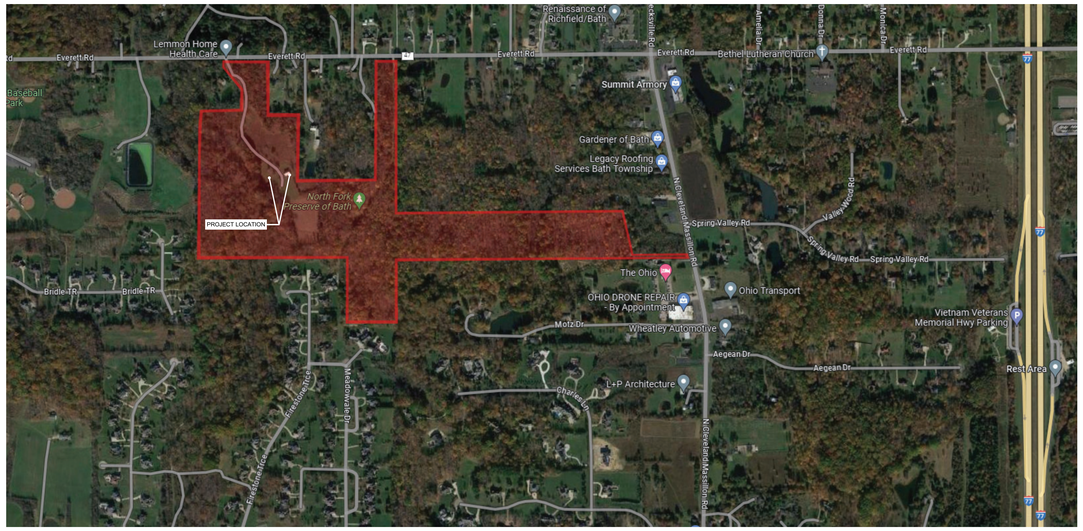
NORTH FORK PRESERVE BARN AND RESTROOM

PROJECT LOCATION MAP



SYMBOLS

- DETAIL (1 / A4.00)
- EXTERIOR ELEVATION (1 / A2.00)
- BUILDING SECTION (1 / A3.00)
- INTERIOR ELEVATION (1, 2, 3, 4 / A5.00)
- WALL SECTION (2 / A3.00)
- CENTERLINE AND GRID (J)
- WALL TYPE (3)
- MATERIAL TYPE (3)
- DOOR TAG (101A)
- WINDOW TAG (3)

MATERIALS LEGEND

- DIMENSIONAL LUMBER
- PLYWOOD
- FINISH WOOD
- GYPSUM BOARD
- BRICK
- EARTH
- STONE VENEER
- BLOCKING
- GRAVEL
- CONCRETE
- CONCRETE BLOCK
- STEEL
- RIGID INSULATION
- SPRAY FOAM INSULATION
- MINERAL WOOL INSULATION
- METAL DECK

BATH TOWNSHIP 1818

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CONTACT: MARK ENOS

STRUCTURAL - BARN

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MEP

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P: 216.531.8880

CONTACT: ROBERT SOTOCK & SCOTT SUSTAR

PROJECT GENERAL NOTES

THE CONTRACTOR WILL FURNISH ALL LABOR, MATERIAL, EQUIPMENT, PERMITS, TAXES, AND INSURANCE NECESSARY TO COMPLETE THE WORK INDICATED AND/ OR IMPLIED IN THE CONSTRUCTION DOCUMENTS UNLESS NOTED OTHERWISE AND WILL COORDINATE THE WORK RESPONSIBILITIES OF ALL SUBCONTRACTORS. ALL LABOR AND MATERIALS TO CARRY OUT FULLY THE INTENTIONS OF THE PLANS AND SPECIFICATIONS ARE PART OF THE CONTRACT, WHETHER OR NOT SPECIFICALLY DOCUMENTED.

ALL WORK WILL CONFORM TO THE CURRENT OHIO BUILDING, MECHANICAL & PLUMBING CODES, AS WELL AS THE CURRENT NATIONAL BOARD OF FIRE UNDERWRITERS AND ALL OTHER APPLICABLE CITY CODES, LOCAL LAWS, AND AUTHORITIES HAVING JURISDICTION. CODE STANDARDS AND PUBLICATIONS OF PRIVATE AND PUBLIC BODIES MENTIONED WITHIN THE SPECIFICATIONS OR ON THE DRAWINGS, WILL BE CONSIDERED TO BE THOSE IN FORCE AT THE TIME OF THE CONTRACT AWARD.

THE CONTRACTOR WILL BE RESPONSIBLE FOR ALL CONTROLLED INSPECTIONS AND ANY TECHNICAL TESTING REQUIRED FOR CONTROLLED INSPECTIONS AS STIPULATED BY ALL APPLICABLE CODES.

ALL MANUFACTURED ARTICLES, MATERIALS, AND EQUIPMENT WILL BE NEW AND FREE OF DEFECTS AND WILL BE SUPPLIED, INSTALLED, CONNECTED, ERECTED, USED, CLEANED, AND CONDITIONED AS DIRECTED BY THE RESPECTIVE MANUFACTURERS, UNLESS SPECIFIED OTHERWISE.

THE CONTRACTOR WILL NOTIFY THE ARCHITECT OF ANY ERRORS, OMISSIONS, CONFLICTS, OR AMBIGUITIES IN AND BETWEEN THE DRAWINGS AND THE SPECIFICATIONS PRIOR TO PROCEEDING WITH THE WORK. IF SUCH NOTICE IS NOT FURNISHED TO THE ARCHITECT, THE CONTRACTOR WILL BE DEEMED TO HAVE INSPECTED THE DRAWINGS AND SPECIFICATIONS AND TO HAVE FOUND THEM IN PROPER FORM FOR EXECUTION.

THE CONTRACTOR REPRESENTS THAT HE HAS HAD ADEQUATE ACCESS TO THE JOB SITE AND BUILDING AREA IN WHICH THE WORK IS TO BE PERFORMED, THAT HE HAS SATISFIED HIMSELF AT TO THE NATURE AND LOCATION OF WORK, INCLUDING ANY OBSTRUCTIONS, SCOPE OF WORK, ACTUAL LEVELS, THE EQUIPMENT AND FACILITIES NEEDED PRELIMINARY TO AND DURING THE EXECUTION OF THE WORK AND ALL OTHER MATTERS, WHICH CAN IN ANY WAY AFFECT THE WORK OR THE COST THEREOF UNDER THIS CONTRACT, AND THAT HE HAS STUDIED THE CONTRACT DOCUMENTS AND ALL OTHER DOCUMENTS PERTAINING TO THE INSTALLATION OF OTHER TRADES WHICH MAY INFLUENCE HIS WORK.

THE CONTRACTOR WILL ASSUME FULL RESPONSIBILITY, INCLUDING RESPONSIBILITY FOR ALL RELATED COSTS FOR ANY AND ALL WORK DONE WITHOUT THE APPROVAL OF THE ARCHITECT IF SUCH WORK IS IN CONFLICT WITH THE CONTRACT, DRAWINGS, OR SPECIFICATIONS.

THE OWNER WILL ESTABLISH THE LIMITS OF THE CONSTRUCTION SITE IN ADDITION TO ANY CONTRACT LIMIT LINES SHOWN IN THE DRAWINGS. THE CONTRACTOR WILL CONTINUE HIS OPERATIONS WITHIN THESE LIMITS, UNLESS UPON WRITTEN REQUEST AND REPLY, A VARIANCE IS AGREED TO BY THE OWNER. THE CONTRACTOR WILL BE RESPONSIBLE FOR TRESPASS ON AND/ OR DAMAGE TO OTHER PROPERTY BY ANY OF HIS EMPLOYEES OR HIS SUBCONTRACTOR'S EMPLOYEES.

THE CONTRACTOR WILL BE RESPONSIBLE FOR THE SAFE WORKING CONDITIONS AT THE SITE. THE ARCHITECT AND OWNER WILL NOT BE DEEMED TO HAVE ANY RESPONSIBILITY OR LIABILITY IN CONNECTION HEREWITH.

CONSTRUCTION OPERATIONS WILL NOT INVOLVE INTERRUPTION OF HEATING, WATER, ELECTRICAL, OR OTHER SERVICES TO ANY PORTION OF THE BUILDING OUTSIDE THE LIMITS OF THE CONSTRUCTION SITE.

THE CONTRACTOR WILL BE RESPONSIBLE FOR CORRECTING ANY DEFICIENCIES CUASED BY DEFECTIVE OR ILL TIMED WORK AT NO ADDITIONAL COST TO THE OWNER.

NO SUBSTITUTIONS ARE PERMITTED EXCEPT WHERE THE TERM "APPROVED EQUAL" APPEARS. ALL SUBSTITUTIONS MUST BE APPROVED IN WRITING BY THE ARCHITECT. THE CONTRACTOR IS TO SUBMIT SAMPLES OR CATALOG CUTS OF ALL VISIBLE MATERIALS AND EQUIPMENT FOR THE ARCHITECT'S APPROVAL PRIOR TO INSTALLATION.

ABBREVIATIONS

ABV	ABOVE	HC	HOLLOW CORE
A/C	AIR CONDITIONING	HDWR.	HARDWARE
AFF	ABOVE FINISHED FLOOR	HM	HOLLOW METAL
ALT	ALTERNATE	HVAC	HEATING, VENTILATION, AIR COND.
AHJ	AUTHORITY HAVING JURISDICTION	HT	HEIGHT
ALUM	ALUMINUM		
APPROX.	APPROXIMATELY	INSUL	INSULATION
ARCH	ARCHITECTURAL		
ASPH	ASPHALT	JST	JOIST
BD	BOARD	LAM	LAMINATED
BLDG	BUILDING	LF	LINEAR FOOT
BOTT	BOTTOM OF		
BRG	BEARING	MAS	MASONRY
BOTT	BOTTOM	MATL	MATERIAL
BTW	BETWEEN	MAX.	MAXIMUM
		MECH	MECHANICAL
CF	CUBIC FEET	MFG.	MANUFACTURER
CIP	CAST IN PLACE	MIN.	MINIMUM
CJ	CONTROL JOINT	MISC	MISCELLANEOUS
CLG	CEILING	MO	MASONRY OPENING
CLR	CLEAR	MTD	MOUNTED
CMU	CONCRETE MASONRY UNIT	MTL	METAL
CONC	CONCRETE		
CO	CLEAN OUT	NOM	NOMINAL
CONT	CONTINUOUS	NTS	NOT TO SCALE
DBL	DOUBLE	O/	OVER
DEPT	DEPARTMENT	O.C.	ON CENTER
DIA	DIAMETER	OPN	OPENING
DIM	DIMENSION		
DN	DOWN	PREFAB	PREFABRICATED
DR	DOOR	PLYWD	PLYWOOD
DS	DOWNSPOUT	P. LAM	PLASTIC LAMINATE
DTL	DETAIL	PR	PAIR
DWG	DRAWING	PSI	POUNDS PER SQUARE INCH
EA	EACH	REF	REFERENCE
ELEC	ELECTRICAL	RM	ROOM
EQ	EQUAL	RO	ROUGH OPENING
EXH	EXHAUST	REQ	REQUIRED
EXIST	EXISTING		
EXP	EXPOSED	SC	SOLID CORE
EXT	EXTERIOR	SECT	SECTION
		SIM.	SIMILAR
FD	FLOOR DRAIN	STRUC	STRUCTURAL
FDN	FOUNDATION		
FIN.	FINISHED	TYP	TYPICAL
FLR	FLOOR		
FT	FOOT	UNO	UNLESS NOTED OTHERWISE
FTG	FOOTING		
FUR	FURRING	W/	WITH
		WWF	WELDED WIRE FABRIC
GALV	GALVANIZED		
GA	GAUGE		
GC	GENERAL CONTRACTOR		
GYP. BD.	GYPSUM BOARD		
GYP	GYPSUM		

PROJECT INFORMATION

ADAPTIVE REUSE AND ADDITION TO AN EXISTING TIMBER FRAMED BARN, A NEW RESTROOM OUTBUILDING, AND NEW PARKING LOTS / DRIVE.

BATH TOWNSHIP, AKRON
SUMMIT COUNTY

PARCEL NUMBER: 0406032

SQUARE FOOTAGES

BARN	2,408 SF
RESTROOM OUTBUILDING	128 SF

PROJECT ALTERNATES

ALTERNATE 1 - PARKING LOT PAVING

ITEMS TO BE COMPLETED IN ALTERNATE 1:
- SOUTH PARKING LOT: DEDUCT GRAVEL, ADD ASPHALT PAVING

DRAWING INDEX

G1.00	COVER SHEET (BID SET)
G1.01	CODE REVIEW & LIFE SAFETY PLAN
G10.2	CODE, LIFE SAFETY
C1.01	EXISTING CONDITIONS
C1.02	CIVIL SITE PLAN
C1.03	STORMWATER POLLUTION PREVENTION PLAN
C1.04	STORMWATER POLLUTION PREVENTION PLAN NOTES
C1.05	SEDIMENT TRAP PLAN
C1.06	DETENTION BASIN PLAN
C1.07	EROSION CONTROL DETAILS
C1.08	SPECIFICATIONS 1
C1.09	SPECIFICATIONS 2
C1.10	SPECIFICATIONS 3
C1.11	SPECIFICATIONS 4
C1.12	SPECIFICATIONS 5
C1.13	SPECIFICATIONS 6
S0.00	GENERAL NOTES & SPECIFICATIONS
S3.01	SECTIONS AND DETAILS
S4.00	PLANS, ELEVATIONS, AND SECTIONS
S10.1	GENERAL NOTES
S10.2	SPECIAL INSPECTIONS
S11.1	FOUNDATION PLAN
S11.2	ROOF FRAMING PLANS
S12.1	BUILDING SECTIONS
S12.2	FOUNDATION DETAILS
S13.1	FRAMING DETAILS
A1.03	RESTROOM BUILDING PLANS
A4.02	RESTROOM BUILDING EXTERIOR AND INTERIOR ELEVATIONS
A11.0	DEMOLITION DRAWING
A11.1	PLANS
A11.2	REFLECTED CEILING PLAN
A12.1	EXTERIOR ELEVATIONS
A13.1	BUILDING SECTIONS
A13.2	WALL SECTIONS
A13.3	DETAILS
A14.1	SPECIFICATIONS
A14.2	SPECIFICATIONS
A14.3	SPECIFICATIONS
A14.4	SPECIFICATIONS
M4.02	HVAC SPECIFICATIONS 1 OF 2
M4.03	HVAC SPECIFICATIONS 2 OF 2
M4.04	PLUMBING SPECIFICATIONS 1 OF 3
M4.05	PLUMBING SPECIFICATIONS 2 OF 3
M4.06	PLUMBING SPECIFICATIONS 3 OF 3
M4.07	PLUMBING DIAGRAMS
M11.1	BARN / RESTROOM MECHANICAL PLAN
M11.2	RESTROOM ROOF PLANS
M12.1	MECHANICAL LEGENDS AND SCHEDULES
ED1.00	ELECTRICAL DEMOLITION PLANS
E11.01	ELECTRICAL SITE PLAN
E11.02	BARN ELECTRICAL PLANS AND ONE LINE DIAGRAM

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BATH TOWNSHIP 1818

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PROJECT # 2324
ISSUE:

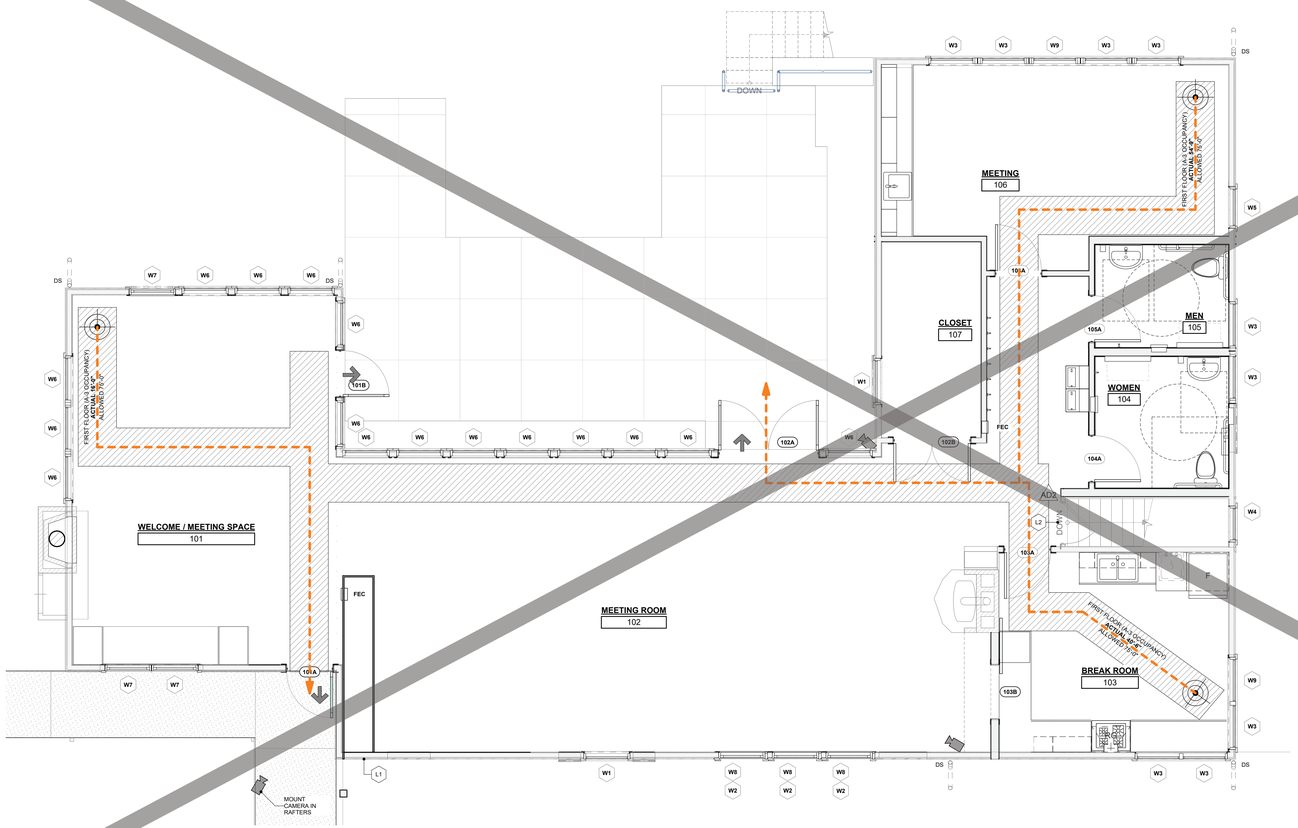
BID SET		07-28-2025

COVER SHEET (BID SET)

G1.00

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Printed: Monday, July 28, 2025



1 **FIRST FLOOR LIFE SAFETY PLAN**
SCALE: 1/4" = 1'-0"

N.I.C.

CODE INFORMATION

APPLICABLE CODES

BUILDING:	2017 OHIO BUILDING CODE (IBC 2015)
MECHANICAL:	2017 OHIO MECHANICAL CODE (IMC 2015)
PLUMBING:	2017 OHIO PLUMBING CODE (IPC 2015)
ELECTRICAL:	2017 NATIONAL ELECTRICAL CODE (NFPA 70-17)
FIRE:	2017 OHIO FIRE CODE (IFC 2015)
ENERGY:	2012 INTERNATIONAL ENERGY CONSERVATION CODE (IECC-12) OR ASHRAE 90.1 2010
ACCESSIBILITY:	STANDARDS FOR ACCESSIBLE DESIGN (ICC A117.1-09 ACCESSIBLE AND USABLE BUILDINGS AND FACILITIES)
FIRE:	2017 OHIO FIRE CODE (IFC 15)
SPRINKLERS:	2016 INSTALLATION OF SPRINKLER SYSTEMS (NFPA 13-16)
FUEL GAS CODE:	2015 INTERNATIONAL FUEL GAS CODE (IFCG-15)

PROJECT SUMMARY:

OBC CHAPTER 3 | | USE & CLASSIFICATION

SECTION 303.4 **A-3 ASSEMBLY**

OBC CHAPTER 5 | | GENERAL BUILDING HEIGHTS & AREAS

ALLOWABLE HEIGHT AND STORIES:
TABLES 504.3 AND 504.4 (**NONSPRINKLERED**)
A-3: **1 STORIES; 60'-0"**

ACTUAL:
HEIGHT: 1 STORY, 15'-9"

AREA:
TABLE 506.2: (NS, **NONSPRINKLERED SINGLE-STORY**)
A-3: 6,000 SF

ACTUAL:
FIRST FLOOR: 2,227 SF

OBC CHAPTER 6 | | TYPES OF CONSTRUCTION

SECTION 602 CONSTRUCTION TYPE: TYPE 5-B

TYPE 5B CONSTRUCTION IS THAT TYPE OF CONTRUCTION IN WHICH THE STRUCTURAL ELEMENTS, EXTERIOR WALLS, AND INTERIOR WALLS ARE OF ANY MATERIALS PERMITTED BY THIS CODE.

OBC CHAPTER 8 | | INTERIOR FINISHES

WALL AND CEILING FINISHES REQUIRED PER TABLE 803.11

OBC CHAPTER 10 | MEANS OF EGRESS

SECTION 1017.2: EXIT ACCESS TRAVEL DISTANCE FOR OCCUPANCY A-3 IS 200'-0" FOR BUILDINGS EQUIPPED WITHOUT AN AUTOMATIC SPRINKLER SYSTEM

SECTION 1020.4: WHERE MORE THAN ONE EXIT OR EXIT ACCESS DOORWAY IS REQUIRED, THE EXIT ACCESS SHALL BE ARRANGED SUCH THAT THERE ARE NOT DEAD END CORRIDORS MORE THAN 20'-0" IN LENGTH

OCCUPANCY SCHEDULE

ID	ROOM NAME	AREA	FUNCTION	CALCULATED OCCUPANT LOAD	ACTUAL OCCUPANT LOAD
101	WELCOME / MEETING SPACE	391	ASSEMBLY	20	16
102	MEETING ROOM	816	ASSEMBLY	87	70
103	BREAK ROOM	128	KITCHEN	1	3
104	WOMEN	75	RESTROOM	1	0
105	MEN	59	RESTROOM	1	0
106	MEETING	245	ASSEMBLY	12	10
107	CLOSET	83	ACCESSORY STORAGE	1	0
108	LEARNING CENTER	447	OUTDOOR ASSEMBLY	20	20
		2,244 ft²			119

LIFE SAFETY PLAN CODED NOTES

NOTE: ALL CODED NOTES MAY NOT OCCUR ON EVERY SHEET

L1 LOCATION OF RECESSED MOUNT KNOX BOX. REFER TO EXTERIOR ELEVATIONS FOR LOCATION INFORMATION AND MANUFACTURER SUPPLIED PRODUCT INFORMATION FOR ADDITIONAL DETAILS.

L2 PROVIDE SIGNAGE INDICATING AUTHORIZED PERSONNEL ONLY.

LIFE SAFETY WALL LEGEND

FIRE EXTINGUISHER: VERIFY LOCATIONS OF FIRE EXTINGUISHERS WITH LOCAL FIRE DEPARTMENT OFFICIAL AND REFER TO SPECIFICATIONS FOR TYPE INFORMATION AND ADDITIONAL DETAILS.

LIFE SAFETY PLAN SYMBOLS

EXIT

W = ACTUAL CLEAR WIDTH OF LIMITING COMPONENT (INCHES)
X = OCCUPANTS USING EXIT
Y = EXIT CAPACITY
Z = EGRESS WIDTH PER OCCUPANT (INCHES/OCCUPANT)

MOST REMOTE POINT..TO DETERMINE EXIT ACCESS TRAVEL DISTANCE

FEC FIRE EXTINGUISHER CABINET
FA FIRE ALARM PULL STATION
F FIRE ALARM VISUAL/STROBE
F FIRE ALARM AUDIO AND VISUAL
FAP FIRE ALARM REMOTE ANNUNCIATOR

WHEELCHAIR ACCESSIBLE ROUTE

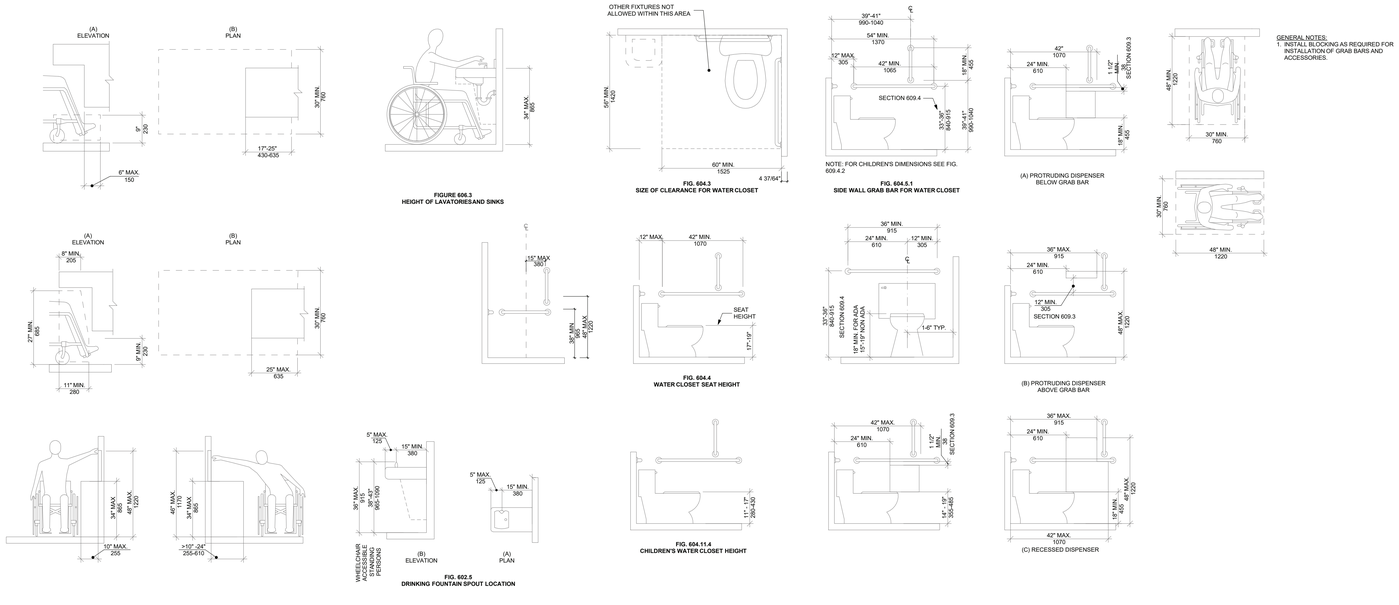
SECURITY CAMERA WITH 360 DEGREE LENSE

OCCUPANCY SIGNAGE

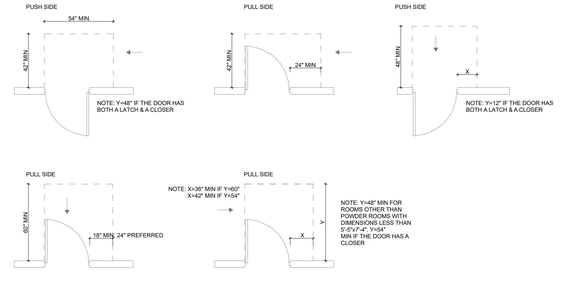
8"
5"
XX OCCUPANTS — 3/4" TEXT
MAXIMUM OCCUPANCY — 1/2" TEXT

NOTE: 'XX' TO BE REPLACED WITH INDICATED OCCUPANCY CAPACITY PER OCCUPANCY SCHEDULE ON G1.01, WHERE OCCUPANCY NUMBERS ARE TO BE POSTED IN ROOMS ADJACENT AND OPEN TO ANOTHER ROOM. COMBINED OCCUPANCY FOR CONNECTED SPACES MAY BE POSTED AT ALL REQUIRED LOCATIONS. INDICATED NUMBER NOT TO EXCEED SUM OF INDIVIDUAL ROOMS INDICATED PER OCCUPANCY SCHEDULE.

TYPICAL ADA DETAILS (ICC A117.1-2009)



MANEUVERING CLEARANCES AT MANUAL SWING DOORS (ADA 404.2.4.1)



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JOSEPH MATAVA
0614145 | 12/31/23

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BATH TOWNSHIP 1818

NORTH FORK PRESERVE RENOVATION
4400 EVERETT ROAD, AKRON, OH 44333

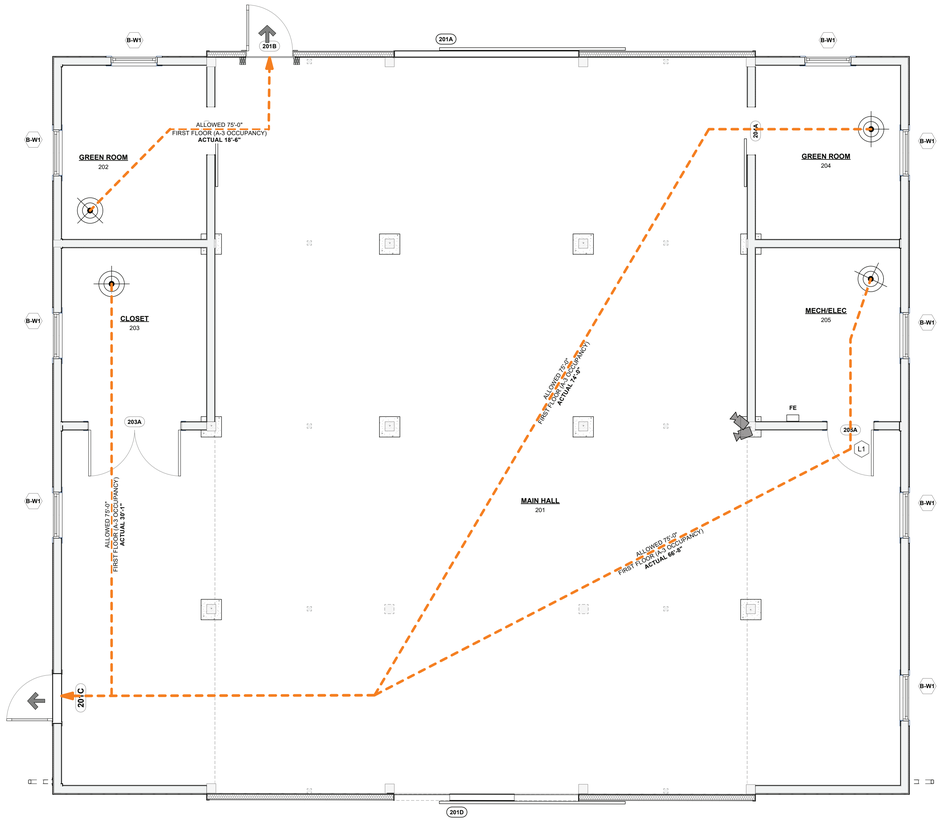
PROJECT # 2324
ISSUE:
BID SET 07-28-2025

CODE REVIEW & LIFE SAFETY PLAN

G1.01

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Printed: Wednesday, May 28, 2025



1 BARN LIFE SAFETY PLAN

SCALE: 1/4" = 1'-0"

0 2' 4' 8'

CODE INFORMATION

APPLICABLE CODES

BUILDING:	2024 OHIO BUILDING CODE (IBC 2024)
MECHANICAL:	2024 OHIO MECHANICAL CODE (IMC 2021)
PLUMBING:	2024 OHIO PLUMBING CODE (IPC 2021)
ELECTRICAL:	2023 NATIONAL ELECTRICAL CODE (NFPA 70-23)
FIRE:	2017 OHIO FIRE CODE (IFC 2021)
ENERGY:	2021 INTERNATIONAL ENERGY CONSERVATION CODE (IECC-21) OR ASHRAE 90.1 2019
ACCESSIBILITY:	STANDARDS FOR ACCESSIBLE DESIGN (ICC A117.1-09 ACCESSIBLE AND USABLE BUILDINGS AND FACILITIES)
FIRE:	2021 OHIO FIRE CODE (IFC 21)

PROJECT SUMMARY:

OBC CHAPTER 3 | USE & CLASSIFICATION

SECTION 303.4 **A-3 ASSEMBLY**

OBC CHAPTER 5 | GENERAL BUILDING HEIGHTS & AREAS

ALLOWABLE HEIGHT AND STORIES:
TABLES 504.3 AND 504.4: **(NONSPRINKLERED)**
A-3: **1 STORIES, 60'-0"**

ACTUAL:
HEIGHT: 1 STORY, 32'-2"

AREA:
TABLE 506.2: **(NS, NONSPRINKLERED SINGLE-STORY)**
A-3: **6,000** SF

ACTUAL:
FIRST FLOOR: 2,708 SF

OBC CHAPTER 6 | TYPES OF CONSTRUCTION

SECTION 602 CONSTRUCTION TYPE: TYPE 5-B

TYPE 5B CONSTRUCTION IS THAT TYPE OF CONTRUCTION IN WHICH THE STRUCTURAL ELEMENTS, EXTERIOR WALLS, AND INTERIOR WALLS ARE OF ANY MATERIALS PERMITTED BY THIS CODE.

OBC CHAPTER 8 | INTERIOR FINISHES

WALL AND CEILING FINISHES REQUIRED PER TABLE 803.11

OBC CHAPTER 10 | MEANS OF EGRESS

SECTION 1017.2: EXIT ACCESS TRAVEL DISTANCE FOR OCCUPANCY A-3 IS 200'-0" FOR BUILDINGS EQUIPPED WITHOUT AN AUTOMATIC SPRINKLER SYSTEM

SECTION 1020.4: WHERE MORE THAN ONE EXIT OR EXIT ACCESS DOORWAY IS REQUIRED, THE EXIT ACCESS SHALL BE ARRANGED SUCH THAT THERE ARE NOT DEAD END CORRIDORS MORE THAN 20'-0" IN LENGTH

TABLE 1004.5:

MAXIMUM FLOOR AREA ALLOWANCES PER OCUPANT

FUNCTION OF SPACE	OCCUPANT LOAD FACTOR
ASSEMBLY WITHOUT FIXED SEATS:	
CONCENTRATED (CHAIRS ONLY - NOT FIXED)	7 NET
STANDING SPACE	5 NET
UNCONCENTRATED (TABLES AND CHAIRS)	15 NET

OCCUPANCY SCHEDULE

ID	ROOM NAME	GROSS AREA	NET AREA	FUNCTION	CALCULATED OCCUPANT LOAD	ACTUAL OCCUPANT LOAD
201	MAIN HALL	2,189	1,750	ASSEMBLY	145	90
202	GREEN ROOM	112	83	ASSEMBLY	6	4
203	CLOSET	112		ACCESSORY STORAGE	1	0
204	GREEN ROOM	104	83	ASSEMBLY	6	4
205	MECH/ELEC	107		ACCESSORY EQUIPMENT	1	1
		2,624 ft²				99

LIFE SAFETY PLAN CODED NOTES

NOTE: ALL CODED NOTES MAY NOT OCCUR ON EVERY SHEET

L1 PROVIDE SIGNAGE INDICATING AUTHORIZED PERSONNEL ONLY.

LIFE SAFETY WALL LEGEND

FIRE EXTINGUISHER: VERIFY LOCATIONS OF FIRE EXTINGUISHERS WITH LOCAL FIRE DEPARTMENT OFFICIAL AND REFER TO SPECIFICATIONS FOR TYPE INFORMATION AND ADDITIONAL DETAILS.

LIFE SAFETY PLAN SYMBOLS

EXIT

W = ACTUAL CLEAR WIDTH OF LIMITING COMPONENT (INCHES).
X = OCCUPANTS USING EXIT
Y = EXIT CAPACITY
Z = EGRESS WIDTH PER OCCUPANT (INCHES/OCCUPANT)

MOST REMOTE POINT, TO DETERMINE EXIT ACCESS TRAVEL DISTANCE

FEC FIRE EXTINGUISHER CABINET

FA FIRE ALARM PULL STATION

F FIRE ALARM VISUAL/STROBE

F FIRE ALARM AUDIO AND VISUAL

FAP FIRE ALARM REMOTE ANNUNCIATOR

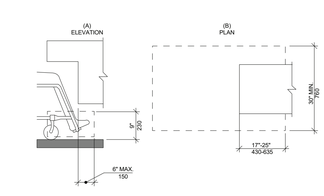
SECURITY CAMERA WITH 360 DEGREE LENSE

OCCUPANCY SIGNAGE

8"
3"
XX OCCUPANTS 3/4" TEXT
MAXIMUM OCCUPANCY 1/2" TEXT

NOTE: "XX" TO BE REPLACED WITH INDICATED OCCUPANCY CAPACITY PER OCCUPANCY SCHEDULE ON G1.01. WHERE OCCUPANCY NUMBERS ARE TO BE POSTED IN ROOMS ADJACENT AND OPEN TO ANOTHER ROOM, COMBINED OCCUPANCY FOR CONNECTED SPACES MAY BE POSTED AT ALL REQUIRED LOCATIONS. INDICATED NUMBER NOT TO EXCEED SUM OF INDIVIDUAL ROOMS INDICATED PER OCCUPANCY SCHEDULE.

TYPICAL ADA DETAILS (ICC A117.1-2009)



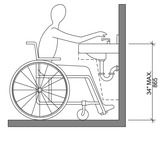


FIGURE 606.3
HEIGHT OF LAVATORIES AND SINKS

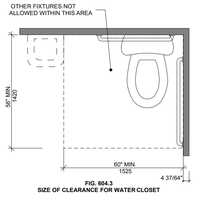
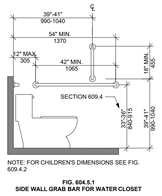
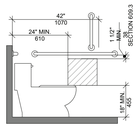


FIG. 604.3
SIZE OF CLEARANCE FOR WATER CLOSET

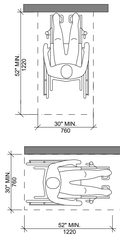


NOTE: FOR CHILDREN'S DIMENSIONS SEE FIG. 609.4.2

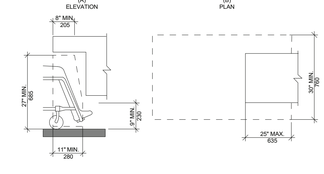
FIG. 604.5.1
SIDE WALL GRAB BAR FOR WATER CLOSET

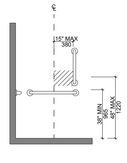


(A) PROTRUDING DISPENSER BELOW GRAB BAR



GENERAL NOTES:
1. INSTALL BLOCKING AS REQUIRED FOR INSTALLATION OF GRAB BARS AND ACCESSORIES.





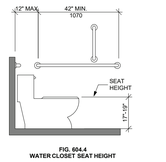
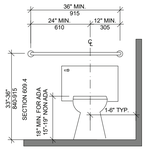
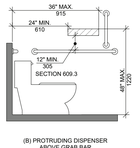
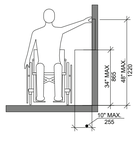


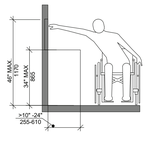
FIG. 604.4
WATER CLOSET SEAT HEIGHT





(B) PROTRUDING DISPENSER ABOVE GRAB BAR





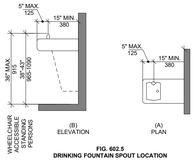


FIG. 602.5
DRINKING FOUNTAIN SPOUT LOCATION

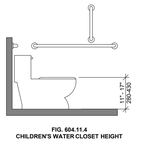
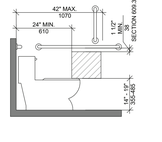
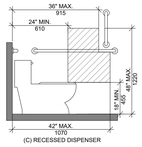
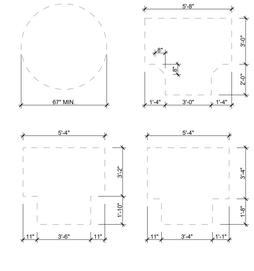


FIG. 604.11.4
CHILDREN'S WATER CLOSET HEIGHT

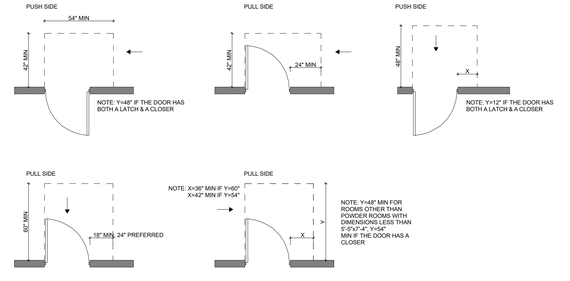




(C) RECESSED DISPENSER



MANEUVERING CLEARANCES AT MANUAL SWING DOORS (ADA 404.2.4.1)



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T 330.657.2800

STATE OF OHIO
JOSEPH MATAVA
REGISTERED ARCHITECT
0614145

JOSEPH MATAVA
0614145 | 12/31/25

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330.335.8232

STRUCTURAL ENGINEER:
TTR Engineers
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MEP ENGINEER:
DENK ASSOCIATES CONSULTING ENGINEERS
216.531.8880

BATH TOWNSHIP
SINCE 1818

NORTH FORK PRESERVE RENOVATION

4400 EVERETT ROAD, AKRON, OH 44333

N

PROJECT # 2324

ISSUE:
BID SET 07-28-2025

CODE, LIFE SAFETY

G10.2

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Printed: Friday, May 09, 2025

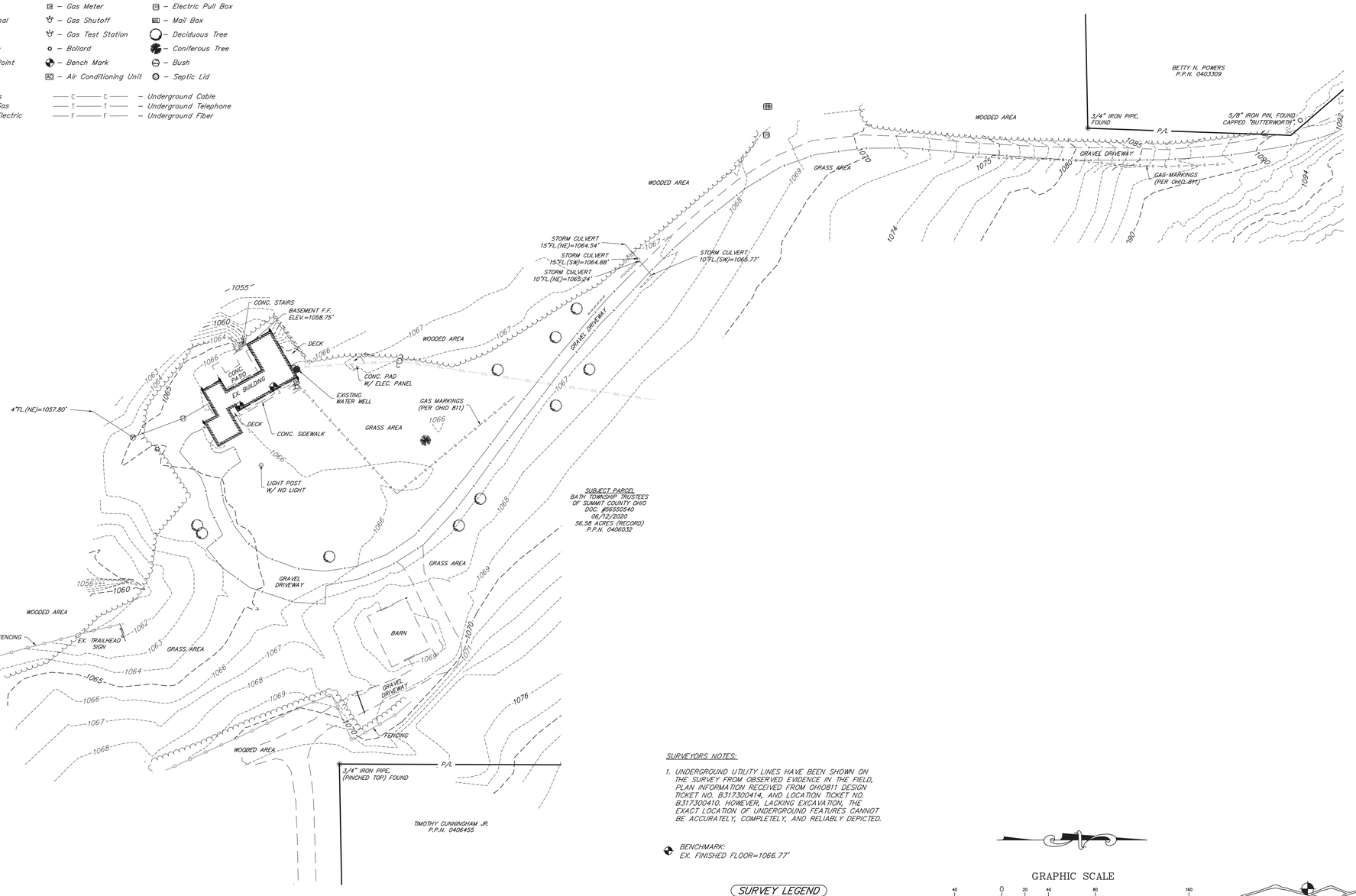
EXISTING CONDITIONS SURVEY

Situated in the Township of Bath,
County of Summit, State of Ohio, and known
as being part of Bath Township Lot 4

4400 Everett Road
P.P.N. 0406032

TOPOGRAPHIC LEGEND

- Hydrant
- Water Valve
- Water Shutoff
- Water Meter Pit
- Well
- Roof Drain
- Storm Manhole
- Inlet Basin
- Catch Basin
- Yard Drain
- Light Pole
- Flood Light
- Sign
- Telephone Manhole
- Guy Wire
- Traffic Signal
- Utility Pole
- Signal Pole
- Soil Test Point
- Signal Box
- Sanitary Manhole
- Cleanout
- Gas Line Marker
- Gas Valve
- Gas Meter
- Gas Shutoff
- Gas Test Station
- Bollard
- Bench Mark
- Air Conditioning Unit
- Telephone Pedestal
- Transformer
- Cable Pedestal
- Electric Meter
- Electric Pull Box
- Mail Box
- Deciduous Tree
- Coniferous Tree
- Bush
- Septic Lid
- OHL — OHL — Overhead Lines
- G — G — Underground Gas
- E — E — Underground Electric
- C — C — Underground Cable
- T — T — Underground Telephone
- F — F — Underground Fiber



Lewis Land Professionals, Inc. has made no investigation or independent search for easements of record, encumbrances, restrictive covenants, ownership title evidence, or any other facts that an accurate and current title search may disclose.

SURVEYORS NOTES:

1. UNDERGROUND UTILITY LINES HAVE BEEN SHOWN ON THE SURVEY FROM OBSERVED EVIDENCE IN THE FIELD, PLAN INFORMATION RECEIVED FROM OHIO811 DESIGN TICKET NO. B317300414, AND LOCATION TICKET NO. B317300410. HOWEVER, LACKING EXCAVATION, THE EXACT LOCATION OF UNDERGROUND FEATURES CANNOT BE ACCURATELY, COMPLETELY, AND RELIABLY DEPICTED.

BENCHMARK:
EX. FINISHED FLOOR=1066.77'

SURVEY LEGEND

- ○ — Iron Pin Found & Described
- ◉ — Iron Pipe Found & Described

Fnd. (F) — Found
Usd. (U) — Used
(P) — Plat
Surv. (S) — Record Survey
Rec. (R) — Record Deed
R/W — Right of Way
C/L — Centerline
P/L — Property Line

GRAPHIC SCALE

40 0 20 40 80 160
(IN FEET)
1 inch = 40 ft.

The "Basis of Bearings" for this survey is **Grid North** of the NAD83 (2011), Ohio State Plane, North Zone as established by GPS Observation.

Lewis Land Professionals, Inc.
Civil Engineering & Surveying
8691 Wadsworth Rd. Suite 100 Wadsworth, Ohio 44281
Phone: (330) 335-8232
www.landprosinc.com

SURVEY DATE: JUNE 2023
SHEET 1 OF 1
PROJ. No. 23-169 DRAWING NAME 23-169.dwg

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STATE OF OHIO — KYLE SALISBURY — 82304 — PROFESSIONAL ENGINEER
3/14/2025

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STRUCTURAL ENGINEER:
DANMARK ENGINEERING
330.734.9331

MEP ENGINEER:
DENK ASSOCIATES
216.531.8880

BATH TOWNSHIP 1818

NORTH FORK PRESERVE RENOVATION
4400 EVERETT ROAD, AKRON, OH 44333

N

PROJECT #: 2324
ISSUE:
BID SET 07-28-2025

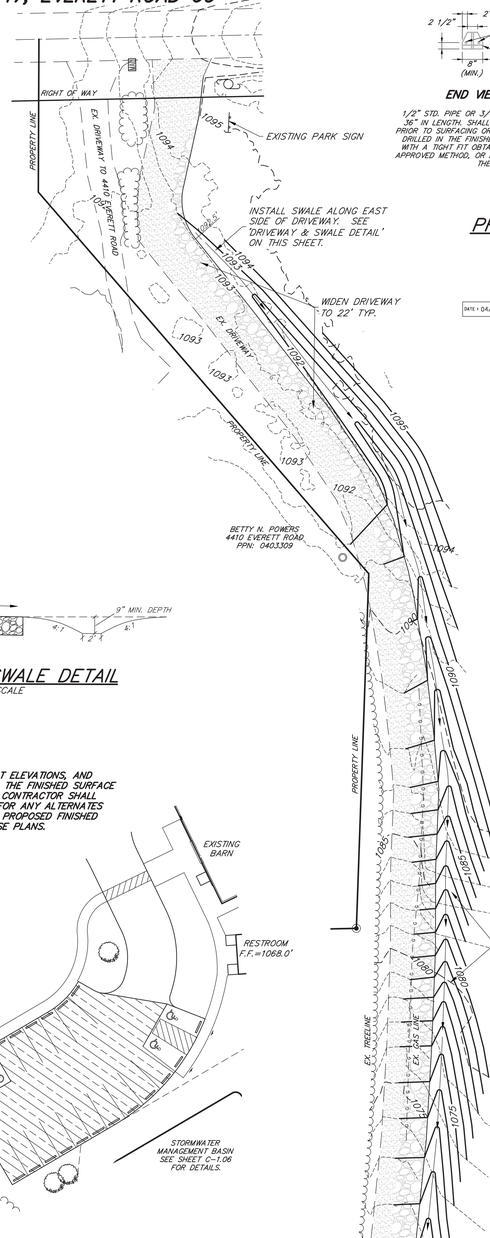
EXISTING CONDITIONS

C-1.01

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Printed Friday, October 13, 2023

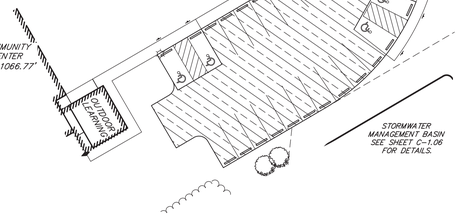
C.H. 47, EVERETT ROAD 60'



DRIVEWAY & SWALE DETAIL

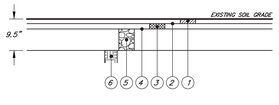
NOT TO SCALE

NOTE:
PROPOSED CONTOURS, SPOT ELEVATIONS, AND CATCH BASIN RIMS ARE TO THE FINISHED SURFACE OF PROPOSED PAVEMENT. CONTRACTOR SHALL GRADE SITE ACCORDINGLY FOR ANY ALTERNATES SELECTED TO ACHIEVE THE PROPOSED FINISHED ELEVATION SHOWN ON THESE PLANS.



ALTERNATE C-1 PLAN

SCALE: 1" = 30'



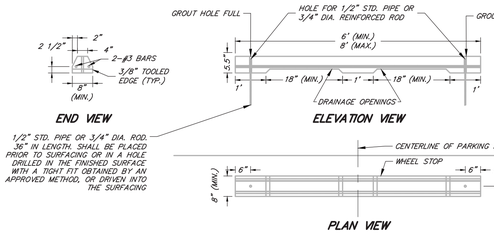
MATERIAL

1. 1.5" ODOT ITEM 441 TYPE 1 ASPHALTIC CONCRETE, SURFACE COURSE
2. ODOT ITEM 407 TACK COAT APPLIED AT 0.05 GALLONS PER SQUARE YARD
3. 2" ODOT ITEM 441 TYPE 2 ASPHALTIC CONCRETE, INTERMEDIATE COURSE
4. ODOT ITEM 407 TACK COAT APPLIED AT 0.05 GALLONS PER SQUARE YARD
5. INSTALL 6" OF COMPACTED ODOT 304 AGGREGATE BASE
6. RE-GRADE AND COMPACT EXISTING SUBGRADE

ALTERNATE C-1 ASPHALT PAVEMENT DETAIL

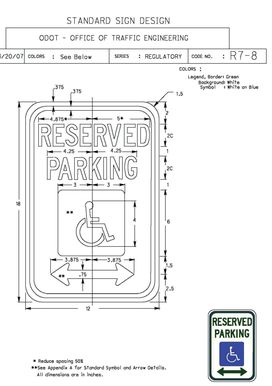
NOT TO SCALE

NOTE:
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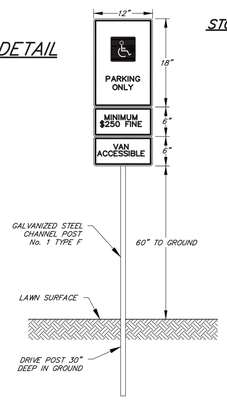
PRECAST CONCRETE WHEEL STOP DETAIL

NOT TO SCALE



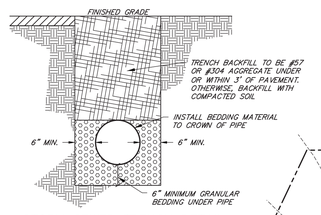
HANDICAP SIGN DETAIL

NOT TO SCALE



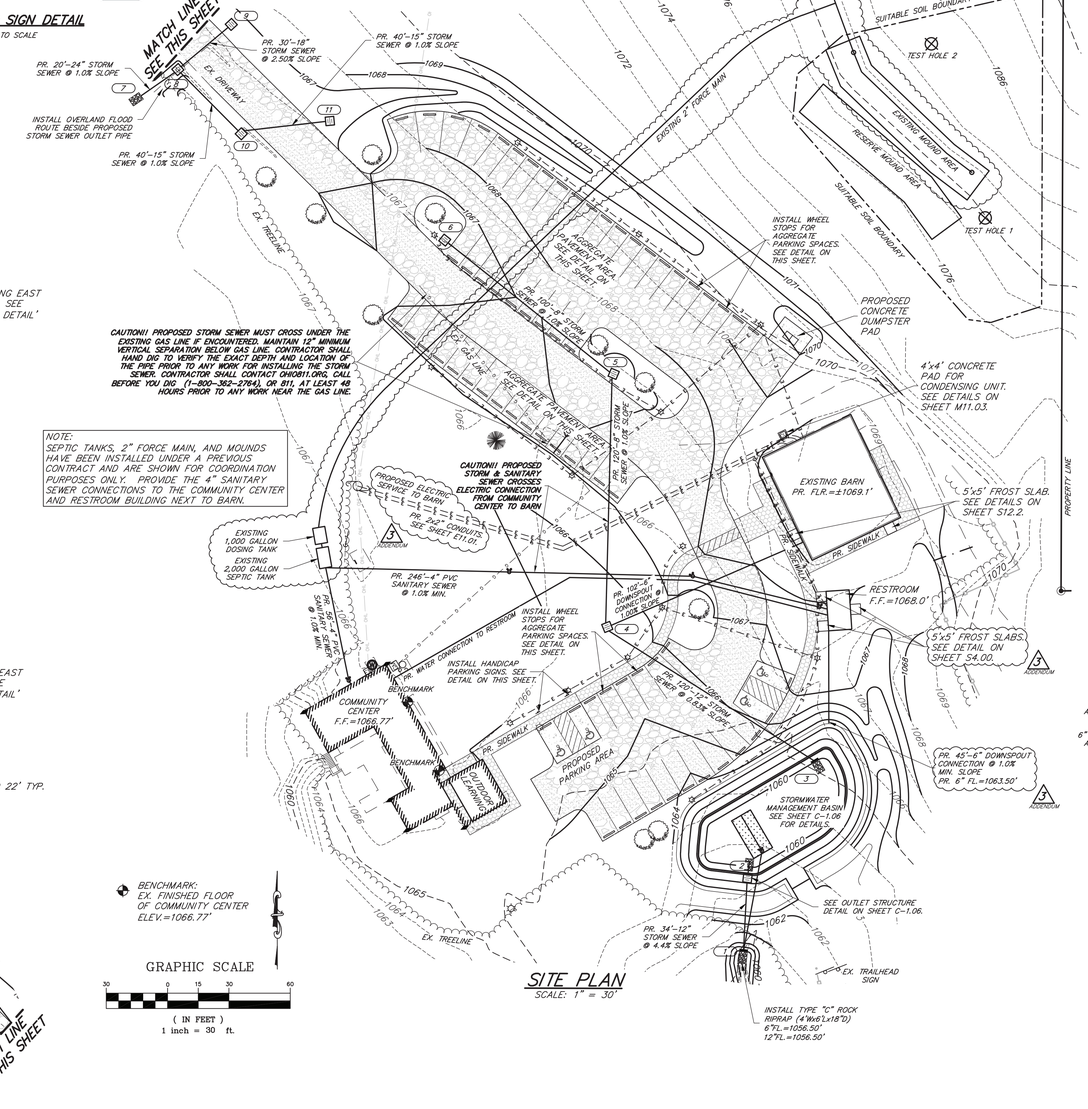
HANDICAP SIGN DETAIL SIGN "HC-V"

NOT TO SCALE



STORM SEWER TRENCH DETAIL

NOT TO SCALE



SITE PLAN

SCALE: 1" = 30'

BENCHMARK: EX. FINISHED FLOOR OF COMMUNITY CENTER ELEV.=1066.77'

GRAPHIC SCALE
30 0 15 30 60
(IN FEET)
1 inch = 30 ft.

