March 25, 2021

This amendment is released to all interested parties.

1. A non-mandatory pre-bid meeting was held on March 18, 2021 at 10:00 AM at Faras Elementary, 410 W. Fir Avenue, Pirtleville, AZ 85626. The Sign-In Sheet is attached for reference. Items contained within this Amendment are intended to clarify and/or change items within the bid as a result of discussions at meeting and walk-through of the sites.

   Pre-bid Sign In Sheet- Faras Weathe

2. Technical clarifications are attached within Addendum No. 1 from Robert Polcar Architects which is two pages.

   Amendment 1 Faras Weatherization.pdf

3. The structural report from Ricker Atkinson McBee Morman and Associates, Inc, which is 49 pages.

   G24634.pdf

4. All other terms and conditions remain the same.
5. Please remember to acknowledge this Amendment #1 with your offer.
6. End of Amendment #1.

	Douglas Unified School District, #27 Pre-Bid Conference Sign-In Sheet		1132 E 12 Street Douglas, AZ 85607
	IFB: 21-007-22 PROJECT: Weatherization, Roofing, and Structural Repairs at Faras Elementary	Page 1 of 3	

Non-Mandatory: Parking Lot at 410 W. Fir Avenue, Pirtleville, AZ 85626
March 11, 2021at 10:00 AM

Firm	Representative	Phone	Email
PGPC	Caroline Brackley	480 797-6873	Caroline@pgpc.org
Progressive Roofing	Bob Gardner	520-839-3816	bob.gardner@progressive4s.com
DUSD	Norma Nerio	x7025 520-364-2447	nnerio@douglasschools.org
Premier Roofing Co.	Anthony Romero	520-909-8591	premierrooftony e Gmail. com
LOR Construction 842 E Isabella Ave Mesa Az 85204 Mark Lorenzen PRES 4805071954 mark@lorconstruction.com	Cory Harned		
SAGEBRUSH	Chris Hyes	602 477 1857	CHRIS@SAGEBRUSH42.COM
DUSD	ENRIQUE MEDRANO	520 249-5025	EMEDRANO@DOUGLASSCHOOLS.ORG
RPA	KIRBY SPILLER	602 317 7209	kirby@rparchitects.com
RPA	BOB POLCAR	602 363 4096	BOB@RPARCHITECTS.COM
Desert Springs	Joe Evenlyrud	520-508-9776	forjoe@hotmail.com

The following additions, deletions, modifications, or clarifications shall be made to the appropriate sections of the plans and specifications and shall become a part of the Contract Documents. Bidders shall acknowledge receipt of this Amendment in the space provided on the Bid form.

PLANS:

1. SHEET A101: Reference PROJECT SCOPE

   Modification: Revise the fourth paragraph to read as follows: "REMOVING AND REPLACING ALL BUILDING SEALANTS AT MASONRY JOINTS, DOORS, WINDOWS, WALL PENETRATIONS AND BUILDING/ SIDEWALK JOINTS. CLEANING, PREPARING, PRIMING AND COATING THE EXTERIOR MASONRY WALLS, CLEANING, PREPARING, PRIMING AND PAINTING EXTERIOR METALS AND WOOD."

   Modification: Add a paragraph after the fourth paragraph to read as follows: "APPROPRIATE TRADES PERSON TO MODIFY OR EXTEND ANY MECHANICAL, ELECTRICAL, PLUMBING, CATV, TELEPHONE, ANTENNAE, SOUND OR LIGHTING FACILITIES, ETC. FOUND TO OBSTRUCT THE WORK OF THIS PROJECT."

2. SHEETS A102 THRU A105: Reference KEYNOTES

   Modification: Revise KEYNOTE 30 to read as follows: "EXISTING MECHANICAL UNITS, VENTS, EXHAUST FANS, SUPPORTS, CURBS, ETC. ARE TO BE INSPECTED BY THE ROOF MANUFACTURER REPRESENTATIVE FOR COMPLIANCE WITH THEIR WARRANTY REQUIREMENTS. DUCTS SHALL BE EXTENDED, CURBS SHALL BE ADJUSTED OR REPLACED AND SUPPORTS SHALL BE ADJUSTED OR REPLACED AS NECESSARY TO ACHIEVE THE 20 YEAR MANUFACTURER'S WARRANTY. ALL ITEMS PENETRATING THE ROOF SHALL EXTEND 8" MINIMUM ABOVE THE FINISH SURFACE OF THE ROOF."

   Modification: Revise KEYNOTE 32 to read as follows: "EXISTING UTILITY LINES; REPLACE ELECTRICAL WHIPS TO DISCONNECT AND CONDENSATE LINES TO RISER AT ROOF PENETRATION. LICENSED TRADES PERSON TO RAISE EXISTING ROOF MOUNTED GAS LINES. PROVIDE NEW CHANNEL SUPPORTS OR RUBBER ROOF BLOCKS FOR ALL UTILITIES TO SECURE TO ROOF – SEE SPECIFICATION SECTION 07 72 00."

   Modification: Add a sentence to the end of KEYNOTES 27 and 28 to read as follows: "INSTALL CONTINOUS, SELF-ADHERED BITUMINOUS MEMBRANE, HIGH TEMPERATURE TYPE, OVER NAILER AND BOTH FACES OF MASONRY TO 1" BELOW JOINT, FULLY ADHERED."

   Modification: Add a sentence to the end of KEYNOTE 40 to read as follows: "COORDINATE REPAIRS WITH STRUCTURAL DRAWINGS."

   Modification: Revise KEYNOTE 43 to read as follows: "CLEAN, PRIME AND PAINT VERTICAL EXTERIOR GYP BD OR PLASTER. REPAIR, RE-FASTEN, PATCH, RE-TEXTURE, PRIME AND PAINT HORIZONTAL EXTERIOR GYP BD."

ROBERT POLCAR ARCHITECTS, INC
ARCHITECTURE • PLANNING • INTERIORS
75 Roadrunner Road, Sedona, Arizona 86336
p| 480.675.9760 c| 602.363.4096

Modification: Revise KEYNOTE 44 to read as follows: "CLEAN, PREPARE (SCRAPE AND SAND), PRIME AND PAINT EXTERIOR EXPOSED WOOD DECK."

GEOTECHNICAL ENGINEERING REPORT:

The report entitled "Geotechnical Engineering Report, Faras Elementary School – Distress Evaluation," by Ricker-Atkinson-McBee-Morman & Associates, Inc., and dated March 15, 2018 (RAMM Project No. G24634), is issued with this amendment.

TECHNICAL SPECIFICATIONS:

1. SECTION 07 54 19 – Polyvinyl Chloride Roofing

    a. Reference Page 1, PART 1 GENERAL
    1.1 SUMMARY
    Modification: Revise paragraph F.1 to read as follows:

    "1. Mechanically attached to deck. Total flat insulation thickness to be 4" assembled in two layers."

    b. Reference Page 9, PART 2 PRODUCTS
    2.3 ROOF INSULATION
    Modification: Revise paragraph B.1 to read as follows:

    "1. Flat: Two layers; total thickness of the assembled layers to be 4 inches."

Geotechnical Engineering Report
Faras Elementary School – Distress Evaluation
410 West Fir Avenue
Pirtleville, Arizona
RAMM Project No. G24634

Expires 9/30/2018

For:
Robert Polcar Architects, Inc.
4226 North 84th Place
Scottsdale, Arizona 85251

◆◆◆

By:
Ricker • Atkinson • McBee • Morman & Associates, Inc.
2105 South Hardy Drive, Suite 13
Tempe, Arizona 85282

RICKER • ATKINSON • McBEE • MORMAN & ASSOCIATES, INC.
Geotechnical Engineering • Construction Materials Testing

R·A·M·M

Robert Polcar Architects, Inc.
4226 North 84th Place
Scottsdale, Arizona 85251

March 15, 2018

Attention: Bob Polcar,

Subject: Geotechnical Engineering Report
Faras Elementary School – Distress Evaluation
410 West Fir Avenue
Pirtleville, Arizona

RAMM. Project No. G24634

Attached to this letter is our Geotechnical Engineering Report for the Faras Elementary School Distress Evaluation. The school is located in Pirtleville, Arizona.

The project consists of two existing, approximately 3,500 square-foot, single-story buildings. The buildings are 30 to 40 years old. The buildings have exhibited cracking in the walls and concrete slab-on-grade floors. The results of our visual observations, field explorations; laboratory testing; and engineering analysis, evaluation, conclusions and recommendations are presented in the report.

The attached report was prepared based on project and site data available at this time and was prepared in a manner and to the standards of the local geotechnical engineering practice. Our services did not include evaluations for the presence of hazardous materials; for concrete durability and corrosion potential with respect to on-site soils and site use water sources; for area subsidence resulting from groundwater withdrawal; or for other geologic hazards.

If you have any questions, please do not hesitate to call.

Respectfully submitted,

RICKER • ATKINSON • MCBEE • MORMAN & ASSOCIATES, INC.

Expires – 9/30/2018

By: Kip E. Reese, P.E.

Expires – 3/31/2019

Reviewed By: Kenneth L. Ricker, P.E.

/dh
Copies to: Addressee (bob@rparchitects.com)
Broderick Engineering, LLC; Ryan Wendt, (ryan@broderickeng.com)

2105 South Hardy Drive, Suite 13, Tempe, AZ 85282-1924 • Telephone (480) 921-8100 • Facsimile (480) 921-4081
www.rammeng.com

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REPORT

INTRODUCTION

This report presents the results of our geotechnical engineering services for the Faras Elementary School Distress Evaluation. The school is located in Pirtleville, Arizona. The scope of our services included discussions with representatives of Robert Polcar Architects, Inc. and Broderick Engineering, LLC (Broderick); reviewing a structural evaluation report for the project prepared by Broderick, dated October 31, 2017; and performing a visual condition survey, a floor elevation survey, a field exploration program, laboratory analyses and geotechnical engineering evaluation, analysis and recommendations. The geotechnical opinions and recommendations presented herein consist of monitoring of building movement, surface drainage and potential building remediation measures. We would be pleased to discuss with you any additional recommendations you may require.

This firm should be notified for additional evaluation and recommendations should the project conditions change (degree and extent of distress, rate of movement) or differ from those presented herein.

PROJECT DESCRIPTION

We understand from our discussions and document reviews that the buildings are 30 to 40 years old. The buildings have been exhibiting distress in the form of cracks in walls and concrete slabs-on-grade. Broderick has completed a structural analysis of the buildings and the site, the results of which are presented in a report titled "Faras Elementary", dated October 31, 2017.

SITE AND BUILDING CONDITIONS

The Faras Elementary School site is located at 410 West Fir Avenue, in Pirtleville, Arizona. The buildings are located in the southern portion of the school campus. The site is relatively flat. Asphalt concrete paved parking areas are located east and west of the buildings. Concrete sidewalks are located along and adjacent to the east and west sides of the northern building and along and adjacent to the south side of the north building and the north side of the south building. Landscaped areas are located on the north side of the north building and the south, west and east sides of the south building and between the buildings (courtyard).

