PLYMC – Poland Library

Poland Library Building Assessment
BSHM Architects, Inc.
1/23/24

The Public Library of Youngstown and Mahoning County Poland Library building assessment, documents existing conditions and provides recommendations for building improvements. The recommendations are one way to remediate or renovate the items as listed. The approach of the assessment is a “replacement-in-kind” and is not intended to modify the library exterior and interior design.

This document encompasses Site and Building Improvements. In both improvement categories, there are 8 Sections that address specific design elements. Each element has a subheading, a description of the assessment items, a conclusion and a recommendation for repair or replacement. Additionally, the PLYMC executed additional geotechnical investigation in the lower-level bookstore where the slab is heaving. The library hired an engineer to perform and provide an analysis of the under-slab materials. The report provided valuable information to remediate the heaved slab. All findings and Reference Drawings are included in the Appendix.

The Assessment provides an Opinion of Probable Cost for each section and associated line items. The Opinion of Probable Cost is based on site visits, meetings with the library, associated geotechnical and construction reports and existing drawings. The Opinion of Probable Cost also includes two-line items of facility maintenance: the exterior painting of the building and resurfacing of the parking lot.

The Opinion of Probable Cost is made up of of Contingencies, Construction fees and Design fees. A contingency is a predetermined amount or percentage of the contract held for unpredictable changes in the project. Contingencies are helpful when used as a risk management tool to financially prepare owners for addressing risk within the project. Two contingencies included in the cost are Design and Construction. A design contingency refers to unforeseen costs during the design phase. It allows for flexibility in the design process and is included in the cost estimate before drawings and specifications are finalized. An owner’s contingency is included in projects during construction. This will provide cost for unforeseen conditions during construction. An example of an unforeseen condition may include, after removal of a material, the need for further repair of a building’s substrate or additional repair of building framing (the studs of a wall).

The intention of the assessment is to provide a document that the PLYMC can assess and provide additional direction on the renovation process. Other steps include the hiring of a design team and the design and documentation of various elements and a public bid process.

The report is a professional opinion based on the investigation and documentation provided.

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Project Team

BSHM Architects, Inc.

DeSalvo Construction Company, Inc.

The Public Library of Youngstown and Mahoning County –

Poland Library

Seidler Engineering, Inc.

J.M. Verotsko, Inc.

The Public Library of Youngstown & Mahoning County
305 Wick Avenue
Youngstown, Ohio, 44503
(330)744- 8636

Building Assessment
Poland Library
311 South Main Street
Poland, Ohio 44514

Year Built: 2000

Building Size: 3 Stories

Lower Level:	15,730 SF (including entry porch)
Main Level:	15,470 SF (including balconies)
Upper Level:	3,800 SF (catwalk and cupola)
Net Building Total:	35,000 SF

Note: Building size is as listed in the Mahoning County Auditor Website

Type of Construction:
Type IIIB

Building Use and Occupancy Classification:

Assembly	Group A-3 (Library)

Poland Library Building Assessment

The assessment is a review and recommendation to provide adequate updates of the Architectural, mechanical, electrical, plumbing and accessibility. As part of the Architectural assessment, building repairs/replacement are recommended to include the building façade, structural slab, exterior pavers and pergolas.
The assessment includes one opinion of probable cost estimate, determined by the facilities assessment building upgrades. This estimate provides a cost analysis for the total building renovation and a rating of each upgrade listed: Rating 1 (satisfactory), 2 (needs repair/partial replacement) and 3 (total replacement of building element).

Building Probable Cost Estimate:

The assessment spreadsheet includes the probable renovations required for all levels. This includes major replacement and upgrades for Architectural structural, mechanical, electrical, and plumbing. Upon development of this plan, this will be verified with PLYMC and Mahoning County Building Department. There are also future areas of work included in the spreadsheet. The provided cost includes all items that will need repair or replacement. The square footage calculations include net building area, patios and balconies.

PLYMC - Poland Library
Design Fee Summary

SECTION 1 - SITE IMPROVEMENTS			
PROBABLE COST	*DESIGN FEE (8.5%)*	*DESIGN CONTINGENCY (15%)*	*OWNERS CONTINGENCY (10%)*
$271,251.75	*$23,056.40*	*$40,687.76*	*$27,125.18*

TOTAL :	***$362,121.09***

SECTION 2 - BUILDING IMPROVEMENTS			
PROBABLE COST	*DESIGN FEE (8.5%)*	*DESIGN CONTINGENCY (15%)*	*OWNERS CONTINGENCY (10%)*
$2,388,456.15	*$203,018.77*	*$358,268.42*	*$238,845.62*

TOTAL :	***$3,188,588.96***

SECTION 3 - STRUCTURAL			
PROBABLE COST	*DESIGN FEE (8.5%)*	*DESIGN CONTINGENCY (15%)*	*OWNERS CONTINGENCY (10%)*
$691,220.61	*$58,753.75*	*$103,683.09*	*$69,122.06*

TOTAL :	***$922,779.51***

SECTION 4 - HEATING			
PROBABLE COST	*DESIGN FEE (8.5%)*	*DESIGN CONTINGENCY (15%)*	*OWNERS CONTINGENCY (10%)*
$95,287.50	*$8,099.44*	*$14,293.13*	*$9,528.75*

TOTAL :	***$127,208.82***

PLYMC - Poland Library
Design Fee Summary

SECTION 5 - AIR CONDITIONING			
PROBABLE COST	*DESIGN FEE (8.5%)*	*DESIGN CONTINGENCY (15%)*	*OWNERS CONTINGENCY (10%)*
$468,445.00	*$39,817.83*	*$70,266.75*	*$46,844.50*

TOTAL :	***$625,374.08***

SECTION 6 - PLUMBING			
PROBABLE COST	*DESIGN FEE (8.5%)*	*DESIGN CONTINGENCY (15%)*	*OWNERS CONTINGENCY (10%)*
$25,410.00	*$2,159.85*	*$3,811.50*	*$2,541.00*

TOTAL :	***$33,922.35***

SECTION 7 - LIFE SAFETY			
PROBABLE COST	*DESIGN FEE (8.5%)*	*DESIGN CONTINGENCY (15%)*	*OWNERS CONTINGENCY (10%)*
$31,762.00	*$2,699.77*	*$4,764.30*	*$3,176.20*

TOTAL :	***$42,402.27***

SECTION 8 - ELECTRICAL			
PROBABLE COST	*DESIGN FEE (8.5%)*	*DESIGN CONTINGENCY (15%)*	*OWNERS CONTINGENCY (10%)*
$497,273.70	*$42,268.26*	*$74,591.06*	*$49,727.37*

TOTAL :	***$663,860.39***

PLYMC - Poland Library
Building Assessment Total Costs

SUMMARY	
SECTION 1 - ***SITE IMPROVEMENTS***	***$362,121.09***
SECTION 2 - ***BUILDING IMPROVEMENTS***	***$3,188,588.96***
SECTION 3 - ***STRUCTURAL***	***$922,779.51***
SECTION 4 - ***HEATING***	***$127,208.82***
SECTION 5 - ***AIR CONDITIONING***	***$625,374.08***
SECTION 6 - ***PLUMBING***	***$33,922.35***
SECTION 7 - ***LIFE SAFETY***	***$42,402.27***
SECTION 8 - ***ELECTRICAL***	***$663,860.39***
CONTRUCTION/ GEO. REPORTS, ETC.	***$40,000.00***
SECTIONS 1-8 TOTAL :	***$6,006,257.47***
OWNER REQUESTED BUILDING MODIFICATIONS	***$1,000,000.00***
PERMANENT IMPROVEMENT PROJECTS - *PARKING LOT & EXTERIOR PAINTING*	***$450,000.00***
CUMULATIVE SECTIONS & ALT. TOTAL :	***$7,456,257.47***

PLYMC - Poland Library
Building Assessment Probable Costs

1 - SITE IMPROVEMENTS

#	ITEM DESCRIPTION	COMMENTS	TOTAL
1	*ARCHITECTURAL & ENGINEERING SERVICES*	*Refer to the Design Fee Summary for separate cost.*	$0.00
2	*R & R BRICK PAVERS - ON GRADE*	*Includes segmental retaining wall & landscape restoration.*	$216,620.25
3	*R & R BRICK PAVERS @ BALCONIES (AREA #3)*	*Includes waterproofing membrane.*	$54,631.50
4	*SECTION TOTAL*		$271.251.75

2 - BUILDING IMPROVEMENTS

#	ITEM DESCRIPTION	COMMENTS	TOTAL
1	*ARCHITECTURAL & ENGINEERING SERVICES*	*Refer to the Design Fee Summary for separate cost.*	$0.00
2	*DORMITORY - DEMO & RESTORE*	*Complete removal and replacement of existing interior finishes to accommodate new floor framing systems, including MEP rebuild to accomplish floor framing installation.*	$1,433,124.00
3	*DORMITORY - WATERPROOF BASEMENT*	*Includes landscape restoration at impacted area.*	$44,467.50
4	*BOOKSTORE - STRUCTURAL SLAB REPAIR*	*Refer to Section 3, Item 8 below.*	$0.00
5	*BUILDING VENEER REPAIR*		$597,135.00
6	*PERGOLAS - REPLACEMENT*	*Note the columns in Section 3, Item 5 below.*	$250,103.01
7	*BALCONIES - EIFS REPLACEMENT*		$32,524.80
8	*ROOF - GUTTER REPLACEMENT*	*Item 2 in this Section addresses cost for Stepped Flashing at both Dormitory chimneys.*	$31,101.84
9	*SECTION TOTAL*		$2,388,456.15

3 - STRUCTURAL

#	ITEM DESCRIPTION	COMMENTS	TOTAL
1	*ARCHITECTURAL & ENGINEERING SERVICES*	*Refer to the Design Fee Summary for separate cost. By Owner.*	$0.00
2	*ENTRANCE PAVER AREA #1*	*Refer to Section 1, Item 2 above.*	$0.00
3	*EGRESS FROST PROTECTION*	*New frost slabs at all exterior doors. Assumes brick paver replacement in separate section below.*	$44,182.91
4	*SIDEWALK INSTALLATION @ PAVER AREA #2*	*Frost slabs and pavers elsewhere. Assumes positive drainage through grading of new subbase.*	$93,460.52
5	*COLUMN WRAPS*	*Assumes demo and replacement of all foundations and columns, utilizing Chadsworth load bearing columns or similar.*	$282,787.89
6	*PERGOLA MOVEMENT*	*See Item 5 in this Section for foundation replacement.*	$0.00
7	*BALCONY STRUCTURAL INTEGRITY*	*Replacement of dormitory balcony "floor". Existing roof to remain. Existing column railings to be removed, salvaged and re-installed.*	$22,869.00
8	*MECHANICAL ROOM SLAB MOVEMENT*	*During the on-site walk-thru, the discussion of further work was not recommended due to existing underground utilities. The price is part of the SECTION TOTAL.*	$31,762.50

PLYMC - Poland Library Building Assessment Probable Costs			
#	ITEM DESCRIPTION	COMMENTS	TOTAL
9	*SLAB-ON-GRADE MATERIAL (BOOKSTORE AREA)*	*All library furniture, fixtures and equipment to be removed, relocated, and re-installed by others. Floor finish and base to be removed and replaced.*	$193,288.79
10	*EXISTING DORMITORY AREA*	*Refer to Section 2, Item 2 above.*	$0.00
10.2	*COMPREHENSIVE STRUCTURAL ANALYSIS*	*Refer to Section 2, Item 2 above.*	$0.00
10.3	*FOUNDATION REINFORCEMENT*	*By Architect/Engineer, IF NEEDED.*	$0.00
10.4	*FIREPLACE & WALL REPAIRS*	*Masonry repairs/restoration.*	$22,869.00
10.5	*SELECTIVE STRUCTURAL REPAIR TECHNIQUES*	*By Architect/Engineer, IF NEEDED.*	$0.00
10.6	*UTILITY MANAGEMENT PLAN*	*By Architect/Engineer, IF NEEDED.*	$0.00
10.7	*MONITORING PROGRAM*	*By Architect/Engineer, IF NEEDED.*	$0.00
11	*SECTION TOTAL*		$691,220.61

4 - HEATING			
#	ITEM DESCRIPTION	COMMENTS	TOTAL
1	*ARCHITECTURAL & ENGINEERING SERVICES*	*Refer to the Design Fee Summary for separate cost. By Owner.*	$0.00
2	*DORMITORY - REPLACE (2) F/AC UNITS*		$30,492.00
3	*DORMITORY - VENT RELOCATION*	*These are vents adjacent to Dormitory Balcony.*	$15,246.00
4	*NEW PORTION - REPLACE BOILERS*	*Boiler replacement only. Pumps & system components to remain "as-is".*	$49,549.50
5	*SECTION TOTAL*		$95,287.50

5 - AIR CONDITIONING			
#	ITEM DESCRIPTION	COMMENTS	TOTAL
1	*ARCHITECTURAL & ENGINEERING SERVICES*	*Refer to the Design Fee Summary for separate cost. By Owner.*	$0.00
2	*REPLACE CHILLER*		$349,387.50
3	*MAINTENANCE ON AIR HANDLER*		$19,057.50
4	*R & R LEAKING CHILLED WATER PIPING*		$100,000.00
5	*SECTION TOTAL*		$468,445.00

PLYMC - Poland Library
Building Assessment Probable Costs

6 - PLUMBING

#	ITEM DESCRIPTION	COMMENTS	TOTAL
1	*ARCHITECTURAL & ENGINEERING SERVICES*	*Refer to the Design Fee Summary for separate cost. By Owner.*	$0.00
2	*REPLACE W/C FLUSH VALVES WITH AUTOMATICS*		$15,246.00
3	*REPLACE LAV. FAUCETS WITH AUTOMATICS*		$10,164.00
4	*REPLACE INDOOR GREASE TRAP*		$13,340.25
5	*SECTION TOTAL*		$25,410.00

7 - LIFE SAFETY

#	ITEM DESCRIPTION	COMMENTS	TOTAL
1	*ARCHITECTURAL & ENGINEERING SERVICES*	*Refer to the Design Fee Summary for separate cost. By Owner.*	$0.00
2	*KITCHEN EF DISCHARGE RELOCATION*	*Final design routing may impact cost significantly.*	$31,762.50
3	*SECTION TOTAL*		$31,762.50

8 - ELECTRICAL

#	ITEM DESCRIPTION	COMMENTS	TOTAL
1	*ARCHITECTURAL & ENGINEERING SERVICES*	*Refer to Summary Design Fee Section for separate cost. By Owner.*	$0.00
2	*UPDATE RECEPTACLES - GFCI & TR*		$28,205.10
3	*REPLACE INTERIOR LIGHTING*	*General and accent light fixtures.*	$281,542.80
4	*LIGHTING CONTROL SYSTEM*	*No new wiring. Occupancy sensors & relay panel.*	$63,525.00
5	*REPLACE EXTERIOR LIGHTING*	*Building exterior lights are included; Parking lot is not.*	$47,770.80
6	*REPLACE FIRE ALARM*		$76,230.00
7	*SECTION TOTAL*		$497,273.70
	CUMULATIVE TOTAL OF SECTIONS 1-8 ABOVE:		**$4,369,107.20**

OWNER REQUESTED BUILDING MODIFICATIONS

#	ITEM DESCRIPTION	COMMENTS	TOTAL
1	*ARCHITECTURAL & ENGINEERING SERVICES*	*Refer to Summary Design Fee Section for separate cost. By Owner.*	$0.00
2	*ADDITIONAL REQUESTED BUILDING RENOVATIONS*		TBD
3	*SECTION TOTAL*		$1,000,000.00

PLYMC - Poland Library
Building Assessment Probable Costs

PERMANENT IMPROVEMENT PROJECTS

#	*ITEM DESCRIPTION*	*COMMENTS*	*TOTAL*
1	*ARCHITECTURAL & ENGINEERING SERVICES*	*Refer to Summary Design Fee Section for separate cost. By Owner.*	$0.00
2	*PARKING LOT - GRINDING, PAVING & STRIPING*		$200,000.00
3	*EXTERIOR PAINTING*		$250,000.00
4	*SECTION TOTAL*		$450,000.00
		CUMULATIVE TOTAL OF ALTERNATE VALUES:	**$1,450,000.00**

Section 1 - Site Improvements

1.2 Pavers at Entries

Description:

The site includes pedestrian exterior areas with Brick pavers as a finish material. The pavers occur in these locations; The entrance plaza adjacent to the parking lot, the patio areas and walkways located along South Main Street, and the exterior balconies on the main floor. The pavers adjacent to the parking lot include uneven areas where pavers have raised or recessed (**Figure 2**).

The patio areas at South Main Street have settled unevenly (**Figure 1**). The distance between the door sill and finish elevation of the pavers does not meet the requirements of The American with Disabilities Act and associated codes. These locations are included as means of egress to the public right-of-way. The railing leading up towards the center patio is broken at its base (**Figure 3**).

The Concrete pad off the entry plaza does not effectively drain water away from the building as water travels towards the double doors. Therefore, door sill damage is evident.

Figure 1: *Pavers are recessed below the door at this patio location.*

Figure 2*: Pavers at lower-level exit, off the Bookstore.*

Figure 3: *Railing at the center patio.*

Recommendations:

For all areas with brick pavers - Remove, salvage and clean the existing Brick pavers. Remove subbase material for installation of new concrete slab and crushed stone base. Before new pour, place underdrains to prevent water from migrating towards the building. Compact the existing subbase demolished on-site and allow for 4” min of compacted, crushed stone subbase. Install 4” reinforced concrete slab and provide control joints @ 10”-0” O.C. in slab that follows the Brick paver design. Provide accessible concrete ramp(s) from parking lot to paver elevation.

Concrete pad - Remove concrete pad and replace in-kind or with brick pavers. Redesign pavement grade with positive drainage away from the building. The new work will include the installation of a segmental site retention wall to transition from lower pavement to parking grade.

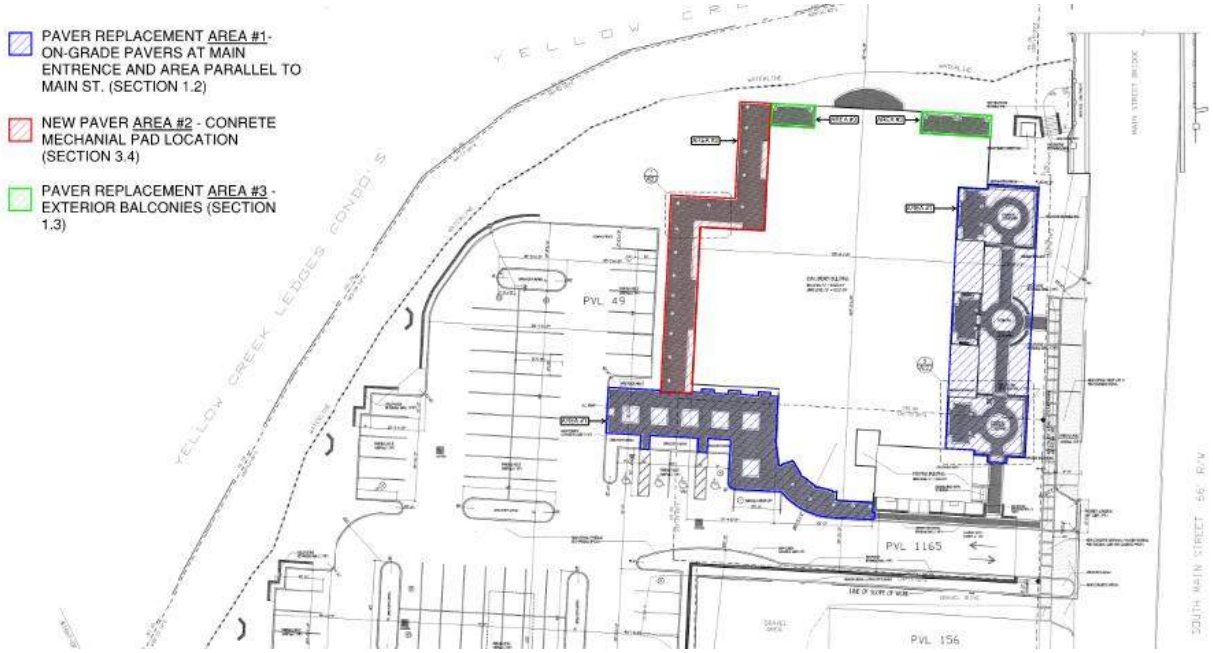


Figure 4: Paver Area Regions on-site.

*Full-Size Drawing is in the **Appendix, labelled 1A.***

1.3 Exterior Balconies - Pavers

Description:

The balcony paver detail from base to finish includes a Rubber membrane, 1” bed of Sand and the Brick paver finish. The pavers currently are uneven and have moderate moss growth. In some locations as in **(Figure 2)**, pavers are missing or damaged. The current detail also includes weeps for the removal of water. The weeps get clogged from excessive buildup and therefore cannot perform as intended.

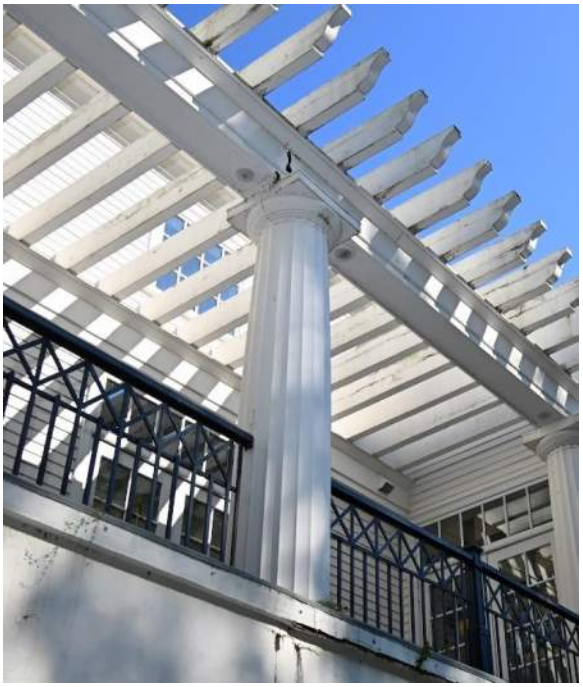


Figure 1: *Balcony view from the Lower Level.*

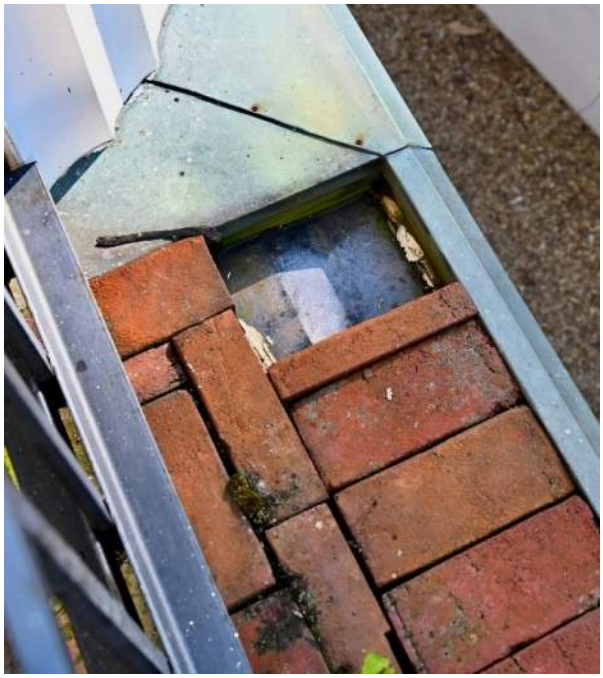


Figure 2: *Northeast Balcony shows missing pavers and moss growth.*

Figure 3: *Base of the Northeast Balcony, accessible from the Main Floor. The symbol "✚" indicates where new fascia panels are needed.*

Recommendations:

Remove, clean and salvage existing Brick pavers. Remove the waterproof membrane and replace it with a new membrane. Provide new flashings and counter flashings at edges, and new fascia panel. Provide new 1"x3 ½" trim mold. Install a new drain system utilizing concrete plank core.

