REPORT

1MWO25001-RPT-01

Final Report – Structural and Fire Protection Concerns at Jenkins Middle School, Colorado Springs, CO

3/10/2025

3/10/2025

3/10/2025

PREPARED FOR

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Proposal #: FBS-COSP-25-001-VLC
Date: 3/10/2025

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Revision Record Summary

Revision	Revision Date	Revision Summary
0A	1/31/2025	Preliminary. Structural engineering and fire protection engineering investigation results and recommendations are provided. Geotechnical engineering investigation is pending. This report will be finalized, signed, and sealed upon conclusion of the geotechnical engineering investigation.
0B	2/12/2025	Preliminary. Structural engineering and fire protection engineering investigation results and recommendations are provided. Additional discussion regarding utility lines is provided. Geotechnical engineering investigation is pending. This report will be finalized, signed, and sealed upon conclusion of the geotechnical engineering investigation.
0	3/10/2025	Final, for client use. Geotechnical engineering investigation results have been incorporated.

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Executive Summary

Following findings of potential damage to the structural components and fire protection systems at Jenkins Middle School (JMS) (6410 Austin Bluffs Parkway, Colorado Springs, CO) made by officials from the Colorado Springs Fire Department (CSFD) and Colorado Division of Fire Prevention and Control (DFPC), Colorado Springs School District #11 (CSSD11) requested that Jensen Hughes investigate the findings and present recommendations for remediation and resolution.

Jensen Hughes personnel inspected JMS and observed differential displacements in floors, walls, and ceilings, cracking in concrete masonry unit (CMU) walls, and assorted degradations of fire protection components. Damage to gas and electrical systems was not observed.

Per the geotechnical report [7.2.1], the root cause of the structural and fire protection degradations is settlement of the soil below the affected areas of the structure. This settlement is due to an increase in moisture content of the soil between the time of construction and the time of this investigation, with fill soils often below the specified moisture content range during construction.

Based on these observations, Jensen Hughes recommends that the following areas of the JMS structure be repaired or removed and replaced. Feasibility of the various repair or removal-and-replacement options is outside the scope of this report.

- Area B (Gym, Fitness Center, Locker Rooms, Music, Mechanical Room, Consumer & Family Studies Room)
- Western wall of the Media Center (part of Area C)
- Area E (Seventh Grade Wing)
- Area F (Eighth Grade Wing)

1.0 Introduction

Following findings of potential damage to the structural components and fire protection systems at Jenkins Middle School (JMS) made by officials from the Colorado Springs Fire Department (CSFD) and Colorado Division of Fire Prevention and Control (DFPC), Colorado Springs School District #11 (CSSD11) requested that Jensen Hughes investigate the findings and present recommendations for remediation and resolution.

2.0 Purpose + Scope

The purposes of this report are as follows.

2.1 DESCRIBE PRELIMINARY FINDINGS FROM INSPECTIONS

This report will document the findings of inspections of both the affected structural components and fire protection components at JMS.

2.2 RECOMMENDATIONS FOR IMMEDIATE RESPONSE TO FINDINGS

This report will make recommendations to CSSD11 regarding how to respond immediately to the findings from the aforementioned structural, fire protection, and utility inspections.

2.3 GEOTECHNICAL INVESTIGATION

An investigation of the soils and foundations at the site has been performed by CLT|Thompson, with results provided on March 10, 2025. This investigation and any effects on the root cause(s) of the damage to JMS has been incorporated into this report.

3.0 Assumptions + Limitations

1. JMS was not assessed for overall building and fire code compliance, including but not limited to active fire protection systems, passive fire protection systems, and life safety systems. This inspection and assessment are limited to identifying active and passive fire protection deficiencies caused by structural damages.
2. Risk impacts to occupancy were evaluated both by considering fire protection and utility degradation due to structural degradations together with fire protection and utility degradation independent from structural degradation (absolute risk) and the change in risk from that previously accepted by the school district (delta between combined condition and likely prior condition). All risk was assessed qualitatively based on reviewer experience.
3. Security systems (particularly, latching and locking of doors, with respect to a lockdown event) were not reviewed. Jensen Hughes personnel performed a cursory evaluation of general door operation to support assumptions about evacuation timing and people movement during non-lockdown emergencies.
4. Functional testing of active fire protection systems is not within the scope of this report.
5. Invasive and/or destructive testing of any systems or components within JMS is not within the scope of this report. All observations within this report are limited to visual observations, soil boring and sampling, and information gained per a review of site documents.
6. Inspection and evaluation of utilities that are either (1) underground or (2) otherwise exterior to the JMS building, and any potential damage thereof, is not within the scope of this report.

4.0 Methodology

The JMS was split into multiple areas, aligning with the key plan of the original construction documents, dated January 28, 1998. Note that these areas are arbitrarily assigned to separate the building into smaller chunks for the purposes of the inspection and this report.

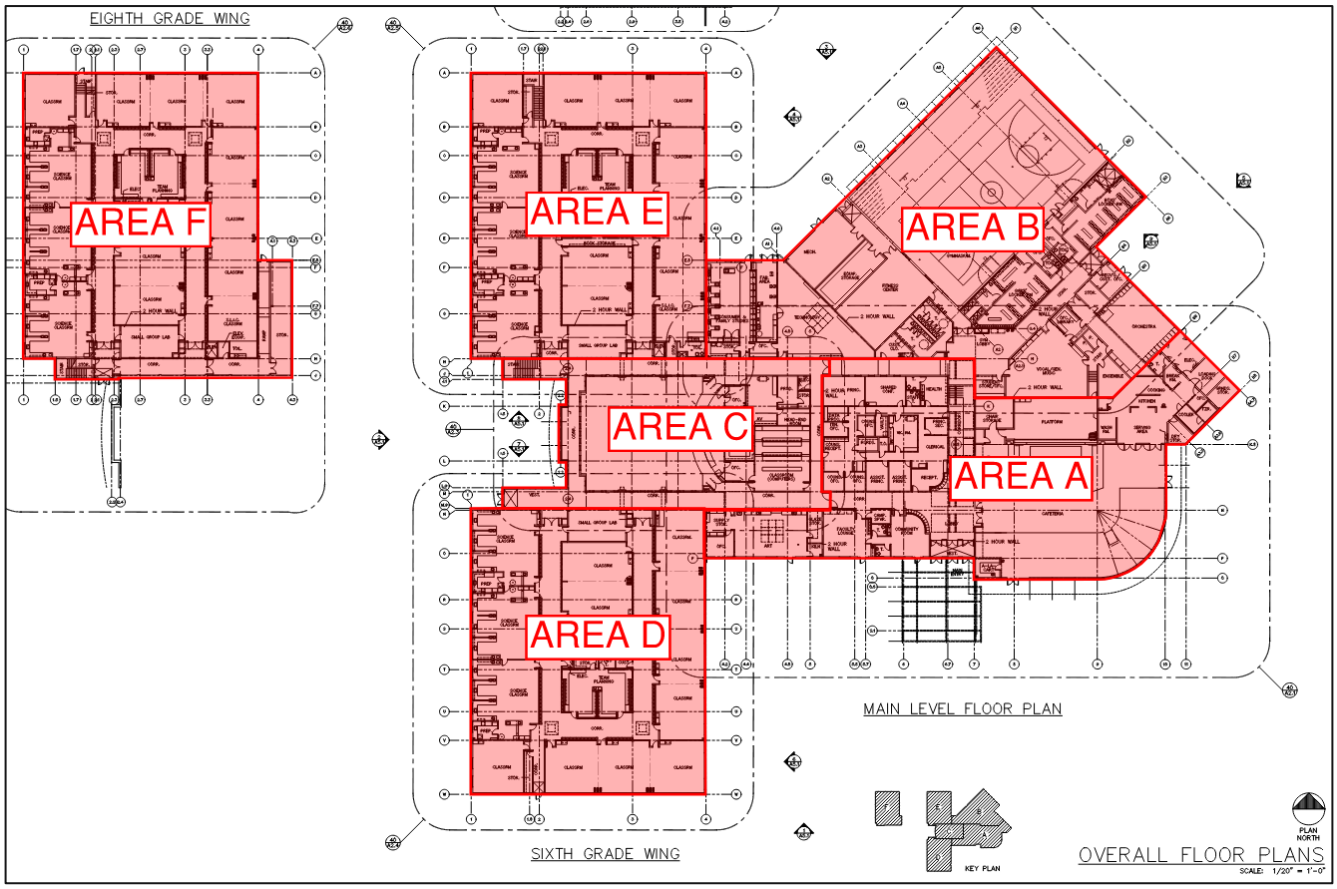


Figure 4.1. JMS Areas for Reference

4.1 INSPECTION OF AFFECTED STRUCTURAL COMPONENTS

1. David Webster, a Professional Engineer licensed in the State of Colorado, inspected the affected structural components at JMS on January 11, 2025.
2. Due to time and resource constraints, Mr. Webster was limited in his areas of inspection to those areas of JMS identified by CSSD11 personnel as being problematic aesthetically, functionally, or otherwise.

   The areas that were not inspected on January 11, 2025 are the shaded areas indicated within Figure 4.2 below.

