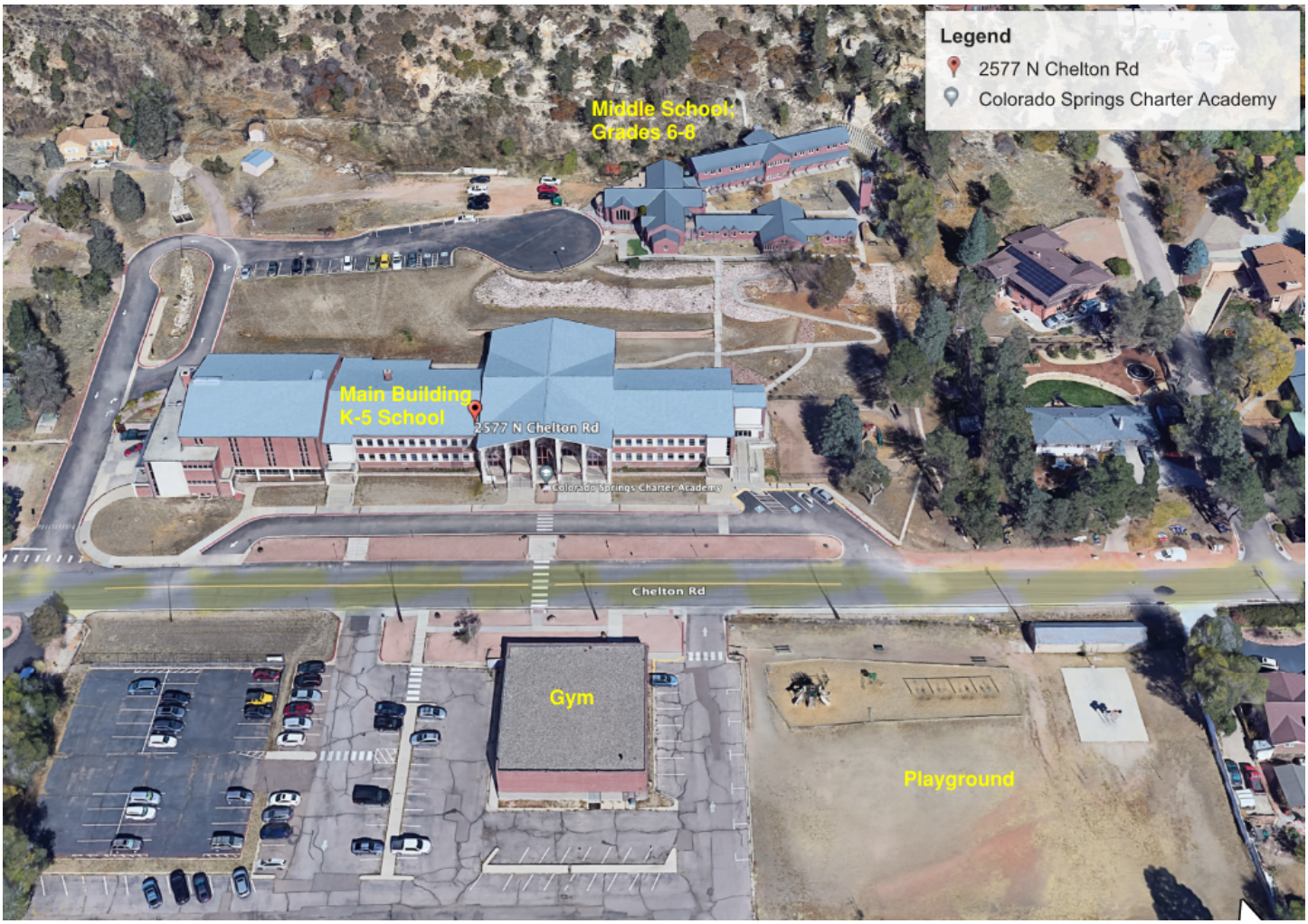
STRUCTURAL CONDITION ASSESSMENT SUMMARY REPORT

PREPARED BY: CORY MYRTLE, PE
DATE: JUNE 23, 2024

PROJECT

At your request, Corbel Engineering LLC performed a Structural Visual Condition Assessment Report for the Colorado Springs Charter Schools located at 2577 N Chelton Road in Colorado Springs, Colorado. The observation included three separate buildings including a middle school, elementary school and a gymnasium. The report is based upon a site visit and review of available information.



