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ENGINEERING & TESTING, INC.
907 ARROW ROAD, STE 2 | CHAMPAIGN, IL 61821

06/20/2023

Mr. Kent Metzger
Dir. of Buildings and Grounds
Decatur Public Schools #61
Buildings & Grounds Department
400 East Cerro Gordo
Decatur, IL 62523
Office – 217-362-3531
kametzger@dps61.org

Re: *Dennis Lab School Inspection (Kaleidoscope)*
1499 W Main St
Decatur, IL 62522
BFW Project No. *23418*

Dear *Mr. Metzger*,

BFW was hired to conduct a structural assessment of Dennis Lab School Kaleidoscope Campus. The original building was built in 1914 with later additions. The original building is multiwythe brick masonry perimeter and interior load-bearing walls. It is assumed the floors are wood framed and the roof framing was found to be wood trusses. On May 30th, BFW performed a thorough visual inspection of the exterior of the school from the ground level and the roof tops. The interior inspection of the school was not as revealing because all structural elements were incased in plaster or decorative wood. Where acoustic drop ceilings were present, we found plaster ceilings above so floor framing was not able to be accessed and inspected. We had to look for cracks in the plaster to clue us into possible deteriorations or movement of the structure behind plaster. We were able to access a portion of the attic to visually observe portions of the roof framing to determine the general framing directions and connections of the wood trusses. The purpose of this report is to identify structural deficiencies observed in the field and to provide recommendations on what elements should be repaired.

BFW inspected the roof and parapet of the original building due to concerns of visible horizontal deflection, bowing and leaning of the parapet. There was visible bowing outward of the parapet on the east end, but we wanted to check all parapets. A string line was used to stretch from corner to corner of the building and from inside face of parapet to inside face of parapet. The results of these measurements are shown in Figure 1 in Appendix A. The east parapet walls were leaning, bowing, and horizontally deflecting the worst. The North portion of the East parapet wall was measured to have a 6 3/8" horizontal deflection at the top just approximately 13 feet from the north corner of the building which is significantly more than the allowable deflection over this length for a masonry wall. Refer to Pictures 1 thru 6 in Appendix A for photos of this east parapet and portions of wall below. We believe there are two main factors causing and allowing this parapet wall to horizontally deflect so extremely. Around the perimeter of the building on the exterior side of the parapet there is a decorative precast stone element that occurs about 4ft below the top of the parapet. This cast stone element protrudes outward almost 2ft from the exterior face of the masonry. The decorative stone could weigh as much as a few hundred pounds per foot. Since this amount of weight is extending from the side of the parapet, it is applying an eccentric load to the exterior wall and causing it to lean and bow outwards. It is typical for a building of this age to have no positive bracing connection between roof and

perimeter walls or even floors and perimeter walls. We could not access the second floor visibly to determine if there is a bracing connection present. When we accessed the attic, we looked along the inside of the east parapet wall and noticed no visible connection between the roof and the perimeter east wall or even the ceiling and the perimeter wall. Roof trusses span in the north-south direction so the span parallel to the east and west parapets. Picture 7 shows no connection between the roof and the east wall. This same picture does however provide some evidence that this east wall was bowing and leaning outward to some extent at the time of the last re-roofing project because it is evident that the purple roof insulation was cut to the contour of the wall and extends over the adjacent truss. These parapet walls lean less near the inside of the building because there are interior bearing walls that connect to the perimeter walls underneath the truss bearing level. The perimeter walls are also connected at the corner to help brace the parapets but the bricks at these corners are separating and deep cracks are visible. Refer to Picture 8 in Appendix A for a photo of the southeast corner wall from inside the attic. Along the north side of the east wall below the parapet there are moderate sizes cracks stepping along the wall likely due to the shifting of bricks from the leaning and bowing. The cast stone decorative pieces along the east face have cracks at joints and hairline cracks along portions of the stone. All of these cracks allow moisture infiltration into the perimeter wall which will cause deterioration of mortar and brick.