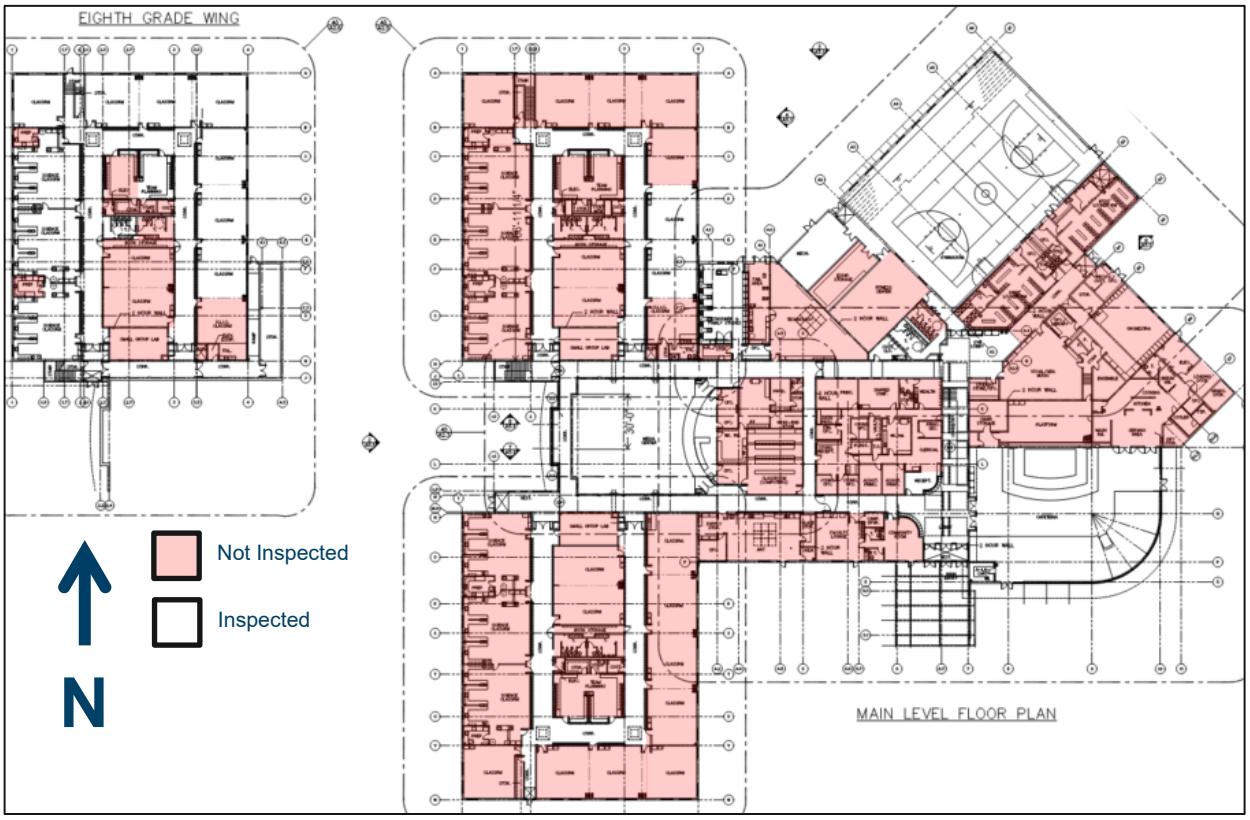


Figure 4.2: Areas of JMS Inspected for Structural Purposes (January 11, 2025)

3. The following tools and equipment were used during the inspection:
   a. Hand-held digital spirit level
   b. Steel tape measure and laser measure
   c. Ziplevel®
   d. Camera
4. CSSD11 personnel provided access to overhead areas via ladder and personnel lift as needed.

4.2 INSPECTION OF AFFECTED FIRE PROTECTION COMPONENTS

1. Christopher Chen, a Professional Engineer with specialty in Fire Protection Engineering licensed in the State of Colorado, inspected the affected fire protection systems and components at JMS on January 14, 2025, and January 16, 2025.
2. Mr. Chen primarily focused on the condition of passive fire protection features throughout JMS; namely, fire doors, general physical condition of wall and floor assemblies and penetrations through walls and floors.
3. The following tools and equipment were used during the inspection:
    a. Camera
    b. Gap Gauge
    c. Tape Measure
    d. CSSD11 personnel provided access to overhead areas via ladder as needed.
4. The fire protection inspection was conducted subsequent to the structural analysis, as the structural analysis's findings and recommendations directly influenced the fire protection inspection. Only a brief fire protection analysis was conducted in areas that were recommended to be not occupied and required significant remediation by the structural analysis.

4.3 INSPECTION OF AFFECTED UTILITIES & ENERGY SYSTEMS

1. Jensen Hughes personnel reviewed gas and electrical drawings ([7.1.8 through 7.1.29]) and compared the routing of gas and electrical lines to the JMS building’s internal areas with significant differential deflections discussed previously (see Appendix A of this report) to determine which lines would be affected by the deflections.
2. Jensen Hughes inspected the affected lines at JMS.
    a. A visual inspection was conducted for undue stress or damage to gas piping and electrical conductors located within and impacted by displaced structural areas.

4.4 INSPECTION OF SOILS

1. CTL|Thompson was contracted with Jensen Hughes to perform a geotechnical assessment of the JMS site. Full methodology of the assessment is provided in [7.2.1].

5.0 Description of Findings

This section of the report outlines the overall findings of the structural and fire protection inspections.

5.1 INSPECTION OF AFFECTED STRUCTURAL COMPONENTS

5.1.1 Area A – Cafeteria, Offices, Faculty Lounge

No structural concerns were observed in Area A.

5.1.2 Area B – Gym, Fitness Center, Locker Rooms, Music, Mechanical Room, Consumer & Family Studies Room

1. Ziplevel® measurements[1] of the gym floor around the perimeter of the gym were taken, with the zero datum at the southwest corner of the gym (Grid A2-B2). See Appendix A.1 of this report for the Ziplevel® measurements in the gym.
    a. The largest differential vertical displacement relative to the datum was 5.5 inches at the northeast corner of the gym (Grid A6-B1).
    b. The largest slope (i.e., change in vertical displacement over horizontal distance) was 0.15 inches of displacement per 1 foot, measured in the northeast corner of the gym (between Grid A5-B1 and A6-B1) (measured as 3.5 inches of displacement vs. 5.0 inches over a length of approximately 10 feet).
    c. Differential vertical displacement between opposite ends of the roof joists, causing joist seat rotation, is considered negligible.
2. Visible cracking within the concrete masonry unit (CMU) walls of the gym was observed.
    a. “Stair-step” cracking along the CMU mortar joints plus some cracking through CMU units.
        i. Along the entire length of the top of the south wall, with estimated mortar joint separations of up to 1/2-inch and mean width of approximately 3/16-inch.
        ii. West side of the north wall
        iii. Near Door B128 in Passage B128 (see [7.1.3])
    b. Cracking through the CMUs originating at corners of several of the windows throughout the gym and running vertically to the ceiling.
    c. Approximately 0.75-inch out-of-plane relative displacement and out-of-plumbness between two wall segments separated by an expansion joint in the northwest corner of the gym (expansion joint labeled as Detail 1-U25 on [7.1.3])

[1] Accuracy of the Ziplevel measurements is typically ±0.2-inches. Readings are recorded to the nearest 0.1-inches. Multiple repeat readings are made from the reference point until stable results are obtained.

5.1.3 Area C – Media Center, Computer Classroom

1. Ziplevel® measurements of Areas C, E (7th Grade Wing), and F (8th Grade Wing) were taken, with the zero datum at the north wall of the media center (near Grid J-3). See Appendix A.2 of this report for the Ziplevel® measurements in Areas C, E, and F.
    a. The largest displacement in Area C relative to the datum was 3.1 inches near Grid J-4.2 and Door C110 in the northeast corner of the media center.
    b. The largest slope (i.e., change in displacement over horizontal distance) in Area C was 0.41 inches of displacement per 1 foot, measured across the width of Door C110 (measured as 0.2 inches of displacement vs. 3.1 inches over a length of approximately 7 feet).
    c. The Grid J-2.6 wall has settled 1.8 inches from datum, with a slope of 0.21 inches per 1 foot.
    d. Displacements are prominent to the east of the 4.2-line. The maximum displacement in the C104 corridor to the west of the 4.2-line is 0.2 inches, whereas the maximum displacement in the C104 corridor to the east of the 4.2-line is 2.5 inches.
2. Visible cracking within the concrete masonry unit (CMU) walls of Area C was observed.
    a. Cracking and out-of-plumbness in the partition wall at Grid J-2.6 and extending south [7.1.4] (the Z-shaped wall in the northern section of the western wall of the Media Center).
    b. Cracking and out-of-plumbness in the partition wall at Grid M-2.6 and extending north (the Z-shaped wall in the southern section of the western wall of the Media Center).
        i. This also includes visible separation of the expansion joint separating the M-line wall from the 2.6-line wall. This separation is presently monitored by a strain gauge.

5.1.4 Area D – Sixth Grade Classrooms

No structural concerns were observed in Area D.