A visual condition survey of the interior and exterior of the buildings was performed by a field technician with our firm on January 3, 2018. The buildings, 30 to 40 years old, are of masonry construction with parapet walls, steel truss roof joists and concrete slab-on-grade, vinyl tile

surfaced floors. Rest rooms located in the east end of the north building have ceramic tile surfaced floors. Each building roof extends over the courtyard side sidewalks of the buildings. Entryway wing walls are located at each end of the courtyard side of the buildings. Downspouts are located along the north side of the north building and the south side of the south building and drain into the landscaped area adjacent to the buildings.

Distress in the form of cracks in the exterior and interior walls and in the floors were observed in both buildings. The exterior wall cracks were located along the east wingwall end of the north and south buildings and along the west wingwall and the south face near the southwest corner of the south building. Interior wall cracks were observed along the north wall near the west end of the north building and the west end and above a doorway on the north side near the midpoint of the south building. The cracks were generally $^{1}/_{16}$ to ½ inches wide and typically exhibited a linear to stair-stepped pattern with little to no apparent horizontal displacement across the cracks. The cracks in the concrete slab-on-grade floors were located along the east-west axis of both buildings and extended the full length of each building. Each building had numerous north-south, generally evenly spaced cracks. The north-south cracking extended across the full length of the building predominantly in the south building. The cracks were generally ⅛ to $^{5}/_{16}$ inches in width with no apparent to some vertical displacement. Sounding of the floor slabs with a 16-ounce hammer on both sides of the cracks indicated possible voids beneath the slab, typically within 6 to 18 inches interior of the crack.

FIELD EXPLORATIONS

Test Borings:

Subsurface conditions at the site were explored by drilling and/or hand excavating five test borings to depths of 5.6 to 15.0 feet in the areas exterior of both buildings and hand excavating ten test borings to depths of 0.9 to 5.0 feet in the interior of both buildings, as shown on the Exterior and Interior Site Plans in Appendix A. The test borings were drilled with a CME 75 drill rig using 7-inch diameter, hollow-stem augers and/or excavated with a hand auger. The drilling equipment and crew were provided by Wildcat Drilling, Inc. (Wildcat). The test boring locations were determined in the field by a project engineer from our firm. Interior test boring locations were based on discussions with Broderick. The concrete slab-on-grade was cored at interior test boring locations using an 8-inch diameter diamond core barrel and an electric core drill. The coring equipment was provided by Penhall Company. A field technician from our firm directed the drill

and concrete coring crew. During the field explorations, representative disturbed and undisturbed samples were obtained, the test borings logged and soils field classified by our field technician. The relatively undisturbed samples (ring samples) were obtained by driving a 3-inch diameter, ring-lined, open-end sampler into the soil with a 140-pound hammer dropping 30 inches (drill rig) or with a 36-pound slide hammer manually thrown down an 18-inch long vertical rod (hand auger). In addition to drilling and sampling, continuous penetration testing using a 2-inch diameter rod and the 140-pound hammer dropping 30 inches was performed and extended to a depth of 7 feet adjacent to Test Borings 11 and 14, located in exterior areas. The results of the field explorations are presented on the Test Boring Logs in Appendix A.

Relative Floor Elevation Survey:

A relative floor elevation surveys were performed to measure concrete slab-on-grade elevation differences within the interior portion of the buildings. The surveys were performed by a field technician with our firm and an assistant from Wildcat using a Pro-Level manometer provided by our firm. The relative elevation of each survey point is recorded onto a floor plan, the lowest elevation survey point determined and the relative elevation difference between each survey point and the lowest survey point is recorded onto a floor plan. The results of the relative floor elevation survey are presented on the Floor Elevation Survey in Appendix A.

LABORATORY ANALYSIS

Representative samples obtained during the field exploration were subjected to the following tests in our laboratory.

Type of Test	Type of Sample	Number of Samples Tested
Compression	Undisturbed	2
Percent Expansion	Undisturbed	2
Percent Expansion	Remolded	2
Percent Passing No. 200 Sieve and Atterberg Limits	Representative	2
Maximum Density–Optimum Moisture Determination	Representative	2
Moisture Content/Dry Density *	Undisturbed	25

* Reported in the Test Boring Logs

The results of the laboratory tests are presented in Appendix B.

SUBSURFACE CONDITIONS

The subsurface conditions encountered at the test boring locations were variable. The results of the test borings are presented in Appendix A in the Test Boring Logs. Test Borings 1 through 10, located in the interior of the building, encountered 3.25 to 4.75 inches of Portland cement concrete overlying 1.0 to 20.0 inches of base material. Tool formed or saw cut control joints to depths of 0.5 to 0.75 inches were observed in concrete cores over crack locations. Voids were not observed beneath the slabs. Test Borings 11, 12, 13 and 14, located in paved areas, encountered 3.0 to 4.0 inches of asphalt concrete over 0 inches of base material. Fill consisting of clayey sand to sandy clay containing trace amounts of gravel was encountered to depths of 0.9 to 3.8 feet in the interior Test Borings 1 through 5 and to depths of 3.0 feet in the exterior Test Borings 11, 12 and 13. The fill soils were medium dense to dense, were stiff to very stiff and had medium plasticity. Underlying the fill soils in the exterior Test Borings 11, 12 and 13 and underlying the concrete slab in the interior Test Borings 5 through 10 and encountered in the exterior Test Borings 14 and 15, and extending to depths of 5.0 to 15.0 feet, clayey sand to sandy clay containing trace amounts of gravel was encountered. These soils were medium dense to dense, were stiff to very stiff and had medium plasticity. Refusal to hand auger penetration occurred in the fill soils at depths of 0.9 to 3.8 feet, the maximum depths of exploration, in Test Borings 1 through 5. Refusal to hand auger penetration occurred in the clayey sand to sandy clay soils at depths of 3.8 to 5.6 feet, the maximum depths of exploration in Test Borings 6, 8 and 15. The maximum depth of exploration of the interior test borings was 5.0 feet and 15.0 feet for the exterior borings. Soil moisture contents were described as slightly damp to damp in the fill soils and damp to moist in the clayey sand to sandy clay native soils. No groundwater was observed in the test boring during the drilling operations.

DISCUSSION OF TEST RESULTS

Remolded samples of the surface and near surface native site soils exhibited moderate swell potentials following wetting when tested in the laboratory. Undisturbed samples from near foundation grades underwent some compression during loading to approximate foundation loads. Upon wetting at approximate foundation loads the soils underwent some compression. Undisturbed samples from slab-grade underwent slight expansion or compression when wetted under slab load.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions:

The fill and native site soils encountered at floor subgrade depths underwent slight expansion or compression when wetted under approximate slab loads and exhibited moderate expansion potentials when remolded and wetted under slab load. The native site soils encountered at likely foundation depth underwent come compression when wetted under approximate foundation loads Soil moisture contents in the soils underlying the floor slab were generally slightly damp to damp. The results of the floor elevation survey indicate relative floor elevation differences between the lowest and highest areas of the buildings in the range of 1.0 to 2.0 inches in the north building and 1.7 to 3.0 inches. The floor cracking is relatively uniform with respect to spacing and alignment and appear to be generally along control joints. The wall cracking is somewhat limited with respect to extent and frequency.

Based on our understanding of the project and the results of our visual observations, field exploration and laboratory testing, it is our opinion within a reasonable degree of engineering certainty that the observed slab distress is attributable to insufficient depth of control joints and the observed wall distress is attributable to some differential movement of the foundation soils. The insufficient depth of control joints has caused a loss of aggregate interlock at the control joints and some slab curling appears to have occurred as evidenced by the sounding results. The depth of control joints should be ½ to ⅓ the thickness of the slab. The differential movement is likely due to moisture infiltration into the soils due to poor drainage and potentially expansive site soils.

Recommendations:

The degree of distress is not of geotechnical significance with respect to the floor slab and building foundations and walls at present. It is likely that the distress can be repaired at this time with little risk of future extensive repairs. The following remediation is recommended:

1. Repair the floor slab cracks with a flexible seal. Floor cracks with vertical deflection should be leveled by grinding or floating. Masonry wall cracks should be sealed with a flexible seal and patched. Repairs should be performed by a contractor experienced in floor and wall repairs.

2. Visual monitoring of the floors and walls for evidence of continued movement.

3. Direct roof runoff away from the exterior of the buildings by regrading and redirecting the downspouts. Runoff should be directed to at least 10 feet away from the exterior of the buildings.

4. Reduce irrigation along the buildings.

APPENDIX A
FIELD EXPLORATIONS

Ref: Cochise County Recorder Web Site
https://www.cochise.az.gov/GIS/Recorder/CcRecorderSubSurvey.html

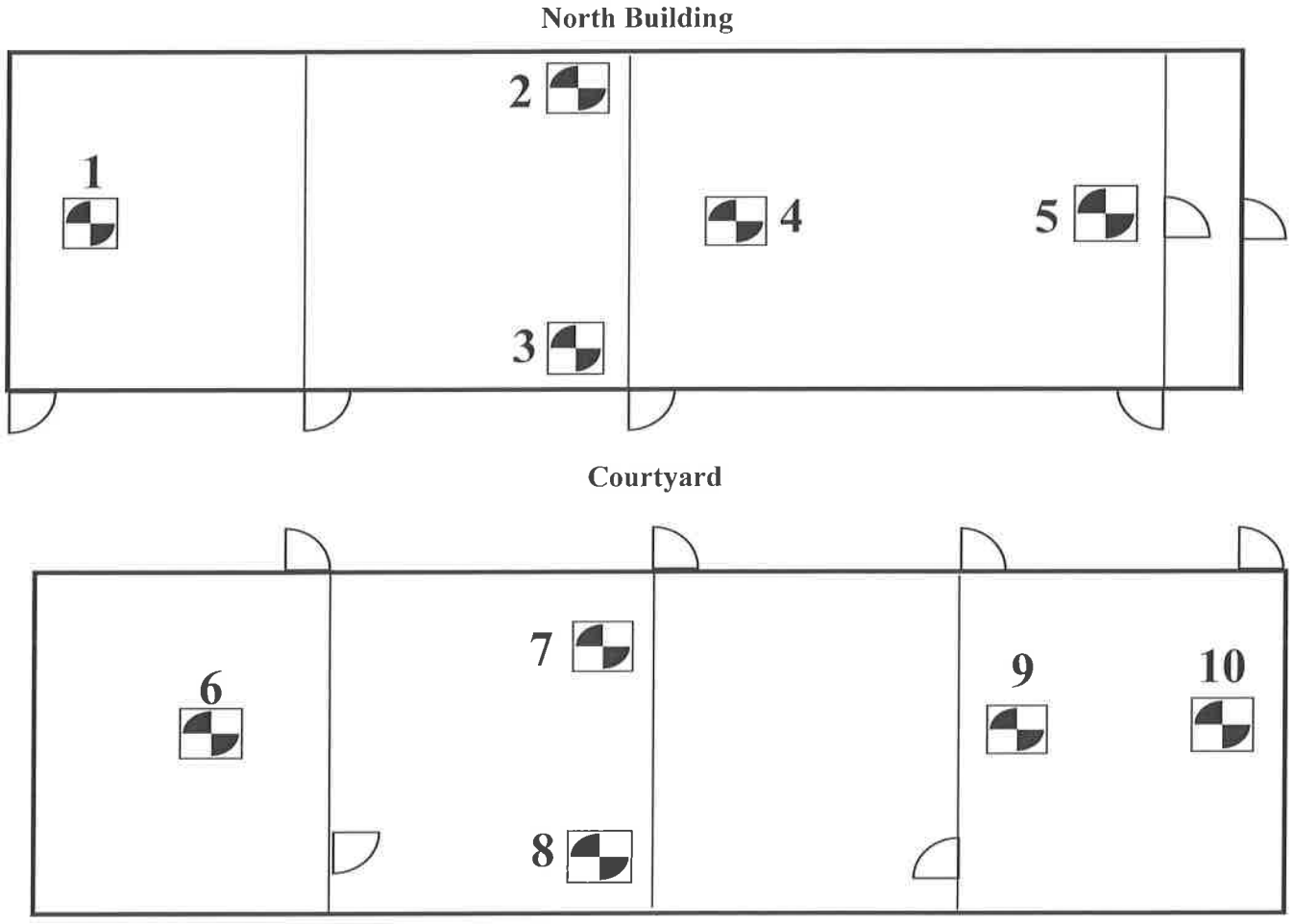
Note: Site Address - 410 West Fir Avenue, Douglas, Arizona.