New work to include leader box downspout (cast-iron downspout, boot painted). The new downspouts will connect to adjacent storm lines.

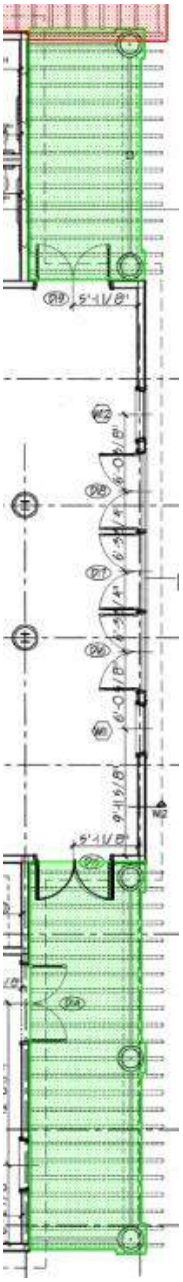


Figure 4: *Green Regions highlight the Balcony Paver areas, accessible from the Main-Level.*

Full-Size Drawing is in the ***Appendix, labelled 1D****.*

Parking Lot

South Main Street

Section 2 - Building Improvements

2.2 Dormitory Building Restoration

Description:

The existing dormitory building is on the North side of the building adjacent to the entrance drive. The West exterior basement wall is damp at various times and discolored. The first-floor slopes towards the center floor support beam. The space in the basement does not provide adequate space for a beam replacement addition. The second floor also slopes in the same direction. The original fireplace on the second floor is separated from the wall. Repair or replacement of the exterior flashing is needed for the existing fireplace chimney (West side of Dormitory), the other chimney with a metal cap (East side of Dormitory) and cupola.

The exterior side porch shows signs of separation from the exterior wall. The Mechanical exhaust located below blows steam onto the wood area (see Mechanical section for more information and images). Railings located on the north elevation have rust at the joint connections, they are not secure.

Figure 1: *Damp spots on the West wall.*

Figure 2: *Discoloration of West basement wall.*

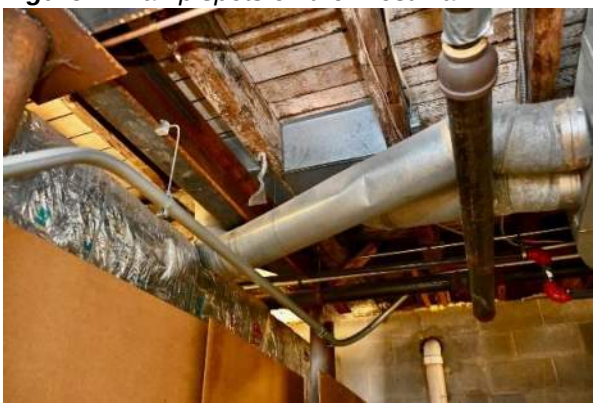


Figure 3: *Lack of space beneath floor joists.*

Figure 4: *Looking up at the floor beam.*

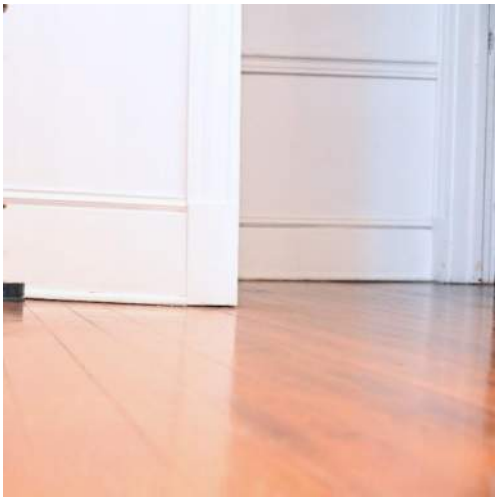


Figure 5: *Uneven slope of the first floor.*

Figure 6: *Fireplace located on the second floor.*

Figure 7: *Existing Chimney Flashing.*

Figure 8: *Porch located on exterior wall. Note exhaust location.*

Figure 9: *Stucco chimney visible from the Main Entrance.*

Recommendations:

General demolition includes removal of walls, floors, subfloors, ceilings on the first and second floor. Demolition also includes mechanical, electrical and plumbing on the ground level. The existing stairs from the lower level to the main floor shall remain. Renovation work includes new floor framing, structural beam replacement of subfloor and finish floor on the first and second floors. Provide new mechanical, electrical and plumbing for the Dormitory Building. The scope of renovation work includes three single use accessible restrooms. Repair interior mantle and block/brick backup. The recommended floor plan will remain like the original design. Materials/floor/ceiling shall be replaced in-kind.

The **Brick chimney** will require new stepped and counter flashing ***(Figure 7).***

The **Stucco chimney** repair will require a new exterior stucco finish as well as stepped flashing and counter flashing ***(Figure 9).***

2.3 Basement Wall Infiltration

Description:

Along the North foundation wall of the Dormitory Building, just off the Mechanical Room has evidence of contact moisture. There are areas of chipped paint and discoloration on the CMU wall. From the Elevation view, The CMU foundation wall is exposed near the raised entry to the building. The uneven soil distribution exposes the CMU wall in the landscaped area, as well as the base trim showing signs of wear.

Recommendation:

Provide waterproofing to the CMU wall and place a foundation drain to prevent moisture leakage onto the foundation wall. Repair any elements from landscaping, brick and railing above.

Figure 1: *Foundation CMU wall and wood beam connection. Location of both wall and wood trim exposure.*

Figure 2: *Sanitary line shown in proximity to foundation wall.*

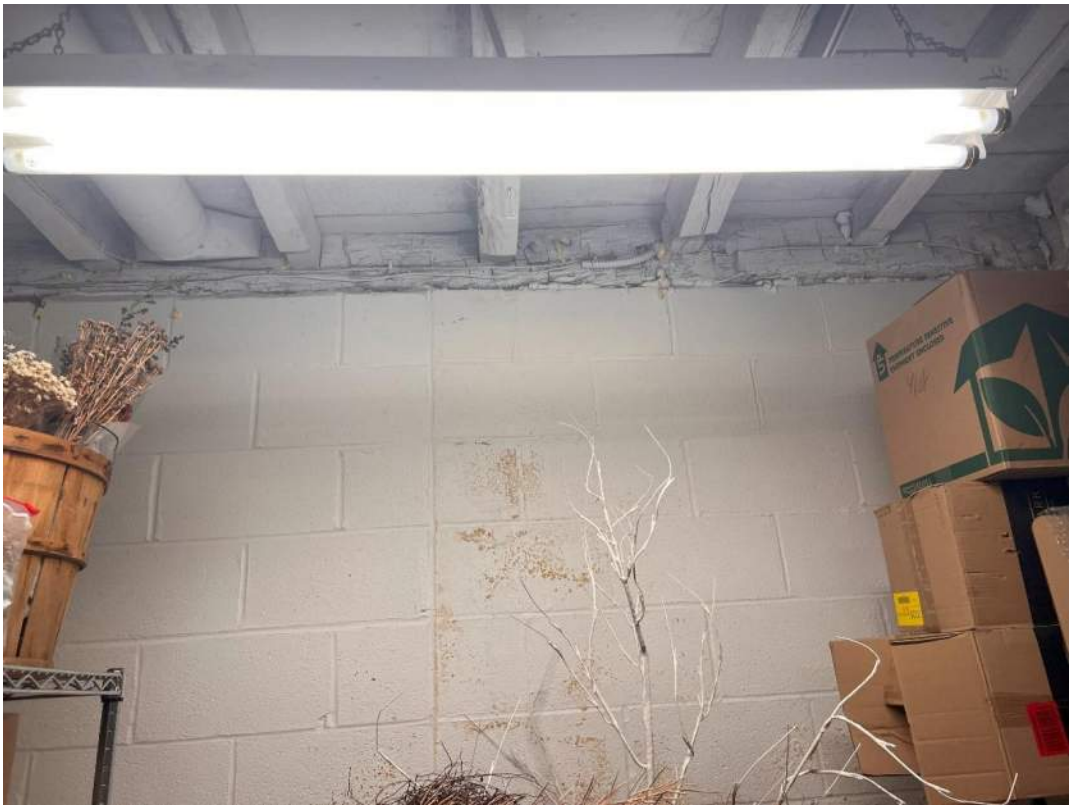


Figure 3: *Wall discoloration to the left of the foundation wall referenced below (**4**).*

Figure 4: *Discoloration of foundation wall.*

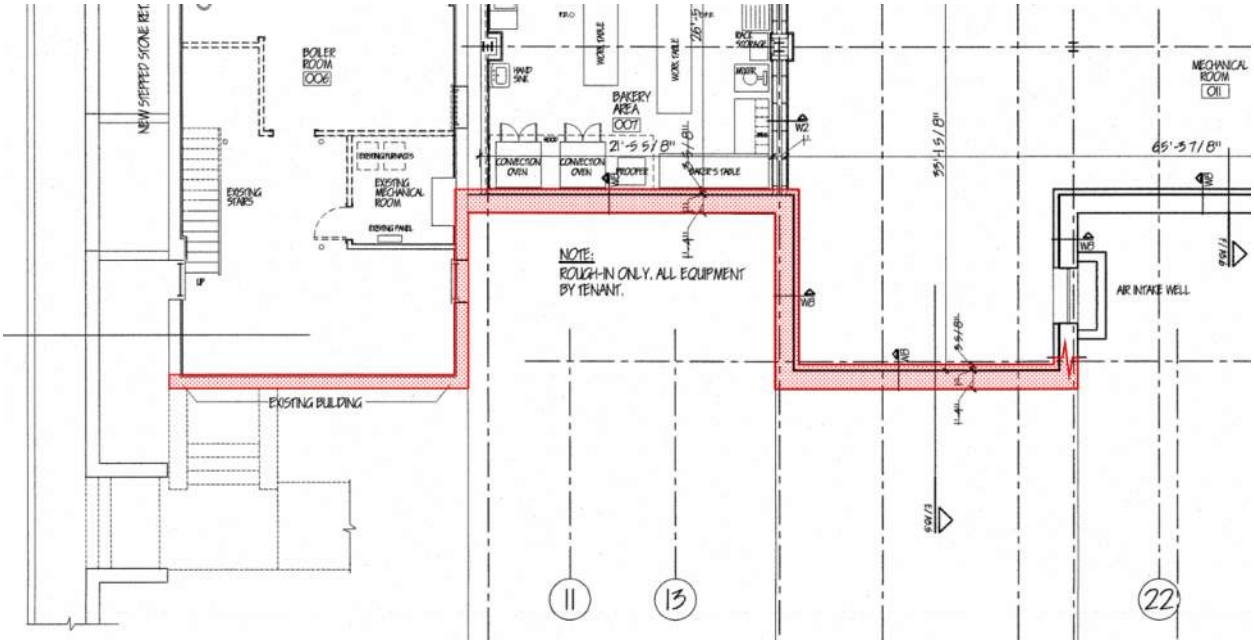


Figure 5: *The Dormitory foundation wall locations are marked in red.*

Full-Size Drawing is in the ***Appendix, labelled 1C.***

2.4 Structural Slab Repair – Book Store Area

Description:

On the lower level, the Book Store (labeled as Future Space in plan drawings), is slab-on-grade at the Southern end of the building **(Figure 4).** The floor slab rests on open-hearth slag at the base **(Figure 1 and 2)**. The slag may have impacted the unevenness in the floor due to differential settlement. It is possible that the floor slab condition extends into the storage area adjacent to the bookstore.

The same condition is in the Electrical Room **(Figure 3).** The concrete has visible cracks due to heaving in the center. The interior walls show no signs of cracking; therefore, it remains a slab issue.

Recommendations:

Demolish interior walls and casework. Remove and salvage glass doors, transoms and carpet tiles.

Leave the slab in the Electrical Room as-is. Library staff should monitor the cracking to see if the current condition worsens. The existing utilities in the Electrical Room pose adversities in the demo and removal of the floor slab.

Remove hearth slag and replace with new compacted gravel base and new concrete. Rebuild walls and casework per original documentation and design. Reinstall salvaged doors and carpet tile. Base profile to match existing.

Figure 1: *Bookstore Area*

Figure 2*: Book Store slab settlement issues.*

Figure 3: *Concrete Slab in Electrical Room.*

Figure 4: *Store area looking out onto the buildings South orientation.*

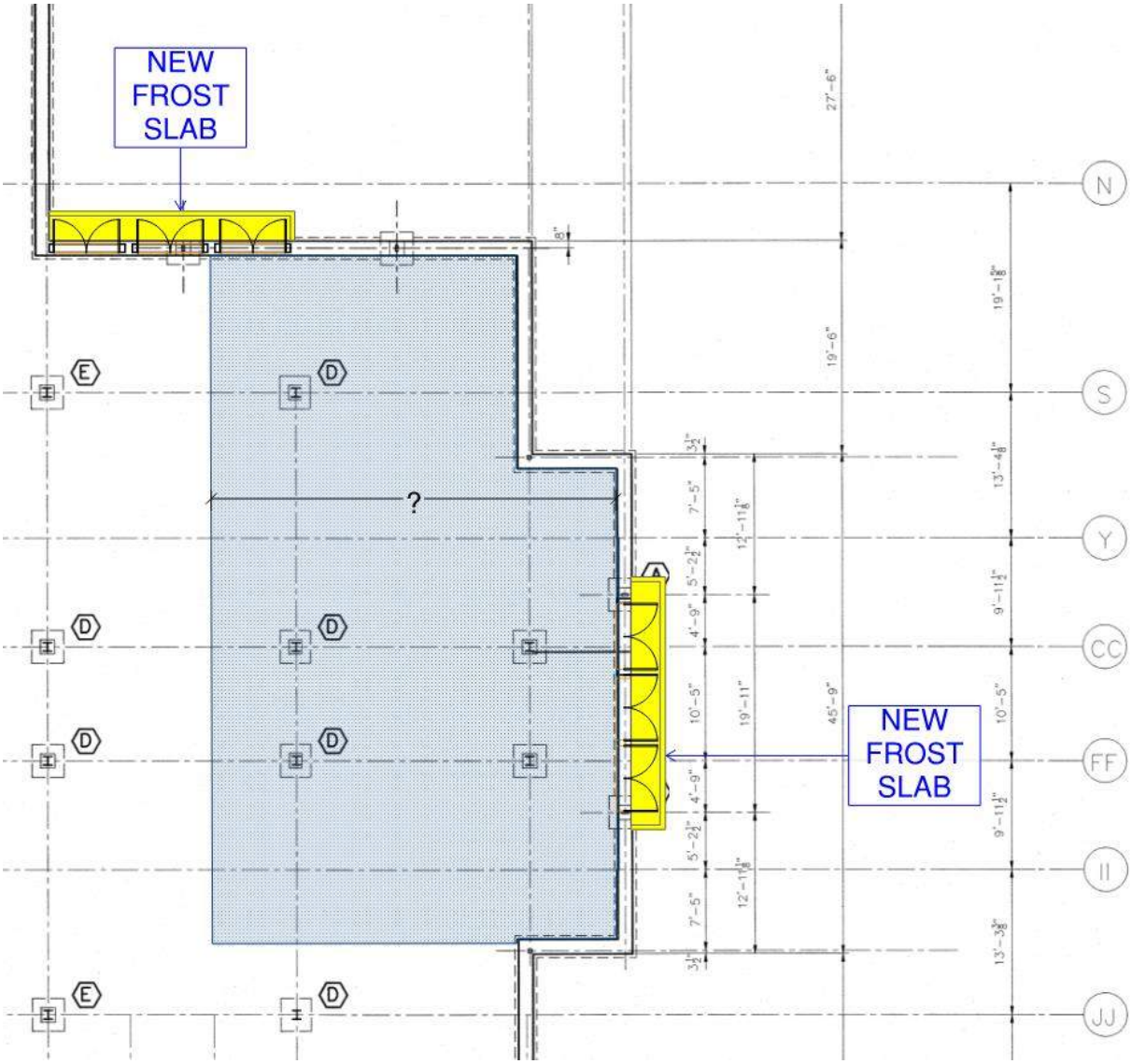


Figure 5: *Slab Repair area included in this assessment. The Blue region and Frost Slabs are shown on the Foundation Floor Plan.*

Full-Size Drawing is in the ***Appendix, labelled 1B.***

2.5 Building Veneer Repair

Description:

Trims, flashing and drip edges show significant damage around the entire building. Pediment material shows signs of lifting at the wood finish corners, specifically the tympanums. Some of the wooden trim on the lower-level west elevation has been restored. In cases like the pilaster in Figure 6, show rot and water damage. Some of the wooden trim on the lower-level west elevation has been restored. In cases like the pilaster in Figure 6, show rot and water damage. For both cupolas, the base trim and pilasters show signs of lifting.

Active and Fixed double doors with transom window and hardware / broken sills on doors and windows (minor).

On the West lower-level elevation, the space underneath the Northern balcony has a patch of the Concrete core exposed.

Recommendations:

Replace Horizontal siding base repair around the entire perimeter of the building where it has not been restored. The locations of replacement are shown on plans and the pictures below: ***Figures 1,2,3,13,14,16,18,19,20*.**

Replace the tympanum wood finish material while trying to maintain the exposed wood trim on the pediment. If demolition requires both trim and tympanum to be removed, replace in-kind. Provide weather barrier and flashings at base of the trim.

Remove all double active and fixed doors and provide new sill flashing. Since the double doors and the transom are one unit, both existing elements will be removed. Hardware will also need to be provided for active doors.

Patch cut-out area to match with exterior finish.

Replace wood base details at pilasters. A typical case where pilaster base needs restored is shown in ***(Figure 6)*.**

Replacement material for estimate to be selected using a similar product of PUC; free foam cellular.

Provide new weather barrier and transition membrane at flashing and open locations. Verify the condition of existing flashing. Profiles and design to be per existing documentation and existing built cupola ***(Figure 19 & 20).***

Figure 1: *Condition of the trim on the Southern balcony.*

Figure 2: *Wood trim on the North Elevation of Dorm. Bldg.*

Figure 3: *Northeast patio siding damage.*

Figure 4a: *Pediment on the Northwest corner of the building.*

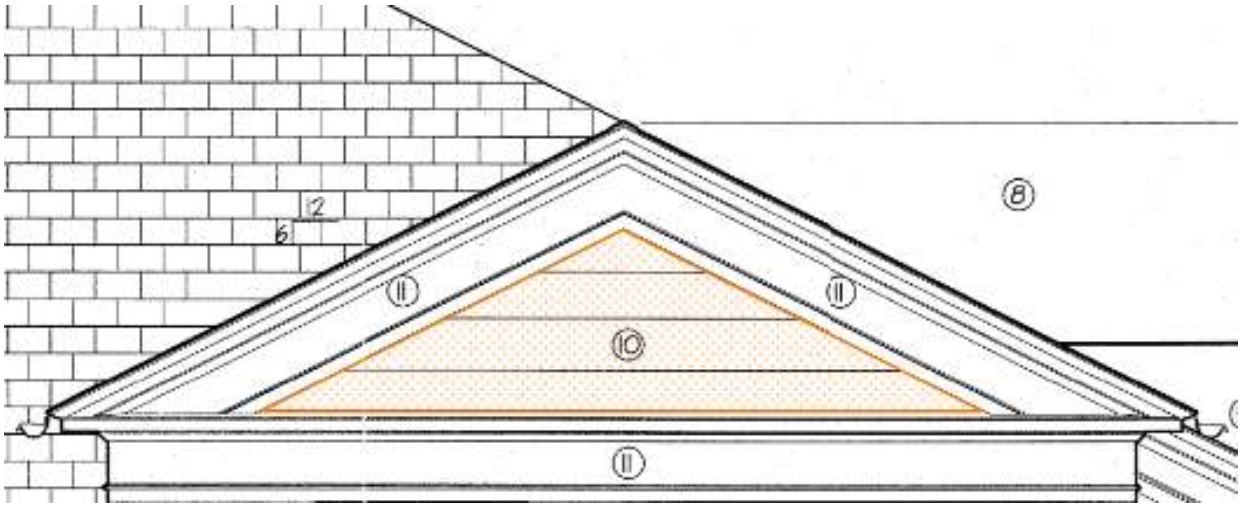


Figure 4b: *North Elevation of pediment pictured in* ***4a****. Tympanum is hatched orange. Full-Size drawing is in the* ***Appendix, labelled 2A.***

Figure 5: *Pediment of the Dormitory Bldg.*

Figure 6: *Typical repair of pilaster base at the main entrance.*

Figure 7: *Active door sill at South Elevation.*

Figure 8: *Door sill at East entrance. Note both pilaster bases.*

Figure 9: *Egress doors at central patio. Note broken sill.*

Figure 10: *Door trim base rotting at West Elevation.*

Figure 11: *Fixed double doors front profile (Northeast patio).*

Figure 12: *Concrete exposure on West Elevation. Red hatch shows desired infill.*