5.1.5 Areas E & F – Seventh and Eighth Grade Classrooms

1. Ziplevel® measurements of Areas C, E (7th Grade Wing, upper level), and F (8th Grade Wing, lower level) were taken, with the zero datum at the north wall of the media center (near Grid J-3). See Appendix A.2 for the Ziplevel® measurements in Areas C, E, and F.
    a. The largest vertical displacement in Areas E&F relative to the datum was 4.8 inches at Grid E-1 along the west exterior wall of Areas E&F.
    b. The largest slope (i.e., change in vertical displacement over horizontal distance) was 0.14 inches of displacement per 1 foot, measured from Grid A-2.1 to a point between Grids A-1 and A-1.7 along the north wall of Areas E&F (measured as 1.0 inches of displacement vs. 3.7 inches over a length of approximately 20 feet).
    c. An additional notable slope is 0.10 inches of vertical displacement per 1 foot, measured across the width of Room F105 (measured as 1.2 inches of displacement vs. 4.8 inches over a length of 37’-3”).

d. Floor displacement throughout Area F, including racking in doorframes and differential movement across expansion joints, was visible to the unaided eye.

e. Associated displacement of stud framing for the plenum gypsum sheathing, drop ceiling panels, and supporting frames was visible throughout Area F.

2. No visible cracking within the CMU partition walls of Area E (7th Grade Wing, upper level) was observed.

3. Visible cracking within the CMU partition walls of Area F was observed.

   a. 2.3-Line wall

   b. 3-Line wall

   c. Expansion joint next to Door F013B

5.2 INSPECTION OF AFFECTED FIRE PROTECTION SYSTEMS & COMPONENTS

JMS was not assessed for overall building and fire code compliance. This inspection and assessment are limited to identifying active and passive fire protection deficiencies caused by structural damages.

For this report, images within this section are meant to demonstrate the general relative condition of the fire protection system and components and are not intended to indicate or pinpoint any specific locations or details.

5.2.1 Active Fire Suppression Systems – All Areas

Active fire protection systems, namely the fire detection and alarm system and fire sprinkler system, were reviewed visually. In addition, annual inspection reports were reviewed when such reports were available. Functional testing of active fire protection systems is not within the scope of this assessment. A summary of the systems and any findings are provided below.

1. **Fire Detection and Alarm System** – The building is equipped with a fire detection and alarm system anchored by a Simplex 4100ES fire alarm control panel. Johnson Controls upgraded the fire detection and alarm system on August 18, 2024, to include 10 new smoke detectors. The fire alarm system serves the entire building, with initiating devices that include manual pull stations, smoke detectors throughout, heat detectors in limited areas (i.e., mechanical rooms), duct detectors for ventilation systems, carbon monoxide detectors in areas with combustion equipment, and water flow and supervisory switches. Notification devices include strobes and horns. A Simplex 4100ES remote command center panel (commonly called an annunciator panel) is provided outside of the main offices/front door.

   a. **Annual Inspection Reports** – D11 facilities last conducted an annual inspection on June 18, 2024. Inspection reports do not indicate any faults or issues related to structural changes to the building.

INSPECTION AND TESTING FORM

DATE: 6/18/2024
TIME: 7:00

SERVICE ORGANIZATION		PROPERTY NAME (USER)	
NAME:	FACILITIES	NAME:	JENKINS MIDDLE
ADDRESS:	5240 GEIGER	ADDRESS:	6410 AUSTIN BLUFFS
REPRESENTIVE:		OWNER CONTACT:	
LICENSE NO.		TELEPHONE:	328-5200
TELEPHONE:	477-6000		
MONITORING ENTITY		**APPROVING AGENCY**	
CONTACT	SIMPLEX	CONTACT	
TELEPHONE	1-888-746-7539	TELEPHONE	
MONITORING ACCOUNT #	W-391-037-045		
TYPE TRANSMISSION		**SERVICE**	
McCULLOH		WEEKLY	
MULITPLEX		MONTHLY	
DIGITAL	X	QUARTERLY	
REVERSE PRIORITY		SEMI-ANNUALLY	
RF		OTHER (SPECIFY)	
OTHER (SPECIFY)			
PANEL MANUFACTURE	SIMPLEX	MODEL NO.	4100 ES
CIRCUIT STYLES	Y		
NO. OF CIRCUITS	2		
SOFTWARE REV.	8/1/2022		
LAST DATE OF SERVICE	6/18/2024		
DATE OF CONFIG.CHANGE	7/1/2022		

Figure 5.1. Snip of JMS Fire Alarm System Inspection and Testing Record dated June 18, 2024

b. **Visual Inspection** – A walkthrough of the fire detection and alarm system in the main areas indicated that the fire alarm initiating devices and notification appliances appeared to be in general good condition, with no apparent damages resulting from structural issues within the building. The fire alarm control panel and the remote command center panel both indicated that the system was normal and had no troubles or faults. Limited inspection of wiring and conduit supporting the system resulted in no findings that could impact system function.

Figure 5.2. JMS Fire Alarm Control Panel and Remote Command Center

2. **Fire Sprinkler System** – The building is equipped with a wet pipe sprinkler system serving only the Stage Platform. The system serves a total of 13 sprinklers. Fire water entry is provided at the east corner of the building within the Ground Storage room. The system is not served by a fire pump.

   a. **Annual Inspection Reports** – The latest fire sprinkler annual inspection report obtained was from July 17, 2024. The inspection report identified two deficiencies: (1) missing trim and (2) a 5-year inspection overdue. These issues are unrelated to the structural concerns and were not pursued further as part of this report effort.

RAPID FIRE PROTECTION
1530 Samco Road. Rapid City, SD 57702
Phone: 605.348.2342 Fax: 605.348.0108
Email: Service@RapidFireInc.com

ANNUAL INSPECTION, TESTING & MAINTENANCE

CUSTOMER & JOB INFORMATION	
Company: Colorado Springs School District 11 | 4459	**Date:** 07-17-2024
Location: Jenkins Middle School - (D-11)	**Job Number:** 35736997
Location Address: 6410 Austin Blufff Parkway, Colorado Springs CO 80923	**Tech & License # :** Tim Jancik CO Springs Tech
Contact: Bryan	**Monitoring Co. & Phone #:** Jci Na

Figure 5.3. Snip of JMS Fire Alarm System Inspection and Testing Record dated July 17, 2024

b. **Visual Inspection** – A walkthrough of the fire sprinkler system was conducted. At and around the fire riser and fire water entry, there were no apparent signs of damage, resulting from structural issues. The fire sprinkler piping above the ceiling did not have signs of physical damage (cracking, dents, warping, etc.). Fire sprinkler piping appeared to be properly supported and restrained throughout.

Figure 5.4. JMS Fire Sprinkler System Riser Room and Piping

3. **Kitchen Suppression System** – The kitchen cooking equipment is protected by a standalone suppression system and was not within the scope of this assessment.

4. **Fire Extinguishers** – Fire extinguishers were not reviewed as part of this assessment.

5.2.2 Passive Fire Protection Systems – Areas C, E, F, and Portions of B (Not Occupiable per Structural Analysis)

As requested by CSFD, the fire protection inspection analysis is to consider the results of the structural evaluation. As such, the fire protection inspection was strategically initiated following the structural evaluation, specifically based on the structural recommendation for occupancy.

Recognizing the decisions of the structural assessment, discussed in Section 6.1 of this report, Areas C, E, F, and a portion of B were determined to not be recommended for occupancy. As such, these areas were not intensively analyzed from a fire protection perspective. However, a summary of the findings based on cursory obse**Error! Reference source not found.** for clarity.

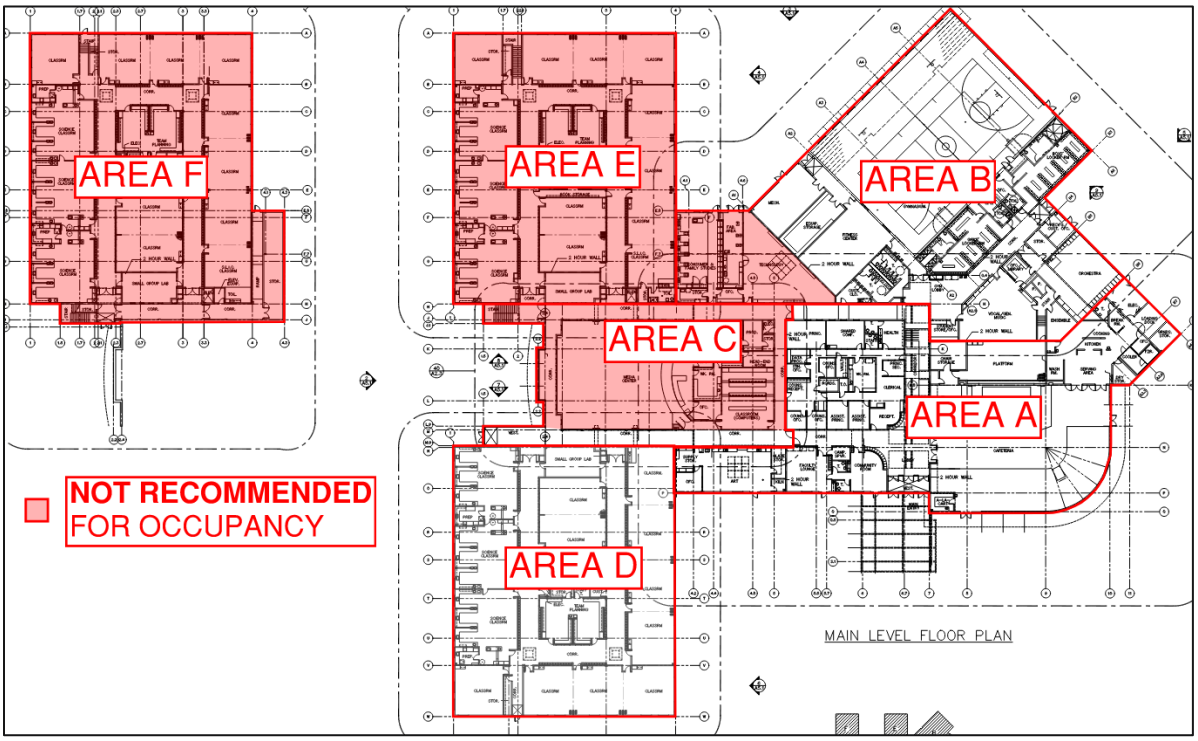


Figure 5.5. Areas Not Recommended for Occupancy by Structural Assessment

1. **Walls –** Walls (both CMU and gypsum assemblies) had significant cracking below and above the ceiling. In some corridor walls, where CMU walls transition to drywall above the ceiling, significant gaps are identified between the transitions due to differential movement of the foundation (primary support for the lower wall sections) and the roof (primary support for the upper wall sections).