N

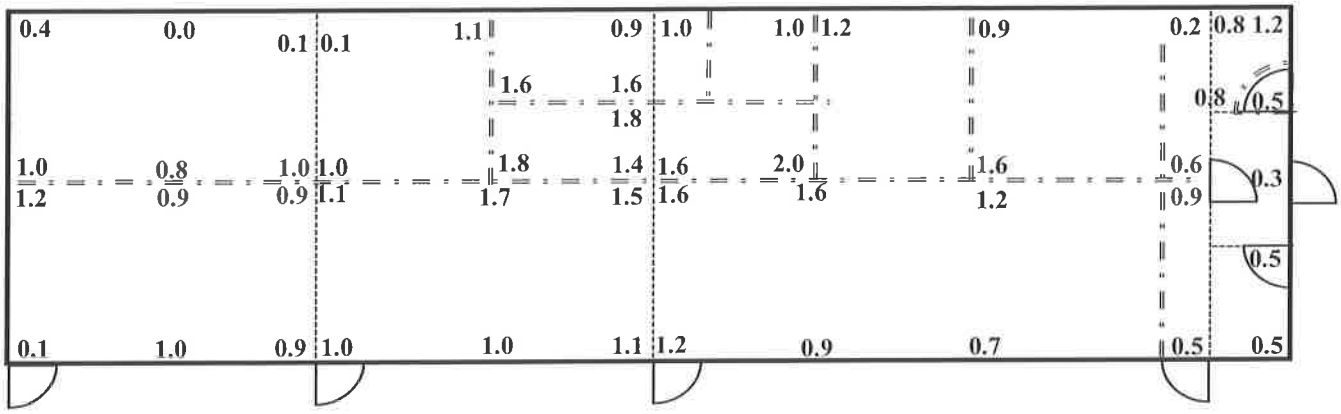
Exterior Test Boring Location

Not To Scale

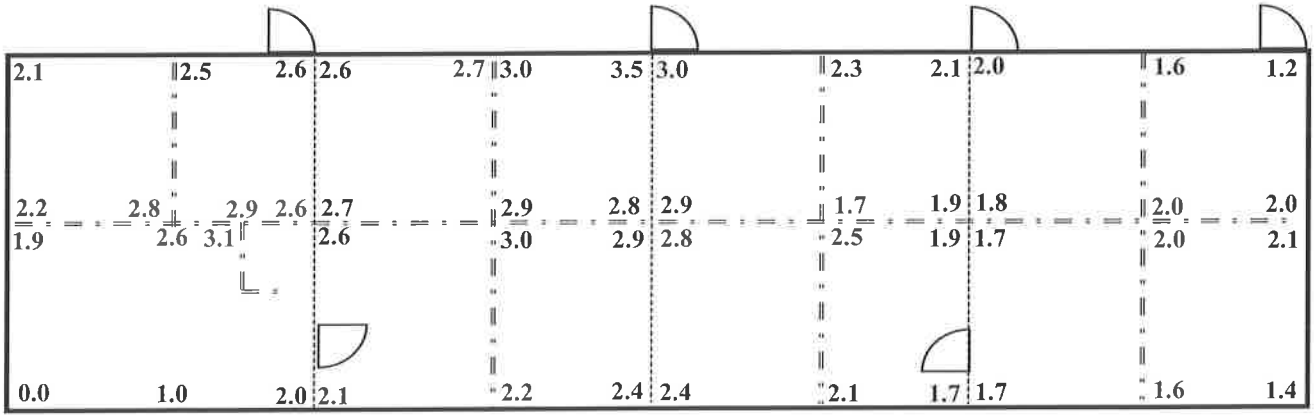
SITE PLAN


North Building
1
2
3
4
5
Courtyard
6
7
8
9
10
South Building
N
Interior Test Boring Location
Not To Scale
SITE PLAN

North Building



Courtyard



South Building

Slab Distress

Doorway

Interior Wall

Interior Test Boring Location

Floor Elevation Survey Point
Elevation Difference (inches) 0.1
(From Lowest Point = 0)

N

Not To Scale

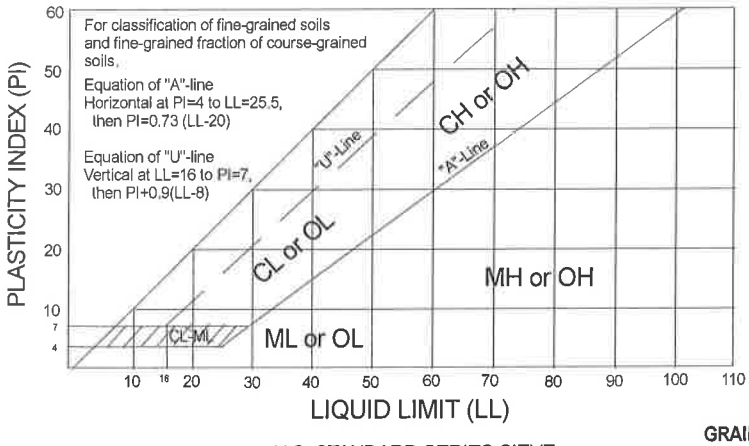
SITE PLAN

LEGEND

CLASSIFICATION OF SOILS

ASTM Designation: D2487-11
(Based on Unified Soil Classification System)

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests					Soil Classification: Group Symbol	Soil Classification: Name
COARSE-GRAINED SOILS More than 50% retained on No. 200 Sieve	Gravels More than 50% coarse fraction retained on No. 4 Sieve	Clean Gravels Less than 5% fines	Cu >4 and 1 <Cc <3		GW	Well graded gravel
			Cu<4 and/or 1>Cc>3		GP	Poorly graded gravel
		Gravels with Fines More than 12% fines	Fines classify as ML or MH		GM	Silty gravel
			Fines classify as CL or CH		GC	Clayey gravel
	Sands 50% or more of coarse fraction passes No. 4 sieve	Clean Sands Less than 5% fines	Cu >6 and 1 <Cc <3		SW	Well-graded sand
			Cu<6 and/or 1>Cc>3		SP	Poorly graded sand
		Sands with Fines More than 12% fines	Fines classify as ML or MH		SM	Silty sand
			Fines classify as CL or CH		SC	Clayey sand
FINE-GRAINED SOILS 50% or more passes the No. 200 Sieve	Silts and Clays Liquid limit less than 50	Inorganic	PI>7 and plots on or above "A" line		CL	Lean clay
			PI<4 or plots below "A" line		ML	Silt
		Organic	Liquid Limit - oven dried / Liquid limit - not dried	<0.75	OL	Organic clay / Organic silt
	Silts and Clays Liquid limit 50 or more	Inorganic	PI plots on or above "A" line		CH	Fat clay
			PI plots below "A" line		MH	Elastic silt
		Organic	Liquid limit - oven dried / Liquid limit - not dried	<0.75	OH	Organic clay / Organic silt
HIGHLY ORGANIC SOILS	Primarily organic matter, dark in color, and organic odor				PT	Peat



TEST BORING LOG DEFINITIONS

Blows per foot using 30 pound hammer with approximately 18 inch free-fall.

Depth, feet	Blows/Foot: C	Blows/Foot: N/R	Sample Type	Dry Density pcf	Water Content, %	Unified Classification	Description

C = Continuous Penetration Resistance (2 inch diameter rod)
N = Standard Penetration Resistance (ASTM D1586)
R = Penetration Resistance (3 inch diameter ring line sampler)

GRAIN SIZES

U.S. STANDARD SERIES SIEVE: 200 | 40 | 10 | 4
CLEAR SQUARE SIEVE OPENINGS: 3/4" | 3" | 12"

SILTS & CLAYS DISTINGUISHED ON BASIS OF PLASTICITY	SAND			GRAVEL		COBBLES	BOULDERS
	FINE	MEDIUM	COARSE	FINE	COARSE		

MOISTURE CONDITION (INCREASING MOISTURE ▶)

DRY | SLIGHTLY DAMP | DAMP | MOIST (Plastic Limit) | VERY MOIST | WET (SATURATED) (Liquid Limit)

CONSISTENCY CORRELATION	
CLAYS & SILTS	BLOWS/FOOT*
VERY SOFT	0-2
SOFT	2-4
FIRM	4-8
STIFF	8-16
VERY STIFF	16-32
HARD	OVER 32

RELATIVE DENSITY CORRELATION	
SANDS & GRAVELS	BLOWS/FOOT*
VERY LOOSE	0-4
LOOSE	4-10
MEDIUM DENSE	10-30
DENSE	30-50
VERY DENSE	OVER 50

*Number of blows of 140 lb hammer falling 30" to drive a 2" O.D. (1-3/8" I.D.) split-spoon sampler (ASTM D1586).

TEST BORING LOG

Project: Faras Elem. School-Distress Evaluation – Pirtleville, Arizona Test Boring: 1

Elevation: Not Determined Datum: --- Date: 1-3-18

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density, pcf	Water Content, %	Unified Classification	Description
		100/5"	R	91	7		4.0" Concrete on 3.0" Aggregate Base
						SC/ CL	FILL: Clayey Sand to Sandy Clay, Trace Gravel; brown, slightly damp to damp, medium dense to dense, stiff to very stiff, medium plasticity.
5							Refusal to hand auger penetration at 0.9 feet. No groundwater observed.
10							
15							
20							
25							

This boring log represents the conditions encountered on the date of drilling at this particular location. No other warranty is expressed or implied to the actual conditions which may exist within the vicinity of this boring location.

