RFQ Question and Answer List
State of Ohio Standard Forms and Documents

Project Name	Perry Stadium Phase 1 Repairs/Upgrades	Project Number	BGU 156088
Project Location	Bowling Green State University		

Date posted: February 16, 2015
Date revised: February 19, 2015

Below are the questions that have been received to date for the RFQ of the above-referenced project:

1. Can you expand upon the scope of work involving the architectural upgrades mentioned in the RFQ? Also, is there a preliminary budget for improving the visitor's locker room and any necessary reconfiguration of adjacent existing space?

    A. The scope involving architectural upgrades is confined to (a) removing existing lockers, (b) refreshing walls ceilings and floors, (c) lighting upgrades, and (d) new lockers/cubbies. A budget is not specifically to this scope. Overall the budget is limited.

2. This RFQ seems to be mostly structural in nature. Is it acceptable for the structural engineering firm to take the lead on the submittal?

    A. It is acceptable for a structural engineering firm to take the lead on the submittal.

3. Does the University have a complete set of existing reference drawings of the project scope areas?

    A. Drawings applicable to the scope of work anticipated are attached for reference. Shortlisted firms will be provided access to the complete set of drawings.

4. Can the existing stadium condition assessment study (circa 2009) be made available prior to submission of the RFQ response?

    A. Attached to this document you find Doyt Perry Stadium Facilities Condition Assessment dated April 11, 2013 and Doyt Perry Stadium – Test Result Review dated October 14, 2013.

5. Is there any work to be done in the home locker room, or is the scope solely for the visitor's locker room?

    A. The scope of work involves the visitor locker room only.

NORTH

CROSS SECTION "WEST" DWG.* A13

SEE PRESS BOX PLANS – WEST DWG.* A16

GRANDSTAND SEATS

BOX SEATS

AISLE

GRANDSTAND SEATS

BOX SEATS

GRANDSTAND SEATS

GRANDSTAND SEATS

BOX SEATS

GRANDSTAND SEATS

FUTURE LOWER DECK

FUTURE LOWER DECK

℄ FOOTBALL FIELD & STADIUM STANDS

GRANDSTAND SEATS

BOX SEATS

GRANDSTAND SEATS

BOX SEATS

AISLE

BOX SEATS

GRANDSTAND SEATS

GRANDSTAND SEATS

GRANDSTAND SEATS

SEE SELECT SEATING BOXES – EAST DWG.* A15

CROSS SECTION "EAST" DWG.* A12

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OSBORN-PAPESH ARCHITECT-ENGINEERS

1/32" SCALE DECK PLAN

DRAWN BY	DATE 7-30-65	SET OF	SHEET A3
	COMM. NO.		

MATCH LINE SEE DWG # A5

26'-8 1/16"

SLOPING CONCRETE STANDS

16'ϕ PIPE RAIL

FILL

PLAYERS

PASSAGE (7)

ENTRY — SEE OPP. HAND

S.S. COUNTER DET. DWG. # A22

SHUTTER (OPP. SIDE SIM.) SEE DWG A22

GENERAL PURPOSE ROOM (6)

UNIFORM DRYING ROOM (8)

LOCKER MAILS

LOCKERS SEE DWG. A22

VARSITY LOCKER ROOM (12)

DRYING ROOM (10)

SHOWER ROOM (9)

TOILET ROOM (11)

HYDROTHERAPY (17)

WHIRLPOOL

TRAINING ROOM (18)

OFFICIAL'S & COACHES LOCKER, SHOWER & TOILET ROOM (15)

SEE DRWG # A22 FOR SHOWER STALL DETAILS

CONC. BLK. WALL RE: BEATH RAMP

RAMP UP

SEE STAIR DETAIL A-24 DWG.

ATHLETIC EQUIPMENT SUPPLY STORAGE (1)

FIRST AID ROOM (2)

CONFERENCE ROOM (3)

RECEPTION ROOM (4)

STAIR (5) SEE DET. DWG. # A23

SEE DRWG # A22 FOR COUNTER & SLIDING GLASS WINDOW

MEN'S PUBLIC TOILET (13)

WOMEN'S PUBLIC TOILET (14)

STORAGE (19)

OFFICE (20)

CONCESSION SEE DWG. # A20

CONC. APRON

ASPHALTIC CONC. CONCOURSE

ASPHALT CONC. CONCOURSE

TYP. SCREEN WALL SEE DET. DWG. # A23

MIRRORS & SHELVES

NOTE: SEE DRWG A22 FOR MIRRORS, SHELVES & ACCESS DOORS

KEY PLAN

N. NORTH E. W.

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1/8" SCALE GROUND PLAN — NORTHEAST

DRAWN BY	DATE 7-30-65	REV. BY	SHEET A-4
COMM. NO.			

115 113 111 109 107 105 103 101

MATCH LINE SEE DWG.* A4

A B C D

PLAYERS PASSAGE

FENCE SEE STRUCT. DWG

PLAYERS RAMP DN.

SLOPING CONC. STANDS

1¼"Φ PIPE RAIL

FILL

LOCKER BASES SEE DWG. A22

100 LOCKERS

VISITING TEAM LOCKER ROOM

CONC. BLK. WALL BEN. RAMP

SEE DRWG.* A 22 FOR SHOWER & STALL DETAILS

RAMP UP

SEE STAIR DETAIL DRWG A24

MIRRORS

SHOWER

TOILET

COACHES LOCKER RM.

TUB

FOOT BATH

ACCESS DOOR

WHIRL POOL

TRAINERS ROOM

CURB

JANITOR RM.

FRESHMAN LOCKER ROOM

160 LOCKERS

DRYING ROOM

SHOWER ROOM

SHOWER HEADS @ 3'-6" O.C.

SEE DRWG A22 FOR DETAILS

TOILET ROOM

WOMEN'S PUBLIC TOILET

SHELVES ONLY

MENS PUBLIC TOILET

COMBO. MIRROR & SHELF

SEE TYP. SCREEN WALL DETAIL DWG. A 28

COMBO. MIRROR & SHELF ABOVE EA. LAV. MENS SEE DRWG A22

UNIFORM DRYING ROOM

NOTE: ERECT WALL AFTER INSULATION OF BOILER

BOILER SEE DWG.* P-3

WATER HEATER SEE DWG.* P3

H.W. STOR. TANK SEE DWG. P-3

MAINTENANCE EQUIPMENT

FOR THIS AREA SEE DWG. A 4

7'-0" HIGH WOVEN WIRE FENCE ENCL.

ELECTRICAL TRANSFORMER AREA - SEE ELECT. DWGS.

PAIR 2'-6" GATES

5'-0" x 9'-0" x 0'-4" HIGH CONC. PAD BENEATH ELECT SUB-STATION SEE NOTE, DRWG A 7 FOR EMBEDDED C's

ADVANCE TICKET SALES

ADV. TICKET WINDOW SEE DET DWG. A28

STAIR SEE DET. DWG.* A2-5

DAMP UP

CONCESSION SEE DWG.* A20

CONC. APRON

ASPHALTIC CONC. CONCOURSE

KEY PLAN

NOTE: SEE DRWG A22 FOR MIRRORS, SHELVES & ACCESS DOOR.

STATE OF OHIO REGISTERED ARCHITECT

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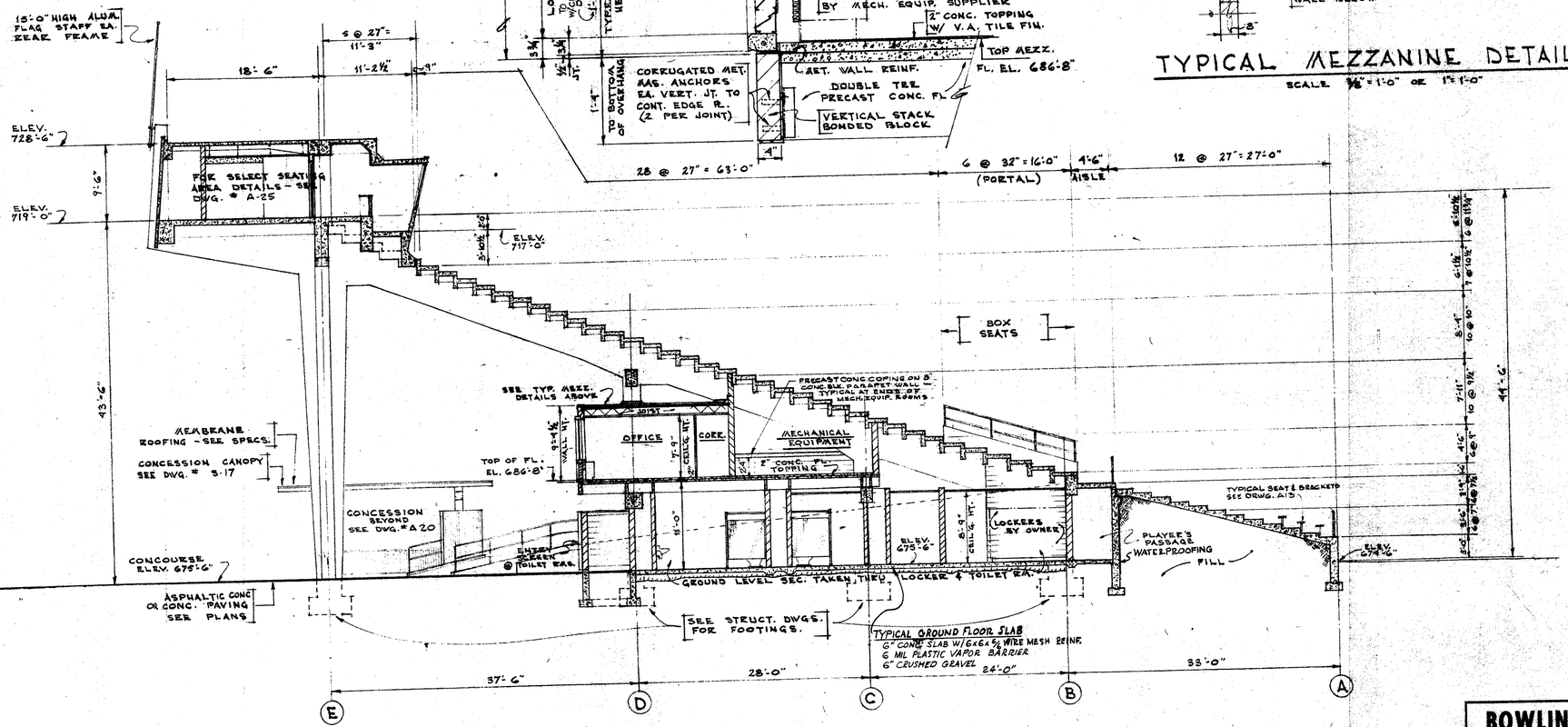
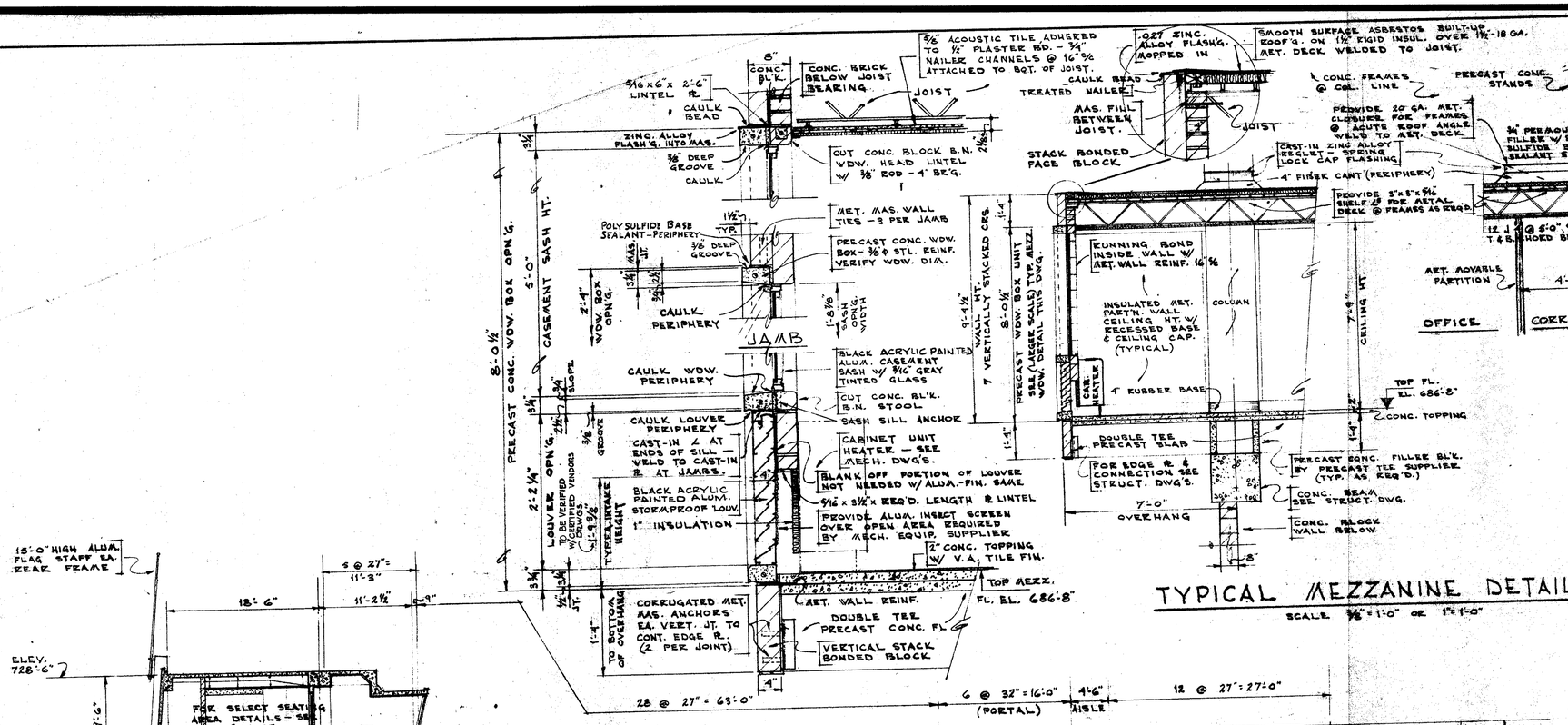
1/8" SCALE GROUND PLAN- SOUTHEAST

DRAWN BY	DATE	SET OF	SHEET
RH	7-30-65		A-3
	COMM. NO.		