STORM SEWER SCHEDULE

1. INSTALL 12" HALF HEADWALL WITH TYPE "C" ROCK RIPRAP (4'Wx6'Lx18"D) 12"FL.=1056.50'
2. INSTALL ODOT 2-2B CATCH BASIN RIM=1062.20' 7.5"FL.=1060.81' 12"FL.=1058.00'
3. INSTALL 12" HALF HEADWALL WITH TYPE "C" ROCK RIPRAP (4'Wx6'Lx18"D) 12"FL.=1060.30'
4. INSTALL ODOT 2-2B CATCH BASIN RIM=1065.00' 6"FL.(E)=1061.80' 8"FL.(N)=1061.63' 12"FL.(S)=1061.30'
5. INSTALL ODOT 2-2B CATCH BASIN RIM=1066.00' 8"FL.=1062.83'
6. INSTALL ODOT 2-2B CATCH BASIN RIM=1066.00' 8"FL.=1063.83'
7. INSTALL TYPE "C" ROCK RIPRAP (4'Wx6'Lx18"D) 24"FL.=1061.75'
8. INSTALL ODOT 2-2B CATCH BASIN RIM=1066.00' 15"FL.(SE)=1062.70' 18"FL.(NE)=1062.45' 24"FL.(SW)=1061.95'
9. INSTALL ODOT 2-2B CATCH BASIN RIM=1066.00' 18"FL.=1063.20'
10. INSTALL ODOT 2-2B CATCH BASIN RIM=1066.00' 15"FL.=1063.10'
11. INSTALL ODOT 2-2B CATCH BASIN RIM=1066.00' 15"FL.=1063.50'

PAVEMENT LEGEND

- – EXISTING AGGREGATE PAVEMENT
- – PROPOSED AGGREGATE PAVEMENT (32,621 SQ. FT.)
- – CONCRETE ADA PARKING PAD & DUMPSTER PAD (1,280 SQ. FT.)
- – PROPOSED CONCRETE SIDEWALK (3,027 SQ. FT.)
- – ALTERNATE C-1: ASPHALT PAVEMENT (5,913 SQ. FT.)

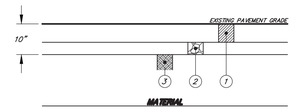
AREA QUANTITIES SHOWN ARE APPROXIMATE.

PARKING SPACES

4 ADA HANDICAP ACCESSIBLE SPACES

63 AGGREGATE SPACES

67 TOTAL SPACES PROVIDED

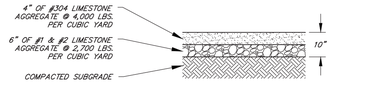


MATERIAL

1. 6" ODOT ITEM 452 CONCRETE PAVEMENT, TYPE I OR II PORTLAND CEMENT
2. 4" ODOT ITEM 304 CRUSHED LIMESTONE AGGREGATE BASE
3. COMPACTED SUBGRADE

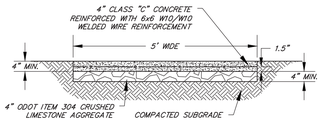
CONCRETE PAVEMENT DETAIL

NOT TO SCALE



AGGREGATE PAVEMENT DETAIL

NOT TO SCALE



CONCRETE SIDEWALK DETAIL

NOT TO SCALE

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3/14/2025

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MEP ENGINEER:
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BATH TOWNSHIP EST. 1818

NORTH FORK PRESERVE RENOVATION

4400 EVERETT ROAD, AKRON, OH 44333

N

PROJECT #: 2324

ISSUE:

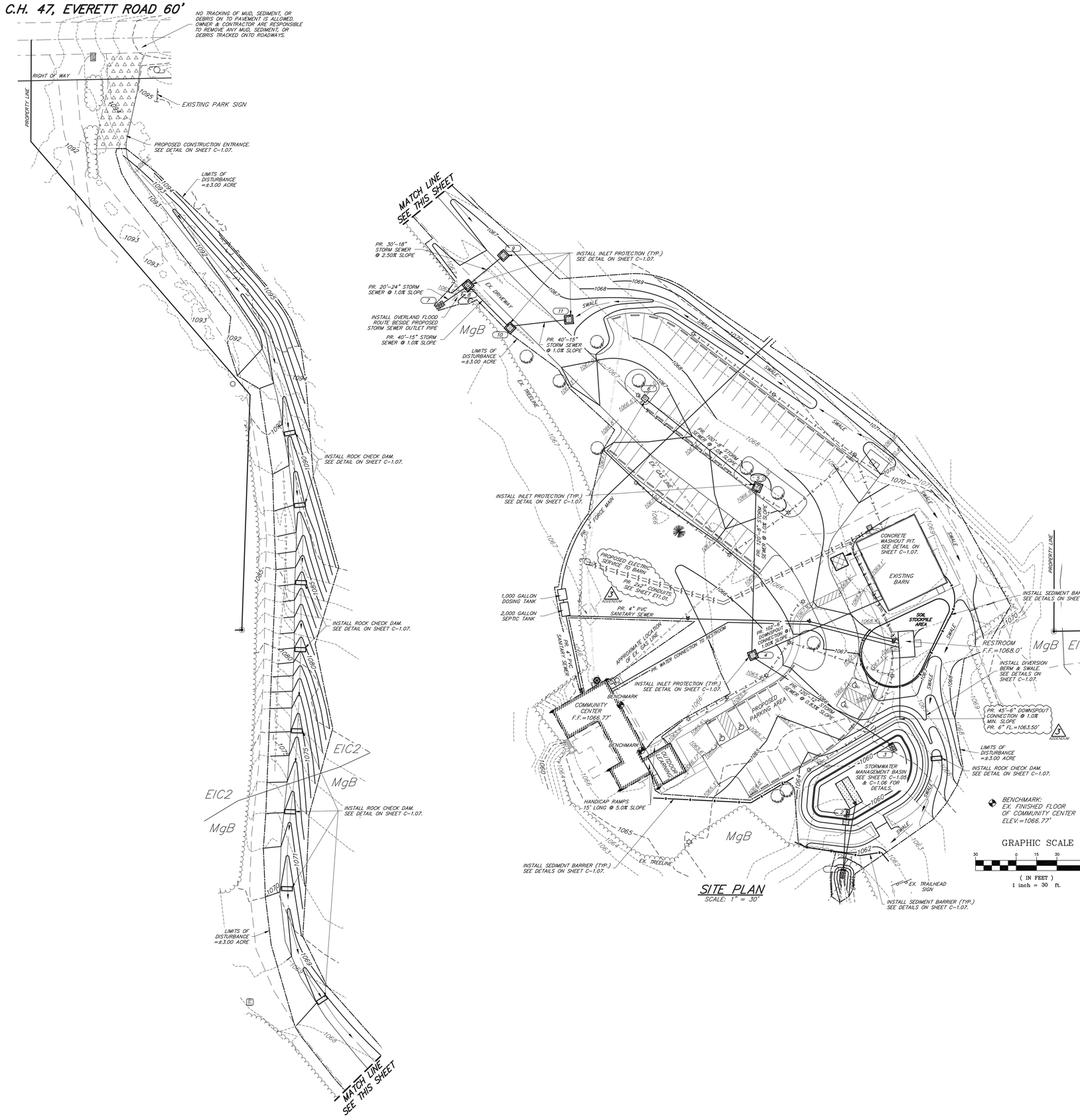
BID SET 07-28-2025

CIVIL SITE PLAN

C-1.02

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Printed Friday, October 10, 2025


C.H. 47, EVERETT ROAD 60'
NO TRACKING OF MUD, SEDIMENT, OR DEBRIS ON TO PAVEMENT IS ALLOWED. OWNER & CONTRACTOR ARE RESPONSIBLE TO REMOVE ANY MUD, SEDIMENT, OR DEBRIS TRACKED ONTO ROADWAYS.
RIGHT OF WAY
PROPERTY LINE
EXISTING PARK SIGN
PROPOSED CONSTRUCTION ENTRANCE. SEE DETAIL ON SHEET C-1.07.
LIMITS OF DISTURBANCE =±3.00 ACRE
INSTALL ROCK CHECK DAM. SEE DETAIL ON SHEET C-1.07.
INSTALL ROCK CHECK DAM. SEE DETAIL ON SHEET C-1.07.
INSTALL ROCK CHECK DAM. SEE DETAIL ON SHEET C-1.07.
LIMITS OF DISTURBANCE =±3.00 ACRE
MATCH LINE SEE THIS SHEET
MATCH LINE SEE THIS SHEET
EIC2
MgB
PR. 30"-18" STORM SEWER @ 2.50% SLOPE
PR. 20"-24" STORM SEWER @ 1.0% SLOPE
INSTALL OVERLAND FLOOD ROUTE BESIDE PROPOSED STORM SEWER OUTLET PIPE
PR. 40"-15" STORM SEWER @ 1.0% SLOPE
PR. 40"-15" STORM SEWER @ 1.0% SLOPE
EX. DRIVEWAY
INSTALL INLET PROTECTION (TYP.) SEE DETAIL ON SHEET C-1.07.
SWALE
LIMITS OF DISTURBANCE =±3.00 ACRE
EX. FENCELINE
PR. 2" FORCE MAIN
INSTALL INLET PROTECTION (TYP.) SEE DETAIL ON SHEET C-1.07.
PROPOSED ELECTRIC SERVICE TO BARN
PR. 3x2" CONDUITS SEE SHEET ET1.01
1,000 GALLON DOSING TANK
2,000 GALLON SEPTIC TANK
PR. 4" PVC SANITARY SEWER
PR. 4" PVC SANITARY SEWER
APPROXIMATE LOCATION OF EX. GAS LINE
PR. 4"x6" STORM SEWER @ 1.0% SLOPE
EX. GAS LINE
PR. 102-6" DOWNSPOUT CONNECTION @ 1.00% SLOPE
PR. 4"x6" STORM SEWER @ 1.0% SLOPE
PR. 4"x6" STORM SEWER @ 1.0% SLOPE
PR. 4"x6" STORM SEWER @ 1.0

STORMWATER POLLUTION PREVENTION PLAN NOTES
FOR
NORTH FORK PRESERVE

4400 Everett Road

Situated in the Township of Bath,
County of Summit, State of Ohio
PPN: 0406032

PERIMETER CONTROLS:
SEDIMENT BASINS/TRAPS AND PERIMETER SEDIMENT CONTROLS SHALL BE IMPLEMENTED AS THE FIRST STEP OF GRADING AND WITHIN SEVEN (7) DAYS FROM THE START OF GRUBBING. UPON COMPLETION OF CONSTRUCTION OF PONDS, SEEDING AND MULCHING SHALL IMMEDIATELY FOLLOW TO AID IN THE STABILIZATION AND MINIMIZE EROSION AND SEDIMENT TRANSPORT OF THE SOIL BEFORE WATER LEAVES THE POND. ALL EROSION AND SEDIMENT CONTROLS SHALL CONTINUE TO FUNCTION UNTIL UPLAND AREAS ARE PERMANENTLY STABILIZED, OR AS DIRECTED BY THE ADMINISTRATOR.

VEGETATIVE STABILIZATION:
DISTURBED AREAS, WHICH WILL REMAIN UN-WORKED FOR A PERIOD OF FOURTEEN (14) DAYS OR GREATER, SHALL BE STABILIZED WITH SEEDING AND MULCHING OR OTHER APPROPRIATE MEANS WITHIN SEVEN (7) DAYS AFTER THE LAST DISTURBANCE. DISTURBED AREAS THAT WILL REMAIN DORMANT FOR MORE THAN TWENTY-ONE (21) DAYS WITHIN FIFTY (50) FEET OF A STREAM SHALL HAVE TEMPORARY EROSION CONTROL MEASURES, INCLUDING BUT NOT LIMITED TO SEEDING AND MULCHING, APPLIED WITHIN TWO (2) DAYS. DISTURBED AREAS THAT HAVE REACHED FINAL GRADE SHALL BE STABILIZED WITH SEVEN (7) DAYS OF REACHING FINAL GRADE.

RAINWATER MANUAL:
ALL EROSION AND SEDIMENT CONTROL PRACTICES SPECIFIED ON THIS PLAN SHALL CONFORM WITH DETAILS AND SPECIFICATIONS OUTLINE IN THE CURRENT VERSION OF THE OHIO DEPARTMENT OF NATURAL RESOURCES BOOKLET, "RAINWATER AND LAND DEVELOPMENT."

ADDITIONAL BEST MANAGEMENT PRACTICES (BMPs):
EROSION AND SEDIMENT CONTROL PRACTICE NOT ALREADY SPECIFIED ON THIS PLAN MAY BE NECESSARY DUE TO UNFORESEEN ENVIRONMENTAL CONDITIONS, CONSTRUCTION PHASING, AND/OR CHANGES IN DRAINAGE PATTERNS CAUSED BY EARTH-MOVING ACTIVITY. ADDITIONAL PRACTICES, AND/OR A REVISED SWP3 SHALL BE REQUIRED AT THE DEVELOPER'S EXPENSE AS DIRECT BY THE ADMINISTRATOR.

BEST MANAGEMENT PRACTICE (BMP) DECOMMISSIONING:
NO EROSION AND SEDIMENT CONTROL BMPs SHALL BE REMOVED FROM THE SITE PRIOR TO ADEQUATE PERMANENT STABILIZATION OF THE ASSOCIATED UPLAND DRAINAGE AREAS AND WITHOUT FIRST OBTAINING AUTHORIZATION FROM THE ADMINISTRATOR, UNLESS THEIR REMOVAL IS SPECIFICALLY PROVIDED FOR WITHIN THE SITE'S APPROVED PLAN.

ADDITIONAL WASTES:
NO SOLID OR LIQUID WASTE SHALL BE DISCHARGED INTO STORMWATER RUNOFF. ANY AND ALL WASTE MATERIALS (SOLID, HAZARDOUS, CONSTRUCTION & DEMOLITION, SANITARY, TOXIC, ETC.) GENERATED AT THE SITE SHALL BE PROPERLY DISPOSED OF IN ACCORDANCE WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL RULES/REGULATIONS. IT IS PROHIBITED TO BURN, BURY OR POUR OUT ONTO THE GROUND OR INTO THE STORM SEWERS ANY SOLVENTS, PAINTS, GASOLINE, DIESEL FUEL, USED MOTOR OIL, HYDRAULIC FLUID, ANTIFREEZE, CEMENT CURING COMPOUNDS AND ANY OTHER SUCH TOXIC OR HAZARDOUS MATERIALS OR WASTES.

GENERAL NOTES:
TRACKING OF SEDIMENTS ONTO ROADWAYS BY VEHICLES SHALL BE MINIMIZED BY UTILIZING THE CONSTRUCTION ENTRANCE AS THE ONLY ENTRANCE FOR VEHICLES. THIS ENTRANCE SHALL BE MAINTAINED WITH STONE AS NEEDED TO PREVENT DIRT AND MUD FROM TRACKING ONTO THE ROADWAY. REGULAR SWEEPING OF THE ROADWAY MAY BE NECESSARY TO ENSURE THAT SEDIMENTS DO NOT BUILD UPON THE ROADWAY.

NO SOLID OR LIQUID WASTE SHALL BE DISCHARGED INTO STORMWATER RUNOFF. (THIS INCLUDES WASHING OUT OF CEMENT TRUCKS.) NO CONCRETE WASH OUT PIT IS PROVIDED. ALL UNUSED CONCRETE MUST BE HAULED BACK TO THE CONCRETE PLANT FOR PROPER DISPOSAL. ALL WASTE MUST BE KEPT AWAY FROM AREAS OF STORMWATER RUNOFF.

EROSION CONTROL COMMENTS:
1. SYMPHONY WAY EXTENSION IS A 4 LOT URBAN SUBDIVISION WITH PROPOSED WATER WELLS AND ON-SITE SEPTIC SYSTEMS. THE ENTIRE SUBDIVISION CONSISTS OF 13.66 ACRES AND WILL BE CONSTRUCTED IN A SINGLE PHASE. APPROXIMATELY 0.95 ACRE WILL BE DISTURBED DURING THE CONSTRUCTION PROCESS, AND THE RECEIVING STREAM FOR THE SITE IS KNOWLTZ CREEK WHICH IS A TRIBUTARY TO WOLF CREEK. THIS SITE WAS PREVIOUSLY USED AS A FARM FIELD AND WOODS WITH A RESIDENTIAL HOUSE ON IT.

2. ANY SOLID, SANITARY, AND TOXIC WASTE FOUND OR CREATED SHALL BE DISPOSED IN ACCORDANCE WITH LOCAL, STATE, AND FEDERAL REGULATIONS.

3. PERIMETER SEDIMENT CONTROL DEVICES SHALL BE IMPLEMENTED AS THE FIRST STEP OF GRADING AND WITHIN SEVEN DAYS FROM THE START OF GRUBBING AND SHALL CONTINUE TO FUNCTION UNTIL UPLAND AREAS ARE PERMANENTLY STABILIZED.

4. SEEDING AND MULCHING SHALL BE APPLIED TO ALL BARE AREAS IMMEDIATELY AFTER THE CONSTRUCTION OF STREETS IS COMPLETED.

5. ALL EROSION AND SEDIMENT CONTROL PRACTICES SPECIFIED IN THESE PLANS ARE FOR THE CONSTRUCTION OF THE SUBDIVISION ONLY. HOME BUILDERS ARE RESPONSIBLE FOR ANY AND ALL SEDIMENT LADEN RUN-OFF FROM THEIR INDIVIDUAL SUB-LOTS WHEN THE SUB-LOT IS SOLD. INDIVIDUAL SUB-LOT OWNERS SHOULD IMPLEMENT AN EROSION CONTROL PLAN TO KEEP SOIL FROM LEAVING THEIR SUB-LOT.

6. ALL EROSION CONTROL DEVICES INSTALLED SHALL BE INSPECTED AT A MINIMUM EVERY SEVEN DAYS OR WITHIN 24 HOURS AFTER A RAIN EVENT. MAINTENANCE SHALL BE DONE IMMEDIATELY UPON INSPECTIONS DETERMINING MAINTENANCE IS NEEDED. SEDIMENT TRAPS SHALL BE INSPECTED FOLLOWING THIS SCHEDULE AND CLEANED OUT AS NECESSARY.

SWPPP INSPECTION AND MAINTENANCE SCHEDULE:
REGULAR INSPECTIONS AND MAINTENANCE BY THE DEVELOPER OR THEIR REPRESENTATIVE SHALL BE PROVIDED FOR ALL TEMPORARY AND PERMANENT EROSION AND SEDIMENT CONTROL PRACTICES. PERMANENT RECORDS OF MAINTENANCE AND INSPECTION ACTIVITIES SHALL BE KEPT ON-SITE THROUGHOUT THE CONSTRUCTION PERIOD. INSPECTIONS MUST BE MADE AT A MINIMUM OF ONCE EVERY 7 DAYS AND IMMEDIATELY AFTER STORM EVENTS GREATER THAN 0.5 INCHES OF RAIN IN A 24-HOUR PERIOD. PROVIDE NAME OF INSPECTOR, DATE OF INSPECTION, MAJOR OBSERVATIONS (IDENTIFY TYPE AND LOCATION OF EACH SEPARATE BMP REQUIRING ATTENTION, DESCRIBE CONDITION OF DAMAGE BMP, SPECIFY TYPE OF REMEDIAL ACTION REQUIRED, ETC.), AND SPECIFIC CORRECTIVE MEASURES TAKEN SINCE THE TIME OF THE PREVIOUS INSPECTION TO ACHIEVE COMPLIANCE WITH THE REQUIREMENTS OF THE SITE'S APPROVED PLAN, THE "RAINWATER AND LAND DEVELOPMENT" MANUAL, AND ANY OTHER REQUIRED EROSION CONTROL PERMITS.

MAINTENANCE SHALL OCCUR AS DETAILED BELOW:

1. WHEN PRACTICES REQUIRE REPAIR OR MAINTENANCE. IF THE INTERNAL INSPECTION REVEALS THAT A CONTROL PRACTICE IS IN NEED OF REPAIR OR MAINTENANCE, WITH THE EXCEPTION OF A SEDIMENT-SETTLING POND, IT MUST BE REPAIRED OR MAINTAINED WITHIN THREE (3) DAYS OF THE INSPECTION. SEDIMENT SETTLING PONDS MUST BE REPAIRED OR MAINTAINED WITHIN TEN (10) DAYS OF INSPECTION.

2. WHEN PRACTICES FAIL TO PROVIDE THEIR INTENDED FUNCTION. IF THE INTERNAL INSPECTION REVEALS THAT A CONTROL PRACTICE FAILS TO PERFORM ITS INTENDED FUNCTION AND THAT ANOTHER, MORE APPROPRIATED CONTROL PRACTICE IS REQUIRED, THE SWP3 MUST BE AMENDED AND THE NEW CONTROL PRACTICE MUST BE INSTALLED WITHIN TEN (10) DAYS OF THE INSPECTION.

3. WHEN PRACTICES DEPICTED ON THE SWP3 ARE NOT INSTALLED. IF THE INTERNAL INSPECTION REVEALS THAT A CONTROL PRACTICE HAS NOT BEEN IMPLEMENTED IN ACCORDANCE WITH THE SCHEDULE, THE CONTROL PRACTICE MUST BE IMPLEMENTED WITH TEN (10) DAYS FROM THE DATED OF THE INSPECTION. IF THE INSPECT REVEALS THAT THE PLANNED CONTROL PRACTICE IS NOT NEEDED, THE RECORD MUST CONTAIN A STATEMENT OF EXPLANATION AS TO WHY THE CONTROL PRACTICE IS NOT NEEDED.

NON-SEDIMENT POLLUTION CONTROL NOTES:
1. ALL CONTRACTORS, INCLUDING SUBCONTRACTORS MUST BE MADE AWARE OF THE FOLLOWING GUIDELINES FOR HANDLING AND DISPOSAL OF HAZARDOUS AND CONSTRUCTION MATERIALS:
   - PREVENT SPILLS
   - COMPLETELY USE PRODUCTS WHEN POSSIBLE
   - FOLLOW PRODUCT LABEL INSTRUCTIONS FOR PROPER DISPOSAL
   - REMOVE LIDS FROM CANS AND BOTTLES WHEN DISPOSING IN THE TRASH
   - WHENEVER POSSIBLE, RECYCLE EXCESS WASTES
   - DO NOT POUR WASTE MATERIALS INTO STORM DRAINS, WATERWAYS OR INTO THE GROUND
   - DO NOT POUR WASTE MATERIALS INTO THE SINK, FLOOR DRAINS OR SEPTIC DRAINS
   - DO NOT BURRY CHEMICALS, CONTAINERS, OR CONSTRUCTION WASTE
   - DO NOT BURN CHEMICALS, CONTAINERS OR CONSTRUCTION WASTE
   - DO NOT MIX CHEMICALS TOGETHER
2. THE CONTRACTOR SHALL PROVIDE CONTAINERS FOR THE PROPER COLLECTION OF ALL WASTE MATERIALS INCLUDING CONSTRUCTION DEBRIS, TRASH, PETROLEUM PRODUCTS AND ANY HAZARDOUS MATERIALS USED ON-SITE. CONTAINERS SHALL BE COVERED AND SHALL NOT LEAK. ALL WASTE MATERIAL SHALL BE DISPOSED OF IN ACCORDANCE WITH ALL FEDERAL, STATE AND LOCAL REQUIREMENTS.
3. MIXING, PUMPING, TRANSFERRING OR ANY OTHER HANDLING OF CONSTRUCTION CHEMICALS, SUCH AS FERTILIZER, LIME, ASPHALT, CONCRETE DRYING COMPOUNDS, AND ALL OTHER POTENTIALLY HAZARDOUS MATERIALS SHALL BE PERFORMED AWAY FROM SWALES, WATERCOURSES, STORM DRAINS OR SANITARY DRAINS.
4. EQUIPMENT FUELING AND MAINTENANCE/REPAIR SHALL BE PERFORMED IN THE DESIGNATED LOCATIONS ON THE PLANS. THE CONTRACTOR IS RESPONSIBLE TO EQUIP SUCH AREAS TO CATCHING SPILLS, RECYCLING OIL MATERIALS, AND PROVIDING SECONDARY CONTAINMENT FOR ALL PETROLEUM STORAGE TANKS. THESE AREAS MUST BE INSPECTED EVERY SEVEN DAYS AND WITHIN 24 HOURS OF A 0.5 INCH OR GREATER RAIN EVENT TO VERIFY THERE ARE NO EXPOSED OR SPILLED MATERIALS WHICH COULD CONTAMINATE STORM WATER.
5. THE CONTRACTOR IS RESPONSIBLE TO PREPARE A SPILL PREVENTION CONTROL AND COUNTERMEASURE PLAN IN ACCORDANCE WITH PART (D.2.3 SPILL PREVENTION) OHIO EPA GENERAL CONSTRUCTION PERMIT OHC000005, FOR ALL SITES WHERE A SINGLE ABOVE GROUND TANK OF 660 GALLONS OR MORE, OR THE TOTAL ABOVE GROUND STORAGE EXCEEDS 1,320 GALLONS, OR 42,000 UNDERGROUND STORAGE IS LOCATED. CONTAMINATES SOILS MUST BE PROPERLY DISPOSED OF.
6. SPILLS ON PAVEMENT SHALL BE ABSORBED WITH SAWDUST OR KITTY LITTER AND DISPOSED OF WITH THE TRASH AT A LICENSED SANITARY LANDFILL. HAZARDOUS OR INDUSTRIAL WASTES, INCLUDING BUT NOT LIMITED TO SOLVENTS, GASOLINE, OIL-BASED PAINTS AND CEMENT CURING COMPOUNDS REQUIRE SPECIAL HANDLING. SPILLS SHALL BE REPORTED TO THE OHIO EPA (330-963-1200). SPILLS OF 25 GALLONS OR MORE OF PETROLEUM PRODUCTS SHALL BE REPORTED TO THE OHIO EPA, THE LOCAL FIRE DEPARTMENT AND THE LOCAL EMERGENCY PLANNING COMMITTEE WITHIN 30 MINUTES OF THE DISCOVERY OF THE RELEASE. ALL SPILLS WHICH CONTACTS WATERS OR THE STATE MUST BE REPORTED TO THE OHIO EPA.
7. IF SUBSTANCES SUCH AS OIL, DIESEL FUEL, HYDRAULIC FLUID, ANTIFREEZE, ETC. ARE SPILLED, LEAKED OR RELEASED ONTO THE SOIL, THE SOIL SHOULD BE DUG UP AND DISPOSED OF AT A LICENSED SANITARY LANDFILL OR OTHER APPROVED CONTAMINATED SOIL REMEDIATION FACILITY. DISPOSAL TO A CONSTRUCTION DEBRIS LANDFILL IS NOT PERMITTED. NOTE THAT STORM WATER RUNOFF ASSOCIATED WITH CONTAMINATED SOILS ARE NOT AUTHORIZED UNDER THE OHIO EPA'S GENERAL STORM WATER PERMIT FOR CONSTRUCTION ACTIVITIES.
8. THE CONTRACTOR MAY NOT BURN CONSTRUCTION MATERIALS, INCLUDING BUT NOT LIMITED TO MATERIALS CONTAINING RUBBER, GREASE, ASPHALT OR PETROLEUM PRODUCTS, SUCH AS TIRES, AUTO PARTS, PLASTICS OR PLASTIC COATED WIRE. (OAC 3745-18). OPEN BURNING WILL NOT BE PERMITTED FOR ANY REASON.
9. NO SOLID OR LIQUID WASTE, INCLUDING BUILDING MATERIALS, SHALL BE DISCHARGED IN STORM WATER RUNOFF.
10. UNDER NO CIRCUMSTANCE SHALL WASTEWATER FROM THE WASHOUT OF CONCRETE TRUCKS, STUCCO, PAINT, FORM RELEASE OILS, CURING COMPOUNDS , AND OTHER CONSTRUCTION MATERIALS BE DISCHARGED DIRECTLY TO A DRAINAGE CHANNEL, STORM SEWER OR SURFACE WATERS OF THE STATE.
11. UTILITY TRENCH AND GROUND WATER DE-WATERING PRACTICES SHALL DISCHARGE PUMPED WATER TO THE STORMWATER MANAGEMENT BASIN. NO WATER REMOVED OR PUMPED DURING THE DE-WATERING PROCESS SHALL BE FREE RELEASED FROM THE SITE.
12. DUST CONTROL IS THE RESPONSIBILITY OF THE CONTRACTOR. A DUST CONTROL PLAN SHOULD BE KEPT ON-SITE BY THE CONTRACTOR. OIL WILL NOT BE PERMITTED AS A DUST SUPPRESSANT MATERIAL.
13. CERTAIN ACTIVITIES ASSOCIATED WITH CONSTRUCTION WILL REQUIRE AIR PERMITS, INCLUDING BUT NOT LIMITED TO CRUSHERS, LARGE GENERATORS, ETC. THESE ACTIVITIES WILL REQUIRE SPECIFIC OHIO EPA AIR PERMITS OF INSTALLATION AND OPERATION. OPERATORS MUST OBTAIN THE REQUIRED APPROVAL AND/OR PERMITS PRIOR TO BEGINNING OF THE PROJECT.
14. ALL POLLUTANT CONTROLS, INCLUDING NON-SEDIMENT POLLUTION CONTROLS REQUIRED TO COMPLETE THIS PROJECT, (DUMPSTER, FUEL STORAGE, ETC.) MUST BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE OHIO RAINWATER AND LAND DEVELOPMENT MANUAL.
15. ALL BRICKS, HARDENED CONCRETE AND SOIL SHALL BE FREE OF WASTE FROM CONTAMINATION WHICH MAY LEACH CONSTITUENTS TO THE WATERS OF THE STATE.
16. ALL CONSTRUCTION AND DEMOLITION DEBRIS (C&DD) WASTE SHALL BE DISPOSED OF IN AN OHIO EPA APPROVED C&DD LANDFILL AS REQUIRED BY OHIO REVISED CODE (ORC) 3714.
17. DUST SUPPRESSANTS SHALL NOT BE APPLIED OR LOCATED NEAR CATCH BASINS FOR STORM SEWERS OR OTHER DRAINAGE WAYS.

EROSION CONTROL NOTES:
1. EROSION CONTROL NETTING SHALL BE INSTALLED IN ALL CONCENTRATED FLOW AREAS WITH THE EXCEPTION OF THE FIRST 50'.
2. ADDITIONAL EROSION CONTROL NOTES AND DETAILS CAN BE SEEN ON SHEET C-1.07.
3. PERIMETER CONTROLS SHALL BE IMPLEMENTED PRIOR TO GRADING AND WITHIN 7 DAYS FROM THE START OF GRUBBING AND SHALL CONTINUE TO FUNCTION UNTIL UPLAND AREAS ARE STABILIZED.
4. ANY DISTURBED AREAS THAT WILL REMAIN UNWORKED FOR A PERIOD OF 14 DAYS OR MORE SHALL BE STABILIZED WITH SEEDING AND MULCHING OR OTHER APPROPRIATE MEANS WITHIN 7 DAYS OF THE LAST EARTHMOVING ACTIVITY IN THAT AREA.
5. EROSION CONTROL BLANKETS / MATTING SHALL BE USED ON DITCHES GREATER THAN 1.5% AND ALL OTHER SLOPES GREATER THAN 6% GRADE.
6. UTILITY TRENCH SPOILS SHALL BE STOCKPILED UPHILL OF THE UTILITY TRENCH.
7. CONCRETE WASH OUT WATER MUST BE HAULED BACK TO THE PLANT FOR DISPOSAL.
8. NO SOLID OR LIQUID WASTE SHALL BE DISCHARGED INTO STORM WATER RUNOFF.
9. EFFLUENT FROM TRENCH DE-WATERING OPERATIONS MUST DISCHARGE TO A SEDIMENT BASIN OR THROUGH A FILTRATION DEVICE SUCH AS A "DIRT BAG".
10. OFF-SITE VEHICLES TRACKING SEDIMENT SHALL BE MINIMIZED. CONSTRUCTION VEHICLES ARE LIMITED TO THE CONSTRUCTION ACCESS DRIVE NOTED ON THE PLAN.
11. ALL EROSION AND SEDIMENT CONTROL PRACTICES MUST MEET THE STANDARDS AND SPECIFICATIONS OF THE OHIO RAINWATER AND LAND DEVELOPMENT HANDBOOK (CURRENT EDITION).
12. EROSION AND SEDIMENT CONTROL PRACTICES NOT ALREADY SPECIFIED ON THIS PLAN MAY BE NECESSARY DUE TO UNFORESEEN ENVIRONMENTAL CONDITIONS AND/OR CHANGES IN DRAINAGE PATTERNS CAUSED BY EARTH MOVING ACTIVITIES.
13. REGULAR INSPECTION AND MAINTENANCE WILL BE PROVIDED FOR ALL EROSION AND SEDIMENT CONTROL PRACTICES. PERMANENT RECORDS OF MAINTENANCE AND INSPECTIONS MUST BE KEPT THROUGHOUT THE CONSTRUCTION PERIOD. INSPECTIONS MUST BE MADE A MINIMUM OF ONCE EVERY 7 DAYS AND IMMEDIATELY AFTER STORM EVENTS GREATER THAN 0.5 INCHES OF RAIN IN A 24-HOUR PERIOD. PROVIDE NAME OF INSPECTOR, MAJOR OBSERVATIONS, DATE OF INSPECTION AND CORRECTIVE MEASURES TAKEN.
14. ALL DISTURBED AREAS SHALL BE SEEDED AND MULCHED IMMEDIATELY AFTER FINAL GRADING. SECURE SEEDING AND MULCHING WITH POLY NET WHERE SLOPES ARE 3 (HORIZ.) : 1 (VERT.) OR GREATER.
15. WINTERIZATION – ANY DISTURBED AREA THAT IS NOT GOING TO BE WORKED FOR 14 DAYS OR MORE MUST BE SEEDED AND MULCHED BY NOVEMBER 1 OR MUST HAVE A DORMANT SEEDING OR MULCH COVER APPLIED BETWEEN NOVEMBER 1 AND MARCH 1.
16. IT IS THE CONSTRUCTION MANAGER'S DUTY TO INFORM ALL CONTRACTORS AND SUBCONTRACTORS OF THEIR RESPONSIBILITY TO COMPLY WITH THE APPROVED SWPP PLAN AND THE OHIO EPA REQUIREMENTS.

SWPPP NOTES:
1. SITE DESCRIPTION: PROPOSED EVENT CENTER
2. SITE LOCATION: 4400 EVERETT ROAD, AKRON, OHIO 44333

SITE OWNER: BATH TOWNSHIP TRUSTEES
3864 WEST BATH ROAD
AKRON, OH 44333

3. NPDES PERMIT NUMBER: PENDING
4. AREA OF SITE: 76.60 ACRES, 3.00± ACRES EXPECTED TO BE DISTURBED.
5. ESTIMATED START OF CONSTRUCTION: JUNE 2025
6. ESTIMATED END OF CONSTRUCTION: NOVEMBER 2025
7. RECEIVING STREAM: NORTH FORK YELLOW CREEK
8. PRIOR USE: RESIDENTIAL HOUSE
9. THIS SITE IS COMPRISED OF MAHONING SILT LOAM (MgB) & ELLSWORTH SILT LOAM (EtC2) SOILS.
10. TOTAL DRAINAGE AREA: 1.55 ACRES TO DETENTION BASIN
11. PRE-DEVELOPED CN: 83
12. POST-DEVELOPED CN: 89
13. EXISTING IMPERVIOUS AREA ROUTED TO BASIN: 0.23 ACRE
14. PROPOSED IMPERVIOUS AREA ROUTED TO BASIN: 0.79 ACRE
15. IMPERVIOUS AREA ADDED: 0.56 ACRE

SWPPP DECOMMISSIONING SCHEDULE:
THE CONTRACTOR SHALL REMOVE PERIMETER SILT FENCES AFTER UPLAND AREAS ARE STABILIZED WITH VEGETATION. CONTRACTOR SHALL NOT BE RESPONSIBLE FOR SILT FENCE IF THE DEVELOPER REQUESTS TO KEEP SILT FENCE IN PLACE AFTER CONTRACTOR HAS COMPLETED THE PROPOSED WORK WITHIN THESE CONSTRUCTION DOCUMENTS.

SWPPP CONSTRUCTION SEQUENCE:
INITIAL PROJECT STAGE:

1. EXISTING DRIVEWAY ON EVERETT ROAD TO BE USED AS CONSTRUCTION ENTRANCE.
2. CLEARING AND GRUBBING SHALL BE DONE AS NEEDED TO ALLOW FOR INSTALLATION OF PERIMETER SILT FENCE IN SPECIFIED LOCATIONS BEFORE STRIPPING/GRADING OPERATIONS.
3. INSTALL SEDIMENT TRAP PRIOR TO ANY EARTHWORK. SEE SHEET C-1.05 FOR THE SEDIMENT TRAP PLAN.

   SEE SHEET C-1.03 FOR BMP LOCATIONS.
   SEE SHEET C-1.06 FOR DETETION BASIN PLAN.
   SEE SHEET C-1.07 FOR BMP DETAILS AND SPECIFICATIONS.

INTERMEDIATE PROJECT STAGE:

1. CONTRACTOR SHALL PERFORM EARTH MOVING ACTIVITIES UPSTREAM OF ANY BMP INSTALLED IN THE INITIAL PROJECT STAGE AS NECESSARY TO BRING SITE TO PROPER SUBGRADES.
2. ALL SWALES AND DISTURBED AREAS ARE TO BE SEEDED AND MULCHED ONCE BROUGHT TO FINAL GRADE.
3. POLY NETTING SHALL BE INSTALL IMMEDIATELY AFTER SEEDING AND MULCHING OPERATIONS IN LOCATIONS BROUGHT TO FINAL GRADE WHERE NECESSARY. DO NOT INSTALL NETTING WHERE UNDERGROUND UTILITIES WILL BE INSTALLED.
4. INSTALL ALL UNDERGROUND UTILITIES INCLUDING PROPOSED STORM SEWER. INSTALL INLET PROTECTION AROUND PROPOSED STORM STRUCTURES.
5. INSTALL PROPOSED PAVEMENT AS SHOWN ON SHEET C-1.02.
6. BMP'S ARE TO REMAIN FUNCTIONING THROUGH OUT THIS PROJECT STAGE.

FINAL PROJECT STAGE:

1. ALL EARTH MOVING ACTIVITIES SHALL BE COMPLETED AND AREAS SHALL BE BROUGHT TO FINAL GRADE.
2. ALL DISTURBED AREAS SHALL BE SEEDED AND MULCHED.
3. INSTALL POLY NETTING NOT ALREADY INSTALLED AFTER MASS GRADING.
4. ALL SEDIMENT BUILD UP AROUND SILT FENCE SHALL BE REMOVED REGULARLY AS NEEDED.
5. INSTALL OUTLET STRUCTURE FOR THE DETENTION AS SHOWN ON SHEET C-1.06 AND FOLLOW THE ADDITIONAL NOTES FOR CONVERTING THE SEDIMENT TRAP TO A DETENTION BASIN AFTER THE SITE HAS BEEN STABILIZED.

NOTE:
CONTRACTOR SHALL MAINTAIN CONTACT WITH THE COUNTY SOIL & WATER CONSERVATION DISTRICT AND COORDINATE THE TRANSITION BETWEEN THE VARIOUS STAGES OF THE STORMWATER POLLUTION PREVENTION PLAN.

MAINTENANCE NOTES
REGULAR INSPECTIONS AND MAINTENANCE BY THE DEVELOPER OR THEIR REPRESENTATIVE SHALL BE PROVIDED FOR ALL TEMPORARY AND PERMANENT EROSION AND SEDIMENT CONTROL PRACTICES. PERMANENT RECORDS OF MAINTENANCE AND INSPECTION ACTIVITIES SHALL BE KEPT ON-SITE THROUGHOUT THE CONSTRUCTION PERIOD. INSPECTIONS MUST BE MADE AT A MINIMUM OF ONCE EVERY 7 DAYS AND IMMEDIATELY AFTER STORM EVENTS GREATER THAN 0.5 INCHES OF RAIN IN A 24-HOUR PERIOD. PROVIDE NAME OF QUALIFIED INSPECTOR, DATE OF INSPECTION, MAJOR OBSERVATIONS (IDENTIFY TYPE AND LOCATION OF EACH SEPARATE BMP REQUIRING ATTENTION, DESCRIBE CONDITION OF DAMAGED BMP, SPECIFY TYPE OF REMEDIAL ACTION REQUIRED, ETC.), AND SPECIFIC CORRECTIVE MEASURES TAKEN SINCE THE TIME OF THE PREVIOUS INSPECTION TO ACHIEVE COMPLIANCE WITH THE REQUIREMENTS OF THE SITE'S APPROVED PLAN AND THE "RAINWATER AND LAND DEVELOPMENT MANUAL."

MAINTENANCE SHALL OCCUR AS DETAILED BELOW:

WHEN PRACTICES REQUIRE REPAIR OR MAINTENANCE. IF THE INSPECTION REVEALS THAT A CONTROL PRACTICE IS IN NEED OF REPAIR OR MAINTENANCE, WITH THE EXCEPTION OF A SEDIMENT-SETTLING POND, IT MUST BE REPAIRED OR MAINTAINED WITHIN THREE (3) DAYS OF THE INSPECTION. SEDIMENT SETTLING PONDS MUST BE REPAIRED OR MAINTAINED WITHIN TEN (10) DAYS OF THE INSPECTION.

WHEN PRACTICES FAIL TO PROVIDE THEIR INTENDED FUNCTION. IF THE INTERNAL INSPECTION REVEALS THAT A CONTROL PRACTICE FAILS TO PERFORM ITS INTENDED FUNCTION AND THAT ANOTHER, MORE APPROPRIATE CONTROL PRACTICE IS REQUIRED, THE SWP3 PLAN MUST BE AMENDED AND THE NEW CONTROL PRACTICE MUST BE INSTALLED WITHIN TEN (10) DAYS OF THE INSPECTION.

WHEN PRACTICES DEPICTED ON THE ABBREVIATED SWPP PLAN ARE NOT INSTALLED. IF THE INTERNAL INSPECTION REVEALS THAT A CONTROL PRACTICE HAS NOT BEEN IMPLEMENTED IN ACCORDANCE WITH THE AMENDED PLAN, THE CONTROL PRACTICE MUST BE IMPLEMENTED WITHIN TEN (10) DAYS FROM THE DATE OF THE INSPECTION. IF THE INSPECTION REVEALS THAT THE PLANNED CONTROL PRACTICE IS NOT NEEDED, THE RECORD MUST CONTAIN A STATEMENT OF EXPLANATION AS TO WHY THE CONTROL PRACTICE IS NOT NEEDED.

INSPECTION RECORDS SHALL BE KEPT FOR A MINIMUM OF THREE (3) YEARS FOLLOWING THE COMPLETION OF THE PROJECT.

NOTES:

1. AT THE END OF THE PROJECT THE CATCH BASINS AND STORM SEWERS SHALL BE CLEANED OF ANY SEDIMENT.
2. ANY REVISIONS TO BMP'S OR CHANGES TO THE SEQUENCE OF CONSTRUCTION BEING PROPOSED BY CONTRACTOR MUST BE APPROVED BY THE PROJECT ENGINEER PRIOR TO CONSTRUCTION.
3. IMPLEMENTATION OF EROSION AND SEDIMENT CONTROLS SHALL CONFORM TO THE REQUIREMENTS OF THE OHIO EPA NPDES CONSTRUCTION GENERAL PERMIT #OHCO00006 AND THE SOIL & WATER CONSERVATION DISTRICT. IF A CONFLICT EXISTS REGARDING THE EROSION AND SEDIMENT CONTROL PRACTICES, THE MORE RESTRICTIVE SHALL APPLY.

Soil Stabilization. Stabilization of disturbed areas shall, at a minimum, be initiated in accordance with the time frames specified in the following tables.

Table 1: Permanent Stabilization

Area requiring permanent stabilization	Time frame to apply erosion controls
Any areas that will lie dormant for one year or more	Within seven days of the most recent disturbance
Any areas within 50 feet of a surface water of the state and at final grade	Within two days of reaching final grade
Other areas at final grade	Within seven days of reaching final grade *within that area*

Table 2: Temporary Stabilization

Area requiring temporary stabilization	Time frame to apply erosion controls
Any disturbed areas within 50 feet of a surface water of the state and not at final grade	Within two days of the most recent disturbance if the area will remain idle for more than 14 days
Any disturbed areas that will be dormant for more than 14 days but less than one year, and not within 50 feet of a surface water of the state	Within seven days of the most recent disturbance within the area For residential subdivisions, disturbed areas must be stabilized at least seven days prior to transfer of permit coverage for the individual lot(s).
Disturbed areas that will be idle over winter	Prior to the onset of winter weather

Where vegetative stabilization techniques may cause structural instability or are otherwise unobtainable, alternative stabilization techniques must be employed. Permanent and temporary stabilization are defined in Part VII.

PROTECTION OF EXISTING UTILITIES
THE SITE CONTRACTOR MUST PROTECT AND SUPPORT ANY EXISTING UTILITIES WITHIN OR ADJACENT TO THE PROJECT AREA. UTILITIES MUST BE KEPT IN SERVICE AT ALL TIMES. ALL SERVICES TO EXISTING RESIDENCES MUST REMAIN AT ALL TIMES.

SUBCONTRACTOR STORMWATER POLLUTION PREVENTION PLAN ACKNOWLEDGMENT
I hereby acknowledge that all subcontractors shall comply with all erosion and sediment control measures as shown on and described in this plan set.

Name & Company _____ Date _____

Name & Company _____ Date _____

Name & Company _____ Date _____

Name & Company _____ Date _____

Name & Company _____ Date _____

Name & Company _____ Date _____

Name & Company _____ Date _____

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel property gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Kyle Salisbury — Date: 3/17/2025

Kyle Salisbury — Registered Ohio Engineer No. E-82304

STATE OF OHIO · KYLE SALISBURY · 82304 · REGISTERED PROFESSIONAL ENGINEER

SWP3 Amendment Log

Project Name: North Fork Preserve
Site Area: 3.00± Acres disturbance

Amendment No.	Description of the Amendment	Date of Amendment	Name, Title, & Qualification of Person Preparing Amendment

Corrective Action Log

Project Name: North Fork Preserve
Site Area: 3.00± Acres disturbance

Inspection Date	Name, Title, & Qualification of Inspector	Description of Corrective Action Needed (From Inspection Report including location)	Corrective Action Taken	Date Action Taken

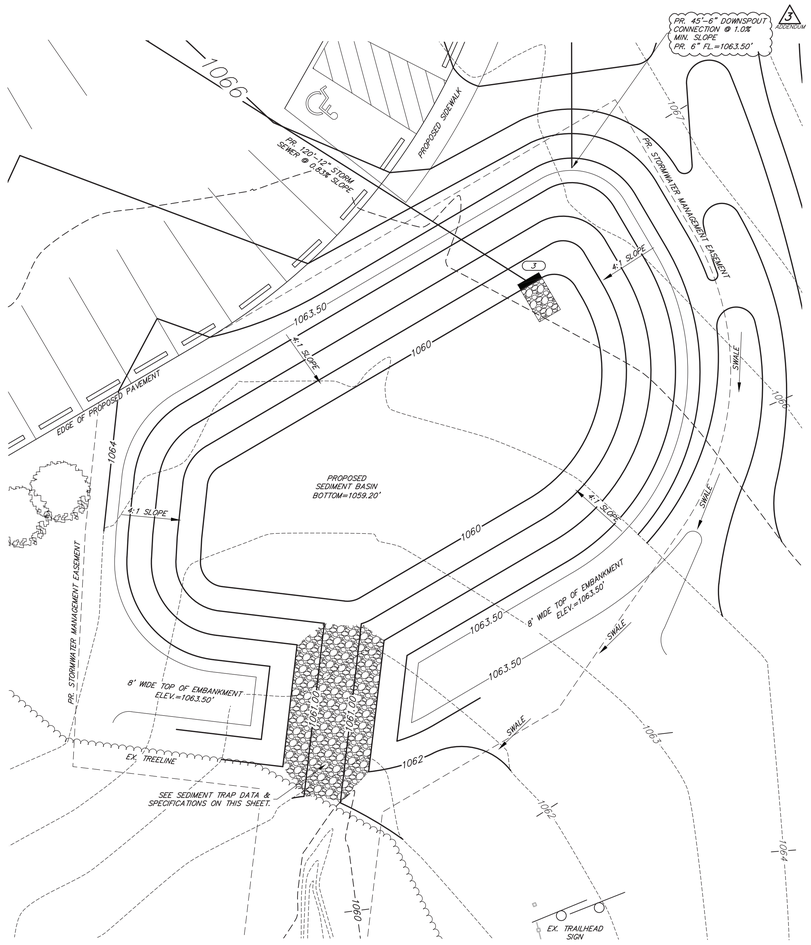
SWP3 Grading and Stabilization Activities Log

Project Name: North Fork Preserve
Site Area: 3.00± Acres disturbance

Date Grading Activity Initiated	Name, Title, & Qualification of Person Performing Grading Activity	Description of Grading Activity	Date Grading Activity Ceased Indicate temporary or permanent	Date When Stabilization Measures are Initiated	Description of Stabilization Measure and Location

SWP3 Inspection Report Log

Project Name: North



SEDIMENT TRAP PLAN VIEW

SCALE: 1"=10'

GRAPHIC SCALE

10 0 5 10 20

(IN FEET)
1 inch = 10 ft.

STORM SEWER SCHEDULE

3 INSTALL 12" HALF HEADWALL WITH TYPE "C" ROCK RIPRAP (4'Wx6'Lx18"D) 12"FL.=1060.30'

DRAINAGE AREA = 1.55 ACRES
TOTAL REQUIRED CAPACITY = 4,340 FT^3
TOTAL CAPACITY PROVIDED = 6,314 FT^3
SEE "SEDIMENT TRAP DATA" ON THIS SHEET FOR ADDITIONAL INFORMATION

SEDIMENT REMOVAL NOTE:
SEDIMENT BUILT UP IN THE BASIN SHALL BE REMOVED AFTER EACH RAINFALL EVENT IF THE SEDIMENT REACHES AN ELEVATION OF 1061.00'

Elevation ft.	Area sq. ft.	Volume (cu. ft.) Incremental	Cumulative
1063.50	5200	2466	12932
1063.00	4663	2200	10466
1062.50	4136	1947	8267
1062.00	3652	1712	6320
1061.50	3194	1489	4608
1061.00	2760	1278	3120
1060.50	2351	1079	1842
1060.00	1964	763	763
1059.20	228	0	0

Sediment Trap Data

Trap Number	1			
A. Total Contributing Watershed (ac)	1.55			
B. Disturbed Area (ac)	1.55			
C. Req. Dewatering Volume (A x 1800 ft³/ac)	2,790			
D. Req. Sediment Storage Zone Vol. (B * 1000	1,550			
E. Total Required Capacity (C + D in ft³)	4,340			
F. Dewatering Volume Provided (ft³/ac)	3,197			
G. Sediment Storage Provided (ft³/ac)	3,117			
Total Required Capacity (yd³)	160.7			
Average Bottom Length (L)	60.0'			
Average Bottom Width (W)	30.0'			
Flow L:W Ratio (2:1 min)	2:1			
Bottom Elevation (max 4 ft sed-storage d)	1059.20			
Top of Embankment Elevation	1063.50'			
Embankment Height (max. 5 ft @ c/l from grnd to top embankment)	3.50'			
Embankment Side Slopes (max 2:1)	4:1			
Embankment Top Width (min. 4 feet)	8.0'			
Crest of Spillway Elevation (at least 1.5' below embankment elev.)	1062.00'			
Top of Sediment Storage Elevation (base of stone outlet)	1061.00'			
Sediment Trap Weir Length (sized to pass 10-year, 24-hour storm)	6'			
Geotextile Specified	Yes			
Aggregate (size and quantity)	0.22 cu. yd. of #57 aggregate			
Rock (size, gradation and quality of rock)	5.1 cu. yd. of ODOT Type D rock riprap			

SEDIMENT TRAP NOTES

1) THE CONTRACTOR SHALL INSTALL THE SEDIMENT TRAP AS SHOWN ON THIS PLAN BEFORE PERFORMING ANY OTHER EARTHWORK ON THE SITE.

2) THE CONTRACTOR SHALL MAINTAIN THE SEDIMENT TRAP DURING THE ENTIRE CONSTRUCTION PROCESS UNTIL ALL UPSLOPE WORK HAS BEEN COMPLETED AND PROPER SEEDING HAS BEEN ESTABLISHED.

3) SEDIMENT BUILT UP IN THE TRAP SHALL BE REMOVED AFTER EACH RAINFALL EVENT IF IT REACHES THE ELEVATION OF 1061.00'

4) THE PROPOSED DETENTION BASIN IS BEING USED AS A SEDIMENT TRAP DURING CONSTRUCTION. DURING ITS USE AS A SEDIMENT BASIN THE FOLLOWING OPERATION AND MAINTENANCE PROCEDURES SHALL BE ADHERED TO:

A) ESTABLISH VEGETATIVE COVER AND FERTILIZE AS NECESSARY TO MAINTAIN A VIGOROUS COVER IN AND AROUND THE SEDIMENT BASIN.

B) REMOVE UNDESIRABLE VEGETATION PERIODICALLY TO PREVENT THE GROWTH OF TREES AND SHRUBS ON THE EMBANKMENT AND SPILLWAY.

C) PROMPTLY REPAIR ERODED AREAS. RE-ESTABLISH VEGETATIVE COVER IMMEDIATELY WHERE SCOUR EROSION HAS REMOVED ESTABLISHED SEEDING.

D) PROMPTLY REMOVE ANY BURROWING RODENTS THAT MAY INVADE AREAS OF THE EMBANKMENT.

E) REMOVE SEDIMENT FROM THE TRAP WHEN IT FILLS THE DESIGN DEPTH OF THE SEDIMENT STORAGE ZONE. THIS ELEVATION SHALL BE MARKED ON A CLEANOUT STAKE NEAR THE RIPRAP WEIR.

F) CHECK INLETS TO ENSURE DRAINAGE IS NOT CAUSING EROSION AND THAT THE RIPRAP IS NOT CLOGGED. REPLACE DISPLACED RIPRAP IMMEDIATELY.

G) AFTER THE ENTIRE CONSTRUCTION PROJECT IS COMPLETED, THE SEDIMENT TRAP SHALL BE DEWATERED AND REGRADED BY THE CONTRACTOR TO CONFORM TO THE CONTOURS OF THE DETENTION BASIN PLAN ON SHEET C-1.06. ALL TEMPORARY STRUCTURES SHOULD BE REMOVED AND THE AREA SEEDED, MULCHED, AND STABILIZED AS NECESSARY.