The north and south parapets horizontally deflect less than the east and west parapets likely because the roof framing bears into these walls, and we did find evidence of some steel straps from some trusses that extended into the perimeter wall providing some lateral bracing to the walls. While the west parapet is likely unbraced just like the east parapet, it does not appear to be bowing and leaning outward quite as much as the east parapet. One theory of this difference could be that over the hundred-plus year lifespan of the building there are usually more prominent westerly winds than easterly winds. Winds from the west would push the west parapet toward the roof, but it would push the east parapet away from the roof and furthermore in the direction that it already wants to lean due to the eccentric load of the cast-stone.

For the following reasons, it is our expert opinion that the east parapet, the wall below, and the walls that the east parapet connects into are unstable and susceptible to a sudden collapse.

- *The east parapet and portions of the wall below the parapet are leaning and bowing a large amount.*
- *The east parapet supports a constant eccentric load.*
- *The corners that help brace the east parapet show cracking and separation of bricks.*
- *The east parapet and wall are not braced by the roof, ceiling and likely not by the floors below either.*

On the evening of the site visit, we corresponded via phone that there was an unstable portion of the building and that we recommended restricting occupancy inside and outside the building at areas adjacent to the unstable location. On the morning of May 31st, an email was sent with an attachment highlighting these areas. The attachment can also be found in Appendix A in Figure 2.

If remediation is an option that is desired to be pursued, then BFW recommends that the perimeter, roof, and inside of the building be 3d scanned so the extent of all bowing, leaning, and deflections can be captured and used for analysis and to further investigate building behavior that can not be seen from the ground. A minimum likely remediation would be to demo the parapets around the entire structure down as low as at least the truss bearing elevation and properly rebuild the parapets while bracing them to the roof. The roof and roof faming might need to be reinforced and second floor bracing to walls might also need to be provided. We would also recommend that not eccentric cast-stone be used when rebuilding the parapets if this option is chosen. Any remediation would be a very costly endeavor and the structure below the replacement would still be approximately 110 years old. The more cost-effective long-term solution will likely be to carefully demo the original building and re-build a new structure.

The following are other non-urgent structural issues that we identified. While conducting the inspection of the exterior of the building, BFW also observed the retaining wall at S College Street is no longer adequately retaining soil. It is deflecting 5 ½" which is significantly more than the allowable limit and has visible cracking along the length

(Picture 9). BFW recommends this retaining wall be scheduled to be replaced. The lintel above the exterior exit to the All Purpose Room was observed to have multiple issues. Cracking above the midspan of the linted was observed to extend the full height of the wall above the lintel as well as cracking at the lintel bearing (Pic 10). These cracks were also evident on the exterior of the building. These are possible indications that the lintel is not sufficiently supporting the brick and CMU above the opening. BFW recommends the CMU to be repaired and the lintel replaced. Cracks were also observed on the interior of the All Purpose Room at the control joint on the North wall, on the North side of the West wall, and above the opening above the primary entrance to the room (Pic 11). These cracks should be monitored for worsening conditions. BFW also noted (3) corroded exterior lintel in rooms 317 and 311 in the original building (Pic 12). BFW recommends these lintels be replaced if they are not included in the parapet/wall repairs outlined previously in this report. Engineers also observed grout missing from the few courses of brick at the Southwest corner of the original building (Pic 13). BFW recommends this area be scheduled to be re-pointed. There is a CMU & brick privacy wall around some roof top equipment on the addition roof. These walls are susceptible to temperature swings and freeze thaw since they are not in a controlled environment. There appears to be many locations of horizontal cracking, cracking at lintel bearing, and some bulging of brick (Pictures 14-16). BFW recommends sealing cracks in these walls with a flexible sealant and setting up crack monitors. We recommend inspecting the monitors and these walls every 3 months for 1 year to see how they behave through the seasons. We feel that these walls should be reassessed after the 1-year timeframe to determine if any more drastic action needs to be taken. One eventual option might be to replace these masonry screen walls with a lighter weight prefabricated option that will not deteriorate like masonry or be as affected by thermal changes.

The interior inspection of the building was limited due to the presence of plaster walls and ceiling as well as decorative woodwork covering structural elements. BFW did note deflections of the handrails and tilting of the primary stairwell at the top level (Pic 17). BFW recommends reinforcement or replacement of the existing structural elements to be scheduled. Further investigation will be required to help determine the correct repair or how to replace it.