TYPICAL MEZZANINE DETAILS

SCALE 3/8" = 1'-0" OR 1" = 1'-0"





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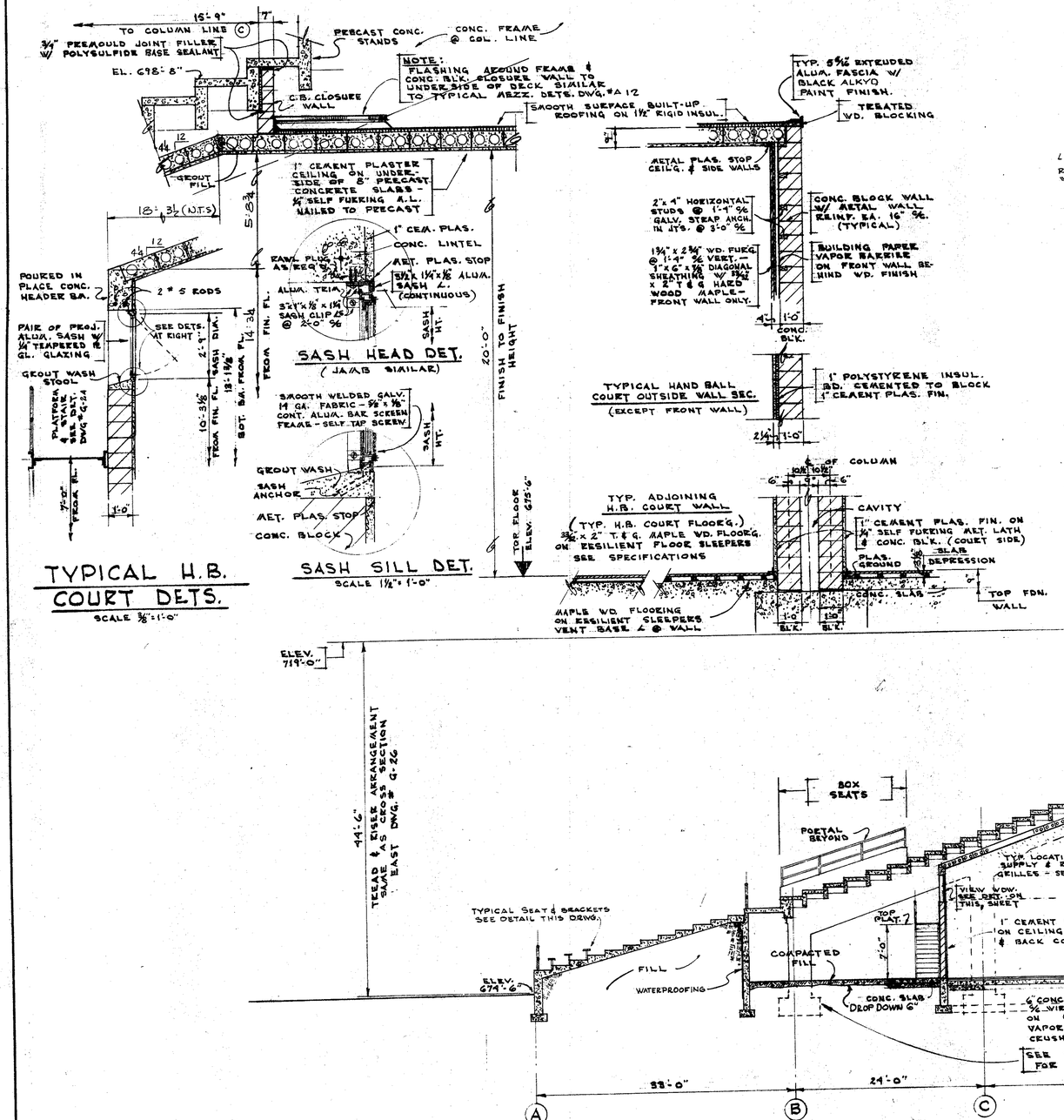
1/8" SCALE CROSS SECTION — EAST

DRAWN BY	DATE 7-30-60	SET OF	SHEET A-12
	COMM. NO.		



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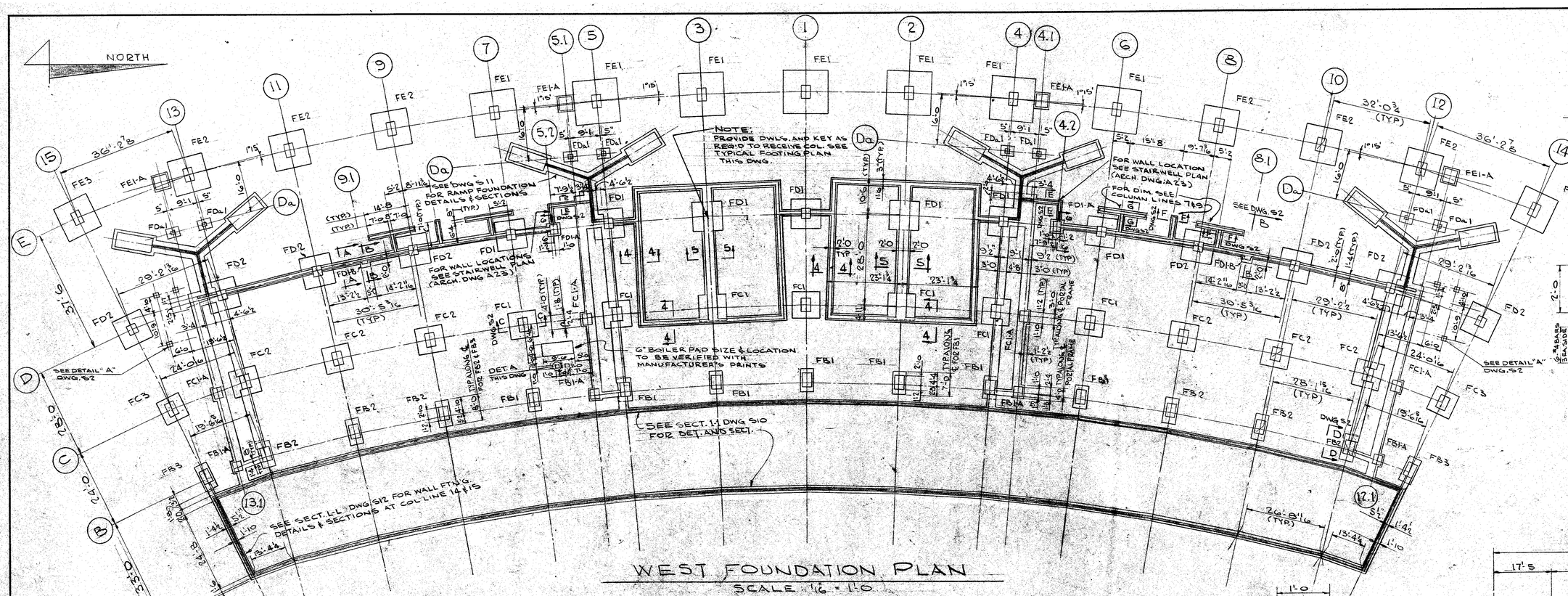
1/8" SCALE CROSS SECTION-WEST

DRAWN BY	DATE 7-30-65	SET OF	SHEET A-13
	COMM. NO.		



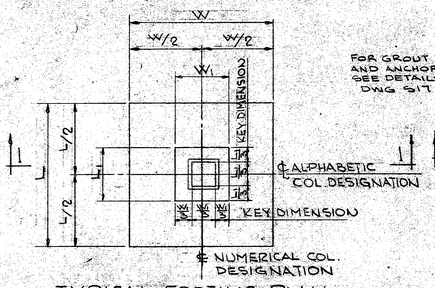
WEST FOUNDATION PLAN

SCALE 1/16" = 1'-0"

NOTE - FOOTINGS AND PIERS TO BE CENTERED ON COL. LINES UNLESS NOTED

FOUNDATION SCHEDULE

COLUMN LOCATION	TYPE	ELE. BOT. OF FTNG.	FOOTING DETAILS DIMENSIONS W	L	D	FOOTING DETAILS REIN FORCING HORIZ	DW'LS	PIER DETAILS DIMENSIONS W1	L1	D1	PIER DETAILS REIN FORCING VERT	TIES	REMARKS
B1-B2-B3-B4 B5-B6-B7	FB1	669'-6	4'-0	7'-0	1'-3	#6 @ 12" EA. WAY	8-#8	2'-9	4'-0	4'-0	10-#8	2-#4 @ 9"	
B4.1-B5.1-B12.1 B13.1	FB1-A	671'-6	4'-0	4'-0	1'-0	#6 @ 12" EA. WAY	8-#8	2'-9	3'-0	2'-3	10-#8	2-#4 @ 9"	
B8-B9-B10-B11 B12-B13	FB2	669'-6	4'-0	8'-0	1'-3	#7 @ 12" EA. WAY	8-#8	2'-9	4'-0	4'-0	10-#8	2-#4 @ 9"	
B14-B15	FB3	669'-6	4'-0	8'-0	1'-3	#6 @ 12" EA. WAY	8-#8	2'-9	4'-0	4'-0	10-#8	2-#4 @ 9"	
C1-C2-C3-C4 C5-C6-C7	FC1	669'-6	8'-6	8'-6	1'-6	#9 @ 12" EA. WAY	8-#8	2'-9	4'-0	3'-9	10-#8	2-#4 @ 9"	
C4.1-C5.1-C12.1 C13.1	FC1-A	671'-6	4'-0	4'-0	1'-0	#6 @ 12" EA. WAY	8-#8	2'-9	3'-0	1'-9	10-#8	2-#4 @ 9"	
C8-C9-C10-C11 C12-C13	FC 2	669'-6	8'-6	8'-6	1'-6	#9 @ 12" EA. WAY	8-#8	2'-9	4'-0	3'-9	10-#8	2-#4 @ 9"	
C14-C15	FC 3	669'-6	7'-6	7'-6	1'-3	#7 @ 9" EA. WAY	8-#8	2'-9	4'-0	4'-0	10-#8	2-#4 @ 9"	
D1-D2-D3-D4-D5 D6-D7	FD 1	669'-6	9'-0	9'-0	2'-0	#9 @ 9" EA. WAY	8-#8	2'-9	3'-0	3'-3	10-#8	2-#4 @ 9"	
D4.2 - D5.2	FD1-A	671'-6	4'-0	4'-0	1'-0	SEE SECT 6-6 THIS DWG	6-#8	2'-2	3'-0	2'-3	8-#6	2-#4 @ 9"	SEE PLAN & SECT 6-6 THIS DWG FOR PIER DETAILS
D8-D9-D10 D11-D12-D13 D14-D15	FD 2	669'-6	9'-6	9'-6	2'-0	#8 @ 9" EA. WAY	8-#8	2'-9	3'-0	3'-3	10-#8	2-#4 @ 9"	
E1-E2-E3-E4-E5 E6-E7	FE 1	669'-6	13'-6	13'-6	3'-0	#10 @ 9" EA. WAY	8-#8	3'-9	4'-0	2'-3	10-#8	2-#4 @ 9"	DESIGN INCLUDES FUTURE DECK LOAD
E4.1-E5.1 E12.1-E13.1	FE1-A	669'-6	4'-8	5'-0	1'-3	#6 @ 12" EA. WAY	8-#8	3'-9	4'-0	4'-0	10-#8	2-#4 @ 9"	
E8-E9-E10-E11 E12-E13	FE2	669'-6	11'-0	11'-0	2'-3	#9 @ 9" EA. WAY	8-#8	3'-9	4'-0	3'-0	10-#8	2-#4 @ 9"	DESIGN INCLUDES FUTURE DECK LOAD
E14-E15	FE 3	669'-6	8'-0	8'-0	1'-3	#8 @ 9" EA. WAY	8-#8	3'-9	4'-0	4'-0	10-#8	2-#4 @ 9"	
Da4-Da4.1-Da5 Da5.1-Da12-Da12.1 Da13-Da13.1	FDa1	671'-6	4'-0	3'-0	1'-0	#5 @ 12" EA. WAY	NONE	SLOPE	SLOPE	3'-3	8-#6	#4 @ 12"	FOR PIER DIM. SEE DETAIL THIS DWG
TICKET BOOTH FRAME FOUNDATION	TBFF	671'-6	4'-0	4'-0	1'-8	#5 @ 12" EA. WAY	NONE	SLOPE	SLOPE	2'-0	8-#6	#4 @ 12"	do
TICKET BOOTH FOUNDATION	TBF	671'-6	4'-0	4'-0	1'-0	#5 @ 12" EA. WAY	NONE	1'-0	1'-0	2'-8	4-#6	#4 @ 12"	BEND VERT. PIER BARS INTO SLAB (SEE SEC. 11-11 DWG S17
D8.1 - D9.1	FD1-B	671'-6	3'-0	3'-4	1'-0	SEE SECT B-B DWG S2	4-#8	2'-0	2'-3	2'-3	8-#6	2-#4 @ 9"	SEE SECT. B-B DWG S2 FOR PIER DETAILS

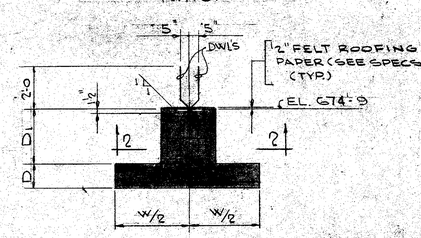


TYPICAL FOOTING PLAN

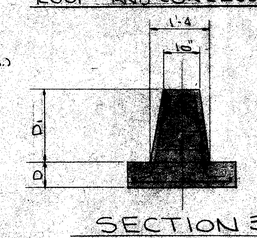
N.T.S.

TYP FTNG PLAN FOR TICKET BOOTH ROOF AND CONCESSION STAND

N.T.S.

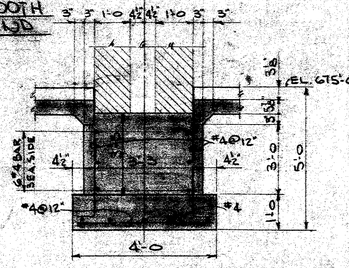


SECTION 1-1



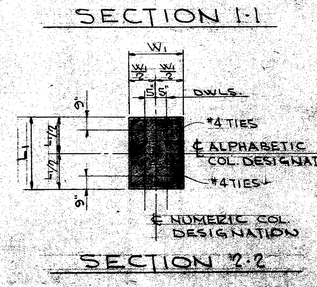
SECTION 3-3

N.T.S.

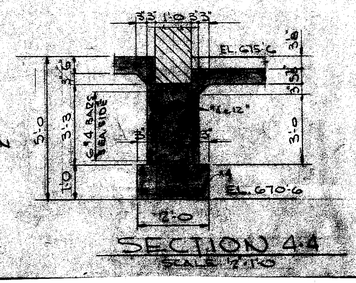


SECTION 5-5

SCALE 1/2" = 1'-0"

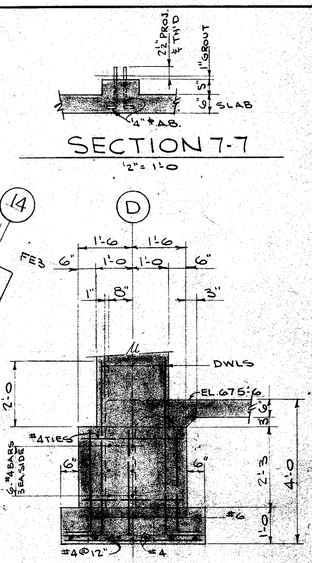


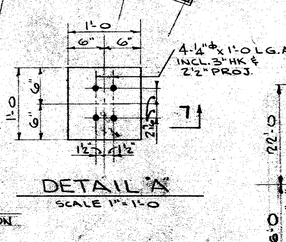
SECTION 2-2

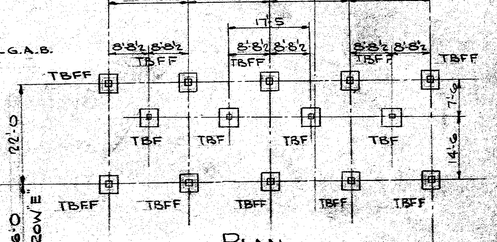


SECTION 4-4

SCALE 1/2" = 1'-0"







Reference Drawings.