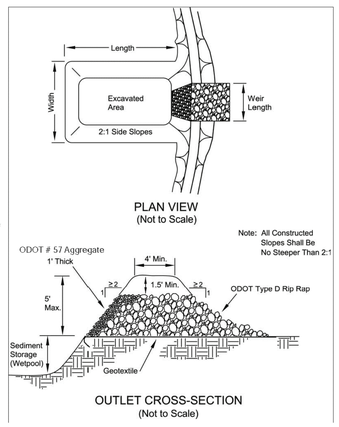
Specifications for

Sediment Traps

1. Work shall consist of the installation, maintenance and removal of all sediment traps at the locations designated on the drawings.
2. Sediment traps shall be constructed to the dimensions specified on the drawings and operational prior to upslope land disturbance.
3. The area beneath the embankment shall be cleared, grubbed and stripped of vegetation to a minimum depth of six (6) inches. The pool shall be cleared as needed to facilitate sediment cleanout.
4. Fill used for the embankment shall be evaluated to assure its suitability and it must be free of roots or other woody vegetation, large rocks, organics or other objectionable materials. Fill material shall be placed in six (6) inch lifts and shall be compacted by traversing with a sheepsfoot or other approved compaction equipment. Fill height shall be increased five (5) percent to allow for structure/foundation settlement. Construction shall not be permitted if either the earthfill or compaction surface is frozen.
5. The maximum height of embankment shall be five (5) feet. All cut and fill slopes shall be 2:1 (H:V) or flatter.
6. A minimum storage volume below the crest of the outlet of 67 yd³. for every acre of contributing drainage area shall be achieved at each location noted on the drawings with additional sediment storage volume provided below this elevation.
7. Temporary seeding shall be established and maintained over the useful life of the practice.
8. The outlet for the sediment trap structure shall be constructed to the dimensions shown on the drawings.
9. The outlet shall be constructed using the materials specified on the drawings. Where geotextile is used, all overlaps shall be a minimum of two (2) feet or as specified by the manufacturer, whichever is greater. All overlaps shall be made with the upper most layer placed last. Geotextile shall be keyed in at least 6" on the upstream side of the outlet.
10. Warning signs and safety fence shall be placed around the traps and maintained over the life of the practice.
11. After all sediment-producing areas have been permanently stabilized, the structure and all associated sediment shall be removed. Stabile earth materials shall be placed in the sediment trap area and compacted. The area shall be graded to blend in with adjoining land surfaces and have positive drainage. The area shall be immediately seeded.

Specifications for

Sediment Trap



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NORTH FORK PRESERVE RENOVATION

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PROJECT #: 2324

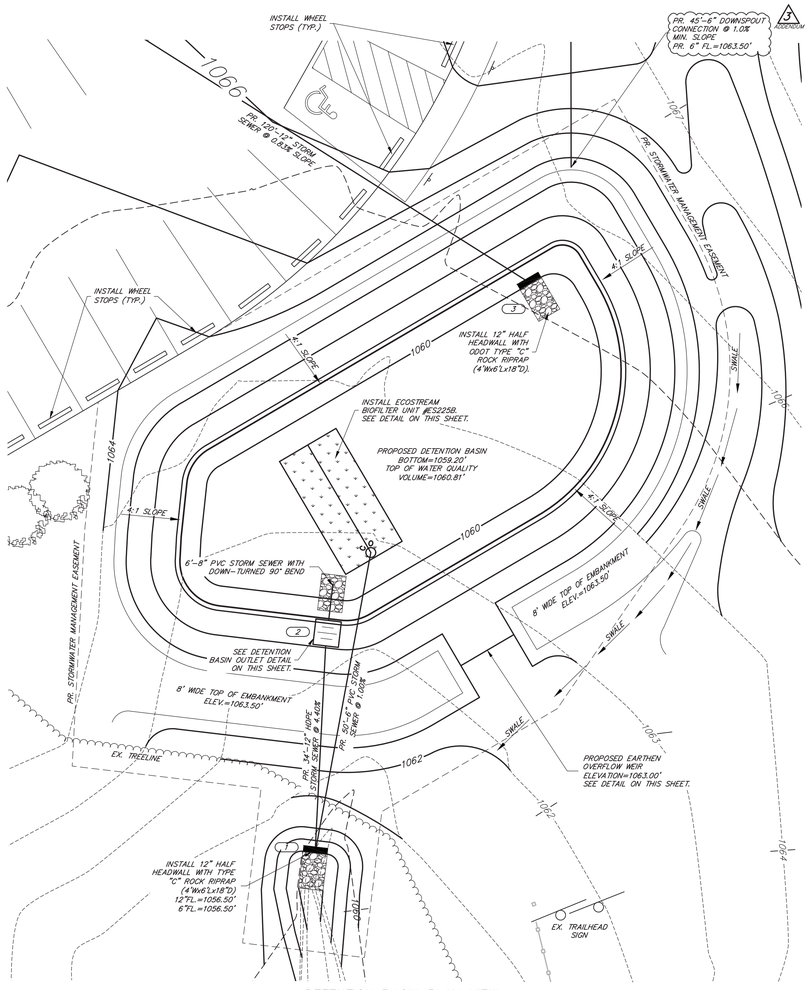
ISSUE:
BID SET 07-28-2025

SEDIMENT TRAP PLAN

C-1.05

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Printed Friday, October 13, 2023



DETENTION BASIN PLAN VIEW

SCALE: 1"=10'

GRAPHIC SCALE

10 0 5 10 20

(IN FEET)
1 inch = 10 ft.

STORM SEWER SCHEDULE

1. INSTALL 12" HALF HEADWALL WITH TYPE "C" ROCK RIPRAP (4'Wx6'Lx18"D) 12"FL.=1056.50'
2. INSTALL ODOT 2-2B CATCH BASIN RIM=1062.20' 7.5"FL.=1060.81' 12"FL.=1058.00'
3. INSTALL 12" HALF HEADWALL WITH TYPE "C" ROCK RIPRAP (4'Wx6'Lx18"D) 12"FL.=1060.30'

STORMWATER MANAGEMENT BASIN SUMMARY

STORM EVENT (YEAR)	PRE-DEVELOPED RUNOFF RATES (C.F.S.)	POST-DEVELOPED RUNOFF RATES (C.F.S.)	ALLOWABLE RUNOFF RATES (C.F.S.)	DETENTION BASIN RELEASE RATES (C.F.S.)	PEAK STORAGE ELEVATION (FT.)
1	1.51	2.26	1.51	0.91	1061.51
2	2.14	2.97	1.51	1.13	1061.71
5*	3.13	4.03	1.51	1.39	1062.01
10	3.98	4.93	3.98	1.86	1062.24
25	5.25	6.23	5.25	3.76	1062.39
50	6.34	7.33	6.34	5.66	1062.49
100	7.52	8.52	7.52	7.05	1062.56

*THE CRITICAL STORM EVENT IS THE 5-YEAR STORM

NOTE: THIS STORMWATER MANAGEMENT BASIN IS A DRY DETENTION BASIN

STORMWATER MANAGEMENT BASIN NOTES:

1) THE CONTRACTOR SHALL INSTALL THE STORMWATER MANAGEMENT BASIN AS SHOWN ON THIS PLAN AT THE END OF THE PROJECT.

2) DEVIATION OF 5% OR GREATER FROM THE DESIGN STORAGE VOLUME AT EACH CONTOUR ELEVATION WILL NOT BE ACCEPTED.

3) THE STORMWATER MANAGEMENT BASIN SHALL NOT AT ANY TIME DISCHARGE STORM WATER AT A HIGHER RATE THAN ANY ALLOWABLE DISCHARGE RATE FOR EACH STORM EVENT.

ECOSTREAM BIOFILTER

UNIT	FILTER AREA (FT²)	MAX TREATMENT FLOW RATE (CFS)	MAX ALLOWABLE DRAINAGE AREA* (ACRES)
ES48B	48	0.441	1.354
ES60B	60	0.551	1.693
ES72B	72	0.662	2.032
ES80B	80	0.735	2.257
ES91B	91	0.836	2.568**
ES96B	96	0.882	2.709**
ES100B	100	0.919	2.822**
ES112B	112	1.029	3.160**
ES120B	120	1.103	3.386**
ES128B	128	1.176	3.612**
ES144B	144	1.323	4.063**
ES160B	160	1.470	4.515**
ES168B	168	1.544	4.740**
ES176B	176	1.618	4.966**
ES225B	225	2.068	6.349**
ES256B	256	2.353	7.223**
ES289B	289	2.656	8.155**
ES324B	324	2.978	9.142**
ES360B	360	3.309	10.158**

* DRAINAGE AREA IS BASED ON 16.93 LB./FT2/ (270.8 LB./16 FT2/) OF EFFECTIVE FILTRATION TREATMENT AREA AND THE EQUATION IN THE NJDEP FILTRATION PROTOCOL APPENDIX, WHERE DRAINAGE AREA IS CALCULATED BASED ON 600 LBS. OF MASS CONTRIBUTED PER ACRE OF DRAINAGE AREA ANNUALLY.
** NJDEP REGULATIONS LIMIT THE CONTRIBUTORY DRAINAGE AREA FOR GI MTD'S TO 2.5 ACRES.

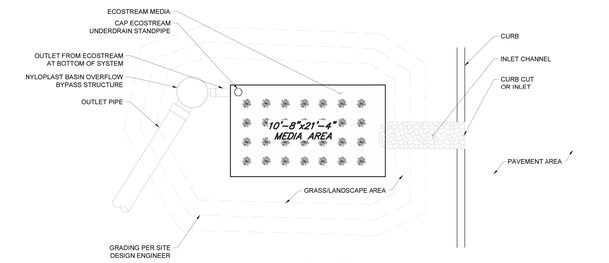
INTEGRATED BYPASS

BASIN	GRATE	BYPASS (CFS)	HEAD REQ. (IN)
15	DOME	1.61	3
		2.28	12
		2.79	18
	FLAT	1.22	6
		1.73	12
		2.12	18
18	DOME	2.32	6
		3.23	12
		4.02	18
	FLAT	1.54	6
		2.18	12
		2.67	18
24	DOME	3.57	6
		5.05	12
		6.19	18
	FLAT	2.57	6
		3.63	12
		4.45	18
30	DOME	4.70	6
		7.65	12
		9.37	18
	FLAT	4.28	6
		6.05	12
		7.41	18

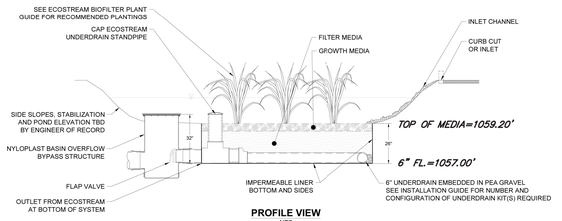
CALCULATIONS BASED ON USDOT/FHWA URBAN DESIGN MANUAL, HYDRAULIC ENGINEERING CIRCULAR NO. 22 THIRD EDITION, PUBLICATION NO FHWA-NHI-10-009, AND A 50% CLOGGING FACTOR.

ECOSTREAM BIOFILTER

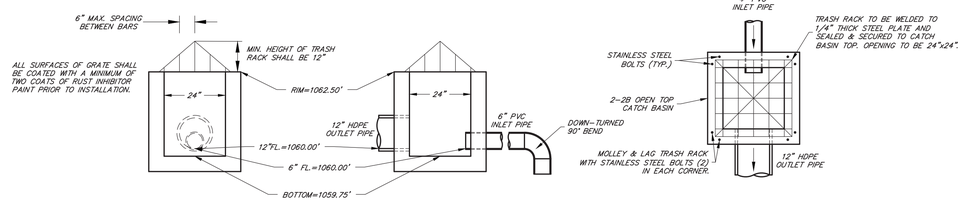
- THE ECOSTREAM BIOFILTER IS A BIOFILTRATION STORMWATER TREATMENT TECHNOLOGY THAT RELIES ON PHYSICAL, CHEMICAL AND BIOLOGICAL MECHANISMS TO REMOVE TOTAL SUSPENDED SOLIDS, TOTAL PHOSPHORUS, TOTAL NITROGEN, HEAVY METALS, OIL AND GREASE, TRASH AND BACTERIA.
- THE SITE DESIGN ENGINEER MUST REVIEW ELEVATIONS AND FINALIZE GRADING TO MEET SITE CONDITIONS.
- THE SITE DESIGN ENGINEER MUST REVIEW THE INLET CHANNEL AND FINALIZE THE DESIGN TO MEET SITE CONDITIONS
- WATER SURFACE ELEVATION ESTIMATED BASED ON THE INLET CAPACITY OF THE NYLOPLAST GRATE AND THE PROVIDED BYPASS FLOW RATE PER THE SITE DESIGN ENGINEER. SITE DESIGN ENGINEER MUST REVIEW THE WATER SURFACE ELEVATION AND FINALIZE THE DESIGN TO MEET THE PROJECT DESIGN PARAMETERS.
- ADS DOES NOT DESIGN OR PROVIDE MEMBRANE LINER SYSTEMS. TO MINIMIZE THE LEAKAGE POTENTIAL OF LINER SYSTEMS, THE MEMBRANE LINER SYSTEM SHOULD BE DESIGNED BY A KNOWLEDGEABLE GEOTEXTILE PROFESSIONAL AND INSTALLED BY A QUALIFIED CONTRACTOR.
- ADS DOES NOT RECOMMEND PLACING THE LINED ECOSTREAM SYSTEM IN THE WATER TABLE. FOR ASSISTANCE PLEASE CONTACT ADS ENGINEERING SERVICES.



PLAN VIEW
NTS

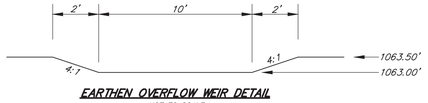


PROFILE VIEW
NTS



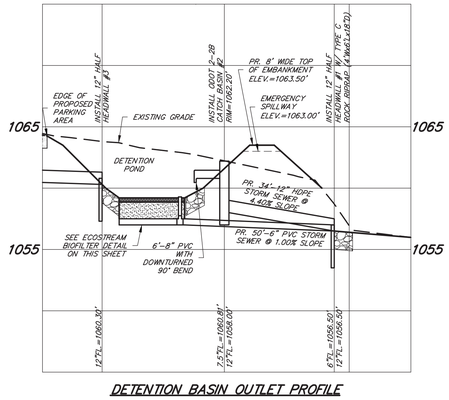
DETENTION BASIN OUTLET DETAIL

SCALE: 1"=2'



EARTHEN OVERFLOW WEIR DETAIL

NOT TO SCALE



DETENTION BASIN OUTLET PROFILE

SCALES: 1"=20' HORIZ., 1"=5' VERT.

ECOSTREAM LINED UNIT OPTION
BASIC MEDIA

DATE:	DRAWN:	JLM
	DRAWING #:	571-010
	CHECKED:	AT

DATE	DRWN	CHKD	DESCRIPTION

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EcoStream™ Biofilter
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PROJECT #: 2324
ISSUE:
BID SET 07-28-2025

DETENTION BASIN PLAN

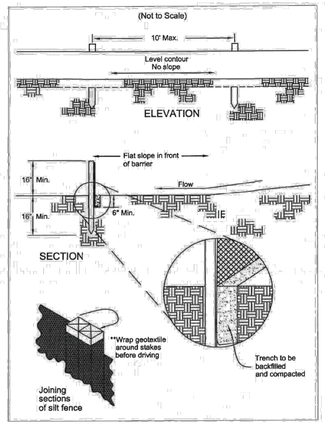
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Printed: Friday, October 10, 2025

Specifications
for

Silt Fence



Specifications
for

Silt Fence

1. Silt fence shall be constructed before upslope land disturbance begins.
2. All silt fence shall be placed as close to the contour as possible so that water will not concentrate at low points in the fence and so that small swales or depressions that may carry small concentrated flows to the silt fence are dissipated along its length.
3. Ends of the silt fences shall be brought upslope slightly so that water ponded by the silt fence will be prevented from flowing around the ends.
4. Silt fence shall be placed on the flattest area available.
5. Where possible, vegetation shall be preserved for 5 feet (or as much as possible) upslope from the silt fence. If vegetation is removed, it shall be reestablished within 7 days from the installation of the silt fence.
6. The height of the silt fence shall be a minimum of 16 inches above the original ground surface.
7. The silt fence shall be placed in an excavated or sliced trench cut a minimum of 6 inches deep. The trench shall be made with a trencher, cable laying machine, slicing machine, or other suitable device that will ensure an adequately uniform trench depth.
8. The silt fence shall be placed with the stakes on the downslope side of the geotextile. A minimum of 8 inches of geotextile must be below the ground surface. Excess material shall lay on the bottom of the 6-inch deep trench. The trench shall be backfilled and compacted on both sides of the fabric.
9. Seams between sections of silt fence shall be spliced together only at a support post with a minimum 6-in. overlap prior to driving into the ground, (see details).
10. Maintenance—Silt fence shall allow runoff to pass only as diffuse flow through the geotextile. If runoff overtops the silt fence, flows under the fabric or around the fence ends, or in any other way allows a concentrated flow discharge, one of the following shall be performed, as appropriate: 1) the layout of the silt fence shall be changed, 2) accumulated sediment shall be removed, or 3) other practices shall be installed.

    Sediment deposits shall be routinely removed when the deposit reaches approximately one-half of the height of the silt fence.

    Silt fences shall be inspected after each rainfall and at least daily during a prolonged rainfall. The location of existing silt fence shall be reviewed daily to ensure its proper location and effectiveness. If damaged, the silt fence shall be repaired immediately.

Criteria for silt fence materials

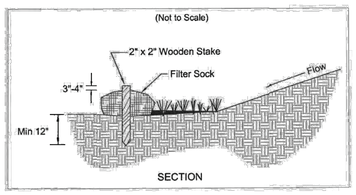
1. Fence post – The length shall be a minimum of 32 inches. Wood posts will be 2-by-2-in. nominal dimensioned hardwood of sound quality. They shall be free of knots, splits and other visible imperfections, that will weaken the posts. The maximum spacing between posts shall be 10 ft. Posts shall be driven a minimum 16 inches into the ground, where possible. If not possible, the posts shall be adequately secured to prevent overturning of the fence due to sediment/water loading.
2. Silt fence fabric – See chart below.

Table 6.3.2 Minimum criteria for Silt Fence Fabric (ODOT, 2002)

FABRIC PROPERTIES	VALUES	TEST METHOD
Minimum Tensile Strength	120 lbs. (535 N)	ASTM D 4632
Maximum Elongation at 60 lbs	50%	ASTM D 4632
Minimum Puncture Strength	50 lbs (220 N)	ASTM D 4833
Minimum Tear Strength	40 lbs (180 N)	ASTM D 4533
Apparent Opening Size	≤ 0.84 mm	ASTM D 4751
Minimum Permittivity	1X10-2 sec.-1	ASTM D 4491
UV Exposure Strength Retention	70%	ASTM G 4355

Specifications
for

Filter Sock



1. Materials – Compost used for filter socks shall be weed, pathogen and insect free and free of any refuse, contaminants or other materials toxic to plant growth. They shall be derived from a well-decomposed source of organic matter and consist of a particles ranging from 3/8" to 2".
2. Filter Socks shall be 3 or 5 mil continuous, tubular, HDPE 3/8" knitted mesh netting material, filled with compost passing the above specifications for compost products.

INSTALLATION:

3. Filter socks will be placed on a level line across slopes, generally parallel to the base of the slope or other affected area. On slopes approaching 2:1, additional socks shall be provided at the top and as needed midslope.
4. Filter socks intended to be left as a permanent filter or part of the natural landscape, shall be seeded at the time of installation for establishment of permanent vegetation.
5. Filter Socks are not to be used in concentrated flow situations or in runoff channels.

MAINTENANCE:

6. Routinely inspect filter socks after each significant rain, maintaining filter socks in a functional condition at all times.
7. Remove sediments collected at the base of the filter socks when they reach 1/3 of the exposed height of the practice.
8. Where the filter sock deteriorates or fails, it will be repaired or replaced with a more effective alternative.
9. Removal – Filter socks will be dispersed on site when no longer required in such as way as to facilitate and not obstruct seedings.

Specifications
for

Temporary Seeding

Table 7.8.1 Temporary Seeding Species Selection

Seeding Dates	Species	Lb./1000 ft2	Lb/Acre
March 1 to August 15	Oats Tall Fescue Annual Ryegrass	3 1 1	128 (4 Bushel) 40 40
	Perennial Ryegrass Tall Fescue Annual Ryegrass	1 1 1	40 40 40
	Annual Ryegrass Perennial Ryegrass Creeping Red Fescue Kentucky Bluegrass	1.25 3.25 0.4 0.4	55 142 17 17
August 16th to November	Oats Tall Fescue Annual Ryegrass	3 1 1	128 (3 bushel) 40 40
	Rye Tall Fescue Annual Ryegrass	3 1 1	112 (2 bushel) 40 40
	Wheat Tall Fescue Annual Ryegrass	3 1 1	120 (2 bushel) 40 40
	Perennial Rye Tall Fescue Annual Ryegrass	1 1 1	40 40 40
	Annual Ryegrass Perennial Ryegrass Creeping Red Fescue Kentucky Bluegrass	1.25 3.25 0.4 0.4	40 40 40
November 1 to Feb. 29	Use mulch only or dormant seeding		

Note: Other approved species may be substituted.

1. Structural erosion and sediment control practices such as diversions and sediment traps shall be installed and stabilized with temporary seeding prior to grading the rest of the construction site.
2. Temporary seed shall be applied between construction operations on soil that will not be graded or reworked for 21 days or greater. These idle areas shall be seeded within 7 days after grading.
3. The seedbed should be pulverized and loose to ensure the success of establishing vegetation. Temporary seeding should not be postponed if ideal seedbed preparation is not possible.
4. Soil Amendments—Temporary vegetation seeding rates shall establish adequate stands of vegetation, which may require the use of soil amendments. Base rates for lime and fertilizer shall be used.
5. Seeding Method—Seed shall be applied uniformly with a cyclone spreader, drill, cultipacker seeder, or hydroseeder. When feasible, seed that has been broadcast shall be covered by raking or dragging and then lightly tamped into place using a roller or cultipacker. If hydroseeding is used, the seed and fertilizer will be mixed on-site and the seedling shall be done immediately and without interruption.

Specifications
for

Temporary Seeding

Mulching Temporary Seeding

1. Applications of temporary seeding shall include mulch, which shall be applied during or immediately after seeding. Seedings made during optimum seeding dates on favorable, very flat soil conditions may not need mulch to achieve adequate stabilization.

2. Materials;

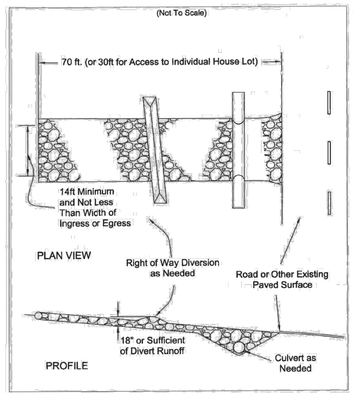
- Straw—If straw is used, it shall be unrotted small-grain straw applied at a rate of 2 tons per acre or 90 lbs./ 1,000 sq. ft. (2-3 bales)
- Hydroseeders—If wood cellulose fiber is used, it shall be used at 2000 lbs / ac. or 46 lb./ 1,000-sq.-ft.
- Other—Other acceptable mulches include mulch mattings applied according to manufacturer's recommendations or wood chips applied at 6 ton/ ac.

3. Straw Mulch shall be anchored immediately to minimize loss by wind or water. Anchoring methods;

- Mechanical—A disk, crimper, or similar type tool shall be set straight to punch or anchor the mulch material into the soil. Straw mechanically anchored shall not be finely chopped but left to a length of approximately 6 inches.
- Mulch Netting—Netting shall be used according to the manufacturers recommendations. Netting may be necessary to hold mulch in place in areas of concentrated runoff and on critical slopes.
- Synthetic Binders—Synthetic binders such as Acrylic DLR (Agri-Tac), DCA-70, Petroset, Terra Track or equivalent may be used at rates recommended by the manufacturer.
- Wood-Cellulose Fiber—Wood-cellulose fiber binder shall be applied at a net dry wt. of 750 lb./ac. The wood-cellulose fiber shall be mixed with water and the mixture shall contain a maximum of 50 lb. / 100 gal.

Specifications
for

Construction Entrance



1. Stone Size—ODOT # 2 (1.5-2.5 inch) stone shall be used, or recycled concrete equivalent.
2. Length—The Construction entrance shall be as long as required to stabilize high traffic areas but not less than 70 ft. (exception: apply 30 ft. minimum to single residence lots).
3. Thickness -The stone layer shall be at least 6 inches thick for light duty entrances or at least 10 inches for heavy duty use.
4. Width -The entrance shall be at least 14 feet wide, but not less than the full width at points where ingress or egress occurs.
5. Geotextile -A geotextile shall be laid over the entire area prior to placing stone. It shall be composed of strong rot-proof polymeric fibers and meet the following specifications:

Figure 7.4.1

Geotextile Specification for Construction Entrance	
Minimum Tensile Strength	200 lbs.
Minimum Puncture Strength	80 psi.
Minimum Tear Strength	50 lbs.
Minimum Burst Strength	320 psi.
Minimum Elongation	20%
Equivalent Opening Size	EOS < 0.6 mm.
Permittivity	1x10-3 cm/sec.

6. Timing—The construction entrance shall be installed as soon as is practicable before major grading activities.
7. Culvert -A pipe or culvert shall be constructed under the entrance if needed to prevent surface water from flowing across the entrance or to prevent runoff from being directed out onto paved surfaces.
8. Water Bar -A water bar shall be constructed as part of the construction entrance if needed to prevent surface runoff from flowing the length of the construction entrance and out onto paved surfaces.
9. Maintenance -Top dressing of additional stone shall be applied as conditions demand. Mud spilled, dropped, washed or tracked onto public roads, or any surface where runoff is not checked by sediment controls, shall be removed immediately. Removal shall be accomplished by scraping or sweeping.
10. Construction entrances shall not be relied upon to remove mud from vehicles and prevent off-site tracking. Vehicles that enter and leave the construction-site shall be restricted from muddy areas.
11. Removal—the entrance shall remain in place until the disturbed area is stabilized or replaced with a permanent roadway or entrance.

Specifications
for

Permanent Seeding

Site Preparation

1. Subsoiler, plow, or other implement shall be used to reduce soil compaction and allow maximum infiltration. (Maximizing infiltration will help control both runoff rate and water quality.) Subsoiling should be done when the soil moisture is low enough to allow the soil to crack or fracture. Subsoiling shall not be done on slip-prone areas where soil preparation should be limited to what is necessary for establishing vegetation.
2. The site shall be graded as needed to permit the use of conventional equipment for seedbed preparation and seeding.
3. Topsoil shall be applied where needed to establish vegetation.

Seedbed Preparation

1. Lime—Agricultural ground limestone shall be applied to acid soil as recommended by a soil test. In lieu of a soil test, lime shall be applied at the rate of 100 pounds per 1,000-sq. ft. or 2 tons per acre.
2. Fertilizer—Fertilizer shall be applied as recommended by a soil test. In place of a soil test, fertilizer shall be applied at a rate of 25 pounds per 1,000-sq. ft. or 1000 pounds per acre of a 10-10-10 or 12-12-12 analyses.
3. The lime and fertilizer shall be worked into the soil with a disk harrow, spring-tooth harrow, or other suitable field implement to a depth of 3 inches. On sloping land, the soil shall be worked on the contour.

Seeding Dates and Soil Conditions

Seeding should be done March 1 to May 31 or August 1 to September 30. If seeding occurs outside of the above-specified dates, additional mulch and irrigation may be required to ensure a minimum of 80% germination. Tillage for seedbed preparation should be done when the soil is dry enough to crumble and not form ribbons when compressed by hand. For winter seeding, see the following section on dormant seeding.

Dormant Seedings

1. Seedings should not be made from October 1 through November 20. During this period, the seeds are likely to germinate but probably will not be able to survive the winter.
2. The following methods may be used for "Dormant Seeding":

3. Straw and Mulch Anchoring Methods

Straw mulch shall be anchored immediately to minimize loss by wind or water.

- Mechanical—A disk, crimper, or similar type tool shall be set straight to punch or anchor the mulch material into the soil. Straw mechanically anchored shall not be finely chopped but, generally, be left longer than 6 inches.
- Mulch Netting—Netting shall be used according to the manufacturer's recommendations. Netting may be necessary to hold mulch in place in areas of concentrated runoff and on critical slopes.
- Synthetic Binders—Synthetic binders such as Acrylic DLR (Agri-Tac), DCA-70, Petroset, Terra Track or equivalent may be used at rates specified by the manufacturer.
- Asphalt Emulsion—Asphalt shall be applied as recommended by the manufacture or at the rate of 160 gallons per acre.
- From October 1 through November 20, prepare the seedbed, add the required amounts of lime and fertilizer, then mulch and anchor. After November 20, and before March 15, broadcast the selected seed mixture. Increase the seeding rates by 50% for this type of seeding.
- From November 20 through March 15, when soil conditions permit, prepare the seedbed, lime and fertilize, apply the selected seed mixture, mulch and anchor. Increase the seeding rates by 50% for this type of seeding.
- Apply seed uniformly with a cyclone seeder, drill, cultipacker seeder, or hydro-seeder (slurry may include seed and fertilizer) on a firm, moist seedbed.
- Where feasible, except when a cultipacker type seeder is used, the seedbed should be firmed following seeding operations with a cultipacker, roller, or light drag. On sloping land, seeding operations should be on the contour where feasible.

Mulching

1. Mulch material shall be applied immediately after seeding. Dormant seeding shall be mulched. 100% of the ground surface shall be covered with an approved material.
2. Materials

- Straw—If straw is used it shall be unrotted small-grain straw applied at the rate of 2 tons per acre or 90 pounds (two to three bales) per 1,000-sq. ft. The mulch shall be spread uniformly by hand or mechanically applied so the soil surface is covered. For uniform distribution of hand-spread mulch, divide area into approximately 1,000-sq.-ft. sections and spread two 45-lb. bales of straw in each section.
- Hydroseeders—If wood cellulose fiber is used, it shall be applied at 2,000 lb./ac. or 46 lb./1,000 sq. ft.
- Other—Other acceptable mulches include rolled erosion control mattings or blankets applied according to manufacturer's recommendations or wood chips applied at 6 tons per acre.

Table 7.10.2 Permanent Seeding

Seed Mix	Seeding Rate: Lbs./acre	Seeding Rate: Lbs./1,000 Sq. Feet	Notes:
General Use			
Creeping Red Fescue Domestic Ryegrass Kentucky Bluegrass	20-40 10-20 20-40	1/2-1 1/4-1/2 1/2-1	For close mowing & for waterways with <2.0 ft/sec velocity
Tall Fescue	40-50	1-1 1/4	
Turf-type (dwarf) Fescue	80	2 1/4	
Steep Banks or Cut Slopes			
Tall Fescue	40-50	1-1 1/4	
Crown Vetch Tall Fescue	10-20 20-30	1/4-1/2 1/2-3/4	Do not seed later than August
Flat Pea Tall Fescue	20-25 20-30	1/2-3/4 1/2-3/4	Do not seed later than August
Road Ditches and Swales			
Tall Fescue	40-50	1-1 1/4	
Turf-type (Dwarf) Fescue Kentucky Bluegrass	90 5	2 1/4 0.1	
Lawns			
Kentucky Bluegrass Perennial Ryegrass	100-120	2 2	
Kentucky Bluegrass Creeping Red Fescue	100-120	2 1-1/2	For shaded areas

Note: Other approved seed species may be substituted.

Specifications
for

Mulching

1. Mulch and other appropriate vegetative practices shall be applied to disturbed areas within 7 days of grading if the area is to remain dormant (undisturbed) for more than 21 days or on areas and portions of the site which can be brought to final grade.
2. Mulch shall consist of one of the following:

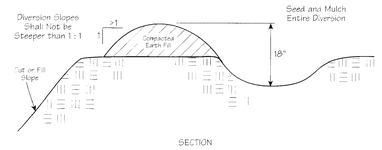
- Straw - Straw shall be unrotted small grain straw applied at the rate of 2 tons/ac, or 90 lb./1,000 sq. ft. (two to three bales). The straw mulch shall be spread uniformly by hand or mechanically so the soil surface is covered. For uniform distribution of hand-spread mulch, divide area into approximately 1,000 sc.ft. sections and place two 45-lb. bales of straw in each section.
- Hydroseeders - Wood cellulose fiber should be used at 2,000 lb./ac. or 46 lb./1,000 sq. ft.
- Other - Acceptable mulches include mulch mattings and rolled erosion control products applied according to manufacturer's recommendations or wood mulch/chips applied at 10-20 tons/ac.

3. Mulch Anchoring - Mulch shall be anchored immediately to minimize loss by wind or runoff. The following are acceptable methods for anchoring mulch.

- Mechanical - Use a disk, crimper, or similar type tool set straight to punch or anchor the mulch material into the soil. Straw mechanically anchored shall not be finely chopped but be left generally longer than 6 inches.
- Mulch Nettings - Use according to the manufacturer's recommendations, following all placement and anchoring requirements. Use in areas of water concentration and steep slopes to hold mulch in place.
- Synthetic Binders - For straw mulch, synthetic binders such as Acrylic DLR (Agri-Tac), DCA-70, Petroset, Terra Tack or equal may be used at rates recommended by the manufacturer. All applications of Synthetic Binders must be conducted in such a manner where there is no contact with waters of the state.
- Wood Cellulose Fiber - Wood cellulose fiber may be used for anchoring straw. The fiber binder shall be applied at a net dry weight of 750 lb./acre. The wood cellulose fiber shall be mixed with water and the mixture shall contain a maximum of 50 lb./100 gal. of wood cellulose fiber.

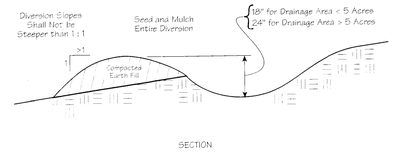
Specifications
for

Temporary Diversion Above Steep Slopes



Specifications
for

Temporary Diversion



Specifications for Temporary Diversion

1. Diversion shall be compacted by traversing with tracked earth--moving equipment.

2. Diversions shall not be breached or lowered to allow construction traffic to cross; instead the top width may be made wider and side slopes made flatter than specified above.

3. Diversions shall be stabilized with vegetation and check dams or the following treatments:

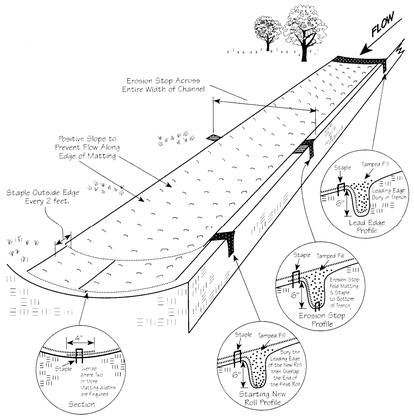
Temporary Diversion Stabilization Treatment

Diversion Slope	*< 2 ac.*	*2 – 5 ac.*	*5 – 10 ac.*
0–3%	*Seed and Straw*	*Seed and Straw*	*Seed and Straw*
3–5%	*Seed and Straw*	*Seed and Straw*	*Matting*
5–8%	*Seed and Straw*	*Matting*	*Matting*
8–20%	*Seed and Straw*	*Matting*	*Engineered*

Note: Diversions with steeper slopes or greater drainage areas are beyond the scope of this standard and must be designed for stability. Seed, straw and matting used shall meet the Specifications for Temporary Seeding, Mulching and Matting.

Specifications
for

Matting



Specifications for Matting

1. Material -- Excelsior matting shall be 48 in. wide and weigh an average of 0.75 lb./sq. yd. or greater. Jute matting shall be 48 in. wide and weigh an average of 1.2 lb./yd or greater. Matting made of other material and providing equal or greater stabilization than the above may be substituted.

2. Site Preparation--After the site has been shaped and graded, a seedbed shall be prepared that is relatively free of foreign material, clods or rocks that are greater that 1.5 in. in diameter. The site shall be prepared to ensure that the matting has good soil contact and the matting will not "bridge" or "tent" over obstructions.

3. Matting shall be held in place as recommended by the manufacturer as adequate for the site conditions or with sod staples. Sod staples are U--shaped wire staples used for fastening sod, jute or excelsior matting and other erosion--control materials to the soil surface. Sod staples shall be No. 11 gauge or heavier and be 6--10 in. in length. In loose or sandy soils longer staples shall be used.

4. Planting--Lime and fertilizer shall be used according to the recommendation of a soil test or the seeding plan. Seed according to the matting manufacturer's recommendations; or, for excelsior matting, seed area to be protected before installation; or, when using jute matting, apply half the seed before and half the seed after installation.

5. Matting shall be installed as specified by the manufacturer as appropriate for the site conditions or the following procedure may be used:

** After the site is prepared and erosion stops are installed, start laying the mat from the top of the slope or channel and unroll the matting allowing 4--in. overlaps at the edges.*

** Secure the matting by burying the top ends in a trench 6 in. deep and staple the folded ends to the bottom of the trench. Backfill and tamp firmly to the established grade.*

** Staple matting every 12 in. across the width beginning at the edges and every 2 ft. in rows the entire length of the matting. Every other row of staples running the length of the matting should be staggered.*

** To join two rolls together, cut a trench to anchor the end of the new roll and secure it the same as the top roll. Overlap the end of the previous roll 18 in. over the new roll. Continue to staple as described above.*

** When using excelsior matting, the plastic netting shall be on top of the good soil contact and the matting will not "bridge" or "tent" over obstructions.*

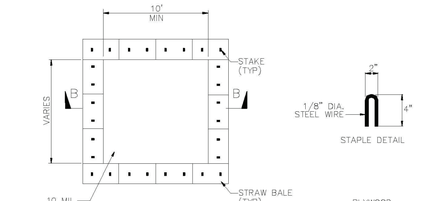
6. Erosion stops shall be used where recommended by the matting manufacturer and on areas specified where high--erosion potential may cause undermining and gullies to form beneath the matting.

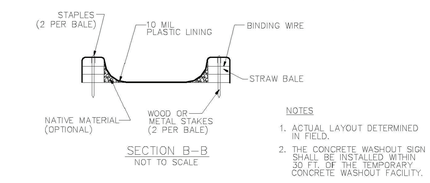
** Erosion stops shall be made of strips of matting placed in narrow trenches 6--12 in. deep that cover the full cross section of the channel. They shall be spaced according to the manufacturer's recommendations or by the following: --3 ft. down the channel from each point of entry of concentrated flow; --at points where change in gradient or direction of channel occurs, and --on long slopes at spacing from 20--100 ft. depending upon the erodibility of the soil, velocity and volume of flow.*

** Erosion stops shall extend beyond the channel liner to the full design width of the channel, this will check any rills that might form outside or along the edge of the channel lining.*

** Erosion stops shall be constructed with 6 in. deep trench, stapled to the bottom of the trench, backfilled and tamped firmly to conform with the cross section of the channel.*

** If seeding has been done prior to installation of erosion stops, reseed disturbed areas prior to placement of channel liner.*





CONCRETE WASHOUT DETAIL

NOT TO SCALE

Storm Water Pollution Prevention Notes

1. THIS CONTRACT DRAWING DOCUMENT SHALL BE MADE AVAILABLE ON--SITE AT ALL TIMES AND PRESENTED UPON REQUEST. ADDITIONAL EROSION AND SEDIMENTATION CONTROL MEASURES MAY BE REQUESTED BY THE FIELD INSPECTOR AT ANYTIME.

2. ALL EROSION AND SEDIMENT CONTROL PRACTICES SPECIFIED ON THIS PLAN SHALL CONFORM WITH DETAILS AND SPECIFICATIONS OUTLINED IN THE OHIO DEPARTMENT OF NATURAL RESOURCES BOOKLET, "RAINWATER AND LAND DEVELOPMENT".

3. SILT FENCE AND SEDIMENT PITS SHALL BE USED AROUND ALL NEW STORM INLETS TO CONTROL SOIL EROSION.

4. EROSION CONTROL MEASURES MUST BE PROVIDED AROUND ALL DIRT STOCKPILES AND OTHER TEMPORARILY DISTURBED AREAS AS DIRECTED BY THE ENGINEER.

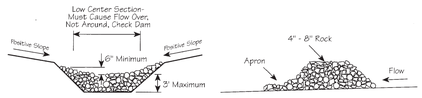
5. IF UNFORESEEN EROSION IS ENCOUNTERED DURING CONSTRUCTION, ADDITIONAL EROSION CONTROL MEASURES SHALL BE PROVIDED, AS DIRECTED BY THE ENGINEER, OR SOIL AND WATER REPRESENTATIVE AT THE CONTRACTOR'S EXPENSE.

6. TEMPORARY SEDIMENTATION AND EROSION CONTROL MEASURES MUST BE INSPECTED AND LOGGED BY A LICENSED INSPECTOR WEEKLY AND AFTER RAIN EVENTS.

7. ALL UTILITY COMPANIES MUST COMPLY WITH ALL STORM WATER POLLUTION PREVENTION MEASURES AS DEFINED ON THIS STORM WATER POLLUTION PREVENTION PLANS.

Specifications
for

Check Dam



Specifications for Check Dam

1. The check dam shall be constructed of 4--5--in.--diameter stone, placed so that it completely covers the width of the channel.

2,: The top of the check dam shall be constructed so that the center is approximately 6 in. lower than the outer edges, so water will flow across the center and not around the ends.

3. The maximum height of the check dam at the center of the weir shall not exceed 3 ft.

4. Spacing between dams shall be as shown in the plans or by the following table:

Dam Height (ft.)	*Check Dam Spacing*			
	Channel Slope			
	< 5 %	*5–10 %*	*10–15 %*	*15 – 20 %*
1	*65 ft.*	*30 ft.*	*20 ft.*	*15 ft.*
2	*130 ft.*	*65 ft.*	*40 ft.*	*30 ft.*
3	*200 ft.*	*100 ft.*	*65 ft.*	*50 ft.*

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N

PROJECT #: 2324

ISSUE:

BID SET	07-28-2025

EROSION CONTROL DETAILS

C-1.07

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SECTION 310000 - EARTHWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Modification to General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. The work described in this section includes cutting, grading, filling, and rough contouring the site for structures, buildings, pavement and landscape areas. Exporting surplus materials or importing needed materials are the responsibility of the contractor. Earthwork operations shall be in accordance with the project geotechnical report.

B. Related Sections include:

1. Section 334000 – Storm Drainage Utilities
2. Section 315000 – Excavation Support and Protection
3. Section 334600 – Subdrainage
4. Section 331100 – Water Utility Distribution Piping
5. Section 333000 – Sanitary Sewerage Utilities

C. Work Included:

1. Soil materials:
   a. Subsoil and topsoil materials.
2. Aggregate materials.
3. Rough grading:
   a. Removal of top soil and sub soil.
   b. Cutting, grading, filling, and rough contouring the site for structures, buildings, pavement.
4. Excavating:
   a. Excavating for building foundations.
   b. Excavating for slabs on grade, paving, landscaping.
   c. Excavating for utilities within the building and to 5 feet outside the building.
   d. Excavating for site utilities.
5. Backfilling:
   a. Building perimeter and site structures backfilling to subgrade elevations.
   b. Site filling and backfilling, including landscaped areas.
   c. Fill under slabs on grade.
   d. Fill under paving.
   e. Consolidation and compaction.
   f. Fill for over-excavation.

   g. Sheet vapor retardant (vapor barrier) and aggregate ballast (sand cushion).
   h. Geotextile fabric.
   i. Backfilling of utilities within the building and to 2 feet outside the building.
   j. Backfilling for utilities not within pavement areas.
6. Trenching:
   a. Excavating trenches for utilities from 2 feet outside building to municipal connections.
   b. Compacted fill from top of utility bedding to subgrade elevations.
   c. Backfilling and compaction.
   d. Geotextile fabric.
7. Aggregate Base Course

1.3 DEFINITIONS

A. Excavation consists of removal of material encountered to subgrade elevations indicated and subsequent disposal of materials removed.

B. Unauthorized excavation consist of removal of materials beyond indicated subgrade elevations or dimensions without specific direction of Engineer. Unauthorized excavation, as well as remedial work directed by Engineer, shall be at Contractor's expense.

1. Under footings, foundation bases, or retaining walls, fill unauthorized excavation by extending indicated bottom elevation of footing or base to excavation bottom, without altering required top elevation. Lean concrete fill (1,000 psi concrete or 1000 PSI K-Krete) may be used to bring elevations to proper position, when acceptable to Engineer.
2. In locations other than those above, backfill and compact unauthorized excavations as specified for authorized excavations of same classification, unless otherwise directed by Engineer.

C. Additional Excavation: When excavation has reached required subgrade elevations, notify Soils Engineer, who will make an inspection of conditions. If Soils Engineer determines bearing material at required subgrade elevations are unsuitable, continue excavation until suitable bearing materials are encountered and replace excavated material as directed by Soils Engineer. The Contract Sum may be adjusted by an appropriate Contract Modification.

D. Subgrade: Undisturbed earth or compacted soil layer immediately below granular sub-base, drainage fill, or topsoil materials.

E. Borrow: Soil material obtained off-site when sufficient approved soil material is not available from excavations.

F. Sub-base Course: A preparatory course constructed over an inadequate subgrade and below the base course in a paving system.

G. Aggregate Base: Course of washed granular material supporting slab-on-grade placed to cut off upward capillary flow of capillary water. In a paving system, the foundations course of a pavement structure placed upon a prepared subgrade or sub-base.

H. Structure: Buildings, footings, foundations, slabs, curbs, or other man-made stationary features occurring above or below ground surface.

1.4 SUBMITTALS

A. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated:

1. Classification according to ASTM D 2487 of each borrow soil material proposed for fill and backfill.
2. Laboratory compaction curve according to ASTM D 698 for each on-site or borrow soil material proposed for fill and backfill.
3. Aggregate base.

PART 2 - PRODUCTS

A. Top Soil:

1. Excavated and reused material, graded, free of roots, rocks larger than 1/2", subsoil, debris, large weeds and foreign matter or imported friable loam; reasonably free of roots, rocks larger than 1/2", subsoil, debris, large weeds, and foreign matter; acidity range (pH) of 5.5 to 7.5; containing a minimum of 3% and a maximum of 20% organic matter; conforming to ODOT CMS Item 653.02.

B. Subsoil Fill Material:

1. Excavated and re-used material, graded, free of lumps larger than 3", rocks larger than 2" or imported material, graded, free of lumps larger than 3", rocks larger than 2", and debris conforming to ASTM D2487 Group Symbol. Material shall be capable of compaction in accordance with requirements of project geotechnical report.

C. Backfill:

1. Coarse Aggregate: Size #57 conforming to ODOT CMS Item 703.
2. Fine Aggregate: Sand conforming to ODOT CMS Item 703.06, 703.03.
3. Concrete: Lean concrete conforming to ODOT Item 305 with a compressive strength of 1000 psi.
4. Subsoil: Material type as listed in B.1.
5. Controlled Density Fill (CDF) (Conforming to ODOT Item 613):
   a. Controlled density fill shall have strength levels between 100 psi and 150 psi.
   b. Initial trial mixture shall be as follows (cubic yard basis):

1)	Cement	90 lbs.
2)	Fly Ash	250 lbs.
3)	Water	55 lbs.
4)	Fine Aggregate	2850 lbs.

   c. These quantities of materials are expected to yield approximately one cubic yard of fill of the proper consistency. Adjustments of the proportions may be made providing the total absolute volume of the materials is maintained.
   d. Mix proportioning shall be adjusted to achieve necessary flowability and strength. The design compressive strength shall be between 100 psi and 150 psi at 28 days. Care shall be exercised in mix proportioning to prevent achieving greater strengths than specified.
   e. Cement shall conform to ASTM C-150, Type 1.
   f. Fly ash shall be Class F, ASTM C-618.

D. Aggregate Base:

1. Material conforming to ODOT CMS Item 304. Aggregate made from recycled concrete is not permitted and shall not be used.

E. Sub-base:

1. Material conforming to ODOT CMS Item 304. Aggregate made from recycled concrete is not permitted and shall not be used.

F. Engineered Fill:

1. Sub-Soil fill materials as noted in B.1 above, or backfill material as noted in C above, constructed and compacted in accordance with the project geotechnical requirements and the plans.

2.2 GEOTEXTILES

A. Subsurface Drainage Geotextile: Nonwoven needle-punched geotextile, manufactured for subsurface drainage applications, made from polyolefins or polyesters; with elongation greater than 50 percent; complying with AASHTO M 288 and the following, measured per test methods referenced:

1. Survivability: Class 2; AASHTO M 288.
2. Grab Tensile Strength: 157 lb; ASTM D 4632.
3. Sewn Seam Strength: 142 lb; ASTM D 4632.
4. Tear Strength: 56 lb; ASTM D 4533.
5. Puncture Strength: 56 lb; ASTM D 4833.
6. Apparent Opening Size: No. 60 sieve, maximum; ASTM D 4751.
7. Permittivity: 0.01 per second, minimum; ASTM D 4491.
8. UV Stability: 50 percent after 500 hours' exposure; ASTM D 4355.

B. Separation Geotextile: Woven geotextile fabric, manufactured for separation applications, made from polyolefins or polyesters; with elongation less than 30 percent; complying with ODOT 712.09 Type D and the following, measured per test methods referenced:

1. Survivability: Class 2; AASHTO M 288.
2. Grab Tensile Strength: 200 lb; ASTM D 4632.
3. Sewn Seam Strength: 222 lb; ASTM D 4632.
4. Tear Strength: 70 lb; ASTM D 4533.
5. Puncture Strength: 95 lb; ASTM D 4833.

   6. Apparent Opening Size: No. 40 sieve, maximum; ASTM D 4751.
   7. Permittivity: 0.001 per second, minimum; ASTM D 4491.
   8. UV Stability: 50 percent after 500 hours' exposure; ASTM D 4355.

C. Reinforcing Fabric

1. Reinforcing fabric shall be made from woven polypropylene containing heavy monofilament and fibrillated yarns with the minimum physical properties:

a.	Grab Strength	ASTM D 4632	250 lbs
b.	Mullen Burst	ASTM D 3786	750 psi
c.	Trapezoidal Tear	ASTM D 4533	110 psi
d.	Water Flow Rate	ASTM D 4491	40 gpm

2. Typically used as subgrade stabilization

D. Reinforcing Geogrid

1. Reinforcing geogrid shall be made from polypropylene with the minimum physical properties:

a.	True Initial Modulus In Use	Type I	17,140 lb/ft
b.	Flexural Stiffness	Type I	250,000 cm
c.	Aperture Stability Modulus	Type I	3.2 deg.
d.	Resistance to Installation Damage	Type I	70% GP

2. Typically used as subgrade stabilization

E. Manufacturers

1. TenCate Mirafi.
2. SI Geosolutions
3. US Fabrics
4. Geo-Synthetics
5. PS Construction Fabrics

PART 3 - EXECUTION

3.1 PREPARATION

A. Identify required lines, levels, contours, and datum.

B. Locate, identify, and protect utilities that remain, from damage.

C. Notify utility companies to remove and/or relocate utilities.

D. Protect plant life, trees, lawns, rock outcropping and other features remaining as a portion of final landscaping.

E. Protect bench marks, existing structures, fences, sidewalks, paving, and curbs from excavation equipment and vehicular traffic.

3.2 EXCAVATION (GENERAL)

A. Underpin adjacent structures which may be damaged by excavation work.

B. Excavate topsoil and subsoil required to accommodate building foundations, slabs-on-grade, paving and site structures, construction operations.

C. Machine slope banks to angle of repose or less, until shored.

D. Do not interfere with 45° bearing splay of foundation.

E. Grade top perimeter of excavation to prevent surface water from draining into excavation.

F. Remove lumped subsoil, boulders, and rock up to 1 cu. yd. measured by volume from site.

G. Notify Engineer of unexpected subsurface conditions and discontinue affected work in areas until notified to resume work.

H. Protect excavations by methods required to prevent cave-in or loose soil from falling into excavation.

I. Protect bottom of excavations and soil adjacent to and beneath foundation, from freezing.

J. Excavate subsoil required for utilities installation.

K. Cut utility trenches sufficiently wide to enable installation and allow inspection.

L. Barricade open excavations occurring as part of this work and post with warning lights and signs. Provide, erect and maintain temporary fences and guardrails as required. All such measures shall conform to applicable Federal, State and Local laws, rules and regulations.

3.3 SITE FILLING AND BACKFILLING (GENERAL)

A. Preparation:

1. The building and pavement subgrades should then be shaped and proof-compacted with sufficient equipment. Areas which fail to stabilize or which become unstable beneath the compaction equipment should be undercut and replaced with structural fill consisting of a combination of #1 and #2 crushed natural aggregate rolled into the subgrade and "choked off" with ODOT Item 304 or as approved by the project geotechnical engineer.
2. All excavations at the site should be designed and performed in accordance with the criteria presented in 29 CFR Part 1926 of the Occupational Safety and Health Standards – Excavations, Final Rule. Excavations should extend to depths as necessary to establish the plan subgrades or remove unsuitable soils in their entirety. The excavated subgrades should be crowned and sloped to direct any collected precipitation and any groundwaters which enter the excavations to their periphery where swales, sumps and pumps should be located to dewater the excavations.
3. All excavations should be completed so as not to undermine the foundations of the adjacent structures or utilities. In general, excavations at the sites should not encroach within an existing foundation or utilities' zone of influence defined by a line extending

out and down from the existing foundation, grade beam or utility at an inclination of one (1) vertical on one (1) horizontal. Excavations which encroach within the zone should be sheeted, shored and/or braced to support the soil adjacent structure loads; or, the foundation or utility should be underpinned to establish it's bearing at a deeper level.
4. All excavation subgrades and structural fill surfaces should be crowned or sloped to direct precipitation, runoff or groundwater which enters the excavations to their periphery. Sumps and pumps should be used as required to depress and remove water and to maintain the excavations in the dry.
5. Stabilization of isolated subsurface materials may be possible by using crushed stone to "bridge" or "choke" into the yielding materials, as approved by the project geotechnical engineer.

B. Site Filling:

1. Fill areas to contours and elevations with unfrozen materials.
2. On-site soil (excluding topsoil or any unsuitable material as determined by a soil engineer), as encountered in the borings, is considered suitable for use as fill when compacted at the proper moisture content.
   a. Fill soil placed for foundation and pavement support should be placed in loose lifts. The first lift of material should be only approximately four (4) inches thick in the loose state. Each lift of soil thereafter should be placed in maximum eight (8) inches loose thickness, within plus or minus two (2) percent of the optimum moisture content, as determined by the Standard Proctor test (ASTM D-698). Fill soil placed under pavement or structures shall be compacted in accordance with the subsurface soil investigation report prepared by the project geotechnical engineer. Fill soil with a maximum dry unit weight of between 90 and 105 pounds per cubic foot (pcf) shall be compacted to not less than 98% of its maximum dry density ± 1.5%. Soil with a maximum dry density of less than 90-pcf should not be employed as fill material. Fill soil containing excess moisture shall be required to dry prior to or during compaction to a moisture content not greater than 2% above or below optimum. Drying of wet soil shall be expedited by the use of plows, discs, or by other approved methods when so ordered by the site soil engineer.
3. Maintain optimum moisture content of fill materials to attain required compaction density.
4. Make grade changes gradual. Blend slope into level areas.
5. Remove surplus fill materials from site.
6. Grade top surface of subgrade to ± 1/2" of plan elevations, grade the detention basin to ±1/2" of plan elevations.
7. Building pads shall be graded to 8" below finish floor elevation. Center of the pad shall be installed with a very slight crown to drain without trapping or ponding water.
8. The contractor shall provide temporary swales to drain the building pad and pavement areas.
9. The contractor shall smooth roll all disturbed areas within the building pad and pavement areas prior to expected rainfall events. No ponding of water is permitted to occur on the building pad or pavement areas.

C. Subgrade Inspection:

1. Notify Architect when excavations have reached required subgrade.
2. If Architect determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.

3. Proof-roll subgrade below the building slabs and pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.
   a. Completely proof-roll subgrade in one direction, repeating proof-rolling in direction perpendicular to first direction. Limit vehicle speed to 3 mph (5 km/h).
   b. Proof-roll with a loaded 10-wheel, tandem-axle dump truck weighing not less than 15 tons (13.6 tonnes).
   c. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Architect, and replace with compacted backfill or fill as directed.
4. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
5. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Architect, without additional compensation.

D. Backfilling:

1. Backfill areas to contours and elevations with unfrozen materials.
2. Systematically backfill and provide proper compaction. Do not backfill over porous, wet, frozen or spongy subgrade surfaces.
3. Coarse aggregate or fine aggregate: Place and compact materials in continuous layers not exceeding 6" compacted depth.
4. Aggregate base and sub-base: Place and compact materials in continuous layers not exceeding 6" compacted depth.
5. Subsoil: Place and compact material in continuous layers not exceeding 8" loose depth.
6. Employ a placement method that does not disturb or damage other work.
7. Maintain optimum moisture content of backfill materials to attain required compaction density. Backfill against supported foundation walls. Do not backfill against unsupported foundation walls.
8. Backfill simultaneously on each side of unsupported foundation walls until supports are in place.
9. Make gradual grade changes. Blend slope into level areas.
10. Remove surplus backfill materials from site.
11. Leave fill material stockpile areas free of excess fill materials.
12. Grade top surface of backfilling under paved areas and structures, ±¼" from required elevations.
13. Grade top surface of general backfilling: ±½" from required elevations.