TEST BORING LOG

Project: Faras Elem. School-Distress Evaluation – Pirtleville, Arizona Test Boring: 2

Elevation: Not Determined Datum: --- Date: 1-3-18

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density, pcf	Water Content, %	Unified Classification	Description
							3.75" Concrete on 1.5" Aggregate Base
		100/7"	R	107	7	SC/ CL	FILL: Clayey Sand to Sandy Clay, Trace Gravel; brown, slightly damp to damp, medium dense to dense, stiff to very stiff, medium plasticity.
5							Refusal to hand auger penetration at 1.1 feet. No groundwater observed.
10							
15							
20							
25							

This boring log represents the conditions encountered on the date of drilling at this particular location. No other warranty is expressed or implied to the actual conditions which may exist within the vicinity of this boring location.

TEST BORING LOG

Project: Faras Elem. School-Distress Evaluation – Pirtleville, Arizona Test Boring: 3

Elevation: Not Determined Datum: --- Date: 1-3-18

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density, pcf	Water Content, %	Unified Classification	Description
		100/4"	R	106	6		4.75" Concrete on 1.0" Aggregate Base
						SC/ CL	FILL: Clayey Sand to Sandy Clay, Trace Gravel; brown, slightly damp to damp, medium dense to dense, stiff to very stiff, medium plasticity.
5							Refusal to hand auger penetration at 0.9 feet. No groundwater observed.
10							
15							
20							
25							

This boring log represents the conditions encountered on the date of drilling at this particular location. No other warranty is expressed or implied to the actual conditions which may exist within the vicinity of this boring location.

TEST BORING LOG

Project: Faras Elem. School-Distress Evaluation – Pirtleville, Arizona Test Boring: 4

Elevation: Not Determined Datum: --- Date: 1-3-18

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density, pcf	Water Content, %	Unified Classification	Description
							4.5" Concrete on 2.0" Aggregate Base
		100/10"	R	111	7	SC/ CL	FILL: Clayey Sand to Sandy Clay, Trace Gravel; brown, slightly damp to damp, medium dense to dense, stiff to very stiff, medium plasticity.
5							Refusal to hand auger penetration at 3.8 feet. No groundwater observed.
10							
15							
20							
25							

This boring log represents the conditions encountered on the date of drilling at this particular location. No other warranty is expressed or implied to the actual conditions which may exist within the vicinity of this boring location.

TEST BORING LOG

Project: Faras Elem. School-Distress Evaluation – Pirtleville, Arizona Test Boring: 5

Elevation: Not Determined Datum: --- Date: 1-3-18

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density, pcf	Water Content, %	Unified Classification	Description
							4.75" Concrete on 1.0" Aggregate Base
		100/9"	R	105	7	SC/ CL	FILL: Clayey Sand to Sandy Clay, Trace Gravel; brown, slightly damp to damp, medium dense to dense, stiff to very stiff, medium plasticity.
5							Refusal to hand auger penetration at 1.4 feet. No groundwater observed.
10							
15							
20							
25							

This boring log represents the conditions encountered on the date of drilling at this particular location. No other warranty is expressed or implied to the actual conditions which may exist within the vicinity of this boring location.

TEST BORING LOG

Project: Faras Elem. School-Distress Evaluation – Pirtleville, Arizona Test Boring: 6

Elevation: Not Determined Datum: --- Date: 1-3-18

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density, pcf	Water Content, %	Unified Classification	Description
							3.25" Concrete on 20" Aggregate Base
		73	R	101	13	SC/ CL	Clayey Sand to Sandy Clay, Trace Gravel; brown, damp to moist, medium dense to dense, stiff to very stiff, medium plasticity.
5							Refusal to hand auger penetration at 4.3 feet. No groundwater observed.
10							
15							
20							
25							

This boring log represents the conditions encountered on the date of drilling at this particular location. No other warranty is expressed or implied to the actual conditions which may exist within the vicinity of this boring location.

TEST BORING LOG

Project: Faras Elem. School-Distress Evaluation – Pirtleville, Arizona Test Boring: 7

Elevation: Not Determined Datum: --- Date: 1-3-18

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density, pcf	Water Content, %	Unified Classification	Description
							3.75" Concrete on 18" Aggregate Base
		27	R	95	8	SC/ CL	Clayey Sand to Sandy Clay, Trace Gravel; brown, damp to moist, medium dense to dense, stiff to very stiff, medium plasticity.
5							Stopped hand auger excavation at 5 feet. No groundwater observed.
10							
15							
20							
25							

This boring log represents the conditions encountered on the date of drilling at this particular location. No other warranty is expressed or implied to the actual conditions which may exist within the vicinity of this boring location.

TEST BORING LOG

Project: Faras Elem. School-Distress Evaluation – Pirtleville, Arizona Test Boring: 8

Elevation: Not Determined Datum: --- Date: 1-3-18

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density, pcf	Water Content, %	Unified Classification	Description
							3.5" Concrete on 16" Aggregate Base
		75	R	108	12	SC/ CL	Clayey Sand to Sandy Clay, Trace Gravel; brown, damp to moist, medium dense to dense, stiff to very stiff, medium plasticity.
5							Refusal to hand auger penetration at 3.8 feet. No groundwater observed.
10							
15							
20							
25							

This boring log represents the conditions encountered on the date of drilling at this particular location. No other warranty is expressed or implied to the actual conditions which may exist within the vicinity of this boring location.

TEST BORING LOG

Project: Faras Elem. School-Distress Evaluation – Pirtleville, Arizona Test Boring: 9

Elevation: Not Determined Datum: --- Date: 1-3-18

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density, pcf	Water Content, %	Unified Classification	Description
		20	R	110	3		3.25" Concrete on 16" Aggregate Base
		54	R	109	13	SC/ CL	Clayey Sand to Sandy Clay, Trace Gravel; brown, damp to moist, medium dense to dense, stiff to very stiff, medium plasticity.
5							Stopped hand auger excavation at 5 feet. No groundwater observed.
10							
15							
20							
25							

This boring log represents the conditions encountered on the date of drilling at this particular location. No other warranty is expressed or implied to the actual conditions which may exist within the vicinity of this boring location.

TEST BORING LOG

Project: Faras Elem. School-Distress Evaluation – Pirtleville, Arizona Test Boring: 10

Elevation: Not Determined Datum: --- Date: 1-3-18

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density, pcf	Water Content, %	Unified Classification	Description
							4.5" Concrete on 11.5" Aggregate Base
		81	R	106	9	SC/ CL	Clayey Sand to Sandy Clay, Trace Gravel; brown, damp to moist, medium dense to dense, stiff to very stiff, medium plasticity.
5							Stopped hand auger excavation at 5 feet. No groundwater observed.
10							
15							
20							
25							

This boring log represents the conditions encountered on the date of drilling at this particular location. No other warranty is expressed or implied to the actual conditions which may exist within the vicinity of this boring location.

TEST BORING LOG

Project: Faras Elem. School-Distress Evaluation – Pirtleville, Arizona Test Boring: 11

Elevation: Not Determined Datum: --- Date: 1-2-18

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density, pcf	Water Content, %	Unified Classification	Description
							3.0" Asphalt Concrete
	21					SC/	FILL: Clayey Sand to Sandy Clay, Trace
	12	19	R	109	18	CL	Gravel; brown, slightly damp to damp,
	9						medium dense to dense, stiff to very
	17						stiff, medium plasticity.
5	30						5
	32	16	R	112	16	SC/	Clayey Sand to Sandy Clay, Trace Gravel;
	38					CL	brown, damp to moist, medium dense to
							dense, stiff to very stiff, medium plasticity.
10		45	R	117	14		10
15							15
							Stopped drilling at 15 feet with CME 75 drill rig.
							No groundwater observed.
20							20
25							25

This boring log represents the conditions encountered on the date of drilling at this particular location. No other warranty is expressed or implied to the actual conditions which may exist within the vicinity of this boring location.

TEST BORING LOG

Project: Faras Elem. School-Distress Evaluation – Pirtleville, Arizona Test Boring: 12

Elevation: Not Determined Datum: --- Date: 1-2-18

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density, pcf	Water Content, %	Unified Classification	Description
							4.0" Asphalt Concrete
		19	R	104	10	SC/CL	FILL: Clayey Sand to Sandy Clay, Trace Gravel; brown, slightly damp to damp, medium dense to dense, stiff to very stiff, medium plasticity.
5		41	R	121	7	SC/CL	Clayey Sand to Sandy Clay, Trace Gravel; brown, damp to moist, medium dense to dense, stiff to very stiff, medium plasticity.
10		50/7"	R	110	12		
15							Stopped drilling at 15 feet with CME 75 drill rig. No groundwater observed.
20							
25							

This boring log represents the conditions encountered on the date of drilling at this particular location. No other warranty is expressed or implied to the actual conditions which may exist within the vicinity of this boring location.

TEST BORING LOG

Project: Faras Elem. School-Distress Evaluation – Pirtleville, Arizona Test Boring: 13

Elevation: Not Determined Datum: --- Date: 1-2-18

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density, pcf	Water Content, %	Unified Classification	Description
							4.0" Asphalt Concrete
		36	R	110	12	SC/ CL	FILL: Clayey Sand to Sandy Clay, Trace Gravel; brown, slightly damp to damp, medium dense to dense, stiff to very stiff, medium plasticity.
5		42	R	119	11	SC/ CL	Clayey Sand to Sandy Clay, Trace Gravel; brown, damp to moist, medium dense to dense, stiff to very stiff, medium plasticity.
10		50/9"	R	119	11		
15							Stopped drilling at 15 feet with CME 75 drill rig. No groundwater observed.
20							
25							

This boring log represents the conditions encountered on the date of drilling at this particular location. No other warranty is expressed or implied to the actual conditions which may exist within the vicinity of this boring location.

TEST BORING LOG

Project: Faras Elem. School-Distress Evaluation – Pirtleville, Arizona Test Boring: 14

Elevation: Not Determined Datum: --- Date: 1-2-18

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density, pcf	Water Content, %	Unified Classification	Description
							3.0" Asphalt Concrete
	12					SC/	Clayey Sand to Sandy Clay, Trace Gravel;
	4	18	R	113	13	CL	brown, damp to moist, medium dense to
	4						dense, stiff to very stiff, medium plasticity.
	6						
5	11						5
	17	28	R	110	10		
	32						
10							10
		50/10"	R	119	12		
15							15
							Stopped drilling at 15 feet with CME 75 drill rig.
							No groundwater observed.
20							20
25							25

This boring log represents the conditions encountered on the date of drilling at this particular location. No other warranty is expressed or implied to the actual conditions which may exist within the vicinity of this boring location.