Overall, BFW recommends that at a minimum the Kaleidoscope school remain partially closed until necessary repairs are made. Please reach out if there are further questions, concerns, or if 3D scanning and design for remediations of the school is desired.

Sincerely,

Bacon Farmer Workman Engineering & Testing, Inc.

Phillip Holthaus, PE, SE

SIGNED: 06/20/23
EXPIRES: 11/30/24

Bacon Farmer Workman Engineering & Testing, Inc.
907 Arrow Road, Ste. 2
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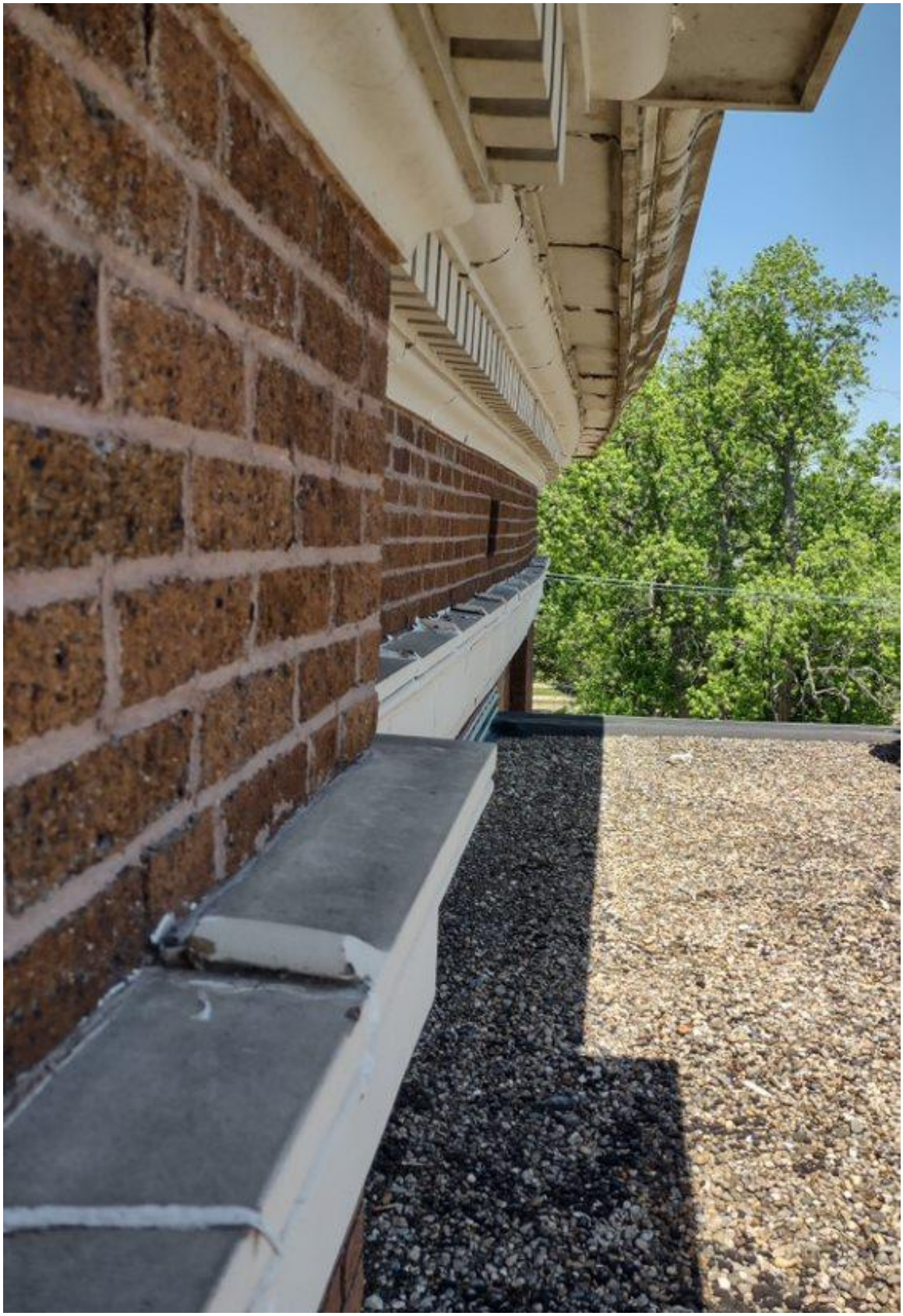
Appendix A