E. Aggregate Placement (General):

1. Place aggregate in maximum 6" layers and compact.
2. Level and contour surfaces to elevations and gradients indicated.
3. Add water to assist compaction. If excess water is apparent, remove aggregate and aerate to reduce moisture content.
4. Use mechanical tamping equipment in areas in accessible to compaction equipment.
5. Tolerances:
   a. Flatness: Maximum variation of 1/4" measured with 10 foot straight edge.
   b. Scheduled Compacted Thickness: Within 1/4".
   c. Variation from True Elevation: Within 1/4".

3.4 FIELD QUALITY CONTROL

A. Field inspection and testing will be performed under provisions of Division 1.

B. Compaction testing will be performed in accordance with ANSI/ASTM D698.

C. If tests indicate work does not meet specified requirements, remove work, replace and retest.

D. Frequency of Tests: Perform one fill density test for every 1,000 SF of each lift placed.

3.5 EROSION CONTROL

A. Provide erosion control methods in accordance with project plans and authorities having jurisdiction.

B. Smooth roll disturbed earth area to seal surface prior to rainfall events to reduce erosion.

C. Install rock or stone check dams and diversion berms such that runoff is directed into sediment control traps or basins.

3.6 MAINTENANCE (GENERAL)

A. Stockpiling:

1. Stockpile materials on site at locations indicated or approved by Engineer.
2. Stockpile in sufficient quantities to meet project schedule and requirements.
3. Separate differing materials with dividers or stockpile apart to prevent mixing.
4. Direct surface water away from stockpile site so as to prevent erosion or deterioration of materials.
5. Install and maintain silt fence around stockpile. Provide seeding and establish temporary vegetation cover.

B. Stockpile Cleanup:

1. Remove stockpile, leave area in a clean and neat condition. Grade site surface to prevent freestanding surface water. Provide seeding and establish permanent vegetation cover.

C. Dewatering:

1. Prevent surface water and subsurface or ground water from flowing into excavations and from flooding project site and surrounding area.
   a. Do not allow water to accumulate in excavations. Remove water to prevent softening of foundation bottoms, undercutting footings, and soil changes detrimental to stability of subgrades and foundations. Provide and maintain pumps, well points, sumps, suction, and discharge lines, and other de-watering system components necessary to convey water away from excavations.
   b. Establish and maintain temporary drainage ditches and other diversions outside excavation limits to convey rain water and water removed from excavations to

collecting or runoff areas. Do not use trench excavations as temporary drainage ditches.
   c. Provide temporary drainage structures as detailed on plans as "manhole/catch basin/inlet – abandonment and temporary usage." Number of such structures to be determined at Contractor's option.
   d. Protection of Finished Work:
      1) Protect finished work under provisions of Division 1.
      2) Reshape and re-compact fills subjected to vehicular traffic during construction.

3.7 SCHEDULE OF EMBANKMENT SOIL COMPACTION

Compaction and moisture content of suitable soil material shall be in accordance with the project subsurface soil investigation report, prepared by the project geotechnical engineer.

A. Exterior Slab-On-Grade Areas:

1. Engineered Fill (2.1.F.1), (Depth Varies); Compacted to 98% (min.) of maximum dry density per ASTM-D-698.
2. Fine aggregate backfill (2.1.C.2), 4 inches thick, compacted to 98% (min.) of maximum density per ASTM-D-4253 and D-4254.
3. Pipe trenches within the building areas shall be backfilled with suitable inert, granular material and properly compacted in 6" lifts to 98% of the maximum density per ASTM-D-4253 and D-4254.

B. Fill Under Grass Areas and Athletic Play Fields:

1. Subsoil fill material (2.1.B.1), 6 inches below finish grade, compacted to 98% (min.) of maximum dry density per ASTM-698.

C. Fill Under Landscape Areas:

1. Subsoil Fill Material (2.1.B.1), 12 inches below finish grade, compacted to 98% (min.) of maximum dry density per ASTM-698.

D. Fill Under Paving and Trench Backfill within 5 feet of Pavement:

1. Compact subsoil to 96% of its maximum dry density per ASTM D-698.
2. Engineered fill (depth varies), compacted to 98% of its maximum dry density per ASTM D-698.

E. Fill Under Building, Building Foundation, and Within 10' of Building:

1. Compact subsoil to 98% of its maximum dry density per ASTM D-698.
2. Engineered fill (depth varies), compacted to *100%* of its maximum dry density per ASTM D-698.

END OF SECTION 31 00 00

SECTION 312319 - DEWATERING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Modification to General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes construction dewatering.

B. Related Sections include:

1. Section 334000 – Storm Drainage Utilities
2. Section 315000 – Excavation Support and Protection
3. Section 334600 – Subdrainage
4. Section 331100 – Water Utility Distribution Piping
5. Section 333000 – Sanitary Sewerage Utilities

1.3 PERFORMANCE REQUIREMENTS

A. Dewatering Performance: Design, furnish, install, test, operate, monitor, and maintain dewatering system of sufficient scope, size, and capacity to control hydrostatic pressures and to lower, control, remove, and dispose of ground water and permit excavation and construction to proceed on dry, stable subgrades.

1. Delegated Design: Design dewatering system including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
2. Continuously monitor and maintain dewatering operations to ensure erosion control, stability of excavations and constructed slopes, that excavation does not flood, and that damage to subgrades and permanent structures is prevented.
3. Prevent surface water from entering excavations by grading, dikes, or other means.
4. Accomplish dewatering without damaging existing buildings, structures, and site improvements adjacent to excavation.
5. Remove dewatering system when no longer required for construction.

1.4 SUBMITTALS

A. Shop Drawings: For dewatering system. Show arrangement, locations, and details of wells and well points; locations of risers, headers, filters, pumps, power units, and discharge lines; and means of discharge, control of sediment, and disposal of water.

1. Include layouts of piezometers and flow-measuring devices for monitoring performance of dewatering system.
2. Include a written plan for dewatering operations including control procedures to be adopted if dewatering problems arise.

B. Delegated-Design Submittal: For dewatering system indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation It is the contractor's responsibility to provide for the design and installation of dewatering systems. It is the contractor's responsibility to make the determination as to when dewatering is necessary.

C. Field quality-control reports.

D. Other Informational Submittals:

1. Photographs: Show existing conditions of adjoining construction and site improvements that might be misconstrued as damage caused by dewatering operations.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer that has specialized in dewatering work.

B. Regulatory Requirements: Comply with governing EPA notification regulations before beginning dewatering. Comply with hauling and disposal regulations of authorities having jurisdiction.

C. Preinstallation Conference: Conduct conference at Project site.

1. Review methods and procedures related to dewatering including, but not limited to, the following:
   a. Inspection and discussion of condition of site to be dewatered including coordination with temporary erosion control measures and temporary controls and protections.
   b. Geotechnical report.
   c. Proposed site clearing and excavations.
   d. Existing utilities and subsurface conditions.
   e. Coordination for interruption, shutoff, capping, and continuation of utility services.
   f. Construction schedule. Verify availability of Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
   g. Testing and monitoring of dewatering system.

1.6 PROJECT CONDITIONS

A. Interruption of Existing Utilities: Do not interrupt any utility serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility according to requirements indicated:

1. Notify Construction Manager no fewer than two days in advance of proposed interruption of utility.
2. Do not proceed with interruption of utility without Construction Manager's written permission.

B. Project-Site Information: A geotechnical report has been prepared for this Project and is available for information only. The opinions expressed in this report are those of geotechnical engineer and represent interpretations of subsoil conditions, tests, and results of analyses conducted by geotechnical engineer. Owner will not be responsible for interpretations or conclusions drawn from this data.

1. Make additional test borings and conduct other exploratory operations necessary for dewatering.
2. The geotechnical report is included elsewhere in the Project Manual.

C. Survey Work: Engage a qualified land surveyor or professional engineer to survey adjacent existing buildings, structures, and site improvements, establishing exact elevations at fixed points to act as benchmarks. Clearly identify benchmarks and record existing conditions.

1. During dewatering, regularly resurvey benchmarks, maintaining an accurate log of surveyed elevations for comparison with original elevations. Promptly notify Engineer if changes in elevations occur or if cracks, sags, or other damage is evident in adjacent construction.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by dewatering operations.

1. Prevent surface water and subsurface or ground water from entering excavations, from ponding on prepared subgrades, and from flooding site and surrounding area.
2. Protect subgrades and foundation soils from softening and damage by rain or water accumulation.

B. Install dewatering system to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.

C. Provide temporary grading to facilitate dewatering and control of surface water.

D. Monitor dewatering systems continuously.

E. Promptly repair damages to adjacent facilities caused by dewatering.

F. Protect and maintain temporary erosion and sedimentation controls, which are specified in Division 01 Section "Temporary Facilities and Controls" during dewatering operations.

3.2 INSTALLATION

A. Install dewatering system utilizing wells, well points, or similar methods complete with pump equipment, standby power and pumps, filter material gradation, valves, appurtenances, water disposal, and surface-water controls.

1. Space well points or wells at intervals required to provide sufficient dewatering.
2. Use filters or other means to prevent pumping of fine sands or silts from the subsurface.

B. Before excavating below ground-water level, place system into operation to lower water to specified levels. Operate system continuously until drains, sewers, and structures have been constructed and fill materials have been placed or until dewatering is no longer required.

C. Provide an adequate system to lower and control ground water to permit excavation, construction of structures, and placement of fill materials on dry subgrades. Install sufficient dewatering equipment to drain water-bearing strata above and below bottom of foundations, drains, sewers, and other excavations.

1. Do not permit open-sump pumping that leads to loss of fines, soil piping, subgrade softening, and slope instability.

D. Reduce hydrostatic head in water-bearing strata below subgrade elevations of foundations, drains, sewers, and other excavations.

1. Maintain piezometric water level a minimum of 24 inches below surface of excavation.

E. Dispose of water removed by dewatering in a manner that avoids endangering public health, property, and portions of work under construction or completed. Dispose of water and sediment in a manner that avoids inconvenience to others. Provide sumps, sedimentation tanks, and other flow-control devices as required by authorities having jurisdiction.

F. Provide standby equipment on site, installed and available for immediate operation, to maintain dewatering on continuous basis if any part of system becomes inadequate or fails. If dewatering requirements are not satisfied due to inadequacy or failure of dewatering system, restore damaged structures and foundation soils at no additional expense to Owner.

1. Remove dewatering system from Project site on completion of dewatering. Plug or fill well holes with sand or cut off and cap wells a minimum of 36 inches below overlying construction.

G. Damages: Promptly repair damages to adjacent facilities caused by dewatering operations.

3.3 FIELD QUALITY CONTROL

A. Observation Wells: Provide, take measurements, and maintain at least the minimum number of observation wells or piezometers indicated; additional observation wells may be required by authorities having jurisdiction.

1. Observe and record daily elevation of ground water and piezometric water levels in observation wells.
2. Repair or replace, within 24 hours, observation wells that become inactive, damaged, or destroyed. In areas where observation wells are not functioning properly, suspend construction activities until reliable observations can be made. Add or remove water from observation-well risers to demonstrate that observation wells are functioning properly.
3. Fill observation wells, remove piezometers, and fill holes when dewatering is completed.

B. Provide continual observation to ensure that subsurface soils are not being removed by the dewatering operation.

END OF SECTION 31 23 19

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PROJECT #: 2324

ISSUE:
BID SET 07-28-2025

SPECIFICATIONS 1

C-1.08

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SECTION 315000 – EXCAVATION SUPPORT AND PROTECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Modification to General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes temporary excavation support and protection systems.

B. Related Sections include:
1. Section 334000 – Storm Drainage Utilities
2. Section 312319 – Dewatering
3. Section 334600 – Subdrainage
4. Section 331100 – Water Utility Distribution Piping
5. Section 333000 – Sanitary Sewerage Utilities

1.3 PERFORMANCE REQUIREMENTS

A. Furnish, install, monitor, and maintain excavation support and protection system capable of supporting excavation sidewalls and of resisting soil and hydrostatic pressure and superimposed and construction loads.

1. Delegated Design: Design excavation support and protection system, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
2. Prevent surface water from entering excavations by grading, dikes, or other means.
3. Install excavation support and protection systems without damaging existing buildings, structures, and site improvements adjacent to excavation.
4. Monitor vibrations, settlements, and movements.

1.4 SUBMITTALS

A. Shop Drawings: For excavation support and protection system.

B. Delegated-Design Submittal: For excavation support and protection system indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

C. Other Informational Submittals:

1. Record Drawings: Identifying and locating capped utilities and other subsurface structural, electrical, or mechanical conditions.

a. Note locations and capping depth of wells and well points.

1.5 QUALITY ASSURANCE

A. Preinstallation Conference: Conduct conference at Project site.

1. Review methods and procedures related to excavation support and protection system including, but not limited to, the following:

a. Geotechnical report.
b. Existing utilities and subsurface conditions.
c. Proposed excavations.
d. Proposed equipment.
e. Monitoring of excavation support and protection system.
f. Working area location and stability.
g. Coordination with waterproofing.
h. Abandonment or removal of excavation support and protection system.

1.6 PROJECT CONDITIONS

A. Interruption of Existing Utilities: Do not interrupt any utility serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility according to requirements indicated:

1. Notify Engineer no fewer than two days in advance of proposed interruption of utility.
2. Do not proceed with interruption of utility without Engineer's written permission.

B. Project-Site Information: A geotechnical report has been prepared for this Project and is available for information only. The opinions expressed in this report are those of geotechnical engineer and represent interpretations of subsoil conditions, tests, and results of analyses conducted by geotechnical engineer. Owner will not be responsible for interpretations or conclusions drawn from the data.

1. Make additional test borings and conduct other exploratory operations necessary for excavation support and protection.
2. The geotechnical report is included elsewhere in the Project Manual.

C. Survey Work: Engage a qualified land surveyor or professional engineer to survey adjacent existing buildings, structures, and site improvements; establish exact elevations at fixed points to act as benchmarks. Clearly identify benchmarks and record existing elevations.

1. During installation of excavation support and protection systems, regularly resurvey benchmarks, maintaining an accurate log of surveyed elevations and positions for comparison with original elevations and positions. Promptly notify Engineer if changes in elevations or positions occur or if cracks, sags, or other damage is evident in adjacent construction.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Provide materials that are either new or in serviceable condition.

B. Structural Steel: ASTM A 36/A 36M, ASTM A 690/A 690M, or ASTM A 992/A 992M.

C. Wood Lagging: Lumber, mixed hardwood, nominal rough thickness of 4 inches.

D. Cast-in-Place Concrete: ACI 301, of compressive strength required for application.

E. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), deformed.

F. Tiebacks: Steel bars, ASTM A 722/A 722M.

G. Tiebacks: Steel strand, ASTM A 416/A 416M.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards that could develop during excavation support and protection system operations.

1. Shore, support, and protect utilities encountered.

B. Install excavation support and protection systems to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.

C. Locate excavation support and protection systems clear of permanent construction so that forming and finishing of concrete surfaces are not impeded.

D. Monitor excavation support and protection systems daily during excavation progress and for as long as excavation remains open. Promptly correct bulges, breakage, or other evidence of movement to ensure that excavation support and protection systems remain stable.

E. Promptly repair damages to adjacent facilities caused by installing excavation support and protection systems.

3.2 SOLDIER PILES AND LAGGING

A. Install steel soldier piles before starting excavation. Extend soldier piles below excavation grade level to depths adequate to prevent lateral movement. Space soldier piles at regular intervals not to exceed allowable flexural strength of wood lagging. Accurately align exposed faces of flanges to vary not more than 2 inches from a horizontal line and not more than 1:120 out of vertical alignment.

B. Install wood lagging within flanges of soldier piles as excavation proceeds. Trim excavation as required to install lagging. Fill voids behind lagging with soil, and compact.

C. Install wales horizontally at locations indicated on Drawings and secure to soldier piles.

3.3 REMOVAL AND REPAIRS

A. Remove excavation support and protection systems when construction has progressed sufficiently to support excavation and bear soil and hydrostatic pressures. Remove in stages to avoid disturbing underlying soils or damaging structures, pavements, facilities, and utilities.

1. Remove excavation support and protection systems to a minimum depth of 48 inches below overlaying construction and abandon remainder.
2. Fill voids immediately with approved backfill compacted to density specified in Division 31 Section "Earthwork."
3. Repair or replace, as approved by Engineer, adjacent work damaged or displaced by removing excavation support and protection systems.

B. Leave excavation support and protection systems permanently in place.

END OF SECTION 31 50 00

SECTION 321216 - ASPHALT PAVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes provisions for hot-mixed asphalt paving over compacted aggregate base material.

B. Compacted aggregate base is specified in another Division 32 section.

C. Proof rolling of prepared base is included in this Section.

D. Related Sections:

1. Section 310000 – Earthwork
2. Section 312319 – Dewatering

1.3 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

B. Material Certificates signed by material producer and Contractor, certifying that each material item complies with or exceeds specified requirements.

1.4 QUALITY ASSURANCE

A. Codes and Standards: Comply with ODOT "Construction and Materials Specifications", Chapter 400 – Flexible Pavement 2005 edition, and with local governing regulations if more stringent than herein specified.

1.5 SITE CONDITIONS

A. Weather Limitations: Apply prime and tack coats when ambient temperature is above 50 deg F and when temperature has not been below 35 deg F for 12 hours immediately prior to application. Do not apply when base is wet or contains an excess of moisture.

B. Construct hot-mixed asphalt surface course when atmospheric temperature is above 40 deg F and when base is dry. Base course may be placed when air temperature is above 32 deg F and rising.

C. Grade Control: Establish and maintain required lines and elevations.

PART 2 - MATERIALS

2.1 AGGREGATE BASE COURSES

A. Base courses for drives, parking and walks shall be ODOT Item 304.

2.2 PRIME COAT

A. Prime coat shall be a medium curing liquid asphalt emulsion meeting the requirements of ODOT Item 408.

2.3 TACK COAT

A. Tack coat shall meet the requirements of ODOT Item 407, and shall be used between the intermediate course and surface course of asphalt.

2.4 ASPHALTIC CONCRETE

A. Recycled content: To the best extent possible, this product shall contain preconsumer and/or postconsumer recycled content.

B. Regional Materials: Provide product that has been manufactured within 500 miles of the project site including extraction, harvest, or recovery for each raw material.

C. Intermediate course shall be ODOT Item 448-type 2, thickness as called for on the drawings. Aggregate shall be crushed limestone. Slag or crushed river rock will not be acceptable.

D. Surface course shall be ODOT Item 448–type 1, thickness as called for on the drawings. Aggregate shall be crushed limestone. Slag or crushed river rock will not be acceptable.

E. Base Asphalt course shall be ODOT 301, thickness as called for on the plans.

2.5 SEALER

A. Sealer shall be Cosmicoat, Jennit, or Koppers meeting Federal Specification R-P 355D.

2.6 LINING PAINT

A. Lining paint shall be non-bleeding traffic paint specifically formulated for asphalt surfaces; per ODOT Item 641 and 642. Colors shall include: red, yellow, green, white, and blue as indicated on the drawings.

PART 3 - EXECUTION

3.1 SURFACE PREPARATION

A. General: Remove loose material from compacted sub base surface immediately before applying herbicide treatment or prime coat.

B. Mill existing asphalt to create a butt joint with smooth transition from new pavement to existing pavement.

B. Proof-roll prepared sub base surface to check for unstable areas and areas requiring additional compaction.

C. Notify Architect of unsatisfactory conditions. Do not begin paving work until deficient sub base areas have been corrected and are ready to receive paving.

D. Prime Coat: Apply at rate of 0.20 to 0.50 gal. per sq yd., over compacted subgrade. Apply material to penetrate and seal, but not flood, surface. Cure and dry as long as necessary to attain penetration and evaporation of volatile.

E. Tack Coat: Apply to contact surfaces of previously constructed asphalt or Portland cement concrete and surfaces abutting or projecting into hot-mixed asphalt pavement. Distribute at rate of 0.05 to 0.15 gal. per sq. yd. of surface.

F. Allow to dry until at proper condition to receive paving.

G. Exercise care in applying bituminous materials to avoid smearing of adjoining concrete surfaces. Remove and clean damaged surfaces.

H. Verify gradients and elevations of base.

I. Verify that compacted subgrade is dry.

J. Verify that catch basins, manholes, etc., have been installed in the correct position and elevation.

3.2 PLACING MIX

A. General: Place hot-mixed asphalt mixture on prepared surface, spread, and strike off. Spread mixture at minimum temperature of 225 deg F. Place areas inaccessible to equipment by hand. Place each course to required grade, cross-section, and compacted thickness.

B. Paver Placing: Place in strips not less than 10 feet wide, unless otherwise acceptable to Architect. After first strip has been placed and rolled, place succeeding strips and extend rolling to overlap previous strips. Complete base course for a section before placing surface course.

C. Immediately correct surface irregularities in finish course behind paver. Remove excess material forming high spots with shovel or lute.

D. Joints: Make joints between old and new pavements, or between successive days' work, to ensure continuous bond between adjoining work. Construct joints to have same texture, density, and

smoothness as other sections of hot-mixed asphalt course. Clean contact surfaces and apply tack coat.

E. Place finish course within 24 hours of placing and compacting intermediate course. If intermediate course is placed more than 24 hours before placing surface course, clean surface before application of surface course and apply tack coat per ODOT Item 407 at a uniform rate of 0.4 gallons per square yard of surface area.

F. Surfaces shall be smoothed and compacted to 95% Max. Dry Density per ASTM D698 to provide an evenly textured finished appearance.

G. Provide positive drainage of surfaces according to the drawings. Allow no pockets or depressions to create water puddling. Areas which do not drain shall be cut out and replaced so as to drain.

H. Compaction shall be with a minimum 8 ton roller. Do not displace or extrude pavement from position. Hand compact if not accessible to equipment. Roll with consecutive passes to achieve even finishes without roller marks.

3.3 ROLLING

A. General: Begin rolling when mixture will bear roller weight without excessive displacement.

B. Compact mixture with hot hand tampers or vibrating plate compactors in areas inaccessible to rollers.

C. Breakdown Rolling: Accomplish breakdown or initial rolling immediately following rolling of joints and outside edge. Check surface after breakdown rolling and repair displaced areas by loosening and filling, if required, with hot material.

D. Second Rolling: Follow breakdown rolling as soon as possible, while mixture is hot. Continue second rolling until mixture has been evenly compacted.

E. Finish Rolling: Perform finish rolling while mixture is still warm enough for removal of roller marks. Continue rolling until roller marks are eliminated and course has attained 92 to 96 percent laboratory density.

F. Patching: Remove and replace paving areas mixed with foreign materials and defective areas. Cut out such areas and fill with fresh, hot hot-mixed asphalt. Compact by rolling to specified surface density and smoothness.

G. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.

H. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

3.5 FIELD QUALITY CONTROL

A. General: Test in-place hot-mixed asphalt courses for compliance with requirements for thickness and surface smoothness. Repair or remove and replace unacceptable paving as directed by Architect.

B. Thickness: In-place compacted thickness tested in accordance with ASTM D 3549 will not be acceptable if exceeding following allowable variations:

1. Base Course: Plus 1/2 inch, no minus.
2. Surface Course: Plus 1/4 inch, no minus.
3. Total Pavement Cross Section: Plus ½ inch, no minus. Average of all thickness measurements must equal or exceed design thickness.

C. Surface Smoothness: Test finished surface of each hot-mixed asphalt course for smoothness, using 10-foot straightedge applied parallel with and at right angles to centerline of paved area. Surfaces will not be acceptable if exceeding the following tolerances for smoothness:

1. Base Course Surface: 1/4 inch.
2. Wearing Course Surface: 3/16 inch.
3. Crowned Surfaces: Test with crowned template centered and at right angle to crown. Maximum allowable variance from template is 1/4 inch.

D. Check surface areas at intervals as directed by Architect.

3.6 LINING AND SEALING

A. Make certain that all dirt has been removed prior to lining and sealing. Traffic is to be kept off the pavement for at least 48 hours after sealer application.

B. Parking spaces shall be marked on the asphalt as shown on the drawings including handicapped symbols, low E.V., and Van/Car Pool.

C. Apply traffic paint, at manufacturer's recommended rates, with mechanical marking equipment. Provide uniform straight edges, 4" minimum width lines.

D. Pavement markings shall be in accordance with ODOT 640, Item 641 and Item 642.

3.7 TOLERANCES

A. Slope: Maximum variation of 3/8 inch measured along a 10'-0" straight edge.

END OF SECTION 321216

SECTION 321243 – FLEXIBLE POROUS PAVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This specification provides requirements for the construction of flexible porous paving.

B. Related Sections include the following:

1. Section 310000 – Earthwork
2. Section 312319 – Dewatering

1.3 DEFINITIONS

A. Exposure Condition, Moderate: Exposure to a climate where the paving will not be in a saturated condition when exposed to freezing and will not be exposed to deicing agents or other aggressive chemicals.

B. Exposure Condition, Severe: Exposure to deicing chemicals or other aggressive agents or where the paving can become saturated by continual contact with moisture or free water before freezing.

C. Base Reinforcement: The use of a geosynthic within the aggregate base course to enhance the performanace of a pavement.

D. Geogrid: Biaxial or triaxial woven polypropylene material for base course reinforcement and confinement, and subgrade stabilization and increased subgrade load capacity.

E. Panel: An individual paving slab bordered by joints or slab edges.

F. Porous/Pervious Paving: A paving comprising material with sufficient continuous voids to allow water to pass from the surface to the underlying layers.

G. Porous/Pervious: The property of a material which permits movement of water through it under ordinary hydrostatic pressure.

H. Flexible Porous Paving: Paving system comprised of three components: recycled passenger car tires, aggregate, and urethane binder that provides a strong, pervious, yet flexible paving.

I. Subbase: A layer in a paving system between the subgrade and the base course, or between the subgrade and a flexible pervious paving.

J. Subgrade: The soil prepared and compacted to support a structure or paving system.

1.4 REFERENCED STANDARDS

A. ASTM Standards:

1. ASTM C 666/ C 666M-03, "Standard Test Method for Resistance of Concrete to Freezing and Thawing, Procedure A – freezing and Thawing in Water." Samples shall indicate only minimal mass change results after 300 nominal freeze-thaw cycles, and visual examination of the test specimens shall indicate no crackes or breaks.

a. D 3385-03 Standard Test Method for Infiltration Rate of Soils in Field Using Double-Ring Infiltrometer.

b. D 3665-06 Standard Practice for Random Sampling of Construction Materials E 329-06a Specificaton for Agencies Engaged in Construction Inspection and/or Testing.

1.5 SUBMITTALS

A. Proposed Aggregate Mix Design

B. Samples for Verification: Provide one 6" diameter sample, full thickness.

1.6 PROJECT CONDITIONS

A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities.

B. Schedule placements to minimize exposure to wind, rainfall, and freezing before installation.

C. Avoid placing porous paving if rain, snow, or frost is forecast within 24 hours unless measures are taken as described later. Always protect fresh paving from moisture and freezing.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Installer shall provide a geogrid product for approval by the project owner and project engineer prior to installation.

2.2 SUBBASE

A. Coarse aggregates shall meet the durability requirements of ASTM C 33

2.3 FLEXIBLE POROUS PAVING

A. Aggregate:
1. Stone: Triple-washed coarse aggregate, No. 8 course aggregate (3/8" to 1/2" diameter) per ASTM C 33. Nominal maximum aggregate size shall not exceed 1-1/3".

B. Mix Design: Using materials acceptable to the Manufacturer design a tentative mix and test for the consistency intended for use in this project.
1. The volume by weight of aggregate per cubic yard shall be 100% of the dry mix
2. Permeability: Pervious infiltration rate of 2,000 gallons per square foot per hour

2.4 FORMS

A. Form Materials: Plywood, metal, metal-framed plywood, or other approved panel-type materials to provide full-depth, continuous, straight, smooth exposed surfaces that are capable of supporting aggregate placing equipment.

B. Forms shall be clean and free of debris of any kind, rust, and hardened concrete.

C. Form-Release Agent: Not applicable for this project.

PART 3 - EXECUTION

3.1 SUBGRADE PREPARATION

A. Prepare subgrade as specified in the contract documents.

B. Construct subgrade to ensure that the required paving thickness is obtained in all locations.

C. Keep all traffic off of the subgrade during construction to the maximum extent practical. Regrade subgrade disturbed by delivery vehicles or other construction traffic, as needed.

D. Compact the material added to obtain final subgrade elevation.

E. Determine subgrade permability in accordance with ASTM D3385 before porous paving placement. Confirm that subgrade permeability meets requirements of Contract Documents.

3.2 SUBBASE

A. Prepare subbase in accordance with contract documents and manufacturer recommendations.

3.3 SETTING FORMWORK

A. Set, align, and brace forms as needed for placement of geogrid product and aggregate.

B. The vertical face of previously placed pavement areas may be used as a form.

C. Placement width shall be as specified in the Contract Documents.

3.4 PLACING AND FINISHING PAVING

A. Do not place porous paving on frozen or wet subgrade or subbase

B. Deposit porous paving either directly onto the subgrade or subbase by wheelbarrow or by material handler onto the subgrade or subbase, unless otherwise specified.

C. Deposit porous paving between the forms to an approximately uniform height as specified by the Contract Documents.

D. Spread the porous paving using a come-along, short-handle, square-ended shovel or rake.

E. Use steel trowels to finish to the elevations and thickness specified in Contract Documents.

F. Place a minimum of 6" of topsoil, and seed and mulch according to Contract Documents.

3.5 OPENING TO TRAFFIC

A. Do not open the paving to light vehicular traffic until the porous paving has established more than 75% vegetative cover and all other project erosion control measures have been removed.

END OF SECTION 321243

SECTION 321313 - CONCRETE PAVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes exterior cement concrete pavement for the following:

1. Driveways and roadways.
2. Parking lots.
3. Curbs and gutters.
4. Walkways.

B. Related Sections include the following:

1. Section 310000 – Earthworks
2. Section 312319 – Dewatering
3. Section 321373 – Concrete Paving Joint Sealants

1.3 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, fly ash and other pozzolans, and ground granulated blast-furnace slag.

1.4 SUBMITTALS

A. Product Data: For each type of manufactured material and product indicated.

B. Design Mixtures: For each concrete pavement mixture. Include alternate mixture designs when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

C. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated, based on comprehensive testing of current materials:

1. Aggregates. Include service record data indicating absence of deleterious expansion of concrete due to alkali-aggregate reactivity.

D. Material Certificates: Signed by manufacturers certifying that each of the following materials complies with requirements:

1. Cementitious materials.
2. Steel reinforcement and reinforcement accessories.
3. Fiber reinforcement.
4. Admixtures.
5. Curing compounds.
6. Applied finish materials.
7. Bonding agent or epoxy adhesive.
8. Joint fillers.

E. Field quality-control test reports.

F. Minutes of preinstallation conference.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Manufacturer of ready-mixed concrete products who complies with ASTM C 94/C 94M requirements for production facilities and equipment.

1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

B. Testing Agency Qualifications: An independent agency qualified according to ASTM C 1077 and ASTM E 329 for testing indicated, as documented according to ASTM E 548.

1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-01 or an equivalent certification program.

C. ACI Publications: Comply with ACI 301, "Specification for Structural Concrete," unless modified by requirements in the Contract Documents.

D. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.

E. Mockups: Cast mockups of full-size sections of concrete pavement to demonstrate typical joints, surface finish, texture, color, and standard of workmanship.

1. Build mockups in the location and of the size indicated or, if not indicated, as directed by Architect.
2. Notify Architect seven days in advance of dates and times when mockups will be constructed.
3. Obtain Architect's approval of mockups before starting construction.
4. Maintain approved mockups during construction in an undisturbed condition as a standard for judging the completed pavement.
5. Demolish and remove approved mockups from the site when directed by Architect.
6. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

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PROJECT #: 2324

ISSUE:
BID SET 07-28-2025

SPECIFICATIONS 2

C-1.09

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F. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

1. Before submitting design mixtures, review concrete pavement mixture design and examine procedures for ensuring quality of concrete materials and concrete pavement construction practices. Require representatives, including the following, of each entity directly concerned with concrete pavement, to attend conference:

a. Contractor's superintendent.
b. Independent testing agency responsible for concrete design mixtures.
c. Ready-mix concrete producer.
d. Concrete pavement subcontractor.

1.6 PROJECT CONDITIONS

A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 FORMS

A. Form Materials: Plywood, metal, metal-framed plywood, or other approved panel-type materials to provide full-depth, continuous, straight, smooth exposed surfaces.

1. Use flexible or curved forms for curves with a radius 100 feet or less.

B. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

2.3 STEEL REINFORCEMENT

A. Plain-Steel Welded Wire Reinforcement: ASTM A 185, fabricated from as-drawn steel wire into flat sheets.

B. Deformed-Steel Welded Wire Reinforcement: ASTM A 497, flat sheet.

C. Epoxy-Coated Welded Wire Fabric: ASTM A 884/A 884M, Class A, plain steel.

D. Reinforcing Bars: ASTM A 615/A 615M, Grade 60; deformed.

E. Galvanized Reinforcing Bars: ASTM A 767/A 767M, Class II zinc coated, hot-dip galvanized after fabrication and bending; with ASTM A 615/A 615M, Grade 60 deformed bars.

F. Epoxy-Coated Reinforcing Bars: ASTM A 775/A 775M or ASTM A 934/A 934M; with ASTM A 615/A 615M, Grade 60 deformed bars.

G. Steel Bar Mats: ASTM A 184/A 184M; with ASTM A 615/A 615M, Grade 60, deformed bars; assembled with clips.

H. Plain Steel Wire: ASTM A 82, galvanized.

I. Deformed-Steel Wire: ASTM A 496.

J. Joint Dowel Bars: Plain steel bars, ASTM A 615/A 615M, Grade 60. Cut bars true to length with ends square and free of burrs.

K. Epoxy-Coated Joint Dowel Bars: ASTM A 775/A 775M; with ASTM A 615/A 615M, Grade 60, plain steel bars.

L. Tie Bars: ASTM A 615/A 615M, Grade 60, deformed.

M. Hook Bolts: ASTM A 307, Grade A, internally and externally threaded. Design hook-bolt joint assembly to hold coupling against pavement form and in position during concreting operations, and to permit removal without damage to concrete or hook bolt.

N. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars, welded wire reinforcement, and dowels in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete of greater compressive strength than concrete, and as follows:

1. Equip wire bar supports with sand plates or horizontal runners where base material will not support chair legs.
2. For epoxy-coated reinforcement, use epoxy-coated or other dielectric-polymer-coated wire bar supports.

O. Epoxy Repair Coating: Liquid two-part epoxy repair coating, compatible with epoxy coating on reinforcement.

P. Zinc Repair Material: ASTM A 780.

2.4 CONCRETE MATERIALS

A. Cementitious Material: Use one of the following cementitious materials, of the same type, brand, and source throughout the Project:

1. Portland Cement: ASTM C 150, Type I or II, gray. Supply with the following:

a. Fly Ash: ASTM C 618, Class C or F.
b. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.

c. The following maximum pozzolan materials shall be observed as a percent of total cementitious material in accordance with ODOT Item 499:
1) Fly Ash: 25% Maximum
2) Ground Granulated Blast-Furnace Slag: 30% Maximum
3) A maximum combination of pozzolan materials shall not exceed 50% of cementitious content by weight.

B. Normal-Weight Aggregates: ASTM C 33, Class 3S coarse aggregate, uniformly graded. Provide aggregates from a single source with documented service record data of at least 10 years' satisfactory service in similar pavement applications and service conditions using similar aggregates and cementitious materials.

1. Maximum Coarse-Aggregate Size: 3/4 inch nominal.
2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

C. Water: ASTM C 94/C 94M.

D. Air-Entraining Admixture: ASTM C 260.

E. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material.

1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
2. Retarding Admixture: ASTM C 494/C 494M, Type B.
3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

2.5 CURING MATERIALS

A. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. dry.

B. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

C. Water: Potable.

D. Evaporation Retarder: Waterborne, monomolecular film forming; manufactured for application to fresh concrete.

1. Products:

a. Axim Concrete Technologies; Cimfilm.
b. Burke by Edeco; BurkeFilm.
c. ChemMasters; Spray-Film.
d. Conspec Marketing & Manufacturing Co., Inc.; Aquafilm.

e. Dayton Superior Corporation; Sure Film.
f. Euclid Chemical Company (The); Eucobar.
g. Kaufman Products, Inc.; Vapor Aid.
h. Lambert Corporation; Lambco Skin.
i. L&M Construction Chemicals, Inc.; E-Cor.
j. MBT Protection and Repair, ChemRex Inc.; Confilm.
k. Meadows, W. R., Inc.; Sealtight Evapre.
l. Metalcrete Industries; Waterhold.
m. Nox-Crete Products Group, Kinsman Corporation; Monofilm.
n. Sika Corporation, Inc.; SikaFilm.
o. Symons Corporation; Finishing Aid.
p. Vexcon Chemicals, Inc.; Certi-Vex EnvioAssist.

E. Clear Waterborne Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B.

1. Products:

a. Anti-Hydro International, Inc.; AH Curing Compound #2 DR WB.
b. Burke by Edoko; Aqua Resin Cure.
c. ChemMasters; Safe-Cure Clear.
d. Conspec Marketing & Manufacturing Co., Inc.; W.B. Resin Cure.
e. Dayton Superior Corporation; Day Chem Rez Cure (J-11-W).
f. Euclid Chemical Company (The); Kurez DR VOX.
g. Kaufman Products, Inc.; Thinfilm 420.
h. Lambert Corporation; Aqua Kure-Clear.
i. L&M Construction Chemicals, Inc.; L&M Cure R.
j. Meadows, W. R., Inc.; 1100 Clear.
k. Nox-Crete Products Group, Kinsman Corporation; Resin Cure E.
l. Symons Corporation; Resi-Chem Clear.
m. Tamms Industries Inc.; Horncure WB 30.
n. Unitex; Hydro Cure 309.
o. Vexcon Chemicals, Inc.; Certi-Vex Enviocure 100.

F. White Waterborne Membrane-Forming Curing Compound: ASTM C 309, Type 2, Class B.

1. Products:

a. Anti-Hydro International, Inc.; AH Curing Compound #2 WP WB.
b. Burke by Edoco; Resin Emulsion White.
c. ChemMasters; Safe-Cure 2000.
d. Conspec Marketing & Manufacturing Co., Inc.; W.B. Resin Cure.
e. Dayton Superior Corporation; Day-Chem White Pigmented Cure (J-10-W).
f. Euclid Chemical Company (The); Kurez VOX White Pigmented.
g. Kaufman Products, Inc.; Thinfilm 450.
h. Lambert Corporation; Aqua Kure-White.
i. L&M Construction Chemicals, Inc.; L&M Cure R-2.
j. Meadows, W. R., Inc.; 1200-White.
k. Symons Corporation; Resi-Chem White.
l. Tamms Industries, Inc.; Horncure 200-W.
m. Unitex; Hydro White.
n. Vexcon Chemicals, Inc.; Certi-Vex Enviocure White 100.

2.6 RELATED MATERIALS

A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber.

B. Slip-Resistive Aggregate Finish: Factory-graded, packaged, rustproof, nonglazing, abrasive aggregate of fused aluminum-oxide granules or crushed emery with emery aggregate containing not less than 50 percent aluminum oxide and not less than 20 percent ferric oxide; unaffected by freezing, moisture, and cleaning materials.

C. Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.

D. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to requirements, and as follows:

1. Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

E. Chemical Surface Retarder: Water-soluble, liquid-set retarder with color dye, for horizontal concrete surface application, capable of temporarily delaying final hardening of concrete to a depth of 1/8 to 1/4 inch.

1. Products:

a. Burke by Edeco; True Etch Surface Retarder.
b. ChemMasters; Exposee.
c. Conspec Marketing & Manufacturing Co., Inc.; Delay S.
d. Euclid Chemical Company (The); Surface Retarder S.
e. Metalcrete Industries; Surflard.
f. Nox-Crete Products Group, Kinsman Corporation; Crete-Nox TA.
g. Scofield, L. M. Company; Lithotex.
h. Sika Corporation, Inc.; Rugasol-S.
i. Vexcon Chemicals, Inc.; Certi-Vex Envioset.

2.7 CONCRETE MIXTURES

A. Prepare design mixtures, proportioned according to ACI 301, for each type and strength of normal-weight concrete determined by either laboratory trial mixes or field experience.

1. Use a qualified independent testing agency for preparing and reporting proposed concrete mixture designs for the trial batch method.

B. Proportion mixtures to provide normal-weight concrete with the following properties:

1. Compressive Strength (28 Days): 4000 psi.
2. Maximum Water-Cementitious Materials Ratio at Point of Placement: 0.50.
3. Slump Limit: 4 inches, plus or minus 1 inch.

C. Add air-entraining admixture at manufacturer's prescribed rate to result in normal-weight concrete at point of placement having an air content as follows:
1. Air Content: 6 percent plus or minus 1.5 percent for 3/4-inch nominal maximum aggregate size

D. Limit water-soluble, chloride-ion content in hardened concrete to 0.10 percent by weight of cement.

E. Chemical Admixtures: Use admixtures according to manufacturer's written instructions.

1. Use high-range, water-reducing and retarding admixture in concrete, as required, for placement and workability.
2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.

F. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement according to ACI 301 requirements for concrete exposed to deicing chemicals.

1. Fly Ash or Pozzolan: 25 percent.
2. Ground Granulated Blast-Furnace Slag: 50 percent.
3. Combined Fly Ash or Pozzolan, and Ground Granulated Blast-Furnace Slag: 50 percent, with fly ash or pozzolan not exceeding 25 percent.

G. Synthetic Fiber: Uniformly disperse in concrete mix at manufacturer's recommended rate, but not less than 1.5 lb/cu. yd.

2.8 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M and ASTM C 1116. Furnish batch certificates for each batch discharged and used in the Work.

1. When air temperature is between 85 deg F and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

B. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Mix concrete materials in appropriate drum-type batch machine mixer.

1. For concrete mixes of 1 cu. yd. or smaller, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released.
2. For concrete mixes larger than 1 cu. yd., increase mixing time by 15 seconds for each additional 1 cu. yd..
3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mixture type, mixing time, quantity, and amount of water added.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine exposed subgrades and subbase surfaces for compliance with requirements for dimensional, grading, and elevation tolerances.

B. Proof-roll prepared subbase surface below concrete pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding.

1. Completely proof-roll subbase in one direction and repeat in perpendicular direction. Limit vehicle speed to 3 mph.
2. Proof-roll with a loaded 10-wheel tandem-axle dump truck weighing not less than 15 tons.
3. Subbase with soft spots and areas of pumping or rutting exceeding depth of 1/2 inch require correction according to requirements in Division 31 Section "Earth Moving."

C. Proceed with concrete pavement operations only after nonconforming conditions have been corrected and subgrade is ready to receive pavement.

3.2 PREPARATION

A. Remove loose material from compacted subbase surface immediately before placing concrete.

3.3 EDGE FORMS AND SCREED CONSTRUCTION

A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides for pavement to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.

B. Clean forms after each use and coat with form-release agent to ensure separation from concrete without damage.

3.4 STEEL REINFORCEMENT

A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.

B. Clean reinforcement of loose rust and mill scale, earth, ice, or other bond-reducing materials.

C. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement. Maintain minimum cover to reinforcement.

D. Install welded wire reinforcement in lengths as long as practicable. Lap adjoining pieces at least one full mesh, and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.

E. Zinc-Coated Reinforcement: Use galvanized steel wire ties to fasten zinc-coated reinforcement. Repair cut and damaged zinc coatings with zinc repair material.

F. Install fabricated bar mats in lengths as long as practicable. Handle units to keep them flat and free of distortions. Straighten bends, kinks, and other irregularities, or replace units as required before placement. Set mats for a minimum 2-inch overlap of adjacent mats.

3.5 JOINTS

A. General: Form construction, isolation, and contraction joints and tool edgings true to line with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline, unless otherwise indicated.

1. When joining existing pavement, place transverse joints to align with previously placed joints, unless otherwise indicated.

B. Construction Joints: Set construction joints at side and end terminations of pavement and at locations where pavement operations are stopped for more than one-half hour unless pavement terminates at isolation joints.

1. Continue steel reinforcement across construction joints, unless otherwise indicated. Do not continue reinforcement through sides of pavement strips, unless otherwise indicated.
2. Provide tie bars at sides of pavement strips where indicated.
3. Butt Joints: Use bonding agent at joint locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
4. Keyed Joints: Provide preformed keyway-section forms or bulkhead forms with keys, unless otherwise indicated. Embed keys at least 1-1/2 inches into concrete.
5. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt-coat one-half of dowel length to prevent concrete bonding to one side of joint.

C. Isolation Joints: Form isolation joints of preformed joint-filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, walks, other fixed objects, and where indicated.

1. Locate expansion joints at intervals of 50 feet, unless otherwise indicated.
2. Extend joint fillers full width and depth of joint.
3. Terminate joint filler not less than 1/2 inch or more than 1 inch below finished surface if joint sealant is indicated.
4. Place top of joint filler flush with finished concrete surface if joint sealant is not indicated.
5. Furnish joint fillers in one-piece lengths. Where more than one length is required, lace or clip joint-filler sections together.
6. Protect top edge of joint filler during concrete placement with metal, plastic, or other temporary preformed cap. Remove protective cap after concrete has been placed on both sides of joint.

D. Contraction Joints: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of the concrete thickness, as follows to match jointing of existing adjacent concrete pavement:

1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint with grooving tool to a 3/8-inch radius. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover marks on concrete surfaces.
2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before developing random contraction cracks.
3. Doweled Contraction Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length to prevent concrete bonding to one side of joint.

E. Edging: Tool edges of pavement, gutters, curbs, and joints in concrete after initial floating with an edging tool to a 3/8-inch radius. Repeat tooling of edges after applying surface finishes. Eliminate tool marks on concrete surfaces.

3.6 CONCRETE PLACEMENT

A. Inspection: Before placing concrete, inspect and complete formwork installation, steel reinforcement, and items to be embedded or cast in. Notify other trades to permit installation of their work.

B. Remove snow, ice, or frost from subbase surface and reinforcement before placing concrete. Do not place concrete on frozen surfaces.

C. Moisten subbase to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.

D. Comply with ACI 301 requirements for measuring, mixing, transporting, and placing concrete.

E. Do not add water to concrete during delivery or at Project site.

F. Do not add water to fresh concrete after testing.

G. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.

H. Consolidate concrete according to ACI 301 by mechanical vibrating equipment supplemented by hand spading, rodding, or tamping.

1. Consolidate concrete along face of forms and adjacent to transverse joints with an internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Use only square-faced shovels for hand spreading and consolidation. Consolidate with care to prevent dislocating reinforcement, dowels, and joint devices.

I. Place concrete in two operations; strike off initial pour for entire width of placement and to the required depth below finish surface. Lay welded wire fabric or fabricated bar mats immediately in final position. Place top layer of concrete, strike off, and screed.

1. Remove and replace concrete that has been placed for more than 15 minutes without being covered by top layer, or use bonding agent if approved by Architect.

J. Screed pavement surfaces with a straightedge and strike off.

K. Commence initial floating using bull floats or darbies to impart an open textured and uniform surface plane before excess moisture or bleed water appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading surface treatments.

L. Curbs and Gutters: When automatic machine placement is used for curb and gutter placement, submit revised mix design and laboratory test results that meet or exceed requirements. Produce curbs and gutters to required cross section, lines, grades, finish, and jointing as specified for formed concrete. If results are not approved, remove and replace with formed concrete.

M. Slip-Form Pavers: When automatic machine placement is used for pavement, submit revised mix design and laboratory test results that meet or exceed requirements. Produce pavement to required thickness, lines, grades, finish, and jointing as required for formed pavement.

1. Compact subbase and prepare subgrade of sufficient width to prevent displacement of paver machine during operations.

N. When adjoining pavement lanes are placed in separate pours, do not operate equipment on concrete until pavement has attained 85 percent of its 28-day compressive strength.

O. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

1. When air temperature has fallen to or is expected to fall below 40 deg F, uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F and not more than 80 deg F at point of placement.
2. Do not use frozen materials or materials containing ice or snow.
3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mix designs.

P. Hot-Weather Placement: Comply with ACI 301 and as follows when hot-weather conditions exist:

1. Cool ingredients before mixing to maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
2. Cover steel reinforcement with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
3. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

3.7 FLOAT FINISHING

A. General: Do not add water to concrete surfaces during finishing operations.

B. Float Finish: Begin the second floating operation when bleed-water sheen has disappeared and concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats, or by hand floating if area is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots and fill low spots. Refloat surface immediately to uniform granular texture.

1. Burlap Finish: Drag a seamless strip of damp burlap across float-finished concrete, perpendicular to line of traffic, to provide a uniform, gritty texture.
2. Medium-to-Fine-Textured Broom Finish: Draw a soft bristle broom across float-finished concrete surface perpendicular to line of traffic to provide a uniform, fine-line texture.
3. Medium-to-Coarse-Textured Broom Finish: Provide a coarse finish by straining float-finished concrete surface 1/16 to 1/8 inch deep with a stiff-bristled broom, perpendicular to line of traffic.

3.8 SPECIAL FINISHES

A. Slip-Resistive Aggregate Finish: Before final floating, spread slip-resistive aggregate finish on pavement surface according to manufacturer's written instructions and as follows:

1. Uniformly spread 40 lb/100 sq. ft. dampened slip-resistive aggregate over pavement surface in 2 applications. Tamp aggregate flush with surface using a steel trowel, but do not force below surface.
2. Uniformly distribute approximately two-thirds of slip-resistive aggregate over pavement surface with mechanical spreader, allow to absorb moisture, and embed by power floating. Follow power floating with a second slip-resistive aggregate application, uniformly distributing remainder of material at right angles to first application to ensure uniform coverage, and embed by power floating.
3. Cure concrete with curing compound recommended by slip-resistive aggregate manufacturer. Apply curing compound immediately after final finishing.
4. After curing, lightly work surface with a steel wire brush or abrasive stone and water to expose nonslip aggregate.

3.9 CONCRETE PROTECTION AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

B. Comply with ACI 306.1 for cold-weather protection.

C. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

D. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.

E. Curing Methods: Cure concrete by moisture curing, moisture-retaining-cover curing, curing compound, or a combination of these as follows:

1. Moist Curing: Keep surfaces continuously moist for not less than seven days with the following materials:

a. Water.
b. Continuous water-fog spray.
c. Absorptive cover, water saturated and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.

2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

3.10 PAVEMENT TOLERANCES

A. Comply with tolerances of ACI 117 and as follows:

1. Elevation: 1/4 inch.
2. Thickness: Plus 3/8 inch, no minus.
3. Surface: Gap below 10-foot- long, unleveled straightedge not to exceed 1/4 inch.
4. Lateral Alignment and Spacing of Tie Bars and Dowels: 1 inch.
5. Vertical Alignment of Tie Bars and Dowels: 1/4 inch.
6. Alignment of Tie-Bar End Relative to Line Perpendicular to Pavement Edge: 1/2 inch.
7. Alignment of Dowel-Bar End Relative to Line Perpendicular to Pavement Edge: Length of dowel 1/4 inch per 12 inches.
8. Joint Spacing: 3 inches.
9. Contraction Joint Depth: Plus 1/4 inch, no minus.
10. Joint Width: Plus 1/8 inch, no minus.

3.11 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Testing Services: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:

1. Testing Frequency: Obtain at least 1 composite sample for each 5000 sq. ft. or fraction thereof of each concrete mix placed each day.

a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.

2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mix. Perform additional tests when concrete consistency appears to change.
3. Air Content: ASTM C 231, pressure method; one test for each composite sample, but not less than one test for each day's pour of each concrete mix.
4. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F and below and when 80 deg F and above, and one test for each composite sample.
5. Compression Test Specimens: ASTM C 31/C 31M; cast and laboratory cure one set of three standard cylinder specimens for each composite sample.
6. Compressive-Strength Tests: ASTM C 39/C 39M; test 1 specimen at 7 days and 2 specimens at 28 days.

a. A compressive-strength test shall be the average compressive strength from 2 specimens obtained from same composite sample and tested at 28 days.

C. Strength of each concrete mix will be satisfactory if average of any 3 consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.

D. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.

E. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.

F. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect.

G. Remove and replace concrete pavement where test results indicate that it does not comply with specified requirements.

H. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.12 REPAIRS AND PROTECTION

A. Remove and replace concrete pavement that is broken, damaged, or defective or that does not comply with requirements in this Section.

B. Drill test cores, where directed by Architect, when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory pavement areas with portland cement concrete bonded to pavement with epoxy adhesive.

C. Protect concrete from damage. Exclude traffic from pavement for at least 14 days after placement. When construction traffic is permitted, maintain pavement as clean as possible by removing surface stains and spillage of materials as they occur.

D. Maintain concrete pavement free of stains, discoloration, dirt, and other foreign material. Sweep concrete pavement not more than two days before date scheduled for Substantial Completion inspections.

END OF SECTION 321313

SECTION 321373 - CONCRETE PAVING JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Expansion and contraction joints within cement concrete pavement.
2. Joints between cement concrete and asphalt pavement.

B. Related Sections include the following:

1. Section 321216 – Asphalt Paving
2. Section 321313 – Concrete Paving

1.3 SUBMITTALS

A. Product Data: For each joint-sealant product indicated.

B. Samples for Verification: For each type and color of joint sealant required. Install joint-sealant samples in 1/2-inch- wide joints formed between two 6-inch- long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.

C. Product Certificates: For each type of joint sealant and accessory, signed by product manufacturer.

D. Compatibility and Adhesion Test Reports: From sealant manufacturer, indicating the following:

1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.
2. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.

E. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for sealants.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: An employer of workers trained and approved by manufacturer.

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N

PROJECT #: 2324
ISSUE:
BID SET 07-28-2025

SPECIFICATIONS 3

C-1.10

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B. Source Limitations: Obtain each type of joint sealant through one source from a single manufacturer.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project site in original unopened containers or bundles with labels indicating manufacturer, product name and designation, color, expiration date, pot life, curing time, and mixing instructions for multicomponent materials.

B. Store and handle materials to comply with manufacturer's written instructions to prevent their deterioration or damage due to moisture, high or low temperatures, contaminants, or other causes.

1.6 PROJECT CONDITIONS

A. Do not proceed with installation of joint sealants under the following conditions:

1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer.
2. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F.
3. When joint substrates are wet or covered with frost.
4. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
5. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products listed in other Part 2 articles.

B. Products: Subject to compliance with requirements, provide one of the products listed in other Part 2 articles.

2.2 MATERIALS, GENERAL

A. Compatibility: Provide joint sealants, backing materials, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer based on testing and field experience.

B. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.3 COLD-APPLIED JOINT SEALANTS

A. Multicomponent High-Octane-Fuel-Resistant Sealant for Concrete: Pourable, chemically curing elastomeric formulation complying with the following requirements for formulation and with ASTM C 920 for type, grade, class, and uses indicated:

1. Urethane Formulation: Type M; Grade P; Class 12-1/2; Uses T, M, and, as applicable to joint substrates indicated, O.
2. Coal-Tar-Modified Polymer Formulation: Type M; Grade P; Class 25; Uses T and, as applicable to joint substrates indicated, O.
3. Bitumen-Modified Urethane Formulation: Type M; Grade P; Class 25; Uses T, M, and, as applicable to joint substrates indicated, O.

B. Single-Component High-Octane-Fuel-Resistant Urethane Sealant for Concrete: Single-component, pourable, coal-tar-modified, urethane formulation complying with ASTM C 920 for Type S; Grade P; Class 25; Uses T, M, and, as applicable to joint substrates indicated, O.

C. Type NS Silicone Sealant for Concrete: Single-component, low-modulus, neutral-curing, nonsag silicone sealant complying with ASTM D 5893 for Type NS.

D. Type SL Silicone Sealant for Concrete and Asphalt: Single-component, low-modulus, neutral-curing, self-leveling silicone sealant complying with ASTM D 5893 for Type SL.

E. Multicomponent Low-Modulus Sealant for Concrete and Asphalt: Proprietary formulation consisting of reactive petropolymer and activator components producing a pourable, self-leveling sealant.

2.4 HOT-APPLIED JOINT SEALANTS

A. High-Octane-Fuel-Resistant Elastomeric Sealant for Concrete: Single-component formulation complying with ASTM D 3569.

B. Elastomeric Sealant for Concrete: Single-component formulation complying with ASTM D 3406.

C. Sealant for Concrete and Asphalt: Single-component formulation complying with ASTM D 3405.

1. Products:

a. Koch Materials Company; Product No. 9005.
b. Koch Materials Company; Product No. 9030.
c. Meadows, W. R., Inc.; Sealtight Hi-Spec.

2.5 JOINT-SEALANT BACKER MATERIALS

A. General: Provide joint-sealant backer materials that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by joint-sealant manufacturer based on field experience and laboratory testing.

