: 0

Total Floor Area (sq. ft.): 7,000

Year Built: 1974

Code Year: EST

Additions: None

Yes, Year(s) Built:

Occupancy: Assembly Industrial Commercial

Office

Error Services

School

Historic

Government

Residential

Soil Type: C

A

B

C

D

E

F

DNK

If DNK, assume Type D.

Geologic Hazards: Liquefaction: Yes/No/DNK Landslide: Yes/No/DNK Surf. Rupt.: Yes/No/DNK

Adjacency: Pounding

Falling Hazards from Taller Adjacent Building

Irregularities:

Vertical (type/ severity)

Plan (type)

Exterior Falling Hazards:

Unbraced Chimneys

Heavy Cladding or Heavy Veneer

Parapets

Appenages

Other:

COMMENTS:

Raised roof at gymt cafeteria
Concrete members
Rigid diaphragm

SKETCH

PHOTOGRAPH

BASIC SCORE, MODIFIERS, AND FINAL LEVEL 1 SCORE, SL1

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<td>0.4</td>
<td>0.4</td>
<td>0.4</td>
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<td>0.4</td>
<td>0.4</td>
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<td></td>
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<tr>
<td>Soil Type E (1–3 stories)</td>
<td>0.1</td>
<td>-0.6</td>
<td>-0.9</td>
<td>-0.6</td>
<td>-0.6</td>
<td>NA</td>
<td>-0.6</td>
<td>-0.4</td>
<td>-0.7</td>
<td>-0.3</td>
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<td>-0.6</td>
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<td>NA</td>
<td>-0.4</td>
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<tr>
<td>Minimum Score, S1</td>
<td>1.1</td>
<td>0.9</td>
<td>0.7</td>
<td>0.5</td>
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<td>0.2</td>
<td>0.2</td>
<td></td>
</tr>
</tbody>
</table>

FINAL LEVEL 1 SCORE, SL1 = S1:

0.3

EXTENT OF REVIEW

Exterior:

Partial

All Sides

Aerial

Interior:

None

Visible

Entered

Drawings Reviewed:

Yes

No

Soil Type Source:

Geologic Hazards Source:

Contact Person:

OTHER HAZARDS

Are There Hazards That Trigger A Detailed Structural Evaluation?

- Yes

- No

Detailed Structural Evaluation Required?

- Yes

- No

- Other

- Other Hazards

ACTION REQUIRED

Detailed Nonstructural Evaluation Required?

- Yes

- No

- Other

- Other Hazards

Legend:

MRF = Moment-resisting frame
MR = Monotored concrete
RC = Reinforced concrete
MB = Masonry
SH = Shear wall
CMI = Cast-in-place masonry
MRM = Masonry
LIM = Light metal
BR = Braced frame
SW = Shear wall
TU = Tie up
LD = Flexible diaphragm
RD = Rigid diaphragm
DNK = Do Not Know
Structure 78, Building 55 Photographs

Interior, Cafeteria

Interior, Exposed Concrete Column
Rapid Visual Screening of Buildings for Potential Seismic Hazards

FEMA P-154 Data Collection Form

MODERATELY HIGH Seismicity

Address: ISLE NJ 30th Ave
Zip: 38343

Other Identifiers: Humboldt, TN

Building Name: Elementary School

Use: Commercial/Office

Latitude: 35.8231.765
Longitude: 88.1817.219

Year Built: 1974

No. Stories: Above Grade: 1
Below Grade: 0
Total Floor Area (sq. ft.): 27000

Occupancy: Assembly

Additions: None

Geologic Hazards: Liquefaction: Yes/No/DNK

Adjacency: None

Soil Type: A

Rounding Hazards: Unbraced Chimneys

Soil Filling Hazards: Poor

Pre-Code

Annual Fall Locations: Yes/No/DNK

Irrigabilities: Vertical (type/severity)

Soil Type E (1-3 stories)

Exterior Falling Hazards: Parapets

Soil Type E (3 stories)

Appendages

COMMENTS:

RM1

Additional sketches or comments on separate page

BASIC SCORE, MODIFIERS, AND FINAL LEVEL 1 SCORE, SL1

<table>
<thead>
<tr>
<th>FEMA BUILDING TYPE</th>
<th>Do Not Know</th>
<th>W1</th>
<th>W1A</th>
<th>W2</th>
<th>W3</th>
<th>W4</th>
<th>W5</th>
<th>W6</th>
<th>W7</th>
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<tbody>
<tr>
<td>Basic Score</td>
<td>4.1</td>
<td>3.7</td>
<td>3.2</td>
<td>2.3</td>
<td>2.2</td>
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<td>2.1</td>
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<td>Severe Vertical Irregularity, ( V_{UR} )</td>
<td>-1.3</td>
<td>-1.3</td>
<td>-1.3</td>
<td>-1.1</td>
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<td>-1.2</td>
<td>-1.0</td>
<td>-0.9</td>
<td>-1.0</td>
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<tr>
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<td>-0.8</td>
<td>-0.8</td>
<td>-0.7</td>
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<td>-0.6</td>
<td>-0.6</td>
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</tr>
<tr>
<td>Plan Irregularity, ( P_t )</td>
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<td>-1.3</td>
<td>-1.2</td>
<td>-1.1</td>
<td>-0.9</td>
<td>-0.8</td>
<td>-1.0</td>
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<td>-0.7</td>
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<tr>
<td>Pre-Code</td>
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<td>-0.7</td>
<td>-0.7</td>
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<td>Post-Benchmark</td>
<td>1.5</td>
<td>1.9</td>
<td>2.3</td>
<td>1.4</td>
<td>1.4</td>
<td>1.0</td>
<td>1.9</td>
<td>NA</td>
<td>1.9</td>
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<td>Soil Type A or B</td>
<td>0.3</td>
<td>0.5</td>
<td>0.9</td>
<td>0.6</td>
<td>0.6</td>
<td>0.3</td>
<td>0.9</td>
<td>0.9</td>
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<td>0.0</td>
<td>-0.1</td>
<td>-0.3</td>
<td>-0.4</td>
<td>-0.5</td>
<td>0.0</td>
<td>-0.4</td>
<td>-0.6</td>
<td>-0.9</td>
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<tr>
<td>Soil Type E (3 stories)</td>
<td>-0.5</td>
<td>-0.8</td>
<td>-1.2</td>
<td>-0.7</td>
<td>-0.7</td>
<td>NA</td>
<td>-0.7</td>
<td>-0.6</td>
<td>-0.8</td>
</tr>
<tr>
<td>Minimum Score, Sum</td>
<td>1.6</td>
<td>1.2</td>
<td>0.8</td>
<td>0.8</td>
<td>0.5</td>
<td>0.9</td>
<td>0.3</td>
<td>0.3</td>
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</tbody>
</table>

FINAL LEVEL 1 SCORE, SL1 ≥ 0.3

EXTENT OF REVIEW

<table>
<thead>
<tr>
<th>Exterior:</th>
<th>Partial</th>
<th>All Sides</th>
<th>Aerial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interior:</td>
<td>None</td>
<td>Visible</td>
<td>Entered</td>
</tr>
<tr>
<td>Soil Type Source:</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Soil Type E Source:</td>
<td>N/A</td>
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<td></td>
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<tr>
<td>Contact Person:</td>
<td>&quot;R.M.&quot;</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

OTHER HAZARDS

Are There Hazards That Trigger A Detailed Structural Evaluation?

- Pounding potential (unless \( S_s > S_s > 0 \) cut-off, if known)
- Falling hazards from parking lot

ACTION REQUIRED

Detailed Structural Evaluation Required?

- Yes, unknown FEMA building type or other building
- Yes, score less than cut-off
- Yes, other hazards present
- No

Detailed Nonstructural Evaluation Recommended? (check one)

- Yes, nonstructural hazards identified that should be evaluated
- No, nonstructural hazards exist that may require mitigation, but a detailed evaluation is not necessary
- No, no nonstructural hazards identified

Where information cannot be verified, screeners shall note the following: EST = Estimated or unreliable data OR DNK = Do Not Know

Legend:
- MFR = Moment-resisting frame
- RC = Reinforced concrete
- LRM INF = Unreinforced masonry wall
- MRH INF = Manufactured Housing
- RT = Rigid diaphragm
- SW = Shear wall
- TU = Tie-up
- LM = Light metal
- RD = Rigid diaphragm
Structure 79, Building 56 Photographs

Exterior

Left is Structure 79, Right is Structure 80, Connected by Hallway
Structure 80, Building 56 Photographs

Left is Structure 79, Right is Structure 80, Connected by Hallway

Exterior
Structure 81, Building 57 Photographs

Exterior

Exterior
Rapid Visual Screening of Buildings for Potential Seismic Hazards
FEMA P-154 Data Collection Form