L-6	GEOMETRY
S-2	FOUNDATION - EAST STAND
S-4	FRAME NO. 1 AND COLUMNS
S-5	FRAMES NO. 2 AND NO. 3 AND COLUMNS
S-10	RISER PLAN (WEST AND EAST)
S-11	RAMP DETAILS AND SECTIONS
S-12	PORTAL DETAILS AND SECTIONS

FOR GENERAL NOTES SEE DWG. S-7

AUG 4 1965

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PREPARED BY

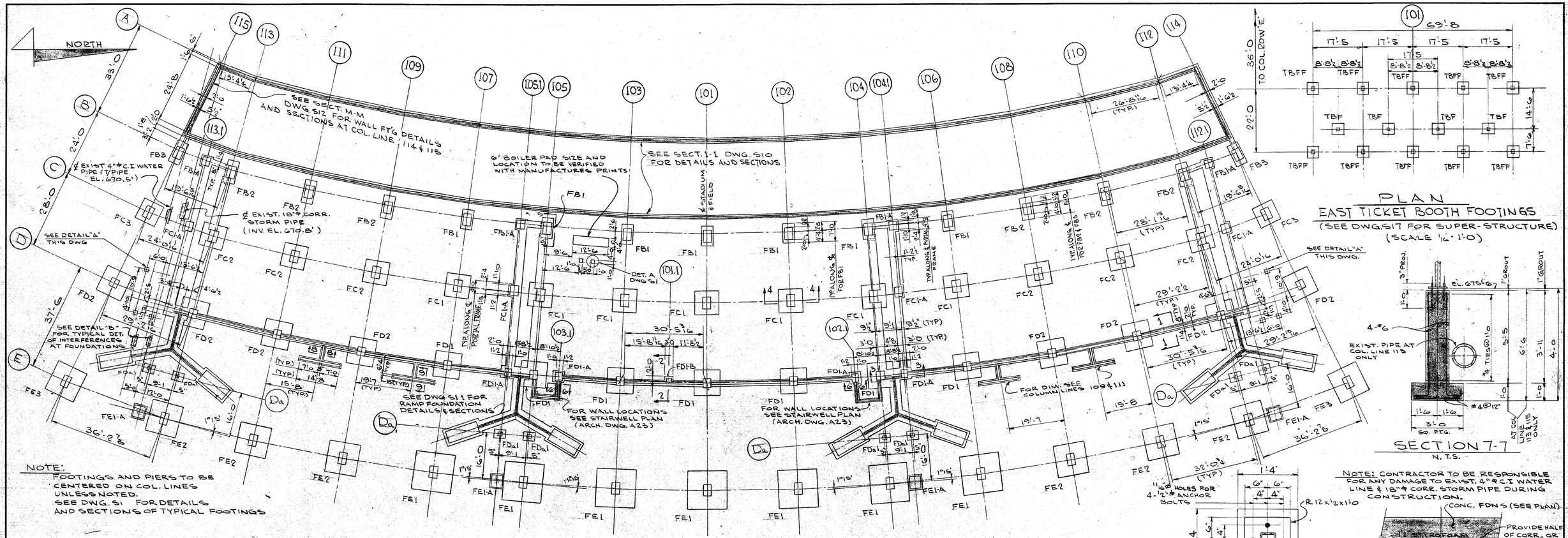
OSBORN-PAPESH ARCHITECT-ENGINEERS

FOUNDATION - WEST STAND

STATE OF OHIO JAMES LOYAL BORTON 13560 REGISTERED PROFESSIONAL ENGINEER

STATE OF OHIO ALEXANDER A. PAPESH 3004 REGISTERED ARCHITECT

DRAWN BY	DATE	SET OF	SHEET
S. E. L.	7-30-65		S-1
	COMM. NO.		



NOTE:
FOOTINGS AND PIERS TO BE CENTERED ON COL. LINES UNLESS NOTED.
SEE DWG. S1 FOR DETAILS AND SECTIONS OF TYPICAL FOOTINGS

PLAN
EAST TICKET BOOTH FOOTINGS
(SEE DWGS S17 FOR SUPER-STRUCTURE)
(SCALE 1/4" = 1'-0")

SECTION 7-7
N. T. S.

NOTE: CONTRACTOR TO BE RESPONSIBLE FOR ANY DAMAGE TO EXIST. 4"ϕ C.I WATER LINE & 18"ϕ CORR. STORM PIPE DURING CONSTRUCTION.

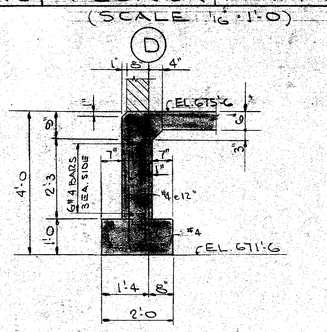
DETAIL "A"
1" = 1'-0

DETAIL "B"
N.T.S.

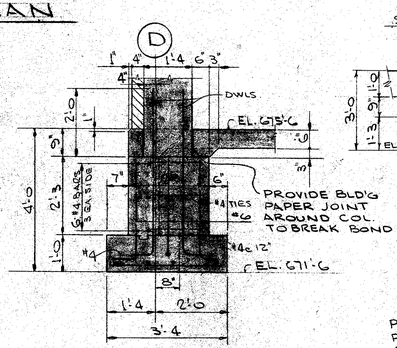
FOUNDATION SCHEDULE

COLUMN LOCATION	TYPE	ELE. BOTT. OF FTNG.	FOOTING DETAILS DIMENSIONS W	L	D	REINFORCING HORIZ	DWLS	PIER DETAILS DIMENSIONS W1	L1	D1	REINFORCING VERT	TIES	REMARKS
B101-B102-B103 B104-B105-B106-B107	FB1	669'-6	4'-0	7'-0	1'-3	#6 @ 12" EA. WAY	8-#8	2'-9	4'-0	4'-0	10-#8	2-#4 @ 9"	
B104.1-B105.1-B112.1 B113.1	FB1-A	671'-6	4'-0	4'-0	1'-0	#6 @ 12" EA. WAY	8-#8	2'-9	3'-0	2'-3	10-#8	2-#4 @ 9"	
B108-B109-B110 B111-B112-B113	FB2	669'-6	4'-0	8'-0	1'-3	#7 @ 12" EA. WAY	8-#8	2'-9	4'-0	4'-0	10-#8	2-#4 @ 9"	
B114-B115	FB3	669'-6	4'-0	8'-0	1'-3	#6 @ 12" EA. WAY	8-#8	2'-9	4'-0	4'-0	10-#8	2-#4 @ 9"	
C101-C102-C103-C104 C105-C106-C107	FC1	669'-6	8'-6	8'-6	1'-6	#9 @ 12" EA. WAY	8-#8	2'-9	4'-0	3'-9	10-#8	2-#4 @ 9"	
C104.1-C105.1-C112.1 C113.1	FC1-A	671'-6	4'-0	4'-0	1'-0	#6 @ 12" EA. WAY	8-#8	2'-9	3'-0	2'-3	10-#8	2-#4 @ 9"	
C108-C109-C110 C111-C112-C113	FC2	669'-6	8'-6	8'-6	1'-6	#9 @ 12" EA. WAY	8-#8	2'-9	4'-0	3'-9	10-#8	2-#4 @ 9"	
C114-C115	FC3	669'-6	7'-6	7'-6	1'-3	#7 @ 9" EA. WAY	8-#8	2'-9	4'-0	4'-0	10-#8	2-#4 @ 9"	
D101-D102-D103-D104 D105-D106-D107	FD1	669'-6	9'-0	9'-0	2'-0	#9 @ 9" EA. WAY	8-#8	2'-9	3'-0	3'-3	10-#8	2-#4 @ 9"	
D104.1-D105.1 D103.1-D102.1	FD1-A	671'-6	4'-0	4'-0	1'-0	——	6-#8	2'-2	3'-0	2'-3	8-#6	2-#4 @ 9"	
D108-D109-D110 D111-D112-D113 D114-D115	FD2	669'-6	9'-6	9'-6	2'-0	#8 @ 9" EA. WAY	8-#8	2'-9	3'-0	3'-3	10-#8	2-#4 @ 9"	
E101-E102-E103-E104 E105-E106-E107	FE1	669'-6	13'-6	13'-6	3'-0	#10 @ 9" EA. WAY	8-#8	3'-9	4'-0	2'-3	10-#8	2-#4 @ 9"	DESIGN INCLUDES FUTURE DECK LOAD
E104.1-E105.1 E112.1-E113.1	FE1-A	669'-6	4'-8	5'-0	1'-3	#6 @ 12" EA. WAY	8-#8	3'-9	4'-0	4'-0	10-#8	2-#4 @ 9"	
E106-E109-E110 E111-E112-E113	FE2	669'-6	11'-0	11'-0	2'-3	#9 @ 9" EA. WAY	8-#8	3'-9	4'-0	3'-0	10-#8	2-#4 @ 9"	DESIGN INCLUDES FUTURE DECK LOAD
E114-E115	FE3	669'-6	8'-0	8'-0	1'-3	#8 @ 9" EA. WAY	8-#8	3'-9	4'-0	4'-0	10-#8	2-#4 @ 9"	
Da104-Da104.1-Da105 Da105.1-Da112-Da112.1 Da113-Da113.1	FDa1	671'-6	4'-0	3'-0	1'-0	#5 @ 12" EA. WAY	NONE	SLOPE	SLOPE	3'-3	8-#6	#4 @ 12"	FOR PIER DIM. SEE DETAIL DWG. S1
TICKET BOOTH FRAME FOUNDATION	TBFF	671'-6	4'-0	4'-0	1'-3	#5 @ 12" EA. WAY	NONE	SLOPE	SLOPE	2'-0	8-#6	#4 @ 12"	do
TICKET BOOTH FOUNDATION	TBF	671'-6	4'-0	4'-0	1'-0	#5 @ 12" EA. WAY	NONE	1'-0	1'-0	2'-8	4-#6	#4 @ 12"	BEND VERT. PIER BARS INTO SLAB (SEE SECT. 11 DWG S11)
D101.1	FD1-B	671'-6	3'-0	3'-4	1'-0	SEE SECT. 2-2 THIS DWG	4-#8	2'-0	2'-3	2'-3	8-#6	2-#4 @ 9"	SEE SECT. 2-2 THIS DWG FOR PIER DETAILS

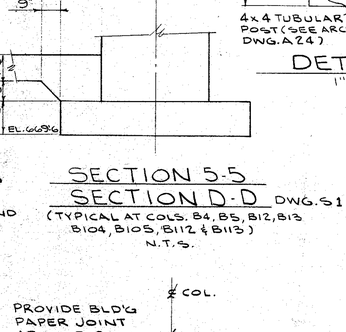
EAST FOUNDATION PLAN
(SCALE 1/6" = 1'-0")



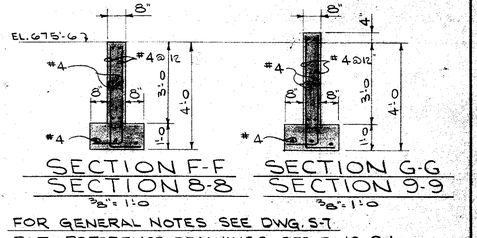
SECTION 1-1
SECTION A-A DWG. S1
(SCALE 1/2" = 1'-0")



SECTION 2-2
SECTION B-B DWG. S1 & S8
(SCALE 1/2" = 1'-0")



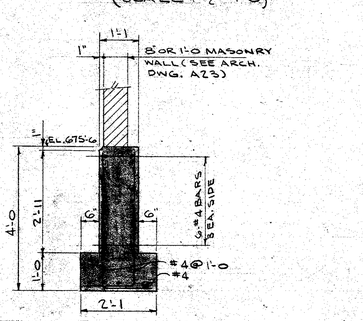
SECTION 5-5
SECTION D-D DWG. S1
(TYPICAL AT COLS. B4, B5, B12, B13 B104, B105, B112 & B113)
N.T.S.



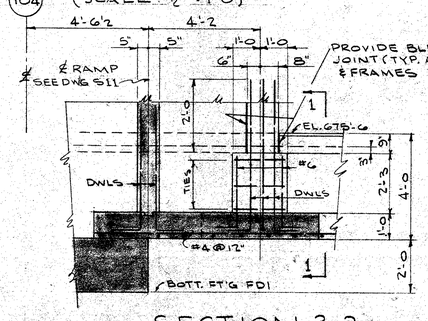
SECTION F-F
SECTION 8-8
3/8" = 1'-0"

SECTION G-G
SECTION 9-9
3/8" = 1'-0"

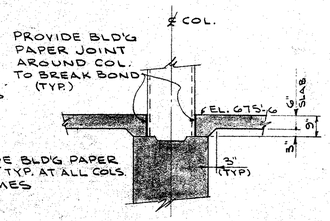
FOR GENERAL NOTES SEE DWG. S-1
FOR REFERENCE DRAWINGS SEE DWG. S-1



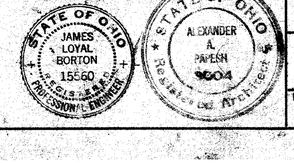
SECTION 6-6
SECTION E-E DWG. S1
SCALE 3/8" = 1'-0"



SECTION 3-3
SCALE 3/8" = 1'-0"



SECTION 4-4
SECTION C-C DWG. S1
N.T.S.



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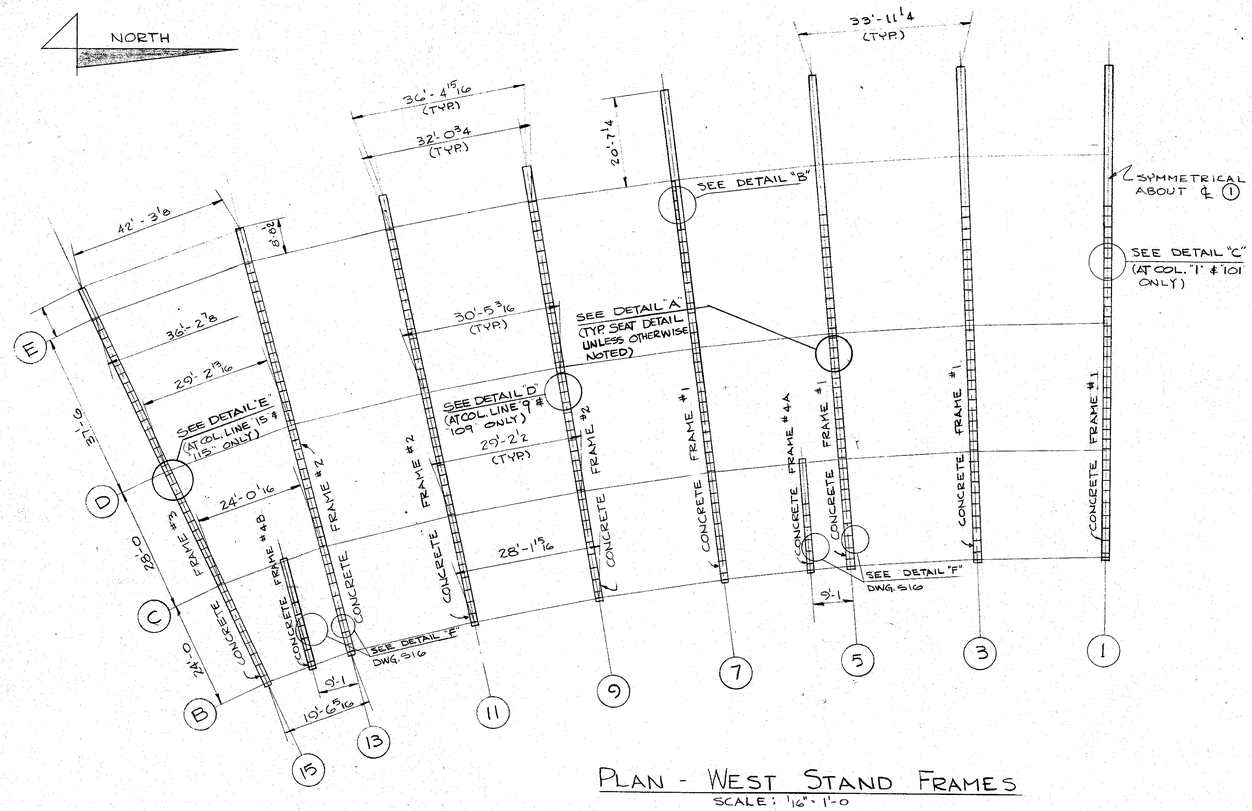
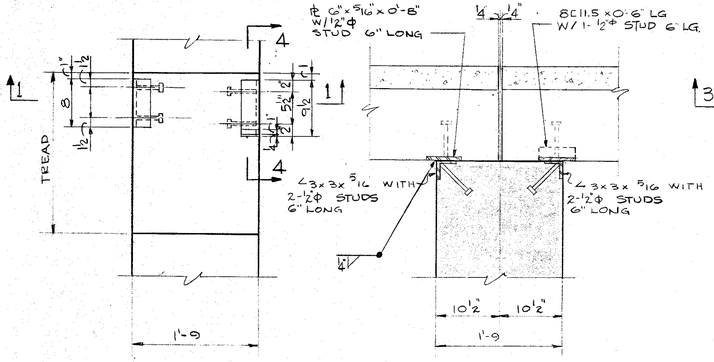
FOUNDATION—EAST STAND

DRAWN BY	DATE	SET OF	SHEET
S.E.L.	7-30-65		S-2
	COMM. NO.		