B. Round Backer Rods for Cold- and Hot-Applied Sealants: ASTM D 5249, Type 1, of diameter and density required to control sealant depth and prevent bottom-side adhesion of sealant.

C. Backer Strips for Cold- and Hot-Applied Sealants: ASTM D 5249; Type 2; of thickness and width required to control sealant depth, prevent bottom-side adhesion of sealant, and fill remainder of joint opening under sealant.

D. Round Backer Rods for Cold-Applied Sealants: ASTM D 5249, Type 3, of diameter and density required to control sealant depth and prevent bottom-side adhesion of sealant.

2.6 PRIMERS

A. Primers: Product recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.

1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions.

B. Joint Priming: Prime joint substrates where indicated or where recommended in writing by joint-sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

3.3 INSTALLATION OF JOINT SEALANTS

A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

SECTION 329200 - TURF AND GRASSES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Modification to General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Seeding.
2. Hydroseeding.
3. Turf renovation.
4. Erosion-control material(s).

B. Related Sections include:

1. Section 310000 – Earthwork
2. Section 334600 – Subdrainage

C. Section 329200 "Turf and Grasses" is to be used anywhere earth disturbing activity occurs with the exception of the baseball and softball outfields. Temporary erosion control materials and seeding shall follow the specifications as stated on the storm water pollution prevention plan.

1.3 DEFINITIONS

A. Duff Layer: The surface layer of native topsoil that is composed of mostly decayed leaves, twigs, and detritus.

B. Finish Grade: Elevation of finished surface of planting soil.

C. Manufactured Topsoil: Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil.

D. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. This includes insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. It also includes substances or mixtures intended for use as a plant regulator, defoliant, or desiccant.

E. Pests: Living organisms that occur where they are not desired or that cause damage to plants, animals, or people. These include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.

C. Install backer materials of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

1. Do not leave gaps between ends of backer materials.
2. Do not stretch, twist, puncture, or tear backer materials.
3. Remove absorbent backer materials that have become wet before sealant application and replace them with dry materials.

D. Install sealants using proven techniques that comply with the following and at the same time backings are installed:

1. Place sealants so they directly contact and fully wet joint substrates.
2. Completely fill recesses provided for each joint configuration.
3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

E. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

1. Remove excess sealants from surfaces adjacent to joint.
2. Use tooling agents that are approved in writing by joint-sealant manufacturer and that do not discolor sealants or adjacent surfaces.

F. Provide joint configuration to comply with joint-sealant manufacturer's written instructions, unless otherwise indicated.

G. Provide recessed joint configuration for silicone sealants of recess depth and at locations indicated.

3.4 CLEANING

A. Clean off excess sealants or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved by manufacturers of joint sealants and of products in which joints occur.

3.5 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately and replace with joint sealant so installations with repaired areas are indistinguishable from the original work.

END OF SECTION 321373

1. Professional Membership: Installer shall be a member in good standing of either the Professional Landcare Network or the American Nursery and Landscape Association.
2. Experience: Three years' experience in turf installation in addition to requirements in Division 01 Section "Quality Requirements."
3. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when work is in progress.
4. Personnel Certifications: Installer's field supervisor shall have certification in one of the following categories from the Professional Landcare Network:

a. Certified Landscape Technician - Exterior, with installation specialty area(s), designated CLT-Exterior.
b. Certified Turfgrass Professional, designated CTP.
c. Certified Turfgrass Professional of Cool Season Lawns, designated CTP-CSL.

5. Maintenance Proximity: Not more than two hours' normal travel time from Installer's place of business to Project site.
6. Pesticide Applicator: State licensed, commercial.

B. Soil-Testing Laboratory Qualifications: An independent laboratory or university laboratory, recognized by the State Department of Agriculture, with the experience and capability to conduct the testing indicated and that specializes in types of tests to be performed.

C. Soil Analysis: For each unamended soil type, furnish soil analysis and a written report by a qualified soil-testing laboratory stating percentages of organic matter; gradation of sand, silt, and clay content; cation exchange capacity; sodium absorption ratio; deleterious material; pH; and mineral and plant-nutrient content of the soil.

1. Testing methods and written recommendations shall comply with USDA's Handbook No. 60.
2. The soil-testing laboratory shall oversee soil sampling, with depth, location, and number of samples to be taken per instructions from Engineer. A minimum of three representative samples shall be taken from varied locations for each soil to be used or amended for planting purposes.
3. Report suitability of tested soil for turf growth.

a. Based on the test results, state recommendations for soil treatments and soil amendments to be incorporated. State recommendations in weight per 1000 sq. ft. (92.9 sq. m) or volume per cu. yd. (0.76 cu. m) for nitrogen, phosphorus, and potash nutrients and soil amendments to be added to produce satisfactory planting soil suitable for healthy, viable plants.
b. Report presence of problem salts, minerals, or heavy metals, including aluminum, arsenic, barium, cadmium, chromium, cobalt, lead, lithium, and vanadium. If such problem materials are present, provide additional recommendations for corrective action.

D. Preinstallation Conference: Conduct conference at Project site.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Seed and Other Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of conformance with state and federal laws, as applicable.

B. Bulk Materials:

1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
2. Provide erosion-control measures to prevent erosion or displacement of bulk materials, discharge of soil-bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
3. Accompany each delivery of bulk fertilizers, lime, and soil amendments with appropriate certificates.

1.7 PROJECT CONDITIONS

A. Planting Restrictions: Plant during one of the following periods. Coordinate planting periods with initial maintenance periods to provide required maintenance from date of Substantial Completion.

1. Spring Planting: March 1 – May 31.
2. Fall Planting: August 1 – September 30.

B. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions.

1.8 MAINTENANCE SERVICE

A. Initial Turf Maintenance Service: Provide full maintenance by skilled employees of landscape Installer. Maintain as required in Part 3. Begin maintenance immediately after each area is planted and continue until acceptable turf is established but for not less than the following periods:

1. Seeded Turf: 90 days from date of Substantial Completion.

a. When initial maintenance period has not elapsed before end of planting season, or if turf is not fully established, continue maintenance during next planting season.
b. Reseeding by over seeding method in spring planting season.

B. Continuing Maintenance Proposal: From Installer to Owner, in the form of a standard yearly (or other period) maintenance agreement, starting on date initial maintenance service is concluded. State services, obligations, conditions, and terms for agreement period and for future renewal options.

E. Perlite: Horticultural perlite, soil amendment grade.

F. Agricultural Gypsum: Minimum 90 percent calcium sulfate, finely ground with 90 percent passing through No. 50 (0.30-mm) sieve.

G. Sand: Clean, washed, natural or manufactured, and free of toxic materials.

H. Diatomaceous Earth: Calcined, 90 percent silica, with approximately 140 percent water absorption capacity by weight.

I. Zeolites: Mineral clinoptilolite with at least 60 percent water absorption by weight.

2.3 ORGANIC SOIL AMENDMENTS

A. Compost: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through 1-inch (25-mm) sieve; soluble salt content of 5 to 10 decisiemens/m; not exceeding 0.5 percent inert contaminants and free of substances toxic to plantings; and as follows:

1. Organic Matter Content: 50 to 60 percent of dry weight.
2. Feedstock: Agricultural, food, or industrial residuals; biosolids; yard trimmings; or source-separated or compostable mixed solid waste.

B. Sphagnum Peat: Partially decomposed sphagnum peat moss, finely divided or of granular texture, with a pH range of 3.4 to 4.8.

C. Muck Peat: Partially decomposed moss peat, native peat, or reed-sedge peat, finely divided or of granular texture, with a pH range of 6 to 7.5, and having a water-absorbing capacity of 1100 to 2000 percent.

D. Wood Derivatives: Decomposed, nitrogen-treated sawdust, ground bark, or wood waste; of uniform texture and free of chips, stones, sticks, soil, or toxic materials.

1. In lieu of decomposed wood derivatives, mix partially decomposed wood derivatives with ammonium nitrate at a minimum rate of 0.15 lb/cu. ft. (2.4 kg/cu. m) of loose sawdust or ground bark, or with ammonium sulfate at a minimum rate of 0.25 lb/cu. ft. (4 kg/cu. m) of loose sawdust or ground bark.

E. Manure: Well-rotted, unleached, stable or cattle manure containing not more than 25 percent by volume of straw, sawdust, or other bedding materials; free of toxic substances, stones, sticks, soil, weed seed, and material harmful to plant growth.

2.4 FERTILIZERS

A. Bonemeal: Commercial, raw or steamed, finely ground; a minimum of 4 percent nitrogen and 10 percent phosphoric acid.

B. Superphosphate: Commercial, phosphate mixture, soluble; a minimum of 20 percent available phosphoric acid.

C. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium in the following composition:

1. Composition: 1 lb/1000 sq. ft. (0.45 kg/92.9 sq. m) of actual nitrogen, 4 percent phosphorous, and 2 percent potassium, by weight.
2. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing laboratory.

D. Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition:

1. Composition: 20 percent nitrogen, 10 percent phosphorous, and 10 percent potassium, by weight.
2. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing laboratory.

2.5 PLANTING SOILS

A. Planting Soil: ASTM D 5268 topsoil, with pH range of 5.5 to 7, a minimum of 4 percent organic material content; free of stones 1 inch (25 mm) or larger in any dimension and other extraneous materials harmful to plant growth.

2.6 MULCHES

A. Straw Mulch: Provide air-dry, clean, mildew- and seed-free, salt hay or threshed straw of wheat, rye, oats, or barley.

B. Sphagnum Peat Mulch: Partially decomposed sphagnum peat moss, finely divided or of granular texture, and with a pH range of 3.4 to 4.8.

C. Muck Peat Mulch: Partially decomposed moss peat, native peat, or reed-sedge peat, finely divided or of granular texture, with a pH range of 6 to 7.5, and having a water-absorbing capacity of 1100 to 2000 percent.

D. Compost Mulch: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through 1-inch (25-mm) sieve; soluble salt content of 2 to 5 decisiemens/m; not exceeding 0.5 percent inert contaminants and free of substances toxic to plantings; and as follows:

1. Organic Matter Content: 50 to 60 percent of dry weight.
2. Feedstock: Agricultural, food, or industrial residuals; biosolids; yard trimmings; or source-separated or compostable mixed solid waste.

E. Fiber Mulch: Biodegradable, dyed-wood, cellulose-fiber mulch; nontoxic and free of plant-growth or germination inhibitors; with a maximum moisture content of 15 percent and a pH range of 4.5 to 6.5.

1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area.
2. Do not mix or place soils and soil amendments in frozen, wet, or muddy conditions.
3. Suspend soil spreading, grading, and tilling operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
4. Uniformly moisten excessively dry soil that is not workable and which is too dusty.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

C. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Engineer and replace with new planting soil.

3.2 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities, trees, shrubs, and plantings from damage caused by planting operations.

1. Protect adjacent and adjoining areas from hydroseeding and hydromulching overspray.
2. Protect grade stakes set by others until directed to remove them.

B. Install erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

3.3 TURF AREA PREPARATION

A. Limit turf subgrade preparation to areas to be planted.

B. Newly Graded Subgrades: Loosen subgrade to a minimum depth of 6 inches (150 mm). Remove stones larger than 1/2 inch (13 mm) in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.

1. Apply superphosphate fertilizer directly to subgrade before loosening.
2. Spread topsoil, apply soil amendments and fertilizer on surface, and thoroughly blend planting soil. Top soil shall be a minimum of 4 inches (100 mm) thick.

a. Delay mixing fertilizer with planting soil if planting will not proceed within a few days.
b. Mix lime with dry soil before mixing fertilizer.

3. Spread planting soil to a depth of 6 inches (150 mm) but not less than required to meet finish grades after light rolling and natural settlement. Do not spread if planting soil or subgrade is frozen, muddy, or excessively wet.

a. Spread approximately 1/2 the thickness of planting soil over loosened subgrade. Mix thoroughly into top 4 inches (100 mm) of subgrade. Spread remainder of planting soil.

F. Planting Soil: Standardized topsoil; existing, native surface topsoil; existing, in-place surface soil; imported topsoil; or manufactured topsoil that is modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.

G. Subgrade: Surface or elevation of subsoil remaining after excavation is complete, or top surface of a fill or backfill before planting soil is placed.

H. Subsoil: All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.

I. Surface Soil: Soil that is present at the top layer of the existing soil profile at the Project site. In undisturbed areas, the surface soil is typically topsoil, but in disturbed areas such as urban environments, the surface soil can be subsoil.

J. Disturbed Areas: Any disturbed soil or earth disturbing activity that has been caused by the contractors activity of subcontractors activity.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

1. Pesticides and Herbicides: Include product label and manufacturer's application instructions specific to this Project.

B. Certification of Grass Seed: From seed vendor for each grass-seed monostand or mixture stating the botanical and common name, percentage by weight of each species and variety, and percentage of purity, germination, and weed seed. Include the year of production and date of packaging.

1. Certification of each seed mixture for turf grass sod. Include identification of source and name and telephone number of supplier.

C. Qualification Data: For qualified landscape Installer.

D. Product Certificates: For soil amendments and fertilizers, from manufacturer.

E. Material Test Reports: For standardized ASTM D 5268 topsoil, existing native surface topsoil, existing in-place surface soil, and imported or manufactured topsoil.

F. Maintenance Instructions: Recommended procedures to be established by Owner for maintenance of turf during a calendar year. Submit before expiration of required initial maintenance periods.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: A qualified landscape Installer whose work has resulted in successful turf establishment.

PART 2 - PRODUCTS

2.1 SEED

A. Grass Seed: Fresh, clean, dry, new-crop seed complying with AOSA's "Journal of Seed Technology; Rules for Testing Seeds" for purity and germination tolerances.

B. Seed Species: State-certified seed of grass species as follows:

C. Seed Species: Seed of grass species as follows, with not less than 95 percent germination, not less than 85 percent pure seed, and not more than 0.5 percent weed seed:

1. Full Sun: Kentucky bluegrass (Poa pratensis), a minimum of three cultivars.
2. Sun and Partial Shade: Proportioned by weight as follows:

a. 50 percent Kentucky bluegrass (Poa pratensis).
b. 30 percent chewings red fescue (Festuca rubra variety).
c. 10 percent perennial ryegrass (Lolium perenne).
d. 10 percent redtop (Agrostis alba).

3. Shade: Proportioned by weight as follows:

a. 50 percent chewings red fescue (Festuca rubra variety).
b. 35 percent rough bluegrass (Poa trivialis).
c. 15 percent redtop (Agrostis alba).

D. Grass Seed Mix: Proprietary seed mix as follows:

1. Products: Subject to compliance with requirements, any available products that may be incorporated into the work and comply with specifications and plans.

2.2 INORGANIC SOIL AMENDMENTS

A. Lime: ASTM C 602, agricultural liming material containing a minimum of 80 percent calcium carbonate equivalent and as follows:

1. Class: T, with a minimum of 99 percent passing through No. 8 (2.36-mm) sieve and a minimum of 75 percent passing through No. 60 (0.25-mm) sieve.
2. Class: O, with a minimum of 95 percent passing through No. 8 (2.36-mm) sieve and a minimum of 55 percent passing through No. 60 (0.25-mm) sieve.
3. Provide lime in form of ground dolomitic limestone or calcitic limestone.

B. Sulfur: Granular, biodegradable, containing a minimum of 90 percent sulfur, and with a minimum of 99 percent passing through No. 6 (3.35-mm) sieve and a maximum of 10 percent passing through No. 40 (0.425-mm) sieve.

C. Iron Sulfate: Granulated ferrous sulfate containing a minimum of 20 percent iron and 10 percent sulfur.

D. Aluminum Sulfate: Commercial grade, unadulterated.

F. Nonasphaltic Tackifier: Colloidal tackifier recommended by fiber-mulch manufacturer for slurry application; nontoxic and free of plant-growth or germination inhibitors.

G. Asphalt Emulsion: ASTM D 977, Grade SS-1; nontoxic and free of plant-growth or germination inhibitors.

2.7 PESTICIDES

A. General: Pesticide, registered and approved by EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for Project conditions and application. Do not use restricted pesticides unless authorized in writing by authorities having jurisdiction.

B. Pre-Emergent Herbicide (Selective and Non-Selective): Effective for controlling the germination or growth of weeds within planted areas a: the soil level directly below the mulch layer.

C. Post-Emergent Herbicide (Selective and Non-Selective): Effective for controlling weed growth that has already germinated.

2.8 EROSION-CONTROL MATERIALS

A. Erosion-Control Blankets: Biodegradable wood excelsior, straw, or coconut-fiber mat enclosed in a photodegradable plastic mesh. Include manufacturer's recommended steel wire staples, 6 inches (150 mm) long.

B. Erosion-Control Fiber Mesh: Biodegradable burlap or spun-coir mesh, a minimum of 0.92 lb/sq. yd. (0.5 kg/sq. m), with 50 to 65 percent open area. Include manufacturer's recommended steel wire staples, 6 inches (150 mm) long.

C. Erosion-Control Mats: Cellular, non-biodegradable slope-stabilization mats designed to isolate and contain small areas of soil over steeply sloped surface, of 6-inch (150-mm) nominal mat thickness. Include manufacturer's recommended anchorage system for slope conditions.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Invisible Structures, Inc.; Slopetame 2.
b. Presto Products Company, a business of Alcoa; Geoweb.
c. Tenax Corporation - USA; Tenweb.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas to be planted for compliance with requirements and other conditions affecting performance.

b. Reduce elevation of planting soil to allow for soil thickness of sod.

C. Unchanged Subgrades: If turf is to be planted in areas unaltered or undisturbed by excavating, grading, or surface-soil stripping operations, prepare surface soil as follows:

1. Remove existing grass, vegetation, and turf. Do not mix into surface soil.
2. Loosen surface soil to a depth of at least 6 inches (150 mm). Apply soil amendments and fertilizers according to planting soil mix proportions and mix thoroughly into top 4 inches (100 mm) of soil. Till soil to a homogeneous mixture of fine texture. Rack soil to remove rocks, stones, sticks, roots and other debris.

a. Apply superphosphate fertilizer directly to surface soil before loosening.

3. Remove stones larger than 1/2 inch (13 mm) in any dimension and sticks, roots, trash, and other extraneous matter.
4. Legally dispose of waste material, including grass, vegetation, and turf, off Owner's property.

D. Finish Grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Grade to within plus or minus 1/2 inch (13 mm) of finish elevation. Roll and rake, remove ridges, and fill depressions to meet finish grades. Limit finish grading to areas that can be planted in the immediate future.

E. Moisten prepared area before planting if soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

F. Before planting, obtain Engineer's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.

3.4 PREPARATION FOR EROSION-CONTROL MATERIALS

A. Prepare area as specified in "Turf Area Preparation" Article.

B. For erosion-control mats, install planting soil in two lifts, with second lift equal to thickness of erosion-control mats. Install erosion-control mat and fasten as recommended by material manufacturer.

C. Fill cells of erosion-control mat with planting soil and compact before planting.

D. For erosion-control blanket or mesh, install from top of slope, working downward, and as recommended by material manufacturer for site conditions. Fasten as recommended by material manufacturer.

E. Moisten prepared area before planting if surface is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

3.5 SEEDING

A. Sow seed with spreader or seeding machine. Do not broadcast or drop seed when wind velocity exceeds 5 mph (8 km/h). Evenly distribute seed by sowing equal quantities in two directions at right angles to each other.

1. Do not use wet seed or seed that is moldy or otherwise damaged.
2. Do not seed against existing trees. Limit extent of seed to outside edge of planting saucer.

B. Sow seed at a total rate of 2 lb/1000 sq. ft. (0.9 kg/92.9 sq. m).

C. Rake seed lightly into top 1/8 inch (3 mm) of soil, roll lightly, and water with fine spray.

D. Protect seeded areas with slopes exceeding 1:3 with erosion-control blankets installed and stapled according to manufacturer's written instructions.

E. Protect seeded areas with erosion-control mats where shown on Drawings; install and anchor according to manufacturer's written instructions.

F. Protect seeded areas with slopes not exceeding 1:6 by spreading straw mulch. Spread uniformly at a minimum rate of 2 tons/acre (42 kg/92.9 sq. m) to form a continuous blanket 1-1/2 inches (38 mm) in loose thickness over seeded areas. Spread by hand, blower, or other suitable equipment.

1. Anchor straw mulch by crimping into soil with suitable mechanical equipment.
2. Bond straw mulch by spraying with asphalt emulsion at a rate of 10 to 13 gal./1000 sq. ft. (38 to 49 L/92.9 sq. m). Take precautions to prevent damage or staining of structures or other plantings adjacent to mulched areas. Immediately clean damaged or stained areas.

G. Protect seeded areas from hot, dry weather or drying winds by applying compost mulch within 24 hours after completing seeding operations. Soak areas, scatter mulch uniformly to a thickness of 3/16 inch (4.8 mm), and roll surface smooth.

3.6 HYDROSEEDING

A. Hydroseeding: Mix specified seed, fertilizer, and fiber mulch in water, using equipment specifically designed for hydroseed application. Continue mixing until uniformly blended into homogeneous slurry suitable for hydraulic application.

1. Mix slurry with fiber-mulch manufacturer's recommended tackifier.
2. Apply slurry uniformly to all areas to be seeded in a one-step process. Apply slurry at a rate so that mulch component is deposited at not less than 1500 lb/acre (15.6-kg/92.9 sq. m) dry weight, and seed component is deposited at not less than the specified seed-sowing rate.
3. Apply slurry uniformly to all areas to be seeded in a two-step process. Apply first slurry coat at a rate so that mulch component is deposited at not less than 500-lb/acre (5.2-kg/92.9 sq. m) dry weight, and seed component is deposited at not less than the specified seed-sowing rate. Apply slurry cover coat of fiber mulch (hydromulching) at a rate of 1000 lb/acre (10.4 kg/92.9 sq. m).

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NORTH FORK PRESERVE RENOVATION

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N

PROJECT #: 2324

ISSUE:
BID SET 07-28-2025

SPECIFICATIONS 4

C-1.11

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3.7 TURF RENOVATION

A. Renovate existing turf.

B. Renovate existing turf damaged by Contractor's operations, such as storage of materials or equipment and movement of vehicles.

1. Reestablish turf where settlement or washouts occur or where minor regrading is required.
2. Install new planting soil as required.

C. Remove sod and vegetation from diseased or unsatisfactory turf areas; do not bury in soil.

D. Remove topsoil containing foreign materials such as oil droppings, fuel spills, stones, gravel, and other construction materials resulting from Contractor's operations, and replace with new planting soil.

E. Mow, dethatch, core aerate, and rake existing turf.

F. Remove weeds before seeding. Where weeds are extensive, apply selective herbicides as required. Do not use pre-emergence herbicides.

G. Remove waste and foreign materials, including weeds, soil cores, grass, vegetation, and turf, and legally dispose of them off Owner's property.

H. Till stripped, bare, and compacted areas thoroughly to a soil depth of 6 inches (150 mm).

I. Apply soil amendments and initial fertilizers required for establishing new turf and mix thoroughly into top 4 inches (100 mm) of existing soil. Install new planting soil to fill low spots and meet finish grades.

J. Apply seed and protect with straw mulch as required for new turf.

K. Water newly planted areas and keep moist until new turf is established.

3.8 TURF MAINTENANCE

A. Maintain and establish turf by watering, fertilizing, weeding, mowing, trimming, replanting, and performing other operations as required to establish healthy, viable turf. Roll, regrade, and replant bare or eroded areas and remulch to produce a uniformly smooth turf. Provide materials and installation the same as those used in the original installation.

1. Fill in as necessary soil subsidence that may occur because of settling or other processes. Replace materials and turf damaged or lost in areas of subsidence.
2. In areas where mulch has been disturbed by wind or maintenance operations, add new mulch and anchor as required to prevent displacement.
3. Apply treatments as required to keep turf and soil free of pests and pathogens or disease. Use integrated pest management practices whenever possible to minimize the use of pesticides and reduce hazards.

B. Watering: Install and maintain temporary piping, hoses, and turf-watering equipment to convey water from sources and to keep turf uniformly moist to a depth of 4 inches (100 mm).

1. Schedule watering to prevent wilting, puddling, erosion, and displacement of seed or mulch. Lay out temporary watering system to avoid walking over muddy or newly planted areas.
2. Water turf with fine spray at a minimum rate of 1 inch (25 mm) per week unless rainfall precipitation is adequate.

C. Mow turf as soon as top growth is tall enough to cut. Repeat mowing to maintain specified height without cutting more than 1/3 of grass height. Remove no more than 1/3 of grass-leaf growth in initial or subsequent mowings. Do not delay mowing until grass blades bend over and become matted. Do not mow when grass is wet. Schedule initial and subsequent mowings to maintain the following grass height:

1. Mow perennial ryegrass to a height of 2 to 3 inches.
2. Mow Kentucky bluegrass, annual ryegrass, chewings red fescue to a height of 2 to 3 inches.
3. Mow turf-type tall fescue to a height of 2 to 3 inches.

D. Turf Postfertilization: Apply fertilizer after initial mowing and when grass is dry.

1. Use fertilizer that will provide actual nitrogen of at least 1 lb/1000 sq. ft. (0.45 kg/92.9 sq. m) to turf area.

3.9 SATISFACTORY TURF

A. Turf installations shall meet the following criteria as determined by Engineer:

1. Satisfactory Seeded Turf: At end of maintenance period, a healthy, uniform, close stand of grass has been established, free of weeds and surface irregularities, with coverage exceeding 90 percent over any 10 sq. ft. (0.92 sq. m) and bare spots not exceeding 3 by 3 inches.

B. Use specified materials to reestablish turf that does not comply with requirements and continue maintenance until turf is satisfactory.

3.10 PESTICIDE APPLICATION

A. Apply pesticides and other chemical products and biological control agents in accordance with requirements of authorities having jurisdiction and manufacturer's written recommendations. Coordinate applications with Owner's operations and others in proximity to the Work. Notify Owner before each application is performed.

B. Post-Emergent Herbicides (Selective and Non-Selective): Apply only as necessary to treat already-germinated weeds and in accordance with manufacturer's written recommendations.

3.11 CLEANUP AND PROTECTION

A. Promptly remove soil and debris created by turf work from paved areas. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.

B. Erect temporary fencing or barricades and warning signs as required to protect newly planted areas from traffic. Maintain fencing and barricades throughout initial maintenance period and remove after plantings are established.

C. Remove nondegradable erosion-control measures after grass establishment period.

3.12 RESEEDING DURING THE FOLLOWING SPRING PLANTING SEASON

A. Apply over seeding at a rate of 2 lbs / 1,000 SF in accordance with Section 3.5 Seeding.

B. Reseed and mulch as required for new seed, all areas where satisfactory seeded turf has not been established. The contractor shall continue to provide:

1. Turf area preparation
2. Erosion control materials
3. Seeding
4. Turf maintenance including fertilizing and watering until all turf areas have been satisfactorily established.

END OF SECTION 329200

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SECTION 333000 – SANITARY SEWERAGE UTILITIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Work Included:

1. Sanitary sewerage drainage piping, fittings, accessories and bedding.
2. Connection of building sanitary sewerage system to municipal sewers.
3. Manholes, Cleanouts.

B. Related Sections include:

1. Section 310000 – Earthwork
2. Section 312319 – Dewatering
3. Section 315000 – Excavation

1.3 REFERENCES

A. AASHTO T180 - Moisture-Density Relations of Soils Using a 10-lb Rammer and an 18-in. Drop.

B. ANSI/ASTM D698 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures, Using 5.5 lb Rammer and 12" Drop.

C. ASTM C700 – Vitrified clay pipe, extra strength, standard strength and perforated.

D. ANSI/ASTM D1557 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10 lb Rammer and 18" Drop.

E. ANSI/ASTM D2321 - Recommended Practice for Underground Installation of Flexible Thermoplastic Sewer Pipe.

F. ANSI/ASTM D3034 - Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings, SDR 35 O-ring joint.

G. ASTM D2922 - Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).

H. ASTM D3017 - Test Methods for Moisture Content of Soil and Soil-Aggregate Mixtures.

1.4 DEFINITIONS

A. Bedding: Aggregate fill placed under and beside pipe, prior to subsequent backfill operations.

1.5 SUBMITTALS

A. Product Data: Provide data indicating pipe, pipe accessories; manholes, cleanouts, frames and lids, steps.

B. Manufacturer's Installation Instructions: Indicate special procedures required to install Products specified.

C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

1.6 PROJECT RECORD DOCUMENTS

A. Record location of pipe runs, connections, manholes, cleanouts, and invert elevations.

B. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.7 REGULATORY REQUIREMENTS

A. Conform to all applicable code for materials and installation of the Work of this section.

1.8 FIELD MEASUREMENTS

A. Verify that field measurements and elevations are as indicated.

1.9 COORDINATION

A. Coordinate the Work with termination of sanitary sewer termination point outside building, connection to municipal sewer utility service, and trenching.

PART 2 - PRODUCTS

2.1 SEWER PIPE MATERIALS

A. Plastic Pipe: ANSI/ASTM D3034, Type PSM, Polyvinyl Chloride (PVC) material; inside nominal diameter as indicated, bell and spigot style, O-ring joint end.

3.2 PREPARATION

A. Hand trim excavations to required elevations. Correct over excavation with fine aggregate.

B. Remove large stones or other hard matter which could damage pipe or impede consistent backfilling or compaction.

3.3 BEDDING

A. Excavate pipe trench in accordance with Section 310000 for work of this Section. Hand trim excavation for accurate placement of pipe to elevations indicated.

B. Place bedding material at trench bottom, level materials in continuous layer not exceeding 8" compacted depth, compacted in accordance with section 310000.

C. Maintain optimum moisture content of bedding material to attain required compaction density.

3.4 INSTALLATION – PIPE

A. Install pipe, fittings, and accessories in accordance with ASTM D2321 and manufacturer's instructions. Seal joints watertight.

B. Lay pipe to slope gradients noted on drawings; with maximum variation from true slope of 1/8" in 10 feet.

C. Install bedding at sides and over top of pipe to minimum compacted thickness of 12"; compacted in accordance with section 310000.

D. Refer to Section 310000 for trenching requirements. Do not displace or damage pipe when compacting.

E. Connect sanitary sewer outlet to municipal sewer system.

F. Install trace wire continuous over top of pipe. Coordinate with Section 312000.

3.5 INSTALLATION – MANHOLES

A. Form bottom of excavation clean and smooth to correct elevation.

B. Form and place cast-in-place concrete base pad, with provision for sanitary sewer pipe end sections.

C. Establish elevations and pipe inverts for inlets and outlets as indicated.

D. Mount lid and frame level in grout, secured to top cone section to elevation indicated.

E. Place precast concrete sections as indicated. Where manholes occur in pavements, set tops of frames and covers flush with finish surface. Elsewhere, set tops 3" above finish surface, unless otherwise indicated.

F. Install in accordance with ASTM C 891.

G. Provide rubber joint gasket complying with ASTM C 443 at joints of sections.

3.6 FIELD QUALITY CONTROL

A. Field inspection and testing will be performed under provisions of Division 1.

B. Request inspection prior to and immediately after placing bedding.

C. Compaction testing will be performed in accordance with ANSI/ASTM D698.

D. If tests indicate Work does not meet specified requirements, remove Work, replace and retest at no cost to Owner.

E. Pressure Test: Test in accordance with requirements of local authority.

F. Infiltration Test: Test in accordance with requirements of local authority.

G. Deflection Test: Test in accordance with requirements of local authority.

3.7 PROTECTION

A. Protect finished installation under provisions of Division 1.

B. Protect pipe and aggregate cover from damage or displacement until backfilling operation is in progress.

END OF SECTION 33 30 00

SECTION 334000 – STORM DRAINAGE UTILITIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. The work of this section shall include all construction of entire storm sewer system and storm water detention system including connections between the storm water system and the leaders to the building storm water down spouts, yard drains, drain tile and associated underground piping.

B. Related Sections include:

1. Section 310000 – Earthwork
2. Section 312319 – Dewatering
3. Section 315000 – Excavation

1.3 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

B. Product data for drainage materials and products.

C. Shop Drawings showing pipe sizes, special fittings, attachments, manholes, catch basins, castings, grates, underdrains, etc. Include details of underground detention structure, connections and special piping shapes and sizes as shown on the Contract Drawings.

1.4 QUALITY ASSURANCE

A. Environmental Compliance: Comply with applicable portions of local environmental agency regulations pertaining to storm sewerage systems.

B. Utility Compliance: Comply with local utility regulations and standards pertaining to storm water sewerage systems. Catch basins, manholes and inlets shall be installed in accordance with the plans, and shall be installed to proper plan elevation ±1/2 inch.

1.5 PROJECT CONDITIONS.

A. Site Information: Verify existing utility locations and cepths prior to starting work. Verify that storm sewerage system piping may be installed in compliance with reference standards.

B. Prior to installing run of pipes determine that existing utility lines have been removed.

C. Coordinate the work of this section with other site preparation work, such as tree clearing and earthwork.

PART 2 - PRODUCTS

2.1 CORRUGATED HIGH DENSITY POLYETHYLENE PIPE

A. Pipe manufactured for this specification shall comply with the requirements for test methods, dimensions, and markings found in AASHTO M252 Type S for 4" – 10" diameters or AASHTO M294 Type S for 12" – 60" diameters. As further defined and described in AASHTO M252 and AASHTO M294, the prescribed sizes of pipe are nominal inside diameters. Pipe diameter tolerance shall be 4.5 percent oversize and 1.5 percent undersize. Pipe lengths shall not be less than 99 percent of the manufactures stated length.

B. Four- through 10-inch (100 through 250 mm) pipe shal be silt tight and shall be Hancor Sure-Lok F477 or pre-approved equal. Pipe supplied shall be smooth Interior and Annular Exterior Corrugated High Density Polyethylene (HDPE) Pipe meeting the requirements of AASHTO M252, Type S. The pipe supplied shall be silt tight as defined in the joint performance requirements of this specification.

C. Twelve- through 60-inch (300 through 1500 mm) pipe shall be silt tight and shall be Hancor Sure-Lok F477 or pre-approved equal. Pipe supplied shall be smooth Interior and Annular Exterior Corrugated High Density Polyethylene (HDPE) Pipe meeting the requirements of AASHTO M294, Type S. The pipe supplied shal be silt tight as defined in the joint performance requirements of this specification.

D. Virgin material for 4"- 10" Pipe and fitting production shall meet the requirements of AASHTO M252.

E. Virgin material for 12"- 60" Pipe and fitting production shall meet the requirements of AASHTO M294 with the addition that it shall be a slow crack resistant material evaluated using the notched constant ligament-stress (NCLS) test according to the procedure described in AASHTO M294, Section 9.5. Average NCLS test specimens must exceed 24 hours with no test results less than 17 hours. The virgin material shall have a minimum 50-year tensile strength of 900 psi.

F. Joint Performance

1. Silt tight joints shall be bell-and-spigot meeting the silt tight requirements of AASHTO M252 or AASHTO M294. Silt tight joints shall meet a 2.0 psi (14kPa) laboratory test as further defined and described in the performance section of this specification. Gaskets shall be made of polyisoprene meeting the requirements of ASTM F477. Gaskets shall be installed by the pipe manufacturer and covered with a removable wrap to ensure the

gasket is free from debris. A joint lubricant supplied by the pipe manufacturer shall be used on the gasket and bell during assembly.

G. Fittings

1. Fittings shall conform to AASHTO M252 or AASHTO M294. Fabricated fittings shall be welded on the interior and exterior at all accessible junctions.

H. Acceptable Manufacturers

1. Manufacturer shall submit production lot testing logs, signed by an executive officer, to verify adequate quality assurance quality control system. In lieu of test logs, manufacturer shall have an ISO 9001/2000 Quality Lab and a quality control – quality assurance system based on ISO 9001:2000 standards and manufacturer shall be UL listed for quality systems on the ISO 9001:2000 quality systems certification.

I. Installation

1. Pipe installation shall be in accordance with Section 3 of this specification and the product manufacturer's published installation guiles.

2.2 CATCH BASINS

A. Standard Precast Concrete Catch Basins and Manholes

1. Standard Precast Concrete Catch Basins shall meet ASTM C478/C478M, and shall be manufactured with precast reinforced concrete. Minimum diameter shall be 48-inch or 24" x 24" square.
   a. Base section shall have a minimum floor slab thickness of 6 inches and shall have a minimum wall thickness of 4 inches. Wall and floor thickness of base section shall be as specified on project plans.
   b. Riser Sections shall have a minimum wall thickness of 4 inches and a minimum diameter of 48 inches. Lengths and depths shall be as specified on project plans.
   c. Top section shall consist of eccentric-cone type unless concentric-cone or flat-slab-top type is specified on project plans.
   d. Joint Sealant shall meet ASTM C990/C990M and shall be manufactured with bitumen or butyl rubber.
   e. As specified on project plans, reinforced concrete grade rings shall be used to adjust final grate elevation. Inside diameter of grade rings shall be same as inside diameter of top section.
   f. Steps shall consist of individual FRP steps, FRP ladder, or 1/2-inch steel reinforcing rods meeting ASTM A615/A615M encased in polypropylene meeting ASTM D4101. Steps shall be wide enough to allow worker to place both feet on one (1) step and designed to prevent lateral slippage off step. Steps shall be cast or anchored into sidewalls at 12- to 16-inch intervals. Steps shall be omitted if total depth from floor of catch basin to finished grade is less than 60 inches.
   g. Pipe connectors shall meet ASTM C923/C923M, shall be resilient and shall be sized for each pipe connecting to base section. Pipe connectors shall be fitted or cast into manhole walls.

A. For all stormwater and subsurface drainage piping, install green warning tape directly over pipe and at outside edges of underground structures.

1. Green warning tape or detectable warning tape shall be installed over ferrous piping.
2. Detectable warning tape shall be installed over nonferrous piping and over edges of underground structures

3.3 PIPE INSPECTION

A. General

1. Piping, fittings, and drainage structures shall be inspected prior to installation and any defective or damaged product shall be replaced.
2. All pipe shall be in new condition.

B. Corrugated HDPE Pipe and Fittings

1. Any pipe, fittings, or drainage structures with cuts, punctures, or other damage on the interior or exterior shall be rejected and replaced.
2. Any pipe, fittings or drainage structures with damaged ends or joints, which would prevent proper sealing of the joints, shall be rejected and replaced.

3.4 PIPING, FITTING, AND DRAINAGE STRUCTURE INSTALLATION

A. General

1. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground storm and drainage piping system, when determining location and arrangement of piping layout in the field, consider field conditions. Install piping system as indicated herein and as directed by the product manufacturer, to extent practical. Where specific installation procedure is not indicated, follow product manufacturer's written instructions.
2. All products shall be inspected for defects and cracks before being lowered into the trench, piece by piece. Any defective, damaged or unsound pipe, fitting or drainage structure or any product that has had its grade disturbed after laying, shall be taken up and replaced. Open ends shall be protected with a pipe plug to prevent earth or other material from entering the pipe during construction. The interior of the pipe shall be free from dirt, excess water and other foreign materials as the pipe laying progresses and left clean at the completion of the installation.
3. Install piping system beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions. Follow product manufacturer's instructions for the use of lubricants, cements, and other special installation requirements.
4. Use Manholes or Catch Basins for changes in direction, unless fittings are indicated. Use fittings for branch connections, unless direct tap into existing sewer is indicated.
5. Use proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited.

B. Trench Excavation

1. Excavation
   a. Excavate trenches to ensure that sides will be stable under all working conditions. Slope trench walls or provide supports in conformance with all local and national standards for safety. Open only as much trench as can be safely maintained by available equipment. Backfill all trenches as soon as practicable, but not later than the end of each working day.
   b. Where trench walls are stable or supported, provide a width sufficient, but no greater than necessary, to ensure working room to properly and safely place and compact haunching and other embedment materials. The space between the pipe and trench wall must be wider than the compaction equipment used in the pipe zone. Minimum width shall be not less than the greater of either the pipe outside diameter plus 16 in. or the pipe outside diameter times 1.25, plus 12 in. In addition to safety considerations, trench width in unsupported, unstable soils will depend on the size and stiffness of the pipe, stiffness of the embedment and in-situ soil, and depth of cover.
   c. When supports such as trench sheeting, trench jacks, trench shields or boxes are used, ensure that support of the pipe and its embedment is maintained throughout installation. Ensure that sheeting is sufficiently tight to prevent washing out of the trench wall from behind the sheeting. Provide tight support of trench walls below viaducts, existing utilities, or other obstructions that restrict driving of sheeting.
2. Dewatering
   a. Do not lay or embed pipe fittings or drainage structures in standing or running water. At all times, prevent runoff and surface water from entering the trench.
   b. When water is present in the work area, dewater to maintain stability of in-situ and imported materials. Maintain water level below pipe bedding and foundation to provide a stable trench bottom. Use, as appropriate, sump pumps, well points, deep wells, geofabrics, perforated under drains, or stone blankets of sufficient thickness to remove and control water is the trench. When excavating while depressing ground water, ensure the ground water is below the bottom of cut at all times to prevent washout from behind sheeting or sloughing of exposed trench walls. Maintain control of water in the trench before, during, and after pipe system installation and until embedment is installed and sufficient backfill has been placed to prevent flotation of the pipe, fitting, or drainage structures. To preclude loss of soil support, employ dewatering methods that minimize removal of fines and the creation of voids in in-situ materials.
3. Removal of Rock
   a. Rock in either ledge or boulder formation shall be replaced with suitable materials to provide a compacted earth cushion having a thickness between exposed rock and the pipe of at least 12 inches (0.3m). Where Bell-and-Spigot pipe is used, the cushion shall be maintained under the bell as well as under the straight portion of the pipe. Rock excavation shall be as specified and defined under section 02300 Earthwork.
4. Removal of Unstable Material
   a. Where wet or otherwise unstable soil incapable of properly supporting the pipe system, as determined by the Engineer, is encountered in the bottom of a trench,

h. Steps shall be installed in the manhole such that the worker will face on coming vehicular traffic.

B. Designed Precast Concrete Catch Basins and Manholes

1. Designed precast concrete catch basins shall meet ASTM C913 and shall be designed according to ASTM C890 for AASHTO HS-25, heavy-traffic, structural loading.
   a. Joint sealant shall meet ASTM C990/C990M and shall be manufactured with bitumen or butyl rubber.
   b. As specified on project plans, reinforced concrete grade rings shall be used to adjust final grate elevation. Inside diameter of grade rings shall be same as inside diameter of top of top section.
   c. Steps shall consist of individual FRP steps, FRP ladder, or 1/2 inch steel reinforcing rods meeting ASTM A615/A615M encased in polypropylene meeting ASTM D4101. Steps shall be wide enough to allow worker to place both feet on one (1) step and designed to prevent lateral slippage off step. Steps shall be cast or anchored into sidewalls at 12- to 16-inch intervals. Steps shall be omitted if total depth from floor of catch basin to finished grade is less than 60 inches.
   d. Pipe connectors shall meet ASTM C923/C923M, shall be resilient and shall be sized for each pipe connecting to base section. Pipe connectors shall be fitted or cast into manhole walls.
2. Catch Basin Frame and Grates
   a. Frames and grates shall be manufactured with grade 80-55-06 ductile iron meeting ASTM A536 as specified on project plans. Frames and grates shall be designed to accept H-25 and HS-25 live loads with a concrete collar installed under the frame.
   b. Grates shall be bicycle safe.

2.3 DRAIN TILE

A. Plastic Pipe

1. ANSI/ASTM D2751, SDR 35, Acrylonitrile-Butadiene-Styrene (ABS) material; inside nominal diameter of 4 inches, bell and spigot style solvent sealed joint end.
2. Fittings shall be same material as pipe molded or formed to suit pipe size and end design, in required tee, bends, elbows, cleanouts, reducers, traps and other configurations required.

PART 3 - EXECUTION

3.1 EARTHWORK

A. Excavation, trenching, and backfilling shall be as specified in Division 3 Section 310000 "Earthwork." Embankment and fill shall be compacted in place prior to trenching.

3.2 IDENTIFICATION

such material shall be removed to at least 24 inches below bottom of pipe and replaced to the proper grade with select granular material, compacted as directed by the engineer. When removal of unstable material is due to the fault or neglect of the Contractor while performing shoring and sheeting, water removal, or other specified requirements, such removal and replacement shall be performed at no additional cost to the Owner.

5. Bedding
   a. Stable and uniform bedding shall be provided for the pipe and any protruding features of its joint and/or fittings. The middle of the bedding, equal to one-third of the pipe outside diameter, shall be loosely placed while the remainder shall be compacted to a minimum of 90% of maximum density per AASHTO T99, or as shown in the plans. Pipe bedding shall be a minimum of 4" – 6" in thickness. The bedding surface for the pipe shall provide a firm foundation of uniform density throughout the entire length of the pipe.
6. Placing Pipe
   a. Each pipe shall be thoroughly examined before being laid; defective or damaged pipe shall not be used. Pipelines shall be laid to the grades and alignment indicated. Proper facilities shall be provided for lowering sections of pipe into trenches. Pipe shall not be laid in water, and the pipe shall not be laid when trench conditions or weather are unsuitable for such work. Diversion of drainage or dewatering of trenches shall be provided as directed by the engineer; see dewatering section.
7. Jointing
   a. Joints shall be constructed as described herein and in accordance with manufacturer's installation instructions.
   b. All Bell-and-Spigot pipe joints shall be thoroughly cleaned. Joint lubricant, supplied by the manufacturer, shall be liberally applied to entire interior of bell and gasket on spigot prior to assembly.
8. Backfilling
   a. General
      1) Backfill material, placement, and compaction shall be constructed in accordance with the specifications herein and the product manufacturer's published installation guides.
   b. Backfilling Pipe in Trenches
      1) After the pipe and pipe system have been properly bedded, selected material from excavation or borrow, at a moisture content that will facilitate compaction, shall be placed along both sides of pipe in layer depths to ensure minimum compaction density is obtained evenly throughout the backfill material. The backfill shall be brought up evenly on both sides of pipe and pipe system for the full length of pipe. The fill shall be thoroughly compacted under the haunches of the pipe. Each layer shall be thoroughly compacted with mechanical tampers or rammers. This method of filling and compacting shall continue until the fill has reached an elevation of at least 12 inches above the top of the pipe. The remainder of the trench shall be backfilled and compacted by spreading and rolling or compacted by

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PROJECT #: 2324
ISSUE:
BID SET 07-28-2025

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mechanical rammers or tampers in layers not exceeding 8 inches. Tests for density shall be made as necessary to ensure conformance to the compaction requirements specified below. Where it is necessary, in the opinion of the Engineer, that sheeting or portions of bracing used may be left in place. Untreated sheeting shall not be left in place bereath structures or pavements.

c. Backfilling Pipe in Fill Sections

1) For pipe placed in fill sections, fill shall be constructed to at least 12 inches above the top of proposed pipe prior to trench excavation. Fill shall be placed in 12-inch lifts and shall be compacted in accordance with section 310000. Once fill is placed and compacted pipe trench shall be constructed in accordance with the Trench Excavation section of this specification.

d. Movement of Construction Machinery

1) When compacting by rolling or operating heavy equipment parallel with the pipe, displacement of or injury to the pipe shall be avoided. Movement of construction machinery over a culvert or storm drain at any stage of construction shall be at the Contractor's risk. Any damaged pipe shall be repaired or replaced.

e. Compaction

1) General Requirements

a) Non-cohesive materials include gravels, gravel-sand mixtures, sands, and gravelly sands. Cohesive materials include clayey and silty gravels, gravel-silt mixtures, clayey and silty sands, sand-clay mixtures, silts, and very fine sands. When results of compaction tests for moisture-density relations are recorded on graphs, non-cohesive soils will show straight lines or reverse-shaped moisture-density curves, and cohesive soils will show normal moisture-density curves.

2) Minimum Density

a) Backfill over and around the pipe and backfill around and adjacent to drainage structures shall be compacted at the approved moisture content to the following applicable minimum density, which will be determined as specified below.

b) Under paved roads, streets, parking areas, and similar-use pavements including adjacent shoulder areas, all trench backfill shall be compacted #57 crushed aggregate up to the subgrade elevation. Recycled concrete or asphalt material is not acceptable for use.

3) Determination of Density

a) Testing shall be the responsibility of the Contractor and performed at no additional cost to the Owner. Testing shall be performed by an approved commercial testing laboratory or by the Contractor subject to approval by the Engineer. Tests shall be performed in sufficient number to ensure that specified density is being obtained. Laboratory tests for moisture-density relations shall be made in accordance with ASTM D1557 except that mechanical tampers shall be used provided the results are correlated with those obtained with the specified hand tamper. Field density tests shall be determined in accordance with

ASTM D2167 or ASTM D2922. When ASTM D2922 is used, the calibration curves shall be checked and adjusted, if necessary, using the sand cone method as described in the Calibration paragraph of the referenced publications. ASTM D2922 results in a wet unit weight of soil and when using this method ASTM D3017 shall be used to determine the moisture content of the soil. The calibration curves furnished with the moisture gauges shall be checked along with density calibration checks as described in ASTM D3017 or ASTM D2922. Test results shall be furnished to the Engineer. The calibration checks of both the density and moisture gauges shall be made at the beginning of a job on each different type of material encountered and at intervals as directed.

3.5 MANHOLE AND CATCH BASIN INSTALLATION

A. In addition to the piping, fitting, and drainage structure installation specifications, the following shall be considered for the installation of manholes and catch basins.

1. Manholes and catch basins shall be installed according to the manufacturer's written instructions.
2. Manholes and catch basins shall be installed complete with appurtenances and accessories indicated on the project plans.
3. Precast concrete manhole and catch basin sections shall be installed with gaskets according to ASTM C891.
4. Cast in place manholes shall be constructed as indicated on the project plans.
5. Tops of frames and covers shall be set flush with finished surface of manholes in paved areas.

3.6 FINAL INSPECTION

A. Upon completion of the work and before final acceptance by the Owner, the entire drainage system shall be subject to a final inspection in the presence of the Owner and Architect. The work shall not be considered as complete until all requirements for line, grade, cleanliness, and workmanship have been completed. The contractor shall provide an as-built survey of the storm sewer systems.

END OF SECTION 33 40 00

Plotted: Friday, October 10, 2025

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STRUCTURAL SPECIFICATIONS AND GENERAL NOTES

CODE

2017 OHIO BUILDING CODE / IBC 2015 / ASCE 7-10

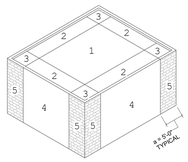
DESIGN CRITERIA

LIVE LOADS:	ROOF	=	20 PSF
	1ST FLOOR	=	100 PSF
SNOW LOAD:	GROUND SNOW LOAD, P_g	=	20 PSF
	FLAT ROOF SNOW LOAD (P_f)	=	20 PSF
	SNOW EXPOSURE FACTOR (C_e)	=	1.0
	SNOW LOAD IMPORTANCE FACTOR (I_s)	=	1.0
	THERMAL FACTOR (C_t)	=	1.0
	SLOPE FACTOR (C_s)	=	1.0
WIND LOAD:	ULTIMATE DESIGN WIND SPEED (V_{ult})	=	115 MPH
	NOMINAL WIND SPEED (V_{asd})	=	90 MPH
	RISK CATEGORY	=	II
	WIND EXPOSURE	=	C
	INTERNAL PRESSURE COEFFICIENT (GC_{pi})	=	±0.18

COMPONENTS & CLADDING (PSF): ASD LOADS

+ = TOWARDS STRUCTURE.
(-) = AWAY FROM STRUCTURE

AREA (SF)	10		50		200	
ZONE	+	(-)	+	(-)	+	(-)
1	14.7	-26.8	13.5	-25.6	13.0	-25.0
2	14.7	-40.6	13.5	-32.1	13.0	-28.5
3	14.7	-57.9	13.5	-37.3	13.0	-28.5
4	26.8	-28.5	24.6	-26.4	22.8	-24.5
5	26.8	-33.7	24.6	-29.4	22.8	-25.7



SEISMIC:

S_S = 0.158, S_1 = 0.057, S_{DS} = 0.168, S_{D1} = 0.091

SEISMIC SITE CLASS	=	D (ASSUMED)
SEISMIC DESIGN CATEGORY	=	B
IMPORTANCE FACTOR, I_E	=	1.0
RESPONSE MODIFICATION FACTOR	=	6.5
SEISMIC RESPONSE COEFFICIENT, C_S	=	0.024

SEISMIC BASE SHEAR, $V=W_E * C_S$
THE EQUIVALENT LATERAL FORCE PROCEDURE USED

OTHER LOADS 5 PSF INTERNAL PRESSURE FOR INTERIOR WALLS

FROST DEPTH = 3'-6"

GENERAL NOTES

CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE LATEST OHIO BUILDING CODE.

THE STRUCTURE IS DESIGNED TO BE SELF-SUPPORTING UPON COMPLETION. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO DETERMINE THE ERECTION PROCEDURE, ENSURING SAFETY FOR ALL INVOLVED AND THE STRUCTURAL INTEGRITY DURING CONSTRUCTION. THIS RESPONSIBILITY EXTENDS TO ANY NECESSARY TEMPORARY BRACING OR SHORING. CONTRACTOR-SUPPLIED TEMPORARY SUPPORTS MUST REMAIN IN PLACE UNTIL THEY'RE REPLACED WITH PERMANENT STRUCTURES. THE TEMPORARY SUPPORTS MUST BE DESIGNED BY THE CONTRACTOR'S ENGINEER, WHOM MUST BE A REGISTERED PROFESSIONAL ENGINEER IN THE PROJECT'S JURISDICTION.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE SAFETY OF WORK AREA. THE CONTRACTOR SHALL PROTECT ADJACENT PROPERTY FROM DAMAGE AND ENVIRONMENTAL EFFECTS.

THIS SET OF DRAWING IS BASED ON THE PRESUMPTION THAT ALL EXISTING CONSTRUCTION OR CONSTRUCTION PREVIOUSLY DONE ON THIS PROJECT OR PART OF THE EXISTING STRUCTURE IS FIELD VERIFIED, WHICH INCLUDES ALL DIMENSIONS AND CONDITIONS.

REFERENCE THE ARCHITECTURAL MECHANICAL, ELECTRICAL AND ANY OTHER RELEVANT TRADES FOR USE WITH THIS SET OF DRAWINGS.

ALL DIMENSIONAL DISCREPANCIES BETWEEN CONTRACT DOCUMENTS OR BETWEEN MANUFACTURE DETAILS AND THE DRAWINGS SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT OR ENGINEER PRIOR TO COMMENCEMENT OF WORK.

SHOP DRAWINGS AND DEFERRED STRUCTURAL SUBMITTALS

SHOP DRAWINGS REQUIRED BY THE PROJECT SPECIFICATIONS SHALL BE SUBMITTED TO THE ENGINEER / ARCHITECT FOR REVIEW PRIOR TO FABRICATION / PROCUREMENT. DRAWINGS ARE REVIEWED BY THE ENGINEER FOR GENERAL CONFORMANCE TO THE DESIGN PRIOR TO SUBMISSION TO THE BUILDING DEPARTMENT FOR REVIEW. REGARDLESS OF THE ENGINEER'S REVIEW, THE CONTRACTOR IS FULLY AND SOLELY RESPONSIBLE FOR COMPLETE AND SATISFACTORY SUBMITTAL AND CONFORMANCE TO THE CONTRACT DOCUMENTS. SHOP DRAWINGS WILL BE REJECTED FOR INCOMPLETENESS, LACK OF CALCULATIONS (IF REQUIRED) OR CHANGES WITHOUT PRE-APPROVAL. ALL STRUCTURAL CALCULATIONS AND DRAWINGS AS PART OF THE SHOP DRAWINGS SUBMITTAL SHALL BE SIGNED AND STAMPED BY A PROFESSIONAL ENGINEER REGISTERED IN OHIO. FOR RE-SUBMITTALS, ALL CHANGES FROM THE PRIOR SUBMITTAL SHALL BE TIGHTLY ENCLOSED BY A "CLOUD" SO AS TO INDICATE ONLY THOSE AREAS CHANGED.

DEFERRED SUBMITTALS SHALL INCLUDE: NONE

BUILDING PAD PREPARATION

ALL BUILDING PAD PREPARATION SHALL FOLLOW THE RECOMMENDATIONS OF THE GEOTECHNICAL REPORT (UNO).

ALL ORGANIC MATERIALS ENCOUNTERED, ORGANIC CONTAMINATED SOILS OR OTHERWISE DELETERIOUS IN ANYWAY ARE TO BE REMOVED FROM STRUCTURAL AREAS OF THE SITE.

SUBGRADE AREAS ARE TO BE PROOF ROLLED OR COMPACTED BY VIBRATION. AREAS TO SUPPORT FILL ARE TO BE COMPACTED AS WELL. NEW FILL SHALL BE PLACED IN 8" LIFTS AND COMPACTED AFTER EACH LIFT.