Picture 1

Picture 2

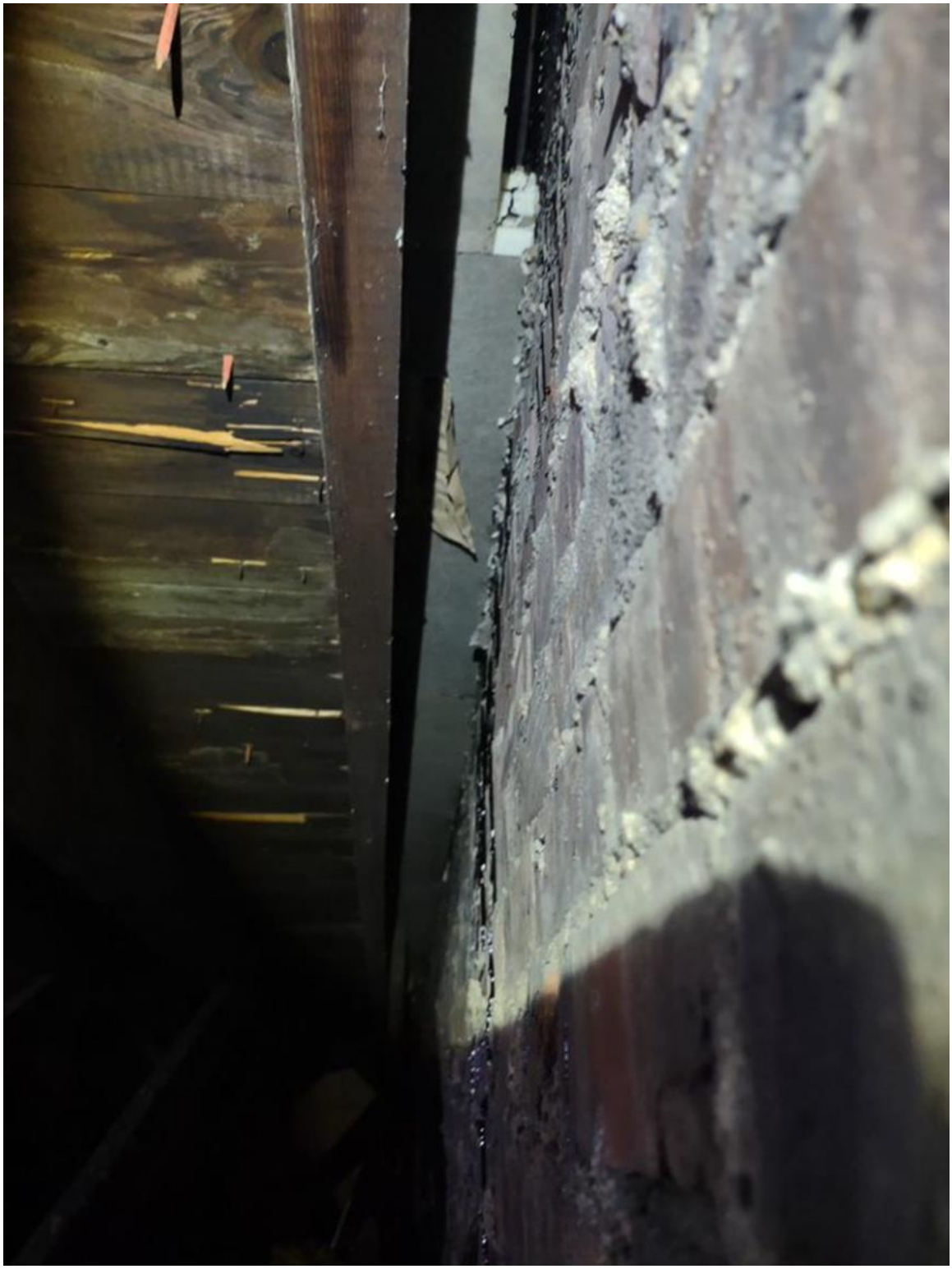


Picture 3

Picture 4

Picture 5

Picture 6



Picture 7

Photo 8

Picture 9

Picture 10

Picture 11

Picture 12

Picture 13

Picture 14

Picture 15

Picture 16

Picture 17