Figure 13: *View of cupola occupied near the Dormitory Bldg.*

Figure 14: *Cupola pilaster bases.*

Figure 15: *Cupola trim peeling at base.*

Figure 16: *Cupola base trim issues.*

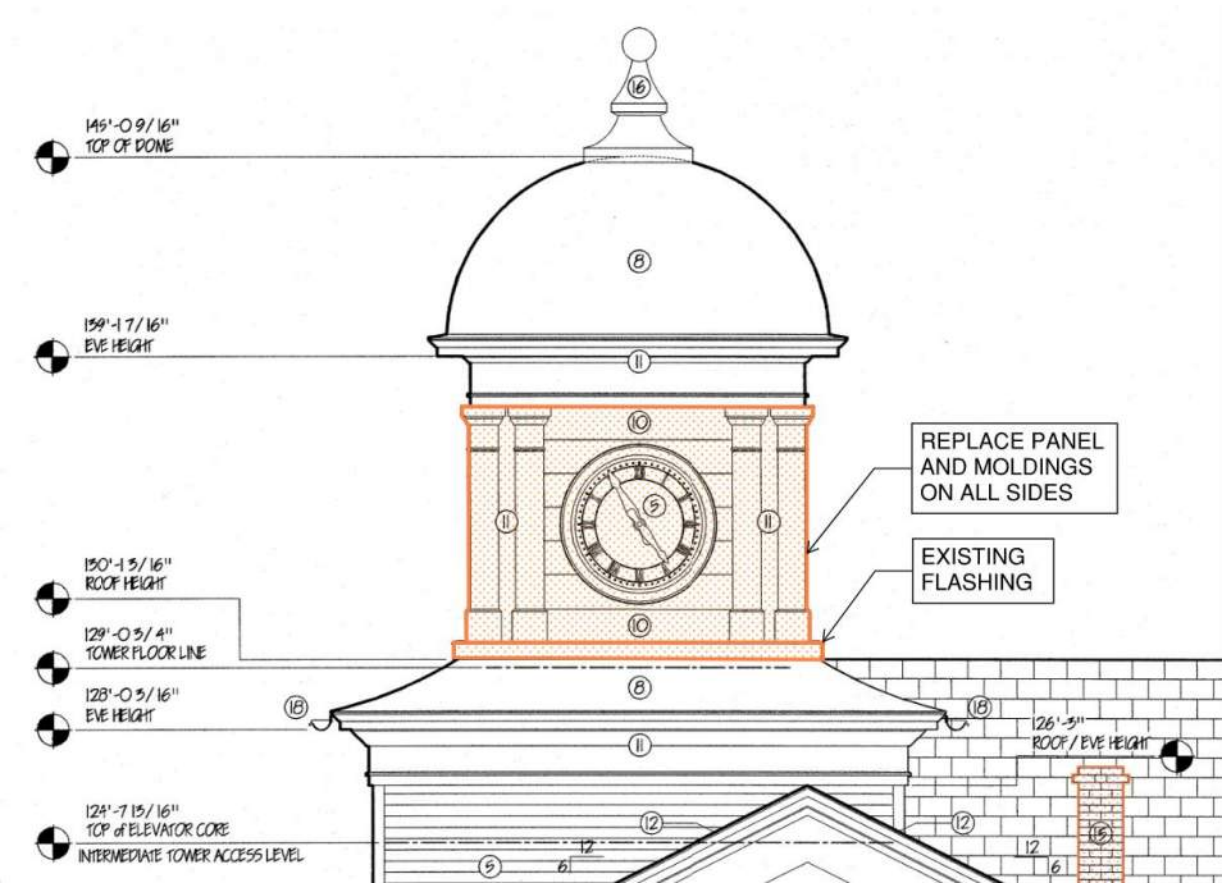


Figure 17: *North Elevation of Cupola Behind the Dormitory. Orange hatch highlights areas of material replacement.*

Full-Size drawing is in the ***Appendix, labelled 2A.***

Figure 18: *Cupola pilaster cracks from rot.*

Figure 19: *Center cupola trim and pilaster issues.*

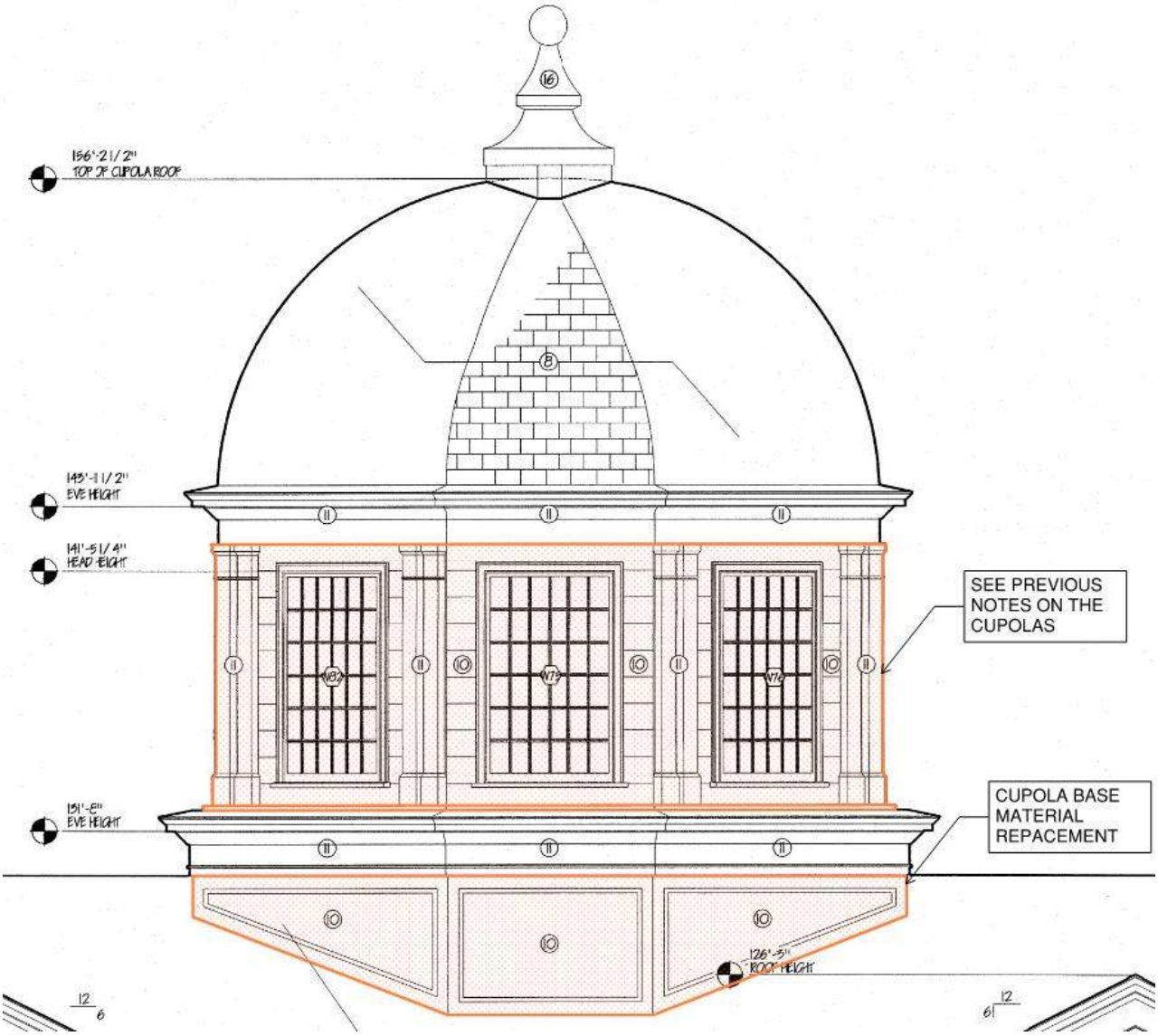


Figure 20: *North Elevation of centeralized cupola. Orange hatch highlights areas of material replacement.*

Full-Size drawing is in the ***Appendix, labelled 2A, 3A, 3C & 3D.***

2.6 Pergolas

Description:

South Elevation – The 2 closet columns in the Southwest corner have severe cracking down the center of each capital onto the beam. Starting at the same corner, the first five columns have additional joint-beam metal strap connections from the architrave to the bottom off the joists. This continues at every joist as the pergola wraps around to the Southern end (***Figures 7,9,10,11,12,13***).

North Elevation –The three patio areas show significant damage to the wood members and the beam. The beam veneers have some areas of damage, mostly in the patio on the far west side. The interior structure of the beams has significant rot, as water sits on top of the beam and near the seams of the joint-beam connections. Where the column capital and the beam connect, there are cracks and tears around the profile. These columns are all supported by T-Framing below the base of the column ***(Figures 2,3,4,5,6).***

East Elevation (Main Library Entrance) – The joists are in mid-condition but will need replacement of all column bases once frost sabs and new pavers are put in. As to whether the all the columns have a structural member in the center, that will be determined through geotechnical survey ***(Figure 1)***.

West Elevation (Main Level <u>Balconies</u>) – From the view of the Southern Balcony, there is more evidence of wood rot of the joists on the lower-level pergola. The balconies themselves have the same condition, as well as beam deterioration and the beginning of the column capital splitting ***(Figure 8).***

Recommendations:

Replace all joists and beam structures with 4x12 cedar material (spec. type of material will be addressed later). Replace entire columns where needed due to extensive material repair or to add structural column inside the doric shell. Where there is excessive wear at the column base, cut and replace with column wraps in-kind. The column profile used throughout the building is the Doric column.

Total Pergola replacement will be required for balconies and patios. All Pergola repairs will coincide with paver replacements and new retention supports for column load distribution.

Figure 1: *Column base at East entrance.*

Figure 2: *Northeast pergola.*

Figure 3: *Pergola wood joists highlighting rot and metal trim beneath.*

Figure 4: *Pergola wood joist resting on beam. Notice weathering and decay of wood members.*

Figure 5: *Column base at center patio location. The surrounding paver settlement indicates concrete support under column.*

Figure 6: *Compromise of beam at the corner patio location.*

Figure 7: *Metal-strap connections on pergola assembly near parking lot.*

Figure 8: *Pergola on balcony looking out to S Main St.*

Figure 9: *Pergola corner condition near parking lot.*

Figure 10: *Crack in column capital.*

Figure 11: *Major split at column capital near the parking lot.*

Figure 12: *South Elevation pergola.*

Figure 13: *Joist deterioration at South Elevation.*

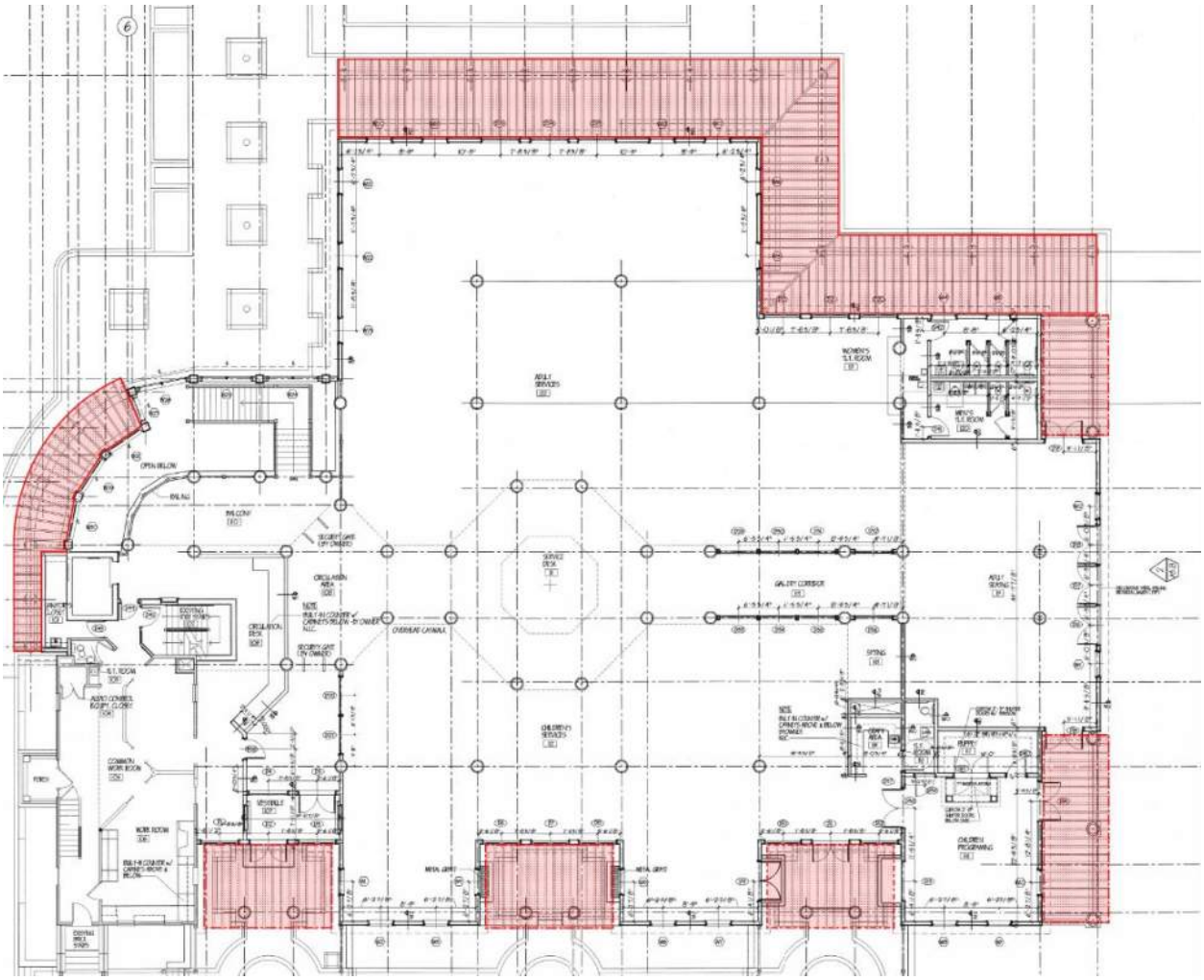


Figure 14: Red Regions show the Pergola areas. Dashed boundary lines indicate Main Level Pergolas, while solid boundaries depict lower-level pergolas beyond the cut plane.

Full-Size Drawing is in the ***Appendix, labelled 1E.***

2.7 Exterior Balcony Assembly

Description:

1. Refer to **Site Improvements 1.3** for specific paver recommendations.
2. Both balconies are located on the West Elevation. The balcony at the Southern end has removed paver spots located near the corner and adjacent to the metal flashing. The same condition of the balcony **Pergolas** applies to the section above.
3. Referencing the wood trim in the **Building Veneer Replacement,** the bottom trim on each balcony has significant wear.

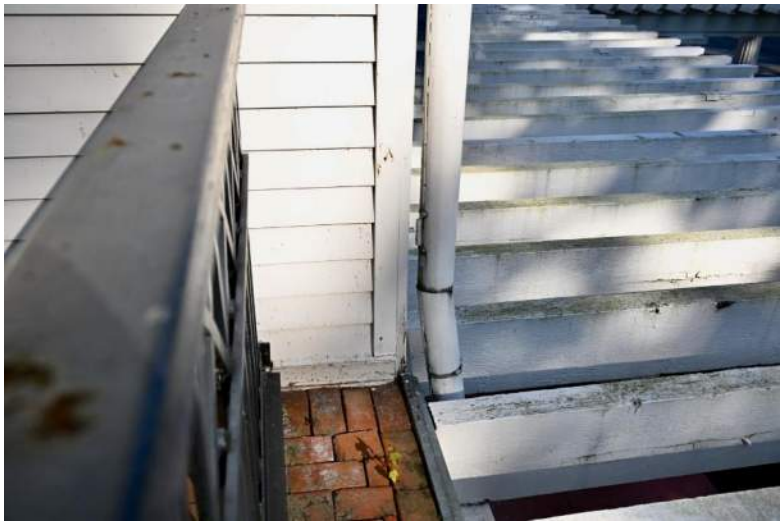


Figure 1: *South Elevation balcony view above the pergola.*

Figure 2: *Exposed membrane at the balcony facing the parking lot.*

Figure 3: *View underneath the main-level balcony.*

Figure 4: *EFIS damage underneath the main-level balcony.*

Figure 5: *EFIS crack underneath main-level balcony.*

Figure 6: *EFIS damage at base of concrete pillar.*

Recommendations:

1. Carefully remove pavers for reuse. Demo the membrane, leaving the concrete planks accessible to install drains through the hollow openings.
2. Apply a new membrane and place the existing pavers back with compacted material. The wood trim and Pergolas will be replaced once the pavers are re-installed.
3. Replace all EIFS to the substrate to add a draining board.

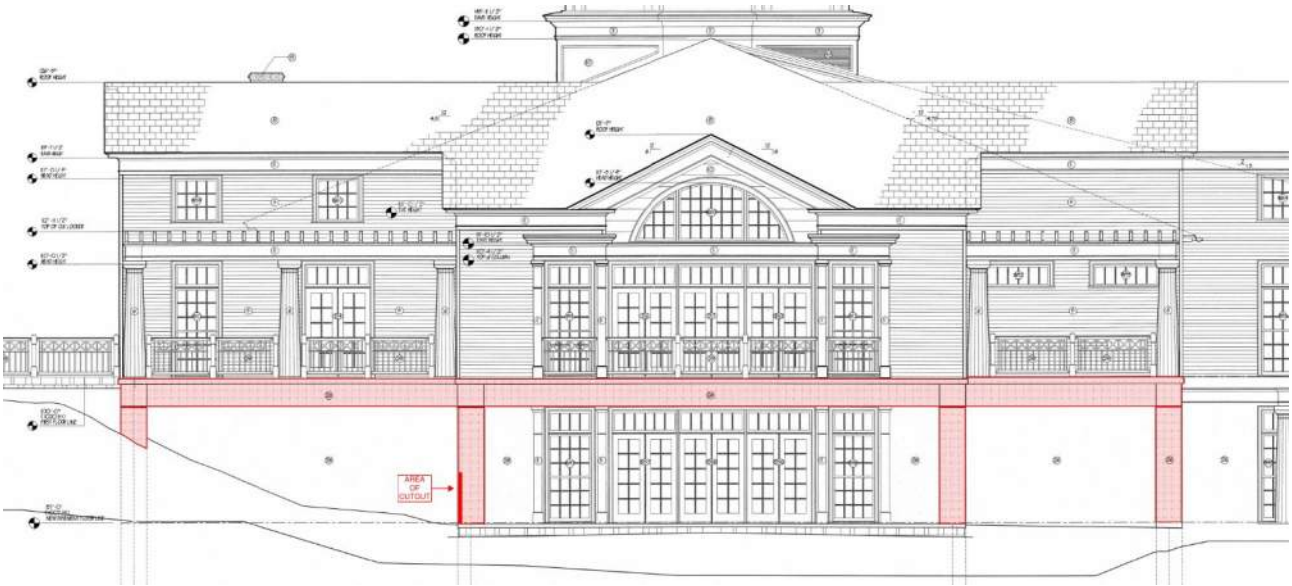


Figure 7: *Location of EFIS damage areas (Northwest balcony) and EFIS cutout (dimensioned) highlighted with red hatching.*

Full-Size drawing is in the ***Appendix, labelled 2B.***

2.8 Roofs

Description:

Starting in the South Elevation, the two gable roofs above the pergola direct water down and out onto the pergola. Ice and rainfall collect on the pergola and near the building entry locations. The gutter sizes are too small; therefore, water cannot be directed to gutter drains as previously designed. This directly affects the issues listed in **Pergolas, Building Veneer** and **Exterior Entrance Pavers.**

Reference the **Dormitory Building** section for the stepped flashing for chimney recommendations.

Recommendation:

Remove gutters and provide a larger size where existing gutters are placed.

Figure 1: *Closeup of gutter configuration.*

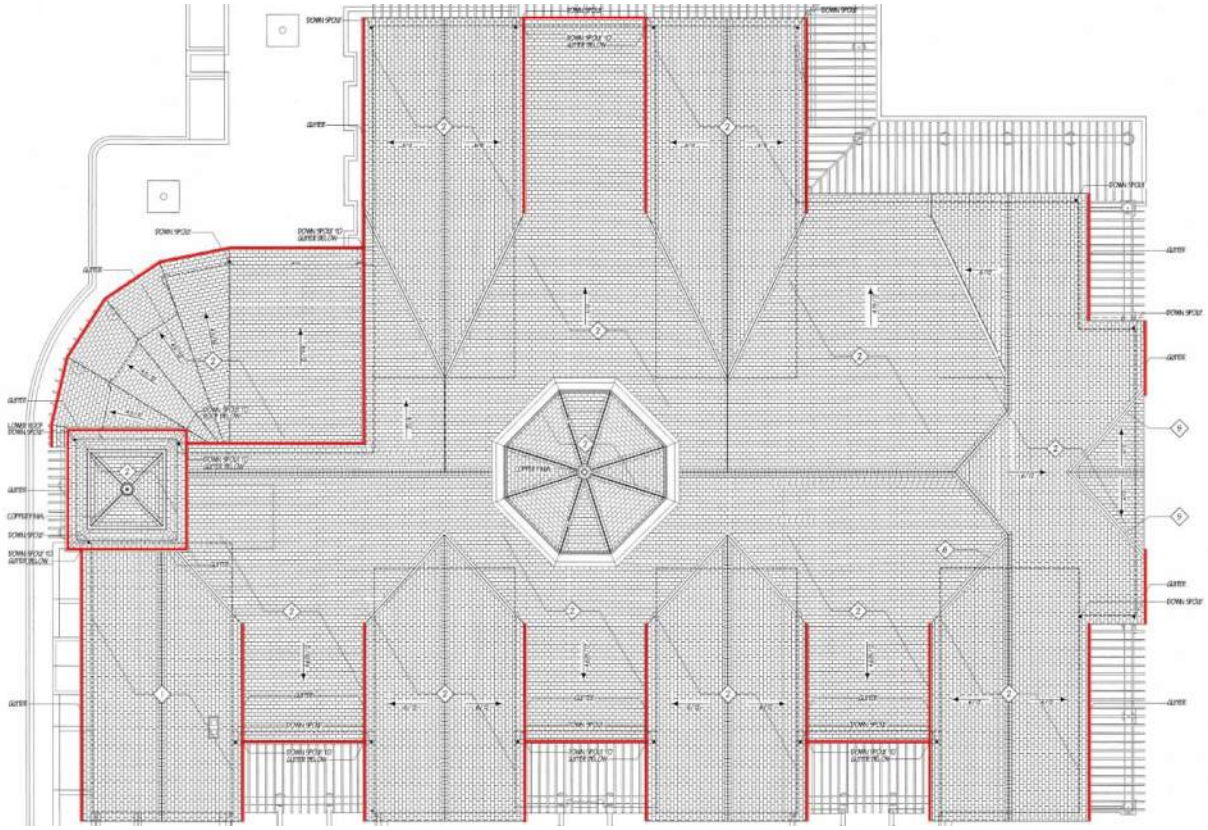


Figure 2: *Red Segments highlight Gutter placements.*

Full-Size drawing is in the ***Appendix, labelled 1F****.*

Section 3 – Structural

This structural condition survey was conducted for the Poland Library to document, assess, and evaluate several observed structural, geotechnical, and site engineering issues identified during an inspection. The survey focuses on several primary areas of concern involving settlement, drainage, column structural integrity, and material deficiencies.