SUBGRADE AREAS THAT ARE UNSTABLE ARE TO BE REMOVED AND REPLACED WITH ENGINEERED FILL. UNSTABLE SUBGRADE'S THAT CANNOT BE STABILIZED BY CUT AND FILL, SHALL HAVE COARSE AGGREGATE ROLLED INTO THE SUBGRADE UNTIL A STIFF SUBGRADE REACTION IS ACHIEVED.

THE GEOTECHNICAL ENGINEER SHALL DETERMINE ALL IMPORTED MATERIAL THAT CAN BE USED FOR ENGINEERED FILL. ALL FILL MATERIAL SHALL BE APPROVED BY THE GEOTECHNICAL ENGINEER.

SLAB ON GRADE: MINIMUM OF 95% MAXIMUM DENSITY BY ASTM D698.
FOOTINGS BEARING ON FILL: MINIMUM OF 98% MAXIMUM DENSITY BY ASTM D698.

THE EARTHWORK PROGRAM SHALL BE CONDUCTED UNDER THE SUPERVISION OF A SOILS TESTING LABORATORY. THE IN-PLACE DENSITIES ACHIEVED ARE TO BE VERIFIED BY TESTS.

FOUNDATIONS

ALLOWABLE SOIL BEARING PRESSURE = 1500 PSF (PRESUMED)

IT IS THE CONTRACTORS' RESPONSIBILITY TO SCARIFY ALL TOPSOIL AND DETERMINE EXCAVATION DEPTH. INSPECT THE SUBGRADE, APPROVE FILL, VERIFY COMPACTION AND VERIFY PRESUMED BEARING CAPACITY.

FOUNDATIONS SHALL BE PLACED IMMEDIATELY FOLLOWING EXCAVATION AND INSPECTION. LONG TERM EXPOSURE AND INUNDATION OF BEARING SURFACES CAN CAUSE LOSS OF BEARING RESISTANCE AND SHALL BE AVOIDED.

ALL FILL MATERIALS SHALL BE CLEAN, ORGANIC FREE, DRY, NATIVE TO THE SITE (UNLESS DIRECTED OTHERWISE BY A GEOTECHNICAL ENGINEER) AND FREE OF ALL OTHER DELETERIOUS MATERIAL.

NOTIFY ENGINEER OF ANY UNUSUAL SOIL CONDITIONS. IF ADVERSE SOIL CONDITIONS ARE ENCOUNTERED, A SOILS INVESTIGATION REPORT MAY BE REQUIRED.

A SOILS INVESTIGATION REPORT WILL BE REQUIRED, IF SOIL CANNOT BE STABILIZED BY CUT AND FILL OR REINFORCEMENT AS DESCRIBED ABOVE.

CONCRETE

ALL CONCRETE CONSTRUCTION SHALL CONFORM TO ACI 301, "SPECIFICATIONS FOR STRUCTURAL CONCRETE", ACI 305.1, AND ACI 306.1 UNLESS NOTED OTHERWISE.

ALL DETAILING, FABRICATION AND PLACING OF REINFORCING BARS, UNLESS OTHERWISE NOTED, SHALL CONFORM TO ACI 318, "BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE", ACI 117, AND THE ACI DETAILING MANUAL.

CONCRETE MIXES: (MINIMUM COMPRESSIVE STRENGTH)

a. ALL CONCRETE 4,000 PSI

ALL EXTERIOR EXPOSED CONCRETE SHALL HAVE 6% +/-1% AIR ENTRAPMENT.

ALL CEMENT SHALL BE TYPE I PORTLAND CEMENT PER ASTM C150. USE ONE BRAND OF CEMENT THROUGHOUT PROJECT.

GROUND GRANULATED BLAST FURNACE SLAG IS NOT PERMITTED EXCEPT IN FOOTING MIXES THAT ARE NOT VISIBLE.

CALCIUM CHLORIDE SHALL NOT BE PERMITTED, NOR SHALL ANY ADMIXTURE CONTAINING CALCIUM CHLORIDE BE PERMITTED.

FLY ASH IS PERMITTED AND SHALL CONFORM TO ASTM C618 TYPE C OR F, BUT SHALL NOT EXCEED 15% OF CEMENTITIOUS CONTENT BY WEIGHT AND SHALL BE INCLUDED IN THE WATER-TO-CEMENT RATIO. IF FLY ASH IS USED, THE MIX DESIGN SUBMITTALS SHALL HAVE TESTS USING THE SAME AMOUNT OF FLY ASH.

CONCRETE USED FOR FLOORS SHALL HAVE 1800 PSI, 3 DAY STRENGTH, MIXES TO BE PUMPED SHALL BE SO IDENTIFIED ON THE MIX DESIGN SUBMITTAL. ALL PUMPED MIXES SHALL HAVE A MID-RANGE OR HIGH-RANGE WATER REDUCER.

ALL ADMIXTURES OTHER THAN SUPERPLASTICIZERS SHALL BE ADDED AT THE BATCH PLANT. SUPERPLASTICIZERS, DESIGNED FOR ADDITION TO THE MIX AT THE PLANT, MAY BE ADDED AT THE BATCH PLANT WITH VERIFICATIONS FROM THE STRUCTURAL ENGINEER AND VERIFICATIONS THAT THE WATER-TO-CEMENT RATIO HAS NOT BEEN EXCEEDED. SUPERPLASTICIZERS ADDED AT THE SITE SHALL BE SENT IN PRE-MEASURED CONTAINERS FROM THE BATCH PLANT.

ALL CONCRETE SLABS, PLACED AT TEMPERATURE BELOW 50°F SHALL CONTAIN THE SPECIFIED NON-CORROSIVE, NON-CHLORIDE ACCELERATOR. ALL CONCRETE PLACED AT AIR TEMPERATURE ABOVE 80° SHALL CONTAIN SPECIFIED WATER-REDUCING/RETARDER ADMIXTURE.

ALL PIPE SLEEVE OPENINGS THROUGH CONCRETE SLABS SHALL BE FORMED WITH STANDARD STEEL PIPE.

ALL WATER MUST BE ADDED AT THE BATCH PLANT AND CONCRETE SHALL BE DISCHARGED AT THE SITE WITHIN 1 1/2 HOURS AFTER WATER HAS BEEN ADDED TO THE CEMENT. SLUMP MAY BE ADJUSTED ONLY THROUGH THE USE OF ADDITIONAL WATER REDUCING ADMIXTURE.

CONCRETE SHALL BE PLACED WITHOUT HORIZONTAL CONSTRUCTION JOINTS, EXCEPT WHERE SPECIFICALLY NOTED. HORIZONTAL REINFORCEMENT SHALL BE CONTINUOUS THROUGH VERTICAL CONSTRUCTION JOINTS.

ALL EXPOSED EDGES OF CONCRETE MEMBERS SHALL BE CHAMFERED 3/4" UNLESS SHOWN OTHERWISE ON ARCHITECTURAL DRAWINGS.

REINFORCING BARS SHALL CONFORM TO ASTM A615, GRADE 60.

REINFORCING BARS FOR WELDING SHALL CONFORM TO ASTM A706, 60 KSI YIELD STRENGTH. NOTED AS: DEFORMED BAR ANCHORS (DBA).

WELDED WIRE FABRIC REINFORCING SHALL CONFORM TO ASTM A1064 AND BE FURNISHED IN FLAT SHEETS AND INSTALLED ON CHAIRS.

ALL HOOKS SHOWN ON DRAWINGS SHALL BE STANDARD HOOKS UNLESS OTHERWISE NOTED.

WHERE CONTINUOUS BARS ARE CALLED FOR, THEY SHALL RUN CONTINUOUSLY AROUND CORNERS AND BE LAPPED AT SPLICES.

MINIMUM LAP SPLICE AND ANCHORAGE DIMENSION TABLE

TOP BARS			OTHER BARS		
BAR SIZE	LAP	ANCHORAGE	BAR SIZE	LAP	ANCHORAGE
#4	37"	29"	#4	29"	22"
#5	47"	36"	#5	36"	28"

WHEN LAPPING TWO DIFFERENT SIZE BARS, USE THE LAP DIMENSION OF THE SMALLER BAR OR THE ANCHORAGE DIMENSION OF THE LARGER BAR.

MINIMUM CONCRETE COVER FOR REINFORCING UNLESS NOTED OTHERWISE, CONCRETE REINFORCING SHALL BE PLACED WITH PROPER COVER TO PROVIDE PROTECTION IN ACCORDANCE WITH ACI 318, AND WITHIN DEVIATION TOLERANCES LISTED IN ACI 117.

MASONRY

MASONRY SHALL CONFORM TO "BUILDING CODE REQUIREMENTS FOR MASONRY STRUCTURES" (ACI 530/ASCE 5/TMS 402) AND "SPECIFICATION FOR MASONRY STRUCTURES" (ACI 530.1/ASCE 6/TMS 602).

BRICK AND CONCRETE MASONRY CONSTRUCTION SHALL COMPLY WITH THE RECOMMENDATIONS OF THE BRICK INDUSTRY ASSOCIATION (BIA) AND THE NATIONAL CONCRETE MASONRY ASSOCIATION (NCMA) AND MINIMUM REQUIREMENTS ESTABLISHED IN THE APPLICABLE BUILDING CODE.

MASONRY SHALL HAVE A COMPRESSIVE STRENGTH OF F'_M = 1,500 PSI BASED ON UNIT STRENGTH METHOD, UNLESS OTHERWISE NOTED.

CONCRETE MASONRY UNITS SHALL CONFORM TO ASTM C90.

MORTAR FOR STRUCTURAL MASONRY SHALL BE TYPE S, CONFORMING TO ASTM C270 , AND BE EITHER PORTLAND CEMENT, HYDRATED LIME, OR MORTAR CEMENT.
MASONRY CEMENT MORTAR IS NOT ACCEPTABLE FOR STRUCTURAL MASONRY.

GROUT TO FILL CORES SHALL BE ASTM C476, COARSE GROUT (3/8" MAXIMUM AGGREGATE) WITH A MINIMUM COMPRESSIVE STRENGTH OF 2500 PSI IN 28 DAYS.

REINFORCING BARS SHALL CONFORM TO ASTM A615, GRADE 60.

DEFORMED BAR ANCHORS SHALL CONFORM TO ASTM A496, 70 KSI YIELD STRENGTH.

CONCRETE MASONRY UNITS SHALL HAVE 9 GA GALVANIZED HORIZONTAL JOINT REINFORCEMENT AT 16" OC (LADDER OR TRUSS). LAP 8" MINIMUM.

CORES WITH REINFORCEMENT SHALL BE FILLED WITH GROUT AND CONSOLIDATED IN PLACE BY VIBRATION.

PLACE REINFORCING BARS BEFORE GROUTING. PROPERLY SECURE REINFORCING BARS AT 4'-0" ON CENTER VERTICALLY TO MAINTAIN THE POSITIONS INDICATED ON THE DRAWINGS. BARS TO BE LOCATED IN CENTER OF CELLS UNLESS OTHERWISE NOTED.

MORTAR PROTRUSIONS, EXTENDING INTO CELLS TO BE REINFORCED, SHALL BE REMOVED.

LAY MASONRY UNITS WITH FULL MORTAR COVERAGE ON HORIZONTAL AND VERTICAL FACE SHELLS. BED WEBS IN MORTAR IN STARTING COURSE ON FOOTING AND IN ALL COURSES OF COLUMNS, AND AT CELLS TO BE REINFORCED..

PROVIDE 16" OF SOLID MASONRY UNDER WALL BEARING BEAMS AND JOIST GIRDERS UNLESS NOTED OTHERWISE.

CORNERS TO BE TIED BY MASONRY BOND.

GROUT CORES SOLID ONE COURSE BELOW ANY CHANGE IN WALL THICKNESS.

CMU SHALL BE TEMPORARILY BRACED DURING CONSTRUCTION IN ACCORDANCE WITH THE GOVERNING BUILDING CODE FOR LATERAL DESIGN LOADS UNTIL PERMANENT RESTRAINTS HAVE BEEN INSTALLED. TEMPORARY BRACING IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR IS RESPONSIBLE FOR ALL COSTS ASSOCIATED WITH REPAIRS RESULTING FROM IMPROPER OR INSUFFICIENT BRACING.

STRUCTURAL STEEL

DETAILING, FABRICATION, AND ERECTION SHALL CONFORM TO THE LATEST EDITION AS REFERENCED BY THE APPLICABLE BUILDING CODE, OF THE AISC 'STEEL CONSTRUCTION MANUAL' AND AISC 360 'SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS', HEREIN REFERRED TO AS 'AISC MANUAL' AND 'AISC SPECIFICATION'.

PLATES, ANGLES, CHANNELS	=	A36	(Fy=36 KSI)
WIDE FLANGE SHAPES	=	A992 GR. 50	(Fy=50 KSI)
TUBES	=	A500 GR. B	(Fy=46 KSI)
PIPES	=	A53 GR. B	(Fy=35 KSI)

ALL ANCHOR RODS SHALL BE ASTM F1554 GRADE 36, UNO.

ALL STRUCTURAL STEEL SHALL BE PRIMED GRAY, UNO.

ALL COLUMN BASE PLATES SHALL HAVE A MINIMUM OF FOUR ANCHOR RODS PER O.S.H.A.

STRUCTURAL STEEL CONNECTIONS SHOWN HERE ARE SCHEMATIC. THEY ARE INTENDED TO SHOW THE GEOMETRICAL RELATIONSHIPS OF MEMBERS IN ORDER TO MAKE A POSSIBLE CONNECTION. ANY DETAILS COMMITTED OR NOT FINISHED ARE TO BE DETAILED BY THE FABRICATOR AND DESIGNED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE THE PROJECT IS LOCATED.

CONNECTIONS DETAILED IN THE CONTRACT DRAWINGS MAY NOT BE ALTERED WITHOUT APPROVAL BY THE ENGINEER. WHERE APPROVED, ALTERED CONNECTIONS SHALL BE DETAILED BY THE FABRICATOR'S ENGINEER CLEARLY ON THE SHOP DRAWINGS.

CHANGES BY THE FABRICATOR THAT IMPACT THE ARCHITECTURAL CONCEPT WILL BE REJECTED, HOWEVER A REQUEST CAN BE MADE FOR REVIEW.

IF BEAM OR COLUMN CONNECTION REACTIONS ARE OMITTED FROM THE DRAWING THE CONNECTION SHALL BE DESIGNED FOR THE FULL STRENGTH OF THE BEAM PER THE AISC MANUAL.

ALL WELDING SHALL BE DONE USING E-70XX ELECTRODES IN ACCORDANCE WITH THE LATEST AWS SPECIFICATIONS.

GENERAL CONTRACTOR SHALL VERIFY ALL STRUCTURAL BEAM LOCATIONS, MECHANICAL UNIT WEIGHTS AND OPENING SIZES AND LOCATIONS WITH MECHANICAL CONTRACTOR AND VENDOR'S DRAWINGS FOR ACTUAL MECHANICAL UNIT PURCHASED. PROVIDE L4x4x¼" DECK SUPPORT ANGLES AT ALL DECK OPENINGS GREATER THAN 1'-0" X 1'-0".

SPLICING OF STRUCTURAL MEMBERS WHERE NOT DETAILED ON THE DRAWINGS IS PROHIBITED WITHOUT PRIOR APPROVAL OF THE STRUCTURAL ENGINEER.

HSS SHAPES (ROUND, SQUARE, RECTANGULAR, ETC.) ARE TO HAVE A 1/4" CAP PLATE AT EXPOSED ENDS. CAP PLATES TO BE SEAL WELDED ALL AROUND, UNO. PROVIDE 3/8"Ø WEEP HOLES IN THE CENTER OF BASE PLATES.

ANY MEMBER SIZES SHOWN ON THE PLANS, AND CURRENTLY LISTED IN THE AISC STEEL MANUAL, WHICH ARE NOT CURRENTLY AVAILABLE MUST BE BROUGHT TO THE ARCHITECT'S AND STRUCTURAL ENGINEER'S ATTENTION PRIOR TO AWARD OF STEEL CONTRACT. NO CLAIM FOR ADDITIONAL COST WILL BE ACCEPTED AFTER THE AWARD, FOR MEMBER/BUILT UP MEMBER SUBSTITUTIONS FOR THESE SIZES.

ALL SUPPLEMENTAL STEEL REQUIRED FOR ROOF UNITS AND ROOF OPENINGS OVER 12"X12" TO BE SUPPLIED BY STRUCTURAL STEEL FABRICATOR AND BE COORDINATED BY GENERAL CONTRACTOR WITH THE JOIST FABRICATOR, MECHANICAL DRAWINGS AND MECHANICAL EQUIPMENT SUPPLIER.

EXTERIOR EXPOSED SURFACES OF MASONRY LINTELS SHALL BE HOT DIP GALVANIZE PER ASTM A123.

COLD-FORMED METAL FRAMING

THE DESIGN, INSTALLATION AND CONSTRUCTION OF COLD-FORMED CARBON, STRUCTURAL AND NONSTRUCTURAL EXTERIOR STEEL FRAMING, SHALL BE IN ACCORDANCE WITH "THE STANDARD FOR COLD-FORMED STEEL FRAMING-GENERAL PROVISIONS, AMERICAN IRON AND STEEL INSTITUTE" (AISI).

DESIGN OF COLD-FORMED METAL STUD FRAMING SHOWN IS BASED ON SSMA STUDS WITH SECTION PROPERTIES AND ALLOWABLE RESISTING MOMENT CAPACITIES AS DEFINED IN AISI MANUAL, COLD-FORMED STEEL DESIGN.

FRAMING MEMBERS 16 GA. AND HEAVIER SHALL BE HAVE A MINIMUM YIELD STRENGTH OF 50 KSI. OTHER FRAMING SHALL HAVE A MINIMUM YIELD STRENGTH OF 33 KSI.

FRAMING SHALL GALVANIZED WITH A G60 COATING UNLESS IN CONTACT WITH MASONRY OR CONCRETE AND THEN SHALL HAVE A G90 COATING.

CONNECTIONS SHALL BE SCREWED, UNO.

MEMBER WEB OPENINGS TO BE PLACED AT LEAST 10" AWAY FROM CONNECTIONS.

CONTRACTOR SHALL SUBMIT FABRICATION AND ERECTION SHOP DRAWINGS TO THE ENGINEER FOR REVIEW OF COLD-FORMED METAL FRAMING COMPONENTS AND CONNECTIONS INDICATED ON THE CONTRACT DRAWINGS. ANY DEVIATION FROM COLD-FORMED METAL FRAMING LAYOUT AND ARRANGEMENT SHOWN ON THE ARCHITECTURAL AND STRUCTURAL DRAWINGS SHALL BE APPROVED BY THE ARCHITECT/ENGINEER AND ADDITIONAL REVIEW COSTS SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.

FRAMING COMPONENTS AND CONNECTIONS NOT SPECIFICALLY DETAILED ON THE DRAWINGS ARE TO HAVE SHOP DRAWINGS AND CALCULATIONS STAMPED BY AN ENGINEER REGISTERED IN THE STATE WHERE THE PROJECT LOCATED, SUBMITTED FOR REVIEW.

SCREWS TO BE GRADE 5, EQUAL OR BETTER, UNO. SPACE SCREWS WITH ½" MINIMUM SPACE BETWEEN SCREWS. AT WOOD MEMBERS, SCREWS ARE TO BE EMBEDDED 1½" MINIMUM.

POWER ACTUATED FASTENERS ARE PERMITTED AT CFS TO STEEL CONNECTIONS OR CFS TO CONCRETE. POWDER ACTUATED FASTENER (PAF) SHALL BE TYPE X-U BY HILTI OR APPROVED EQUAL. MINIMUM SHANK DIAMETER 0.157" WITH MINIMUM 1" EMBEDMENT IN CONCRETE.

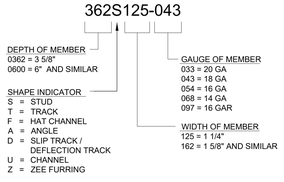
STUD TO STUD OR TRACK CONNECTIONS REQUIRE 1-#10 SCREW ON PER FLANGE.

TRACK TO STRUCTURAL MEMBER CONNECTIONS REQUIRE 2-#12 SCREWS (OR PAF) PER STUD OR JOIST, UNO.

CUT MEMBERS SQUARELY FOR ATTACHMENT TO PERPENDICULAR MEMBERS OR SLOPE CUT FOR A TIGHT FIT AGAINST SLOPING MEMBERS.

TORCH CUTTING IS NOT PERMITTED.

DO NOT CUT OR SPLICE MEMBERS UNLESS INDICATED BY THESE DRAWINGS.



COLD FORMED STEEL STUD/TRACK NOMENCLATURE

WOOD FRAMING

DETAIL, FABRICATE AND ERECT STRUCTURAL WOOD IN ACCORDANCE WITH THE LATEST VERSION OF THE OHIO BUILDING CODE, NDS (NATIONAL DESIGN SPECIFICATION), ANSI / AWC WFCM (WOOD FRAMED CONSTRUCTION MANUAL). AITC (AMERICAN INSTITUTE OF TIMBER CONSTRUCTION) AND THE LOCAL JURISDICTION HAVING AUTHORITY AND THESE DRAWINGS.

STRESS GRADE OF CONVENTIONAL LUMBER SHALL BE AS FOLLOWS VALUES:
IN ACCORDANCE WITH THE NATIONAL DESIGN SPECIFICATION FOR WOOD CONSTRUCTION.

SPRUCE PINE FIR (SPF):

GRADE:		
No. 2 OR BETTER	BENDING	F_b = 875 psi
	TENSILE	F_t = 450 psi
	SHEAR	F_v = 135 psi
	COMPRESSIVE (⊥ TO GRAIN)	F_c = 425 psi
	COMPRESSIVE (" TO GRAIN)	F_c = 1,150 psi
	MODULUS OF ELASTICITY	E = 1,400 ksi
	MOISTURE CONTENT	19% MAX

MAXIMUM MOISTURE CONTENT FOR ALL WOOD STRUCTURAL MEMBERS SHALL NOT EXCEED 19%

WOOD MEMBERS SHALL BE SPRUCE PINE FIR PER NDS, VISUALLY GRADED DIMENSION LUMBER, UNLESS NOTED OTHERWISE. ALL LUMBER SHALL BEAR THE GRADE STAMP OF AN APPROVED TESTING AGENCY, EXCEPT EXPOSED LUMBER AT VISIBLE AREAS.

FRAMING CONNECTIONS SHALL BE MANUFACTURED BY SIMPSON AND SHALL MEET THE REQUIREMENTS OF THESE DRAWINGS. ALL SUBSTITUTIONS OR OTHERWISE NOT SPECIFICALLY DETAILED, HERE, MUST BE SUBMITTED TO ARCHITECT FOR REVIEW AND APPROVAL. LUMBER SUPPLIER TO FURNISH APPROPRIATE CONNECTIONS AS SPECIFIED HEREIN.

ALL FRAMING CONNECTIONS SHALL BE HOT DIPPED GALVANIZED STEEL UNLESS NOTED OTHER WISE WITHIN THESE DRAWINGS. BOLT HOLES SHALL BE 1/16" GREATER THAN THE BOLT DIAMETER AND WASHERS ARE REQUIRED ON ALL FAYING SURFACES IN CONTACT WITH WOOD. (BOTH SIDES)

ALL EXTERIOR EXPOSED LUMBER, INCLUSIVE OF LUMBER EXPOSED TO EARTH, SHALL BE CONSTRUCTED USING PRESSURE TREATED LUMBER AND MUST MEET THE ENVIRONMENTAL REQUIREMENTS OF THE LOCAL JURISDICTION HAVING AUTHORITY.

FASTENERS IN CONTACT WITH PRESSURE TREATED LUMBER OR FIRE RETARDANT LUMBER MUST BE APPROVED FOR USE WITH PRESSURE TREATED LUMBER BY THE MANUFACTURE OR BE GALVANIZED OR STAINLESS STEEL (300 SERIES).

WOOD MAY SHRINK AFTER CONSTRUCTION IS COMPLETED. THE CONTRACTOR IS FULLY RESPONSIBLE FOR WOOD SHRINKAGE ISSUE AND IS REQUIRED TO BRING UP ANY POTENTIAL OR PROBABLE ISSUES WITH THE ENGINEER. NAILS ARE TO BE COMMON AND THE SCHEDULE OF NAILS PER CONNECTION SHALL MEET THE OHIO RESIDENTIAL BUILDING CODE PRESCRIPTIVE REQUIREMENTS OR THE AWC WFCM SPECIFICATIONS.

ALL BOLTS IN WOOD SHALL BE HOT DIPPED GALVANIZED AND BE CONSTRUCTED OF ASTM A307 MATERIAL.

STATEMENT OF SPECIAL INSPECTION

SPECIAL INSPECTION SHALL CONFORM TO THE 2015 IBC, CHAPTER 17 AND ANY ADDITIONAL LOCAL JURISDICTIONAL REQUIREMENTS.

THE SPECIAL INSPECTOR SHALL BE HIRED BY THE OWNER.

THE SPECIAL INSPECTOR MAY BE A LICENSED ENGINEER APPROVED TO PERFORM THE WORK OR A TEST AGENCY WITH INSPECTORS UNDER THE DIRECT SUPERVISION OF A REGISTERED ENGINEER IN THE STATE OF OHIO.

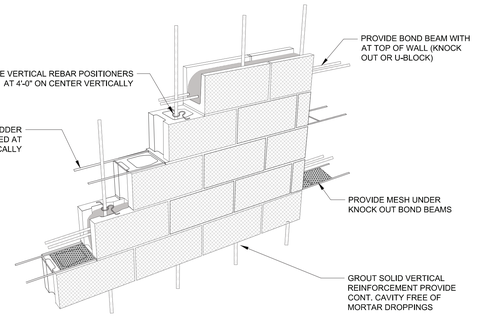
THE SPECIAL INSPECTOR SHALL OBSERVE THE WORK ASSIGNED FOR CONFORMANCE WITH THE SEALED DRAWINGS AND SPECIFICATIONS AND FURNISH REPORTS TO THE BUILDING OFFICIAL, THE ENGINEER OF RECORD, THE CONTRACTOR AND ANY OTHER DESIGNATED PERSON OR GROUP.

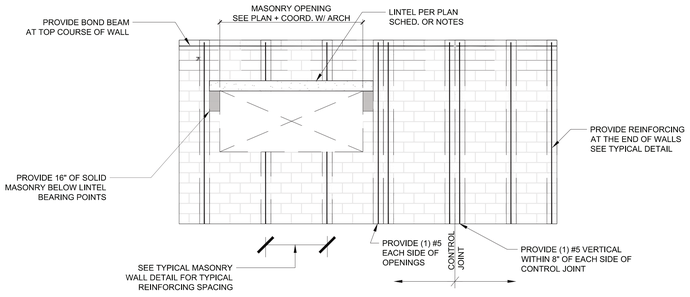
ALL DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE CONTRACTOR FOR CORRECTION, THEN, IF UNCORRECTED, TO THE PROPER CONSTRUCTION AUTHORITY AND TO THE BUILDING OFFICIAL.

THE SPECIAL INSPECTOR SHALL SUBMIT A FINAL SIGNED REPORT THAT SHALL COMPLY WITH THE REQUIREMENTS OF IBC CHAPTER 17, STATING WHETHER THE WORK REQUIRING SPECIAL INSPECTION WAS IN CONFORMANCE WITH THE APPROVED PLANS, SPECIFICATIONS AND THE BUILDING CODE.

SPECIAL INSPECTION SCHEDULE
IBC 2015

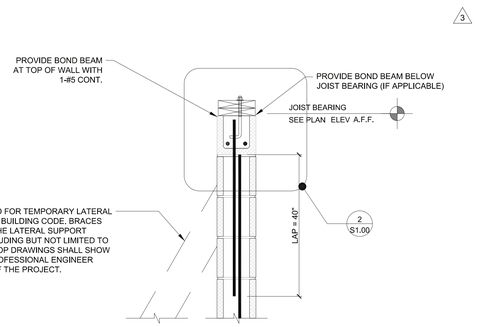
REQ	ITEM TO BE INSPECTED	CONTINUOUS	PERIODIC	STANDARDS
	INSPECTION OF FABRICATORS			IBC 1704.2.5
	STEEL CONSTRUCTION			IBC 1705.2
	MATERIALS			
	WELDING			AWS D1.1
	STEEL FRAME DETAILS			AISC 360
	HIGH-STRENGTH BOLTS			AISC 360 / RCSC
	STRUCTURAL STEEL			IBC 1705.2.1 AISC 360
	COLD-FORMED STEEL DECK			IBC 1705.2.2 SDI QA/QC
	STEEL JOISTS & JOIST GIRDERS			IBC 1705.2.3
	CONCRETE CONSTRUCTION			IBC TBL 1705.3
	REINFORCING STEEL			
	CONC PLACEMENT			
	DESIGN MIX VERIFICATION			
	SAMPLING & STRENGTH TESTS			
X	ANCHOR BOLTS/ EMBEDS		X	
X	POST INSTALLED ANCHOR BOLTS		X	IBC 1704.13
	MASONRY CONSTRUCTION			IBC 1705.4 TMS 402 & 602
	ESSENTIAL FACILITY - LEVEL 1			
	NONESSENTIAL FACILITY - LEVEL 1			
	ESSENTIAL FACILITY- LEVEL 2			
	WOOD CONSTRUCTION			IBC 1705.5
	HIGH LOAD DIAPHRAGMS			IBC 1705.5.1
	METAL-PL-CONNECTED WOOD TRUSSES			
	SOILS			IBC TBL 1705.6
	SITE PREPARATION			
	IN-PLACE DENSITY			
	FILL PLACEMENT			
	ALLOWABLE BEARING CAPACITY 1500 PSF			
	DEEP FOUNDATION ELEMENTS			IBC TBL 1705.7 + 1705.8
	WIND RESISTANCE			IBC 1705.11
	[IF EXP. B, V_{ASD}> 120 MPH OR EXP. C OR D, V_{ASD}> 110 MPH]			
	STRUCTURAL WOOD			IBC 1705.11.1
	COLD-FORMED STEEL LIGHT-FRAME CONSTRUCTION			IBC 1705.11.2
	WIND-RESISTING COMPONENTS			IBC 1705.11.3
	SEISMIC DESIGN			IBC 1705.12
	SEISMIC-FORCE-RESISTING SYSTEMS			IBC 1705.12.1
	STRUCTURAL STEEL			IBC 1705.12.2
	STRUCTURAL WOOD			IBC 1705.12.3
	COLD-FORMED STEEL FRAMING			IBC 1705.12.4
	ARCHITECTURAL COMPONENTS			IBC 1705.12.5
	SUSPENDED CEILINGS			
	MEP COMPONENTS			IBC 1705.12.6
	STORAGE RACKS			IBC 1705.12.7
	SEISMICALLY ISOLATED SYSTEMS			IBC 1705.12.8
	SPRAY FIRE-RESISTANT MATERIALS			IBC 1705.14
	FIRE-RESISTANT COATINGS			IBC 1705.15
	E

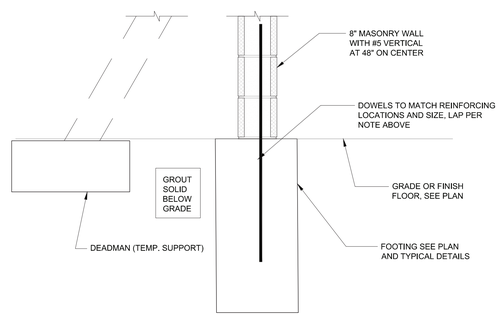




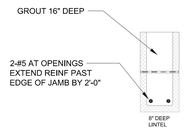
MASONRY WALL NOTES:

1. GROUT TO BE PLACED IN POURS AND LIFTS NOT TO EXCEED 5 FT. CONSOLIDATE LIFTS OVER 12" USING MECHANICAL VIBRATION.
2. PROVIDE CONTROL JOINTS IN ALL MASONRY WALLS AS INDICATED ON PLAN AND AT A SPACING NOT TO EXCEED 24 FT ON CENTER OR 3 TIMES THE STORY HEIGHT OF THE WALL. (WHICHEVER IS LESS). ADDITIONAL CONTROL JOINTS ARE REQUIRED AT CHANGES IN WALL HEIGHT, CHANGE IN WALL THICKNESS, AT CORNERS, AT INTERSECTIONS AND TRANSITIONS FROM INTERIOR TO EXTERIOR.

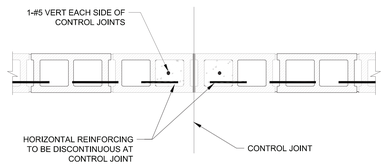




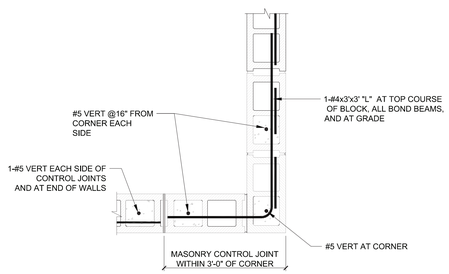
3 - MASONRY WALL SECTION
SCALE: 1"=1'-0"



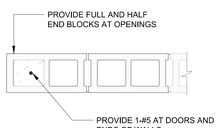
MASONARY LINTEL DETAIL
SCALE: 1"=1'-0"



MASONRY CONTROL JOINT DETAIL
SCALE: 1"=1'-0"



MASONRY CORNER PLAN DETAIL
SCALE: 1"=1'-0"



MASONRY ENDS AND JAMB DETAIL
SCALE: 1"=1'-0"

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BATH TOWNSHIP

NORTH FORK PRESERVE RENOVATION
4400 EVERETT ROAD, AKRON, OH 44333

PROJECT # 2324

ISSUE:

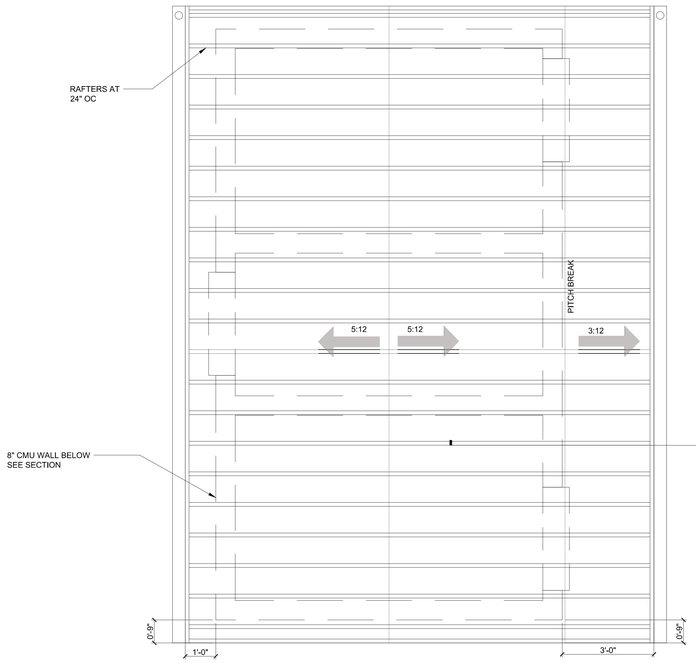
BID SET	07-28-2025

SECTIONS AND DETAILS

S3.01

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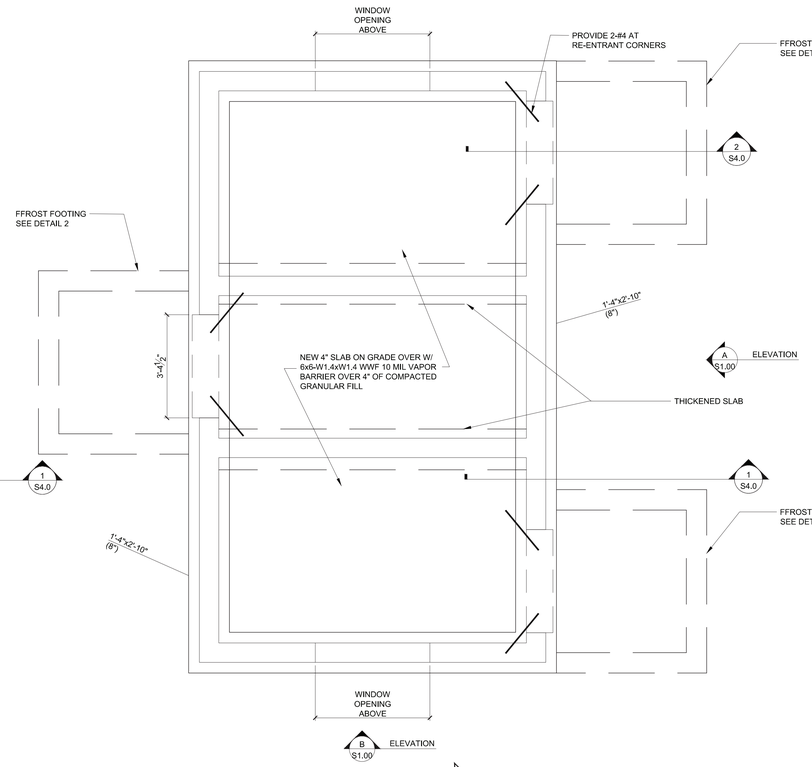


ROOF FRAMING PLAN
PLAN

SCALE: 1/2"=1'-0"

NOTES:

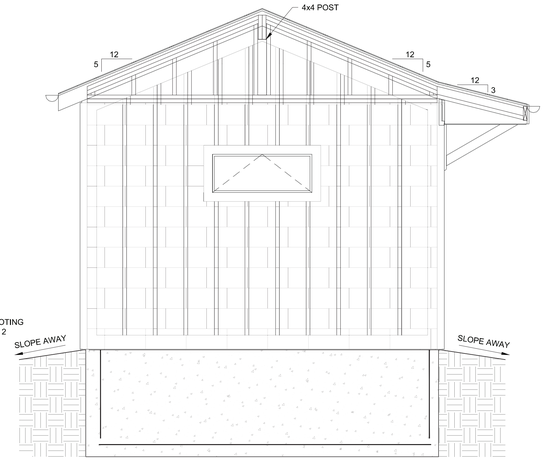
1. ALL ROOF MEMBERS ARE 2x10 SPF NO. 2 OR BETTER
2. FASTEN:
   a. 2x4 TO 2x4 WITH 2-16d NAILS
   b. 2x6 TO 2x6 WITH 3-16d NAILS
   c. USE 3-16d NAILS AT 2x4 TO 2x6 CONNECTIONS
3. ROOF SHEATHING TO BE $^{15}/_{32}$" OSB WITH 8d NAILS AT 8" OC ALONG EDGES AND RIDGES. FASTEN FIELD WITH 8d NAILS AT 16" OC ALONG EACH RAFTER.



FOUNDATION PLAN

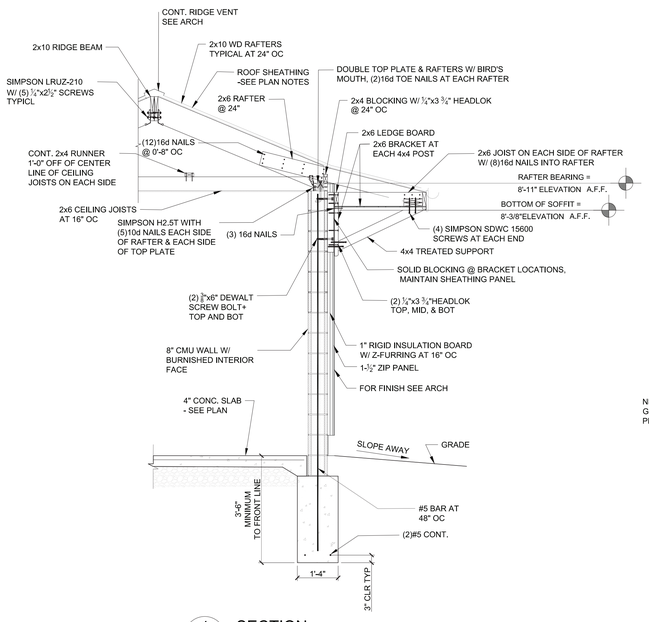
SCALE: 1/2"=1'-0"

1. SEE GENERAL NOTES FOR SUB-GRADE SOIL PREPARATION.
2. TOP OF SLAB ELEVATION = EXTERIOR GRADE = 0'-0"
3. CONTINUOUS FOOTINGS ARE NOTED (WIDTH x DEPTH (TOP OF FTG ELEV))
4. BOTTOM OF EXTERIOR WALL FOOTINGS SHALL BE A MINIMUM OF 3'-6" BELOW FINAL GRADE.
5. PROVIDE 2-#4x3'-0" AT ALL RE-ENTRANT CORNERS.
6. SEE ARCHITECTURAL DRAWINGS FOR FINISHES, DEPRESSIONS AND EXTENTS OF SLAB.
7. SEE S000 FOR GENERAL NOTES AND SPECIFICATIONS.
8. SEE S1.00 FOR TYPICAL FOUNDATION DETAILS.



ELEVATION A
NORTH

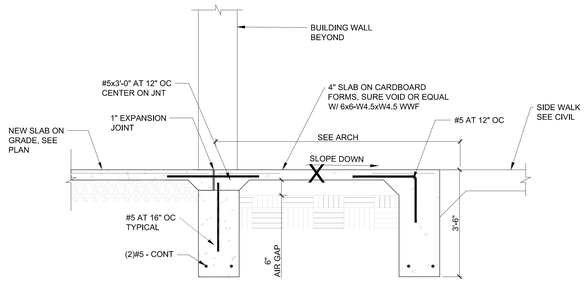
SCALE: 1/2"=1'-0"



1 SECTION

SCALE: 1/2"=1'-0"

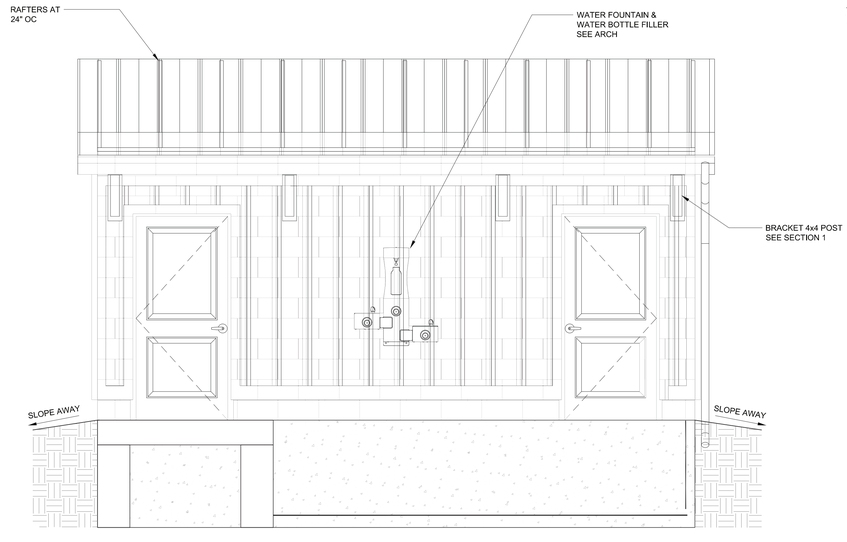
SEE ARCHITECTURAL DRAWINGS FOR INSULATION, FINISHES AND OTHER DETAILS



AT DOOR OPENINGS

2 FROST FOOTING AT MAN-DOORS

SCALE: 1/2"=1'-0"



A ELEVATION A
NORTH

SCALE: 1/2"=1'-0"

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NORTH FORK PRESERVE RENOVATION

4400 EVERETT ROAD, AKRON, OH 44333

PROJECT # 2324

ISSUE:

BID SET	07-28-2025

PLANS, ELEVATIONS, AND SECTIONS

S4.00

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GENERAL NOTES

A. GENERAL

1. THIS STRUCTURE WAS DESIGNED IN ACCORDANCE WITH STATE OF OHIO BUILDING CODE (O.B.C.), 2024 EDITION.
2. ALL CONSTRUCTION SHALL CONFORM TO THE OHIO BUILDING CODE AND TO OSHA STANDARDS. WORK STRUCTURAL DRAWINGS WITH ARCHITECTURAL, MECHANICAL DRAWINGS, AND CIVIL DRAWINGS.
3. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR ALL CONSTRUCTION METHODS AND FOR SAFETY CONDITIONS AT THE SITE.
4. TEMPORARY BRACING OF THE STRUCTURE, TRUSSES, COLUMNS, BEAMS, WALLS, ETC. DURING CONSTRUCTION ARE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. TEMPORARY BRACING OF THE STRUCTURE SHALL REMAIN IN PLACE UNTIL ALL LATERAL FORCE RESISTING ELEMENTS ARE INSTALLED (INCLUDING WALL AND ROOF SHEATHING). CONTRACTOR SHALL DESIGN AND COORDINATE LOCATIONS OF TEMPORARY BRACING WITH OTHER CONTRACTORS.
5. LIFTING MEANS AND METHODS ARE BY THE CONTRACTOR. THE CONTRACTOR SHALL RETAIN QUALIFIED RIGGING AND LIFTING PROFESSIONALS TO PERFORM ALL LIFTING OPERATIONS AND SHALL BE RESPONSIBLE FOR ALL TEMPORARY SUPPORT AND BRACING OF THE STRUCTURE. CONTRACTOR IS TO FIELD VERIFY AND COORDINATE ALL FINAL FOUNDATION DIMENSIONS AND IS RESPONSIBLE FOR ALL COORDINATION REQUIRED TO PLACE THE BARN ON THE NEW FOUNDATIONS.
6. CONSTRUCTION LOADS SHALL NOT EXCEED DESIGN LIVE LOADS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL DESIGN REQUIRED TO SUPPORT CONSTRUCTION EQUIPMENT USED IN CONSTRUCTING THIS PROJECT. SHORING IS THE RESPONSIBILITY OF THE CONTRACTOR.
7. FOUNDATION CONTRACTOR SHALL COORDINATE AND SCHEDULE WORK WITH MECHANICAL AND ELECTRICAL CONTRACTORS REGARDING ITEMS CONCEALED BY OR EMBEDDED IN FOUNDATIONS, WALLS OR FLOOR SLABS.
8. PRINCIPAL OPENINGS THROUGH THE FRAMING ARE SHOWN ON THESE DRAWINGS. THE CONTRACTOR SHALL COORDINATE THE STRUCTURAL AND MECHANICAL DRAWINGS FOR THE REQUIRED OPENINGS AND SHALL VERIFY SIZE AND LOCATION OF ALL OPENINGS WITH THE MECHANICAL CONTRACTOR.
9. DO NOT SCALE DRAWINGS
10. THE CONTRACTOR SHALL NOTIFY THE ARCHITECT IF THE WEIGHTS OF MECHANICAL UNITS ETC. ARE DIFFERENT FROM THE WEIGHTS POSTED ON THE DESIGN DRAWINGS. DISCREPANCIES SHALL BE RESOLVED BEFORE PROCEEDING WITH CONSTRUCTION.
11. THE CONTRACTOR SHALL NOTIFY THE ARCHITECT/ENGINEER IMMEDIATELY OF ANY DISCREPANCIES BETWEEN DRAWINGS.
12. SEE ARCHITECTURAL DRAWINGS FOR THE FOLLOWING:
    - SIZE AND LOCATION OF ALL DOOR AND WINDOW OPENINGS, EXCEPT AS NOTED..
    - SIZE AND LOCATION OF ALL INTERIOR AND EXTERIOR NON-BEARING PARTITIONS.
    - SIZE AND LOCATION OF ALL CONCRETE CURBS, FLOOR DRAINS, SLOPES, DEPRESSED AREAS, CHANGES IN LEVEL, CHAMFER, GROOVES, INSERTS, ETC.
    - SIZE AND LOCATION OF FLOOR AND ROOF OPENINGS, EXCEPT AS SHOWN.
    - FLOOR AND ROOF FINISHES.
    - DIMENSIONS NOT SHOWN ON STRUCTURAL DRAWINGS.
    - LIMITS OF DRAFT STOPPING IN THE ATTIC SPACE

DESIGN LOAD INFORMATION:

DEAD LOAD

1. ROOF = 20 PSF

ROOF LIVE LOADS

1. LIVE LOAD = 20 PSF

ROOF SNOW LOAD

1. GROUND SNOW LOAD (Pg) = 20.00 PSF
2. FLAT ROOF SNOW LOAD (Pf) = 20.00 PSF
3. SNOW EXPOSURE FACTOR (Ce) = 1.0
4. SNOW LOAD IMPORTANCE FACTOR (I) = 1.0
5. THERMAL FACTOR, Ct = 1.0
6. TOTAL DESIGN SNOW LOAD = 20 PSF + DRIFTING

WIND LOAD

1. ULTIMATE DESIGN WIND SPEED, Vult (3 SECOND GUST) = 106 MPH
2. NOMINAL DESIGN WIND SPEED, Vasd = 85 MPH
3. WIND IMPORTANCE FACTOR (Iw) = 1.0, OCCUPANCY CATEGORY = II
4. WIND EXPOSURE = C
5. INTERNAL PRESSURE COEFFICIENT = ±0.18

COMPONENTS AND CLADDING WIND DESIGN PRESSURES - SEE TABLES BELOW

WALL COMPONENTS AND CLADDING (ULTIMATE) (PSF)									
EFFECTIVE AREA (SQ. FT.)									
INTERIOR ZONE					EXTERIOR ZONE (13'-6" WIDE)				
10	20	50	100	500	10	20	50	100	500
25.7	24.6	23.3	22.2	19.8	31.7	29.5	26.8	24.6	19.8

ROOF UPLIFT - COMPONENTS AND CLADDING (ULTIMATE) (PSF)								
ZONE	EFFECTIVE AREA (SQ. FT.)							
	GROSS				NET (ROOF JOISTS)			
	10	20	50	100	10	20	50	100
CORNER (13'-6")	-43.5	-38.9	-32.7	-28.1	-38.8	-33.9	-27.7	-23.1
PERIMETER (13'-6")	-43.5	-38.9	-32.7	-28.1	-38.8	-33.9	-27.7	-23.1
INTERIOR	-25.9	-25.3	-24.4	-23.7	-20.9	-20.3	-19.4	-18.7

EARTHQUAKE DESIGN DATA

1. SEISMIC USE GROUP = II
2. SEISMIC IMPORTANCE FACTOR (IE) = 1.00
3. MAPPED SPECTRAL RESPONSE ACCELERATIONS, Ss=14.9%, S1=6.4%
4. SITE CLASS = D
5. SPECTRAL RESPONSE COEFFICIENTS, Sds=0.133, Sd1= 0.103
6. SEISMIC DESIGN CATEGORY = B
7. BASIC SEISMIC-FORCE-RESISTING SYSTEM:
   -LIGHT FRAMED WALL w/SHEAR PANELS
   -ALL OTHER MATERIALS
8. DESIGN BASE SHEAR =0.024W
9. SEISMIC RESPONSE COEFFICIENT (Cs) = 0.024
10. RESPONSE MODIFICATION FACTOR (R) = 6.5
11. V = (Sds)(W)(IE)/R (SIMPLIFIED ANALYSIS PROCEDURE)

B. FOUNDATIONS

1. ALL FOUNDATIONS SHALL BEAR ON UNDISTURBED SOIL WITH AN ASSUMED BEARING CAPACITY OF 1500 PSF. FOOTINGS SHALL BE POURED THE SAME DAY THEY ARE EXCAVATED. FOOTINGS MAY BE POURED INTO EARTH-FORMED TRENCHES IF THE SOIL CONDITIONS PERMIT.
2. COMPACT BACKFILL OVER FOOTINGS AND BENEATH SLABS ON GRADE TO AT LEAST 98% OF ITS STANDARD PROCTOR MAXIMUM DRY DENSITY PER ASTM D-698 ±2.0% MOISTURE CONTENT. STRUCTURAL FILL UNDER FOOTINGS SHALL EXTEND OUTSIDE A FOOTING A MINIMUM OF ¾ THE DEPTH OF COMPACTION. ALL FILL SHALL BE TESTED FOR IN-PLACE DENSITY TO ASSURE THAT THE COMPACTION RECOMMENDATIONS ARE ATTAINED.
3. FOOTING ELEVATIONS SHOWN ON PLANS ARE APPROXIMATE AND SHALL BE FIELD ADJUSTED IF REQUIRED.
4. A SOILS TESTING LABORATORY SHALL BE RETAINED BY THE OWNER TO PROVIDE CONSTRUCTION REVIEW TO INSURE CONFORMANCE WITH THE CONSTRUCTION DOCUMENTS DURING THE EXCAVATION, BACKFILL, AND FOUNDATION PHASES OF THE PROJECT. IT SHALL BE THE RESPONSIBILITY OF THE SOILS TESTING LABORATORY TO: DETERMINE TOPSOIL AND EXCAVATION STRIPPING DEPTH; INSPECT ALL SUBSOIL EXPOSED DURING STRIPPING, SITE GRADING, AND EXCAVATION OPERATIONS; APPROVE FILL MATERIALS, PERFORM DENSITY TESTS OF FILLS TO INSURE PLACEMENT PER SPECIFICATION REQUIREMENTS; INSPECT FOUNDATION BEARING SURFACES.
5. NOTIFY STRUCTURAL ENGINEER OF ANY UNUSUAL SOIL CONDITIONS THAT ARE IN VARIANCE WITH THE GEOTECHNICAL REPORT.

C. CONCRETE AND REINFORCING STEEL

1. ALL CONCRETE SHALL CONFORM TO THE FOLLOWING REFERENCED STANDARDS:
   ACI 318-19: BUILDING CODE REQUIREMENT FOR REINFORCED CONCRETE.
   ACI 315: DETAILS AND DETAILING OF CONCRETE REINFORCEMENT.
   ACI 305: RECOMMENDED PRACTICES FOR HOT WEATHER CONCRETING.
   ACI 306: RECOMMENDED PRACTICES FOR COLD WEATHER CONCRETING.
2. ALL CAST-IN-PLACE INTERIOR SLAB CONCRETE AND ALL INTERIOR CONCRETE NOT OTHERWISE IDENTIFIED SHALL BE 3500 PSI (W/C RATIO = 0.55) AT 28 DAYS WITHOUT AIR ENTRAINMENT AND WITH THE APPROPRIATE CURE SEALER.
3. CAST-IN-PLACE CONCRETE FOR SPREAD AND WALL FOOTINGS SHALL BE 3000 PSI (W/C RATIO = 0.50) AT 28 DAYS.
4. ALL CAST-IN-PLACE EXTERIOR SLAB CONCRETE AND ALL EXTERIOR CONCRETE NOT OTHERWISE IDENTIFIED SHALL BE 4000 PSI (W/C RATIO = 0.50) AT 28 DAYS WITH AIR ENTRAINMENT (6% ±1%).
5. REINFORCING STEEL SHALL BE DEFORMED BARS CONFORMING TO ASTM A-615 GRADE-60.
6. WELDED WIRE FABRIC SHALL CONFORM TO ASTM A185. ONLY FLAT SHEETS SHALL BE USED.
7. ALL WELDED WIRE FABRIC SPLICES SHALL BE NOT LESS THAN (2) SPACINGS OF CROSS WIRES OR 6", WHICHEVER IS GREATER.
8. CORNER BARS SHALL BE PROVIDED TO MATCH HORIZONTAL WALL AND FOOTING REINFORCEMENT AT ALL CORNERS. LAP BARS 30 BAR DIAMETERS OR A MINIMUM OF 1'-0".
9. PROVIDE A 3/4"X45° CHAMFER ON ALL EXPOSED EDGES OF CONCRETE.
10. A CURING COMPOUND IS TO BE APPLIED TO THE CONCRETE AFTER FINISHING.
11. ALL ALUMINUM IN CONTACT WITH CONCRETE OR DISSIMILAR METALS SHALL BE COATED WITH TWO COATS COAL TAR EPOXY, APPROVED BY THE ARCHITECT, UNLESS OTHERWISE NOTED.
12. ALL CONCRETE SHALL BE PLACED WITHOUT HORIZONTAL CONSTRUCTION JOINTS, EXCEPT WHERE SPECIFICALLY NOTED. HORIZONTAL REINFORCEMENT SHALL BE CONTINUOUS THROUGH VERTICAL CONSTRUCTION JOINTS.
13. SEE ARCHITECTURAL DRAWINGS FOR CONCRETE FINISHES, MASONRY ANCHORS, AND FOR MISCELLANEOUS EMBEDDED PLATES, BOLTS, ANCHORS, ANGLES, ETC.
14. ALL HOOKS SHOWN ON DRAWINGS SHALL BE STANDARDS HOOKS PER ACI STANDARD

MINIMUM LAP SPLICE (CLASS B)
(Fy = GRADE 60, NON-COATED BARS). SPLICE REINFORCING WHERE INDICATED ON THE DRAWINGS OR ON THE SHOP DRAWINGS. ALL SPLICES SHALL BE CLASS 'B' AS DEFINED IN ACI 318. IF SPLICE LENGTH IS NOT GIVEN ON THE DRAWINGS, PROVIDE LAP SPLICE LENGTHS (IN INCHES) AS FOLLOWS.