TEST BORING LOG

Project: Faras Elem. School-Distress Evaluation – Pirtleville, Arizona Test Boring: 15

Elevation: Not Determined Datum: --- Date: 1-3-18

Depth, feet	Blows/Foot C	Blows/Foot N/R	Sample Type	Dry Density, pcf	Water Content, %	Unified Classification	Description
		32	R	101	16	SC/ CL	Clayey Sand to Sandy Clay, Trace Gravel; brown, damp to moist, medium dense to dense, stiff to very stiff, medium plasticity.
5		100/7"	R	98	9		
							Refusal to hand auger penetration at 5.6 feet. No groundwater observed.
10							
15							
20							
25							

This boring log represents the conditions encountered on the date of drilling at this particular location. No other warranty is expressed or implied to the actual conditions which may exist within the vicinity of this boring location.

APPENDIX B
LABORATORY ANALYSIS

R·A·M·M

LABORATORY TEST RESULTS

Date: 17-Jan-18

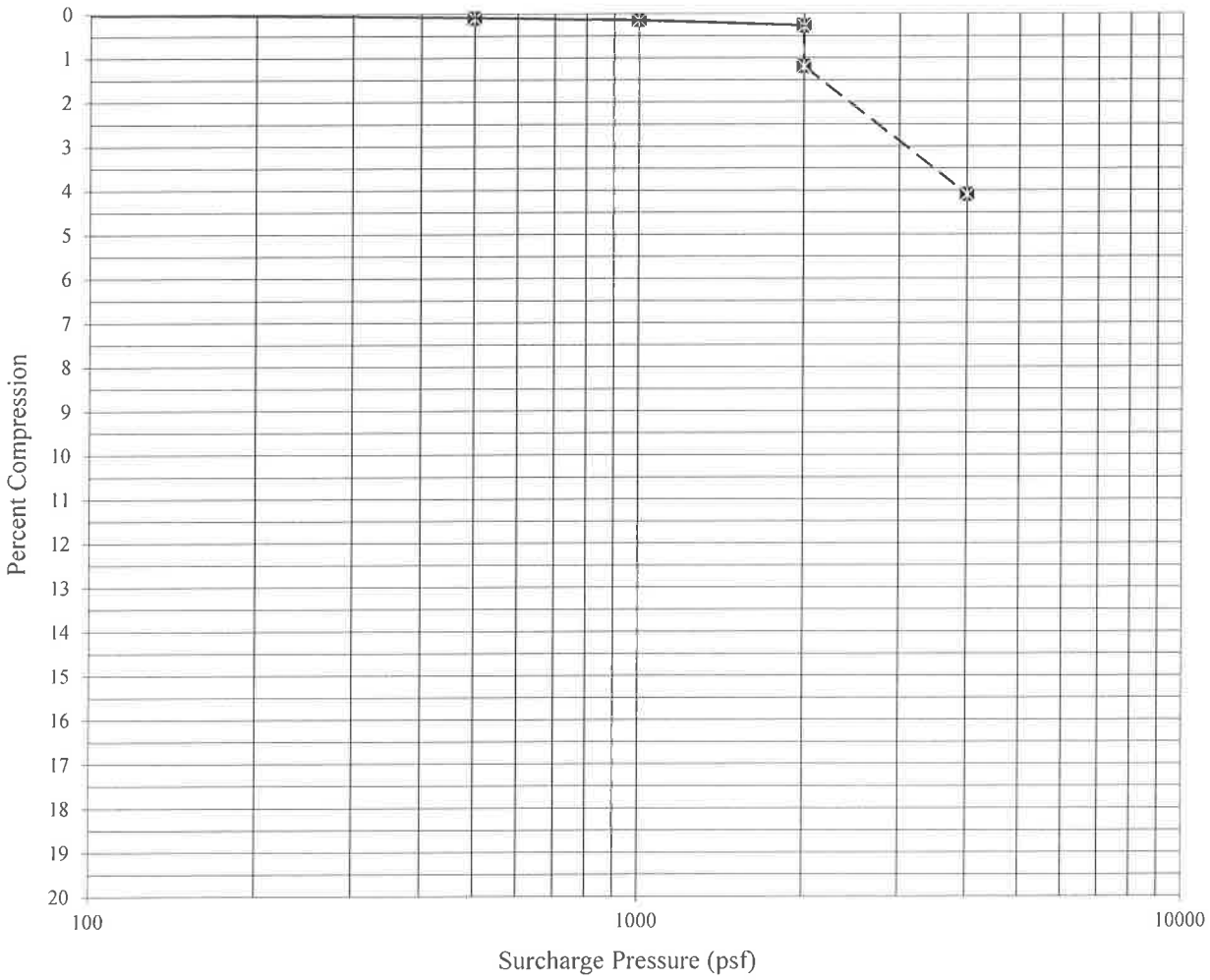
SAMPLE SOURCE: 12 @ 1.5'-2.5'

TESTING PERFORMED: Compression (ASTM D2435) - Driven Ring Sample

SAMPLED BY: RAMM/Durot

RESULTS:

Dry Density (pcf): 104 Moisture Content (%): 10



REMARKS: Sample submerged at 2000 psf.

LABORATORY TEST RESULTS

Date: 17-Jan-18

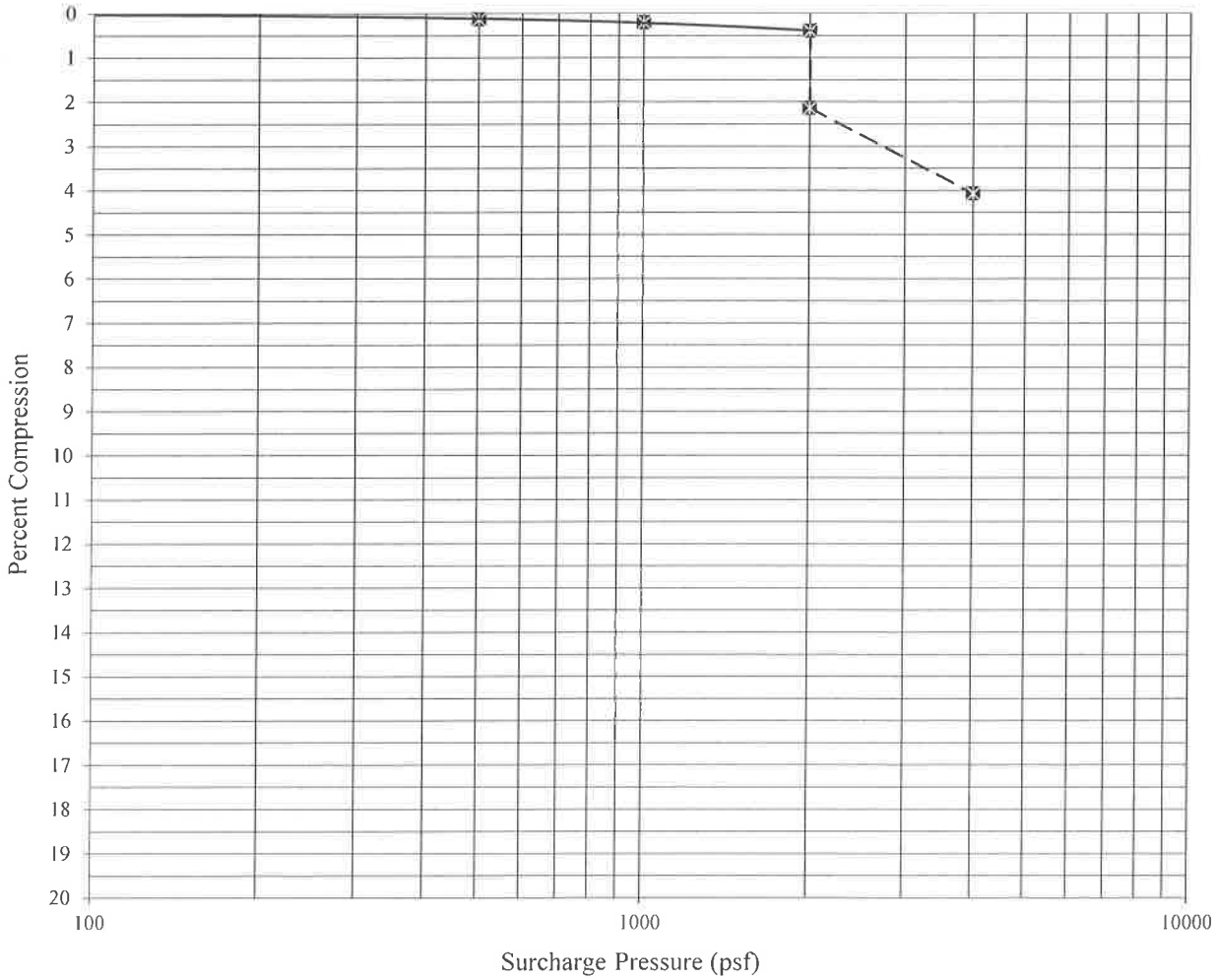
SAMPLE SOURCE: 13 @ 1.5'-2.5'

TESTING PERFORMED: Compression (ASTM D2435) - Driven Ring Sample

SAMPLED BY: RAMM/Durot

RESULTS:

Dry Density (pcf): 110 Moisture Content (%): 12



REMARKS: Sample submerged at 2000 psf.

LABORATORY TEST RESULTS

Date: 17-Jan-18

SAMPLE SOURCE: As noted below

TESTING PERFORMED: Percent Expansion (ASTM D4546) - Driven Ring Sample

SAMPLED BY: RAMM/Durot

RESULTS:

Sample Source	Percent Change*	Dry Density (pcf)	Moisture Content (%)
4 @ 7"-19"	+0.2	111	7
6 @ 2'-3'	-0.4	101	13

Remarks: + Percent Expansion; - Percent Compression

*Sample tested with a surcharge pressure of 100 psf.

LABORATORY TEST RESULTS

Date: 17-Jan-18

SAMPLE SOURCE: As noted below

TESTING PERFORMED: Percent Passing No. 200 Sieve, Atterberg Limits, Percent Expansion (ASTM D1140, D4318, D4546)

SAMPLED BY: RAMM/Durot

RESULTS:

Sample Source	Percent Retained No. 4 Sieve	Percent Passing No. 200 Sieve	Liquid Limit	Plasticity Index	Percent Expansion*	Remolded Dry Density (pcf)	Remolded Moisture Content (%)
11 @ 0'-3'	6	49	40	23	3.2	105	15
14 @ 0'-3'	8	52	33	19	3.6	110	11

* Based upon sample remolded to 95% of the laboratory maximum dry density at 2% below the estimated optimum moisture content, with a surcharge pressure of 100 psf.