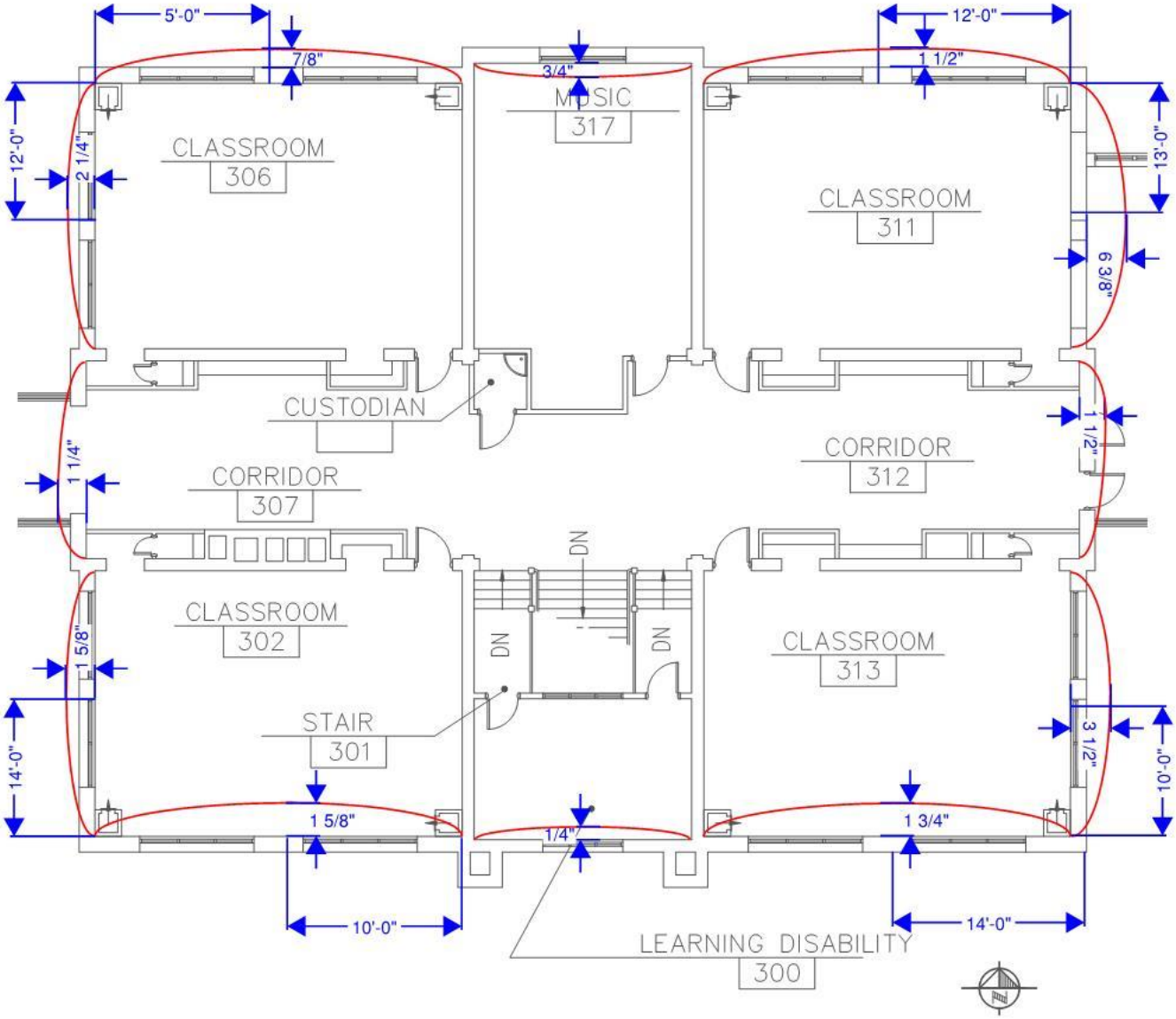
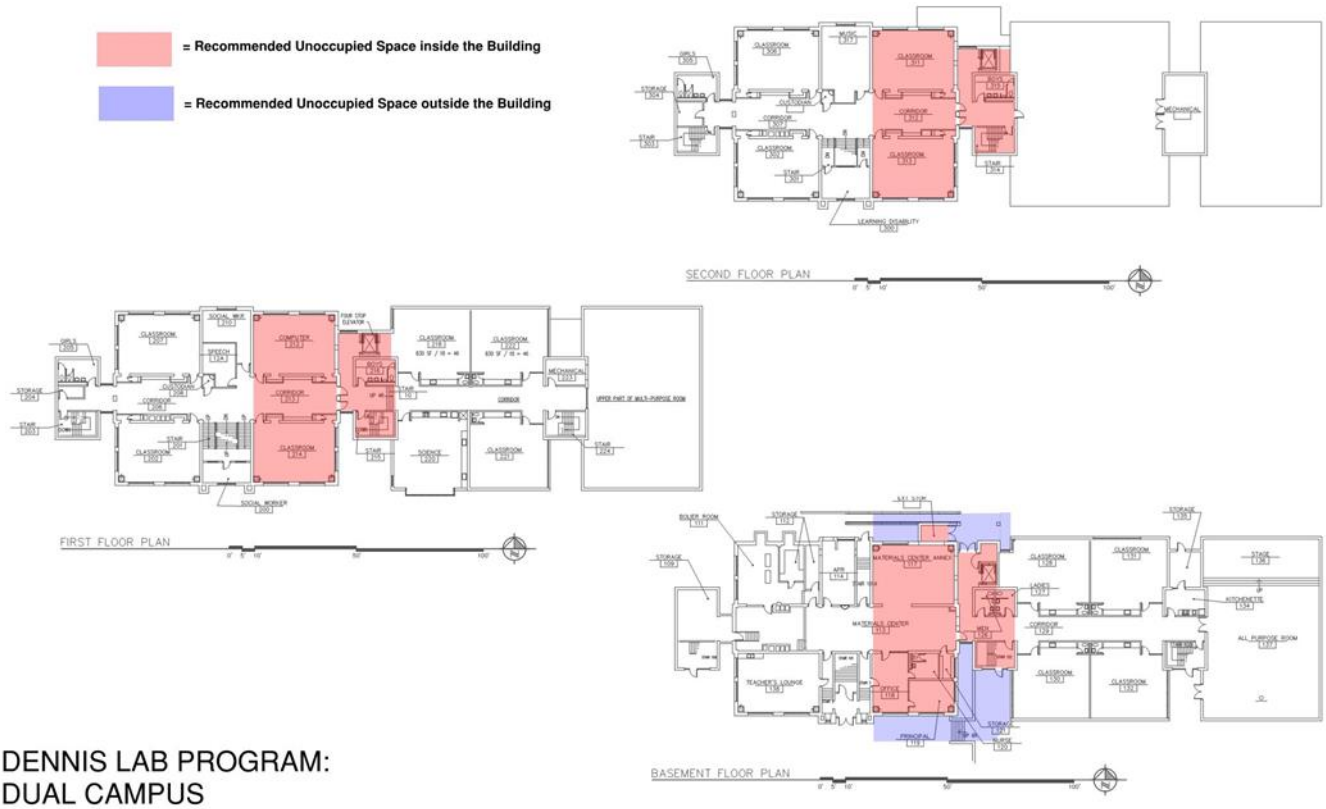

5'-0"
7/8"
3/4"
12'-0"
1 1/2"
12'-0"
2 1/4"
13'-0"
CLASSROOM
306
MUSIC
317
CLASSROOM
311
6 3/8"
CUSTODIAN
1 1/2"
1 1/4"
CORRIDOR
307
CORRIDOR
312
DN
DN
DN
CLASSROOM
302
CLASSROOM
313
1 5/8"
STAIR
301
3 1/2"
14'-0"
10'-0"
1 5/8"
1/4"
1 3/4"
10'-0"
14'-0"
LEARNING DISABILITY
300

Figure 1



DENNIS LAB PROGRAM:
DUAL CAMPUS
Kaleidoscope

Figure 2

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