3000 PSI CONCRETE

BAR SIZE	TYPICAL	TOP
#3	22"	28"
#4	29"	37"
#5	36"	47"
#6	43"	56"
#7	63"	81"
#8	72"	93"

4000 PSI CONCRETE

BAR SIZE	TYPICAL	TOP
#3	19"	24"
#4	25"	32"
#5	31"	40"
#6	37"	48"
#7	54"	70"
#8	62"	80"
#9	70"	91"

1. WHEN LAPPING TWO DIFFERENT SIZE BARS, USE THE LAP DIMENSION OF THE LARGER BAR OR THE TENSION LAP SPLICE OF SMALLER BAR, USE WHICHEVER DIMENSION IS LARGER.
2. LAP LENGTHS ASSUME CLEAR SPACING BETWEEN BARS OF 2 BAR DIAMETERS, AND A MINIMUM COVER OF 1 BAR DIAMETER. FOR DEVELOPMENT LENGTHS, DIVIDE "TYPICAL DIMENSIONS" BY 1.3.
3. TOP BARS ARE DEFINED AS HORIZONTAL BARS WITH MORE THAN 1'-0" OF FRESH CONCRETE BELOW.

TYPICAL REINFORCING BAR CLEARANCE TABLE

LOCATION	CLEARANCE
(a) CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH	3"
(b) SLABS ON GRADE (WELDED WIRE FABRIC)	¼ SLAB THICKNESS FROM TOP OF SLAB
(c) CONCRETE EXPOSED TO EARTH OR WEATHER	
-NO. 6 THRU NO. 18 BARS	2"
-NO. 5 BAR, W31 OR D31 WIRE, AND SMALLER	1½"
(d) CONCRETE NOT EXPOSED TO WEATHER OR IN CONTACT WITH GROUND:	
SLABS, WALLS, JOISTS	
-NO. 14 & NO. 18 BARS	1½"
-NO. 11 BAR AND SMALLER	¾"
BEAMS, COLUMNS	
-PRIMARY REINFORCEMENT, TIES, STIRRUPS, SPIRALS	1½"

D. MASONRY

1. ALL DESIGN, MATERIALS, LABOR AND CONSTRUCTION OF THE MASONRY SHALL CONFORM TO THE BUILDING CODE REQUIREMENTS FOR MASONRY STRUCTURES (TMS 402-16) AND THE SPECIFICATION FOR MASONRY STRUCTURES (TMS 602-16).
2. ALL BRICK AND CONCRETE MASONRY AND CONSTRUCTION SHALL COMPLY WITH THE RECOMMENDATIONS OF BRICK INDUSTRY ASSOCIATION AND THE NATIONAL CONCRETE MASONRY ASSOCIATION AND MINIMUM REQUIREMENTS ESTABLISHED AS REFERENCED IN THE APPLICABLE BUILDING CODE.
3. ALL HOLLOW CONCRETE BLOCK SHALL CONFORM TO ASTM C-90 WITH A NET COMPRESSIVE STRENGTH OF 2000 PSI.
4. MORTAR SHALL BE ASTM C 270, TYPE "S", SPECIFIED BY PROPORTION WITH A MINIMUM COMPRESSIVE STRENGTH OF 1800 PSI.
5. AGGREGATE FOR MORTAR SHALL BE ASTM C 144. AGGREGATE FOR GROUT ASTM C404.
6. ALL MASONRY GROUT SHALL CONFORM TO ASTM C 476, SPECIFIED BY PROPORTION, AND SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 2,000 P.S.I. (⅜" MAX. AGGREGATE SIZE).
7. REINFORCING STEEL SHALL BE DEFORMED BARS CONFORMING TO ASTM A-615 GRADE-60. WELDING OF REINFORCING STEEL SHALL CONFORM TO ANSI/AWS D1.4-11.
8. ALL CORES WITH REINFORCEMENT SHALL BE FILLED SOLID WITH GROUT.
9. CONTINUOUS WIRE JOINT REINFORCING SHALL BE GALVANIZED FABRICATED UNITS WITH 9 GAGE SIDE RODS AND 9 GAGE CROSS RODS FABRICATED FROM COLD-DRAWN STEEL WIRE COMPLYING WITH ASTM A82. USE TRUSS TYPE AT NON-VERTICALLY REINFORCED WALLS AND LADDER TYPE AT VERTICALLY REINFORCED WALLS. PREFABRICATED CORNERS & TEES SHALL BE USED FOR ALL INTERSECTING WALLS.
10. ALL INTERSECTING MASONRY WALLS AND PILASTERS SHALL BE IN RUNNING BOND WITH AT LEAST 50% OF THE MASONRY UNITS INTERLOCKING AT THE INTERFACE.
11. LAY MASONRY UNITS WITH FULL MORTAR COVERAGE ON HORIZONTAL AND VERTICAL FACE SHELLS. BED WEBS IN MORTAR IN STARTING COURSE ON FOOTING AND IN ALL COURSES OF COLUMN AND PILASTERS, AND WHERE ADJACENT TO CELLS OR CAVITIES TO BE REINFORCED OR FILLED WITH CONCRETE OR GROUT.
12. MISCELLANEOUS:
    .a. CONSOLIDATE GROUT BY MECHANICAL VIBRATION AT TIME OF PLACEMENT AND RECONSOLIDATE BY MECHANICAL VIBRATION AFTER THE INITIAL WATER LOSS AND SETTLEMENT HAS OCCURRED.
    .b. MAX. GROUT POUR HEIGHT SHALL BE AS PER PAGE S-77(TABLE 6) OF TMS 402-16.
    .c. CORRECT LOCATION OF THE VERTICAL REINFORCING STEEL MUST BE MAINTAINED BY THE USE OF VERTICAL BAR POSITIONERS PLACED AT THE TOP OF 1st COURSE AND COURSE BELOW TOP OF WALL W/ A MAXIMUM OF 6'-0" BETWEEN POSITIONERS.
    .d. FILL CORE SOLID AROUND ANCHOR BOLTS, EMBEDDED STEEL AND REINFORCING.
    .e. PROVIDE JOINT REINFORCING AT 16" EXCEPT AS NOTED. BOND BEAM REINFORCEMENT SHALL BE STOPPED EITHER SIDE OF VERTICAL CONTROL JOINTS.
    .f. PROVIDE 100% SOLID BEARING, MINIMUM 3 COURSES (24") UNDER BEAMS AND WIDE FLANGE LINTELS, 1 COURSE (8") UNDER ANGLE LINTELS AND STEEL LINTELS UNLESS DETAILED OTHERWISE.
    .g. LAP ALL SPLICES AS FOLLOWS:
        #3 - 16"
        #4 - 24"
        #5 - 28"
        #6 - 40"
        #7 - 46"

E. WOOD FRAMING

1. QUALITY AND CONSTRUCTION OF WOOD FRAMING MEMBERS AND THEIR FASTENERS FOR LOAD SUPPORTING PURPOSES NOT OTHERWISE INDICATED ON THE DRAWINGS SHALL BE IN ACCORDANCE WITH THE OHIO BUILDING CODE.
2. ALL WOOD SHALL CONFORM TO THE NATIONAL DESIGN SPECIFICATIONS FOR WOOD CONSTRUCTION, NDS (2018 EDITION) AND THE 2024 OHIO BUILDING CODE CHAPTER 23.
3. TREATED BOTTOM PLATES WHERE THERE IS CONTACT WITH MASONRY.
4. JOISTS, RAFTERS, STUDS & HEADERS-(SPF, NO.1/NO.2, DOUGLAS FIR OR SOUTHERN PINE), DESIGN VALUES SHALL EQUAL OR EXCEED THE FOLLOWING:
   ..a. Fb: 875 P.S.I.
   ..b. Fv: 135 P.S.I.
   ..c. E: 1,400,000 P.S.I.
5. NAILING OF ALL FRAMING MEMBERS SHALL MEET THE RECOMMENDED NAILING SCHEDULE (TABLE 2304.10.2) CONTAINED IN THE OBC, CHAPTER 23.
6. ERECTION PLANS FOR ALL TRUSSES SHALL BE SUBMITTED FOR REVIEW WITH SHOP DRAWINGS PRIOR TO FABRICATION. ERECTION PLANS SHALL INCLUDE HOW AND WHERE THE PERMANENT BRIDGING WILL BE INSTALLED. SHOP DRAWINGS SHALL BE SEALED BY A PROFESSIONAL ENGINEER OF OHIO REGISTRATION. TEMPORARY AND PERMANENT BRIDGING AND BRACING OF WOOD ROOF AND FLOOR TRUSSES SHALL BE IN ACCORDANCE WITH THE TRUSS INSTITUTE, INC. TEMPORARY BRIDGING SHALL BE FURNISHED AS REQUIRED TO MAINTAIN TRUSS STABILITY, SPACING AND TO PREVENT BUCKLING DURING ERECTION. LIVE LOAD DEFLECTION FOR FLOOR TRUSSES IS LIMITED TO L/480 AND TOTAL LOAD DEFLECTION L/360.
7. PRE-ENGINEERED WOOD TRUSSES SHALL BE DESIGNED IN ACCORDANCE WITH THE TRUSS PLATE INSTITUTE'S NATIONAL DESIGN STANDARD FOR METAL-PLATE CONNECTED WOOD TRUSS CONSTRUCTION (ANSI/TPI-1 LATEST EDITION). TRUSSES SHALL BE DESIGNED AND MANUFACTURED BY AN AUTHORIZED MEMBER OF THE WOOD TRUSS COUNCIL OF AMERICA (WTCA). TRUSS DESIGN SHALL CONFORM TO SPECIFIED CODES, ALLOWABLE STRESS INCREASES, DEFLECTION LIMITATIONS, AND OTHER APPLICABLE CRITERIA OF THE GOVERNING CODE.
8. CONNECT ROOF TRUSSES TO TOP PLATE WITH A SIMPSON "HI" TIE UNLESS NOTED OTHERWISE.
9. NO STRUCTURAL MEMBER SHALL BE CUT OR NOTCHED UNLESS SPECIFICALLY SHOWN, NOTED OR APPROVED.
10. SHEATHING:
    EXTERIOR WALL SHEATHING: 40/20 APA RATED ½" PLYWOOD ROOF SHEATHING EXPOSURE 1.
    24/16 APA RATED ½" PLYWOOD WALL SHEATHING EXPOSURE 1.
    ALL SHEATHING TO BE NAILED WITH 8d COMMON NAILS AT 6" ON CENTER AT PANEL EDGES AND 12" ON CENTER AT INTERMEDIATE SUPPORTS UNLESS NOTED OTHERWISE. PROVIDE SOLID BLOCKING TO MATCH WALL STUD SIZE AT ALL FREE EDGES OF WALL SHEATHING AND NAIL w/ 8d COMMON NAILS AT 6" O.C.
11. BOLTS HOLES SHALL BE 1/16" MAXIMUM LARGER THAN THE BOLT SIZE. RE-TIGHTEN ALL NUTS PRIOR TO CLOSING IN.
12. 2x2x¼ PLATE WASHERS SHALL BE USED UNDER BOLT HEADS AND NUTS AGAINST WOOD.
13. SERVICE CONDITION – DRY WITH MOISTURE CONTENT AT OR BELOW 19% IN SERVICE.
14. CONTRACTOR SHALL COORDINATE TRUSS LAYOUT FOR OPENINGS AND PENETRATIONS REQUIRED BY OTHER TRADES INCLUDING FOR PLUMBING, HVAC, ELECTRICAL, ROOF ACCESS HATCHES, CHASES, ETC.
15. DRYWALL CLIPS OR 2X LADDER BLOCKING AT 24" O/C SHALL BE USED AT CORNER FRAMING AND INTERIOR WALL INTERSECTIONS

F. SUBMITTALS

1. THE GENERAL CONTRACTOR SHALL SUBMIT FOR ENGINEER REVIEW SHOP DRAWINGS FOR THE FOLLOWING ITEMS:

   CONCRETE DESIGN MIX

ITEMS MARKED (*) SHALL HAVE SHOP DRAWINGS SEALED BY A REGISTERED ENGINEER IN THE STATE WHERE THE PROJECT IS LOCATED. ITEMS MARKED (^) SHALL HAVE CALCULATIONS PREPARED BY A REGISTERED ENGINEER.

2. ALL SHOP DRAWINGS MUST BE REVIEWED AND SEALED BY THE GENERAL CONTRACTOR PRIOR TO SUBMITTAL.
3. CONTRACTOR SHALL SUBMIT ELECTRONIC COPIES (E.G. PDFS) OF ALL SHOP DRAWINGS SPECIFIED TO BE RETURNED BY THE ENGINEER.
4. THE OMISSION FROM THE SHOP DRAWINGS OF ANY MATERIAL REQUIRED BY THE CONTRACT DOCUMENTS TO BE FURNISHED SHALL NOT RELIEVE THE CONTRACTOR OF THE RESPONSIBILITY OF FURNISHING AND INSTALLING SUCH MATERIALS, REGARDLESS OF WHETHER THE SHOP DRAWINGS HAVE BEEN REVIEWED AND APPROVED.
5. SUBMIT TWO COPIES OF MANUFACTURER'S LITERATURE FOR ALL MATERIALS AND PRODUCTS USED IN CONSTRUCTION ON THE PROJECT.
6. THE USE OF REPRODUCTIONS OF THESE CONTRACT DOCUMENTS BY ANY CONTRACTOR, SUBCONTRACTOR, ERECTOR, FABRICATOR, OR MATERIAL SUPPLIER IN LIEU OF PREPARATION OF SHOP DRAWINGS SIGNIFIES HIS ACCEPTANCE OF ALL INFORMATION SHOWN HEREIN AS CORRECT, AND OBLIGATE HIMSELF TO ANY JOB EXPENSE, REAL OR IMPLIED, ARISING DUE TO ANY ERRORS THAT MAY OCCUR HEREIN.

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BATH TOWNSHIP
1826

NORTH FORK PRESERVE BARN RENOVATION

4400 EVERETT ROAD, AKRON, OH 44333

PROJECT # 2324

ISSUE:
BID SET 07-28-2025

GENERAL NOTES

S10.1

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SPECIAL INSPECTIONS

1. SPECIAL INSPECTION IS TO BE PROVIDED IN ADDITION TO THE INSPECTIONS CONDUCTED BY THE DEPARTMENT OF BUILDING SAFETY AND SHALL NOT BE CONSTRUED TO RELIEVE THE OWNER OR HIS AUTHORIZED AGENT FROM REQUESTING THE PERIODIC AND CALLED INSPECTIONS REQUIRED BY THE BUILDING CODE. SPECIAL INSPECTION SHALL BE PAID BY OWNER.

REQUIRED SPECIAL INSPECTIONS

1. IN ADDITION TO THE REGULAR INSPECTIONS, THE FOLLOWING ITEMS WILL ALSO REQUIRE SPECIAL INSPECTION ACCORDANCE WITH THE BUILDING CODE.

   A. STRUCTURAL STEEL ELEMENTS OF BUILDINGS AND STRUCTURES AS REQUIRED BY OBC SECTION 1705.2 AND TABLE 1705.2.3, EXCEPT AS ALLOWED IN OBC SECTION 1704.2.

   B. CONCRETE CONSTRUCTION AS REQUIRED BY OBC SECTION 1705.3 AND TABLE 1705.3, EXCEPT AS ALLOWED IN OBC SECTION 1704.2.

   C. MASONRY CONSTRUCTION AS REQUIRED BY OBC SECTION 1705.4, LEVEL 1 SPECIAL INSPECTION, EXCEPT ALLOWED IN OBC SECTION 1704.2.

   D. SPECIAL INSPECTION FOR EXISTING SITE SOIL CONDITIONS. DURING SITE PREPARATION AND FILL PLACEMENT, TO ENSURE LOAD-BEARING REQUIREMENTS IN COMPLIANCE WITH OBC SECTION 1705.6 EXCEPT AS ALLOWED IN OBC SECTION 1704.2.

   E. SPRAYED FIRE-RESISTANT MATERIALS AS REQUIRED BY SECTION 1705.15.

   F. EFIS SYSTEM AS PER SECTION 1705.17.

   G. SPECIAL CASES AS DEEMED NECESSARY BY BUILDING OFFICIAL IN COMPLIANCE WITH OBC SECTION 1705.1.1.

2. SPECIAL INSPECTOR SHALL MEET THE QUALIFICATIONS AS STATED IN THE BUILDING CODE AND SHALL PERFORM THE DUTIES AND RESPONSIBILITIES AS OUTLINED IN THE BUILDING CODE.

3. SPECIAL INSPECTION SHALL MEET THE REQUIREMENTS OF OBC SECTION 1704. SPECIAL INSPECTORS(S) SHALL BE HIRED BY THE OWNER TO PERFORM THE REQUIRED SPECIAL INSPECTIONS. THE NAMES OF PERSONS OR FIRMS WHO ARE TO PERFORM THE SPECIAL INSPECTIONS SHALL BE FORWARDED TO THE BUILDING OFFICIAL FOR APPROVAL. THE SPECIAL INSPECTOR(S) SHALL COMPLETE AND SUBMIT ALL FORMS REQUIRED BY THE BUILDING DEPARTMENT HAVING JURISDICTION.

4. THE SPECIAL INSPECTOR(S) SHALL:

   A. OBSERVE THE WORK ASSIGNED FOR CONFORMANCE TO THE APPROVED DRAWING AND SPECIFICATIONS.

   B. FURNISH INSPECTION REPORTS TO THE ENGINEER OF RECORD AND BUILDING DEPARTMENT. DISCREPANCIES SHALL BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE CONTRACTOR FOR CORRECTION. THEN IF NOT CORRECTED, TO THE ENGINEER AND THE BUILDING DEPARTMENT.

   C. SUBMIT TO THE ENGINEER OF RECORD AND THE BUILDING DEPARTMENT A SIGNED FINAL REPORT STATING THAT THE WORK WAS IN CONFORMANCE WITH THE APPROVED DRAWINGS AND SPECIFICATIONS AND THE APPLICABLE WORKMANSHIP PROVISIONS OF THE OBC.

5. SPECIAL INSPECTION NOTES:

   A. CONTINUOUS SPECIAL INSPECTION IS ALWAYS REQUIRED DURING THE PERFORMANCE OF THE WORK UNLESS SPECIFICALLY NOTED BELOW.

   B. WHERE FABRICATION OF STRUCTURAL LOAD-BEARING MEMBERS AND ASSEMBLIES IS BEING PERFORMED ON THE PREMISES OF A FABRICATOR'S SHOP, CONTINUOUS SPECIAL INSPECTION IS REQUIRED DURING THE PERFORMANCE OF THE WORK EXCEPT AS ALLOWED IN OBC SECTION 1704.2.5.1 AND UNLESS SPECIFICALLY NOTED BELOW.

   C. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO PROVIDE THE SPECIAL INSPECTOR(S) WITH ADVANCE NOTICE, NO LESS THAN ONE WORKING DAY, OF THE INITIATION OF ANY WORK REQUIRED TO HAVE SPECIAL INSPECTIONS. ALL WORK PERFORMED WITHOUT REQUIRED SPECIAL INSPECTION WILL BE SUBJECT TO REMOVAL.

STRUCTURAL SPECIAL INSPECTION SCHEDULE: SOILS

VERIFICATION AND INSPECTION TASK	APPLICABLE TO THIS PROJECT?	FREQUENCY		REFERENCED STANDARD	CODE REFERENCE
		CONTINUOUS	PERIODIC		
VERIFY MATERIALS BELOW FOOTINGS ARE ADEQUATE TO ACHIEVE THE DESIGN BEARING CAPACITY.	X	-	X	-	1704.7
VERIFY EXCAVATIONS ARE EXTENDED TO PROPER DEPTH AND HAVE REACHED PROPER MATERIAL.	X	-	X	-	1704.7
PERFORM CLASSIFICATION AND TESTING OF CONTROLLED FILL MATERIALS.	X	-	X	-	1704.7
DURING FILL PLACEMENT, VERIFY USE OF PROPER MATERIALS AND PROCEDURES IN ACCORDANCE WITH THE PROVISIONS OF THE APPROVED GEOTECHNICAL REPORT. VERIFY DENSITIES AND LIFT THICKNESS DURING PLACEMENT AND COMPACTION OF CONTROLLED FILL.	X	X	-	-	1704.7
PRIOR TO PLACEMENT OF CONTROLLED FILL, OBSERVE SUBGRADE AND VERIFY THAT SITE HAS BEEN PREPARED PROPERLY.	X	-	X	-	1704.7

STRUCTURAL SPECIAL INSPECTION SCHEDULE: CONCRETE CONSTRUCTION

VERIFICATION AND INSPECTION TASK	APPLICABLE TO THIS PROJECT?	FREQUENCY		REFERENCED STANDARD	CODE REFERENCE
		CONTINUOUS	PERIODIC		
1. INSPECT REINFORCEMENT, INCLUDING PRESTRESSING TENDONS, AND VERIFY PLACEMENT.	X	-	X	ACI 318 Ch. 20, 25.2, 25.3, 26.6.1-26.6.3	-
2. REINFORCING BAR WELDING:	-	-	-	AWS D1.4 ACI 318: 26.6.4	-
a. VERIFY WELDABILITY OF REINFORCING BARS OTHER THAN ASTM A706	-	-	X		
b. INSPECT SINGLE-PASS FILLET WELDS, MAXIMUM $\frac{5}{16}$"	-	-	X		
c. INSPECT ALL OTHER WELDS	-	X	-		
3. INSPECT ANCHORS CAST IN CONCRETE	X	-	X	ACI 318 Ch. 17.8.2	-
4. INSPECT ANCHORS POST-INSTALLED IN HARDENED CONCRETE MEMBERS	-	-	-	-	-
a. ADHESIVE ANCHORS INSTALLED IN HORIZONTALLY OR UPWARDLY INCLINED ORIENTATIONS TO RESIST SUSTAINED TENSION LOADS	-	X	-	ACI 318 Ch. 17.8.2.4	-
b. MECHANICAL ANCHORS AND ADHESIVE ANCHORS NOT DEFINED IN 4.a.	X	-	X	ACI 318 Ch. 17.8.2	-
5. VERIFY USE OF REQUIRED DESIGN MIX.	X	X	-	ACI 318 Ch. 19, 26.4.3, 26.4.4	1904.1, 1904.2
6. PRIOR TO CONCRETE PLACEMENT, FABRICATE SPECIMENS FOR STRENGTH TESTS, PERFORM SLUMP AND AIR CONTENT TESTS, AND DETERMINE THE TEMPERATURE OF THE CONCRETE	X	X	-	ASTM C31, C172 ACI 318: 26.5, 26.12	-
7. INSPECT CONCRETE AND SHOTCRETE PLACEMENT FOR PROPER APPLICATION TECHNIQUES	X	X	-	ACI 318 Ch. 26.5.3-26.5.5	-
8. VERIFY MAINTENANCE OF SPECIFIED CURING TEMPERATURE AND TECHNIQUES	X	-	X	ACI 318 Ch. 26.5.3-26.5.5	-
9. INSPECT PRESTRESSED CONCRETE FOR:	-	-	-	ACI 318 Ch. 26.10	-
a. APPLICATION OF PRESTESSING FORCES	-	X	-		
b. GROUTING OF BONDED PRESTRESSING TENDONS	-	X	-		
10. INSPECT ERECTION OF PRECAST CONCRETE MEMBERS	-	-	X	ACI 318 Ch. 26.9	-
11. FOR PRECAST CONCRETE DIAPHRAGM CONNECTIONS OR REINFORCEMENT AT JOINTS CLASSIFIED AS MODERATE OR HIGH DEFORMABILITY ELEMENTS (MDE OR HDE) IN STRUCTURES ASSIGNED TO SEISMIC DESIGN CATEGORY C, D, E, OR F, INSPECT SUCH CONNECTIONS AND REINFORCEMENT IN THE FIELD FOR:	-	-	-	ACI 318 Ch. 26.13.1.3	-
A. INSTALLATION OF THE EMBEDDED PARTS	-	X	-	ACI 318 Ch. 26.13.1.3	-
B. COMPLETION OF THE CONTINUITY OF REINFORCEMENT ACROSS JOINTS	-	X	-		
C. COMPLETION OF CONNECTIONS IN THE FIELD	-	X	-		
12. INSPECT INSTALLATION TOLLERANCES OF PRECAST CONCRETE DIAPHRAGM CONNECTIONS FOR COMPLIANCE WITH ACI 550.5	-	-	X	ACI 318 Ch. 26.13.1.3	-
13. VERIFY IN-SITU CONCRETE STRENGTH, PRIOR TO STRESSING OF TENDONS IN POST-TENSIONED CONCRETE AND PRIOR TO REMOVAL OF SHORES AND FORMS FROM BEAMS AND STRUCTURAL SLABS	-	-	X	ACI 318 Ch. 26.11.2	-
14. INSPECT FORMWORK FOR SHAPE, LOCATION AND DIMENSIONS OF THE CONCRETE MEMBER BEING FORMED.	X	-	X	ACI 318 Ch. 26.11.1.2(b)	-

REQUIRED VERIFICATION & INSPECTION OF WOOD FRAMING

APPLICABLE TO THIS PROJECT	VERIFICATION AND INSPECTION TASK	CONTINUOUS	PERIODIC
X	1. VERIFY LUMBER GRADE - VISUAL	--	X
X	2. SHEAR WALL NAILING PATTERNS - VISUAL	--	X
X	3. LIGHT GAGE METAL CONNECTIONS - VISUAL	--	X
X	4. SHEAR WALL HOLD DOWN ANCHORS - VISUAL	X	--

MINIMUM VERIFICATION REQUIREMENTS

MINIMUM VERIFICATION	REQUIRED FOR QUALITY ASSURANCE			TMS 602
	LEVEL 1	LEVEL 2	LEVEL 3	
1. PRIOR TO CONSTRUCTION, VERIFICATION OF COMPLIANCE OF SUBMITTALS.	X	X	X	ART. 1.5
2. PRIOR TO CONSTRUCTION, VERIFICATION OF f'_m AND f'_{AAC} EXCEPT WHERE SPECIFICALLY EXEMPTED BY THIS CODE.	-	X	X	ART. 1.4 B
3. DURING CONSTRUCTION, VERIFICATION OF SLUMP FLOW AND VISUAL STABILITY INDEX (VSI) WHEN SELF-CONSOLIDATING GROUT IS DELIVERED TO THE PROJECT SITE.	-	X	X	ART. 1.5, 1.6.3
2. DURING CONSTRUCTION, VERIFICATION OF f'_m AND f'_{AAC} FOR EVERY 5,000 SQ. FT. (465 SQ. M)	-	-	X	ART. 1.4 B
3. DURING CONSTRUCTION, VERIFICATION OF PROPORTIONS OF MATERIALS AS DELIVERED TO THE PROJECT SITE FOR PREMIXED OR PREBLENDED MORTAR, PRESTRESSING GROUT, ANDGROUT OTHER THAN SELF-CONSOLIDATING GROUT.	-	-	X	ART. 1.4 B

STRUCTURAL SPECIAL INSPECTION SCHEDULE: MASONRY CONSTRUCTION

VERIFICATION AND INSPECTION TASK	APPLICABLE TO THIS PROJECT?	FREQUENCY[A]			TMS 402	TMS 602
		LEVEL 1	LEVEL 2	LEVEL 3		
4. AS MASONRY CONSTRUCTION BEGINS, THE FOLLOWING SHALL BE VERIFIED TO ENSURE COMPLIANCE:						
A. PROPORTIONS OF SITE PREPARED MORTAR	-	-	P	P		ART. 2.1, 2.6 A, 2.6 C
B. GRADE AND SIZE OF PRESTRESSING TENDONS AND ANCHORAGES.	-	-	P	P		ART. 2.4 B, 2.4 H
C. GRADE, TYPE, AND SIZE OF REINFORCEMENT, CONNECTORS, ANCHOR BOLTS, AND PRESTRESSING TENDONS AND ANCHORAGES.	X	-	P	P		ART. 3.4, 3.6 A
D. PRESTRESSING TECHNIQUE.	-	-	P	P		ART. 3.6 B
E. PROPERTIES OF THIN-BED MORTAR FOR AAC MASONRY	-	-	C[B]/P[C]	C		ART. 2.1 C.1
F. SAMPLE PANEL CONSTRUCTION	-	-	P	C		ART. 1.6 D
2. PRIOR TO GROUTING, VERIFY THAT THE FOLLOWING ARE IN COMPLIANCE:						
A. GROUT SPACE	X	-	P	C		ART. 3.2 D, 3.2 F
B. PLACEMENT OF PRESTRESSING TENDONS AND ANCHORAGES	-	-	P	P	SEC. 10.8, 10.9	ART. 2.4, 3.6
C. PLACEMENT OF REINFORCEMENT, CONNECTORS, AND ANCHOR BOLTS	X	-	P	C	SEC. 6.1, 6.3.1, 6.3.6, 6.3.7	ART. 3.2 E, 3.4
D. PROPORTIONS OF SITE-PREPARED GROUT AND PRESTRESSING GROUT FOR BONDED TENDONS	-	-	P	P		ART. 2.6 B, 2.4 G.1.b
3. VERIFY COMPLIANCE OF THE FOLLOWING DURING CONSTRUCTION:						
A. MATERIALS AND PROCEDURES WITH THE APPROVED SUBMITTALS	X	-	P	P		ART. 1.5
B. PLACEMENT OF MASONRY UNITS AND MORTAR JOINT CONSTRUCTION	X	-	P	P		ART. 3.3 B
C. SIZE AND LOCATION OF STRUCTURAL MEMBERS	X	-	P	P		ART. 3.3 F
D. TYPE, SIZE, AND LOCATION OF ANCHORS, INCLUDING OTHER DETAILS OF ANCHORAGE OF MASONRY TO STRUCTURAL MEMBERS, FRAMES, OR OTHER CONSTRUCTION	X	-	P	C	SEC. 1.2.1(e), 6.2.1, 6.3.1	
E. WELDING OF REINFORCEMENT	-	-	C	C	SEC. 6.1.6.1.2	
F. PREPARATION, CONSTRUCTION, AND PROTECTION OF MASONRY DURING COLD WEATHER (TEMPERATURE BELOW 40° F (4.4° C)) OR HOT WEATHER (TEMPERATURE ABOVE 90° F (32.2° C))	-	-	P	P		ART. 1.8 C, 1.8 D
G. APPLICATION AND MEASURING OF PRESTRESSING FORCE	-	-	C	C		ART. 3.6 B
H. PLACEMENT OF GROUT AND PRESTRESSING GROUT FOR BONDED TENDONS IS IN COMPLIANCE	-	-	C	C		ART. 3.5, 3.6 C
I. PLACEMENT OF AAC MASONRY UNITS AND CONSTRUCTION OF THIN-BED MORTAR JOINTS	-	-	C[B]/P[C]	C		ART. 3.3 B.9, 3.3 F.1.b
4. OBSERVE PREPARATION OF GROUT SPECIMENS, MORTAR SPECIMENS, AND/OR PRISMS	-	-	P	C		ART. 1.4 B.2.a.3, 1.4 B.2.b.3, 1.4 B.2.c.3, 1.4 B.3, 1.4 B.4

(A) FREQUENCY REFERS TO THE FREQUENCY OF INSPECTION, WHICH MAY BE CONTIUOUS DURING THE LISTED TASK OR PERIODICALLY DURING THE LISTED TASK, AS DEFINED IN THE TABLE.
- = NOT REQUIRED, P = PERIODIC, C= CONTINUOUS

(B) REQUIRED FOR THE FIRST 5000 SQUARE FEET (465 SQUARE METERS) OF AAC MASONRY

(C) REQUIRED AFTER THE FIRST 5000 SQUARE FEET (465 SQUARE METERS) OF AAC MASONRY

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BATH TOWNSHIP
1826

NORTH FORK PRESERVE BARN RENOVATION

4400 EVERETT ROAD, AKRON, OH 44333

PROJECT # 2324

ISSUE:

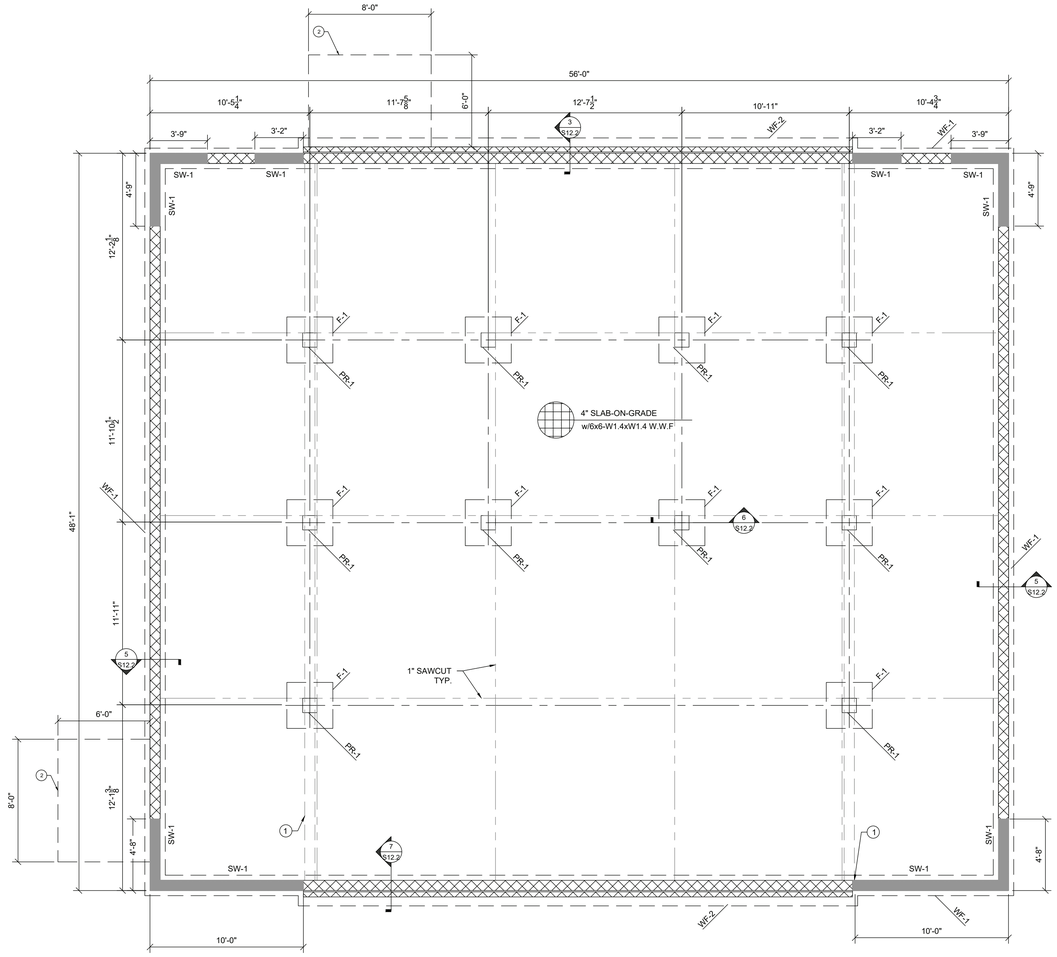
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SPECIAL INSPECTIONS

S10.2

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1 S11.1 FOUNDATION PLAN

1/4" = 1'-0"

FOOTING SCHEDULE				
MARK	SIZE			REINFORCEMENT
	L	W	T	
WF-1	-	1'-4"	1'-0"	(3) #4 CONT.
WF-2	-	2'-0"	1'-0"	(3)#4 CONT.
F-1	3'-0"	3'-0"	1'-0"	(4) #4 EW

PIER SCHEDULE			
MARK	TYPE	SIZE	REINF.
PR-1	SANDSTONE	1'-4"x1'-4"x2'-4"	(1)#4 DOWEL

FOUNDATION NOTES:

1. CONTRACTOR SHALL COORDINATE ALL DIMENSIONS AND ELEVATIONS w/ ARCHITECTURAL DRAWINGS PRIOR TO CONSTRUCTION.
2. DIMENSIONS SHOWN ARE TO OUTSIDE FACE OF MASONRY
3. FOR ADDITIONAL INFORMATION AND REQUIREMENTS, SEE TYPICAL DETAILS AND GENERAL NOTES.
4. SAWCUT JOINTS IN SLAB-ON-GRADE SHALL BE MADE AFTER CONCRETE HAS TAKEN INITIAL SET BEFORE CONCRETE SHRINKAGE STRESSES ARE INCURRED. SAWCUTS SHALL BE PLACE @ MAX. 12'-0" o/c SPACING.
5. ELEVATIONS MEASURED FROM FINISHED FLOOR = 0'-0"
6. CONTRACTOR TO FIELD VERIFY DIMENSIONS. CONTRACTOR IS RESPONSIBLE FOR ALL SHORING NECESSARY FOR RAISING AND SETTING BARN ON NEW FOUNDATIONS. CONTRACTOR RESPONSIBLE FOR RAISING STRUCTURE SHALL COORDINATE WITH FOUNDATION CONTRACTOR ON ALL FINAL DIMENSIONS
7. SEE S12.2 FOR SHEAR WALL NAILING AND HOLD DOWN REQUIREMENTS.

(1) EXISTING FOOTING AND FOUNDATION WALL MAY REMAIN IN PLACE BELOW LEVEL OF COMPACTED BACKFILL FOR SLAB.

(2) INDICATES LOCATION OF NEW FROST SLAB.

TOP OF INT. FTG = -0' -8" UNO
TOP OF PIER = +1' -8" UNO
TOP OF EXT. FTG = -3' -0" UNO

EXISTING BARN IS TO BE LIFTED OFF OF EXISTING FOUNDATIONS. EXISTING FOUNDATIONS ARE TO BE DEMOLISHED AND NEW FOUNDATIONS ARE TO BE CONSTRUCTED FOR SUPPORT OF EXISTING BARN AND NEW ADDITIONS. SEE FOUNDATION NOTES AND ARCHITECTURAL DRAWINGS FOR ADDITIONAL INFORMATION.

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PROJECT # 2324

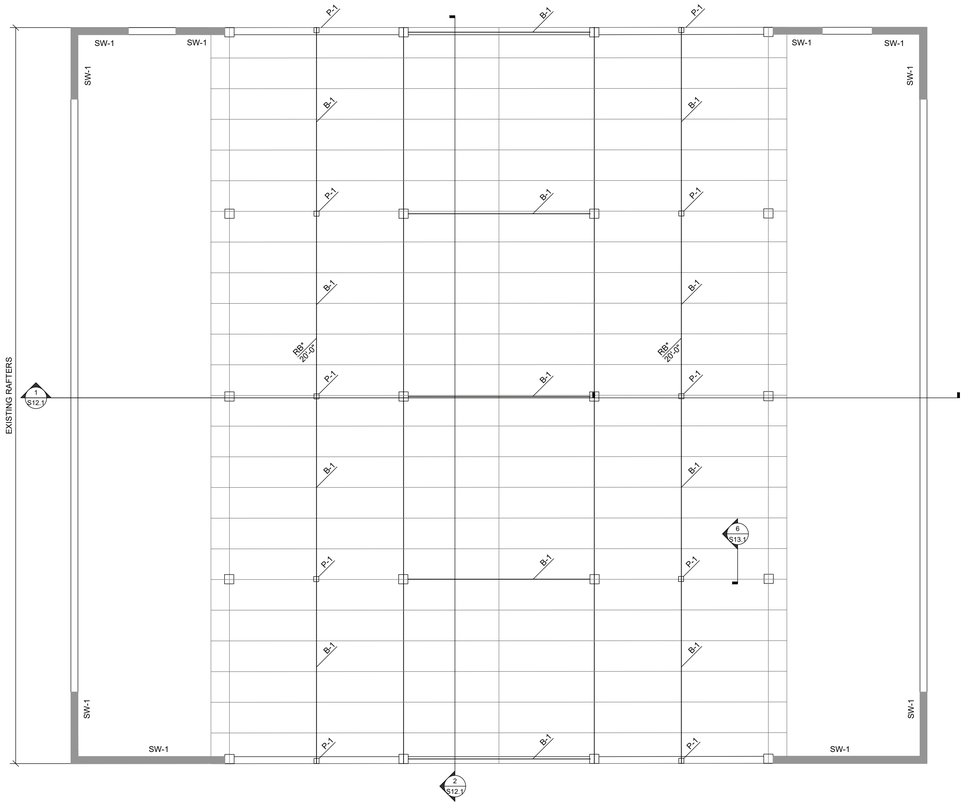
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FOUNDATION PLAN

S11.1

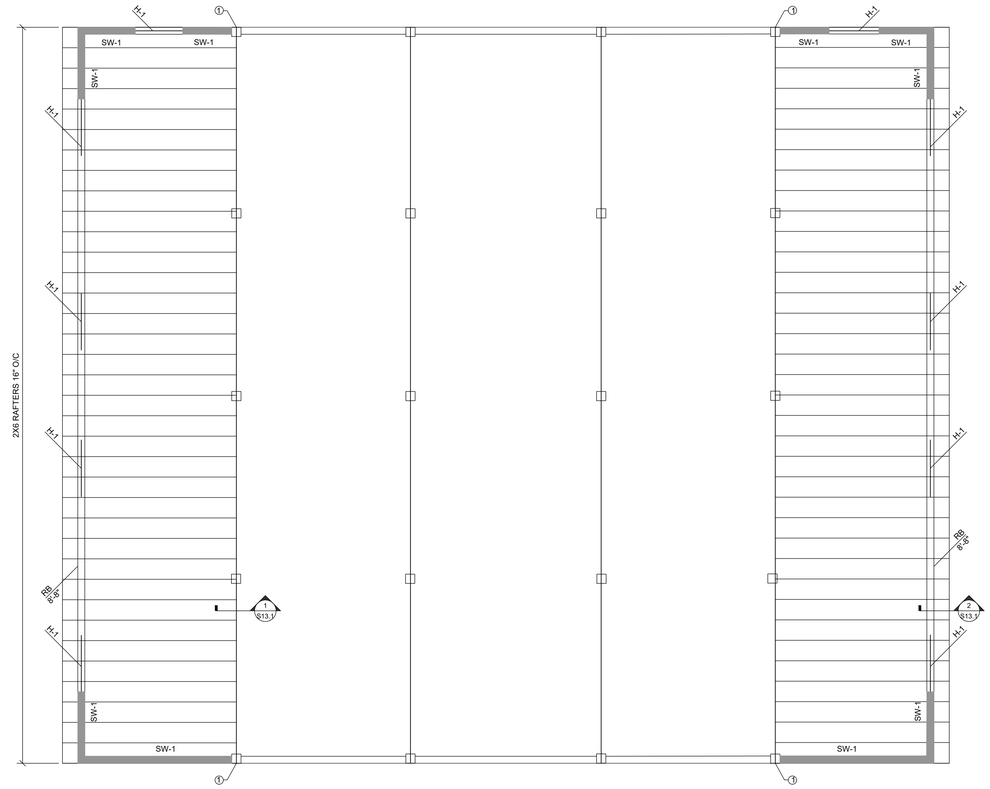
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1 S11.2 UPPER ROOF FRAMING PLAN

1/4" = 1'-0"



2 S11.2 LOWER ROOF FRAMING PLAN

1/4" = 1'-0"

POST SCHEDULE	
MARK	SIZE
P-1	4X4

BEAM SCHEDULE	
MARK	SIZE
B-1	4X8

HEADER SCHEDULE			
MARK	HEADER SIZE	JACK STUDS	KING STUDS
H-1	(3)-2x6	1	1

FRAMING NOTES:

1. SEE S10.1 & S10.2 FOR STRUCTURAL NOTES & SPECIAL INSPECTIONS
2. COORDINATE ALL OPENINGS WITH ARCHITECTURAL AND MECHANICAL DRAWINGS.
3. SEE S12.1, S12.2 & S13.1 FOR TYPICAL DETAILS & SECTIONS.
4. PROVIDE SIMPSON H1 TIE ON ALL RAFTERS TO PREVENT WIND UPLIFT.
5. SEE ARCHITECTURAL DRAWINGS FOR ROOF ELEVATIONS AND SLOPES.
6. ELEVATIONS MEASURED FROM FINISHED FLOOR = 0'-0". DIMS MARKED * TO BE FIELD VERIFIED BY CONTRACTOR
7. EXISTING 4X8 TIMBERS WHICH ARE TO BE REMOVED DURING DEMOLITION MAY BE SALVAGED AND RE-USED. RE-USED TIMBERS MUST BE FREE OF STRUCTURAL DEFECTS OR DAMAGE.

RB = RAFTER BEARING ELEVATION

① STRAP SHEAR WALL TO EXISTING BARN, SEE DTL 10/S13.1

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BATH TOWNSHIP EST. 1818

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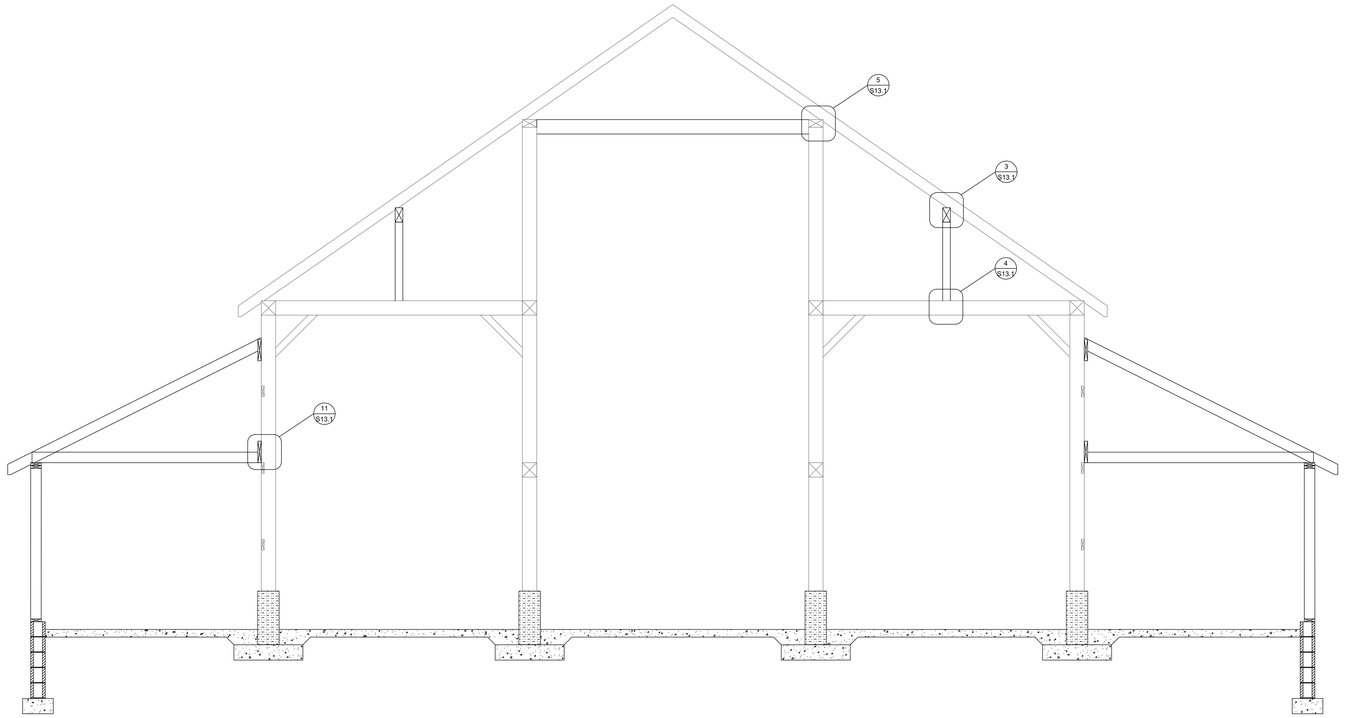
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ROOF FRAMING PLANS

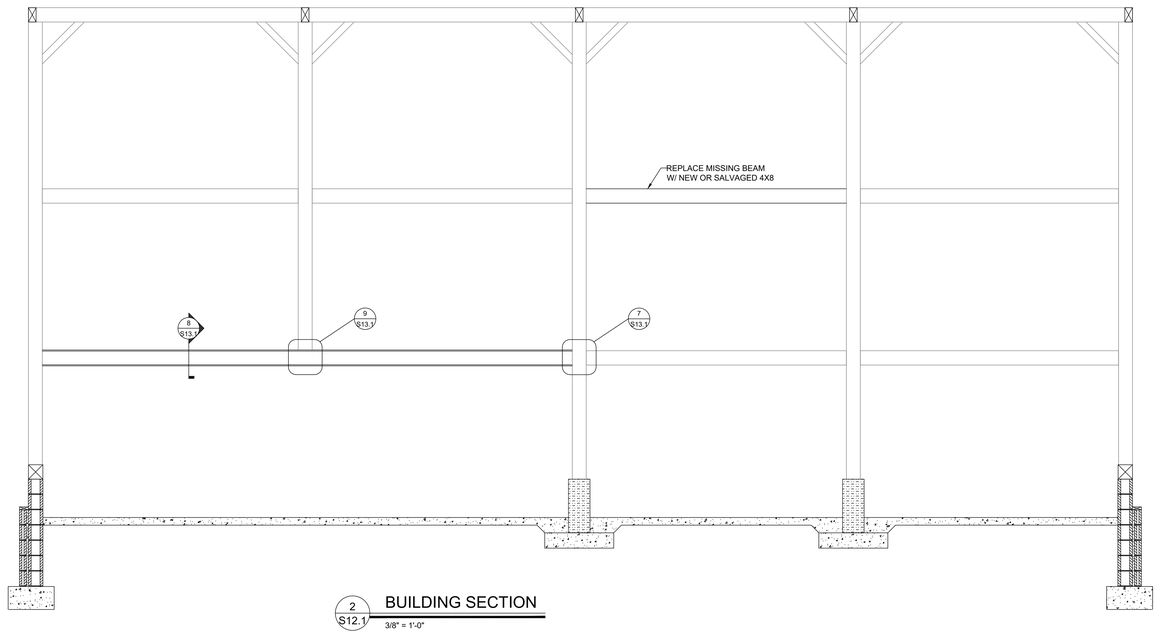
S11.2

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1 S12.1 BUILDING SECTION
3/8" = 1'-0"



2 S12.1 BUILDING SECTION
3/8" = 1'-0"

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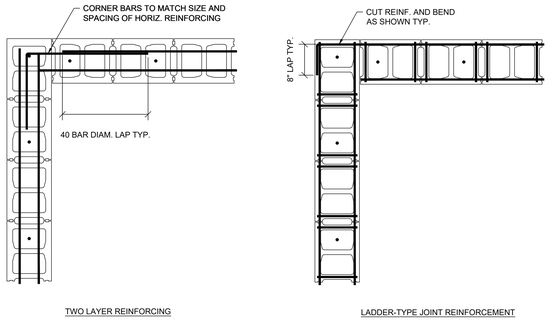
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BUILDING SECTIONS

S12.1

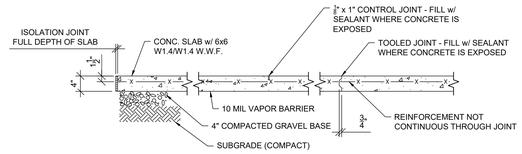
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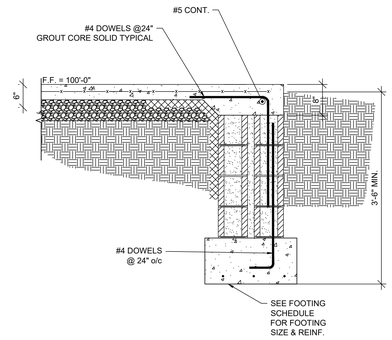
TYPICAL CORNER REINFORCING FOR MASONRY WALLS

1 S12.2 PLAN DETAIL
3/4" = 1'-0"

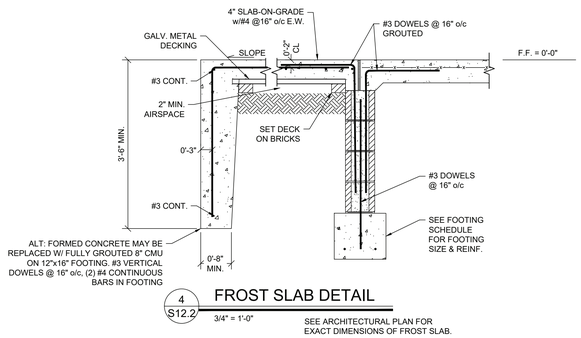


2 S12.2 4" SLAB JOINT DETAILS
3/4" = 1'-0"

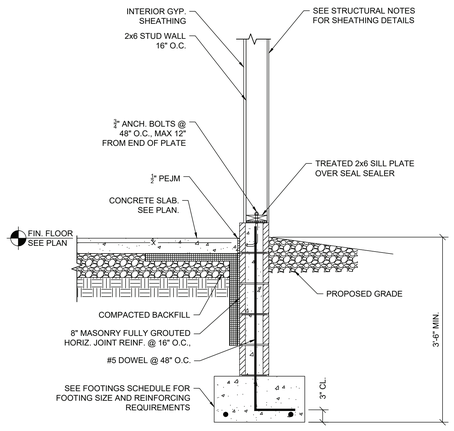
NOTES:
1. CONSTRUCTION JOINTS SHALL BE LOCATED AT THE END OF ANY SINGLE POUR.
2. CONSTRUCTION JOINT MAY REPLACE A CONTROL JOINT.
3. PROVIDE ISOLATION JOINTS AT THE FACE OF ALL COLUMNS, WALLS, PIERS AND ADJACENT CONSTRUCTION.
4. SPACING OF CONTROL JOINTS SHALL BE BETWEEN 8' TO 12' o/c. SEE PLAN.



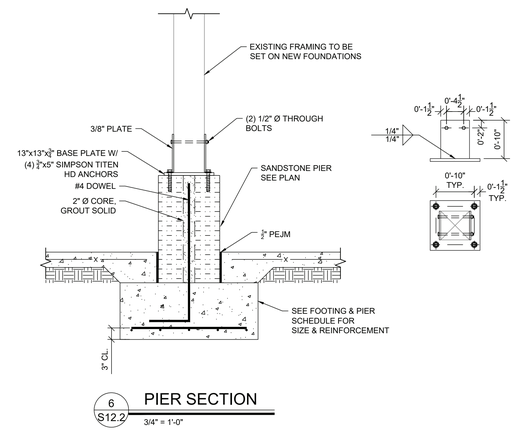
3 S12.2 SECTION AT OVERHEAD DOOR
3/4" = 1'-0"



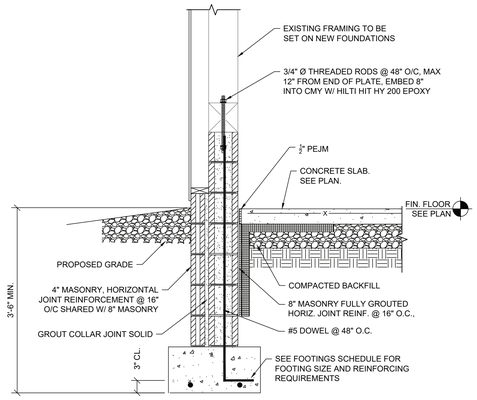
4 S12.2 FROST SLAB DETAIL
3/4" = 1'-0"
SEE ARCHITECTURAL PLAN FOR EXACT DIMENSIONS OF FROST SLAB.