EXECUTIVE SUMMARY

ELEMENTARY SCHOOL

Our assessment revealed the structure is in good overall structural condition. The primary structure (roof framing, floor framing, bearing walls and foundations, etc.) generally appears to be in good condition. There were no apparent signs of significant deterioration, global instability, or localized structural failures. However, the following deficiencies and conditions should be addressed as redevelopment planning progresses.

- Repair or replace failed sealant joints around windows and veneer joints.

- Repair damaged or corroded stair and ramp railing and guardrails at entrances. Update guardrails and stair treads on exterior stairs to meet OSHA and building code safety design standards.

MIDDLE SCHOOL

Our assessment revealed the structure is in poor-to-fair overall structural condition. The primary structure (roof framing, floor framing, bearing walls and foundations, etc.) generally appears to be in fair condition. The slab-on-grade appears to be in poor condition showing signs of distress and extreme differential movement with localized swelling and settlements. The facility is nearly 40 years old, and has had apparently slab settlement and heave problems shortly after construction was completed in 1986. Multiple structural and geotechnical investigations on the property identified the primary cause is due to drainage issues and underlying soil conditions which include highly expansive claystone and fill. It is our professional opinion, the only structural repair solution that would produce a floor system meeting the performance requirements of current design standards such as a structural slab on void or a structural floor over a crawlspace. This will require the entire interior slab to be removed, partial excavation of the soils below to make room for a new structural slab and sufficient void. A structural slab may be constructed over a continuous void form. However, thicker sections of void form entails a higher risk related to constructing a floor over a crawl space, primarily to effective void collapse of these taller voids.

If it is determined that the removal of the existing slab and the installation of a structural floor system is not feasible or economical, a temporary repair solution could polyurethane foam injection (slab jacking) to lift the existing settled slab. Even after slab jacking, it is important to recognize that a slab on grade may continue to move over time due to underlying soil conditions and environmental factors. Slab jacking lifts and stabilizes the concrete surface by filling voids beneath it, but it does not address the root causes of soil instability, such as poor drainage, expansive clay soils, or ongoing erosion. As the soil beneath the slab continues to shift, settle, or swell, the slab may experience additional movement, leading to new cracks and unevenness. To mitigate this risk, it is essential to improve the underlying soil conditions through measures like enhancing drainage, soil stabilization, or implementing proper grading around the structure. Regular maintenance and monitoring can also help identify early signs of movement, allowing for timely interventions to preserve the integrity of the slab.

The following additional structural deficiencies and conditions will need to be addressed as redevelopment planning progresses.

- Repair or replace failed sealant joints.
- Repair the cracking and deteriorated brick mortar joints to prevent further damage.
- Adjust grading to provide positive drainage around the perimeter of the building to properly drain water away.

GYMNASIUM

Our assessment revealed the structure is in good overall structural condition. There were no apparent signs of significant deterioration, global instability, or localized structural failures.

INTRODUCTION

This report summarizes the visual structural condition assessment of the structures identified above. This report is based upon our on-site field observations and the review of existing documentation. The observation was performed on June 7th, 2024, by Cory Myrtle, PE (license number 47848) with Corbel Engineering LLC.

The goal of this study is to evaluate the general condition of the structures and identify structural deficiencies that may affect the reuse or future renovations. The evaluation considered the overall condition of the building, with a focus on identifying existing structural deficiencies and conditions that may develop into future deficiencies. This includes general recommendations for repair, rehabilitation, or demolition.

SCOPE

The scope of our investigation was limited to the preliminary visual assessment including the interior and exterior structural components, non-structural components, existing roofing materials, and other major building elements that may impact future redevelopment. Our investigation was further limited to readily visible elements without removing finishes, cladding, coverings, and other obstructions to expose concealed conditions. The following items were outside the scope of our assessment and are not included in this report:

- Destructive and non-destructive materials testing and inspection.
- Hazardous materials testing and inspection.
- Review of existing conditions for conformance to past or current Building Code requirements.
- Review of existing building MEP systems, equipment, and utility services to the property.

The following are the condition descriptors used for this project:

Good: Above average for this type and age of building system in this geographic area. No immediate repair work required or recommended.

Fair: Average condition for this type and age of building system in this geographic area. Some work may be required or recommended primarily due to the normal aging of the building system or material.

Poor: Below average condition for this type and age of building system in this geographic area. Significant work required to return building system or material to normal operating condition.

EXISTING BUILDING INFORMATION

Partial record drawings documenting the building's original design and construction were available for our use in performing the assessment and preparing this report. Existing documents included floor plans and wall sections, and structural foundation plans.