LABORATORY TEST RESULTS

Date: 17-Jan-18

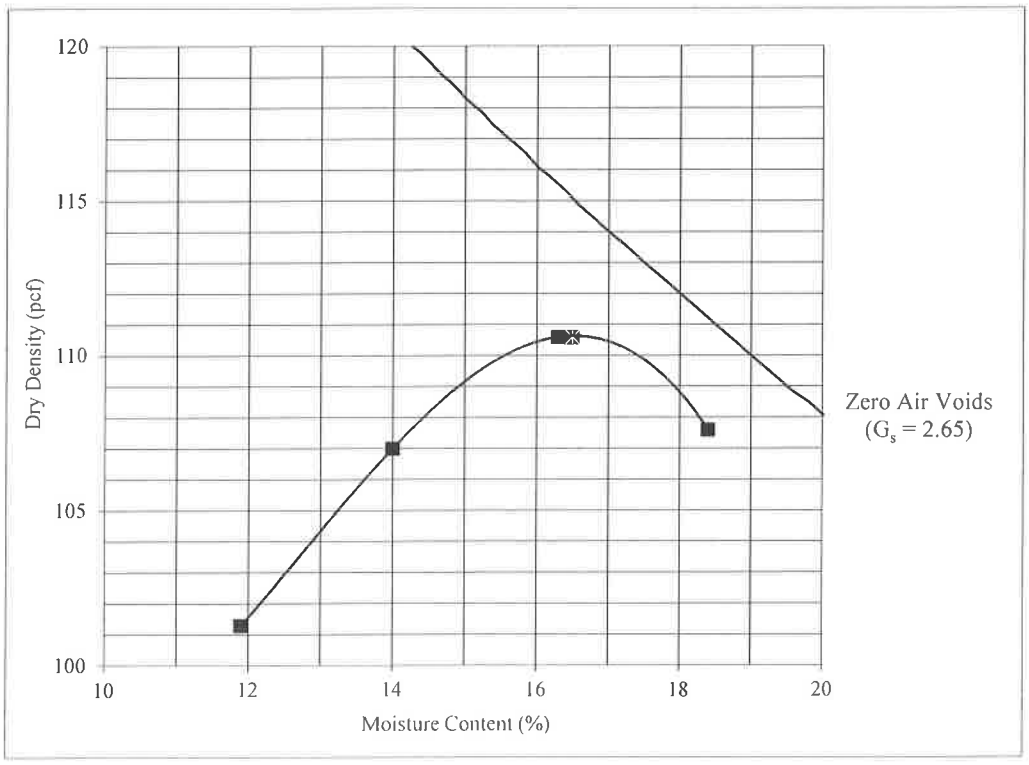
SAMPLE SOURCE: 11 @ 0'-3'

TESTING PERFORMED Maximum Density-Optimum Moisture Determination (ASTM D698 Method A)

SAMPLED BY: RAMM/Durot

RESULTS:

Maximum Density (pcf) = 110.6 Optimum Moisture (%) = 16.5



LABORATORY TEST RESULTS

Date: 17-Jan-18

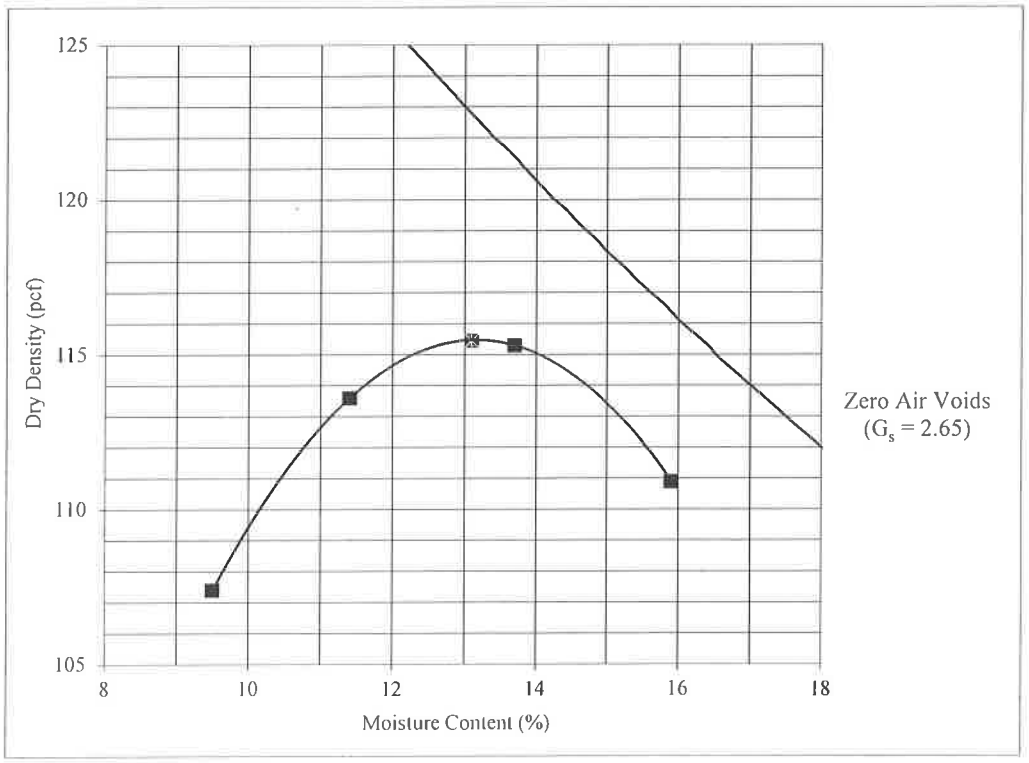
SAMPLE SOURCE: 14 @ 0'-3'

TESTING PERFORMED Maximum Density-Optimum Moisture Determination (ASTM D698 Method A)

SAMPLED BY: RAMM/Durot

RESULTS:

Maximum Density (pcf) = 115.5 Optimum Moisture (%) = 13.1



APPENDIX C
EXCERPTS
BRODERICK ENGINEERING LLC
STRUCTURAL ANALYSIS REPORT

BRODERICK
ENGINEERING
L.L.C.
Structural Engineering Consulting

October 31, 2017

Mr. Bob Polcar
Robert Polcar Architects
4226 N. 84th Place
Scottsdale, AZ 85251

Re: Faras Elementary - 410 W. Fir Avenue; Douglas, Arizona
BE#17293

Bob,

As requested, we have performed a structural analysis to determine the capability of the (2) existing classroom buildings to support re-roofing of their entire roof areas (approximately 4,800 S.F. each). Existing construction documents were not available, and our analysis is based on a visual investigation performed on October 12, 2017 in order to determine as-built conditions.

Building Description
The existing structures are both single story classroom buildings with exterior masonry parapet walls, and flat roofs sloping away from a center courtyard area between buildings. Roof framing at the north building consists of plywood roof sheathing over 16" deep prefabricated "I" joists at 24" o.c., spanning 28'-0" between steel beams (bearing on steel columns and cast-in-place concrete spread footings) and 8" masonry walls (bearing on cast-in-place concrete wall footings). Roof framing at the south building consists of 2x6 T&G decking, over 24" deep steel joists at 7'-0" o.c., spanning 31'-0" between an exterior beam and column line and exterior 8" masonry walls (bearing on cast-in-place concrete wall footings).

Existing Roof Loads
Per the attached structural calculations, the roof dead load equals 16psf and the roof live load equals 20psf for both of the existing buildings. Existing roof top mechanical units are assumed to weigh a maximum of 800lbs each.

New Reroofing Roof Loads
It is our understanding that the existing built-up roofing for both buildings will be

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3275 W. Ina Rd. #211 • Tucson, Arizona 85741 • 520.887.9416 • Fax 520.887.9486

removed and replaced with new roofing material that is either similar in weight or less in weight (2.5psf or less). This will result in similar roof loads as existing (16psf roof dead load and 20psf roof live load). If the new reroofing material weighs more than initially anticipated, and ends up weighing 4.0psf in lieu of 2.5psf, the roof dead load will still be within the 16psf loading criteria since a 1.5psf miscellaneous load has been factored into the roof dead load.

Structural Analysis

Structural calculations have been provided verifying the original design of the wood decking, wood joists, steel joists, steel beams, and steel columns and their ability to support the design loads.

Based on our analysis, the (2) existing classroom buildings are structurally adequate to support new reroofing material as long as the new reroofing process and material fits within the criteria previously specified; existing built-up roofing material is removed and new reroofing material does not weigh more than 4.0psf (total installed weight).

Noticeable Cracking

During our visual investigation, noticeable interior concrete slab-on-grade cracks and exterior masonry wall cracks were observed at both buildings. The slab cracks run full length in the east-west direction, at the middle of each building, and are most noticeable near the east and west exterior ends of each building (see pictures 1 & 2 of the north and south buildings respectively). Exterior wall cracks were observed at the east wall of the south building near the opening (see picture 3), at the south wall of the south building near the westernmost masonry control joint (see picture 4), at multiple locations along the west wall of the south building (see pictures 5 and 6), and at the east wall of the north building near the opening (see picture 7). Interior wall cracks were observed at the south end of the westernmost masonry partition wall of the south building (see picture 8), and near the middle of the westernmost steel stud partition wall of the north building (see picture 9).

Cracking Assessment

The cause of the cracks in both the slabs and the walls of these (2) existing classroom buildings is most likely a result of differential movement in the subgrade below the foundation. Foundation movement can occur when water infiltrates the underlying soil below a building. Depending on the characteristics of the soil, moisture within the soil can cause significant settlement in collapsible soils and significant swell and heaving in clayey soils. Significant settlement or

swell results in differential movement which can cause noticeable cracking within the elements of the building. The locations of the slab and wall cracks suggest that the differential movement could potentially be settlement of the east and west exterior portions of each building near the center courtyard area, or it could also be heaving of the east and west exterior portions of each building near their midspans (where the interior slab cracks are most noticeable).

It appears that positive drainage away from the exterior perimeter does not occur for both the north and south classroom buildings, which may be a contributing factor in allowing water to infiltrate the soils near building foundations. Downspouts and planters occur around the (3) non-courtyard sides of each building (see picture 10 of the north building and pictures 11 and 12 of the south building).

Recommendations for Cracking

Initial recommendations are to conduct a geotechnical investigation and a relative interior floor survey for each building in order to gather additional information. The geotechnical investigation can determine the existing soil conditions and the potential of the soil to either collapse or heave when subjected to moisture. It can also determine existing moisture content within the soil at different areas below and around the existing buildings. The interior floor surveys can determine locations and extents of either settlement or heaving experienced throughout each building.

Based on the findings from the geotechnical investigation and relative floor surveys, water infiltration near the perimeter of the buildings will most likely need to be mitigated by creating positive surface drainage away from the buildings; possibly by constructing new concrete slabs. Additionally, if it is determined that specific wall and footing locations of the buildings have experienced significant settlement, helical piers could be installed in order to help stabilize the existing foundations and jack up the settled building elements to a near level condition. Helical piers, if required, shall be designed by a licensed structural engineer.