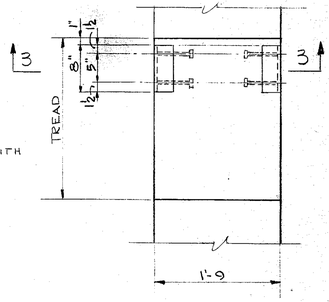
PLAN - WEST STAND FRAMES

SCALE: 1/16" = 1'-0



DETAIL "A" (TYP. UNLESS OTHERWISE NOTED)

SCALE: 1" = 1'-0

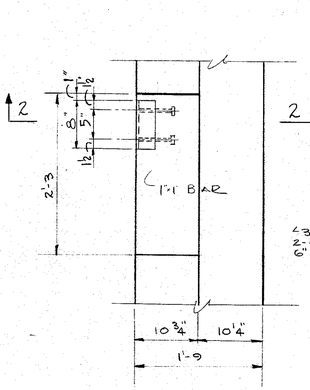


SECTION 1-1

SCALE: 1" = 1'-0

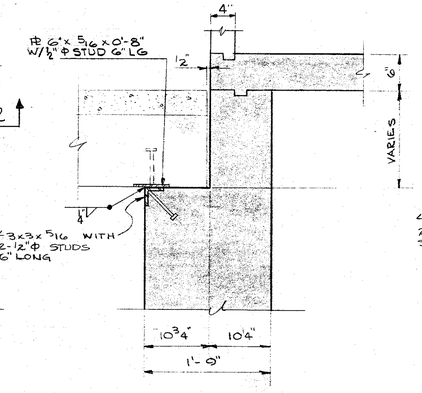
DETAIL "C"

SCALE 1-1 0



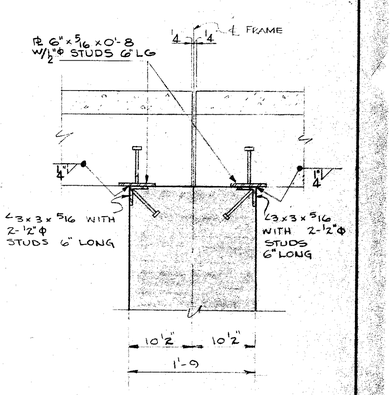
DETAIL "B"

SCALE: 1"=1'-0



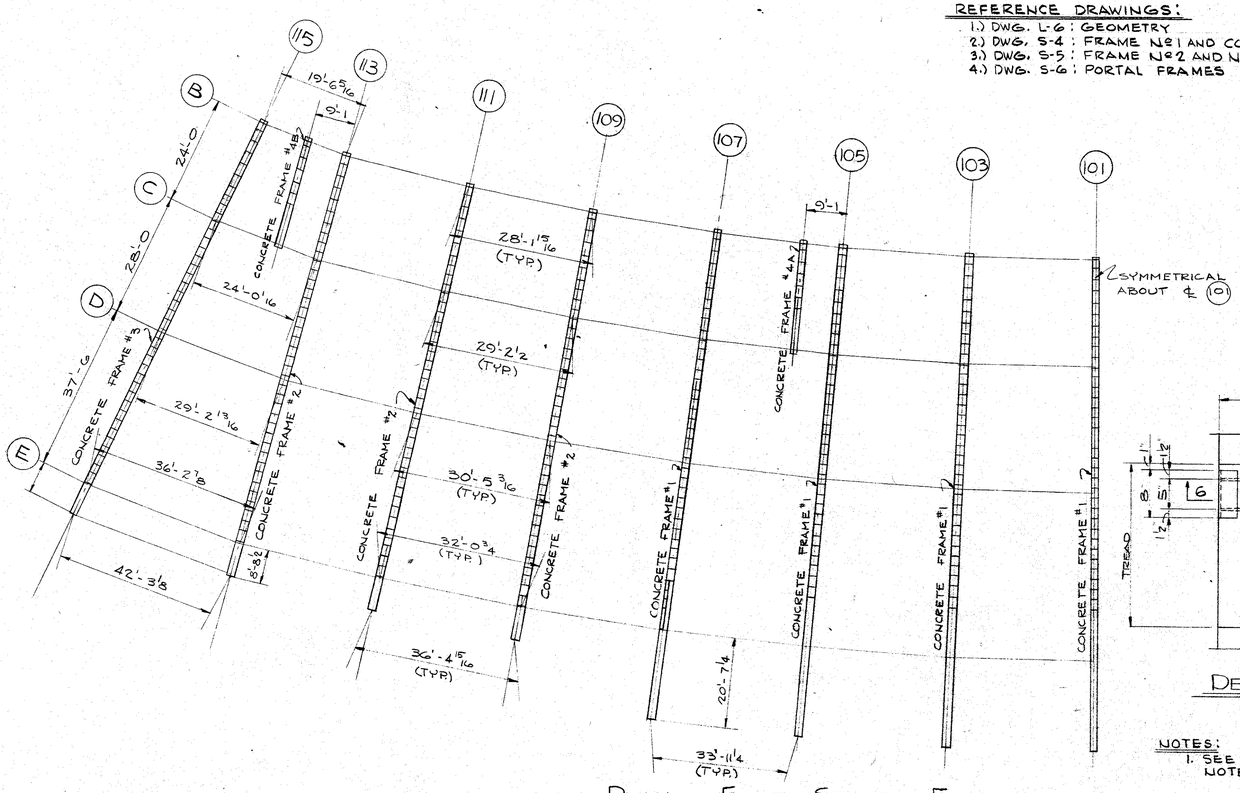
SECTION 2-2

SCALE: 1"=1'-0



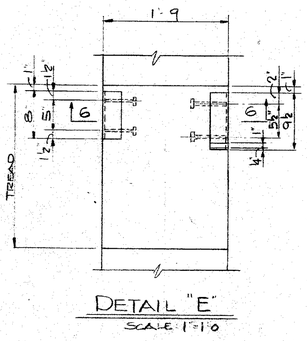
SECTION 3-3

SCALE: 1"=1'-0



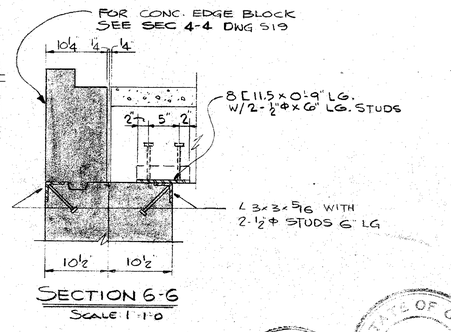
PLAN - EAST STAND FRAMES

SCALE: 1/16" = 1'-0



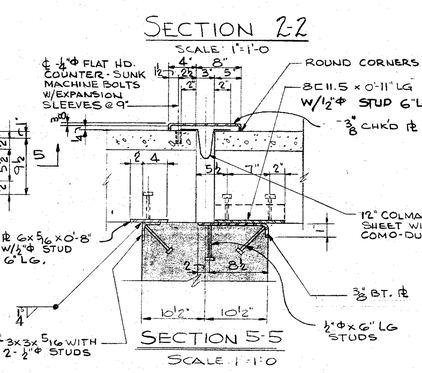
DETAIL "E"

SCALE: 1"=1'-0



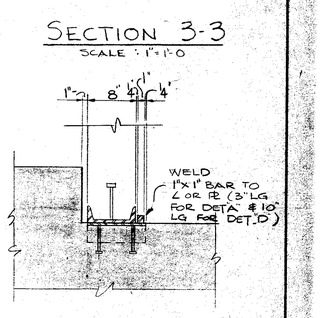
SECTION 6-6

Scale 1"=1'-0



SECTION 5-5

SCALE 1"=1'-0



SECTION 4-4

SCALE: 1"=1'-0

NOTES:
1. SEE DWG. S-7 FOR GENERAL NOTES.

AUG 4 1975

STATE OF OHIO JAMES LOYAL BORTON 15560 REGISTERED PROFESSIONAL ENGINEER

STATE OF OHIO ALEXANDER A. PAPESH 3004 Registered Architect

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MAIN DECK PLAN AND DETAILS

DRAWN BY	DATE 7-30-65	SET OF	SHEET
F. R.	COMM. NO.		S-3

℄ ¾"ø THREADED INSERT ON ℄ OF FRAME BY:
1) RICHMOND ROCK-ET INSERTS
2) NO. 160 RKL "GRIP RITE" THREADED INSERTS.
3) CLEVELAND BLDG. SPECIALTIES

FOR EMBEDDED ℞. SEE SEC 11-11 DWG. S-5.

FOR PRESS BOX REINFORCING SEE DWG. S15

EL. 728'-6

12-#4 TIES @ 1'-6 (2 TIES/SET)

COLS. AT COL. #6, 7, 10 & 10 ONLY .. SEE SECT. 12-12 DWG. S-6 FOR DETAIL.

6-#8 DWLS

EL. 719'-0

24-#4 TIES @ 1'-6 (2 TIES/SET)

TENSION LAP SPLICE

27-#4 TIES @ 1'-0 (2 TIES/SET)

25-#4 TIES @ 1'-6 (2 TIES/SET) (SEE SECTIONS)

18-#4 TIES @ 1'-3 (2 TIES/SET)

15-#4 TIES @ 1'-6 (2 TIES/SET)

EL. 675'-6

DWG. S-5

CONCRETE FRAME #1

SECTION 2-2

SECTION 3-3
SCALE ½" = 1'-0

SECTION 4-4
SCALE ½" = 1'-0

SECTION 5-5
SCALE ½" = 1'-0

SECTION 6-6
SCALE ½" = 1'-0

SECTION 11-11
SCALE: ½" = 1'-0

SECTION 7-7
SCALE: ½" = 1'-0

SECTION 12-12
SCALE: ½" = 1'-0

2-#6 NOT SHOWN ON ELEVATION

SECTION 1-1
SCALE ½" = 1'-0

SECTION 10-10
SCALE ½" = 1'-0

SECTION 8-8
SECTION A-A DWG. S5
SCALE ½" = 1'-0

SECTION 9-9
SCALE ½" = 1'-0

PROVIDE 8"x1'2" KEY WHEREVER 8" MASONRY WALL FRAMES INTO COLUMNS.

REFERENCE DWGS.
1) DWG. S-1: FOUNDATION - WEST STAND
2) DWG. S-2: FOUNDATION - EAST STAND
3) DWG. S-3: MAIN DECK PLAN & DETAILS
4) DWG. S-5: FRAME NO. 2 & NO. 3 & COLUMNS

NOTES
1) SEE DWG. S-7 FOR GENERAL NOTES.
2) CONTRACTOR TO SECURE AND LOCATE ALL BEAMS AND STRUTS WHICH FRAME INTO CONC. FRAME #1. (SEE DWGS. S-8, S-9, S-13 AND S-14 FOR BEAM AND STRUT LOCATIONS).
3) FOR EMBEDDED STEEL FOR RISER SEATS SEE DWG. S-3.)
4) TENSION LAP SPLICE TO CONFORM TO LATEST A.C.I. CODE REQUIREMENTS UNLESS OTHERWISE NOTED.
5) FOR ELECTRICAL CONDUIT SLEEVES, SEE DWG. E-12, E-13, E-111 & E-112.

STATE OF OHIO · JAMES LOYAL BORTON · 15560 · REGISTERED PROFESSIONAL ENGINEER

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FRAME NO. 1 AND COLUMNS

DRAWN BY	DATE	SET OF	SHEET
K. R.	7-30-65		S-4
	COMM. NO.		

DRAFT REPORT 04/11/13

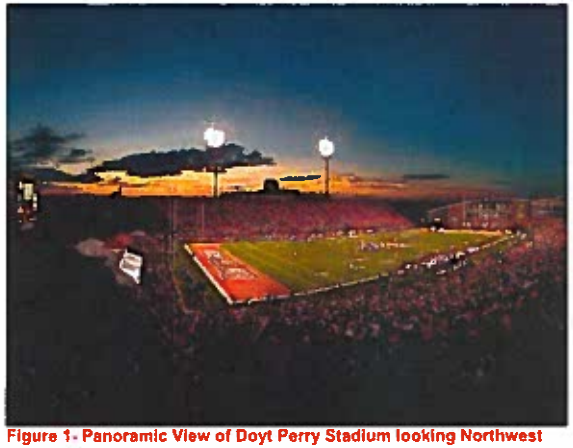

Figure 1- Panoramic View of Doyt Perry Stadium looking Northwest

EXECUTIVE SUMMARY:

ROSSETTI was retained to provide a Facility Conditions Assessment for Bowling Green State University, related specifically to Architectural and Structural areas. The structural review + testing requirements follows the architectural review starting on page 13.

The architectural review concentrated on the following areas;

- Team Facilities and Spectator Facilities Spaces
- Stadium Bowl Seating: Condition and function of the existing seating.
- Accessibility Study: Review the existing Stadium's general accessibility features
- Building Envelope: Condition and function of the existing architectural wall systems.

The objective of the assessment is to evaluate the existing condition and expected remaining service life of the Stadium's systems and infrastructure.

On March 8th, 2013 ROSSETTI made a site visit to observe the existing conditions of the facility. It should be noted that no testing, instruments or destructive investigation methods were applied; this was an observational evaluation only.
We reviewed example rooms of each type within the facility related to the scope of work, performed multiple walks around the exterior of the facility and on roof portions of the Suite and Media areas. The assessment provides recommendations based on the observations. We utilize photographs to help describe the existing conditions as much as possible. The existing Sebo Center Facility was not fully reviewed as part of this assessment as this is the most recent addition to the Stadium.