This condition survey references direction as though the west elevation of the building faces South Main Street. The following observations were noted on-site and are categorized according to location and type of issue:

Photograph 1: *Main Entrance to the Poland Library looking south.*

3.2 Entrance Paver Area #2

Description:

The brick pavers at the east entrance exhibit unevenness due to settlement of the underlying soils. This movement is likely a result of insufficient compaction of base material or natural soil consolidation over time, affecting the surface stability and levelness of the entrance pavers.

Photograph 2: *Standard photography of the pavers looking east.*

Photograph 3: *Standard photography of the pavers looking south.*

Conclusion:

Settlement of underlying soils and/or inadequate base material has caused unevenness in the brick pavers, affecting the east entrance's surface integrity.

Recommendation:

Remove and replace uneven pavers. Conduct a geotechnical assessment to determine the need for additional base preparation, including proper compaction or stabilization of underlying soils, to prevent future settlement.

3.3 Egress Frost Protection

Description:

At all exit doors throughout the building, frost slabs appear to be absent, which are required by building codes to prevent frost heave. Without these frost slabs, the exit thresholds are vulnerable to movement and heaving, which can pose a safety hazard, particularly during colder months.

Conclusion:

The absence of code-required frost slabs at exit doors exposes the exit pathways to potential heave and movement from freeze-thaw cycles, which can compromise safety.

Recommendation:

Install frost slabs at all egress door locations in compliance with building codes. These frost slabs will mitigate movement from freeze-thaw cycles, ensuring stable thresholds at each exit.

Photograph 4: *Absent frost slab at outswinging exterior door.*

Photograph 5: *Absent frost slab at outswinging exterior door.*

3.4 Sidewalk Installation at Paver Area #1

Description:

The sidewalk on the east side of the building under the pergola slopes toward the building. This negative slope condition allows water to pool and flow towards the building rather than away from it, creating potential moisture intrusion issues that may impact the foundation and structural elements over time.

Photograph 6: *East sidewalk slopes toward building.*

Conclusion:

The sidewalk slope towards the building under the pergola creates drainage issues that may lead to foundation damage due to moisture intrusion.

Recommendation:

Re-grade or replace the sidewalk adjacent to the building to achieve a positive slope away from the structure. Consider installing a drainage system along the building's edge under the pergola to redirect water away from the foundation.

3.5 Column Wraps

Description:

Several column wraps, primarily at the exterior pergolas, are in various stages of failure. This appears to be due to structural issues within the columns themselves, as the wraps have experienced displacement or separation, potentially compromising the load-carrying capacity of the columns.

Photograph 7: *Column wrap failure.*

Photograph 8: *Column wrap failure.*

Conclusion:

Failures in several column wraps indicate potential structural deficiencies in the columns that may compromise their load-bearing capacity.

Recommendation:

Conduct a structural assessment of all columns with failed wraps to determine the extent of damage. Replace or repair columns as needed, ensuring that new wraps are adequately secured to the columns.

3.6 Pergola Movement

Description:

The pergola at the southern end of the west side has shifted, suggesting foundation movement in this area. This movement may stem from soil instability, insufficient foundation support, or differential settlement, which is affecting the stability of the pergola.

Photograph 9: *Standard photography of the west side southern pergola.*

Photograph 10: *Close up of the west side southern pergola.*

Conclusion:

Movement of the pergola on the west side of the building suggests foundation instability or settlement, likely due to underlying soil conditions.

Recommendation:

Perform a foundation investigation for the pergola area to assess soil conditions and foundation stability. Reinforce or rebuild the foundation as necessary to address any settlement or soil instability.

3.7 Balcony Structural Integrity

Dormitory Balcony Description:

The balcony located at the north end of the building exhibits significant structural distress and displacement. The extent of this movement suggests a structural deficiency that has compromised the balcony's stability and serviceability, posing safety risks to occupants.

Conclusion:

The north balcony is experiencing structural failure and displacement, suggesting inadequate structural support or material degradation over time.

Recommendation:

Engage a structural engineer to design reinforcement or replacement of the balcony structure to restore its integrity and prevent further displacement.

Photograph 11: *Standard photography of the north side balcony.*

Photograph 12: *Close up of the north side balcony.*

Second Floor Balconies Description:

The second-floor balconies on the south side of the building appeared to be constructed with a concrete slab and finished with brick pavers. There are wrapped columns supporting pergolas at each balcony. As at the ground level pergolas, several of the column wraps are in various stages of failure, again indicating structural issues within the columns themselves. Although vegetation was growing on and between the brick pavers, structural distress was not observed in the slab itself.

Conclusion:

The north balcony is experiencing structural failure and displacement, suggesting inadequate structural support or material degradation over time.

Recommendation:

Conduct a structural assessment of all columns with failed wraps to determine the extent of damage. Replace or repair columns as needed, ensuring that new wraps are adequately secured to the columns. Remove pavers and conduct a thorough assessment of the structure. Waterproof and refinish the balconies.

Photograph 13: *Standard photography of the south balcony looking west.*

Photograph 14: *Close up of the brick pavers.*

3.8 Mechanical Room Slab Movement

Description:

In the interior mechanical room at the southwestern corner, there is evidence of slab-on-grade movement. This movement may be indicative of subgrade settlement or poor base material quality affecting the stability of the mechanical room slabs.

Conclusion:

Movement of the slab in the mechanical room indicates potential subgrade issues or deficiencies in the slab foundation.

Recommendation:

Perform a subgrade inspection in the mechanical room to identify the cause of movement. If necessary, inject a stabilizing material beneath the slab or replace the slab with a properly compacted and reinforced foundation.

Photograph 15: *Crack shown in floor slab.*

3.9 Slab-On-Grade Material (Bookstore Area)

Description:

There is noticeable slope in the floor slab in the Bookstore Area at the southern end of the building. The slab-on-grade was installed over an unsuitable base material, identified as open-hearth slag. The presence of slag may lead to differential settlement and unevenness in the slab, causing structural issues over time.

Conclusion:

The use of open-hearth slag as a base material under the slab near the bookstore has led to differential settlement, adversely affecting the slab stability.

Recommendation:

Remove the existing slab near the bookstore and excavate to remove the open-hearth slag. Replace with compacted, engineer-approved fill material and install a new slab-on-grade with appropriate reinforcement.

Although the effects from the use of open-hearth slag have only been observed in the bookstore area, the extents of the open-hearth slag are unknown and may occur under other portions of the building. As such, there is potential for additional issues if it were to expand.

Photograph 16: *Floor slab sloping In the Bookstore Area.*

Photograph 17: *Gap above east exterior window in the Bookstore Area.*

3.10 Existing Dormitory Area

Description:

The two-story dormitory portion of the library, located at the north end of the building, presents additional structural concerns. This area is unique in its configuration, as it includes a basement with extensive utilities. Due to the nature of the construction and current structural conditions, this section will require a detailed and specialized approach to ensure stability and minimize disruption.

Recommendation:

The two-story dormitory area at the north end of the building exhibits structural distress that warrants significant attention to ensure safe usage. Extensive utility presence complicates access for repairs, requiring a carefully coordinated approach to both reinforce structural elements and preserve essential utility functions. By following the outlined recommendations, the library can address these structural issues while minimizing disruption to library operations. Regular inspections and monitoring of this area are advised to prevent reoccurrence and maintain structural integrity. To address the structural and access issues in the dormitory portion, the following actions are recommended:

Photograph 18: *Standard photography of the Dormitory.*

Photograph 19: *Standard photography of the Dormitory.*

3.10.2 Comprehensive Structural Analysis

Uneven Floors Description:

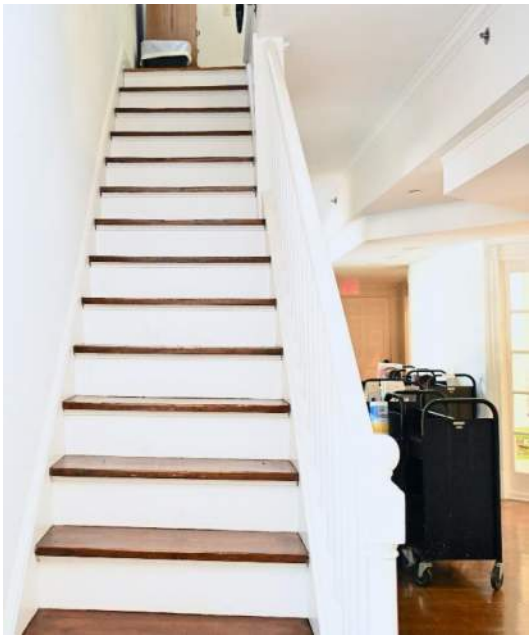
There is visible unevenness across various areas of the dormitory, indicating possible settlement or structural deformation within the floor framing or foundation **(3.10.3 Foundation Reinforcement)**. This unevenness suggests underlying structural or geotechnical issues that may require corrective action.

Conclusion:

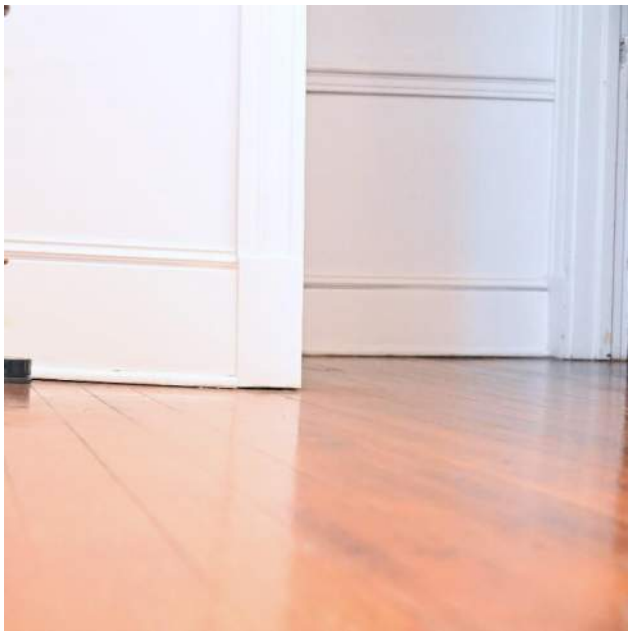
The uneven floors indicate either settlement in the foundation or potential weakness in the floor framing system. The extent of floor deflection may impact the long-term stability and usability of the dormitory area.

Recommendation:

Conduct an in-depth structural analysis of the dormitory, particularly focusing on floor framing and foundation conditions **(3.10.3 Foundation Reinforcement)**. This analysis should identify the source and extent of settlement or deflection, as well as any load-bearing deficiencies.



Photograph 20: *Standard photography of the Dormitory.*



Photograph 21: *Standard photography of the Dormitory.*

3.10.3 Foundation Reinforcement

Recommendation:

Reinforce the dormitory foundation if settlement is determined to be a contributing factor. This may involve underpinning or soil stabilization techniques to prevent further movement.

3.10.4 Fireplace and Wall Repairs

Description:

The area surrounding the fireplace displays cracking, indicating stress and potential movement of structural elements in this location. The presence of cracks near the fireplace is concerning, as it suggests movement or settlement in the adjacent wall or floor supports.

Conclusion:

Cracking near the fireplace is likely a result of foundation settlement (**3.10.3 Foundation Reinforcement)** or load-related stress in the adjacent walls or floor system. This movement may compromise both the aesthetic and structural integrity of this focal element.

Recommendation:

Investigate the structural condition around the fireplace and repair cracks using flexible sealants or epoxy injection techniques where appropriate. Consider reinforcing adjacent walls and supports to improve load distribution.

Photograph 22: *Cracking around fireplace.*

3.10.5 Selective Structural Repair Techniques

Additional Structural Distress Description:

Other signs of structural distress are visible throughout the dormitory area, with cracking in walls and around openings. These symptoms may stem from differential settlement, material degradation, or load-induced stress.

Conclusion:

Visible signs of structural distress including cracking in walls and around openings may stem from differential settlement, material degradation, or load-induced stress.

Recommendation:

Use minimally invasive repair techniques, such as fiber-reinforced polymer (FRP) wraps or post-installed anchors, to reinforce load-bearing walls and framing. These methods reduce the need for extensive demolition and facilitate repairs in hard-to-access areas.

Photograph 23: *Cracking in wall.*

Photograph 24: *Gap at door.*

Second Floor Catwalk Description:

No signs of structural distress were observed. Structural repairs are not required at this time.

3.10.6 Utility Management Plan

Basement Utility Access Description:

The basement in this area contains extensive utilities, including electrical, plumbing, and mechanical systems, that run throughout the dormitory. This heavy utility load in combination with structural issues poses access challenges for repairs, as maintaining these utilities while conducting extensive structural work will require meticulous planning.

Conclusion:

Given the extent of the existing issues and concentration of utilities in the basement, access to structural elements for reinforcement or replacement will be particularly challenging, requiring non-invasive or minimally invasive techniques wherever possible to limit disruptions.

Recommendation:

Develop a utility management and protection plan for the basement area to enable access to structural elements while preserving utility services. This plan should identify safe zones for temporary relocation of utilities if necessary to facilitate repair work.

3.10.7 Monitoring Program

Recommendation:

Establish a monitoring program to assess ongoing movement or deflection in the dormitory area. This will provide early detection of any further structural issues and help evaluate the effectiveness of the repairs over time.

Closing & Limitations

This report highlights structural, geotechnical, and site issues at the Poland Library, including settlement, drainage, material deficiencies, and structural integrity concerns. Implementation of the recommended repairs and mitigation measures will be critical to ensuring the long-term stability, safety, and usability of the library's facilities. Regular maintenance and monitoring of these areas are also advised to prevent reoccurrence and to manage potential future issues proactively.

The scope of our work consists of a visual inspection to render a professional opinion as to the structural integrity of the Poland Library. Extensive soil information and test data were not provided or within the scope of work. We did not employ any testing or investigative measures beyond those discussed. Our conclusions and recommendations are based on our observations, engineering principles, and our experience in dealing with similar structures. No warranty, either expressed or implied, is given. This report provides our professional opinion based on the information presented to us at the time the report was prepared. We reserve the right to revise this report as more evidence becomes available, especially during any repair work that may occur. Seidler Engineering, Inc. is not responsible for the conclusions, opinions, or recommendations made by others based upon the data included herein.

Seidler Engineering, Inc. appreciates the opportunity to serve you on this project. Please call if you have any questions or if we can be of further assistance.

Sincerely,

SEIDLER ENGINEERING, INC.

Kurt O. Seidler, PE
President

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Section 4 – Heating

4.2 Dormitory – Replace (2) F/AC Units

Description:
The original house portion of the facility houses the offices and cafe for the newer library facility built in 1999. The heating and air conditioning of this original portion occurs from 2- condensing furnace/AC units located in the basement level. These units were installed over 20+ years ago and are in poor shape.

Recommendation:
Replace the 2 furnace/AC units in the original house part of the facility. Rework the vents to eliminate the damage to the building structure.

Photograph 1: *F/AC Unit.*

4.3 Dormitory – Vent Relocation

Description:

The vents from the F/AC units discussed in 4.2, are causing considerable damage to the porch and siding of the original building. These vents need to be relocated to prevent further damage and unsafe conditions for the public.

Recommendation:

Refer to the Recommendation for 4.2 above.

Photograph 2: *F/AC Outdoor Condensing Units.*

Photograph 3: *Damage from F/AC Vents.*

4.4 New Portion – Replace Boilers

Description:

The new portion of the facility has 2- Lochinvar Boilers that were installed in 2006 and appear to operate adequately to meet the needs of the facility. These units are approaching 20 years old, and the typical life span is about 30 years. The hot water distribution pumps are original and one of them is presently being rebuilt. The piping is original and does not appear to have any leaking or ongoing problems with the operating characteristics.

This heating hot water is supplied to 2 large, indoor Air Handling Units serving the newer library facility, along with VAV Boxes and reheat coils in each of the different spaces. The units and all reheat coils are original from the 1999 construction. These 2 air handling units had the linkages and actuators upgraded to electronic DDC control last year. The remaining VAV Boxes and reheat coils are pneumatic and original to the new construction.

In addition, the newer library portion of the facility has 2 humidifiers that were installed but not being used. Library staff have stated that these units are very expensive to operate.

Recommendation:

Consider replacing the 2 hot water boilers due to the age and expected life of the system. Rebalance pumps and distribution system to original values. Check and verify proper operation of all reheat coil control valve, thermostats and vav box controllers.

Photograph 4: *Lochinvar Boilers (2006).*

.

Photograph 5: *Hot Water Pumps.*

Photograph 6: *Indoor Air Handling*

Photograph 7: *Space Reheat Coil.*

Section 5 – Air Conditioning

5.2 Replace Chiller

Description:

The entire 1999 facility is cooled from a central outdoor air cooler chiller. This unit is original and is nearing the end of its useful life. This unit utilizes R-22 as its refrigerant, which is no longer commercially available, and very expensive to purchase when needed for this chiller. The maintenance personnel have added that this unit is very loud when operating. Compressor blankets, sound enclosures and other sound attenuating considerations should be evaluated if this unit is to remain. These same considerations should occur if the unit is replaced.

Recommendation:

Replace the outdoor air-cooled chiller with a unit that is quieter, has better performance characteristics and safer, allowable refrigerants that are more readily accessible.

Photograph 8: *Furnace/AC Unit (original building).*

5.3 Maintenance on Air Handler

Description:

The temperature control system is a Johnson Control Metasys System that is pneumatic except for upgrades at the 2 air handling units and their components. These upgrades occurred last year.

Recommendation:

Rebalance air handling units along with cleaning all coils, verifying proper operations of all economizer dampers and verify that all sequences of operation are controlling to the desired parameters.

Photograph 9: *AHU with Chilled Water Coil.*

Photograph 10: *Chilled Water Pumps Coil.*

5.4 R & R Leaking Chilled Water Piping

Description:

In addition, there is an ongoing, underground leak in the chilled water piping from the outdoor chiller to the building that will need to be replaced.

The chilled water distribution pumps are original and were rebuilt last year. The piping is original and does not appear to have any leaking or ongoing problems with the operating characteristics.

Recommendation:

Determine where the underground leak is occurring and replace that portion of the chilled water piping.

Section 6 - Plumbing

The plumbing of this building appears to adequately serve the library and building usage. The incoming water service is a 2” line and has the required backflow preventer. There is a second water service entry that is a 4” line serving the fire protection system.

During the walk-through, no complaints of poor pressure or inadequate flow were mentioned. In addition, there was no mention of any fixtures or areas with slow drainage or backups occurring. The domestic hot water heater is a Rheem 40- gallon tank and appears to be under 5 years old and in fair shape.

6.2 Replace W/C Flush Valves with Automatics
6.3 Replace Lavatory Faucets with Automatics

Description:

All the plumbing fixtures are original and were installed in 1999. These fixtures are not low flow that are now being used for water conservation and water use reduction. All the water closets have manual flush valves along with the lavatories having manual faucets. All the urinals in the men’s restroom have automatic flush valves. The electric water coolers appear to be in good shape and have bottle fillers that also aid in water conservation and use reduction.

A sanitary lift station is used for the facility and has been upgraded within the last 5 years. No complaints or issues were reported during our walk-through.

Recommendations:

- Replace water closet manual flush valves with automatic.
- Replace lavatory manual faucets with automatic.

Photograph 11: *Water Service Backflow Preventer.*

Photograph 12: *Urinals w/AFV.*

Photograph 13: *Water Closet w/MFV.*

Photograph 14: *Lavatories w/Manual Faucets.*

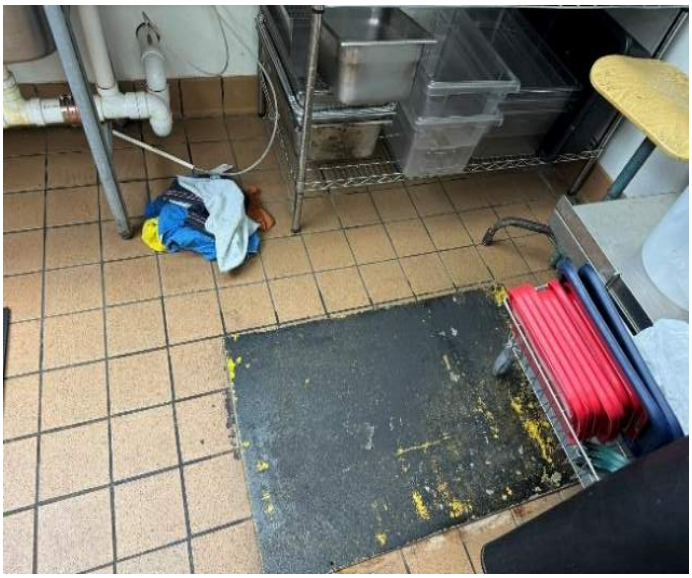
6.4 Replace Indoor Grease Trap

Description:

There is a kitchen with a 3-bowl sink, hand sink and the required indoor grease trap. Maintenance personnel have stated that the grease trap is undersized with overflow occurring often with use of the kitchen. The fixtures appear to be adequate for kitchen use.

Recommendation:

Replace the indoor grease trap with a larger unit to prevent overflow of grease laden sanitary waste.



Photograph 15: *Indoor Grease Trap.*

Photograph 16: *EWC w/ Bottle Filler.*

Section 7 – Life Safety

7.2 Kitchen EF Discharge Relocation

The entire facility has a fire protection system that is adequate and meets all codes. The system utilizes an incoming 4” water service and has the required backflow preventer.

Description:

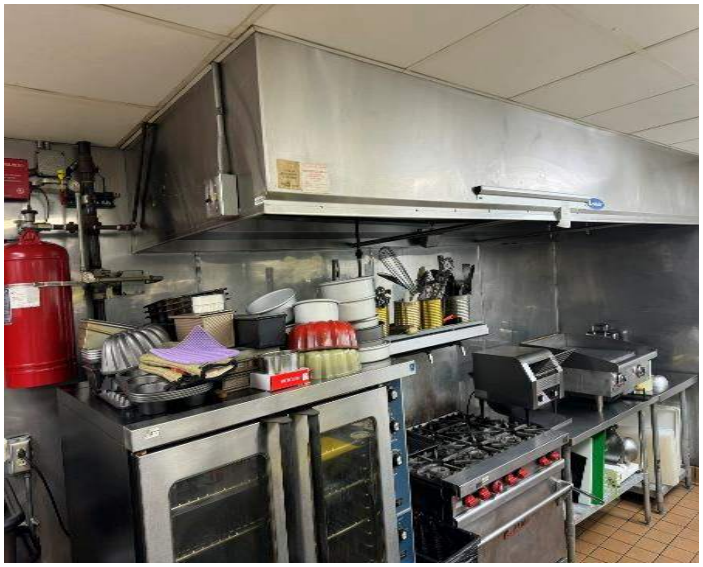
The kitchen utilizes a Type I Hood that appears to be installed correctly and has all the required components, interlocks and control for a Type I system. The exhaust fan for this hood is a sidewall fan and does not meet present code for installation height above grade. The location of this kitchen exhaust fan poses both a safety risk with the grease vapor discharge and a maintenance issue of grease buildup at or near ground level.