**Level 1 MODERATELY HIGH Seismicity**

**Address:** 1100 Middle Rd., Milan, TN 38358

**Other Identifiers:** R2

**Building Name:** Elementary School

**Latitude:** 35.941451  **Longitude:** -88.764754

**Screener(s):** CRM  **Date/Time:**

<table>
<thead>
<tr>
<th>No. Stories:</th>
<th>Above Grade:</th>
<th>Below Grade:</th>
<th>Year Built: 1995</th>
<th>Code Year:</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td></td>
<td>1995 EST</td>
<td></td>
</tr>
</tbody>
</table>

**Total Floor Area (sq. ft.):** 10,800

**Occupancy:** Commercial Services (School)

**Geologic Hazards:**
- Liquefaction: Yes/No/DNk
- Landslide: Yes/No/DNk
- Surf. Rup.: Yes/No/DNk

**Adjacency:**
- Pounding
- Falling Hazards from Taller Adjacent Building

**Irregularities:**
- Vertical (type/severity): Split Level/Mod
- Plan (type): Re-entrant corner

**Exterior Falling Hazards:**
- Unbraced Chimneys
- Heavy Cladding or Heavy Veneer
- Appendages

**Comments:**
- "RM1: Change in ceiling height"  
- "RM2: Change in floor height"

---

**Basic Score, Modifiers, and Final Level 1 Score, S_LT**

| FEMA BUILDING TYPE | Do Not Know | W1 | W1A | W2 | S1 (MIF) | S2 (BF) | S3 (LM) | S4 (IS) | S5 (URM) | S6 (IF) | C1 (MIF) | C2 (IS) | C3 (IS) | PC1 (A) | PC2 (B) | RM1 (F) | RM2 (D) | URM | MH |
|--------------------|-------------|----|-----|----|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|-----|-----|
| Basic Score        | 4.1         | 3.7| 3.2 | 2.3| 2.2     | 2.8     | 2.2     | 2.0     | 1.7     | 2.1     | 1.4     | 1.8     | 1.5     | 1.8     | 1.2     | 2.2 |
| Severe Vertical Irregularity, Vv  | -1.3        | -1.3| -1.9| -1.1| -1.0     | -1.2    | -1.0    | -0.9    | -1.0    | -1.1    | -0.8    | -1.0    | -0.6    | -0.6    | -0.6    | -0.8 |
| Moderate Vertical Irregularity, Vm  | -0.8        | -0.8| -0.8| -0.7| -0.6     | -0.6    | -0.6    | -0.6    | -0.6    | -0.6    | -0.6    | -0.6    | -0.6    | -0.6    | -0.6    | -0.6 |
| Plan Irregularity, Pp  | -1.3        | -1.2| -1.1| -0.9| -0.8     | -1.0    | -0.8    | -0.7    | -0.7    | -0.9    | -0.6    | -0.8    | -0.7    | -0.7    | -0.5    | -0.3 |
| Pre-Code  | -0.8        | -0.9| -0.9| -0.5| -0.5     | -0.7    | -0.6    | -0.2    | -0.4    | -0.7    | -0.1    | -0.4    | -0.3    | -0.3    | -0.3    | -0.3 |
| Post-Benchmark  | 1.5         | 1.9| 2.3| 1.4| 1.4     | 1.0     | 1.9     | NA      | 1.9     | 2.1     | NA      | 2.1     | 2.1     | 2.1     | 2.1     | NA |
| Soil Type A or B  | 0.3         | 0.6| 0.9| 0.6| 0.9     | 0.9     | 0.9     | 0.6     | 0.8     | 0.7     | 0.9     | 0.8     | 0.8     | 0.8     | 0.9     | 0.9 |
| Soil Type E (1-3 stories)  | 0.0         | -0.1| -0.3| -0.4| -0.5     | 0.0     | -0.4    | -0.5    | -0.2    | -0.2    | -0.4    | -0.3    | -0.4    | -0.3    | -0.3    | -0.3 |
| Soil Type E (4+ stories)  | -0.6        | -0.8| -1.2| -0.7| -0.7     | NA      | -0.6    | -0.8    | -0.4    | -0.6    | -0.4    | -0.6    | -0.7    | -0.7    | -0.3    | -0.3 |
| Minimum Score, Smin  | 1.6         | 1.2| 0.0| 0.5| 0.5     | 0.9     | 0.5     | 0.3     | 0.3     | 0.3     | 0.3     | 0.2     | 0.3     | 0.2     | 0.3     | 0.2 |