2. **Fire Doors –** Excessive door-to-frame or door-to-floor gaps were identified at the top, sides, and bottoms of fire-rated doors. Excessive gaps are also identified around the frame. Many doors have been cut or otherwise modified to fit door frames. Some doors did not latch. Gaskets intended to restrict smoke movement were missing on some doors.

3. **Firestopping –** Multiple penetration seals have started to become dislodged or are completely missing. It is not clear if the dislodged/missing seals are the result of structural movement as opposed to some other condition or issue.

5.2.3 Passive Fire Protection Systems – Areas A, D, and Portions of B

Areas A, D, and Portions of B were determined to be potentially occupiable by the structural assessment. As a result, an assessment of these areas was conducted as it relates to passive fire protection systems. An above-ceiling assessment was conducted in these areas where it was accessible. A summary of the findings is presented below.

1. **Walls** – Walls are primarily CMU from floor to roof deck, CMU that transition to drywall above the ceiling, or drywall from floor deck. The Kiln Room wall had a minor crack that appeared to be caused by structural concerns. No other deficiencies that could be related to structural concerns were identified.
2. **Fire and Smoke Dampers** – No deficiencies that could be related to structural concerns were identified to the fire and smoke dampers in these areas. The dampers were not functionally tested, so no perspectives on impact to operation is made.
3. **Fire Doors** – Some fire doors had door-to-frame or door-to-floor gaps that exceeded allowable tolerances. No other deficiencies that could be related to structural concerns were identified for the fire doors in these areas.
4. **Fire Rated Shutters** – No deficiencies that could be related to the structural concerns were identified for the fire rated shutters in these areas. The shutters were inspected and functionally tested on June 6, 2024, and were found to be in good condition with no deficiencies identified.
5. **Fire-Resistant Glazing (Windows) –** No deficiencies that could be related to the structural concerns were identified for the fire-resistance glazing in these areas. Fire-resistant glazing appears to be in good condition and no cracks or other significant damage was observed. The frames also appear to be in acceptable conditions, with no gaps between frame and wall identified.
6. **Firestopping** – Multiple penetration seals have started to become dislodged or are completely missing. It is not clear if the dislodged/missing seals are the result of structural movement as opposed to some other condition or issue.

5.2.4 Passive Fire Protection Systems – Area Separation Walls

The JMS is separated by five (5) area separation walls, each with a 2-hour fire-resistance-rating, according to the Construction Documents dated January 28, 1998. These area separation walls are shown in Figure 5.6.

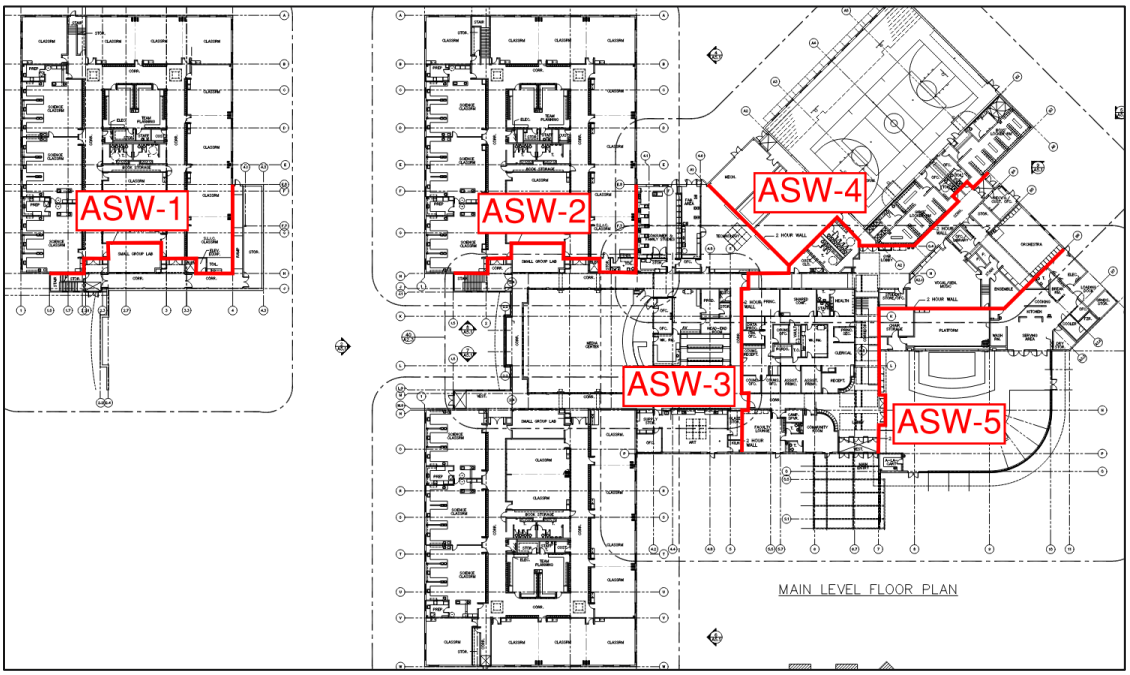


Figure 5.6. Area Separation Walls within JMS

1. **ASW-1 – Separates 8th Grade Wing from the Remainder of the Building**

   A limited assessment of this wall was conducted as the area it is within was found to be structurally compromised. An above-ceiling assessment was conducted in areas where the wall was accessible.

   Construction: This area separation wall is primarily CMU from the floor to the roof deck. No major cracking was observed within the CMU wall.

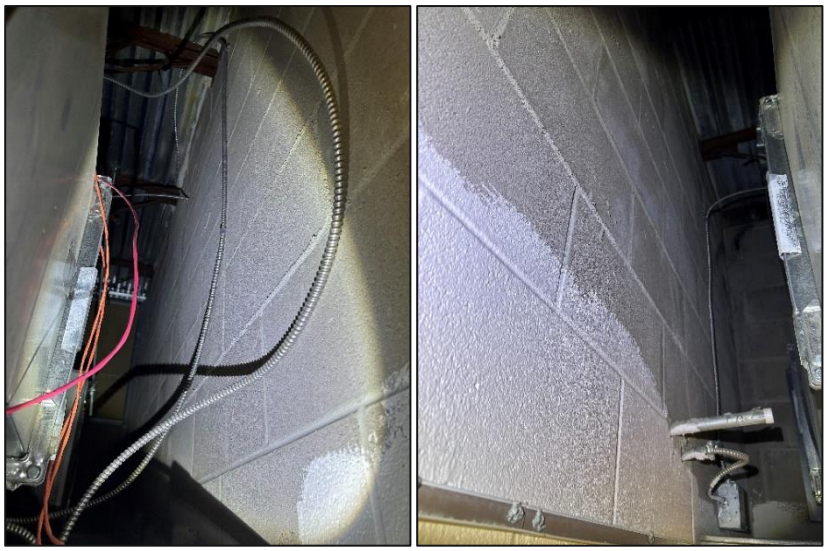


Figure 5.7. Picture of ASW-1 Wall

Openings: The two sets of double doors within the area separation wall were provided with magnetic hold-open devices connected to the fire detection and alarm system. The fire detection and alarm system function that would release the doors from the magnetic hold-open devices was not evaluated. The doors were manually released from the hold-open devices for this evaluation. The doors were confirmed to be provided with a listing label, self-closing after manual release, and positive latching. Door-to-frame and door-to-floor gaps were outside of the allowable tolerances. No major damage to the doors was observed.

Figure 5.8. Picture of ASW-1 Doors

2. **ASW-2 – Separates 7th Grade Wing from the Remainder of the Building**

A limited assessment of this wall was conducted, as the area it is within was found to be structurally compromised. An above-ceiling assessment of this wall was not conducted.

Construction: This area separation wall is primarily CMU, assumed to extend from the floor to the roof deck. No major cracking was observed within the CMU wall.

Openings: The two sets of double doors within the area separation wall were on mag-holds. They were confirmed to be labeled, self-closing, and positive latching. Door-to-frame gaps were outside of the allowable tolerances. No major damage to the doors was observed.