The following general information was determined from our observations and the review of the existing documentation:

ELEMENTARY SCHOOL

The original building was built in 1965 determined from existing construction documents. The two-story building is constructed with reinforced concrete including the elevated floors and roof systems. The walls consists of a non-load bearing multi-wythe brick and block construction. The foundations are all shallow spread footings and slab-on-grade.

MIDDLE SCHOOL

The original building was built in 1986 determined from existing construction documents and has two classroom wings. One wing is 2-stories. The approximate total area is 12,950 sf. The construction consists of 2x4 wood stud load bearing walls, TJI floor framing, and engineered wood roof trusses. The foundation of the existing structure consists concrete grade beams supported by drilled piers existing into bedrock. The floor slab is a non-structural slab-on-grade isolated from the building foundation system.

Renovations in 2010 included an interior renovation which removed interior lateral shear wall bracing. Additional steel shear walls and steel diaphragm bracing was installed with the removal of shear walls.

GYMNASIUM

The gym was built in 1975 determined from existing construction documents. The 6,300-sf gymnasium is built with load bearing reinforced CMU walls and precast double tee roof structure. The foundations are shallow spread footings and slab-on-grade.

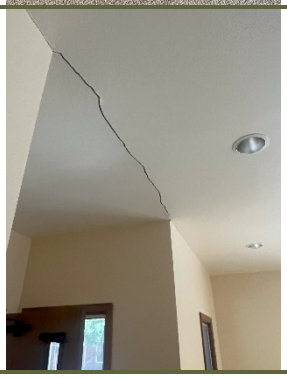
OBSERVATIONS

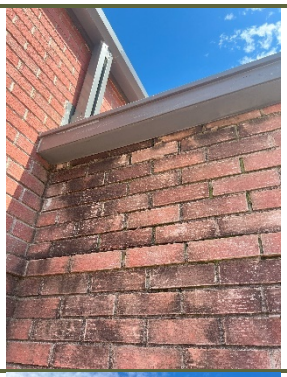
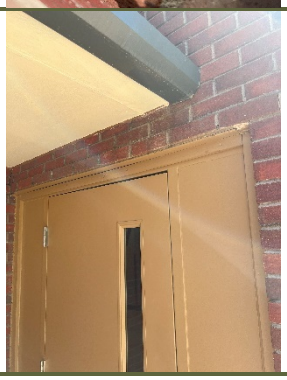
A summary of general observations made during our site visit is provided below. All observations were made from ground level. Interior observations were limited to readily accessible areas of each floor.

ELEMENTARY SCHOOL

1.	Failed joint sealant and caulking around windows and door openings. Recommendation: Repair joint to protect from water intrusion and further damages.	

2.	Minor deterioration of the brick veneer around the base where exterior paving is butted against the veneer. This is likely caused by freeze thaw expansion where water is ponding against the veneer, along with the use of deicing salts. Recommendation: Repair and replace bricks as necessary. Seal brick to increase durability to freeze/thaw.	
3.	The slab on grade at the entries has deteriorated. The likely cause is from a low-quality concrete mix design and the use of deicing salts. Recommendation: Replace the concrete slab on grade as necessary.	
4.	Guardrails and handrails are showing signs of deterioration where connected to the concrete stairs along the bases. Recommendation: Replace deteriorated railing and repair concrete slabs.	
5.	The exterior paving around the west side loading dock is in poor condition. Recommendation: replace the paving and properly drain the area around the dock.	

1.	A large crack in the existing science classroom (northwest side) has formed between bearing wall and column. The crack appears to be caused from the settlement of the slab along the north side and heaving directly under the cracked area. This settlement and heaving caused the large crack to open up.	
2.	Settlement of the slab next to the exterior foundation grade beam is visible around nearly the entire building perimeter. Settlement of over 2” was observed.	
3.	Large slab crack in the slab was observed in the hallway. Reviewing the existing structural drawings, this cracking is directly located over an existing foundation grade beam. This indicates that the slab has settled causing the large crack and step to form.	
4.	Slab on grade around existing foundation grade beam has settled causing a large step in the slab.	
5.	Large interior drywall cracks were observed along the second level of the north wing. These cracks are located next to bearing walls. No cracking on the walls was observed. It is likely these cracks are caused by some foundation differential movement. Other possible causes could be thermal expansion of the ceiling system.	