**Final Level 1 Score, S_LT:** ≥ 0.3

**EXTENT OF REVIEW**
- Exterior: [ ] Partial  [ ] All Sides  [ ] Aerial
- Interior: [ ] None  [ ] Visible  [ ] Entered
- Drawings Reviewed: [ ] Yes  [ ] No
- Geologic Hazards Source: NA
- Contact Person: N/A

**OTHER HAZARDS**
- Are There Hazards That Trigger A Detailed Structural Evaluation? [ ] Yes  [ ] No
- Pounding potential (unless S_LT > cut-off, if known)
- Falling hazards from taller adjacent building
- Geologic hazards or Soil Type F
- Significant damage/deterioration to the structural system

**ACTION REQUIRED**
- Detailed Structural Evaluation Required? [ ] Yes  [ ] No
- Yes, unknown FEMA building type or other building
- Yes, score less than cut-off
- Yes, other hazards present
- Detailed Nonstructural Evaluation Recommended? [check one]
- No nonstructural hazards identified [ ]
- Yes, nonstructural hazards identified that should be evaluated
- No, nonstructural hazards exist that may require mitigation, but a detailed evaluation is not necessary
- No, no nonstructural hazards identified [ ]

---

Legend:
- MRF = Moment-resisting frame
- RC = Reinforced concrete
- URM INF = Unreinforced masonry infill
- MR = Manufactured housing
- BR = Braced frame
- SW = Shear wall
- TU = Tilt-up
- LM = Light metal
- RD = Rigid diaphragm

Where information cannot be verified, screener shall note the following.

- EST = Estimated or unreliable data
- DNK = Do Not Know
Structure 82, Building 58 Photographs

Exterior
Rapid Visual Screening of Buildings for Potential Seismic Hazards
FEMA P-154 Data Collection Form

**Address:**

4040 Middle Rd.
Milton, TN
Zip: 38588

**Level 1 MODERATELY HIGH Seismicity**

**Occupancy:**
Assembly - 1
Industrial - 0
Commercial - 0
Office - 0
Emergency Services - 0
Warehouse - 0
Residential - 0
Education - 0
Government - 0

**Soil Type:**
A - 0
B - 0
C - 0
D - 0
E - 0
F - 0
DKN - 0

**Geologic Hazards:**
Liquefaction - Yes/No/DNK
Landslide - Yes/No/DNK
Surf. Rupt. - Yes/No/DNK

**Additional sketches or comments on separate page**

**COMMENTS:**

"Change of ceiling height @ Lobby"

**SKETCH**

**PHOTOGRAPH**

**BASIC SCORE, MODIFIERS, AND FINAL LEVEL 1 SCORE, S1**

---

**FINAL LEVEL 1 SCORE, S1 ≥ Smin:**

**EXTENT OF REVIEW**

Exterior: 
- Partial
- All Sides
- Aerial

Interior: 
- None
- Visible
- Entered

Drawings Reviewed:
- Yes
- No

**SOIL TYPE SOURCE:**

Geologic Hazards Source:

**Thank you for your assistance.**  

**OTHER HAZARDS**

Are There Hazards That Trigger A Detailed Structural Evaluation?  
- Yes
- No

**ACTION REQUIRED**

Detailed Structural Evaluation Required?
- Yes, unknown FEMA building type or other building
- Yes, score less than cut-off
- Yes, other hazards present
- No

Detailed Nonstructural Evaluation Recommended? (check one)
- Yes, nonstructural hazards identified that should be evaluated
- No, nonstructural hazards exist that may require mitigation, but a detailed evaluation is not necessary
- No, no nonstructural hazards identified

---

**LEVEL 2 SCREENING PERFORMED?**

- Yes, Final Level 2 Score, S2
- No

Nonstructural hazards?
- Yes
- No

---

**Where information cannot be verified, screen shall note the following:**

EST = Estimated or unreliable data
DNK = Do Not Know

Legend:
- MRF = Moment-resisting frame
- RC = Reinforced concrete
- URM INF = Unreinforced masonry infill
- MU = Manufactured housing
- TF = Flexible diaphragm
- BR = Braced frame
- SW = Shear wall
- TU = Tilt-up
- LM = Light metal
- RD = Rigid diaphragm
Structure 83, Building 59 Photographs

Exterior, Split Level

Interior, Split Level

Interior, Exposed Flexible Diaphragm Roof
Structure 84, Building 60 Photographs

Joint Between Structures 84 (Right) and 85 (Left)

Exposed Concrete Members
Structure 85, Building 60 Photographs

Joint Between Structures 84 (Right) and 85 (Left)

Structure 85 is One Hallway Addition to Structure 84
REFERENCES