Figure 5.9. Picture of ASW-2 Doors

3. **ASW-3 – Separates Media Center and 6th Grade from the Remainder of the Building**

An above-ceiling assessment was conducted in areas where the wall was accessible.

Construction: This area separation wall is primarily CMU from the floor to the roof deck. No visible cracking within the CMU wall was observed. At the south end of the wall, the wall above-ceiling transitions from CMU to drywall. Within the Kiln Room, the drywall appears to be slightly separated from the deck above. It is unclear if this is a result of structural damage (the floor of the room has significant damage) or if it is a result of thermal expansion of metal construction elements due to the heat from the kiln within the room.

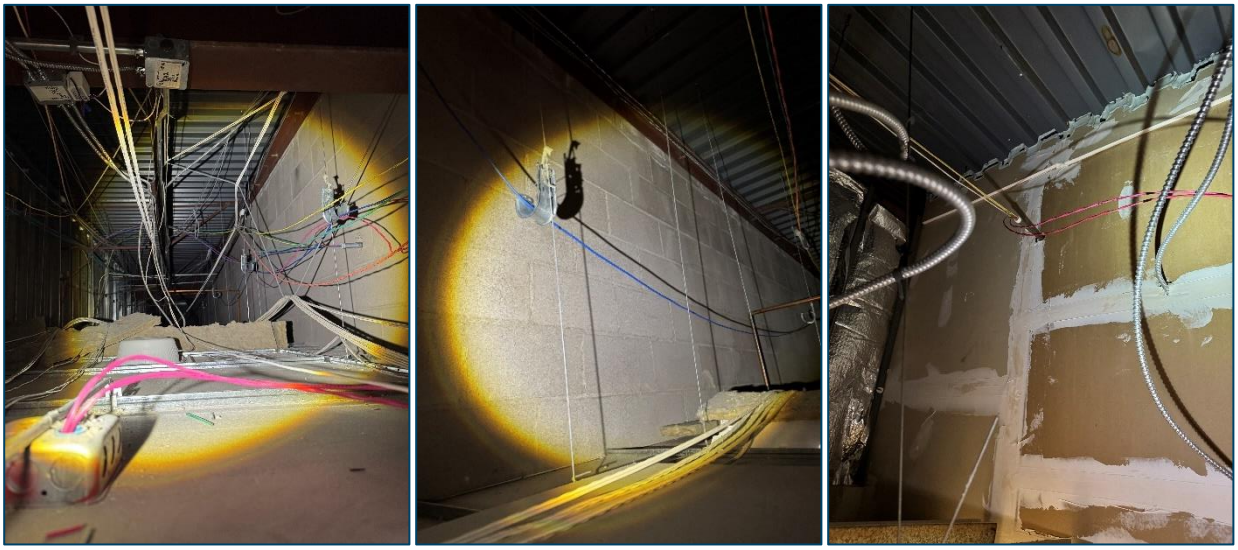


Figure 5.10. Picture of ASW-3 Wall

Openings: The two sets of double doors within the area separation wall were on mag-holds. They were confirmed to be labeled, self-closing, and positive latching. Door-to-frame and door-to-floor gaps were

outside of the allowable tolerances. Windows were provided by rated glazing or fire-rated shutters. No major damage to the doors or windows was observed.

Figure 5.11. Picture of ASW-3 Doors

4. **ASW-4 – Separates Gymnasium and Associated Rooms from the Remainder of the Building**

A limited assessment of this wall was conducted, as the area it is within was found to be structurally compromised. An above-ceiling assessment was conducted in areas where the wall was accessible.

Construction: This area separation wall is primarily CMU from the floor to the roof deck. In certain areas above the ceiling, the CMU wall transitions to drywall with metal studs. Some visible cracking within the CMU wall was observed below and above the ceiling. Where the CMU transitions to drywall, the transition appears smooth without gaps.

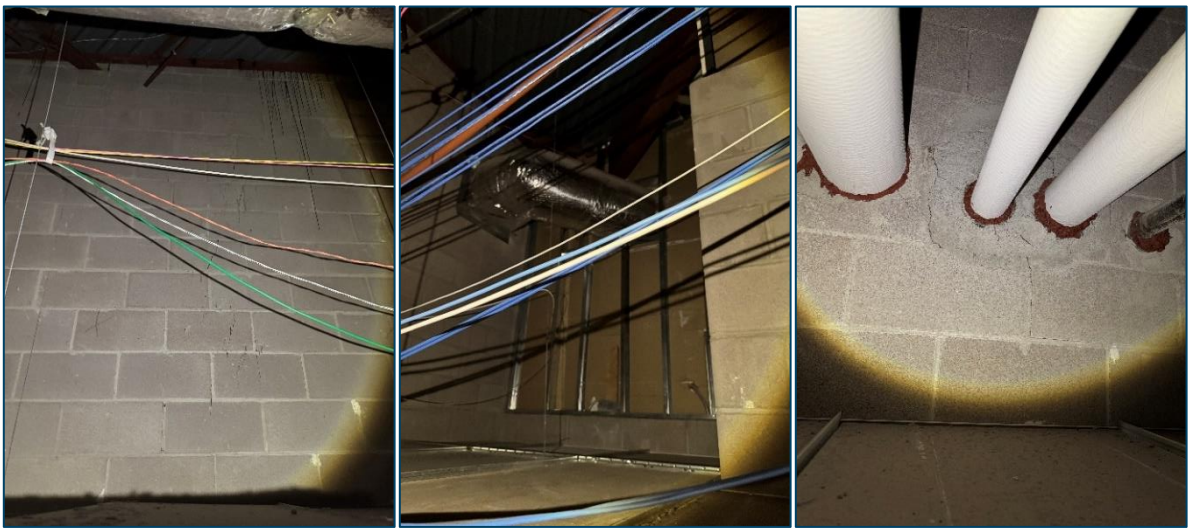


Figure 5.12. Picture of ASW-4 Walls

Openings: There is a set of double doors serving the Gymnasium within the area separation wall on mag-holds. The Boy's and Girl's Locker Room doors were also within the area separation wall. They

were confirmed to be labeled, self-closing, and positive latching. Door-to-frame gaps were outside of the allowable tolerances and at least one of the doors has been shaved, and the latch has been modified. Windows were provided by rated glazing or fire-rated shutters. No major damage to the doors or windows was observed.

Figure 5.13. Picture of ASW-4 Doors

5. **ASW-5 - Separates Cafeteria, Stage, and Kitchen Areas from the Remainder of the Building**

An above-ceiling assessment was conducted in areas where the wall was accessible.

Construction: This area separation wall is primarily CMU from the floor to the roof deck. No visible cracking within the CMU wall was observed.

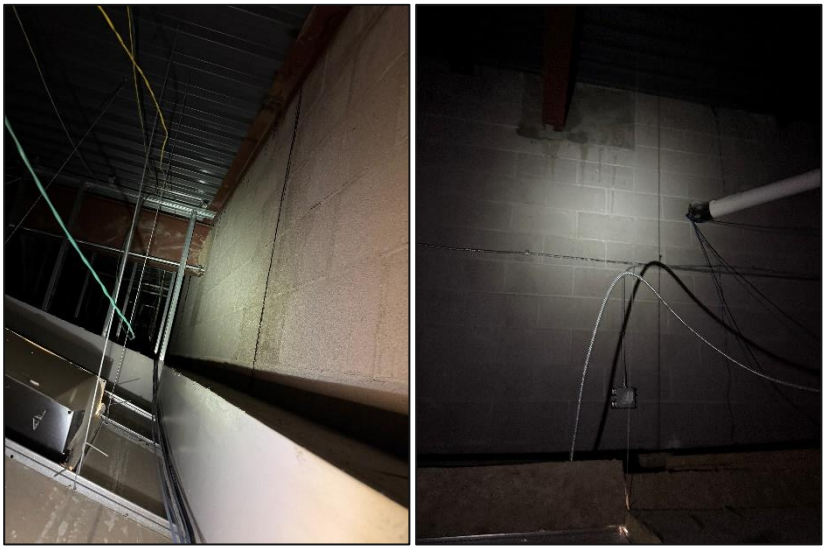


Figure 5.14. Picture of ASW-5 Walls

Openings: The two sets of double doors within the area separation wall were on mag-holds. They were confirmed to be labeled, self-closing, and positive latching. Door-to-frame and door-to-floor gaps were outside of the allowable tolerances. Windows were provided by rated glazing or fire-rated shutters. No major damage to the doors or windows was observed.