Disclaimer

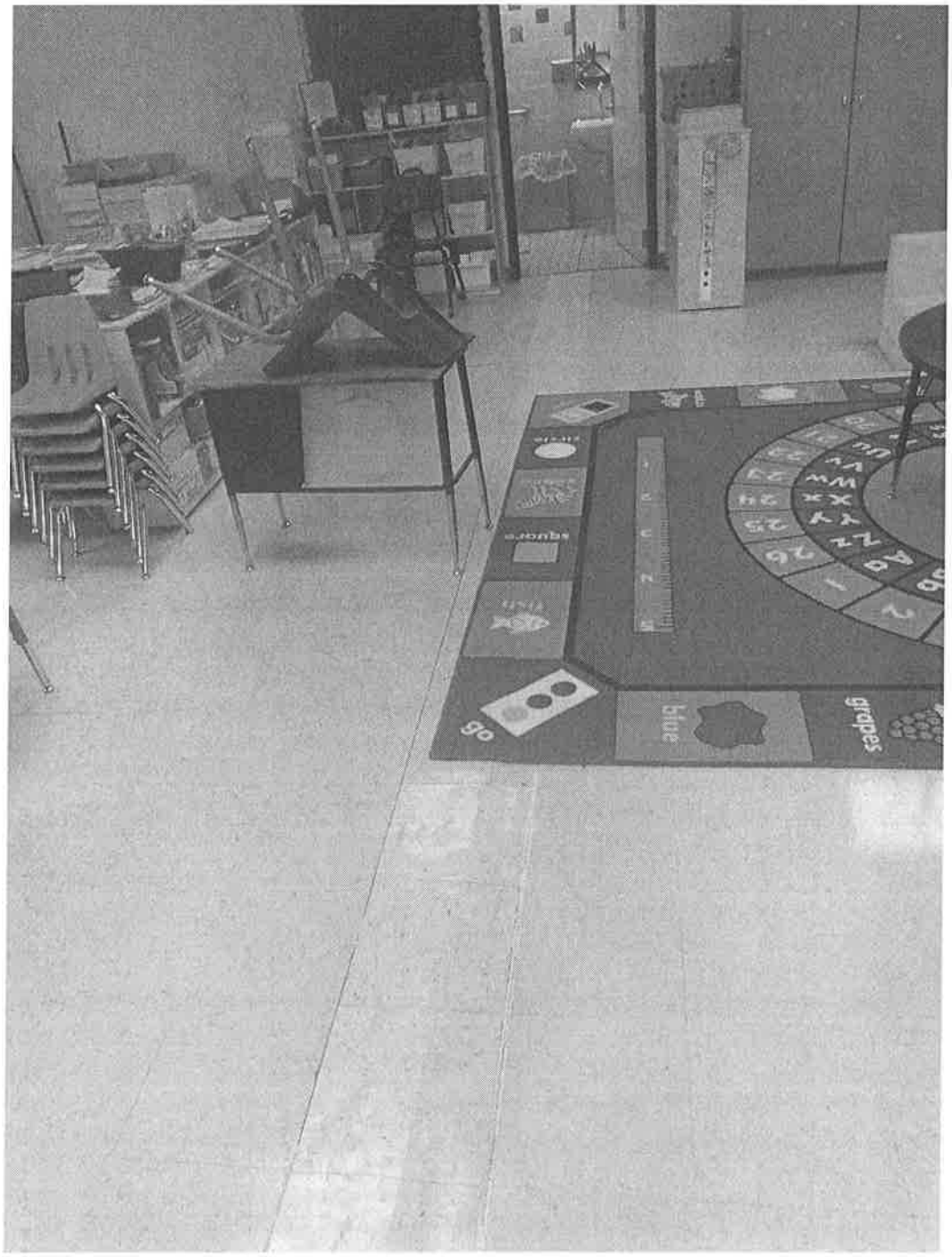
Broderick Engineering, LLC is not the original engineer of record for the existing structures, and did not inspect the structures for signs of distress other than those items mentioned in this report. As with any existing structure, the structural integrity cannot be warranted, and no warranty is given, either expressed or implied. The owner assumes the responsibility for correcting deficient items that are brought to their attention, and for performing any ongoing monitoring to

assure the structures are maintained, and signs of deterioration or distress are evaluated and corrected immediately as items occur. If existing building conditions vary from what is noted and referenced in this analysis, the contractor and/or owner shall notify the engineer of record.

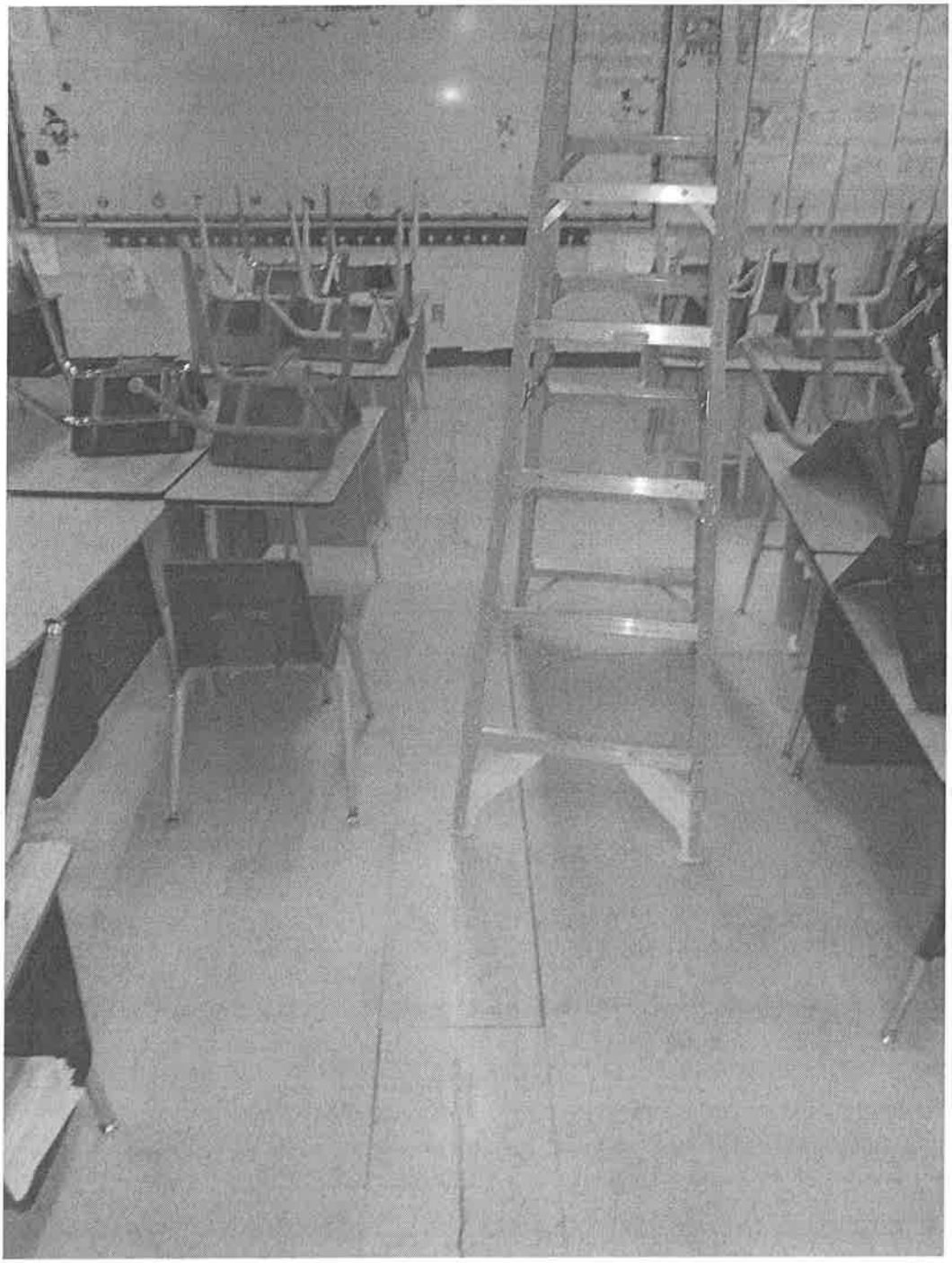
Sincerely,

Ryan Wendt, S.E., M.S.
Senior Engineer

Attachments: Pictures 1-12; Structural Calculations including Key Plan



Picture 1



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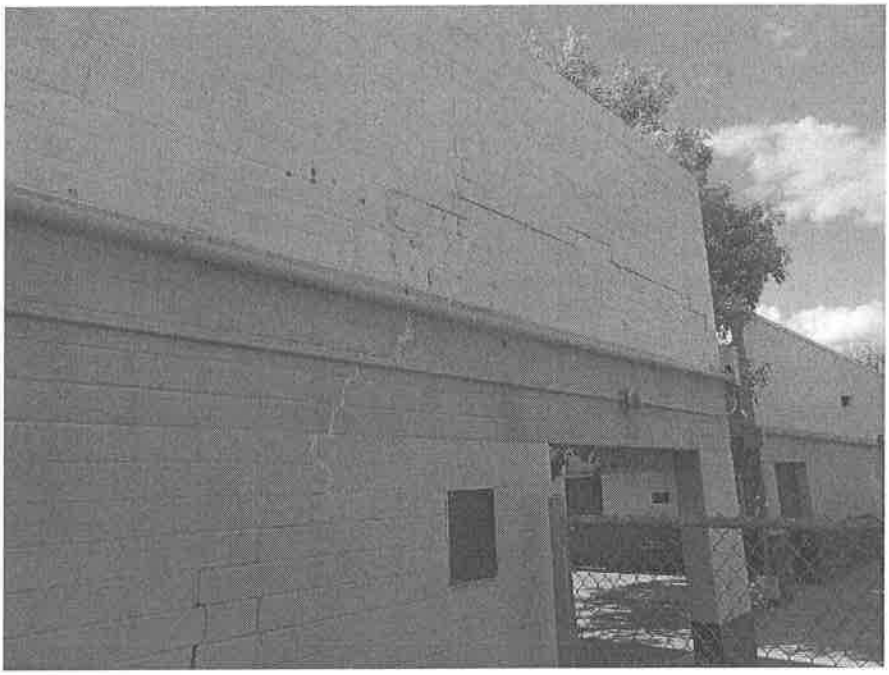

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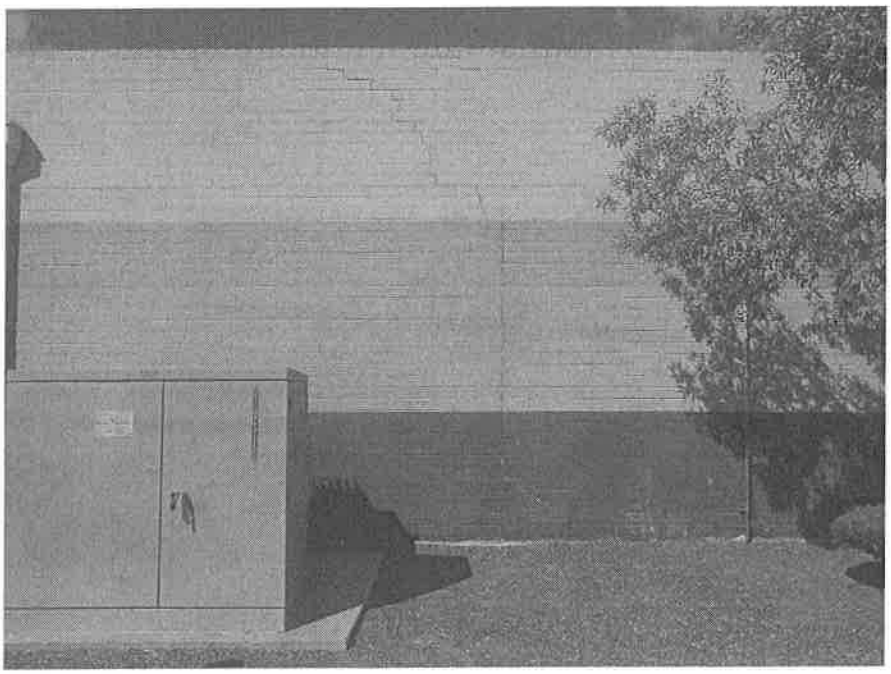