Recommendations:

Relocate the kitchen hood exhaust fan to meet code.

Photograph 17: *Fire Service and Riser.*

Photograph 18: *Kitchen EF Discharge.*



Photograph 19: *Type 1 Kitchen Hood.*

Section 8 - Electrical

8.2 Update Receptacles – GFCI & TR

Description:

The building general power is served by a 300 kva utility owned pad-mounted transformer feeding a 600 amp, 277/480 volt, 3 phase service through panel MDP. Panel MDP feeds panels E, H, and X, and two humidifiers, as well as a 112.5 kva transformer to feed the 120/208-volt sub-distribution panelboard SDP. Panel SDP feeds panels A, B, C, M, and P. Panelboards were installed during original construction in 2001 and are in good condition. The building contains an indoor Olympian 40 kva generator to serve emergency lighting loads. The outlets in the kitchen are not GFCI protected as required by the current electrical code, and receptacles throughout the building are not tamper resistant as required by the current code.

Photograph 20: *Utility Transformer.*

Photograph 21: *Main Distribution Panel.*

Photograph 22: *Step-Down Transformer.*

Photograph 23: *Standby Generator.*

Recommendation:

The electrical service is adequate for the current use. The distribution throughout the building is in good condition and is sufficient for the use of the building. GFCI protection should be added for the kitchen outlets and receptacles replaced with tamper resistant models.

8.3 Replace Interior Lighting
8.4 Lighting Control System
8.5 Replace Exterior Lighting

Description:

8.3 - Lighting throughout the building is provided by downlights with compact fluorescent lamps, suspended strip lights with T-8 fluorescent lamps, chandeliers that have been retrofitted with LED lamps, and lay-in fluorescent fixtures. Light levels in the meeting room were measured at 10 foot-candles (FC), 18 FC in the reading area, and 30 FC in the office. Recommended light levels for a library are 20 to 50 FC.

8.4 - There is a lighting control relay panel for exterior lighting control. Other areas are controlled by standard wall switches with no automation.

8.5 - Exterior lighting is by post top metal-halide fixtures, wall mounted fixtures with compact fluorescent or LED bulbs, and metal halide building façade lighting.

Photograph 24:
Reading Area Lighting.

Photograph 25:
Stack Area Lighting.

Photograph 26: *Exterior Wall Lights and Façade Lighting.*

Recommendations:

The lighting is marginal for a library and steps should be taken to increase lighting levels. It is also recommended that the lighting controls be replaced with a control system that will meet the requirements of the current energy code. Exterior lighting should be replaced with more energy efficient fixtures.

8.6 Replace Fire Alarm

Description:

There is a fire alarm system throughout the building utilizing a Simplex 4010 fire alarm control panel. This is an addressable, modular panel t provides audible and visible indications during trouble, supervisor, or alarm conditions. The system utilizes horn/strobe devices for annunciation and manual pull stations, flow switches, and tamper switches for monitoring. This model panel was discontinued in 2001.

There is a Bosch security system in the building utilizing door contacts, motion sensors, and CCTV cameras.

Photograph 27:
Fire Alarm Control Panel.

Photograph 28:
Horn/Strobe and Pull Station.

Recommendation:

The fire alarm system is approaching the end of its life and should be replaced.

Appendix

Documentation

Geotechnical Survey – Drilling/Slag Summary - Geotechnical Consultants, Inc.

Cost Estimate – DeSalvo Construction Company, Inc.

Structural Assessment – Seidler Engineering, Inc. *(Section 3 Copy).*

M.E.P. Assessment – J.M. Verostko, Inc. *(Sections 4-8 Copy).*

Floor Plans

1A – ***Paver Areas #1-3*** *(Site Plan, Sheet A1.1).*

1B – ***Concrete Slab Repair and New Frost Slab Areas*** *(Foundation Plan, Sheet S1.1).*

1C – ***Slab, Dormitory and Door Repairs*** *(Lower-Level Floor Plan, Sheet A2.2).*

1D – ***Enlarged Paver Area Diagram*** *(Main-Level Floor Plan, Sheet A2.3).*

1E – ***Pergolas, Doors, Dormitory & Porch Areas*** *(Main-Level Floor Plan, Sheet A2.3).*

1F – ***Dormitory Floor Area & Fireplace Location*** *(Upper-Level Floor Plan, Sheet A2.4).*

1G – ***Chimney & Gutter Locations*** *(Roof Plan, Sheet A2.5).*

Building Elevations

2A – ***Building Elevation 1*** *(Sheet A3.7).*

2B – ***Building Elevation 2*** *(Sheet A3.8).*

2C – ***Building Elevation 3*** *(Sheet A3.9).*

2D – ***Building Elevation 4*** *(Sheet A3.10).*

Reference

3A – ***Building Veneer Repair – Cupola*** *(Sheet A3.6).*

3B – ***Exterior Siding & Flashing Detail*** *(Sheet A4.1, #1).*

3C – ***Cupola Section*** *(Sheet A4.5).*

3D – ***Enlarged Cupola Section/Detail*** *(Sheet A4.6).*

3E – ***Door Jamb Types*** *(Sheet A4.12).*

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August 7, 2024

Mr. Mark J. Mrofchak *e-mail*: mmrofchak@libraryvisit.org
The Public Library of Youngstown & Mahoning County
305 Wick Avenue
Youngstown, Ohio 44503

Reference: Floor Slab Heave Assessment
Poland Library
311 South Main Street - Poland, Ohio 44514
GCI Project No.: 24-G-29241

Dear Mr. Mrofchak:

As you requested and authorized, Geotechnical Consultants, Inc. (GCI) visited the project site on July 22, 2024 to perform floor slab cores and shallow hand borings to assess the soil conditions below the floor slab. Presently, the floor slab along the southeast side of the building is exhibiting slab heave.

Available for our use in preparation of this study were the following items:

- *2001 Construction Drawings*, prepared by the 4M Company, and dated 3/15/2000.
- *Subsurface Exploration Report* for the Poland Library, prepared by J.N. Cernica & Associates (Cernica), dated 1/9/1997.
- *Supplementary Subsurface Exploration Report* for the Poland Library, prepared by J.N. Cernica & Associates (Cernica), dated 10/29/1998.

This letter summarizes our field findings, the results of laboratory testing, our conclusions and recommendations.

PROJECT DESCRIPTION

The Poland Library is located at 311 South Main Street in Poland, Ohio. The current library configuration was constructed in 2001 and is presently experiencing floor slab heave in portions of the bookstore and electrical room areas (southeast side of building).

Based on walk-over site observations, it appears that the slab heave (up to ±3-inches, locally) is occurring along a *generalized* line on the southeast side of the building. Presently, the heaving appears to only be impacting the floor slab. General observations of the building structure do not reveal any overt signs of foundation heave or structural framing distress. GCI understands that a structural engineer has been retained to evaluate if any impact to the structural components of the building has occurred. The aerial image on the next page shows the approximate location of the floor slab heave within the building footprint.

Aerial image obtained from Google Earth©

The current building is a 3-story (including the slab-on-grade lower level basement) structure that is constructed into the slope. Plans indicates that foundations are extended to shale and sandstone bedrock, resulting in foundation level subgrades ranging between ±4.5 and ±9 feet below the lower level finish floor elevation (1007.55 feet). The building is located approximately 25 feet west of Yellow Creek. Observations of Yellow Creek indicate a bedrock streambed, approximately 7 to 9 feet below the finish floor elevation along the southeast side of the building.

The provided building plans indicate that the lower level floor slab elevation is 1007.55 feet. While the plans that GCI was provided do not include the civil drawings, topographic information in the Cernica geotechnical reports (1997 and 1998 reports) suggest that cuts up to ±4 feet would have been required to achieve proposed grades in the southeast portion of the lower level. Additionally, site walk-over observations suggest that cuts would have been required to achieve current grades in this portion of the building.

FIELD WORK – SLAB CORING & SHALLOW HAND BORINGS

On July 22, 2024, GCI performed (3) floor slab cores (C-1 through C-3) at the project site. We performed (2) cores in areas exhibiting severe floor heave and (1) core in an area not exhibiting any signs of distress. The cores were obtained using a nominal 6-inch diameter diamond core barrel. Water was used to facilitate coring.

Following slab coring, we extended shallow borings to depths ranging between 2.7 and 3.6 feet below the finish floor elevation. The borings were continuously sampled and advanced using a combination of hand augering, drill augering, and coring methods. The diameter of the shallow boring was approximately 4-inches.

We have attached the boring logs and a copy of the *Coring/Boring Location Plan* to the appendix of this report. Note: We show the approximate location of nearby borings from the Cernica reports (1997 and 1998 reports) on the *Coring/Boring Location Plan* and

include those boring logs in the appendix. The paragraphs below summarize our subsurface findings at the boring locations. Refer to the individual boring logs for more detailed subsurface information each the boring location.

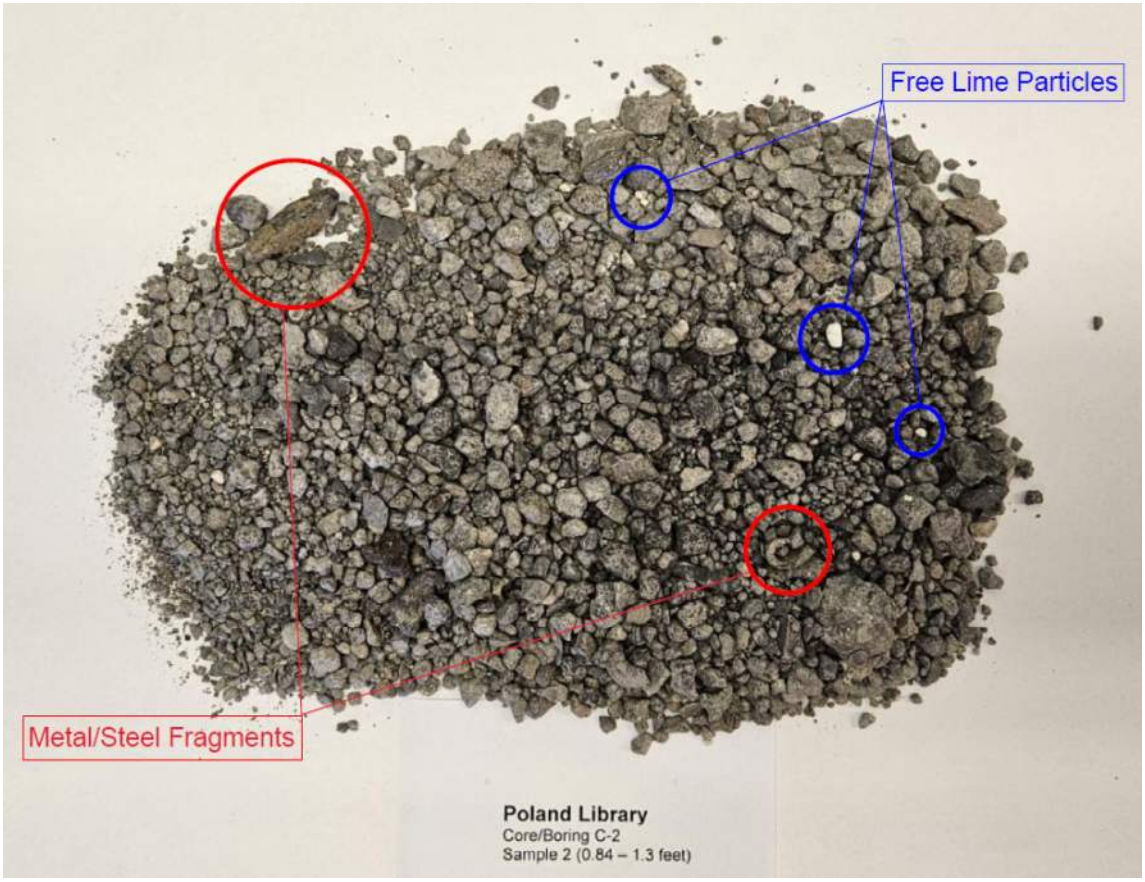
Concrete Slab

The floor slab at the core locations ranged between 4.1 and 5.1 inches thick, with an average thickness of 4.5 inches. A vapor barrier was encountered below the slab at each core location. Welded wire mesh (WWM) reinforcing was observed near the bottom of each core.

Below the slab, an aggregate sub-base was encountered consisting of dense, well-graded, limestone sand and gravel (ODOT Item 304 type gradation). The aggregate sub-base ranged between 4 and 6 inches in thickness at the core locations.

Slag-Based Fill

Below the floor slab section (concrete and underlying sub-base) at locations C-1 and C-2, we encountered dark gray slag-based fill. The slag-based fill consisted of mostly open-hearth slag and contained traces of gravel, sand, and metal fragments. In general, the slag profile had a gradation resembling a poorly graded sand with silt and gravel. The retrieved slag samples contained visible Calcium Oxide (CaO) at all depths. Calcium Oxide is un-hydrated free lime, which is added to the molten steel to facilitate the removal of ore impurities during the steel making process. The photograph below shows the typical slag-based fill gradation (after washing).



Typical slag-based fill at the project site

In portions of the slag profile in borings C-1 and C-2, the slag was found to be in a *fused* condition. Slag particles have the potential to fuse together (crystalize) when exposed to moisture as a result of the chemical compounds within the slag, typically Magnesium Oxide (MgO) and Iron Oxides (Fe_2O_3). In our experience, fused slag typically has a comparable hardness similar to asphalt or occasionally as high as concrete. The photograph below shows a portion of the fused slag, obtained by coring methods from boring C-1.

Fused slag obtained (cored) from C-1 (nominal diameter 4 inches).
Note the presence of free lime within the specimen (white inclusions).

Field observations generally indicated the slag-based fill to be medium dense to dense in cohesionless density. The slag profile was noted to be damp, with in-situ moisture contents ranging between 4.7 and 7.9%. Borings C-1 and C-2 were terminated within the slag deposit at depths of 3.6 and 3.3 feet below finish floor elevation, respectively. For more information regarding slag, see the *Slag Considerations* section of this report.

Natural Soils & Weathered Bedrock

Below the floor slab section at location C-3, we encountered stable, natural soils generally comprised of brown Silty Sand with Gravel (SM)*. The silty sand soils were mostly coarse to fine sand and contained little gravel with little to some slightly plastic fines. Field

observations generally indicated the silty sand soils to be medium dense in cohesionless density. We generally described the retrieved soil samples from the silty sand deposit as moist. The silty sand deposit extended a depth of 2.6 feet below the floor slab elevation.

Below the silty sand deposit, we encountered brown weathered sandstone. Due to the hardness of the weathered sandstone, penetration into the rock layer with our hand drilling equipment was not feasible. Boring C-3 terminated within the weathered sandstone layer at a depth of 2.7 feet below the floor slab elevation.

* Soil classification under the ASTM/Unified Soil Classification System

Groundwater

No groundwater seepage was encountered in our borings. Retrieved soil samples from the slag-based fill layer were generally noted as damp. Retrieved samples from the silty sand deposit were generally noted as moist.

It should be noted that soil moisture conditions and groundwater observations fluctuate due to changes in precipitation, climate, stabilization time and other factors that may differ from the time the measurements were made.

EXISTING BORINGS

We reviewed (2) existing geotechnical reports prepared by J.N. Cernica & Associates for the project, dated 1997 and 1998. Four (4) borings (B-1, B-11, B-12, and B-13) were the closest borings to the current study. We show the *approximate* location of nearby borings from the Cernica reports (1997 and 1998 reports) on the *Coring/Boring Location Plan* and include those boring logs in the appendix.

The Cernica borings identify a variable depth, existing fill layer across the site, generally containing traces to some amounts of slag. Fill soils encountered in our borings (C-1 and C-2) were mostly slag based, with slag constituting approximately 95% of the fill layer. The silt-sand based soils and underlying bedrock encountered in C-3, correspond relatively well to the nearby Cernica boring, when adjusted for construction grade changes (i.e. existing fill soils were cut during construction to achieve proposed grades).

It is our opinion that the slag-based fill encountered in the current study is identified as existing fill in the Cernica studies (i.e. existing fill that was left in-place during construction). Due to the magnitude of slab heaving, both its lateral extents and overall vertical displacement, we feel that the majority of existing fill below the slab in the southeast portion of the building is likely slag-based. Based on the elevation data contained in the Cernica reports and the current finish floor elevation, it is likely that existing slag-based fill extends to depths ranging between ±2 and ±4 feet below the current slab elevation along the southeast side of the building.

LABORATORY TESTING

Our laboratory testing program consisted of natural moisture content, grain size analysis, and expansion testing on select samples obtained from the slag-based fill. The purpose of the laboratory testing was to provide information to refine our soil classifications and to evaluate the characteristics of the subsurface strata. Results of the lab testing are incorporated in the soil descriptions within this report and in the attached boring logs. The results of the laboratory testing are included in the appendix and are summarized in the sections below.

Slag-Based Fill Particle Size Analysis & In-situ Moisture Contents					
Boring Number	Sample Depth (ft.)	Moisture Content (%)	Grain Size Distribution		
			% Gravel[1]	% Sand[1]	% Fines[1]
C-1	1.3 - 1.7	5.1	-	-	-
C-1	1.7 - 2.0	5.4	41.9	53.0	5.1
C-1	2.0 - 2.4	7.4	-	-	-
C-1	2.4 - 2.8	7.9	-	-	-
C-1	2.8 - 3.2	7.3	-	-	-
C-1	3.2 - 3.6	7.9	-	-	-
C-2	0.8 - 1.3	4.9	25.7	66.4	7.9
C-2	1.3 - 1.8	4.7	-	-	-
C-2	1.8 - 2.3	6.1	-	-	-
C-2	2.3 - 2.8	6.7	-	-	-
C-2	2.8 - 3.3	7.0	-	-	-

1. Note: Natural occurring gravel, sand, and fines sized particles only constitutes a small fraction (<5%) of the slag-based fill layer. In the table above gravel denotes particles sizes between 4.75mm and 3", sand denotes particle sizes between 0.075mm and 4.75mm, and fines denotes particles sizes less than 0.075mm.

Expansion Testing

GCI performed an expansion test on (2) samples of slag-based fill obtained from the borings in general accordance with ASTM D 4729 *Standard Test Method for Potential Expansion of Aggregates from Hydration Reactions*. The results of the swell/expansion test are summarized in the table below.

Boring Number	Sample Depth (ft.)	Moist Unit Weight (pcf)	Moisture Content 1 (%)[1]	Moisture Content 2 (%)[2]	Maximum Swell (%)[3]
C-1	2.0 – 2.4	152.0	7.4	22.8	5.8
C-2	2.3 – 2.8	150.9	6.7	22.2	5.4

1. Natural (in-situ) moisture content – before test
2. Moisture content following test – saturated moisture
3. At the termination of the test, the samples were still expanding

The intent of the ASTM D4729 test is only to assess the expansion potential of ferrous slag. Our test results indicate that the slag-based fill materials encountered in borings C-1 and C-2 are expansive. While our tests showed expansion ranging between 5.4% and 5.8%, it should be noted that expansion within the samples was still occurring when we terminated the tests.

Expansion within slag-based materials generally occurs over a very long time period at an often unpredictable, or varying, expansion rate. This makes quantifying (predicting) the total expansion of a slag mass difficult, since the slag-based materials can vary in age, chemical properties, the amount of free lime available for hydration, and the hydration rate. Total expansion exceeding 10% is not uncommon in expansive slag-based

materials.

SLAG CONSIDERATIONS

Slag is a by-product of metal production, typically steel making in our region. For decades steel slag was abundant in our region and often used as a fill material. Due to the potential for expansion, which can lead to determinantal impacts, slag is typically not recommended as a fill material below structures or pavements any more.

The slag encountered in the borings represents open hearth furnace steel slag. Due to different chemical components and cooling conditions, the appearance and color of open-hearth steel slag can vary greatly. Steel slag with a higher alkalinity is often gray, while steel slag with lower alkalinity is often brown or off-white. The steel slag encountered in GCI's current borings was gray in color.

The main chemical components of open-hearth steel slag are Calcium Oxide (CaO), Silicone Oxide (SiO_2), Magnesium Oxide (MgO), Iron Oxide (Fe_2O_3), Aluminum Oxide (Al_2O_3), and Phosphorus Pentoxide (P_2O_5). Open hearth steel slag typically contains 25% to 35% un-hydrated lime (primarily Calcium Oxide). This lime is added as a fluxing agent during the smelting process to aid in removing impurities from the iron ore. This free lime has an affinity for moisture and can absorb moisture through hydration for decades after the slag has been produced.

This hydration process can fuel a chemical reaction with the other oxides (primarily Magnesium Oxide and Iron Oxide) that can produce volume changes (swell and expansion). Volume changes exceeding 10% are not uncommon in open hearth steel slag. Under the right conditions, moisture absorption and slag expansion are not necessarily time dependent, with absorption and expansion occurring for a long period after the slag was produced or placed as a fill material. Soil and air moisture in the vapor phase are often sufficient to result in lime hydration.

Visual observations indicate that the floor slab is heaving, and our laboratory testing indicated that the slag is expansive. In addition to laboratory testing, research has shown other correlations between physical properties of slag and its potential expansiveness. Below we have outlined some of relative physical properties and their significance relating to the slag samples obtained in the borings.

- **Color**: The steel slag encountered in the borings was gray. Steel slag with a higher alkalinity is typically gray. Slag materials with a higher alkalinity typically allow for easier hydration, versus slags with lower alkalinities (i.e. more acidic slags are often less prone to volume change/expansion).

- **High Iron Content**: The steel slag obtained from the borings has a high metallic content. A significant metallic content, when subjected to a magnet, was observed across all particle sizes within the samples. Iron Oxide is one of the primary chemicals that contributes to slag expansion.

- **High Unit Weight**: Due to the high metallic content (noted above), it is not surprising that the obtained slag samples have a high unit weight, further suggesting a high metallic content. Samples prepared for laboratory testing had unit weights in excess of 150 pounds per cubic foot (PCF). Note: Natural occurring soils with similar gradations

typically have unit weights on the order of 115 to 120 PCF.