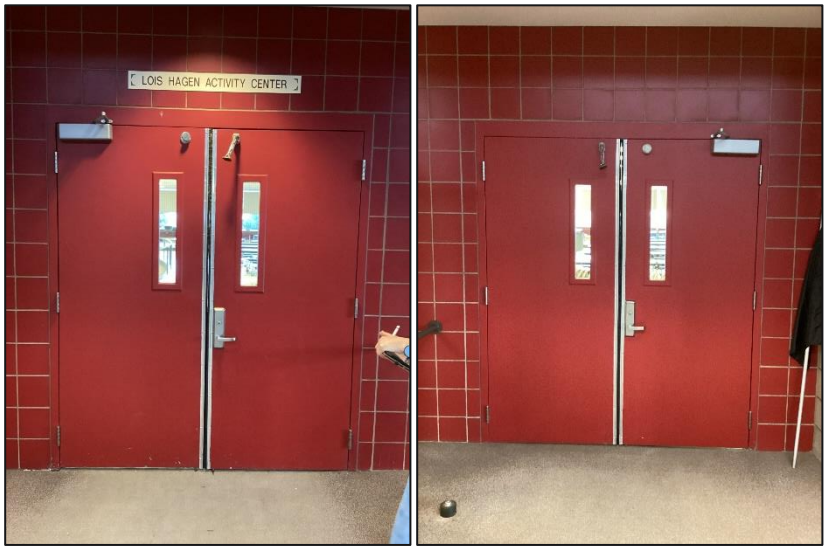


Figure 5.15. Picture of ASW-5 Doors

5.2.5 General Findings (Independent of Structural Degradation)

During the fire protection inspection, various deficiencies were identified that were unrelated to the structural degradation of the building. While these items are not the result of structural degradation, they present an inherent risk to fire protection and life safety. Note that these findings were noted during the inspection for structural impacts to fire protection, and that these may not be all the deficiencies within the building.

1. The main office is missing a fire-rated shutter.
2. The fire sprinkler system is overdue for the 5-year inspection and test.
3. There was an indication of water staining to the ceiling tiles above the Stage Platform, but where inspected, no signs of active leakage or physical damage to sprinkler piping were observed. It is unknown if this water staining was from a roof leak, sprinkler piping leak, or other source.
4. Multiple unsealed or inadequately sealed penetrations were observed through various fire resistance rated walls.
5. Ducts were noted to be penetrating various fire resistance rated walls, potentially without dampers. The lack of dampers may be permissible by code, but a detailed evaluation was not performed at this time to determine if this is the case.
6. Some smoke detectors had dust/paint covers installed. It is unknown if this was a temporary condition.
7. Many fire doors were propped open.

8. Many fire resistance rated doors, windows, and frames were missing listing labels. Some listing labels were painted over.

5.3 INSPECTION OF AFFECTED UTILITIES AND ENERGY SYSTEMS

5.3.1 Electrical Systems

1. Electrical systems are distributed throughout the JMS building, including within the areas affected by differential settlement.
2. Due to time and resource constraints, visual inspection of electrical systems was limited to those areas in the vicinity of the gas systems within Areas E and F (7th and 8th Grade Wing) of the building. See further discussion regarding gas system inspections in Section 5.3.2 below.
3. No indication of damage to electrical conductors due to the displaced Area E and F structure was noted.
4. Engineering judgment was applied by Jensen Hughes structural engineers to the installation of typical electrical systems to determine if the systems installed in areas outside of the 7th and 8th Grade Wing would be negatively affected by building differential settlement.
5. Underground and exterior electrical systems were not evaluated.

5.3.2 Gas Systems

1. See Appendix B for a markup of the gas lines within the JMS areas affected by structural differential displacements. Affected areas were determined to be limited to Areas E and F (7th and 8th Grade Wing).
2. Where accessible, gas piping from the Mechanical Room (B130) to each 7th and 8th Grade Science Classroom was visually inspected, and there was no indication of undue stress or damage that appeared to be impacted by the displaced structural components. Note that within the Science Classrooms, much of the gas piping is run through walls and under floors to feed gas nipples. This piping was not accessible and not inspected; however, this piping is downstream of the gas valves (which are all visually identified as closed).
3. Underground and exterior gas systems were not evaluated.

5.4 INSPECTION OF SOILS

The following are excerpts from [7.2.1].

5.4.1 Root Cause of Movement

The soils below the school have caused movement of the structure. To evaluate the soils, our analysis included a comparison of the moisture content and density of the natural and fill soils for discernable changes from the time of design and construction to the current conditions. The data indicates the natural and fill soils have increased in both the moisture content and density, post-construction. Testing during construction indicated fills were often below the specified moisture content range. Wetting of the soil is typical after development and some settlement of the fill is expected; the wetting of the drier, natural and fill soils likely exacerbated the amount of settlement that has occurred.

5.4.2 Factors Contributing to Building Distress

1. The design level geotechnical report identified fill settlement as a concern for building foundations; however, the geotechnical report did not identify the same concern for the slabs-on-grade. Constructing the slabs on deeper fills resulted in significant differential settlement between the slab floors and drilled pier foundations, which typically undergo limited movement.

2. Slab-bearing, masonry partition walls were included in the building design. These walls are often along column lines and the walls extend over the pier caps. Joints in the masonry walls do not align over the transitions between the slabs and pier caps, resulting in differential wall movement and associated distress.

5.4.3 Existing Building Foundations

1. In general, the drilled piers appear to be performing well. We evaluated possible foundation movements by reviewing roof and wall elevations. These elevations were obtained using our drone and photogrammetry. There are two areas of the building that show some foundation movement has occurred, generally along the west wall of the 7th / 8th Grade Wing (Areas E/F) and near the northern corner of the Gymnasium (Area B). We reviewed structural assessments that indicated continued foundation movement did not appear to be occurring.

2. Foundation movement causes could include down-drag forces on the piers due to the fill settling. This could have resulted in exceeding the capacity of the piers. Pier length increases, due to actual bedrock depths may have resulted in slender piers, which can impact pier performance. We recommend a Structural Engineer evaluate the piers to determine if these factors have a negative impact on the existing piers and whether selective underpinning is appropriate.

3. Additionally, we are evaluating the pier lengths, based on the design quantities and documented over and under runs during construction. These values are being compared to the lengths calculated with the bedrock elevations encountered in our borings. Detailed pier observations were not available for review.

5.4.4 Slope Stability

The stability of the slopes north of the school were evaluated by performing site observations, review of aerial imagery, review of digital elevation models, and by performing a slope stability analysis utilizing computer modeling software. The slopes appear stable and do not present any features consistent with slide failures.

6.0 Conclusions + Recommendations

1. Recommendations made below are based on two definitions of risk of occupants to JMS:

    a. Relative risk (“delta”) between the current damaged condition of JMS and the condition of JMS that likely existed prior to any of the subject structural observations (“pre-damaged condition”).

    b. Total / absolute risk of both the pre-damaged condition and elevated risks caused by the subject structural observations.

2. Regardless of the level of risk of each observation, these observations should be repaired at the earliest reasonably achievable time.

6.1 STRUCTURAL SYSTEMS & COMPONENTS

The following conclusions and recommendations are provided with regard to the structural systems and occupancy of the JMS building.

1. Areas A (Cafeteria, Offices, Faculty Lounge) and D (Sixth Grade Wing) had negligible structural damage.

    These areas have negligible risk relative to the pre-damaged condition of the site.

    No remediation of these areas is required at this time.

2. Area B (Gym, Fitness Center Locker Rooms, Music, Mechanical Room, Consumer & Family Studies Room) contained observable differential displacement and CMU cracking at several places within and near the gym.

    These observations are most likely due to foundation settlement of the structure. See specifics in Section 5.4 of this report.

    However, the south and north side walls have no discernable dislocations and remain plumb. The joist pockets observed have no clear indications of significant damage and the maximum differential vertical displacement between opposite ends of the roof joists is only 2 inches, equivalent to 0.0014 radians (0.08°) of rotation. The walls are expected to remain intact and perform similarly to undamaged walls in an extreme loading event.

    Therefore, these observations do not cause relative immediate risk above-and-beyond the pre-damaged condition. As such, continued occupancy of Area B is therefore acceptable prior to remediation, provided that cracking and displacements are actively monitored in the meantime.

    However, to reduce the long-term risk of future differential settlement, remediation of Area B is recommended.

    Remediations of Area B will be the subject of a future feasibility study and will range from major repair of the affected walls and foundations to the removal and replacement of the entirety of the Area B structure.

    If repair of Area B is preferred in lieu of replacement, then, per [7.2.1], the following repairs are proposed:

a. Some underpinning may be appropriate where foundation movements were observed. The need for underpinning should be based on structural review of the pier designs given pier slenderness and down drag forces.

   We believe micropiles are the more appropriate underpinning method, given the subsurface conditions.

b. The floor could be “mud jacked” to bring it back to level. Methods available include injecting either foam or cementitious grout to lift the slab. This will not mitigate potential future settlement; however, this method may allow the wood floor to remain with relatively small repairs needed. The feasibility of this approach will be impacted by the specialty contractor’s approach needed to address the floor movements.

3. Areas C (Media Center), E (Seventh Grade), and F (Eighth Grade) contained observable differential displacement, severe CMU wall cracking, and loss of partition wall restraint at several places throughout the areas.

   These observations are most likely due to foundation settlement of the structure. See specifics in Section 5.4 of this report.

   These observations add significant risk to occupants beyond the pre-damaged condition of the structure, and it is recommended that these areas not be occupied until the observations can be remediated.

   The damage is primarily to non-structural components (CMU partitions, door frames, light-gage steel stud framing, etc.). Nonetheless, these identified damages do represent a significant hazard with transient loading or changing conditions (e.g., seismic event or significant continued settlement). The differential vertical displacements measured on the upper (seventh grade) level, near the supporting structural steel columns, will be representative of the relative displacement of the supporting foundation piers. Although these displacements are not – in general – substantial enough to cause damage to the steel frame, the main concern with respect to damage remediation is that the foundation piers that support the structural frame have failed and remediation of this damage is likely to be difficult and very costly.