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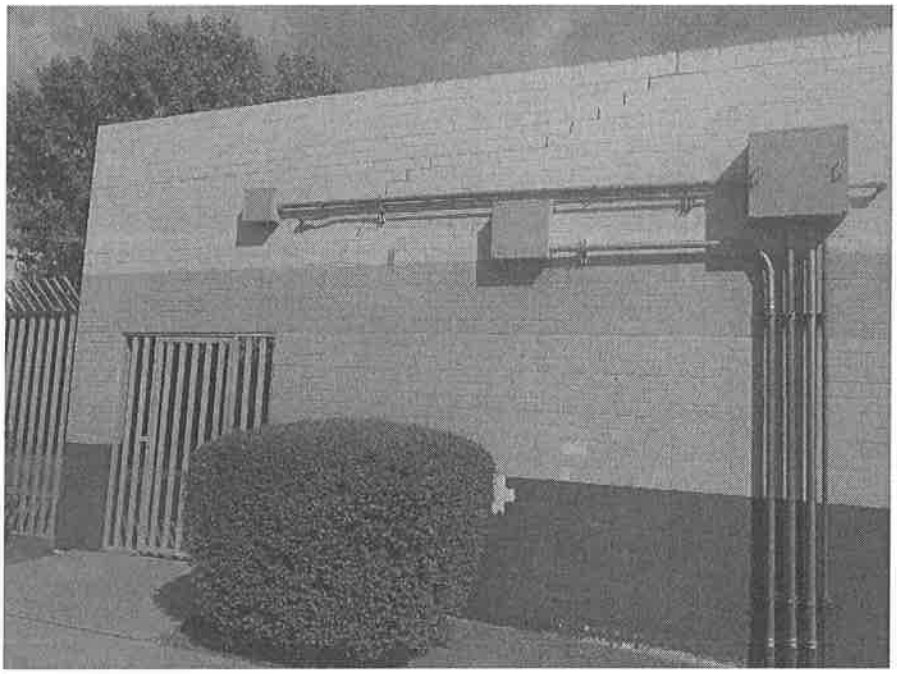

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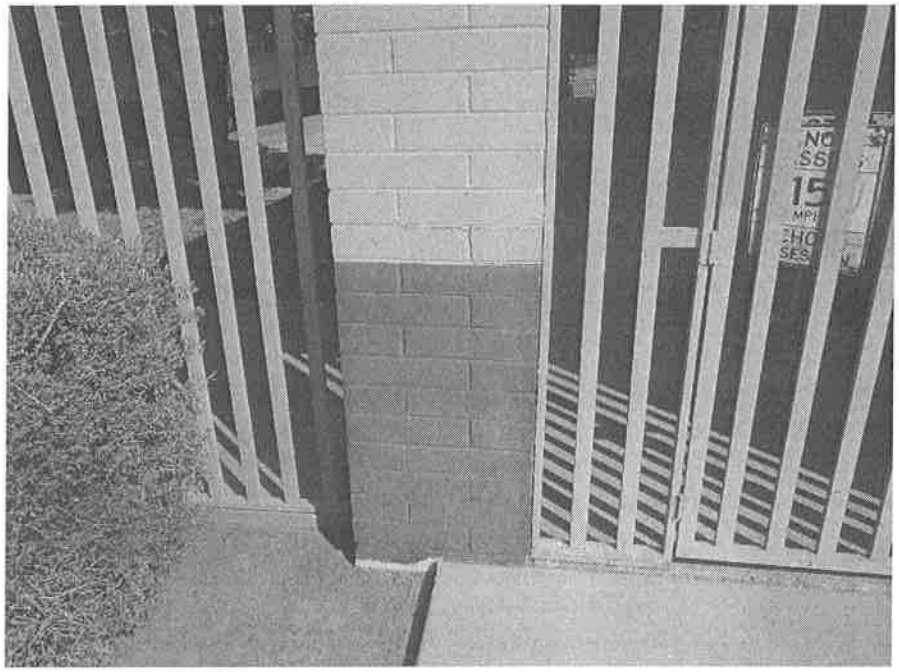
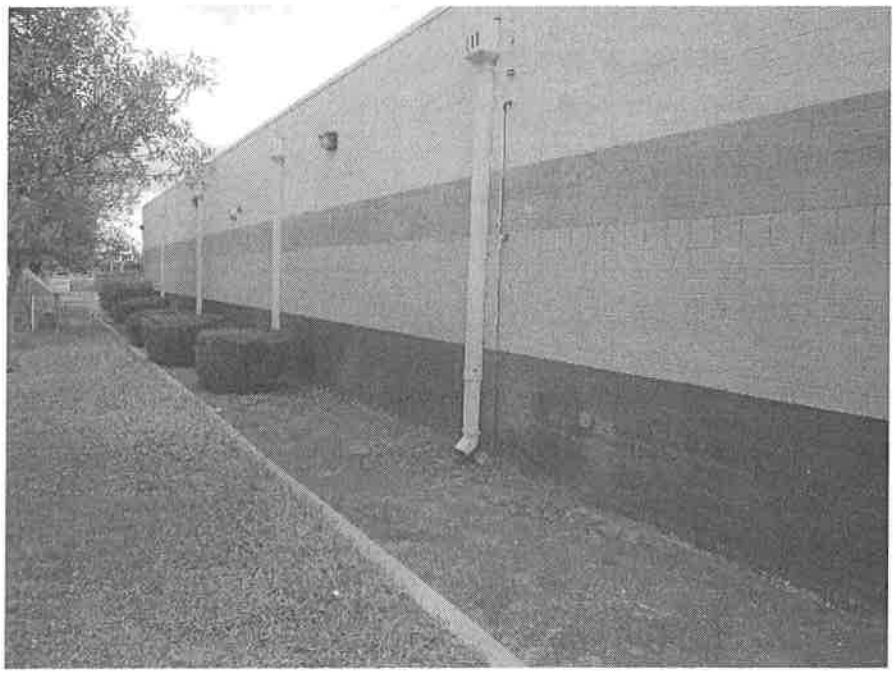


Picture 6

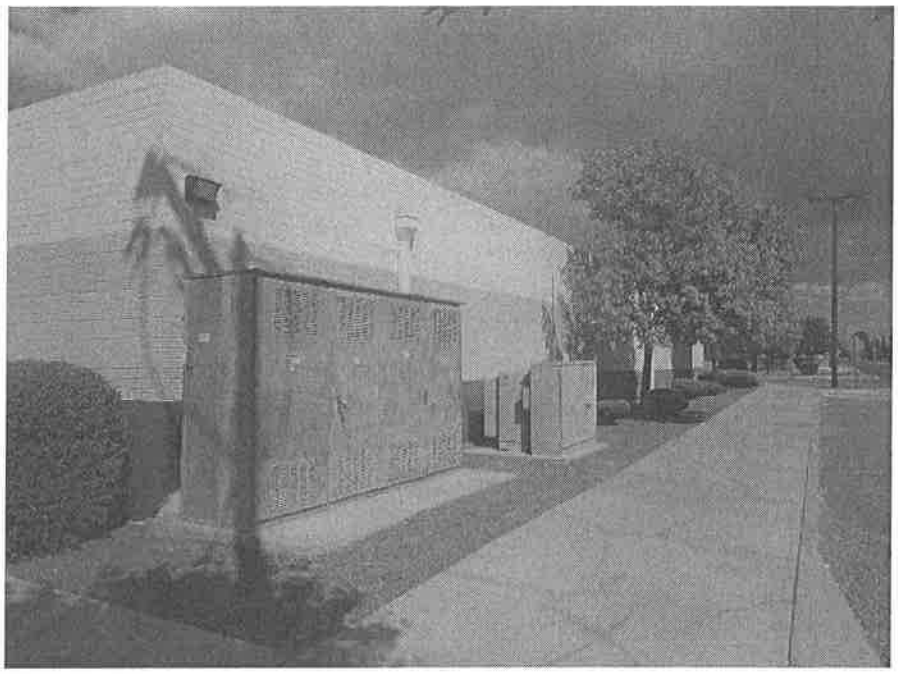
Picture 7

Picture 8

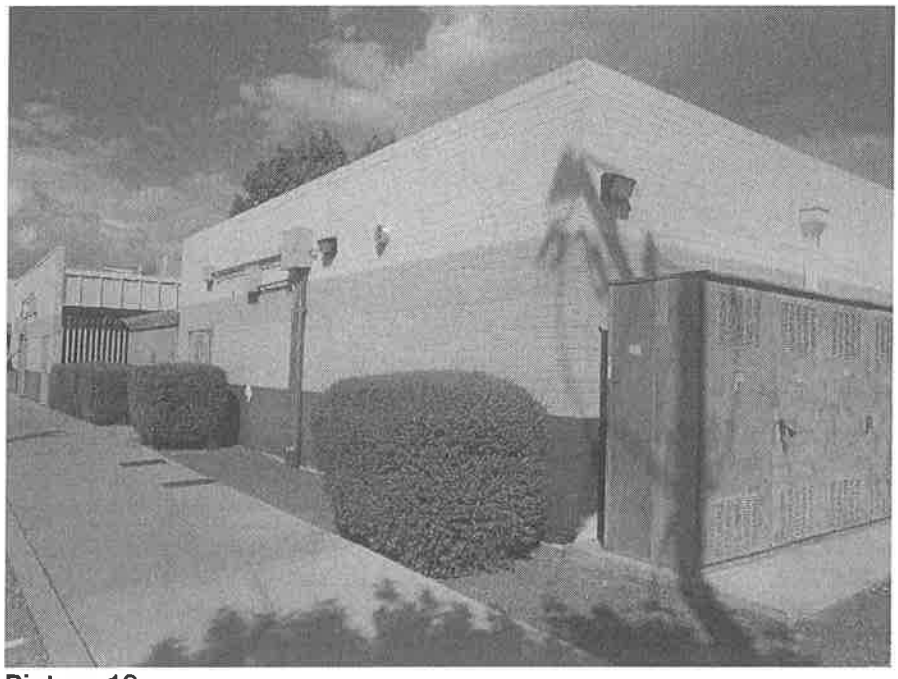
Picture 9



Picture 10



Picture 11



Picture 12