- **Gradation**: Gradation (particle size distribution) contributes to potential expansiveness of slag materials. The expansion potential of well-graded slag materials with a maximum particle size of ¾" is generally increased. Well-graded materials typically possess a low void ratio (i.e. the volume of void space between the individual solid particles). This low void ratio (i.e. not much room between individual particles) can permit expansion forces to transmit more easily to between individual particles, often resulting in uplifting forces (i.e. surface heaving).

  While laboratory testing on the slag samples obtained from our borings generally indicate them to have a gradation similar to poorly-graded sand with silt and gravel; they contained a sufficient amount of variable sized, smaller diameter particles, that in a compacted state produce a relatively low void ratio.

- **Free Lime (CaO – Calcium Oxide) Content**: While all slag contains free lime, the samples obtained from the borings contained a readily observable, significant lime content. As previously mentioned, this free lime has an affinity for moisture and its hydration process is the catalyst for the chemical reaction that can produce volume changes.

- **Moisture Content**: The slag obtained from the borings had an in-situ moisture content between 4.7 and 7.9%. We consider this less moisture than normal for this type of material (composition and gradation). This low in-situ moisture condition, in conjunction with the relatively high free lime content, suggests that the slag materials below the slab have a high moisture absorption potential. As previously noted, soil and air moisture in the vapor phase is often sufficient to result in lime hydration.

CONCLUSIONS & RECOMMENDATIONS

Portions of the floor slab have heaved up to ±3 inches. Results of laboratory expansion testing on slag-based samples obtained below the slab indicate expansion values ranging between 5.4 and 5.8%, with expansion still occurring when the tests were terminated. Based on the results of laboratory testing and the overall composition of the slag-based fill materials below the slab, GCI is of the opinion that the slag-based fill is expanding in-place, resulting in the observable floor slab heave.

The borings performed in the area of floor slab heave extended to depths ranging between 3.3 and 3.6 feet below the slab elevation. It is our opinion that the slag-based fill encountered in our borings is identified as existing fill in the Cernica studies. Due to the magnitude of slab heaving, both its lateral extents and overall vertical displacement, we feel that the majority of existing fill below the slab in the southeast portion of the building is likely slag-based. Based on the elevation data contained in the Cernica reports and the current finish floor elevation, it is likely that existing slag-based fill extends to depths on the order of ±2 to ±4 feet below the finish floor elevation.

Remediation

Based on our conversations, GCI anticipates that only the floor slab in public areas will be addressed at this time. As previously stated, quantifying or predicting the total heave potential is difficult, as is the time required to reach total expansion. Final floor heaves up

to ±5 inches could be realistic (assuming 10% expansion and 4 feet of existing slag-based fill).

The only way to completely eliminate the expansion potential is to remove the slag-based materials, in their entirety, from below the slab. If the current floor heave is unacceptable, then GCI recommends removing the floor slab and removing all the slag-based fill from below the slab. While previous boring data (Cernica borings) suggest that 4 feet of existing fill is likely present below the slab, we suspect it varies and could be deeper in some locations.

Provided the Library is willing to accept some risk (albeit small risk) of future slab movement, GCI is of the opinion that any slag-based existing fill below the 5-foot depth (5 feet below finish floor elevation) can remain in place. We suspect that any slag-based fill left below the 5-foot depth will be minor (i.e. relatively thin). Additionally, the fill required to achieve the subgrade elevation, following slag removal, will act as a cushion should any expansion occur within the left in-place slag-based materials. If the Library is unwilling to accept this risk, then all slag-based materials should be removed.

We provide the following general recommendations regarding removal and replacement of the floor slab and underlying slag-based fill:

1. Remove the existing floor slab from areas experiencing floor heave, plus **at least** 5 feet laterally. It should be noted, the lateral extents of the under-slab slag-based fill may not correlate to the slab areas exhibiting heave, and could extend further. Lateral extents of slab replacement may be dictated by observations made in the field during removal of the existing slab and slag-based fill materials.

2. If the owner is willing to assume some risk, remove existing slag-based fill materials to a depth of 5 feet below finish floor elevation. See comments above regarding leaving slag-base materials in-place below the 5-foot depth. If the owner is not willing to assume the risk, then **all** slag-based fill materials should be removed.

3. Following removal of the existing slag-based fill, the exposed subgrade (anticipated to be brown silty sand with gravel) should be thoroughly re-compacted using the largest feasible compaction equipment available (likely a plate tamper or remote/walk-behind vibratory roller). Any soft, yielding, or otherwise unstable subgrade areas should be stabilized prior to placing controlled fill to finished subgrade elevation.

4. We recommend utilizing a natural (inert), non-organic granular material (less than 25% passing the No. 200 sieve) as controlled fill (backfill) to return the remediation area to original design grade. We consider bank run sand and gravel and ODOT Item 304 or similar, acceptable controlled fill (backfill) materials. Due to the depth of the building foundations (extended to bedrock at depths up to 8 feet below finish floor elevation), we anticipate that gravel backfill will be encountered adjacent to foundation walls. Provided this gravel backfill is inert and does not contain slag, it can remain in-place.

5. New fill materials should be placed in a controlled manner. Controlled fill should be placed in maximum 8-inch thick loose lifts and compacted to 98% of the maximum Standard Proctor (ASTM D-698) dry density, within ±2% of the optimum moisture content. The specified compaction will be difficult to obtain if soft/unstable subgrades are not properly remediated before starting to place fill, or if the proposed fill materials

contain excess moisture.

6. For the floor slab, we recommend a minimum concrete floor slab thickness of at least 4 inches underlain by at least 4 inches of aggregate sub-base (ODOT Item 304-limestone). The slab should utilize concrete with a 28-day compressive strength of at least 4,000 psi and be reinforced as appropriate, using welded wire mesh (WWM) or fiber concrete admixtures. We recommend placing a vapor barrier below the floor slab.

Alternative Remediations

GCI was asked about alternative remediation possibilities that would permit the slag-based materials to remain in-place, while limiting/eliminating the expansive characteristics.

Extensive research, primariliy by DOT's, has been done to determine if low viscosity polyurethane can used to "seal" in-situ slag deposits. In theory, sealing of in-place slag, to prevent moisture hydration, is possible. Small scale testing has shown that in controlled laboratory settings, it is possible. However, real world, non-controlled settings have not been very successful, showing only minor reductions in expansiveness. Sealing a slag deposit, in-situ, requires injection of polyurethane material at the top, bottom, and sides of the deposit (to prevent vapor phase moisture from entering the slag deposit from any direction). The presence of "fused" slag layers would likely make adequate distribution of the polyurethane materials difficult.

Additionally, injecting acid solutions into slag deposits to lower the alkalinity and eliminate the free lime has been shown to reduce to expansiveness in laboratory settings. Again, in real world, non-controlled settings, success has been limited. The variables involved with treating slag deposits using injection methods in actual field conditions are too great and vary significantly.

While research has shown slag expansiveness can be reduced, it still does not provide predictable, long-term acceptable results. As such, the only proven method for remediating slag expansiveness is to remove it from beneath problem areas. Based on this, and our experience with expansive slag, GCI recommends utilizing the remove and replace method outlined above.

CONSTRUCTION MATERIALS ENGINEERING AND TESTING

GCI provides construction materials engineering and testing services. For project continuity throughout construction, we recommend that GCI be retained to observe, test, and document the following:

- Verify slag removal from within the extents of the remediation area.
- Verify subgrade stability following slag removal.
- Evaluation of the material to be used as controlled fill.
- Observe and test controlled fill placement and compaction.
- Floor slab replacement (subgrade preparation and concrete testing).

The purpose of this work is to assess that the intent of our recommendations is being followed and to make timely changes to our recommendations (as needed) in the event site conditions vary from those encountered in our borings. Please contact our field

department to initiate these services.

FINAL

The intent of this study was to assess floor slab heaving, evaluate subsurface conditions, and offer geotechnical recommendations pertinent to the remediation of the floor slab issues currently being experienced at the above referenced site. Geotechnical Consultants Inc. prepared this report for the exclusive use of The Public Library of Youngstown & Mahoning County and their associated consultants for the specific application to the ongoing floor slab heave study at the Poland Library in Poland, Ohio. GCI prepared this report in accordance with generally accepted soil and foundation engineering practices. No warranty, expressed or implied, is made.

In the event that any changes in the nature, design or location of the project are planned, conclusions and recommendations contained in this report shall not be considered valid unless changes are reviewed and conclusions of this report are modified or verified in writing. It should be noted that the nature and extent of variations from the conditions found in the borings might not become evident until construction. If variations appear evident, it will be necessary to re-evaluate the recommendations of this report.

We appreciate the opportunity to provide our services for this project and hope to continue providing our services through construction. Please do not hesitate to contact us with any questions you may have.

Respectfully submitted,
Geotechnical Consultants, Inc.

Tim Petrilla, E.I.
Project Manager

Joseph D. Stafford, P.E.
In-House Reviewer

Attachments: General Notes for Soil Sampling and Classifications
General Site Location Map (DeLorme Street Atlas USA – 2016)
Coring/Boring Location Plan (1 page)
GCI Test Boring Logs (C-1 to C-3)
J.N. Cernica & Associates 1997/1998 Test Boring Logs (B-1, B-11, B-12, and B-13)
Laboratory Test Results (1 page)

Distribution: Mr. Mark Mrofchak @ PLY&MC – pdf via email
Ms. Aimee Fifarek @ PLY&MC – pdf via email
Mr. John Orsini, AIA @ BSHM Architects, Inc. – pdf via email
Mr. Kurt Seidler, PE @ Seidler Engineering, Inc. – pdf via email
GCI File 24-G-29241

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GENERAL NOTES FOR SOIL SAMPLING AND CLASSIFICATIONS

BORINGS, SAMPLING AND GROUNDWATER OBSERVATIONS:

Drilling and sampling were conducted in accordance with procedures generally recognized and accepted as standard methods of exploration of subsurface conditions. The borings were drilled using a truck-mounted drill rig using auger boring methods with standard penetration testing performed in each boring at intervals ranging from 1.5 to 5.0 feet. The stratification lines on the logs represent the approximate boundary between soil types at that specific location and the transition may be gradual.

Water levels were measured at drill locations under conditions stated on the logs. This data has been reviewed and interpretations made in the text of the report. Fluctuations in the level of the groundwater may occur due to other factors than those present at the time the measurements were made.

The Standard Penetration Test (ASTM-D-1586) is performed by driving a 2.0 inch O.D. split barrel sampler a distance of 18 inches utilizing a 140 pound hammer free falling 30 inches. The number of blows required to drive the sampler each 6 inches of penetration are recorded. The summation of the blows required to drive the sampler for the final 12 inches of penetration is termed the Standard Penetration Resistance (N). Soil density/consistency in terms of the N-value is as follows:

COHESIONLESS DENSITY		COHESIVE CONSISTENCY	
0-10	Loose	0-4	Soft
10-30	Medium Dense	4-8	Medium Stiff
30-50	Dense	8-15	Stiff
50 +	Very Dense	15-30	Very Stiff
		30 +	Hard

SOIL MOISTURE TERMS

Soil Samples obtained during the drilling process are visually characterized for moisture content as follows:

MOISTURE CONTENT	DESCRIPTION
Damp	Soil moisture is much drier than the Atterberg plastic limit (where soils are cohesive) and generally more than 3% below Standard Proctor “optimum” moisture conditions. Soils of this moisture generally require added moisture to achieve proper compaction.
Moist	Soil moisture is near the Atterberg plastic limit (cohesive soils) and generally within ±3% of the Standard Proctor “optimum” moisture content. Little to no moisture conditioning is anticipated to be required to achieve proper compaction and stable subgrades.
Very Moist	Soil moisture conditions are above the Atterberg plastic limit (cohesive soils) and generally greater than 3% above Standard Proctor “optimum” moisture conditions. Drying of the soils to near “optimum” conditions is anticipated to achieve proper compaction and stable subgrades.
Wet	Soils are saturated. Significant drying of soils is anticipated to achieve proper compaction and stable subgrades.

SOIL CLASSIFICATION PROCEDURE:

Soil samples obtained during the drilling process are preserved in plastic bags and visually classified in the laboratory. Select soil samples may be subjected to laboratory testing to determine natural moisture content, gradation, Atterberg limits and unit weight. Soil classifications on logs may be adjusted based on results of laboratory testing.

Soils are classified in accordance with the ASTM version of the Unified Soil Classification System. ASTM D-2487 “Classification of Soils for Engineering Purposes (Unified Soil Classification System) describes a system for classifying soils based on laboratory testing. ASTM D-2488 “Description and Identification of Soil (Visual-Manual Procedure) describes a system for classifying soils based on visual examination and manual tests.

Soil classifications are based on the following tables (see reverse side):

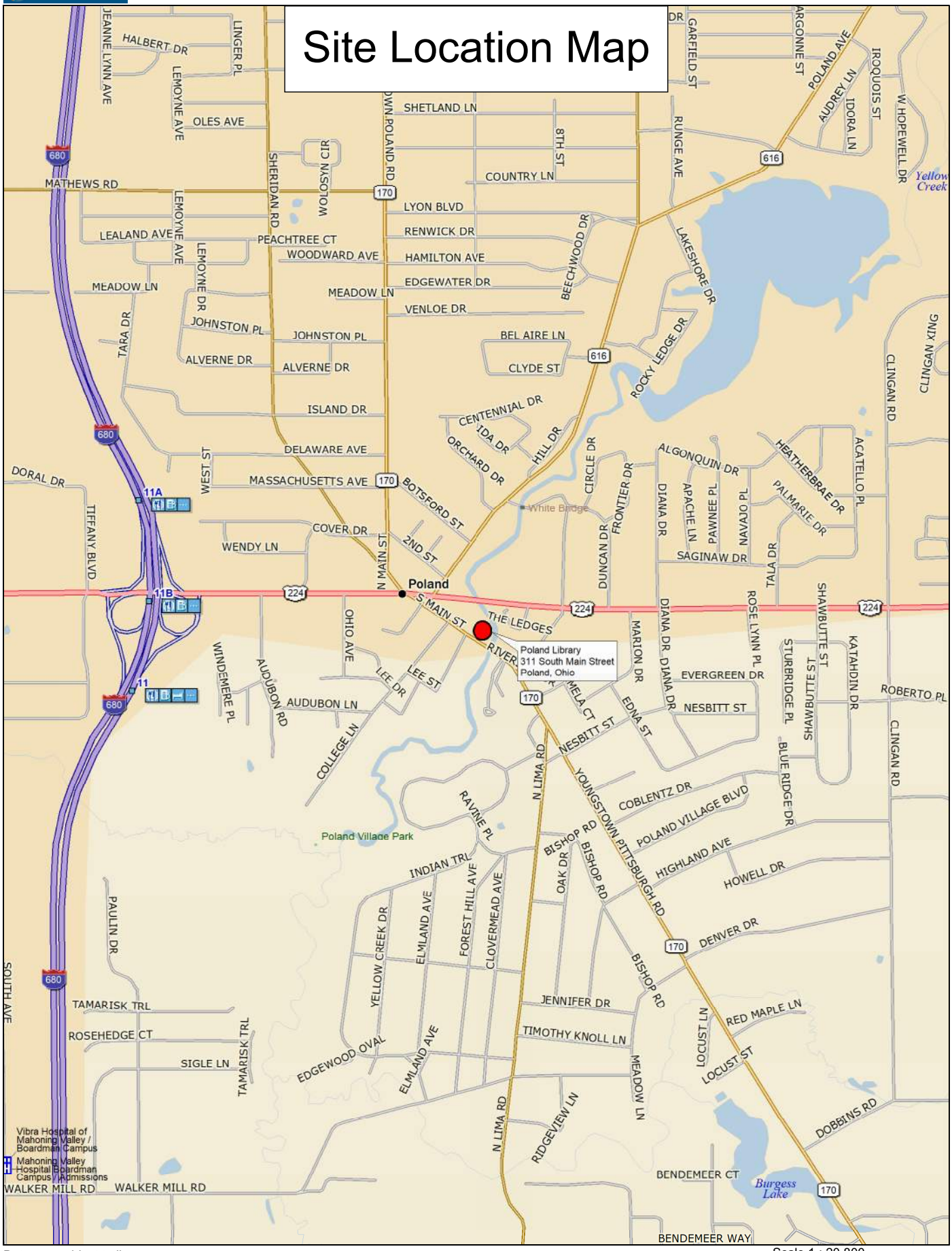
GENERAL NOTES FOR SOIL SAMPLING AND CLASSIFICATIONS

PARTICLE SIZE DEFINITION		
Boulders:		>12"
Cobbles:		3" to 12"
Gravel:	Coarse:	3/4" to 3"
	Fine:	No. 4 (3/16") to 3/4"
Sand:	Coarse	No. 10 (2.0mm) to No. 4 (4.75mm)
	Medium	No. 40 (0.425mm) to No. 10 (2.0mm)
	Fine	No. 200 (0.074mm) to No. 40 (0.425mm)
Silt & Clay		<0.074mm; classification based on overall plasticity; in general clay particles <0.005mm.

CONSTITUENT MODIFIERS	
Trace	Less than 5%
Few	5-10%
Little	15-25%
Some	30-45%
Mostly	50-100%

ASTM/UNIFIED SOIL CLASSIFICATION AND SYMBOL CHART		
COARSE-GRAINED SOILS (more than 50% of materials is larger than No. 200 sieve size)		
GRAVELS More than 50% of coarse fraction larger than No. 4 sieve size	*Clean Gravel (less than 5% fines)*	
	GW	Well-graded gravel, gravel-sand mixtures, little or no fines
	GP	Poorly-graded gravels, gravel sand mixtures, little or no fines
	Gravels with fines (more than 12% fines)	
	GM	Silty gravels, gravel-sand-silt mixtures
	GC	Clayey gravels, gravel-sand-clay mixtures
SANDS More than 50% of coarse fraction smaller than No. 4 sieve size	*Clean Sands (Less than 5% fines)*	
	SW	Well-graded sands, gravelly sands, little or no fines
	SP	Poorly-graded sands, gravelly sands, little or no fines
	Sands with fines (More than 12% fines)	
	SM	Silty sands, sand-silt mixtures
	SC	Clayey sands, sand-clay mixtures
Depending on percentage of fines (fraction smaller than No. 200 sieve size), coarse-grained soils are classified as follows: Less than 5 percent ……GW, GP, SW, SP Greater than 12 percent ……GM, GC, SM, SC 5 to 12 percent ……Borderline cases requiring dual symbols: SP-SM, GP-GM, etc.		
FINE-GRAINED SOILS (50% or more of material is smaller than No. 200 sieve size)		
SILTS AND CLAYS Liquid Limit less than 50%	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity
	CL	Inorganic clays or low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
	CL-ML	Inorganic silty clay of slight plasticity, P.I. between 4 and 7
	OL	Organic silts and organic silty clays of low plasticity
SILTS AND CLAYS Liquid Limit 50% or greater	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
	CH	Inorganic clays of high plasticity, fat clays
	OH	Organic clays or medium to high plasticity, organic silts
HIGHLY ORGANIC SOILS	PT	Peat and other highly organic soils

Site Location Map



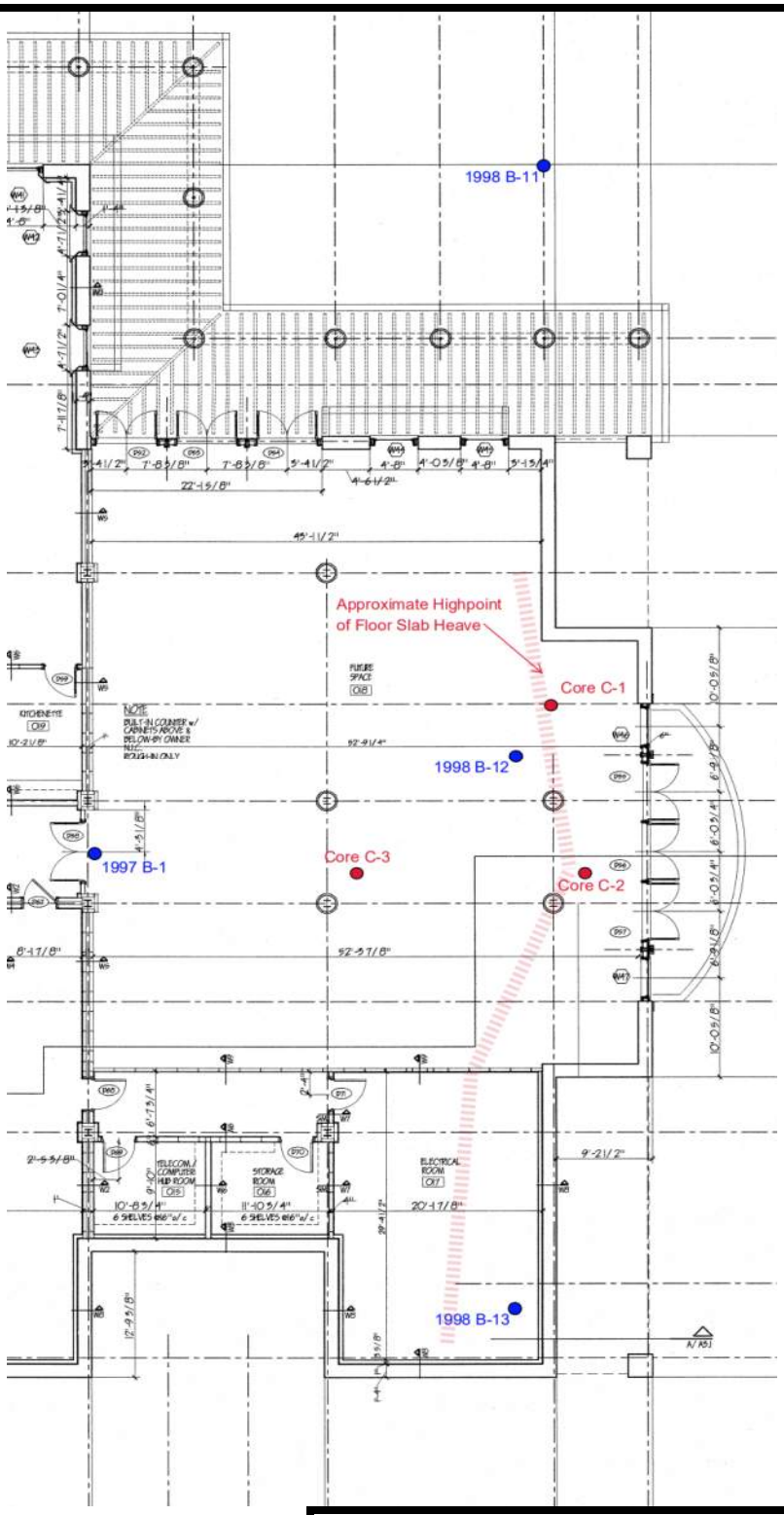
TN
MN (9.3°W)

Scale 1 : 20,800

0 600 1200 1800 2400 3000 ft
0 180 360 540 720 900 m

1" = 1,733.3 ft

Data Zoom 13-3



Current Core/Boring Location (2024)

Cernica Boring Location (1997/1998)

CORING/BORING LOCATION PLAN

Floor Slab Heave Assessment
Poland Library – Poland, Ohio

Base Map: Taken from Sheet A2.2 of the project plans	
Project No.: 24-G-29241	
Date: 7/24/24	**Drawn By:** T.Petrilla
Scale: N.T.S.	