   Remediations of Area C will be the subject of a future feasibility study and will likely consist of the removal and replacement of the western wall of the Media Center (i.e., the 2.6-Line wall).

   Remediations of Areas E and F will be the subject of a future feasibility study and will range from major repairs of the affected walls, foundations, and structural framing to the removal and replacement of the entirety of the Areas E and F structures.

   If repair of Areas E and F is preferred in lieu of replacement, then, per [7.2.1], the following repairs are proposed:

   a. Some underpinning may be appropriate where foundation movements were observed. The need for underpinning should be based on structural review of the pier designs given pier slenderness and down drag forces.

   b. We believe micropiles are the more appropriate underpinning method, given the subsurface conditions.

c. The extent of interior demolition should be determined based on cost and time constraints, as well as constructability and expectations of future performance.

d. If partition walls remain, they should be underpinned to improve performance. If the walls are replaced and constructed on a new slab, the walls should be detailed to allow movement at the pier caps.

e. Soil stabilization will most likely include compaction grouting. Structural floors could be considered in place of soil stabilization; however, we anticipate new foundation elements will be required to support the new foundation loads. Stabilization should be performed by a reputable specialty subcontractor.

f. Existing slabs-on-grade could be leveled, or replaced, after stabilizing the soils. Replacement of the slabs is expected to provide a more streamlined approach verses releveling and repairing the existing slabs.

4. See Figure 5.5 of this report for an annotated drawing of which areas of the site are recommended to not be occupied.

6.2 FIRE PROTECTION SYSTEMS & COMPONENTS

The following conclusions and recommendations are provided with regard to the fire protection systems and occupancy of the JMS building.

1. Areas C, E, F, and Portions of B were not fully assessed, as the structural assessment revealed that they will require repair or replacement. If these areas are not replaced but repaired, a full assessment is recommended after structural repairs have been made, as the repairs may impact the active and passive fire protection systems (in addition to other utilities and systems).
2. In Areas A, D, and Portions of B, the passive fire protection within the building appears to have been previously compromised by conditions unassociated with the structural issues, primarily by unsealed/unprotected penetrations made over a number of years. Based on observations at the site, these are common failures experienced in most public occupancies (office buildings, schools, etc.) on a regular basis. The fire history in these building types suggests a level of risk that is higher than that inherent to building and fire codes but that exists in the general public building inventory. These issues are independent of the building's structural concerns. There is no apparent significant increase in risk within these areas, nor is there an immediate concern that is coupled with the structural concerns. It is, however, still recommended that these items be corrected as soon as reasonably achievable.
3. The recommendations are based on the results of the inspections conducted on January 14, 2025, and January 16, 2025. If portions of the building are to be occupied, ongoing assessment must be conducted bi-annually, to confirm its suitability for occupancy.
4. Monthly, quarterly, and annual inspections, testing, and maintenance of all fire protection systems should be continued as required by applicable codes and standards.
5. On January 17, 2025, JMS students were relocated from this school. JMS is currently restricted in occupancy. Fire suppression crews should be notified that portions of the building are in a structurally compromised position.

6.3 UTILITIES & ENERGY SYSTEMS

6.3.1 Electrical Systems

1. Within Areas E and F (7th and 8th Grade Wing) of JMS, no indication of damage to electrical conductors due to the compromised structure was noted.
2. Based on typical installation details observed above and the judgment of Jensen Hughes structural engineers, electrical systems within JMS consist of a combination of flexible metallic conduit, EMT conduit, and rigid metal conduit, all of which is small-bore.
    a. By their nature, and given the installed slack lengths found throughout the observed areas, flexible metallic conduits are resistant to damage from long-term structural differential settlement.
    b. Based on the small bore, typical span lengths, bends, etc., EMT conduit, rigid conduits, and the electrical conductors within are sufficiently flexible to resist damage from long-term structural differential settlement.
3. Electrical systems within the areas of JMS containing differential structural settlement in their current condition therefore contain negligible risk to occupants above and beyond the risk posed in the pre-damaged condition of JMS.
4. Should further visible displacement occur in JMS prior to remediation, electrical professional services shall be obtained to determine if the electrical systems have degraded.

6.3.2 Gas Systems

1. By comparison of the gas line routing to the measured differential settlements, the only area of potential concern for gas systems due to differential displacements within the JMS structure was within Areas E and F (7th and 8th Grade Wing).
2. Within said Areas E and F, no indication of undue stress or damage that appeared to be impacted by the compromised structural components was observed.
3. The main supply ball valve is provided in the Mechanical Room (B130) for the gas line that serves the 7th and 8th Grade classrooms. It is recommended that this valve be closed if the gas within the 7th and 8th Grade classrooms is not being used.
4. Should further visible displacement occur in JMS prior to remediation, gas professional services shall be obtained to determine if the gas systems have degraded.

7.0 References

7.1 LKA PARTNERS DRAWINGS

1. A.1. “Overall Floor Plans.” 1/28/1998.
2. A2.1. “Floor Plan [Area A].” 1/28/1998.
3. A2.2. “Floor Plan [Area B].” 1/28/1998.
4. A2.3. “Floor Plans [Area C].” 1/28/1998.
5. A2.4. “Floor Plan [Area D].” 1/28/1998.
6. A2.5. “Floor Plan [Area E].” 1/28/1998.
7. A2.6. “Floor Plan [Area F].” 1/28/1998.
8. P1.1. “Plumbing Plan Area A.” 1/28/1998.
9. P1.2. “Plumbing Plan Area B.” 1/28/1998.
10. P1.3. “Plumbing Plan Area C.” 1/28/1998.
11. P1.4. “Plumbing Plan Area D.” 1/28/1998.
12. P1.5. “Plumbing Plan Area E.” 1/28/1998.
13. P1.6. “Plumbing Plan Area F.” 1/28/1998.
14. P1.7. “Kitchen & Ala-Cart Plumbing Plan.” 1/28/1998.
15. P1.8. “Enlarged Mechanical Room Plumbing Plan.” 1/28/1998.
16. E2.1. “Power Plan – Area A.” 1/28/1998.
17. E2.2. “Power Plan – Area B.” 1/28/1998.
18. E2.3. “Power Plan – Area C.” 1/28/1998.
19. E2.4. “Power Plan – Area D.” 1/28/1998.
20. E2.5. “Power Plan – Area E.” 1/28/1998.
21. E2.6. “Power Plan – Area F.” 1/28/1998.
22. E3.1. “Lighting Plan – Area A.” 1/28/1998.
23. E3.2. “Lighting Plan – Area B.” 1/28/1998.
24. E3.3. “Lighting Plan – Area C.” 1/28/1998.
25. E3.4. “Lighting Plan – Area D.” 1/28/1998.

26. E3.5. “Lighting Plan – Area E.” 1/28/1998.
27. E3.6. “Lighting Plan – Area F.” 1/28/1998.
28. E4.1. “Consumer and Family Studies Power Plan.” 1/28/1998.
29. E4.2. “Kitchen Power Plan & A-La-Cart Power Plan.” 1/28/1998.

7.2 OTHER DOCUMENTS

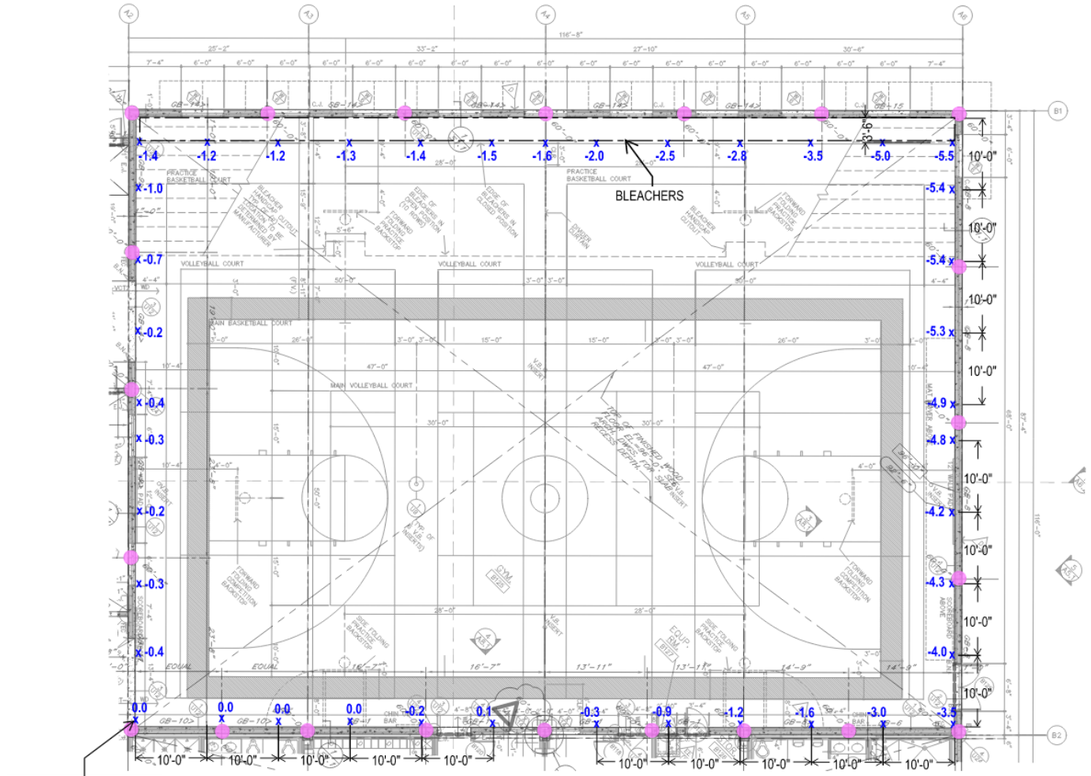
1. CTL|Thompson. Project No. CS19930-145. “Geotechnical Engineering Consultation. Jenkins Middle School.” Date 3/10/2025.