6.	Deteriorated mortar jointing around gutter on the south side. Recommendation: Remove any loose or deteriorated mortar material and repoint the joints, sealing all cracks.	
7.	Cracking in the brick wall above the entry on the northeast side of the south wing was observed. Diagonal cracking in brick veneer is often caused by differential settlement of the foundation, where uneven soil movement leads to stress on the brickwork. Other possible causes include thermal expansion and contraction, which can create stress along diagonal lines, and inadequate support or anchoring of the brick veneer to the underlying structure. Recommendation: Remove any loose or deteriorated mortar material and repoint the joints, sealing all cracks.	
8.	A window on the east side is cracked. The window frame appears to be tight to the veneer. It is our opinion that the cracking window is likely caused from some movement of the foundation system.	
9.	Failed joint sealant and caulking around windows and door openings. Recommendation: Repair joint to protect from water intrusion and further damages.	
10	Cracking in the brick wall above the entry on the south side of the north wing was observed. Additionally, the door frame is racked. Diagonal cracking in brick veneer and racking of door/window frames is often caused by differential settlement of the foundation.	

11	Site retaining wall on north side of the property is washed out. This type of retaining wall depends on the soil behind for stability. Recommendation: Completely rebuild retaining wall.	
12	Downspout drains water next to the building foundation. Site drainage water is ponding next to building Recommendation: Move downspout and re-slope grade away from the foundation.	

GYMNASIUM

No structural deficiencies were observed.

RECOMMENDATIONS AND CONCLUSIONS

ELEMENTARY SCHOOL

Our limited investigation and condition assessment revealed the elementary school building is in good overall condition. Some minor repairs are needed with the exterior concrete flatwork and railings, as identified above. No other structural deficiencies were observed. With the planned future renovations, installing large mechanical equipment into the existing mechanical rooms within a building constructed of concrete poses several construction challenges. First, the limited maneuverability in tight spaces can make it difficult to transport and position the equipment, necessitating the use of specialized tools and techniques, such as cranes or hoists, to navigate confined areas. Additionally, concrete structures often lack the flexibility to be easily modified, meaning that any necessary alterations to accommodate the equipment—such as enlarging openings or reinforcing floors—can be time-consuming and complex. A proper construction budget should include such challenges with the proposed mechanical upgrades.

MIDDLE SCHOOL

Our limited investigation and condition assessment revealed the superstructure (roof framing, floor framing, bearing walls and foundations, etc.) is in fair-to-good overall condition. However, the slab-on-grade shows signs of severe distress and extreme differential movement with localized swelling and settlements. Multiple structural and geotechnical investigations on the property identified the primary cause is due to drainage issues and underlying soil conditions which include highly expansive claystone and fill. It is our professional opinion, the only structural repair solution that would produce a floor system meeting the performance requirements of current design standards such as a structural slab on void or a structural floor over a crawlspace. This will require the entire interior slab to be removed, partial excavation of the soils below to make room for a new structural slab and sufficient void. A structural slab may be constructed over a continuous void form. However, thicker sections of void form entails a higher risk related to constructing a floor over a crawl space, primarily to effective void collapse of these taller voids. A structural slab could

consist of a 8” to 10” reinforced concrete slab over 10” void form, supported by drilled micropiles. The micropiles would be spaced approximately 10 feet on centers each way producing a 10’x10’ grid.

If it is determined that the removal of the existing slab and the installation of a structural floor system is not feasible or economical, a temporary repair solution could polyurethane foam injection (slab jacking) to lift the existing settled slab. Even after slab jacking, it is important to recognize that a slab on grade may continue to move over time due to underlying soil conditions and environmental factors. Slab jacking lifts and stabilizes the concrete surface by filling voids beneath it, but it does not address the root causes of soil instability, such as poor drainage, expansive clay soils, or ongoing erosion. As the soil beneath the slab continues to shift, settle, or swell, the slab may experience additional movement, leading to new cracks and unevenness. To mitigate this risk, it is essential to improve the underlying soil conditions through measures like enhancing drainage, soil stabilization, or implementing proper grading around the structure. Regular maintenance and monitoring can also help identify early signs of movement, allowing for timely interventions to preserve the integrity of the slab.

GYMNASIUM

Our limited investigation and condition assessment revealed the gymnasium building is in good overall condition. No structural deficiencies were observed. Per design discussions on potential future improvements, natural lighting in the existing space would be designed. Installing skylights in the existing precast double tee roof system is possible but requires meticulous planning and adherence to best design practices to maintain structural integrity. While large openings between the stems of the precast double tees could be achieved, the spacing and location of the openings may be limited. Openings through the exterior walls could pose a challenge with the multi-wythe makeup. Steel headers and lintels may require a good portion of the wall to be removed for the installation.

If you have any questions or wish to discuss the information presented in this report, please do not hesitate to contact our office.

Sincerely,

Cory Myrtle, PE