Generally speaking the facility has issues that could fall into overall categories, short term and future:

Short Term (within 1 year)

- Accessibility issues throughout, including ramped walkway
- Lower Bowl Aisle Railing- We recommend that lower bowl railings be added
- Testing of Precast Riser clip angle connectors- see testing requirements
- Testing of Precast Riser steel end bearing plates- see testing requirements
- Repair Precast Riser spalling concrete
- Prepare Precast for installing traffic coating over full stadia
- Repair of steel beams encased in concrete at upper boxes
- Testing Beam Support Corbel- see testing requirements
- Lower Bowl Seating and Retaining Walls repair/replace
- Remove loose steel decking under walkway ramps
- Grouting of Sport Light pole bases
- Replace slabs within concession stands
- Replace Egress Stair at East side Elevator bridge
- Test all guardrails- see testing requirements
- Replace joint sealant at all wall/ramps intersections
- Clean and seal all exterior cmu walls
- Test Precast Wall panel connection- see testing requirements
- Test Spray Insulation in press box – see testing requirements
- Test/Inspect Roof Membrane to determine repairs

- Implement repair program on Precast Riser clip angle connectors
- Implement repair program on Precast Riser steel end bearing plates
- Implement repair on Beam Support Corbel
- Replace Precast Riser joint sealant throughout
- Repair Concrete Main load bearing frames minor spalling
- Repair Concrete Slabs at top of stadia
- Repair Cracking in Precast panels
- Clean and repair steel stairs at Mezzanine ends
- Repair or Replace all steel guardrails
- Repair cracks in cmu walls and seal
- Replace Sealant in exterior windows/ doors
- Repair Roof leaks or Replace roofing
- MEP systems- Not reviewed but assumed to be near end of service life based on observations
- Seating + Supports

FACILITY BACKGROUND:

Doyt Perry Stadium is a stadium in Bowling Green, Ohio, United States. It is primarily used for college football, and is the home field of the Bowling Green State University Falcons. The stadium was designed by Osborn-Papesh Architects of Cleveland, Ohio in 1965.

Constructed in 1966 for approximately $3 million as a replacement for the 43-year-old University Stadium, Doyt Perry Stadium had a capacity of 23,272 until bleacher seats were installed in both end zones in 1982 (those bleachers have since been removed, to give way for the Sebo Athletic Center and Falcon Club Boosters, giving BGSU the 24,000 current capacity).

On October 1, 1966, the stadium opened with a 13-0 win over Dayton. The stadium was named for Doyt L. Perry, a highly successful coach and athletic director at the school. Through 46 seasons, the Bowling Green Falcons have enjoyed an impressive record at Doyt Perry Stadium. Since that time, the Falcons have won over 66 percent of their home games, compiling a 140-68-6 record in the 214 games played at Doyt Perry Stadium.

On Oct. 8, 1983, a huge crowd of 33,527 packed into Perry Stadium for the annual Northwest Ohio rivalry between Bowling Green and Toledo, establishing a school and MAC record for single-game attendance. The Falcons went on to set a season record, breaking the six-digit figure for five games with a total draw of 100,021. It marked the first time in history that Bowling Green averaged more than 20,000 fans for five home football games.

That figure was topped in 1985, when Bowling Green posted a perfect record (11-0) in the regular season and clinched the MAC Championship by shutting out Toledo at Perry Stadium in November. More than 28,000 fans turned out that day, raising Bowling Green's season attendance to an average of 22,422.

In 1994, BG fans bettered the mark of 1985 as 114,802 fans, an average of 22,960, attended the five home games.

The construction of elevators on both sides of the stadium, completed in early 1998, has made the stadium more accessible for all fans.

In 2001 permanent lighting was installed at the venue.

In 2003, Falcon faithful attended sellout games against Northern Illinois and Toledo as ESPN broadcasted three games live from the facility and brought its weekly college football show, Gameday, to Bowling Green. That year, BGSU averaged more than 21,000 per home game.

For the 2007 football season the stadium received an upgrade. The Sebo Athletic Center encloses the North endzone and houses the band seating, luxury suites, offices, training facilities and new box offices. The traditional grass field was also replaced with a Field Turf artificial surface.

The stadium consists of two bowed sideline grandstands. Over the years the stadium also featured steel grandstands at the north and south ends.

Doyt Perry Stadium is more than just a football facility. The east side of the stadium includes locker rooms, equipment and training rooms, along with the Athletic Department offices. The west side is the home of the BGSU Golf Training Center, filled with a 1,200 square foot putting green, locker rooms and hitting bays.

Sitting atop the press box on the west side of the stadium is the plush Stadium Club. The Stadium Club's 106 theatre-type seats provide loyal BGSU fans with the best view of the game. The President's Box, located at the top of the east side of the stadium, provides luxury seating for the University President and guests, along with other supporters of Falcon football.

ARCHITECTURAL REVIEW:

The Stadium has four primary levels:

- Event/Concourse Level on which the playing field, team locker rooms, operations support spaces, public toilet rooms and concessions are located
- Mezzanine Level (partial on West + East sides)
- Suite Level (East side)
- PressBox Level (West side)
- Stadium Club Level (West side)
- Seating Bowl is made of separate concrete seating sections on the West and East sides
- The Sebo Center located at the North end was not included in this review

EVENT LEVEL: PUBLIC AREAS

TICKET BUILDINGS: There are (4) existing Ticket Buildings that are located outside the facility, they are located on the West and East sides (refer to figure 2).

Figure 2- Ticket Buildings

PUBLIC SIDEWALKS AND PAVING AROUND STADIUM: The existing pavement around the stadium for the concourse appeared generally in good condition on all sides around the facility where the public would have access. While previous replacement and patching of the pavement was visible and evident, the new pavement appeared flush and even with the existing material and posed no immediate hazard to spectators.

PUBLIC CONCOURSE: The exterior paving is effectively the public concourse. The paving was in good condition, no major holes, cracks or steps that would create any on-going issues.

PUBLIC RAMPED WALKWAYS: The seating bowl is primarily accessed from (8) large ramped walkways, with a distinctive "Y" shaped entry into the seating bowl (refer to figure 3). These ramps are at a slope of 1" rise over 10" of run, as indicated on the original drawings, but they contain no landings, it is one constant slope for approx. 9 feet of vertical rise. The slope and the arrangement do not comply with current building and accessibility codes, which would require a maximum slope of 1" rise over 12" of run and a landing for every 30" of rise. In the case of this location, you would be required to provide (4) 5'-0" long level landings and revise the slope of the ramp. This would add almost 40 feet to the overall length of these ramps at each location. Handrails would also be required on each side to comply with the current building codes (refer to figure 4).

Figure 3- View of Ramped Walkway to Seating Bowl

Figure 4- View of Ramped Walkway with Hand Rails

The construction on the top surface appears to be in acceptable condition. There are noticeable chalking and weathering issues with the CMU walls along the sides, but the walking surface has no visible issues.

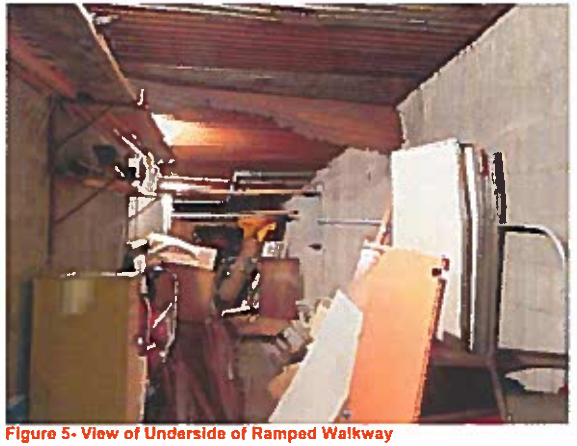

Figure 5- View of Underside of Ramped Walkway

However, the construction on the bottom side of these ramps is another issue (refer to figure 5). It was evident that the supporting metal deck has serious signs of deterioration and appears to be a safety issue for anyone accessing this space. Per the structural assessment, this is not specifically a structural concern, since this decking was used as a form for the ramp.

CONCESSION STANDS: The existing facility contains (8) freestanding concession stands with canopies located at the base of the ramped walkways (refer to figures 6 and 7). It is unclear how many point of sales (POS) machines are setup for each location, but 2-4 POS per stand seems reasonable. This would mean a total amount of 32 POS, which equates to approx. 1 POS for every 718 spectators. This is a very high ratio for a current college facility. We would recommend that the ratio should be closer to 1:200, which would mean a total amount of 115 POS, or an increase of around 83 POS. The public counter height is 3'-6" and would need to have a lowered portion at 3'-0" max. to comply with the current accessibility codes.

Figure 6- Interior of Concession Stand

Figure 7- View of Concession Stand

PUBLIC TOILETS: The existing facility contains a total of (4) Men's and (4) Women's Toilet Rooms. Generally these spaces were in good condition. The painted, floor mounted toilet partitions were in good condition and the ones tested appeared stable and structurally sound. A few locations showed signs of attempts to provide wheelchair accessible stalls, although it was observed that these did not appear to fully comply. These rooms also lacked the required ambulatory stalls and many of the toilet accessories were mounted higher than allowed (refer to figures 8 and 9). The rooms themselves had more than adequate turning clearances; however the existing entry and exit doorways do not. The quantity of existing toilets is well below the current code requirements and would need to be resolved in any future renovation.

Figure 8- Public Toilets- Toilets + Urinals

Figure 9- Public Toilets- Lavs

WAYFINDING SIGNAGE: Simple and clean wayfinding signage helps spectators navigate a facility. Very little wayfinding signage was visible. We did observe some painted letters at the entry to the ramped walkways. We would suggest this signage be

provided and possibly redesigned at least every ten years to keep the facility current.

BUILDING LIGHTING: The site visit was conducted during the day and as such we were not able to determine if the building/ site lighting was adequate or not. Based on observations of the lighting locations, we have no reason to believe there are problems with the lighting.

FOOTBALL FIELD:

FIELD TURF: The traditional grass field was replaced with Field Turf in 2007. The condition of the Field Turf appears to be in good condition. There were no visible defects or issues with the turf (refer to figure 10).

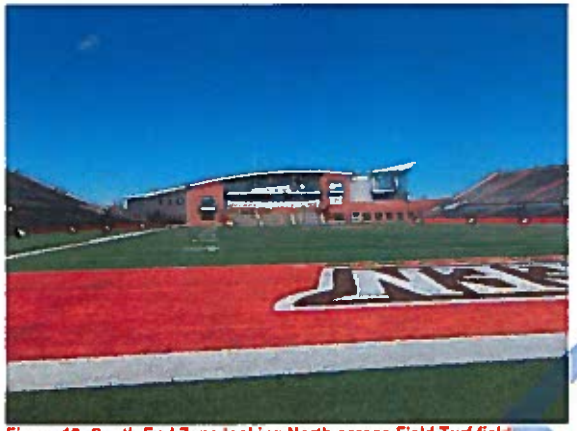

Figure 10- South End Zone looking North across Field Turf field

FIELD LIGHTING: The field lighting is provided from (4) Musco lightpoles. The site visit was conducted during a non-event time and as such we were not able to determine if the field lighting was adequate or not. Based on observations of the lighting quantity and locations, we have no reason to believe there are problems with field lighting (refer to figure 11).

Figure 11- View of Field Lighting, 4 poles

SCOREBOARD: Located at the South end of the field is the main video scoreboard for the facility. The scoreboard was built by Daktronics, originally installed in 2004, was upgraded for the 2012 season has a 15 mm pixel pitch spacing, and approx. 19' x 35' dimensions. The size of this board is on the smaller size for NCAA Division I football (refer to figure 12).

Figure 12- BGSU Video Scoreboard

EVENT LEVEL: TEAM AREAS

VISITING TEAM LOCKER ROOM: The Visiting Team locker room is located in the SE corner of the facility. The room is very dated and simple, but it does appear to have enough space for the intended use. We assume this room is used for all visiting teams (Football, Track, Soccer, etc...). We did not observe separate training facilities for the Visiting Teams, and all areas including the toilet and shower areas appear to be non-compliant with accessibility guidelines (refer to figure 13).

Figure 13- View of Visiting Team Lockers

FALCON'S TEAM LOCKER ROOMS (Track/Cross Country, and Men's Soccer): The various BGSU teams noted above located within the facility are generally dated and in need of revisions (refer to figures 14 and 15).

Figure 14- View of BGSU Men's Soccer Lockers

Figure 15- View of BGSU Track/Cross Country Lockers

FALCON ATHLETIC EQUIPMENT ROOM: The Athletic Equipment Storage room appears to be well organized and able to support the intended uses. The addition of more space would allow for a higher capacity storage system (refer to figure 16).

Figure 16- View of Athletic Equipment Storage Room

PLAYER'S LOUNGE: The Player's Lounge appears to be very small in size for the number of athletes it should serve. The current layout appears to have four activities, but it would be difficult to accommodate the number of people needed. The room is also dividable into three smaller spaces for multiple meetings. We would recommend that this room be increased in size to allow for more comfort and relaxation for the athletes (refer to figure 17).

Figure 17- View of Player's Lounge

FALCON FOOTBALL COACHES LOCKER ROOM- The Coach's locker room is located directly adjacent to the Football Locker room. The room contains separate toilet and shower areas, is in good condition and appears adequate.

FALCON FOOTBALL TEAM LOCKER ROOM: The Falcons Football Locker Room was recently renovated in 2007 as part of the Sebo Center project. The room appears larger and more spacious than the other locker rooms, with detailed wood lockers. The space appears very modern and comparable to other current major NCAA locker rooms with nicely done signage and graphics (refer to figures 18 and 19).

Figure 18- View of Football Locker Room

Figure 19- View of Football Locker Room cont'd

FALCONS TRAINING ROOM (located in the Sebo Center): The Training Room for the Falcon's is part of the Sebo Center and was constructed in 2007. This room is for all of the various sports located in the facility. The room generally appears adequate for the intended use including treatment and taping tables, and multiple hydro tubs for therapy (refer to figure 20).

Figure 20- View of Sebo Training Room

WEIGHT ROOM (located in the Sebo Center): The Weight Room for all associated BGSU sports is located in the Sebo Center and was also constructed in 2007. The room seems well equipped and in good condition. The issue is that the room is primarily used by the football team and the other sports have limited access for using this space. It would be recommended to either increase the size of the room or to provide a separate room for the other sports to utilize (refer to figure 21).

Figure 21- View of Sebo Weight Room

FALCON GOLF TRAINING CENTER: The west side of the facility is dominated by the home of the BGSU Golf Training Center, filled with a 1,200 square foot putting green, locker rooms and hitting bays. The complex was created within the (4) original handball courts. This complex appears to be a very unique feature that is available to the BGSU golf teams (refer to figure 22 thru 24). The associated locker rooms however, are very small and dated and could have some renovations to improve them but the golf training complex appears in good condition. Within the center, the Men's Cross Country team also appears to have their lockers located, we would recommend in a renovation, that these lockers be relocated.


Figure 22- View of Falcon Golf Training Center


Figure 23- View of Driving Range


Figure 24- View of Putting Green

BOH CORRIDORS: The backs of house corridors along this level were simple and clean and well lit.

MEZZANINE LEVEL:

OFFICE CORRIDOR: The East side Mezzanine Level runs under the full length of the seating. It contains various athletic and coaches offices and some associated conference, storage and related mechanical rooms. The enclosed portions like toilets and conference rooms on the North side have been constructed with a sub-roof system under the precast stadia. Many of these areas show signs of previous water damage over the years. The East office hallway is clean and well lit. Besides the water intrusion issue, the major item of note was the non-accessible hallway with the stairs located at each of the ramped walkways (2 locations within corridor). Actually, although a few offices on this level actually comply with the ADA due to the addition of the elevator in 1998, none of the toilet rooms do. This area would need to be resolved in any proposed renovation (refer to figure 25).