8.0 Appendices

Appendices Table of Contents

Appendix A Measurements of Differential Displacements of Floors within JMS

A.1 AREA B (GYM)



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GYMNASIUM
ZIPLEVEL READINGS

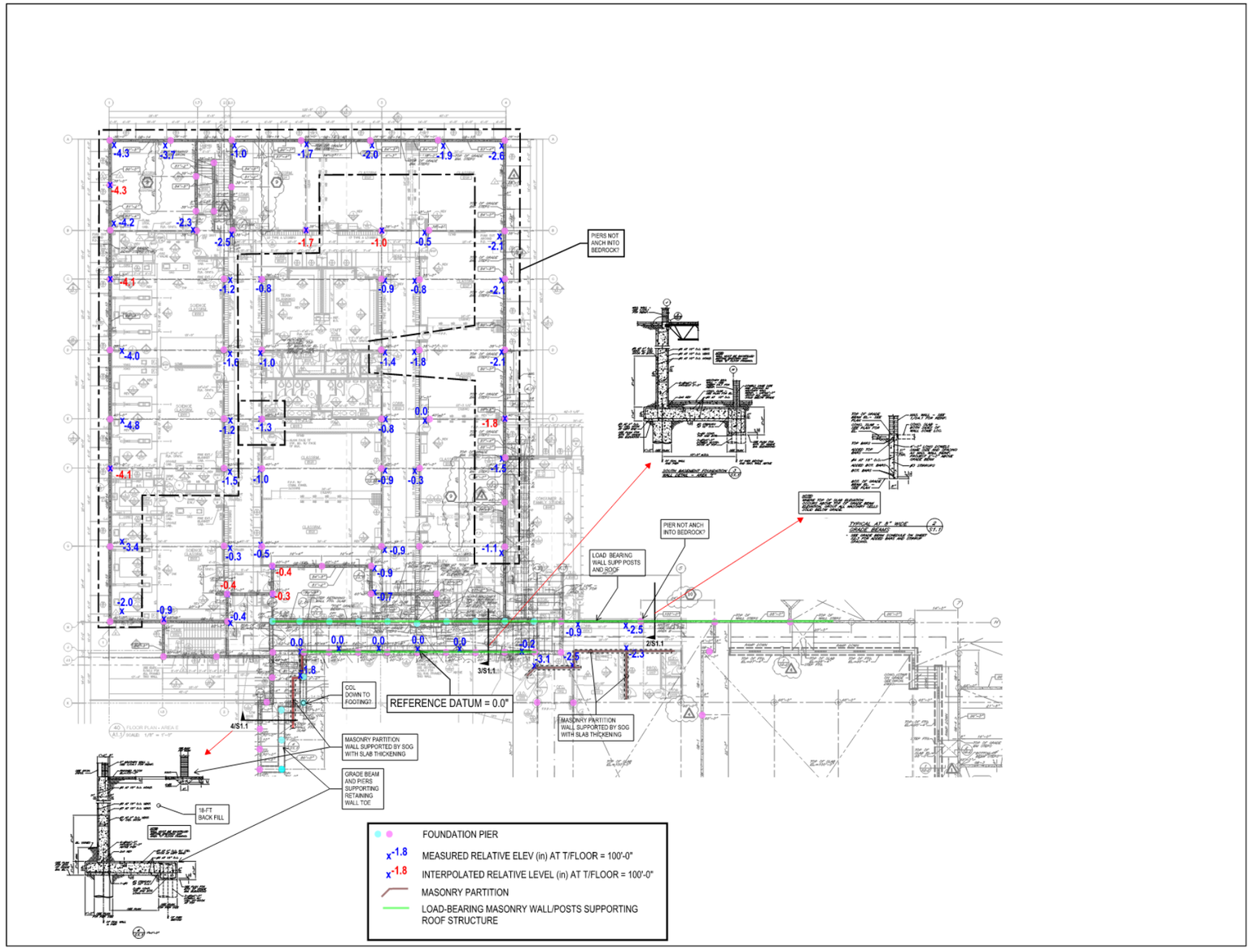
JENKINS MIDDLE SCHOOL
6410 Austin Bluffs Pkwy, Colorado Springs, CO 80923

NO:	REVISIONS:	DATE:

JH No: XXXXXXX
PREPARED BY: DW
DRAWN BY: DW
REVIEWED BY: XXX
DATE: JAN X, 2025

DRAWING No: S-XX

A.2 AREAS C (MEDIA CENTER), E (SEVENTH GRADE), & F (EIGHTH GRADE)



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7th GRADE CLASSROOMS
ZIPLEVEL READINGS

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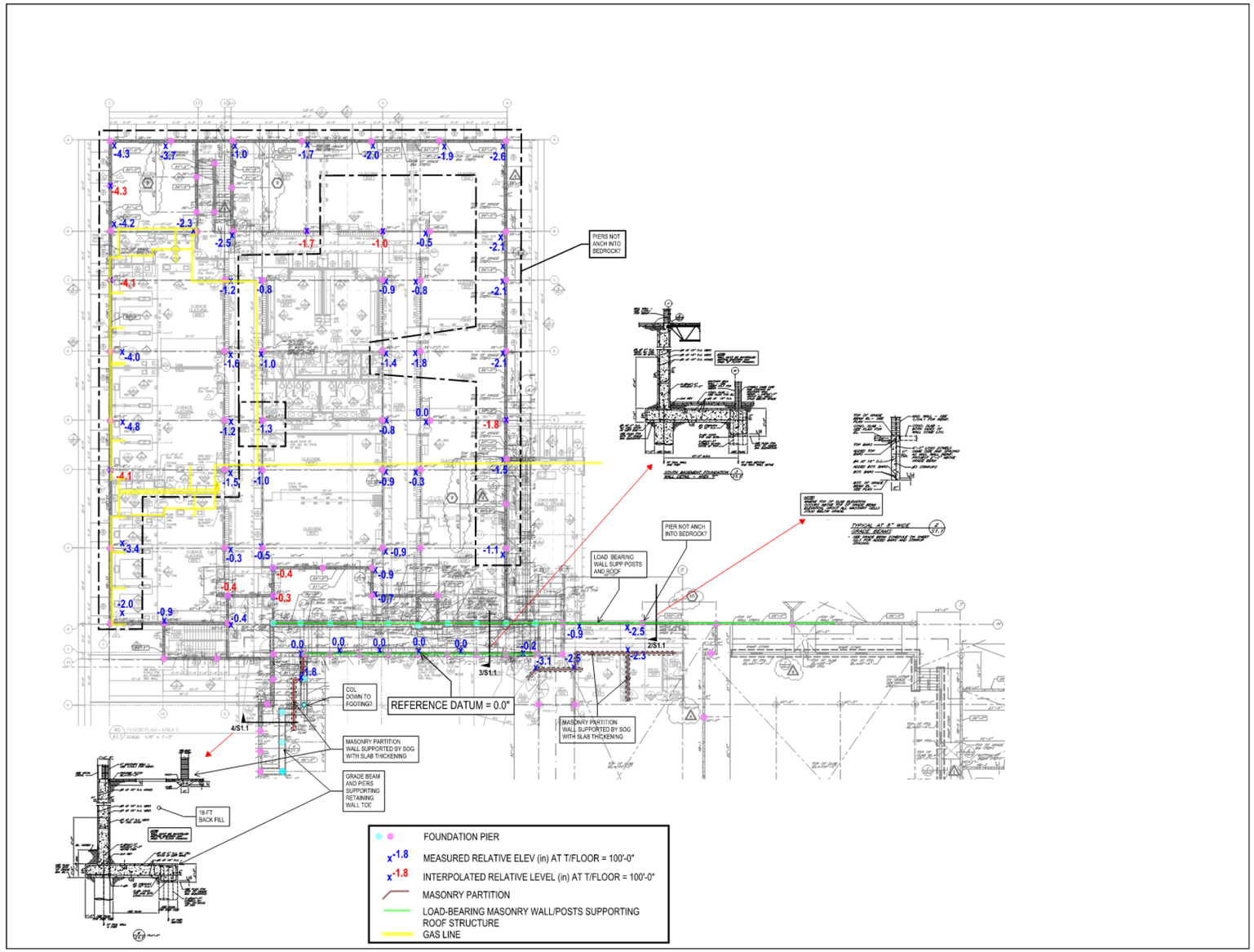
PREPARED BY:	DW
DRAWN BY:	DW
REVIEWED BY:	XXX
DATE:	JAN X, 2025
DRAWING No:	S-XX

Appendix B Overlay of Gas Lines onto Areas with Significant Differential Displacement



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DATE:	JAN X, 2025
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