TEST BORING LOG

PROJECT NAME **Poland Public Library Floor Slab Heave - Poland, Ohio** BORING NO. **C-1**

PROJ. SURF. ELEV. **Finish Floor**

CLIENT **The Public Library of Youngstown & Mahoning County** NO. **24-G-29241** DATE DRILLED **7/22/2024**

GROUND WATER OBSERVATION

None FEET BELOW SURFACE AT COMPLETION

_____ FEET BELOW SURFACE AT 24 HOURS

_____ FEET BELOW SURFACE AT ____ HOURS

Proportions Used

Trace	Less than 5%
Few	5 to 10%
Little	15 to 25%
Some	30 to 45%
Mostly	50 to 100%

140 lb Wt. x 30" fall on 2" O.D. Sampler

Cohesionless Density

0 - 10	Loose
10 - 30	Medium Dense
30 - 50	Dense
50 +	Very Dense

Cohesive Consistency

0 - 4	Soft
4 - 8	Medium Stiff
8 - 15	Stiff
15 - 30	Very Stiff
30 +	Hard

LOCATION OF BORING **See Boring Location Plan**

DEPTH	Sample Depths From To	Type of Sample	Blows per 6" on Sampler From To 0-6	6-12	12-18	Moisture Density or Consist.	Strata Change Depth*	SOIL IDENTIFICATION Remarks include color, type of soil, etc. Rock-color, type, condition, hardness
							0.4	4.3" Concrete Slab - contains welded wire mesh, underlain by a vapor barrier
							0.9	6" Crush Limestone Sand and Gravel (ODOT Item 304 type gradation)
						Damp	1.4	FILL: Gray "fused" open hearth slag (fused layer approxiamtely 6 inches thick)
						Damp Damp Damp Damp Damp Damp	3.6	FILL: Mostly gray open hearth slag with traces of gravel, sand, and metal fragments
5								Bottom of Boring at 3.6 feet

*** The stratification lines represent the approximate boundary between soil types and the transition may be gradual.**

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TEST BORING LOG

PROJECT NAME **Poland Public Library Floor Slab Heave - Poland, Ohio** BORING NO. **C-2**

PROJ. SURF. ELEV. **Finish Floor**

CLIENT **The Public Library of Youngstown & Mahoning County** NO. **24-G-29241** DATE DRILLED **7/22/2024**

GROUND WATER OBSERVATION

None FEET BELOW SURFACE AT COMPLETION

_____ FEET BELOW SURFACE AT 24 HOURS

_____ FEET BELOW SURFACE AT ____ HOURS

Proportions Used

Trace	Less than 5%
Few	5 to 10%
Little	15 to 25%
Some	30 to 45%
Mostly	50 to 100%

140 lb Wt. x 30" fall on 2" O.D. Sampler

Cohesionless Density

0 - 10	Loose
10 - 30	Medium Dense
30 - 50	Dense
50 +	Very Dense

Cohesive Consistency

0 - 4	Soft
4 - 8	Medium Stiff
8 - 15	Stiff
15 - 30	Very Stiff
30 +	Hard

LOCATION OF BORING **See Boring Location Plan**

DEPTH	Sample Depths From To	Type of Sample	Blows per 6" on Sampler From To 0-6	6-12	12-18	Moisture Density or Consist.	Strata Change Depth*	SOIL IDENTIFICATION Remarks include color, type of soil, etc. Rock-color, type, condition, hardness
							0.4	5.1" Concrete Slab - contains welded wire mesh, underlain by a vapor barrier
							0.8	5" Crush Limestone Sand and Gravel (ODOT Item 304 type gradation)
						Damp		FILL: Mostly gray open hearth slag with traces of gravel, sand, and metal fragments
						Damp		
						Damp		
						Damp	2.4	
						Damp	2.8	FILL: Gray "fused" open hearth slag (fused layer approxiamtely 5 inches thick)
						Damp	3.3	FILL: Mostly gray open hearth slag with traces of gravel, sand, and metal fragments
								Bottom of Boring at 3.3 feet
5								

*** The stratification lines represent the approximate boundary between soil types and the transition may be gradual.**

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TEST BORING LOG

PROJECT NAME **Poland Public Library Floor Slab Heave - Poland, Ohio** BORING NO. **C-3**

PROJ. SURF. ELEV. **Finish Floor**

CLIENT **The Public Library of Youngstown & Mahoning County** NO. **24-G-29241** DATE DRILLED **7/22/2024**

GROUND WATER OBSERVATION

None FEET BELOW SURFACE AT COMPLETION

_____ FEET BELOW SURFACE AT 24 HOURS

_____ FEET BELOW SURFACE AT ____ HOURS

Proportions Used

Trace	Less than 5%
Few	5 to 10%
Little	15 to 25%
Some	30 to 45%
Mostly	50 to 100%

140 lb Wt. x 30" fall on 2" O.D. Sampler

Cohesionless Density

0 - 10	Loose
10 - 30	Medium Dense
30 - 50	Dense
50 +	Very Dense

Cohesive Consistency

0 - 4	Soft
4 - 8	Medium Stiff
8 - 15	Stiff
15 - 30	Very Stiff
30 +	Hard

LOCATION OF BORING **See Boring Location Plan**

DEPTH	Sample Depths From To	Type of Sample	Blows per 6" on Sampler From To 0-6	6-12	12-18	Moisture Density or Consist.	Strata Change Depth*	SOIL IDENTIFICATION Remarks include color, type of soil, etc. Rock-color, type, condition, hardness
							0.3	4.1" Concrete Slab - contains welded wire mesh, underlain by a vapor barrier
							0.7	4" Crush Limestone Sand and Gravel (ODOT Item 304 type gradation)
						Moist		Brown Silty Sand with Gravel (SM) - mostly coarse to fine sand, little gravel, little to some slight plasticity fines
						Moist		
						Moist		
						Moist		
						Moist	2.6	
							2.7	Brown Weathered Sandstone
5								Bottom of Boring at 2.7 feet

*** The stratification lines represent the approximate boundary between soil types and the transition may be gradual.**

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Boring log -- Boring # 1

Elevation at top of hole: **1010.64**

Water levels (ft): Initial: Final:

Project: **POLAND LIBRARY ADDITION**

Location: **POLAND, OHIO**

J.N. Cernica & Associates

Consulting Engineers

Remarks: BORING REPORTED TO BE DRY @ COMPLETION OF DRILLING

Sample Number & Type	Blows/6" Or %Rec. And RQD	Depth (feet)	Soil Description
1 SS	2 4 6	0.5 1.0 1.5	4" TOPSOIL FILL: DARK BROWN SANDY SILT (ORGANIC), SOME ASHES, VEGETATION, BRICK AND ROCK FRAGMENTS
2 ST		2.0 3.5	
3 SS	2 4 7	4.0 4.5 5.0 5.5	DARK BROWN SANDY SILT, SOME CLAY, TRACE OF GRAVEL AND SOME ORGANIC MATERIAL BROWN SILTY SAND, GRAVEL AND SANDROCK FRAGMENTS
4 SS	31 50/5"	7.5 8.0 8.4	BROWN AND GRAY SANDY SHALE AUGER REFUSAL @ 7.5'

SS=Split Spoon ST=Shelby Tube

Boring log -- Boring # 11

Elevation at top of hole: **1004.65**
Water levels (ft): Initial: **4.6** Final:
Project: **POLAND LIBRARY ADDITION**
Location: **POLAND, OHIO**

J.N. Cernica & Associates
Consulting Engineers

Remarks: INITIAL WATER LEVEL TAKEN @ COMPLETION OF DRILLING

Sample Number & Type	Blows/6" Or %Rec. And RQD	Depth (feet)	Soil Description
1 SS	3 4 6	0.5 1.0 1.5	5" TOPSOIL FILL: BROWN SILTY SAND, GRAVEL AND ROCK FRAGMENTS, SOME SLAG AND ASHES, TRACE OF GLASS, VEGETATION AND BRICK FRAGMENTS
2 ST		2.0 4.0	BROWN SILTY SAND, SOME CLAY
3 SS	7 7 9	4.5 5.0 5.5 6.5	INITIAL WATER LEVEL @ 4.5' BROWN SILTY SAND AND ROCK FRAGMENTS
4 SS	50/2"	6.7	GRAY SANDY SHALE AND SANDROCK

SS=Split Spoon ST=Shelby Tube

Boring log -- Boring # 12

Elevation at top of hole: **1007.87**
Water levels (ft): Initial: Final:
Project: **POLAND LIBRARY ADDITION**
Location: **POLAND, OHIO**

J.N. Cernica & Associates
Consulting Engineers

Remarks: BORING REPORTED TO BE DRY @ COMPLETION OF DRILLING

Sample Number & Type	Blows/6" Or %Rec. And RQD	Depth (feet)	Soil Description
1 SS	3 5 5	0.5 1.0 1.5	3" TOPSOIL FILL: DARK BROWN SANDY SILT, SOME ASHES, SLAG AND ROCK FRAGMENTS, TRACE OF WOOD, VEGETATION AND BRICK FRAGMENTS
2 SS	12 9 15	3.0 3.5 4.0 4.5	BROWN SILTY SAND AND ROCK FRAGMENTS
3 SS	50/3"	7.0 7.3	BROWN SANDROCK AUGER REFUSAL @ 7.0'

SS=Split Spoon ST=Shelby Tube

Boring log -- Boring # 13

Elevation at top of hole: **1010.39**

Water levels (ft): Initial: Final:

Project: **POLAND LIBRARY ADDITION**

Location: **POLAND, OHIO**

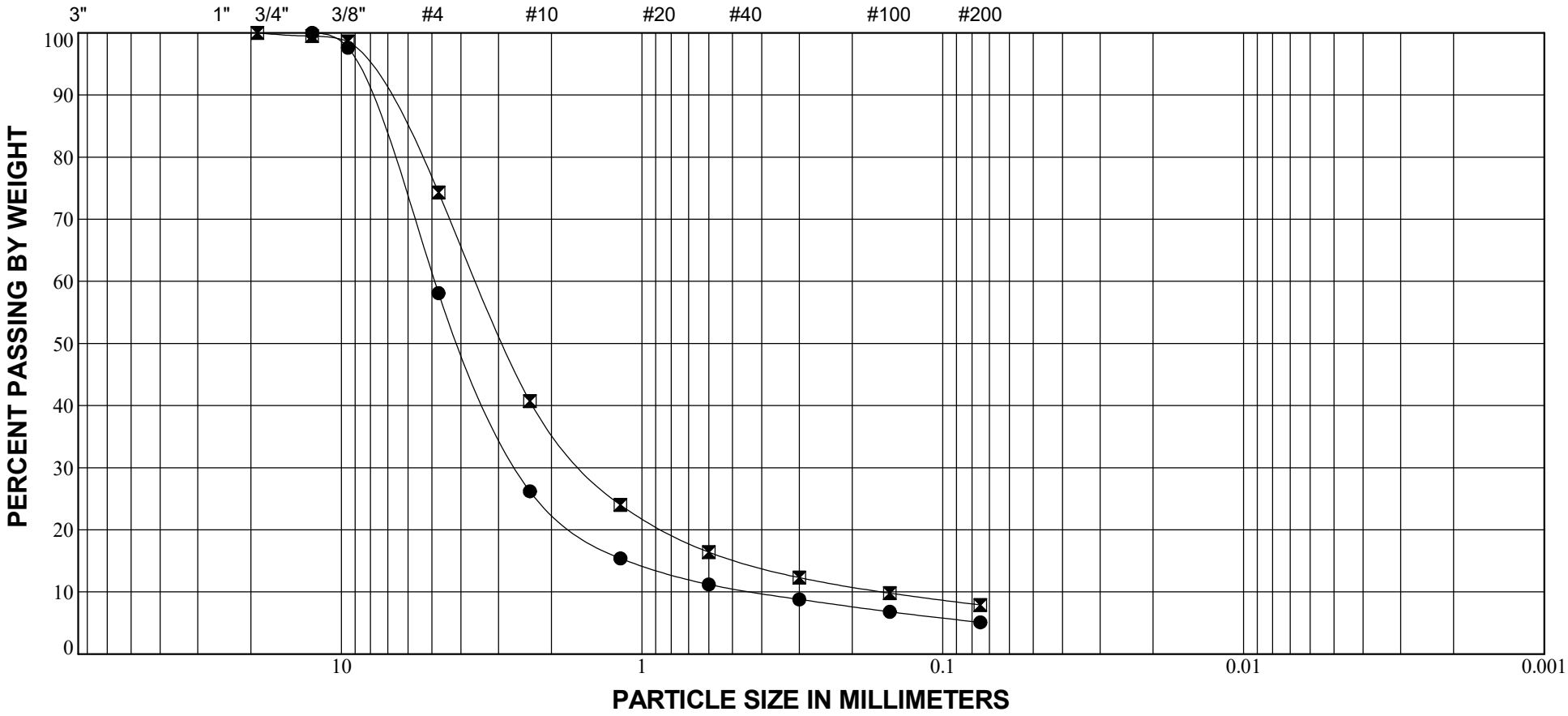
J.N. Cernica & Associates

Consulting Engineers

Remarks: BORING REPORTED TO BE DRY @ COMPLETION OF DRILLING

Sample Number & Type	Blows/6" Or %Rec. And RQD	Depth (feet)	Soil Description
1	3		3" TOPSOIL
SS	4	0.5	
	5	1.0	FILL: DARK BROWN SANDY SILT, SOME GRAVEL,
		1.5	VEGETATION AND ROCK FRAGMENTS,
			TRACE OF ASHES, SLAG AND BRICK FRAGMENTS
		3.5	
2	10	4.0	
SS	15	4.5	
	17	5.0	BROWN SILTY SAND AND ROCK FRAGMENTS
		6.0	
3			
ST		7.0	
4	15	7.5	
SS	27	8.0	
	26	8.5	
5	10	9.0	
SS	15	9.5	
	50/5"	9.9	BROWN WEATHERED SANDROCK
			AUGER REFUSAL @ 9.5'

SS=Split Spoon ST=Shelby Tube



GRAVEL		SAND			SILT	CLAY
coarse	fine	coarse	medium	fine		

LEGEND:

	TEST HOLE	DEPTH	LL	w_n	PL	ASTM CLASSIFI-CATION	ASTM SOIL DESCRIPTION
●	C-1	1.7	NP	5.4	NP	SP-SM	Existing Slag-Based Fill - Poorly Graded Sand With Silt And Gravel
⊠	C-2	1.3	NP	4.9	NP	SP-SM	Existing Slag-Based Fill - Poorly Graded Sand With Silt And Gravel

Job No.: *24-G-29241*

Method: *ASTM D421 D422*

Date: *August 2024*

COMBINED PARTICLE SIZE DISTRIBUTION

Poland Public Library Floor Slab Heave - Poland, Ohio

Geotechnical Consultants, Inc. - Westerville, Ohio 43081

DESALVO CONSTRUCTION
COMMERCIAL / INDUSTRIAL

January 6th, 2025

John Orsini
BSHM Architects, Inc.
117 S Champion Street
Youngstown, Ohio 44503

Re: Probable Cost Summary for:
The Public Library of Youngstown & Mahoning County: Poland Branch

John,

As per your request, we are pleased to submit our thoughts relative to potential probable costs for the proposed recommendations for the Poland Library located at 311 South Main Street, Poland, Ohio 44514.

After review of the conditions affecting the site and the Building Assessment Report dated 11/7/24 completed by you and your team, the undersigned proposes the following probable cost summary to furnish all labor, equipment and materials as follows:

PLYMC – Poland Library:

Probable Construction Cost: ***$ 4,369,107.20***

(Please see attached spreadsheet for an itemized breakdown of the recommended work items.)

Exclusions & Clarifications:

1. This probable construction cost feedback is based on incurred construction costs on past similar projects and should be used for informational purposes only.
2. The probable cost pricing reflected above was prepared as if construction work could commence in Summer 2025.
3. The probable construction cost feedback is based solely on the recommended work items identified within the Building Assessment report prepared by BSHM Architects, Inc.
   If or when a design team is engaged to develop a renovation and/or restoration project for this location, actual scope of work developed at that time may significantly vary and the probable costs within this initial feedback must not be used for comparison.
4. ***PLEASE NOTE - Actual construction costs for a project of any kind at this location will vary.***

Thank you again for engaging DeSalvo Construction Company, Inc. to provide probable cost information and for this project. Please do not hesitate to contact us to further assist with your construction needs as this project continues to develop.

Sincerely,

Jim Bayer
Vice President / Preconstruction Services

cc: JK DeSalvo

1491 West Liberty Street • Hubbard, Ohio 44425
Office (330) 759-8145 • Fax (330) 759-7275
desalvoinc@dccgc.com

PLYMC - Poland Library

Building Assessment Probable Costs

SITE IMPROVEMENTS

#	ITEM DESCRIPTION	UNIT	QTY	DESCRIPTION	TOTAL
1	ARCHITECTURAL & ENGINEERING SERVICES	EXCLUDED	0		0.00
2	R & R BRICK PAVERS - ON GRADE	LS	1	Includes segmental retaining wall & landscape restoration.	216,620.25
3	R & R BRICK PAVERS @ BALCONY	LS	1	Includes waterproofing membrane.	54,631.50
4	SECTION TOTAL				271,251.75

BUILDING IMPROVEMENTS

#	ITEM DESCRIPTION	UNIT	QTY	DESCRIPTION	TOTAL
1	ARCHITECTURAL & ENGINEERING SERVICES	EXCLUDED	0		0.00
2	DORMITORY - DEMO & RE-STORE	LS	1	Complete removal and replacement of existing interior finishes to accommodate new floor framing systems, including MEP re-build to accomplish floor framing installation.	1,433,124.00
3	DORMITORY - WATERPROOF BASEMENT	LS	1	Includes landscape restoration at impacted ara.	44,467.50
4	BOOK STORE - STRUCTURAL SLAB REPAIR		0	Refer to Section 1, Item 8 below.	0.00
5	BUILDING VENEER REPAIR	LS	1		597,135.00
6	PERGOLAS - REPLACEMENT	LS	1	Note - columns in Section 1, Item 5 above.	250,103.01
7	BALCONIES - EIFS REPLACEMENT	LS	1		32,524.80
8	ROOF - GUTTER REPLACEMENT	LS	1		31,101.84
9	SECTION TOTAL				2,388,456.15

STRUCTURAL

#	ITEM DESCRIPTION	UNIT	QTY	DESCRIPTION	TOTAL
1	ARCHITECTURAL & ENGINEERING SERVICES	EXCLUDED	0	By Owner.	0.00
2	Item 4.1: East Entrance Pavers		0	Refer to Section 6, Item 2 below.	0.00
3	Item 4.2: Egress Frost Protection	LS	1	New frost slabs at all exterior doors. Assumes brick paver replacement in separate section below.	44,182.91
4	Item 4.3: East Side Sidewalk Install	LS	1	Frost slabs and pavers elserwhere. Assumes positive drainage through grading of new sub base.	93,460.52
5	Item 4.4: Column Wraps	LS	1	Assumes demo and replacement of all foudnations and columns, utilizing Chadsworth load bearing columns or similar.	282,787.89
6	Item 4.5: Pergola Movement		0	See column work above for foundation replacement.	0.00
7	Item 4.6: Balcony Stuctural Integrity	LS	0	Replacement of dormitory balcony "floor".. Existing roof to remain. Exiting columns railings to be removed, salvaged, and re-installed.	22,869.00
8	Item 4.7: Mechanical Room Slab Movement	LS	1	By architect/engineer, IF NEEDED. During on site walk thru, it was discussed that further work in this room was not recommended due to existing undeground utilities.	31,762.50
9	Item 4.8: Southern Slab-On-Grade Material	LS	1	All library furniture, fixtures, and equipement to be removed, relocated, and re-installed by others. Floor finish and base to be removed and replaced.	193,288.79
10	Item 4.9: Existing Dormitory Area		0	Refer to Section 7, Item 2 below.	0.00
11	Item 4.9.1: Comprehensive Structural Analysis		0	Refer to Section 7, Item 2 below.	0.00
12	Item 4.9.2: Foundation Reinforcement	EXCLUDED	0	By architect/engineer, IF NEEDED.	0.00
13	Item 4.9.3: Fireplace and Wall Repairs	LS	1	Masonry repairs/restoration.	22,869.00
14	Item 4.9.4:Utility Management Plan	EXCLUDED	0	By architect/engineer, IF NEEDED.	0.00
15	Item 4.9.5: Selective Structural Repair Techniques	EXCLUDED	0	By architect/engineer, IF NEEDED.	0.00
16	Item 4.9.6: Monitoring Program	EXCLUDED	0	By architect/engineer, IF NEEDED.	0.00
17	SECTION TOTAL				691,220.61

PLYMC - Poland Library

Building Assessment Probable Costs

HEATING

#	ITEM DESCRIPTION	UNIT	QTY	DESCRIPTION	TOTAL
1	ARCHITECTURAL & ENGINEERING SERVICES	EXCLUDED	0	By Owner.	0.00
2	DORMITORY - REPLACE (2) F/AC UNITS	LS	1		30,492.00
3	DORMITORY - VENT RELOCATION	LS	1	These are vents adjacent to dormitory balcony.	15,246.00
4	NEW PORTION - REPLACE BOILERS	1		Boiler replacement only. Pumps & system components to remain "as-is".	49,549.50
5	SECTION TOTAL				95,287.50

AIR CONDITIONING

#	ITEM DESCRIPTION	UNIT	QTY	DESCRIPTION	TOTAL
1	ARCHITECTURAL & ENGINEERING SERVICES	EXCLUDED	0		0.00
2	REPLACE CHILLER	LS	1		349,387.50
3	MAINTENANCE ON AIR HANDLER	LS	1		19,057.50
4	R & R LEAKING CHILLED WATER PIPING	LS	1		undetermined
5	SECTION TOTAL				368,445.00

PLUMBING

#	ITEM DESCRIPTION	UNIT	QTY	DESCRIPTION	TOTAL
1	ARCHITECTURAL & ENGINEERING SERVICES	EXCLUDED	0		0.00
2	REPLACE W/C FLUSH VALVES WITH AUTO'S	LS	1		15,246.00
3	REPLAE LAV FAUCETS WITH AUTOMATICS	LS	1		10,164.00
4	REPLACE INDOOR GREASE TRAP	LS	1		13,340.25
5	SECTION TOTAL				25,410.00

LIFE SAFETY

#	ITEM DESCRIPTION	UNIT	QTY	DESCRIPTION	TOTAL
1	ARCHITECTURAL & ENGINEERING SERVICES	EXCLUDED	0		0.00
2	KITCHEN EF DISCHARGE RELOCATION	LS	1	Final design routing may impact cost significantly.	31,762.50
3	SECTION TOTAL				31,762.50

ELECTRICAL

#	ITEM DESCRIPTION	UNIT	QTY	DESCRIPTION	TOTAL
1	ARCHITECTURAL & ENGINEERING SERVICES	EXCLUDED	0		0.00
2	UPDATE RECEPTACLES- GFCI & TR	LS	1		28,205.10
3	REPLACE INTERIOR LIGHTING	LS	1	General and accent light fixtures	281,542.80
4	LIGHTING CONTROL SYSTEM	LS	1	No new wiring. Occupancy sensors & relay panel.	63,525.00
5	REPLACE EXTERIOR LIGHTING	LS	1	Building exterior lights only. No Parking Lot.	47,770.80
6	REPLACE FIRE ALARM	LS	1		76,230.00
7	SECTION TOTAL				497,273.70

CUMULATIVE TOTAL OF VALUES ABOVE: **4,369,107.20**

ALTERNATE - RENOVATION OF GROUP RESTROOMS

#	ITEM DESCRIPTION	UNIT	QTY	DESCRIPTION	TOTAL
1	ARCHITECTURAL & ENGINEERING SERVICES	EXCLUDED	0		0.00
2	RENOVATION OF GROUP RESTROOMS	LS	1		undetermined
7	SECTION TOTAL				undetermined

CUMULATIVE TOTAL OF ALTERNATE VALUES ABOVE: undetermined

SEIDLER ENGINEERING, INC.
1920 Churchill Rd., Suite 202
Girard, Ohio 44420
330.746.4482
www.seidlerengineering.com

December 17, 2024

Mr. John F. Orsini, AIA, NCARB
BSHM Architects, Inc.
117 W. Champion St., Suite 201
Youngstown, OH 44503

Send via e-mail to: jfo@bshm-architects.com

Re: Cursory Structural Assessment and Evaluation of Public Library of Youngstown & Mahoning County (PLYMC) - Poland Branch, 311 S. Main St., Poland, Ohio 44514
SEI Communication No. 24129-2

Dear Mr. Orsini:

This is in response to your request for Seidler Engineering, Inc. (SEI) to perform a cursory structural assessment and evaluation of the PLYMC Poland Branch building. Our team conducted inspections on Monday, June 3, 2024; Friday, June 28, 2024; and Thursday, September 26, 2024 to review and document existing conditions of the building.