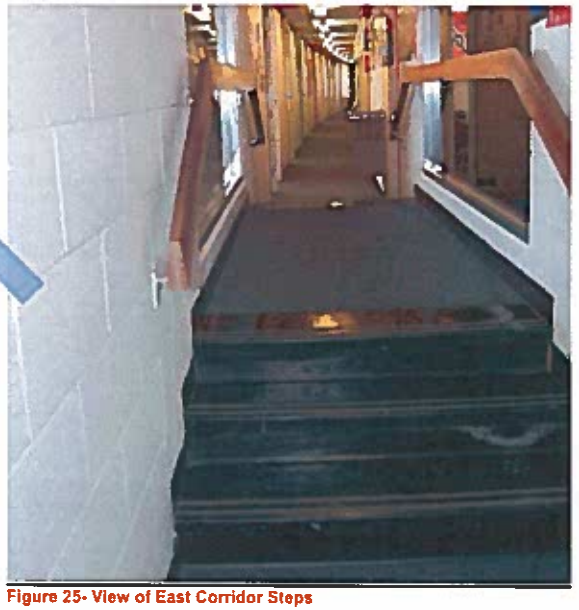
Figure 25- View of East Corridor Steps

The west side Mezzanine Level is much smaller due to the Golf Training Center. The West side is actually two, smaller un-connected buildings without elevator access. The buildings also contain a variety of athletic and coach offices. The portion at the North end also includes the Softball Locker Room. Again, these areas would be required to comply with accessible guidelines if a renovation occurs.

EGRESS STAIR TOWERS: The Mezzanine Levels on both sides of the facility have some interior and exterior egress stairways. Generally these stairs are in need of repair and re-painting to extend their life. The existing steel stairways from the Mezzanine floor and the Elevator access bridge all appear in various states of deterioration. The worst location is the egress stair on the South side of the stadium from the Elevator bridge. This stair is in immediate need or repair, due to the amount of rusting that is visible. This stair should not be used for fear of injuring visitors or spectators.

Figure 26- East Side Elevator Bridge Exit Stair- Corroded Steel

MEZZANINE EXTERIOR WALLS/ WINDOWS:
The Mezzanine Level is enclosed with CMU walls and have small windows for each office area. These offices have separate mechanical units mounted under the windows with an attached louver. Based on the existing drawings, it is not clear if any coating or sealer was installed over the exterior surface. The exterior wall is showing signs of water intrusion, noticeable from the visible staining seen on the walls (refer to figure 27). We would recommend the walls be cleaned and an appropriate sealer or coating be applied to limit water from entering the wall system. The construction of the Mezzanine also has an overhang condition that has the floor slab exposed to the exterior, we would suggest an insulated soffit be constructed to provide a more complete envelope.

Figure 27- Mezzanine Exterior Wall- Staining

The windows appear to be original to the facility and are 3/16" gray tinted single pane units per the drawings. These units should be replaced with insulated glass and associated sealant in order to extend the life of the facility. The insulation of the walls and roof should be increased as well.

SUITE/MEDIA LEVEL:

SELECT SEATS/SUITES (EAST SIDE): Along the East Side of the grandstands, there are (8) Suites and (1) President's Suite contained in a single story structure, it is accessed from the elevator and thru the seating bowl (refer to figure 28). The Suites contain two rows of seating with sloped glass toward the field. The sizes of the suites are very small in comparison to other football facilities. They are dated and lack space to provide much beyond the seats viewing the event. We would recommend a Suite Renovation to start within the next 3-5 years that would create a fresh new look for the Suites and associated spaces. The glass facing the field contains large vertical mullions that block some of the view (refer to figures 29 and 30). The President's Suite, with the associated Lounge area behind, seems appropriate for its use.

Figure 28- View of East Side Select Seats/ Suites

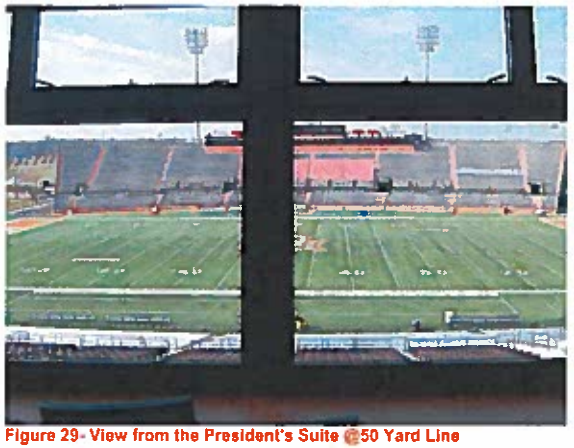

Figure 29- View from the President's Suite @50 Yard Line


Figure 30- View from North East Corner of Level

ROOFING: The single ply roofing above the Suite and Pressbox Levels appears generally in good condition. There are some minor areas that felt spongy when walking over, we would suggest a more formal review of the roofing from the manufacturer to determine the remaining life of the current roofing, we would estimate at least 5-8 years with some minor repairs (refer to figure 31).

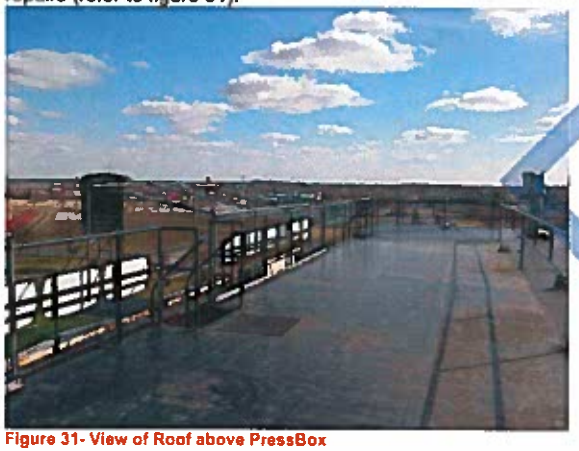
Figure 31- View of Roof above PressBox

PRESSBOX (WEST SIDE): The Pressbox Level was similar to the Suite Level on the opposite side except that it includes a second story (refer to figure 32). The spaces in general appeared to be very tight. Some of the spaces on the North side have been revised to Suites. There was a lot of space allowed for Visiting Teams including; Coaches, Radio and Athletic Director. The area allocated for the Working Press seems adequate. The use of the Dark Rooms was not clear today, it would seem possible for these rooms to be re-purposed in a renovation.


Figure 32- View of West Side PressBox

The finishes and overall design of the space feels dated. Most of the amenities seem to be provided, it is just a very compact design without much overflow space. Like the Suites, the egress from this space is out into the seating bowl and down the grandstands. There is no dedicated egress stair towers from these levels.

STADIUM CLUB LEVEL:

STADIUM CLUB: Sitting atop the Pressbox on the West side of the stadium is the plush Stadium Club. The Stadium Club's 106 theatre-type seats provide loyal BGSU fans with the best view of the game (refer to figure 33). The access to the Club is either from the West side elevator up to this level or access to the Pressbox and then up a dedicated stair. Associated with this interior portion, there are two exterior roof decks that are used for more spectators to view the game. There is only a single means of egress from this level, two should be provided to comply with the Building Code.

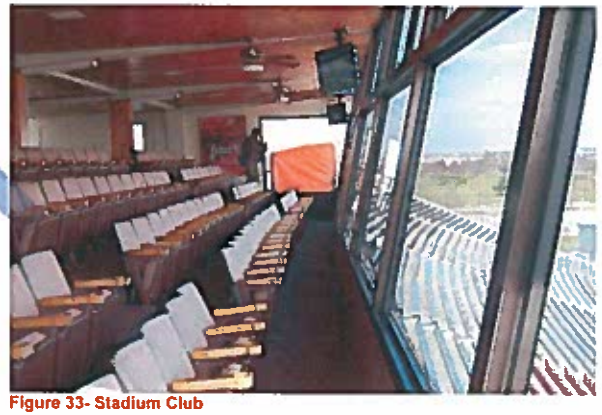
Figure 33- Stadium Club

VERTICAL CIRCULATION:
PASSENGER ELEVATORS- As noted, two elevators were added in 1998. One elevator is provided for each side. The one on the West side stops at the Pressbox and the Stadium Club. The one on the East side stops at the Mezzanine Level and the Suite Level. The elevators were not used during the site tour but appeared to be typical passenger elevators and were well maintained.

SEATING BOWL:

GENERAL ADMISSION BENCH SEATING:
The main seating bowl consists of aluminum bench seating. This seating allows for approx. 18" of width per person. This is fairly tight by stadium standards today (refer to figure 34).

Figure 34- View of General Admission Bench Seating

CHAIR BOX SEATING: Along both sides of the grandstands there are sections containing (6) rows of chairback "Box" seating. Also, the West side grandstand, within the middle seating sections there are also individual seat modules mounted to the existing aluminum benches (refer to figure 35).

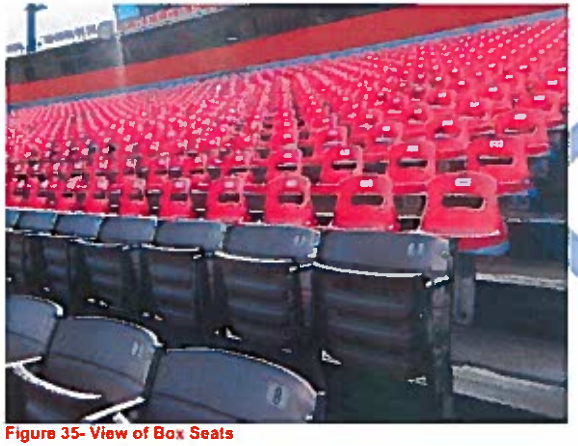

Figure 35- View of Box Seats

ACCESSIBLE SEATING PLATFORMS: In recent years accessible seating platforms have been installed over three existing rows (refer to figure 36). This occurs within the stadium at (4) locations on each side. These platforms appear to provide capacity for roughly 4 wheelchair and 4 companion seats. This would mean the facility has roughly 32 wheelchair and 32 companion total locations. This is less than what is required in the 2010 ADA Guidelines. Per these guidelines, 126 wheelchair and 126 companion seating is required. Also when the elevators were added to the facility, vertical dispersion should likely have been provided as well, this would allow for seating locations at the top of the bowl as well on both sides.

Figure 36- View of Accessible Seating Platform

STADIA: The precast stadia appears to have no coating over most of the seating bowl. There are a number of locations that have a traffic coating applied over occupied areas. This coating appears to have been repaired multiple times over the years, as the water damage underneath is visible. We would recommend a heavy duty coating be applied over all surfaces to help protect the concrete. There are areas of the precast that have been damaged by water penetration and require repair (refer to figure 37). The seating bowl does not have a center aisle railing which has improved safety results and is required by the Building Code. We would recommend adding this missing aisle railing to improve usability to an aging population.

Figure 37- View of Stepped Aisle

RAILING: The painted steel railing installed throughout the facility appears to be non-galvanized steel. The railings show signs of rust and deterioration and should be evaluated for compliance with Building Codes.

SEATING JOINT SEALANT: The sealant installed within the seating bowl is in various states of decline, as part of any major renovation, the sealant should be removed and replaced complete (refer to figure 38).

Figure 38- View of Seating Bowl Sealant/ Joint

FIELD ACCESS STAIRS/ EGRESS TO FIELD: The seating bowl relies on egress into the field in the event of emergency to accommodate all the spectators. These stairs (7) locations per side do not provide the required railings. These railings should be provided (refer to figure 39).

Figure 39- Field Access Stairs

TRAFFIC COATING/ WATERPROOFING: Various methods of waterproofing and traffic coatings have been installed over the occupied areas. In some areas, a membrane has been installed, but it is obvious that water has gotten under the membrane and is trapped between the concrete. This membrane has now delaminated from the concrete. We would recommend that this membrane be removed and the traffic coating be reviewed at all locations (refer to figure 40).

Figure 40- View of Delaminated Membrane

STRUCTURAL REVIEW

BACKGROUND:
Desai/Nasr Consulting Engineers, as part of the ROSSETTI Team were authorized to perform a Phase I Condition Assessment of the Structural Components for the existing Doyt Perry Stadium Facility located at Bowling Green State University (BGSU), Bowling Green, OH.

A walk-through of the captioned property was conducted on Friday March 8th, 2013. The walk-through was conducted by the following individuals:

Mr. Marc Steinhobel, P.E, SECB – Desai/Nasr Consulting Engineers, Inc.
Mr. Greg Sweeney, AIA, LEED AP - ROSSETTI
Mr. Sunghoon Jung, LEED AP BD+C - ROSSETTI

The purpose of the walk-through was to assess the general conditions of the premises. The walk-through inspection was limited to observations of elements that are readily accessible and visible. For many building types, this means that portions of the structure could not be observed because they are concealed by finishes. All reasonably accessible structural components, such as structure above "lay-in" type ceilings were observed.

No destructive or non-destructive testing was performed at this stage. As such, although it is useful for detecting gross issues, it may not detect every issue, especially subtle or hidden conditions.

Environmental issues, such as mold, asbestos, or any other hazardous material are not covered in the Structural Phase I Condition Assessment.

GENERAL BUILDING DESCRIPTION:
The Doyt Perry Stadium was designed by Osborn-Papesh Architects-Engineers in the mid 1960's. The available set of construction documents is dated July 1965.

Per the original drawings, the building is founded on conventional pad foundations bearing on soils with an allowable bearing pressure of 6,000psf at 5ft below grade and 4,000psf at 3ft below grade. The drawings show the foundation typically bear at 4ft to 5ft below the finished grade elevations and extend below the required frost depth.

Figure 41- View of Stadium from West Side

The east and west precast stadium seating is supported by 19 cast-in-place concrete frames that splay outwards from a central axis located at centerfield.

The lowest level of seating is constructed with cast-in-place concrete steps on grade bounded by cast-in-place concrete retaining walls on all sides. The high end retaining wall forms one side of the corridor that runs the length of the stadium on each side.

The remaining stepped seating is constructed with precast-Tee risers that bear on embedded steel plates cast into the supporting frames. The individual steps are tied together with clip angles that are mechanically fastened to steel inserts embedded in the precast.

Stadia seating frames are mechanically fastened to ½" diameter bolt insets embedded in the vertical portion of precast or cast-in-place risers.

To laterally stabilize the concrete frames and transfer lateral forces between the precast risers and the concrete frames, the steel embed plates at the ends of the risers are welded to the steel bearing plates cast in to the concrete frames.

Formed concrete ramps bearing on concrete masonry unit (CMU) walls provide access from the exterior to interior elevated bowl. The lower portion of the ramps are formed, cast-in-place tee shaped sections.

Mezzanines floors are constructed with 8ft wide precast double-tee sections spanning to cast-in-place girders supported by the main building columns.

The upper portions of the stadium, namely the east select seating and west press boxes are cast-in-place concrete with steel framed roof structure cantilevered out from the main column grid.

Two elevator towers were added for vertical transportation to upper levels. The towers are steel framed and clad with precast concrete panels.

The east elevator tower bridges over to the mezzanine office space.

Four steel stairs provide access to the ends of the mezzanine level. One additional steel stair provides access to the bridge linking the east elevator tower to the mezzanine level.

Various waterproofing and traffic coating systems have been applied to many areas of the precast risers in an attempt to prevent water from leaking into the occupied spaces on the ground and mezzanine floors below. In addition to the waterproofing/traffic coating applied to the top side of the precast, steel pan hard ceilings and gutters of various types and effectiveness have been installed on the underside.

The new north building was not included as a part of this condition assessment scope.

DOCUMENT REVIEW:
Prior to carrying out the walk-through, a drawing review was conducted to understand the initial design and construction methodology.

The documents available are:

- Osborn-Papesh Architects – Engineers Drawings, Dated 07/30/65
- Schooley Caldwell Associates – Condition Assessment, Dated March 14, 2012, revised July 24, 2012
- Concrete Microscopy Inc – Petrographic Examination, Dated March 1, 2012

These documents provided valuable insight into the original construction design and details and some indication of issues that have been previously identified.

The Schooley Caldwell Associates and Concrete Microscopy Reports deal with the deterioration of the retaining wall at the low end of the stadia. This cast-in-place concrete wall is discussed in the body of this Report.

STRUCTURAL CONDITION ASSESSMENT:
Visible issues, deterioration and defects discovered during the condition assessment are highlighted with photographic references. These items are prioritized as short term (within 1 year), and future (within 5 years) time span within which the conditions need to be repaired.

Recommendations are made on the need for further destructive or non-destructive testing to determine the cause and extent of significant defects identified. Order of magnitude repair/rehabilitation costs are included for issues identified.

In general, the structure has been well maintained and in overall good condition. However, it is approaching 50 years in service and reaching the end of its original design life. There are a number of issues, related to the construction practices at the time of construction and available materials that are showing signs of significant deterioration and need to be addresses to extend serviceable life. As with all things, maintenance and remedial costs will escalate as the structure ages.

The general observed condition and issues that need to be addressed are detailed below for each building component.

PRECAST CONCRETE RISERS:
In general the precast concrete risers are in good condition showing minor deterioration, some minor cracking and spalling. With the exception of the embedded steel connection plates and load transfers elements. It appears that the embedded steel elements were lightly hot-dip galvanized or coated with a zinc-rich paint.

CLIP ANGLE CONNECTORS – RISER TO RISER:
Few connectors were found to be in near to original condition (refer to figure 42). However, majority of the connectors that connect precast risers together show signs of corrosion.

Figure 42 Steel Connector in Near to Original Condition

This coating over time has been depleted in the sacrificial galvanic reaction process to a beyond its protection, resulting in moderate to severe corrosion of the remaining steel. The extent of corrosion varies from minor to severe with all connectors on the exposed back side showing some signs of corrosion (refer to figure 43).

- ***Comment:** The extent of corrosion does not appear to be affecting the integrity of structure. Left untreated this condition will continue to deteriorate. There are over 8,000 of these clip angles making it a costly and time consuming issue to address (future).*
- ***Testing:** Desai/Nasr recommends removing two to five of these clip angles and their bolts to determine the condition of the bolts and inserts and rate of steel deterioration. Test results to be used to estimate the remaining life and what, if any, remedial measures are required to slow or stop this corrosion (short term).*

Figure 43- Steel Connector Typical Corrosion of Exposed connectors

STEEL END BEARING PLATES:
Steel plates and angle embeds in the ends of the precast risers and concrete frame transfer load from the precast riser to the concrete frame. These plates and angles are welded together to transfer lateral loads between members. The details are clearly illustrated on Osborn-Papesh drawings sheet S-3 (refer to figure 44).

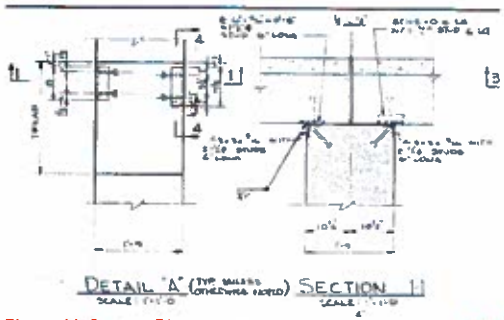

Figure 44- Precast Riser to Cast in Place Frame Typical Connection

During construction, steel shim stacks were used to level the precast risers and make up construction tolerances. These shim packs vary greatly in number and thickness of plates used. In an attempt to comply with the original details, the shim packs were welded together and to the embedded steel inserts. This steel assembly was observed to be moderately to severely corroded. The most severe corrosion was observed where the shim packs are high and/or where the shim plates were thin (refer to figure 45).

Figure 45- Corrosion at Thin Shim Plate – Welded completed Deteriorated

Figure 46- Corrosion of High Shim Stack – Note Rotation of Precast Beam

Rust jacking due to expansion of steel as it corrodes has broken most of the welds required to tie the structure together (refer to figure 46).

This condition occurs at over 2,000 locations.

The only location where no corrosion of the embedded plates was observed was at the expansion joint where the plates were not welded together (refer to figure 47).

Figure 47- No Corrosion at Expansion Joint – No Welds

- ***Comment:*** *Rust jacking due to corroding steel plates is a major issue that needs to be dealt with. This condition is causing joint damage, resulting in increased water leaking through the structure, potential trip hazards as observed on the south east end, as well as compromising the integrity of the structure by leaving the components of the structure un-restrained or attached. Due to the number of locations, this single issue may be cost prohibitive to address. An order of magnitude cost estimate is possible only after the results of testing have been reviewed and possible repair solutions developed (short term).*
- ***Testing:*** *The extent and severity of the corrosion needs to be established to determine the best repair. At least 10 locations need to be tested showing varying states of deterioration. All rusted material should be removed to expose any remaining virgin steel or intact welding. Samples of the steel shim plates should be analyzed for chemical composition (short term).*

PRECAST RISER JOINT SEALANT:

The horizontal and vertical joints between the precast risers are filled with polysulfide base hard sealant, according to the original drawings (refer to figures 48 and 49). The sealant observed in these joints appears to be mainly the original sealant, other than locations where various repairs and patches have been applied below layers of waterproofing and traffic coating.

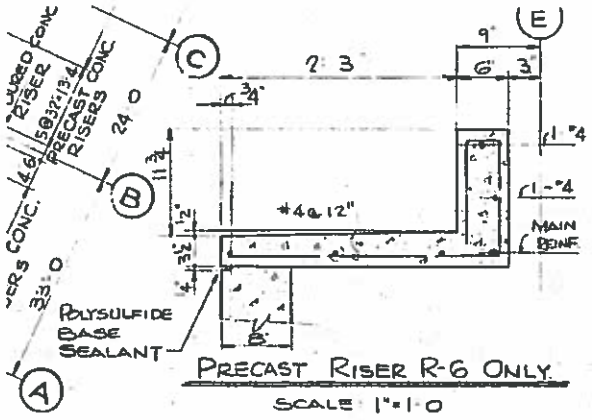

Figure 48- Precast Riser Joint Sealant Details – Horizontal Joint

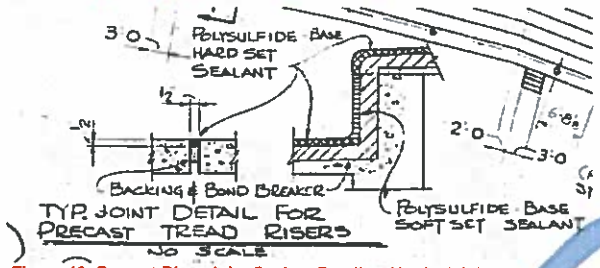

Figure 49- Precast Riser Joint Sealant Details – Vertical Joint

This hard compound can resist limited movement due to expansion and contraction of the structure. The joint, especially the vertical has been damaged by the amount of movement observed due to jacking of the shim stacks allowing water to leak through the joint accelerating the corrosion of the steel embeds and shim stacks below (refer to figures 50 and 51). The joint sealant is beyond is serviceable life and should be removed. There is over 35,000 lf of joint sealant.

Figure 50- Horizontal Joint Sealant – Failure

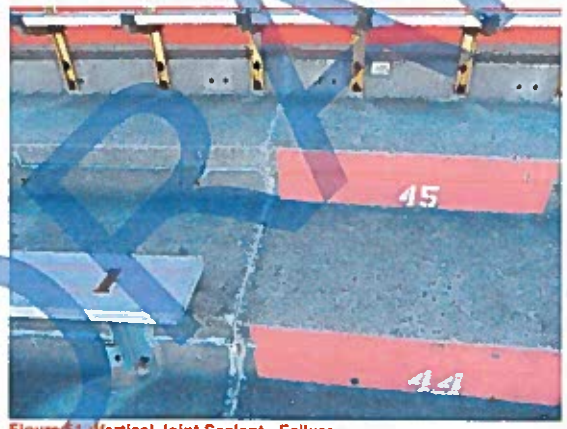

Figure 51- Vertical Joint Sealant - Failure

Comment: *Joint sealant should be removed and replaced with a durable compound that can expand and contract as required. Replacing the joint sealant should only occur after the corrosion of the steel embeds and shim stacks has been addressed (future).*

PRECAST RISER CONCRETE SPALLING:

Small areas of spalled concrete were observed on the top side of the stadia. The majority of spalls were observed in the access aisles that carry most of the foot traffic (refer to figure 52).

Figure 52- Precast Riser – Spalling

Comment: *These spalls are a potential trip hazard and could result in further deterioration of the structural element if not addressed. Removal of loose concrete and cleaning of exposed steel before applying a troweled on mortar patch is recommend for these small areas (short term).*

PRECAST RISER APPLIED WATERPROOFING/TRAFFIC COATING:

To prevent/reduce the amount of water leaking into the occupied spaces below, various waterproofing and traffic coating systems have been applied to the top of the precast risers and over the joints in the precast.

Figure 53- Waterproofing Membrane at Joint – Failure

Delamination, cracking and failure of the waterproofing membranes and applied traffic coating was observed through the structure (refer to figures 53, 54 and 55). In some areas the waterproofing is trapping water under the membrane allowing it to penetrate through the structure.

The area of elevated precast risers is estimated at around 78,000 sf.

Comment: *To reduce the amount of water leaking through the structure into occupied spaces below and corroding the steel connections, a traffic coating is recommended to be applied to the entire top surface of the elevated precast risers and cast-in-place top slab areas. This work should only be carried out after all the other structural issues identified have been addressed (short term/future depending on severity of leaks).*

Figure 54- Waterproofing Membrane at Precast Top - Failure

Figure 55- Applied Traffic Coating – Failure at Joint

CAST-IN-PLACE CONCRETE:
In general the cast-in-place concrete elements are in good condition for their age, with the exception of the lower bowl retaining walls and lower steps which is discussed in detail below.

<u>MAIN LOAD BEARING FRAMES</u>: Minor spalling of concrete due to insufficient cover to shear ties was observed at two elevated beams (refer to figure 56).

Figure 56 – Concrete Spalling at Main Frame Beam

Comment: *Any loose or deteriorated concrete should be removed and exposed reinforcing bars cleaned of all rust. A corrosion inhibiting bonding agent should be applied to steel and concrete under new trowel applied mortar patch to restore adequate concrete cover (future).*

<u>SLABS AT TOP OF STADIA:</u>
The top section of the stadia changes back from precast riser to a flat cast-in-place concrete slab. Cracking parallel to the span was observed consistently along the underside of this slab. The cracks do not appear to be affecting the durability or integrity of the structure at this time (refer to figure 57).

Ponding was observed on the north end of the east stadia. This ponding is penetrating the slab and freeze thaw action is breaking up the concrete slab and edge curb (refer to figure 58).

Comment: *The deterioration of the concrete on the upper flat slab at the north east corner should be addressed (short term).*

Testing: Desai/Nasr recommends petrographic analyses of *two cores through the upper slab on the north east and south east*

corners to determine the condition of the concrete and type and extent of repair required (short term).

Figure 57- Shrinkage Cracking in Concrete

Figure 58- Deterioration of Slab and Curb

EXPOSED FRAME AT EMBEDDED STEEL PLATES:
Along the building expansion joint, the cast-in-place concrete frames column projects through the slab and is topped with an embedded steel plate (refer to figure 59). The probable cause of this concrete deterioration is freeze/thaw cycling in concrete with no entrained air.

Figure 59- Deterioration of Exposed Concrete Column at Embed Plate

***Comment:** The damaged concrete should be removed and patched with a suitable trowel applied mortar.*

STEEL BEAMS ENCASED IN CONCRETE AT UPPER BOXES:
The cantilevered roof framing of the upper boxes is structural steel. This steel is encased in concrete at the perimeter. Spalling of concrete due to in-sufficient cover was noted where the beam bears on the central column (refer to figure 60).

***Comment:** The damaged concrete should be removed, the exposed steel cleaned, a corrosion inhibiting bonding agent applied and area patched with a suitable trowel applied mortar (short term).*

Figure 60- Spalling of Concrete Encasement at Embedded Steel Beam

BEAM SUPPORT CORBEL
In the concessions kitchen area below the west stadia a shear crack was observed in the corbel. This crack is a sign of shear failure (refer to figure 61).

Figure 61- Cracking and Failure of Corbel

Comment: *This crack is an indication of structural failure and needs to be addresses as soon as possible. The probable cause is improperly located shear reinforcing (short term).*

Testing: *Pacometer or penetrating Radar testing to determine location, configuration, size and number of reinforcing bars is recommended. This will determine the extent of repair required (short term).*

LOWER BOWL SEATING AND RETAINING WALLS:
The lower bowl retaining wall deterioration (refer to figures 62 and 63) has been previously assessed in the Schooley Caldwell Associates Report and Concrete Microscopy Petrographic Examination. Visual observations and the review of these reports concludes that the wall is deteriorating due to breakdown of concrete due to combination of the effects of alkali-aggregate reactions, freeze/thaw cycles in low air content concrete and high permeability.

Alkali-aggregate reaction is an expansive chemical reaction between certain minerals found in course aggregate and the alkalies in Portland cement resulting in expansion, cracking and facture of the concrete matrix. Standard practice is to entrain air at a rate of approximately 6% for concrete, with ¾ inch nominal aggregate, subjected to severe exposure. Air content was measured at 2% to 3% in the damaged portion of the wall.

Figure 62- Deterioration of Concrete Retaining Wall

Figure 63- Deterioration of Concrete Return Walls

The Schooley Caldwell Associates Report presented four options for repairing the damaged wall. However, the report only addresses the lowest portion of the wall and horizontal slab to the first step.

Damage and deterioration of the concrete was also observed on the second and third riser of the stadia, the side retaining walls and steps down to the field (refer to figures 64 and 65).

Figure 64- Deterioration of Cast-in-Place Concrete Risers

Figure 65- Deterioration of Concrete Stair and Wall

Comment: *The Schooley Caldwell Associates Report underestimates the extent of the repairs required to address this issue. Future modifications/enhancement of the stadia should consider reworking or re-constructing at least the front and side retaining walls as well as the first four rows of seating if not more of the lower bowl (short term).*

SHRINKAGE CRACKING ON CORRIDOR LID:
Minor shrinkage cracking was observed in the cast-in-place concrete slab over the corridor between expansion joints (refer to figure 66). This cracking has no impact on structural integrity provided, water and de-icing salts do not penetrate into the concrete with the potential for damage due to corroding reinforcing bars.


Figure 66- Shrinkage Cracking in Reinforced Concrete Slab

ACCESS RAMPS:
The sloping cast-in-place concrete access ramps are supported by CMU side walls. To form the slabs during construction light steel corrugated form deck was used (refer to figure 67). Over-time, this form deck has severely corroded and is peeling away from the concrete.


Figure 67- Delaminating steel Form Deck

Comment: *The peeling deck has no structural impact. However, from a safety standpoint the loose and damaged portions should be removed to prevent head injuries to people who access these areas used for storage (short term).*

LIGHT POLE BASES:
Minor deterioration of the grout bed below the light pole base plates was observed. Cracking of the concrete base slab has occurred at one location (refer to figure 68).