Photograph 1: Main Entrance to the Poland Library looking south.

1.0 Introduction

This structural condition survey was conducted for the Poland Library to document, assess, and evaluate several observed structural, geotechnical, and site engineering issues identified during an inspection. The survey focuses on several primary areas of concern involving settlement, drainage, column structural integrity, and material deficiencies.

This condition survey references direction as though the west elevation of the building faces South Main Street.

2.0 Observations

The following observations were noted on-site and are categorized according to location and type of issue:

2.1 East Entrance Pavers

The brick pavers at the east entrance exhibit unevenness due to settlement of the underlying soils. This movement is likely a result of insufficient compaction of base material or natural soil consolidation over time, affecting the surface stability and levelness of the entrance pavers.

Photograph 2: Standard photography of the pavers looking east.

Photograph 3: Standard photography of the pavers looking south.

2.2 Egress Frost Protection

At all exit doors throughout the building, frost slabs appear to be absent, which are required by building codes to prevent frost heave. Without these frost slabs, the exit thresholds are vulnerable to movement and heaving, which can pose a safety hazard, particularly during colder months.

Photograph 4: Absent frost slab at outswinging exterior door.

Photograph 5: Absent frost slab at outswinging exterior door.

2.3 East Side Sidewalk Drainage

The sidewalk on the east side of the building under the pergola slopes toward the building. This negative slope condition allows water to pool and flow towards the building rather than away from it, creating potential moisture intrusion issues that may impact the foundation and structural elements over time.

Photograph 6: East sidewalk slopes toward building.

2.4 Column Wraps

Several column wraps, primarily at the exterior pergolas, are in various stages of failure. This appears to be due to structural issues within the columns themselves, as the wraps have experienced displacement or separation, potentially compromising the load-carrying capacity of the columns.

Photograph 7: Column wrap failure.

Photograph 8: Column wrap failure.

2.5 Pergola Movement

The pergola at the southern end of the west side has shifted, suggesting foundation movement in this area. This movement may stem from soil instability, insufficient foundation support, or differential settlement, which is affecting the stability of the pergola.

Photograph 9: Standard photography of the west side southern pergola.

Photograph 10: Close up of the west side southern pergola.

2.6 North Side Balcony Structural Integrity

The balcony located at the north end of the building exhibits significant structural distress and displacement. The extent of this movement suggests a structural deficiency that has compromised the balcony's stability and serviceability, posing safety risks to occupants.

Photograph 11: Standard photography of the north side balcony.

Photograph 12: Close up of the north side balcony.

2.7 Mechanical Room Slab Movement

In the interior mechanical room at the southwestern corner, there is evidence of slab-on-grade movement. This movement may be indicative of subgrade settlement or poor base material quality affecting the stability of the mechanical room slabs.

2.8 Southern Slab-On-Grade (Bookstore Area)

There is noticeable slope in the floor slab in the Bookstore Area at the southern end of the building. The slab-on-grade was installed over an unsuitable base material, identified as open-hearth slag. The presence of slag may lead to differential settlement and unevenness in the slab, causing structural issues over time.

Photograph 13: Floor slab sloping In the Bookstore Area.

Photograph 14: Gap above east exterior window in the Bookstore Area.

2.9 Existing Dormitory Area

The two-story dormitory portion of the library, located at the north end of the building, presents additional structural concerns. This area is unique in its configuration, as it includes a basement with extensive utilities. Due to the nature of the construction and current structural conditions,

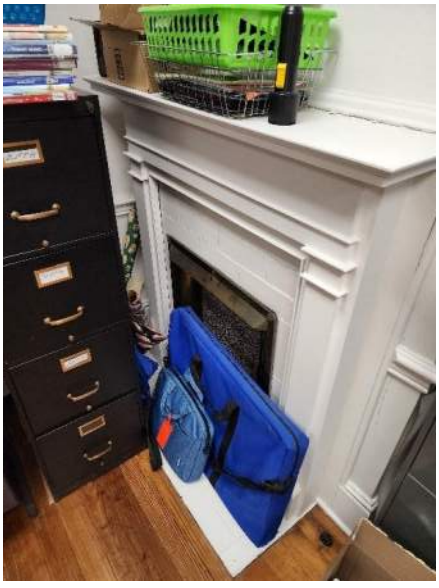
this section will require a detailed and specialized approach to ensure stability and minimize disruption.

Photograph 15: Standard photography of the Dormitory.

Photograph 16: Standard photography of the Dormitory.

2.9.1 Uneven Floors: There is visible unevenness across various areas of the dormitory, indicating possible settlement or structural deformation within the floor framing or foundation. This unevenness suggests underlying structural or geotechnical issues that may require corrective action.

2.9.2 Cracking Around Fireplace: The area surrounding the fireplace displays cracking, indicating stress and potential movement of structural elements in this location. The presence of cracks near the fireplace is concerning, as it suggests movement or settlement in the adjacent wall or floor supports.



Photograph 17: Cracking around fireplace.

2.9.3 Additional Structural Distress: Other signs of structural distress are visible throughout the dormitory area, with cracking in walls and around openings. These symptoms may stem from differential settlement, material degradation, or load-induced stress.

Photograph 18: Cracking in wall.

Photograph 19: Gap at door.

2.9.4 Basement Utility Access: The basement in this area contains extensive utilities, including electrical, plumbing, and mechanical systems, that run throughout the dormitory. This heavy utility load in combination with structural issues poses access challenges for repairs, as maintaining these utilities while conducting extensive structural work will require meticulous planning.

2.10 Second Floor Catwalk

No signs of structural distress were observed.

2.11 South Side Second Floor Balconies

The second-floor balconies on the south side of the building appeared to be constructed with a concrete slab and finished with brick pavers. There are wrapped columns supporting pergolas at each balcony. As at the ground level pergolas, several of the column wraps are in various stages of failure, again indicating structural issues within the columns themselves. Although vegetation was growing on and between the brick pavers, structural distress was not observed in the slab itself.

Photograph 20: Standard photography of the south balcony looking west.

Photograph 21: Close up of the brick pavers.

3.0 Conclusions

Based on the observations, the following conclusions have been made:

3.1 East Entrance Pavers: Settlement of underlying soils and/or inadequate base material has caused unevenness in the brick pavers, affecting the east entrance's surface integrity.

3.2 Egress Frost Protection: The absence of code-required frost slabs at exit doors exposes the exit pathways to potential heave and movement from freeze-thaw cycles, which can compromise safety.

3.3 East Side Sidewalk Drainage: The sidewalk slope towards the building under the pergola creates drainage issues that may lead to foundation damage due to moisture intrusion.

3.4 Column Wraps: Failures in several column wraps indicate potential structural deficiencies in the columns that may compromise their load-bearing capacity.

3.5 Pergola Movement: Movement of the pergola on the west side of the building suggests foundation instability or settlement, likely due to underlying soil conditions.

3.6 North Side Balcony Structural Integrity: The north balcony is experiencing structural failure and displacement, suggesting inadequate structural support or material degradation over time.

3.7 Mechanical Room Slab Movement: Movement of the slab in the mechanical room indicates potential subgrade issues or deficiencies in the slab foundation.

3.8 Southern Slab-On-Grade Material (Bookstore Area): The use of open-hearth slag as a base material under the slab near the bookstore has led to differential settlement, adversely affecting the slab stability.

Although the effects from the use of open-hearth slag have only been observed in the bookstore area, the extents of the open-hearth slag are unknown and may occur under other portions of the building. As such, there is potential for additional issues if it were to expand.

3.9 Existing Dormitory Area

3.9.1. Structural Integrity of Dormitory Floors: The uneven floors indicate either settlement in the foundation or potential weakness in the floor framing system. The extent of floor deflection may impact the long-term stability and usability of the dormitory area.

3.9.2 Fireplace Cracking: Cracking near the fireplace is likely a result of foundation settlement or load-related stress in the adjacent walls or floor system. This movement may compromise both the aesthetic and structural integrity of this focal element.

3.9.3 Additional Structural Distress: Visible signs of structural distress including cracking in walls and around openings may stem from differential settlement, material degradation, or load-induced stress.

3.9.4 Utility Impact: Given the extent of the existing issues and concentration of utilities in the basement, access to structural elements for reinforcement or replacement will be particularly challenging, requiring non-invasive or minimally invasive techniques wherever possible to limit disruptions.

3.10 Second Floor Catwalk: No signs of structural distress were observed.

3.11 South Side Second Floor Balconies: Failures in several column wraps indicate potential structural deficiencies in the columns that may compromise their load-bearing capacity.

4.0 Recommendations

To address the identified issues and mitigate further structural deterioration, the following recommendations are proposed:

4.1 East Entrance Pavers: Remove and replace uneven pavers. Conduct a geotechnical assessment to determine the need for additional base preparation, including proper compaction or stabilization of underlying soils, to prevent future settlement.

4.2 Egress Frost Protection: Install frost slabs at all egress door locations in compliance with building codes. These frost slabs will mitigate movement from freeze-thaw cycles, ensuring stable thresholds at each exit.

4.3 East Side Sidewalk Drainage: Re-grade or replace the sidewalk adjacent to the building to achieve a positive slope away from the structure. Consider installing a drainage system along the building’s edge under the pergola to redirect water away from the foundation.

4.4 Column Wraps: Conduct a structural assessment of all columns with failed wraps to determine the extent of damage. Replace or repair columns as needed, ensuring that new wraps are adequately secured to the columns.

4.5 Pergola Movement: Perform a foundation investigation for the pergola area to assess soil conditions and foundation stability. Reinforce or rebuild the foundation as necessary to address any settlement or soil instability.

4.6 Balcony Structural Integrity: Engage a structural engineer to design reinforcement or replacement of the balcony structure to restore its integrity and prevent further displacement.

4.7 Mechanical Room Slab Movement: Perform a subgrade inspection in the mechanical room to identify the cause of movement. If necessary, inject a stabilizing material beneath the slab or replace the slab with a properly compacted and reinforced foundation.

4.8 Southern Slab-On-Grade Material (Bookstore Area): Remove the existing slab near the bookstore and excavate to remove the open-hearth slag. Replace with compacted, engineer-approved fill material and install a new slab-on-grade with appropriate reinforcement.

The extents of the open-hearth slag throughout the building are unknown. The library should make plans to address potential issues in the event open-hearth slag expands under other areas of the building.

4.9 Existing Dormitory Area: The two-story dormitory area at the north end of the building exhibits structural distress that warrants significant attention to ensure safe usage. Extensive utility presence complicates access for repairs, requiring a carefully coordinated approach to both reinforce structural elements and preserve essential utility functions. By following the outlined recommendations, the library can address these structural issues while minimizing disruption to library operations. Regular inspections and monitoring of this area are advised to prevent reoccurrence and maintain structural integrity. To address the structural and access issues in the dormitory portion, the following actions are recommended:

4.9.1 Comprehensive Structural Analysis: Conduct an in-depth structural analysis of the dormitory, particularly focusing on floor framing and foundation conditions. This analysis should identify the source and extent of settlement or deflection, as well as any load-bearing deficiencies.

4.9.2 Foundation Reinforcement: Reinforce the dormitory foundation if settlement is determined to be a contributing factor. This may involve underpinning or soil stabilization techniques to prevent further movement.

4.9.3 Fireplace and Wall Repairs: Investigate the structural condition around the fireplace and repair cracks using flexible sealants or epoxy injection techniques where appropriate. Consider reinforcing adjacent walls and supports to improve load distribution.

4.9.4 Utility Management Plan: Develop a utility management and protection plan for the basement area to enable access to structural elements while preserving utility services. This plan should identify safe zones for temporary relocation of utilities if necessary to facilitate repair work.

4.9.5 Selective Structural Repair Techniques: Use minimally invasive repair techniques, such as fiber-reinforced polymer (FRP) wraps or post-installed anchors, to reinforce load-bearing

walls and framing. These methods reduce the need for extensive demolition and facilitate repairs in hard-to-access areas.

4.9.6 Monitoring Program: Establish a monitoring program to assess ongoing movement or deflection in the dormitory area. This will provide early detection of any further structural issues and help evaluate the effectiveness of the repairs over time.

4.10 Second Floor Catwalk: Structural repairs are not required at this time.

4.11 South Side Second Floor Balconies: Conduct a structural assessment of all columns with failed wraps to determine the extent of damage. Replace or repair columns as needed, ensuring that new wraps are adequately secured to the columns. Remove pavers and conduct a thorough assessment of the structure. Waterproof and refinish the balconies.

5.0 Closing and Limitations

This report highlights structural, geotechnical, and site issues at the Poland Library, including settlement, drainage, material deficiencies, and structural integrity concerns. Implementation of the recommended repairs and mitigation measures will be critical to ensuring the long-term stability, safety, and usability of the library's facilities. Regular maintenance and monitoring of these areas are also advised to prevent reoccurrence and to manage potential future issues proactively.

The scope of our work consists of a visual inspection to render a professional opinion as to the structural integrity of the Poland Library. Extensive soil information and test data were not provided or within the scope of work. We did not employ any testing or investigative measures beyond those discussed. Our conclusions and recommendations are based on our observations, engineering principles, and our experience in dealing with similar structures. No warranty, either expressed or implied, is given. This report provides our professional opinion based on the information presented to us at the time the report was prepared. We reserve the right to revise this report as more evidence becomes available, especially during any repair work that may occur. Seidler Engineering, Inc. is not responsible for the conclusions, opinions, or recommendations made by others based upon the data included herein.

Seidler Engineering, Inc. appreciates the opportunity to serve you on this project. Please call if you have any questions or if we can be of further assistance.

Sincerely,

SEIDLER ENGINEERING, INC.

Kurt O. Seidler, PE
President

Poland Library

Heating System

Description:

The original house portion of the facility houses the offices and cafe for the newer library facility built in 1999. The heating and air conditioning, of this original portion, occurs from 2- condensing furnace/AC units located in the basement level. These units were installed over 20+ years ago and are in poor shape. The vents from these units are causing considerable damage to the porch and siding of the original building. These vents need to be relocated to prevent further damage and unsafe conditions for the public.

F/AC Unit

F/AC Outdoor
Condensing Units

Damage from F/AC Vents

The new portion of the facility has 2- Lochinvar Boilers that were installed in 2006 and appear to operate adequately to meet the needs of the facility. These units are approaching 20 years old, and the typical life span is about 30 years. The hot water distribution pumps are original and one of them is presently being rebuilt. The piping is original and does not appear to have any leaking or ongoing problems with the operating characteristics.

This heating hot water is supplied to 2 large, indoor Air Handling Units serving the newer library facility, along with VAV Boxes and reheat coils in each of the different spaces. The units and all reheat coils are original from the 1999 construction. These 2 air handling units had the linkages and actuators upgraded to electronic DDC control last year. The remaining VAV Boxes and reheat coils are pneumatic and original to the new construction.

In addition, the newer library portion of the facility has 2 humidifiers that were installed but not being used. Library staff have stated that these units are very expensive to operate.

2- Lochinvar Boilers (2006)

2- Hot Water Pumps

Indoor Air Handling Unit

Space Reheat Coil

Recommendations:

- Replace the 2 furnace/AC units in the original house part of the facility. Rework the vents to eliminate the damage to the building structure.
- Consider replacing the 2 hot water boilers due to the age and expected life of the system. Rebalance pumps and distribution system to original values. Check and verify proper operation of all reheat coil control valve, thermostats and vav box controllers.

Air Conditioning

Description:

The entire 1999 facility is cooled from a central outdoor air cooler chiller. This unit is original and is nearing the end of its useful life. This unit utilizes R-22 as its refrigerant, which is no longer commercially available, and very expensive to purchase when needed for this chiller. The maintenance personnel have added that this unit is very loud when operating. Compressor blankets, sound enclosures and other sound attenuating considerations should be evaluated if this unit is to remain. These same considerations should occur if the unit is replaced. In addition, there is an ongoing, underground leak in the chilled water piping from the outdoor chiller to the building that will need to be replaced.

The chilled water distribution pumps are original and were rebuilt last year. The piping is original and does not appear to have any leaking or ongoing problems with the operating characteristics.

The temperature control system is a Johnson Control Metasys System that is pneumatic except for upgrades at the 2 air handling units and their components. These upgrades occurred last year.

Furnace/AC Unit
(original building)

AHU with Chilled Water Coil

Chilled Water Pumps Coil

Recommendations:

- Replace the outdoor air-cooled chiller with a unit that is quieter, has better performance characteristics and safer, allowable refrigerants that are more readily accessible.
- Rebalance air handling units along with cleaning all coils, verifying proper operations of all economizer dampers and verify that all sequences of operation are controlling to the desired parameters.
- Determine where the underground leak is occurring and replace that portion of the chilled water piping.

Plumbing

Description:

The plumbing of this building appears to adequately serve the library and building usage. The incoming water service is a 2” line and has the required backflow preventer. There is a second water service entry that is a 4” line serving the fire protection system.

During the walk-through, no complaints of poor pressure or inadequate flow were mentioned. In addition, there was no mention of any fixtures or areas with slow drainage or backups occurring. The domestic hot water heater is a Rheem 40- gallon tank and appears to be under 5 years old and in fair shape.

All the plumbing fixtures are original and were installed in 1999. These fixtures are not low flow that are now being used for water conservation and water use reduction. All the water closets have manual flush valves along with the lavatories having manual faucets. All the urinals in the men’s restroom have automatic flush valves. The electric water coolers appear to be in good shape and have bottle fillers that also aid in water conservation and use reduction.

A sanitary lift station is used for the facility and has been upgraded within the last 5 years. No complaints or issues were reported during our walk-through.

There is a kitchen with a 3-bowl sink, hand sink and the required indoor grease trap. Maintenance personnel have stated that the grease trap is undersized with overflow occurring often with use of the kitchen. The fixtures appear to be adequate for kitchen use.

Recommendations:

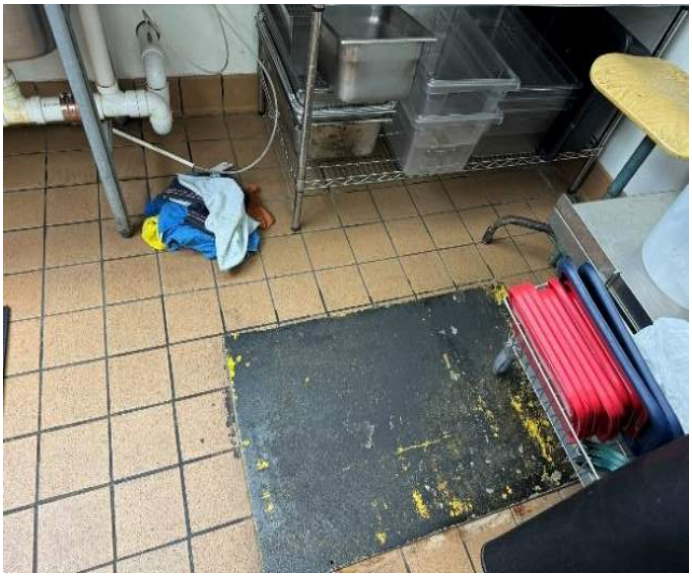
- Replace water closet manual flush valves with automatic.
- Replace lavatory manual faucets with automatic.
- Replace the indoor grease trap with a larger unit to prevent overflow of grease laden sanitary waste.

Water Service Backflow
Preventer

Urinals w/AFV

Water Closet w/MFV

Lavatories w/Manual Faucets



Indoor Grease Trap

EWC w/Bottle Filler

Life Safety

Description:

The entire facility has a fire protection system that is adequate and meets all codes. The system utilizes an incoming 4” water service and has the required backflow preventer.

The kitchen utilizes a Type I Hood that appears to be installed correctly and has all of the required components, interlocks and control for a Type I system. The exhaust fan for this hood is a sidewall fan and does not meet present code for installation height above grade. The location of this kitchen exhaust fan poses both a safety risk with the grease vapor discharge and a maintenance issue of grease buildup at or near ground level.

Fire Service and Riser

Kitchen EF Discharge

Type 1 Kitchen Hood

Recommendations:

- Relocate the kitchen hood exhaust fan to meet code.