Figure 68- Light Pole Support Base Cracking and Grout Deterioration

Comment: *To prevent future damage, the deteriorated grout and damaged concrete should be removed and patched (short term).*

EXTERIOR CONCESSION STRUCTURE:
Six precast concrete concession structures are located on the exterior of the stadia (refer to figure 69).

SLAB ON GRADE:
The slab on grade in all of the concession structures is cracked and showing signs of frost heave, resulting in potential trip hazards inside the area and at the access points.

Comment: *Heaving concrete should be removed, fill below the slab should be replaced with frost resistant material before a new slab is cast (short term).*


Figure 69- Frost Heave at Slab on Grade in Concessions

PRECAST CONCRETE:
In general the precast concrete is in good condition with some minor damage and deterioration due to; corrosion of embedded steel elements used to connect roof double-tees to column tees, cracking and spalling caused by corroding reinforcing (refer to figure 70).


Figure 70- Cracking of Concrete and Corrosion of Steel Embeds

***Comment:** Cracking in the precast and corroding of steel should be addressed to extend the life of these structures and restore their aesthetic (future).*

SEATING CONNECTION:
The design drawing shows steel inserts cast into the precast risers for attaching the vertical seat supports. Although the bolts used are not galvanized they appear to be in acceptable condition considering their age (refer to figure 71). Replacing seats may require a custom connection to take advantage of the existing embeds or the use of expansion or adhesive anchors.

Figure 71- Typical Seat to Precast Connection

STRUCTURAL STEEL STAIRS AND RAILS:

STAIRS:
The original steel stairs accessing the ends of the stadia are constructed of raised lug steel plate floor plate. Considering the age of the structure they are in reasonable condition. Minor steel corrosion and some concrete spalling at steel embedded connectors were observed at these stairs (refer to figure 72).

Figure 72- Minor Corrosion of Checkered Plate Stair

The newer stair on the east side that provides access to the bridge linking the elevator tower to the mezzanine offices is in very poor conditions. The composite metal floor deck is completely destroyed by corrosion. Most if the supporting steel members are showing signs of moderate to severe corrosion (refer to figure 73).

Figure 73- Severe Corrosion of Steel and Deck at Bridge Stair

***Comment:** Cleaning and patching of the original steel stairs and concrete will restore these elements and extend their serviceable life (future).*
The newer stair needs to be removed and re-built to provide safe access to the bridge (short term).

GUARDRAILS:
Original steel guardrails along the north and south ends of the stadia are reaching the ends of their serviceable life. Corrosion of steel pipe rails and post members, joins base connections and welds is moderate to severe (refer to figures 74 and 75).

Figure 74- Split in Guardrail Top Rail

Various repairs and fixes have taken place. Most noticeable are the repairs to the base connections where new plate bracket have been expansion anchored to walls and curbs.

***Comment:** To ensure the guardrails comply with the code required strength to resist a point load of 200lbs or 50plf, we recommend that the guardrails are replaced or repaired (future).*

***Testing:** Horizontal load test should be carried out to all the guardrails to determine the ability of the aging guardrail to rest the code specified loading (short term).*

Figure 75- Corrosion of Embed Plates and Steel Mesh Framing

CONCRETE MASONRY UNIT WALLS (CMU):
In general the CMU walls are in in good condition throughout the structure.

Stepped cracking in two CMU bathroom divider walls were observed (refer to figure 76). The cracking appears to be caused by excessive deflection of the supporting structural members.

Figure 76- Stepped Crack in CMU Wall

Moisture penetrating through the painted CMU wall was observed in the golf practice space (refer to figure 77). Water is leaking into the CMU from damaged or deteriorated control joint sealing along the edges of the concrete ramps supported by the wall. This moisture penetration could be occurring at more locations, but is highlighted here by the peeling paint.

Figure 77- Moisture Penetrating into CMU Wall From Above

Comment: *Structurally, the cracks are minor and can be filled with a flexible sealant. If they are aesthetically un-acceptable then the tile will need to be removed. Additional vertical control joints cut into the CMU wall, the cracks repaired and wall re-tiled, with proper jointing (future).*

Joint sealant along the sides of the concrete ramps should be ground out and replaced with suitable sealant to limit the amount of moisture penetrating into the supporting CMU walls (short term).

EXTERIOR NON-STRUCTURAL ELEMENTS:

WINDOWS AND WINDOW SEALANT:
The exterior window sealant is beyond serviceable life and is hard, cracked, peeling and non-existing in places (refer to figure 78).

Comment: *Wall window sealant should be removed and replaced with a suitable flexible sealant (future).*

Figure 78- Window Sealant Joint - Deteriorated

PRECAST PANELS:
The original drawings show the upper precast panels by-passing the exterior face of the cast-in-place concrete support members. Attachment of the panels is provided by short section of L2 ½ x 2 ½ x ¼ angles field welded to embedded steel plates and angles.

Figure 79 – Bulge in Precast Panel

Previous issues with the precast panel connections resulted in the removal of small exterior decorative panels and installation of new guardrails.

The remaining precast panels, the rear side of the elevated boxes, are in a better condition as the connectors are located inside and protected from corrosion. At one location on the west side a failed connection was observed with signs of the precast panel bulging outwards (refer to figure 79).

Comment: *The attachment of the precast panels to the structure has limited redundancy. Failure of a single connection could result in a panel falling (short term).*

Testing: *Desai/Nasr recommends that all the steel connections attaching the precast panels to the structure be exposed, welds inspected by a qualified welding inspector and damaged or deficient welds or connections should be repaired as required (short term).*

A crack in the precast window surround was observed at one location (refer to figure 80). This crack should be epoxy grouted to prevent further damage or deterioration.

Figure 80- Crack in Precast Window Surround

INTERIOR NON-STRUCTURAL ELEMENTS:

HARD PAN CEILINGS:

In the occupied mezzanine toilets, hard steel ceilings have been provided to protect the space from water leaking through the stadia risers. No insulation is provided above the hard ceiling and it appears that condensation due to a dew point induced by the steel ceiling is causing the paint to peel (refer to figure 81).

Figure 81 - Humidity Corroding Underside of Hard Pan Ceiling

SPRAY ON INSULATION IN PRESS BOXES:

Spray-on thermal or sound insulation has been applied to the roof slab of the upper boxes. Water leaking through the roof into the insulation is causing discoloration and potential mold formation (refer to figure 82).

Comment: *Leaks through the roof need to be fixed (future).*

Testing: *Discolored insulation should be tested for the presence of mold (short term).*

Figure 82 - Mold/Discoloration of Spray on Insulation

STEEL MESH SUN SCREEN:

Minor rusting and corrosion of the plain steel mesh used to construct the sunscreen was observed (refer to figure 83). Regular maintenance and painting should extend its serviceable life.

Figure 83- Corrosion of Steel Mesh Sunscreen

ELEVATOR TOWERS:
The precast panels surrounding the elevator towers appear in good condition (refer to figure 84).


Figure 84- Elevator Tower

ROOFING:
The high roofs above the boxes areas appear to be sound with no signs of cracking, delamination or hardening. There are areas underfoot that appeared soft and/or bulging (refer to figure 85).

Comment: Soft spots in the roofing along with signs of leaking due to discoloration of spray-on material indicate the need for further investigation (future).

Testing: *The membrane roofing should be inspected by a qualified roofing specialist to determine the need for repairs and remaining serviceable life (short term).*


Figure 85- High Roof Membrane

TESTING REQUIREMENTS

Structural Element	Test Type	Location	Number	Remark
Steel Clip Angle and Bolt Connecting Precast Risers	Determine Severity of Steel Corrosion	Underside of precast risers - Both Stadia	5	Remove existing clips and connecting bolts in varing condition, remove all rusted material and measure thickness of remaining virgin steel.
Embedded Steel Elements and Shim Plates at Precast Riser to Cast-in-Place Frame Connection	Determine Severity of Steel Corrosion and composition/quality of steel shim plates.	Ends of precast risers - Both Stadia	10	Remove all corrosion from embed plates and shim plate and measure size and thickness of remaining virgin steel. Take three samples of steel shim plates and determine their chemical composition. These shim plates appear to be corroding at an accelerated rate.
Cast-in-Place Concrete Slab deterioration	Petrographic Analysis of Concrete	Cast-in-place concrete slab at top of Stadia. Take cores through slab at north end south ends of east stadia.	2	
Failing Cast-in-Place Concrete Corbel	Pacometer or Penetrating Radar to determine size and location of shear reinforcing bars.	Corbel in concessions preparation area.	1	
Steel Guard Rail	Horizontal Load Test	Side rails at edges of stadia.	6	Apply incremental loads up to 1.6 times the code specified point load. Stop test if any signs of excessive defleciton or failure is observed. Measure deflection under load and after load has been applied to verify elastic load transfer.
Steel Clip Angles Supporting Elevated Precast Panels	Visual observation of Connection	All elevated original precast panels at upper press boxes - Both Stadia.		Expose and visually observe condition of all steel connections. Report any signs of deterioration, cracking or failure.
Spray on material	Test discoloration of spray on material for signs of dangerous mold.	Underside of slabs at press boxes - Both Stadia	4	
Roof Mebrane	Visual and adhesion test of roofing	High roof areas- Both Stadia	3 Areas	Inspection of roofing material by specialist to determine condition, remianing life and repair work required.

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October 14, 2013 (updated October 29, 2013)

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RE: BGSU Doyt Perry Stadium – Test Result Review
DNCE Project No. 7918

Dear Dave,

TTL Associates have completed their testing work at Doyt Perry Stadium. The following reports, prepared by TTL Associates, were received via Rossetti Architecture:

- Structural and Environmental Investigation – TTL Project No. 10161.01, dated September 28, 2013
- Steel Chemical Analysis – E Report No. TTL001-13-09-50662-1, dated September 25, 2013
- Petrographic Examination – Concrete Microscopy Project 0913-3882, dated September 18, 2013
- GPR Reinforcing Evaluation – GPR Systems Inc, dated September 4, 2013
- Fungal Sampling – TTL Project No. 10161.01, dated September 27, 2013
- Full Facility Roof Report – Tim Tache, dated October 1, 2013
- Structural Steel Examination Report – TTL Project No. 10161.01, dated October 15, 2013.

The testing was carried out in general compliance with tests proposed in Facility Condition Assessment prepared by Rossetti dated April 4, 2013. Specifically the testing table prepared by Rossetti and Desai/Nasr Consulting Engineers included in the Condition Assessment Report.

Each structural item identified for testing, addressed in the TTL reports, is listed below with comment on results of test and recommendations for moving forward.

Steel Clip Angle and Bolt Connecting Precast Risers

Test Results

Based on the TTL test results, the corrosion observed on the clip angles and bolts on the back side of the precast risers is minor with no loss of steel section and no indication of corrosive pitting.

Recommended Action to Extend Serviceable Life

No action required to extend the life of the structure for up to 5 years. To extend the life further we recommend cleaning and coating with Zinc Rich paint.

Embedded Steel Elements and Shim Plates at Precast Riser Support

Test Results

The thickness of the shim plates used ranges from 1/16" to 3/8". The height of the shim stacks vary from no plates to over 10 plates in a stack. Medium to high shim stacks were achieved by stacking numerous 1/16" or 1/8" plate and field welding together.

The most severe corrosion, rust jacking, rotation and weld failure occurred at "high" shim stacks. The amount of rust jacking and rotation is magnified by the use of thin multiple shim plates as corrosion occurs on the exposed surface.

A stack of (3)-1/8" shim plates, typically result in rust expansion of 42times the corroded thickness, in comparison to (1)-3/8" shim plate which would result in rust expansion of 14times the corroded thickness. Assuming corrosion on both faces of each plate.

Corrosion of the shim plates on east stadia is severe at Rust Grade D. On the west stadia the overall condition varies between Rust Grade A through D.

The corrosion is so severe on the 1/16" and 1/8" plates that blast clearing disintegrated large portions of the plates.

The rust jacking between plates have cracked and damaged the welds.

Chemical analysis of the plate material confirms compliance with ASTM Grade 36 steel.

Recommended Action to Extend Serviceable Life

There are a total of 48 locations in four isolated areas where high shim plate stacks were used. At these locations the precast planks need to be shored/jacked up, the corroded steel removed and replaced with thicker, galvanized steel.

Alternatively, precast risers can be shored/jacked up, corroded high shim stacks removed and repaired with properly engineered concrete corbel and a steel bearing plate.

There are an additional 816 steel bearing locations at the ends of the precast risers. 660 of these are welded connections and 156 are not welded at the expansion joints. Some level of repair is required at each of these connection points to restore integrity of the structural system and extend serviceable life.

A majority of the repairs will require the risers to be shored/jacked up, the corroded steel removed and replaced with thicker, galvanized steel adequately welded to the embedded steel structure. The estimated cost of this is $955,000.00

The costs of the repairs does not take into account the disruption of the occupied space below, and repairs to finished spaces.

Petrographic Analysis of Cast-in-Place Concrete

Test Results
The petrographic analysis showed positive results on the composition and condition of the cast in place concrete at the location where cores were taken.

Recommended Action to Extend Serviceable Life
The cracks in the cast-in-place concrete at the upper level of the stadia should be routed our and filled with penetrating epoxy filler. The purpose of the penetrating epoxy filler is to protect embedded reinforcing from corroding due to penetrating water and salts.

GPR of Cracked Concrete Corbel

Test Results
The GPR scan of the cracked concrete corbel, identified the size and location of reinforcing in the concrete corbel. It appears that the shear reinforcing shown on the construction documents shifted during concrete placement. No reinforcing was detected in the corbel.

Recommended Action to Extend Serviceable Life
The failed corbel needs to be repaired to restore structural integrity. A suitable repair, such as, galvanized steel bracket, needs to be designed and installed. The estimated cost of corbel design is $2,000. Including one site visit to observe repair.

Steel Guardrail Load Test

Test Results
All guardrails tested passed the load test. In their current condition the guardrails comply with code required loading requirements.

Recommended Action to Extend Serviceable Life
No action required.

Clip angles and Embedded Plates Supporting Elevated Precast Panels

Test Results
The steel angles, embedded steel plates and welds supporting the precast panels were inspected. Minor surface corrosions was observed in limited locations.

Recommended Action to Extend Serviceable Life
No action required in the short term. For longer term it is recommended that plates showing signs of minor surface corrosion are cleaned and coated with a Zinc Rich Coating.

Spray on Material

Test Results
The testing of the spray on material identified water damage and fungal growth in the spray on material.

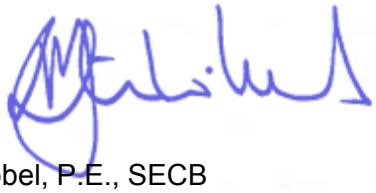
Recommended Action to Extend Serviceable Life
The test report recommends the removal and replace of all spray on material with water damage or fungal growth. The spray on material should be tested for asbestos before removal.

Roof Membrane

Test Results
The Roof Report recommended $71,400 in repairs required to extend the life of the roof membranes, as detailed in Report. Total replacement of all roofs inspected is estimated at approximately $173,000.

Recommended Action to Extend Serviceable Life
The recommended repairs should be completed to extend live of existing roof and delay higher replacement costs.

If there are any questions regarding the above, please do not hesitate to call.
Sincerely,



Marc Steinhobel, P.E., SECB
Principal
DESAI/NASR CONSULTING ENGINEERS INC.

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