5 S12.2 FOUNDATION SECTION
3/4" = 1'-0"



6 S12.2 PIER SECTION
3/4" = 1'-0"



7 S12.2 FOUNDATION SECTION
3/4" = 1'-0"

SHEAR WALL SCHEDULE

MARK	LEVEL	SHEATHING							END STUDS	HOLD DOWN/FLOOR TIES				
		THICKNESS	TYPE	SIDE	BLOCKED	FASTENERS	EDGE SPACING	FIELD SPACING		LEVEL	TYPE	FASTENERS	ANCHOR ROD	EMBEDMENT
SW-1	1	7/16"	PLYWOOD	ONE	YES	8d NAILS	4" o/c	12" o/c	(2)-2x	1	HD3B	(2)⅝" Ø BOLTS	5/8"	8"

NOTES:
- EXTERIOR SHEATHING IS 7/16" PLYWOOD SHEATHING.
- SHEATHING REQUIREMENTS ARE FOR STRUCTURAL ONLY. SEE ARCHITECTURAL FOR COMPLETE WALL ASSEMBLY
- SHEATHING AND GYP BOARD MUST BE ATTACHED DIRECTLY TO STUDS
- ALL EDGES OF PANELS MUST BE ON THE SAME STUD AS ADJACENT PANEL
- END JOINTS OF PANELS SHALL NOT OCCUR AT THE SAME STUD (STAGGER PANELS)
- MAXIMUM STUD SPACING SHALL BE 16" o/c
- HOLD DOWNS ARE BY SIMPSON COMPANY OR EQUAL. HOLDDOWN STUD FASTENERS ARE SIMPSON PROPRIETARY FASTENERS.
- FASTENERS ALONG THE EDGES IN SHEAR PANELS SHALL BE PLACED IN FROM PANEL EDGES NOT LESS THAN ¾" INCHES
- PANELS LESS THAN 12 INCHES WIDE SHALL NOT BE USED. UNLESS NOTED, ALL SHEATHING EDGES SHALL BE ATTACHED TO FRAMING MEMBERS OR BLOCKING.
- BOUNDARY STUDS AT THE END OF THE SHEAR WALLS SHALL BE ATTACHED PER THE MINIMUM NAILING REQUIREMENTS
- THE WIDTH OF THE NAILED FACE OF FRAMING MEMBERS AND BLOCKING SHALL BE 2" NOMINAL OR GREATER
- BLOCKING AND FRAMING MEMBERS SHALL BE 3" NOMINAL AND NAILING SHALL BE STAGGERED AT THE FOLLOWING CONDITIONS:
  - --- NAIL SPACING OF 2" ON CENTER AT ADJOING PANEL EDGES IS SPECIFIED
  - --- 10d COMMON NAILS HAVING PENETRATION INTO FRAMING MEMBERS AND BLOCKING OF MORE THAN 1-1/2" ARE SPECIFIED AT 3" ON CENTER OR LESS AT PANEL EDGES

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BATH TOWNSHIP

NORTH FORK PRESERVE BARN RENOVATION

4400 EVERETT ROAD, AKRON, OH 44333

PROJECT # 2324

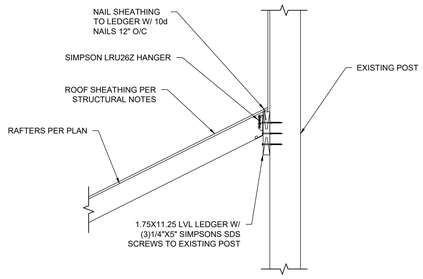
ISSUE:
BID SET 07-28-2025

FOUNDATION DETAILS

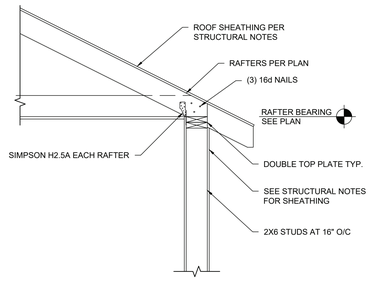
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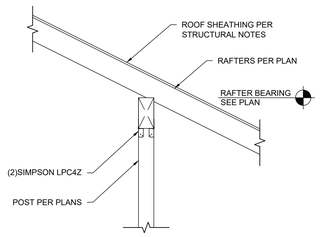
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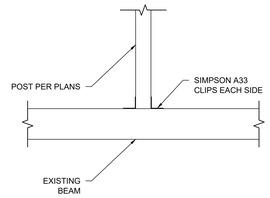
1 S13.1 FRAMING DETAIL
3/4" = 1'-0"



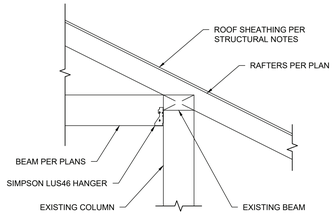
2 S13.1 FRAMING DETAIL
3/4" = 1'-0"



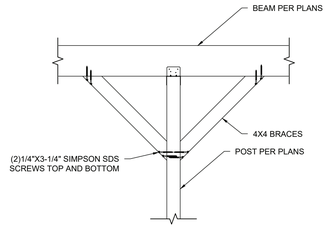
3 S13.1 FRAMING DETAIL
3/4" = 1'-0"



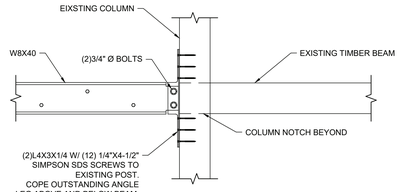
4 S13.1 FRAMING DETAIL
3/4" = 1'-0"



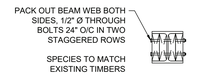
5 S13.1 FRAMING DETAIL
3/4" = 1'-0"



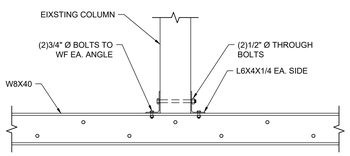
6 S13.1 FRAMING DETAIL
3/4" = 1'-0"



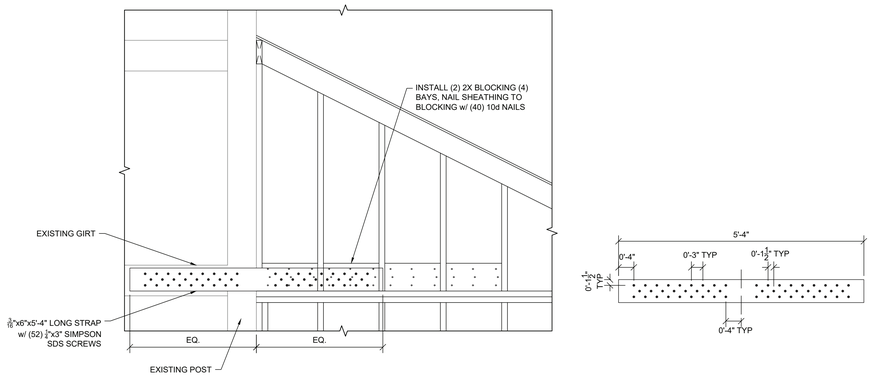
7 S13.1 FRAMING DETAIL
3/4" = 1'-0"



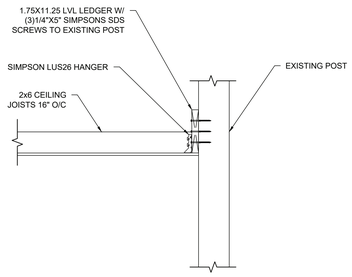
8 S13.1 FRAMING DETAIL
3/4" = 1'-0"



9 S13.1 FRAMING DETAIL
3/4" = 1'-0"



10 S13.1 FRAMING DETAIL
3/4" = 1'-0"



11 S13.1 FRAMING DETAIL
3/4" = 1'-0"

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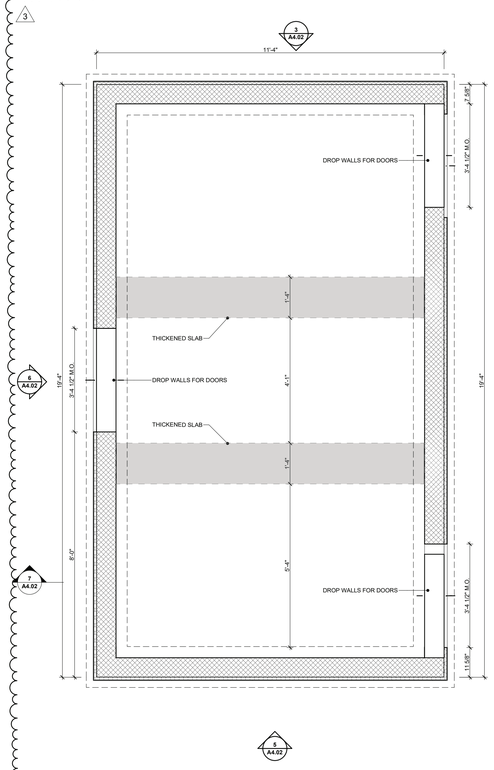
BID SET	07-28-2025

FRAMING DETAILS

S13.1

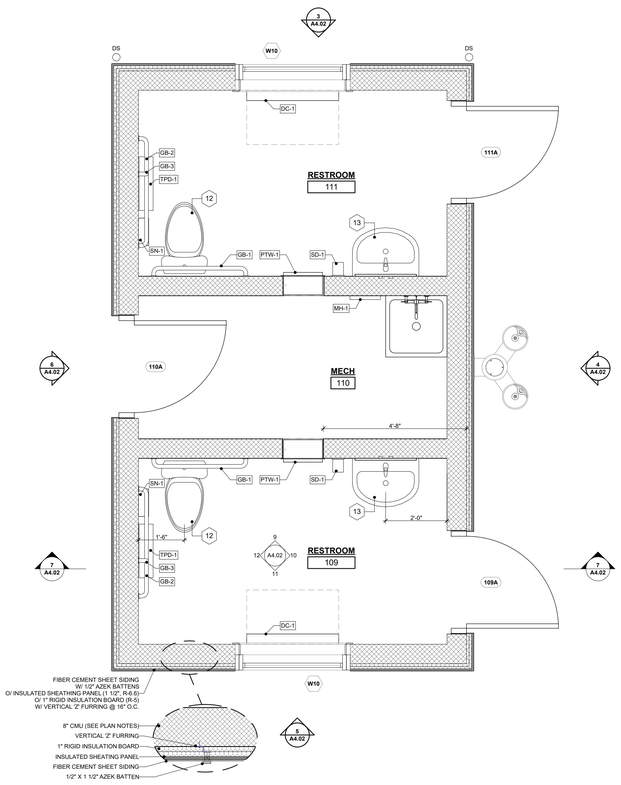
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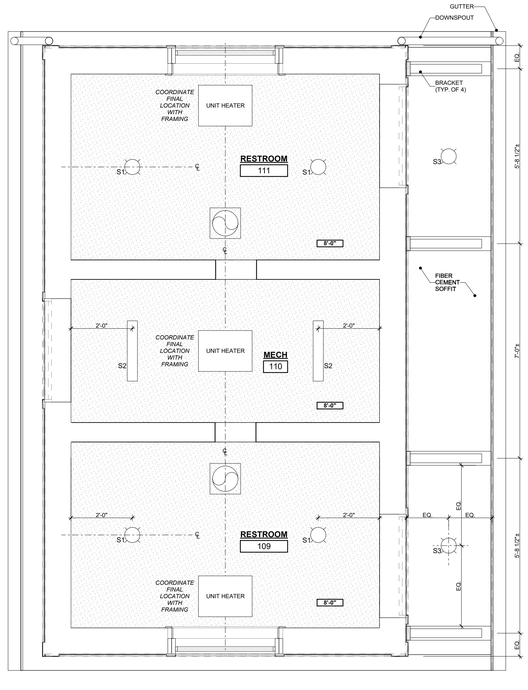
1 RESTROOM OUTBUILDING - FOUNDATION PLAN

SCALE: 1/2" = 1'-0"



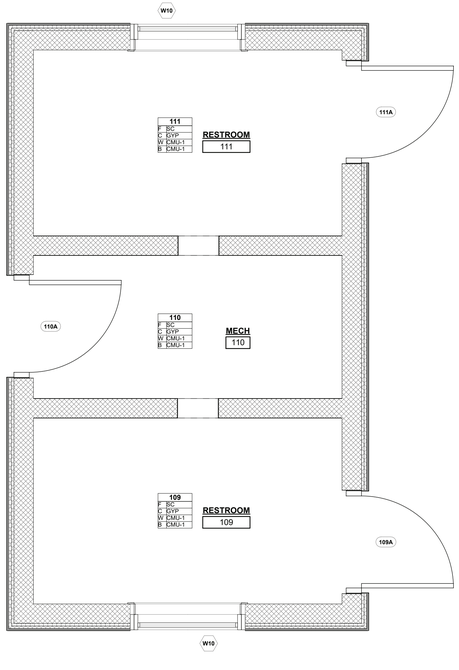
2 RESTROOM OUTBUILDING - FLOOR PLAN

SCALE: 1/2" = 1'-0"



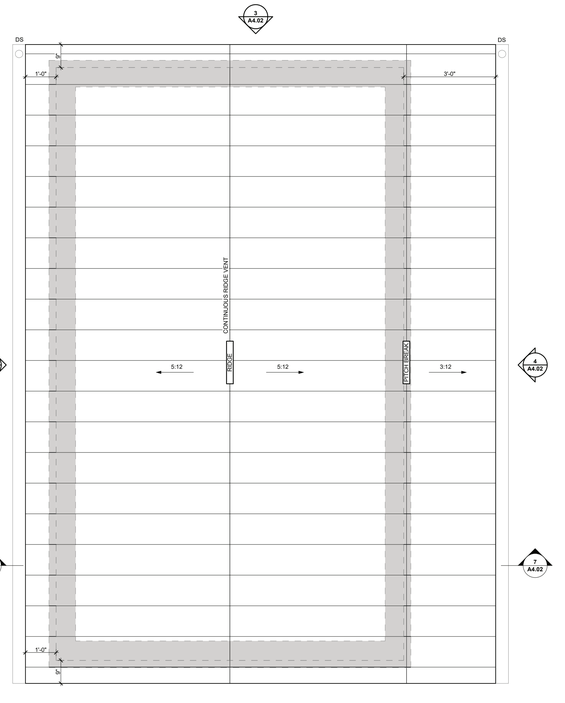
4 RESTROOM OUTBUILDING - CEILING PLAN

SCALE: 1/2" = 1'-0"



3 RESTROOM OUTBUILDING - FINISH PLAN

SCALE: 1/2" = 1'-0"



5 RESTROOM OUTBUILDING - ROOF PLAN

SCALE: 1/2" = 1'-0"

NOTE: PROVIDE TRANSLUCIENT PRIVACY FILM ON INTERIOR OF WINDOWS

WINDOW SCHEDULE

ID	W x H	REMARKS
W10	3'-6"x1'-6"	

ELECTRICAL INFORMATION LEGEND

- SINGLE POLE LIGHT SWITCH
- 3 MULTIPLE POLE LIGHT SWITCH (3-WAY, 4-WAY)
- P RECESSED SHALLOW/PUCK LIGHT
- R RECESSED CAN LIGHT/ SQUARE FIXTURE
- E RECESSED, ADJUSTABLE EYEBALL CAN
- WS WALL SCONCE
- EXT EXTERIOR WALL MOUNTED FIXTURE
- S SURFACE MOUNT FIXTURE
- P PENDANT FIXTURE
- SURFACE MOUNT LINEAR LED
- VL WALL MOUNT VANITY FIXTURE LIGHT
- LFE FAN LIGHT /EXHAUST FAN
- CE CAN FAN
- SMOKE DETECTOR
- E DUPLEX RECEPTACLE
- GF GFCI DUPLEX RECEPTACLE
- 220 220V APPLIANCE OUTLET
- WP WEATHERPROOF DUPLEX RECEPTACLE
- FLOOR DUPLEX RECEPTACLE
- EXHAUST FAN

CEILING TYPE LEGEND

PAINTED GYPSUM BOARD CEILING

CEILING PLAN NOTES

OUTLET SPACING & LOCATIONS
APPLIANCE RECEPTACLE OUTLETS FOR SPECIFIC APPLIANCES SHALL BE INSTALLED WITHIN 6 FT OF THE INTENDED LOCATION OF THE APPLIANCE.
A RECEPTACLE OUTLET SHALL BE INSTALLED AT EACH WALL COUNTERTOP AND WORK SURFACE THAT IS 12 INCHES OR WIDER. RECEPTACLE OUTLETS SHALL BE INSTALLED SO THAT NO POINT ALONG THE WALL LINE IS MORE THAN 24 INCHES MEASURED HORIZONTALLY FROM A RECEPTACLE OUTLET IN THAT SPACE.
AT LEAST ONE RECEPTACLE OUTLET SHALL BE INSTALLED IN BATHROOMS WITHIN 3 FEET OF THE OUTSIDE EDGE OF EACH BASIN.

PER NEC 210.8, THE FOLLOWING LOCATIONS SHALL HAVE GROUND-FAULT CIRCUIT INTERRUPTER PROTECTION: 1) BATHROOMS, 2) GARAGES & ACCESSORY BUILDINGS THAT THAVE A FLOOR LOCATED AT OR BELOW GRADE LEVEL NOT INTENDED AS HABITABLE ROOMS AND LIMITED TO STORAGE AREAS, WORK AREAS, AND AREAS OF SIMILAR USE, 3) OUTDOORS 4) CRAWL SPACES 5) BASEMENTS 6) KITCHENS, 7) SINKS 8) BOATHOUSES, 9) BATHTUBS OR SHOWER STALLS, 10) LAUNDRY AREAS. FOR ADDITIONAL ELECTRICAL INFORMATION CONSULT NEC.

VERIFY LOCATION, NUMBER, AND SWITCHING OF FIXTURES WITH OWNER

LIGHTING LAYOUT FOR REFERENCE ONLY, LIGHTING LAYOUT TO BE FINALIZED PRIOR TO INSTALLATION

1. CEILING MOUNTED FIXTURES INCLUDING, BUT NOT LIMITED TO, LIGHTS, DIFFUSERS, EXIT SIGNS FIRE ALARM STROBES, SMOKE DETECTORS TO BE CENTERED IN AREA IN WHICH THEY OCCUR UNLESS NOTED OTHERWISE.
2. EXIT SIGNS INDICATED ABOVE EGRESS DOORS TO BE LOCATED ON CENTERLINE OF DOOR SWING.
3. ARCHITECTURAL REFLECTED CEILING PLAN DISPLAYS GENERAL LOCATION AND LAYOUT SCHEME OF CEILING AND CEILING MOUNTED FIXTURES. CONSULTANT DRAWINGS SHOULD BE UTILIZED FOR FIXTURE TYPE AND QUANTITIES. MORE MINOR DISCREPANCIES EXIST BETWEEN ARCHITECTURAL AND CONSULTANT DOCUMENTS RELATING TO LOCATION OF CEILING MOUNTED ITEMS, ARCHITECTURAL REFLECTED CEILING PLAN SHOULD GOVERN. FOR MAJOR DISCREPANCIES (GREATER THAN 2'), NOTIFY ARCHITECT PRIOR TO PROCEEDING WITH WORK. FINAL LOCATION TO BE VERIFIED PRIOR TO INSTALLATION.
4. ALL GYPSUM BOARD CEILINGS AND SOFFITS SHALL BE PAINTED UNLESS NOTED OTHERWISE. REFERENCE FINISH DRAWING AND SPECIFICATIONS FOR ADDITIONAL INFORMATION.
5. ALL GYPSUM BOARD SHALL BE MOISTURE AND MOLD RESISTANT TYPE IN AREAS WHERE PLUMBING FIXTURES ARE INSTALLED.

DOOR AND HARDWARE GENERAL NOTES

1. FINAL HARDWARE SCHEDULE TO BE PROVIDED BY CONTRACTOR'S DOOR HARDWARE SUPPLIER AND APPROVED BY OWNER AND ARCHITECT.
2. FINAL LOCKSET FUNCTION AND KEYING SHALL BE COORDINATED WITH THE OWNER BY THE DOOR HARDWARE SUPPLIER. PROVIDE SUB AND GRAND MASTER LEVEL KEYING AND 4 KEYS FOR EACH LOCKSET.
3. ALL PASSAGE SETS, PRIVACY SETS AND LOCKSETS SHALL SHALL BE ANSI/ BHMA GRADE 1 COMMERCIAL WITH ADA COMPLIANT LEVER HARDWARE. ALL LOCKSETS SHALL BE THE PRODUCTS OF A SINGLE MANUFACTURER. ALL DOOR LOCKS SHALL ALLOW EGRESS WITHOUT THE USE OF A KEY AND BY MEANS OF A SINGLE OPERATION.
4. FURNISH NON-RISING TYPE PINS ON OUT SWINGING DOORS SCHEDULED TO RECEIVE LOCKSETS.
5. FINISH DOORS AND FRAMES WITH PAINT OR STAIN AS INDICATED (COLOR AS SELECTED BY OWNER) ALL SIDES.
6. PROVIDE WALL OR FLOOR MOUNTED STOP AS APPROPRIATE FOR EACH DOOR.
7. DOOR CLOSER CONFIGURATION SHALL BE IDENTIFIED AND COORDINATED BY THE DOOR HARDWARE SUPPLIER. ADJUST ALL CLOSER TO ADA 5 LBS. MAX. PULL FORCE.
8. PROVIDE SAFETY GLAZING IN THE FOLLOWING LOCATIONS PER OBC 2406.3:
   1) FIXED AND OPERABLE PANELS OF SWINGING DOORS
   2) PANELS ADJACENT TO DOORS WHERE NEAREST EXPOSED EDGE OF GLAZING IS WITHIN 24" ARC OF EITHER VERTICAL EDGE OF DOOR IN A CLOSED POSITION
   3) PANELS LARGER THAN 9 SF
   4) BOTTOM EDGE OF GLAZING IS LESS THAN 18" ABOVE THE FLOOR
   5) PANELS WITHIN 36" HORIZONTALLY OF A WALKING SURFACE
   6) PANELS WITHIN 36" HORIZONTALLY AND LESS THAN 60" ABOVE WALKING SURFACE OF STAIR
   7) PANELS WITHIN 60" HORIZONTALLY AND LESS THAN 60" ABOVE THE NOSE OF THE BOTTOM STAIR TREAD
9. HARDWARE AND ACCESSORIES TO BE BRUSHED STAINLESS FINISH OR EQUIVALENT.

DOOR OPERATION LEGEND

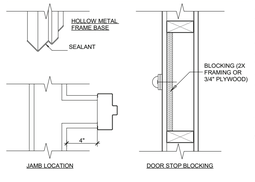
NS - NORMAL SWING
FO - FRAMED OPENING

DOOR HARDWARE SETS

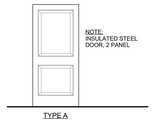
RESTROOM
- LOCK LEVER HANDSET
- CYLINDER LOCK - RESTROOM W/ OCCUPANCY INDICATOR
- CLOSER
- BALL BEARING HINGES
- WALL STOP

STOREROOM
- LOCK LEVER HANDSET
- CYLINDER LOCK - STOREROOM
- BALL BEARING HINGES
- WALL STOP

DOOR TYPICAL DETAILS

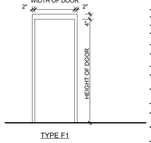


DOOR PANEL TYPE



TYPE A

DOOR FRAME TYPE



TYPE F1

DOOR SCHEDULE

ID	ROOM NAME	DOOR WIDTH	DOOR HEIGHT	OPERATION TYPE	DOOR PANEL TYPE	DOOR PANEL MATERIAL	FRAME TYPE	FRAME MATERIAL	HARDWARE FUNCTION	REMARKS
109A	RESTROOM	3'-0"	7'-0"	NS	A	HM	F1	HM	RESTROOM	
110A	MECH	3'-0"	7'-0"	NS	A	HM	F1	HM	STOREROOM	
111A	RESTROOM	3'-0"	7'-0"	NS	A	HM	F1	HM	RESTROOM	

FLOOR PLAN GENERAL NOTES

1. ARCHITECTURAL GROUND FLOOR FINISH ELEVATION = 0'-0".
2. VERIFY DIMENSIONS AND CONDITIONS IN FIELD. WHEN DIMENSIONS AND/OR CONDITIONS AS INDICATED ON DRAWINGS CONFLICT WITH ACTUAL, CONTACT ARCHITECT FOR CLARIFICATION.
3. FIELD VERIFY ALL EXISTING CONDITIONS PRIOR TO BIDDING, DEMOLITION, AND NEW CONSTRUCTION.
4. COORDINATE LOCATION OF EQUIPMENT AND PENETRATIONS WITH MECHANICAL, ELECTRICAL, AND PLUMBING DRAWINGS.
5. SEE EXTERIOR ELEVATIONS FOR IDENTIFICATION OF WINDOW TYPES AND SIZES.
6. MOISTURE RESISTANT GYP BD TO BE USED ON WALLS AND CEILINGS OF ALL RESTROOMS AND KITCHENS.
7. PROVIDE LEVEL SURFACES AND PREP FLOOR TO RECEIVE SCHEDULED FINISH

ROOF PLAN LEGEND

INDICATES BEARING WALL BELOW

ROOF PLAN GENERAL NOTES

1. REFER TO MECHANICAL AND ELECTRICAL DRAWINGS FOR ADDITIONAL WORK AND MEP PENETRATIONS.
2. ROOF FRAMING SLOPED BY DESIGN (U.N.O.). SLOPE INFORMATION SHOWS INTENT. COORDINATE SLOPES WITH STRUCTURAL DRAWINGS. MINIMUM ROOF SLOPE IS 1/4" PER FOOT UNLESS NOTED OTHERWISE.
3. ROOF PENETRATIONS HAVE BEEN COORDINATED WITH MECHANICAL AND ELECTRICAL DESIGN INTENT AND ARE FOR BIDDING PURPOSES ONLY. CONTRACTOR SHALL COORDINATE FINAL LOCATIONS OF OPENINGS WITH MECHANICAL CONTRACTOR(S).
4. FLASH AND TERMINATE ROOFING AT PENETRATIONS, EDGES, PARAPETS, ETC. PER NRCA AND MANUFACTURER'S WRITTEN RECOMMENDATIONS UNLESS NOTED OTHERWISE. FLASHING AND TERMINATIONS SHALL OCCUR EIGHT INCHES (8") ABOVE ROOF MEMBRANE, MINIMUM.

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BATH TOWNSHIP

NORTH FORK PRESERVE RENOVATION

4400 EVERETT ROAD, AKRON, OH 44333

N

PROJECT # 2324

ISSUE:
BID SET 07-28-2025

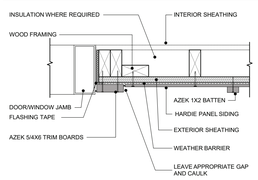
RESTROOM BUILDING PLANS

A1.03

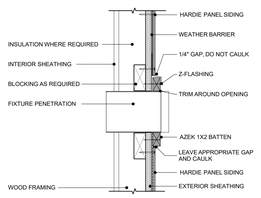
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Plotted: Wednesday, May 28, 2025

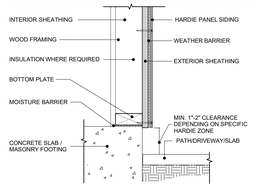
DOOR/WINDOW JAMB



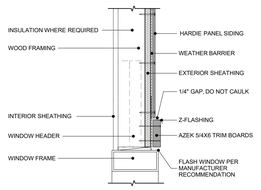
FIXTURE PENETRATION



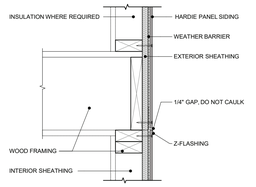
HARDSCAPE CLEARANCES, DECKS, PORCHES, PATIOS, WALKWAYS, ROOFS, ETC.



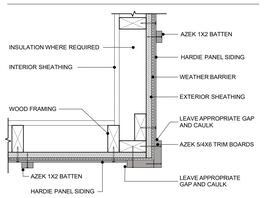
WINDOW/DOOR HEAD



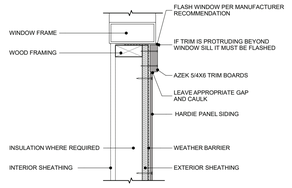
HORIZONTAL JOINT



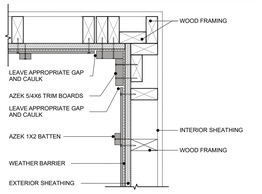
OUTSIDE CORNER



WINDOW SILL



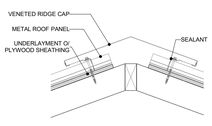
INSIDE CORNER



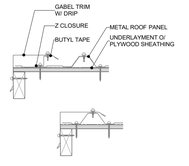
1 TYPICAL SIDING DETAILS

SCALE: 1 1/2"= 1'-0"

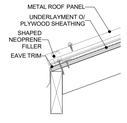
RIDGE DETAIL



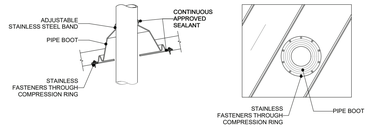
GABLE DETAILS



EAVE DETAIL

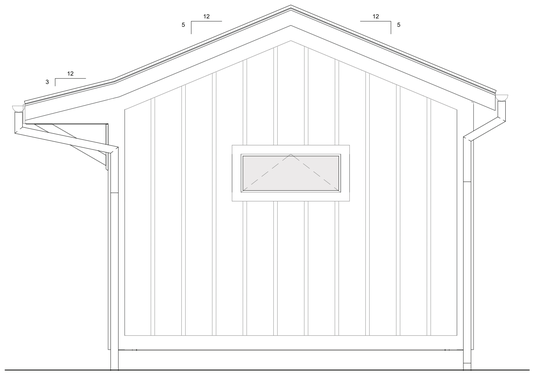


PIPE PENETRATION



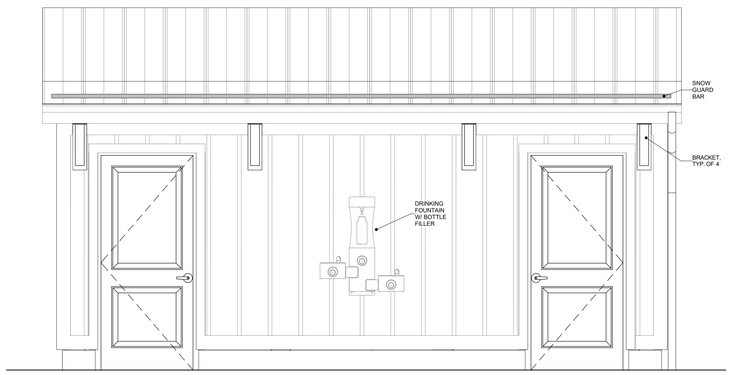
2 TYPICAL ROOF DETAILS

SCALE: 1 1/2"= 1'-0"



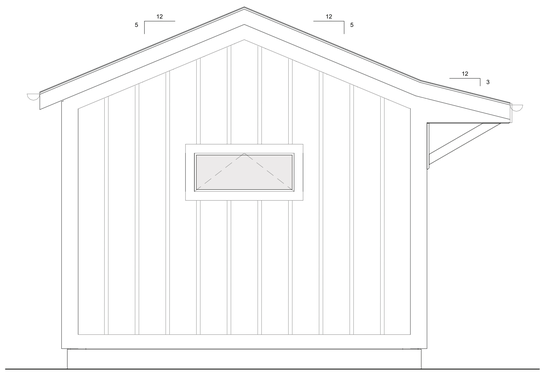
3 SOUTH ELEVATION

SCALE: 1/2" = 1'-0"



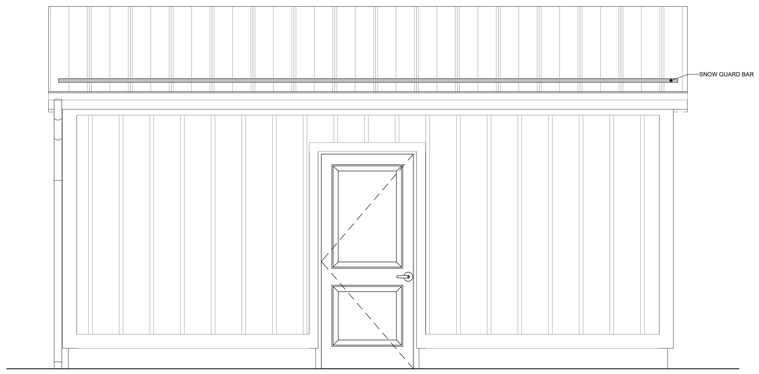
4 WEST ELEVATION

SCALE: 1/2" = 1'-0"



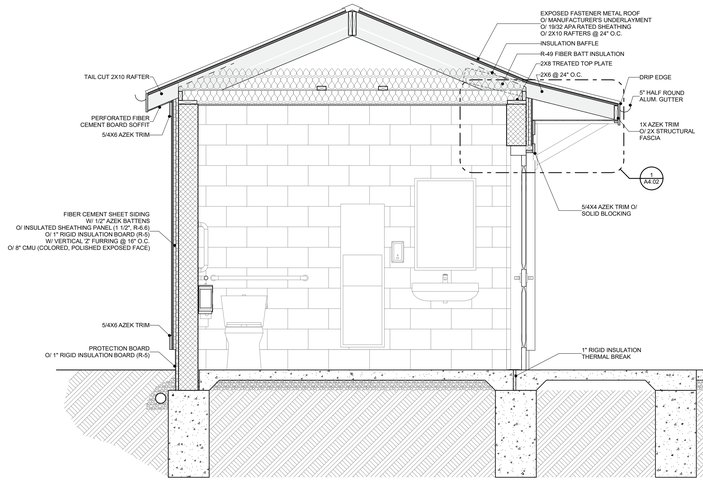
5 NORTH ELEVATION

SCALE: 1/2" = 1'-0"



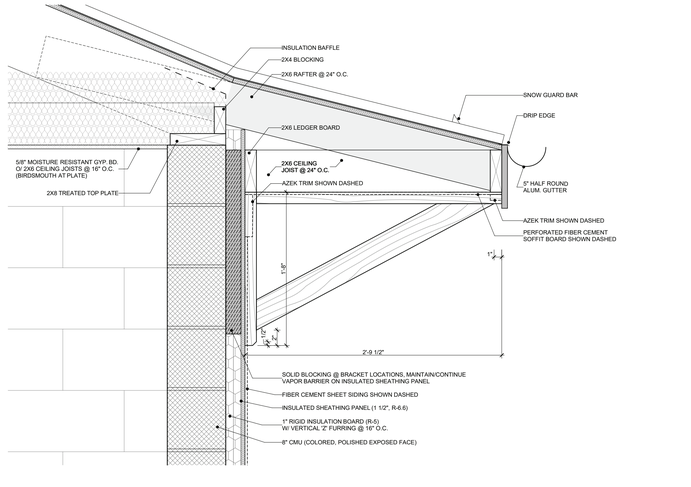
6 EAST ELEVATION

SCALE: 1/2" = 1'-0"



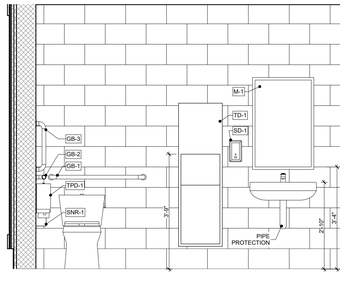
7 RESTROOM OUTBUILDING SECTION

SCALE: 1/2" = 1'-0"



8 BRACKET DETAIL

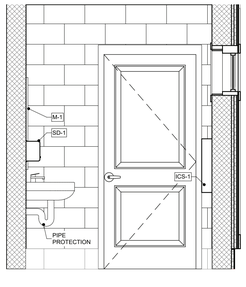
SCALE: 1 1/2"= 1'-0"



9 RESTROOM 109

SCALE: 1/2" = 1'-0"

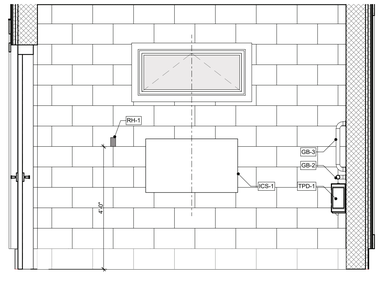
RESTROOM 111
OPP. HAND



10 RESTROOM 109

SCALE: 1/2" = 1'-0"

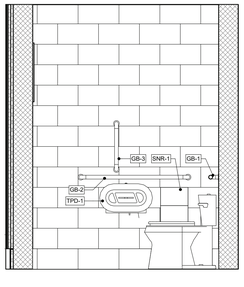
RESTROOM 111
OPP. HAND



11 RESTROOM 109

SCALE: 1/2" = 1'-0"

RESTROOM 111
OPP. HAND



12 RESTROOM 109

SCALE: 1/2" = 1'-0"

RESTROOM 111
OPP. HAND

INTERIOR ELEVATION GENERAL NOTES

1. REFER TO TYPICAL INTERIOR ELEVATIONS & MOUNTING HEIGHTS DRAWINGS.
2. PROVIDE BLOCKING WITHIN FRAMED WALLS FOR WALL MOUNTED AND RECESSED ACCESSORIES, FIXTURES, AND EQUIPMENT.
3. COORDINATE ROUGH OPENING DIMENSIONS FOR RECESSED EQUIPMENT AND ACCESSORIES WITH MANUFACTURER'S REQUIREMENTS.

TOILET ROOM NOTES

TOILET ROOM ACCESSORIES LISTED BELOW ARE BASIS OF DESIGN PRODUCTS. ALTERNATE MANUFACTURER'S PRODUCTS MEETING THE QUALITY, APPEARANCE, OPERATION AND ALL OTHER REQUIREMENTS MAY BE INCORPORATED WHEN SPECIFICALLY APPROVED BY THE ARCHITECT.

1. INSTALL STAINLESS STEEL GRAB BARS IN CONFIGURATIONS INDICATED. BARS AND INSTALLATION SHALL COMPLY WITH THE REQUIREMENTS OF 'ICC A117.1'
2. PROVIDE ADA COMPLIANT PIPE PROTECTION/UNDERLAVATORY GUARDS FOR ALL EXPOSED LAVATORY PIPING
3. TOILET ROOM ACCESSORIES - CONTRACTOR TO PROVIDE AND INSTALL:

GB-1	36" GRAB BAR
GB-2	42" GRAB BAR
GB-3	21" GRAB BAR
ICS-1	INFANT CHANGING STATION
M-1	MIRROR, 2' X 3'
MH-1	MOP AND BROOM HOLDER
RH-1	ROBE HOOK
SD-1	SOAP DISPENSER
SNR-1	SANITARY NAPKIN RECEPTACLE
TD-1	RECESSED PAPER TOWEL DISPENSER AND WASTE RECEPTACLE
TPD-1	TOILET PAPER DISPENSER

4. MOUNT ALL FIXTURES AND ACCESSORIES IN ACCORDANCE WITH THE REQUIREMENTS OF THE ADA. SOLID WOOD BLOCKING BEHIND ALL ITEMS IN FRAMED WALLS. CONCEALED FASTENERS TO BE USED WHERE POSSIBLE.
5. SEAL PLUMBING FIXTURES AT WALLS WITH 100% SILICONE SEALANT.
6. UNLESS NOTED OTHERWISE, PLUMBING FIXTURE AND FLOOR CLEARANCE DIMENSIONS ARE NOTED FROM FACE OF FINISH.

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BATH TOWNSHIP SINCE

NORTH FORK PRESERVE RENOVATION

4400 EVERETT ROAD, AKRON, OH 44333

PROJECT # 2324

ISSUE:

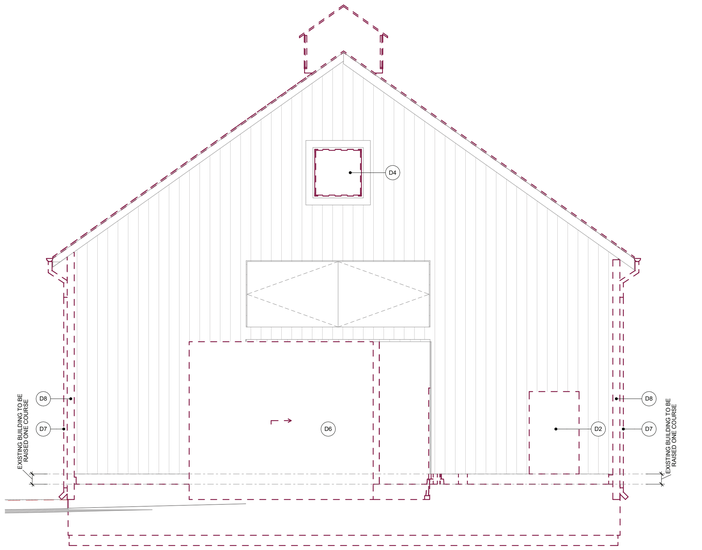
BID SET	07-28-2025

RESTROOM BUILDING EXTERIOR AND INTERIOR ELEVATIONS

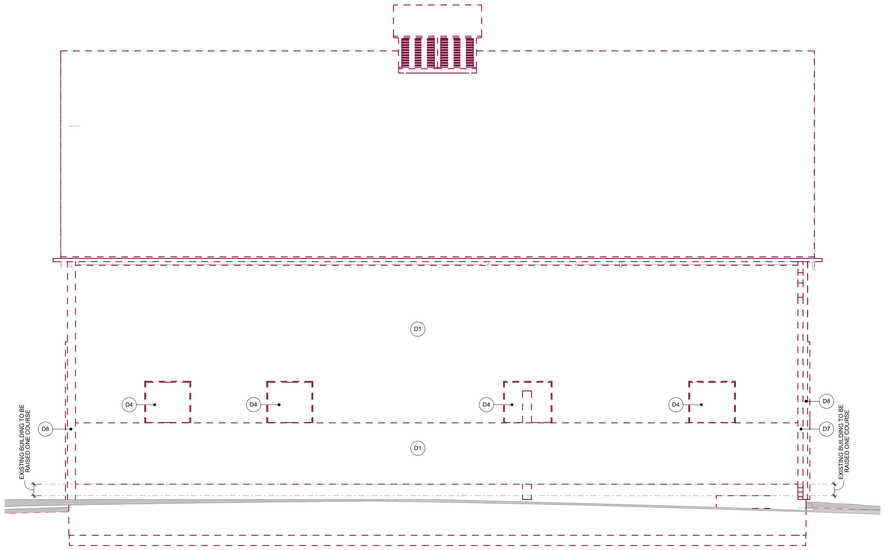
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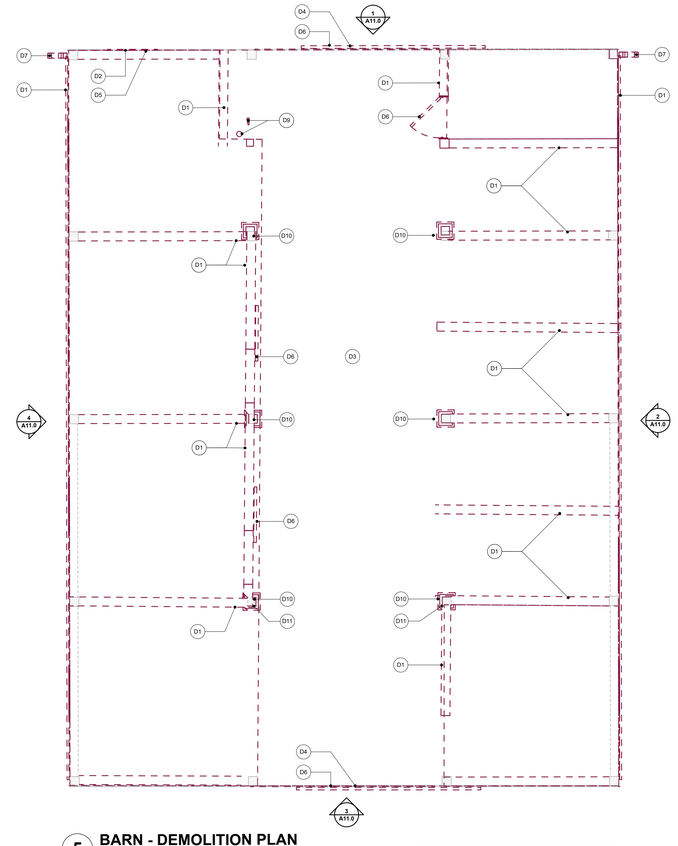
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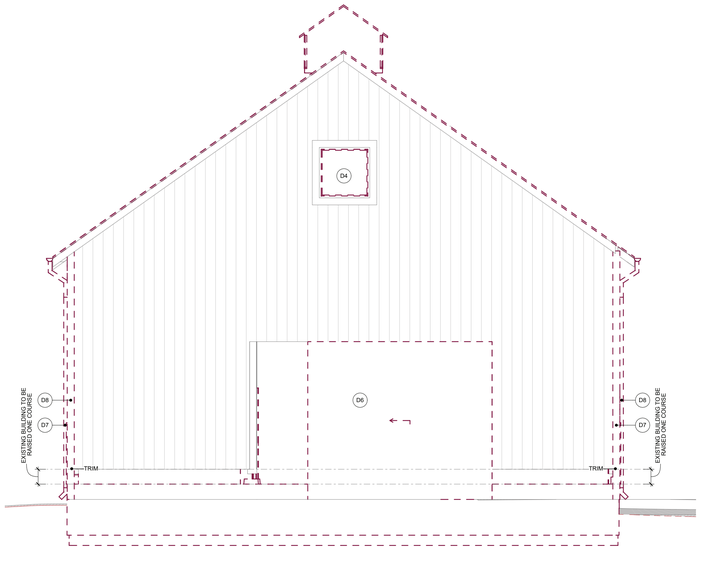
1 WEST DEMOLITION ELEVATION (FRONT OF BARN)
SCALE: 1/4" = 1'-0"



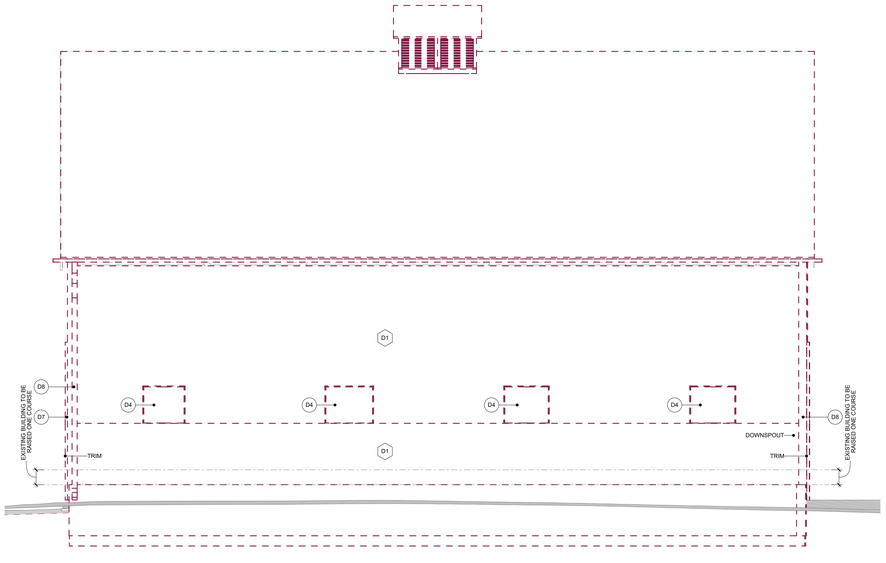
2 NORTH DEMOLITION ELEVATION (SIDE OF BARN)
SCALE: 1/4" = 1'-0"



5 BARN - DEMOLITION PLAN
SCALE: 1/4" = 1'-0"



3 EAST DEMOLITION ELEVATION (BACK OF BARN)
SCALE: 1/4" = 1'-0"



4 SOUTH DEMOLITION ELEVATION (SIDE OF BARN)
SCALE: 1/4" = 1'-0"

DEMOLITION GENERAL NOTES

1. **THE BUILDING IS TO BE LIFTED OFF THE EXISTING FOUNDATION. REMOVE EXISTING FOUNDATION WALLS AND FOOTER. ADJUST TIMBER FRAME AND WALLS TO SQUARE THE BUILDING. USE ADJUSTED FRAME/WALLS TO ESTABLISH FINAL LAYOUT OF NEW FOUNDATION.**
2. IN DEMOLITION AREAS, REMOVE ALL MISCELLANEOUS ITEMS ON WALLS.
3. FILL AND LEVEL ALL HOLES IN FLOORS AND WALLS AFTER REMOVAL OR ADDITION OF PIPES, CONDUITS, AND OTHER PENETRATING ITEMS.
4. REFER TO MECHANICAL AND ELECTRICAL DRAWINGS FOR REQUIRED DEMOLITION AND RELATED WORK.
5. TAKE ALL NECESSARY PRECAUTIONS TO PREVENT DAMAGE TO ADJACENT AREAS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL DAMAGE INCURRED.
6. ALL DEMOLITION ACTIVITIES SHALL BE COORDINATE WITH THE OWNER.
7. PATCHALL EXISTING ADJACENT INTERIOR FINISHES TO REMAIN AS UNDISTURBED BY THE DEMOLITION TO MATCH ADJACENT SURFACES.
8. ALL DEMOLISHED ITEMS ARE TO REMAIN THE PROPERTY OF THE OWNER AT THEIR DISCRETION.
9. ALL STRUCTURAL MEMBERS ARE TO REMAIN AND BE PROTECTED UNLESS OTHERWISE NOTED. SOFTSODA BLAST AND PREPARE FOR NEW PAINT.
10. NOTIFY ARCHITECT PRIOR TO DEMOLITION IF ITEM INDICATED TO BE REMOVED IS SUSPECTED TO BE A STRUCTURAL ELEMENT.
11. ALL EXISTING SIDING IS TO SOFT/SODA BLASTED AND PREPARED FOR NEW PAINT.
12. REMOVE ALL EXISTING FIXTURES AND FINISHES, COORDINATE WITH OWNER AND SALVAGE FOR REUSE.
13. REMOVE EXISTING FLOOR AND ALL ASSOCIATED PLUMBING EQUIPMENT COMPLETELY. PREP AND CLEAN AREA TO RECEIVE NEW FLOORING.
14. REMOVE ALL EXISTING CONDUIT AND LIGHT FIXTURES.
15. REMOVE ENTIRE WALL TO UNDERSIDE OF DECK UNLESS NOTED OTHERWISE.
16. THE EXISTING METAL ROOF IS TO BE REMOVED AND SALVAGED FOR REINSTALLATION. PROVIDE SIPS OVER EXISTING RAFTERS.

DEMOLITION CODED NOTES

NOTE: NOT ALL CODED NOTES OCCUR EVERY SHEET

- D1 REMOVE WALL IN ITS ENTIRETY. REMOVAL OF WALL SHALL BE DONE IN SUCH MANNER AS TO NOT DAMAGE EXISTING, ADJOINING WALLS.
- D2 REMOVE PORTION OF WALL TO ACCOMODATE NEW DOOR OR CASED OPENING. REFER TO PLANS AND DOOR SCHEDULE FOR ADDITIONAL INFORMATION.
- D3 EXAMINE EXISTING CONDITION OF BEAMS, PATCH WOOD WITH WOOD PUTTY, SAND, AND STAIN BEAMS.
- D4 REMOVE WINDOW IN ITS ENTIRETY.
- D5 REMOVE SIDING TO EXISTING POST. SALVAGE FOR REUSE. REMOVE SECONDARY HORIZONTAL FRAMING
- D6 REMOVE DOOR, FRAME AND ANCHORS IN THEIR ENTIRETY. THE REMOVAL OF DOOR, FRAME AND ANCHORS SHALL BE DONE IN SUCH MANNER AS TO NOT DAMAGE EXISTING, ADJOINING WALLS. PREP AND CLEAN EXISTING WALL OPENING FOR NEW DOOR OR WINDOW INSTALLATION OR FILL TO MATCH EXISTING.
- D7 REMOVE EXISTING DOWNSPOUTS
- D8 REMOVE EXISTING TRIM
- D9 REMOVE EXISTING YARD HYDRANT AND ASSOCIATED PLUMBING.
- D10 REMOVE EXISTING STONE COLUMN BASE AND FOUNDATION. PREP ARE FOR NEW FOOTING AND STONE BASE. REFER TO STRUCTRUAL DRAWINGS
- D11 COLUMN TO BE CUT, REFER TO STRUCTURAL DRAWINGS

DEMOLITION LEGEND

EXISTING TO REMAIN

ELEMENTS TO BE REMOVED

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BATH TOWNSHIP · 1818

NORTH FORK PRESERVE BARN RENOVATION

4400 EVERETT ROAD, AKRON, OH 44333

N

PROJECT # 2324

ISSUE:

BID SET	07-28-2025

DEMOLITION DRAWINGS

A11.0

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Plotted: Friday, March 21, 2025

FOUNDATION PLAN GENERAL NOTES

REFER TO STRUCTURAL DRAWINGS FOR FOOTING AND PIER SCHEDULES

SUBSTITUTION CHART:

LVL SIZE	WF STEEL SIZE
(2) 9.5" LVL	W10 x 15
(2) 14" LVL	W12 x 16
(2) 16" LVL	W14 x 22
(2) 18" LVL	W16 x 26
(3) 12" LVL	W10 x 17
(3) 14" LVL	W12 x 16
(3) 16" LVL	W14 x 22
(3) 18" LVL	W16 x 26
(2) 16" LVL W/ 1/2" PL	W16 x 26
(2) 16" LVL W/ (2) 1/2" PL	W16 x 40

GENERAL NOTES

BLOCK WEBS SOLID AT BEARING WALL LOCATIONS ABOVE

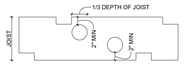
CONTRACTOR TO EXTEND ALL POSTS DOWN TO SOUND FOUNDATION, INSTALL FULL DEPTH SOLID BLOCKING AT ALL POINT LOAD LOCATIONS

ALL FOOTINGS TO EXTEND DOWN TO FROST LEVEL MIN.

INDICATES LOCATION OF POINT LOAD ABOVE

INDICATES LOCATION OF BEARING WALL ABOVE

COORDINATE EXACT LOCATIONS OF FLOOR DRAIN WITH MECH.CONTRACTOR



SECTION 502.8
NOTCHES IN THE TOP OR BOTTOM OF JOISTS SHALL NOT EXCEED ONE-SIXTH THE DEPTH OF THE JOIST AND SHALL NOT BE LOCATED IN THE MIDDLE THIRD OF THE SPAN, WHERE JOISTS ARE NOTCHED ON THE ENDS FOR A LEDGER, THE NOTCH SHALL NOT EXCEED ONE-FOURTH THE JOISTS DEPTH. CANTILEVERED JOISTS SHALL NOT BE NOTCHED UNLESS THE REDUCED SECTION PROPERTIES AND LUMBER DEFECTS ARE CONSIDERED IN THE DESIGN.
HOLES DRILLED OR BORED IN JOISTS SHALL NOT BE WITHIN 2 INCHES OF THE TOP OR BOTTOM OR THE JOISTS AND THEIR DIAMETER SHALL NOT EXCEED ONE-THIRD THE DEPTH OF THE JOIST.

SECTION 602.6
ANY STUD IN AN EXTERIOR BEARING PARTITION MAY BE CUT OR NOTCHED TO A DEPTH NOT EXCEEDING 25% OF ITS WIDTH. STUDS IN NON-BEARING PARTITIONS MAY BE NOTCHED TO A DEPTH NOT TO EXCEED 40% OF A SINGLE STUD WIDTH. ANY STUD MAY BE BORED OR DRILLED, PROVIDED THAT THE DIAMETER OF THE RESULTING HOLES IS NO GREATER THAN 40% OF THE STUD WIDTH, THE EDGE OF THE HOLE IS NO CLOSER THAN 5/8 INCH TO THE EDGE OF THE STUD, AND THE HOLE IS NOT LOCATED IN THE SAME SECTION AS A CUT OR NOTCH.

FLOOR PLAN GENERAL NOTES

1. ALL INTERIOR WALLS SHALL BE 6" WOOD STUD WITH (1) LAYER 5/8" GYPSUM BOARD ON BOTH SIDES UNLESS NOTED OTHERWISE. .
2. ARCHITECTURAL GROUND FLOOR FINISH ELEVATION = 0'-0".
3. VERIFY DIMENSIONS AND CONDITIONS IN FIELD. WHEN DIMENSIONS AND/OR CONDITIONS AS INDICATED ON DRAWINGS CONFLICT WITH ACTUAL, CONTACT ARCHITECT FOR CLARIFICATION.
4. FIELD VERIFY ALL EXISTING CONDITIONS PRIOR TO BIDDING, DEMOLITION, AND NEW CONSTRUCTION.
5. PROVIDE DOUBLE TOP TRACK DEFLECTION JOINT AT ALL WALLS WHICH EXTEND TO UNDERSIDE OF ROOF DECK ABOVE.
6. COORDINATE LOCATION OF EQUIPMENT AND PENETRATIONS WITH MECHANICAL, ELECTRICAL, AND PLUMBING DRAWINGS.
7. SEE EXTERIOR ELEVATIONS FOR IDENTIFICATION OF WINDOW TYPES AND SIZES.
8. HINGE SIDE OF DOOR JAMB LOCATED IN METAL STUD WALLS TO BE 4" FROM ADJACENT PERPENDICULAR WALLS, UNO.
9. ALL DOORS ARE DIMENSIONED TO THE CENTER LINE OF THE ROUGH OPENING.
10. VERIFY LOCATIONS OF FIRE EXTINGUISHERS WITH LOCAL FIRE DEPARTMENT OFFICIAL AND ARCHITECT PRIOR TO PLACEMENT. ALL EXTINGUISHERS TO BE RECESSED CABINET MOUNTED TYPE, UNO.
11. PROVIDE LEVEL SURFACES AND PREP FLOOR TO RECEIVE SCHEDULED FINISH

FLOOR PLAN CODED NOTES

NOTE: NOT ALL CODED NOTES OCCUR EVERY SHEET

1. PROVIDE NEW FROST SLAB IN FRONT OF EXTERIOR DOOR, REFER TO STRUCTURAL DRAWINGS
2. HOOK MOUNTED FIRE EXTINGUISHER

INTERIOR STUD WALL SYMBOL KEY

A1

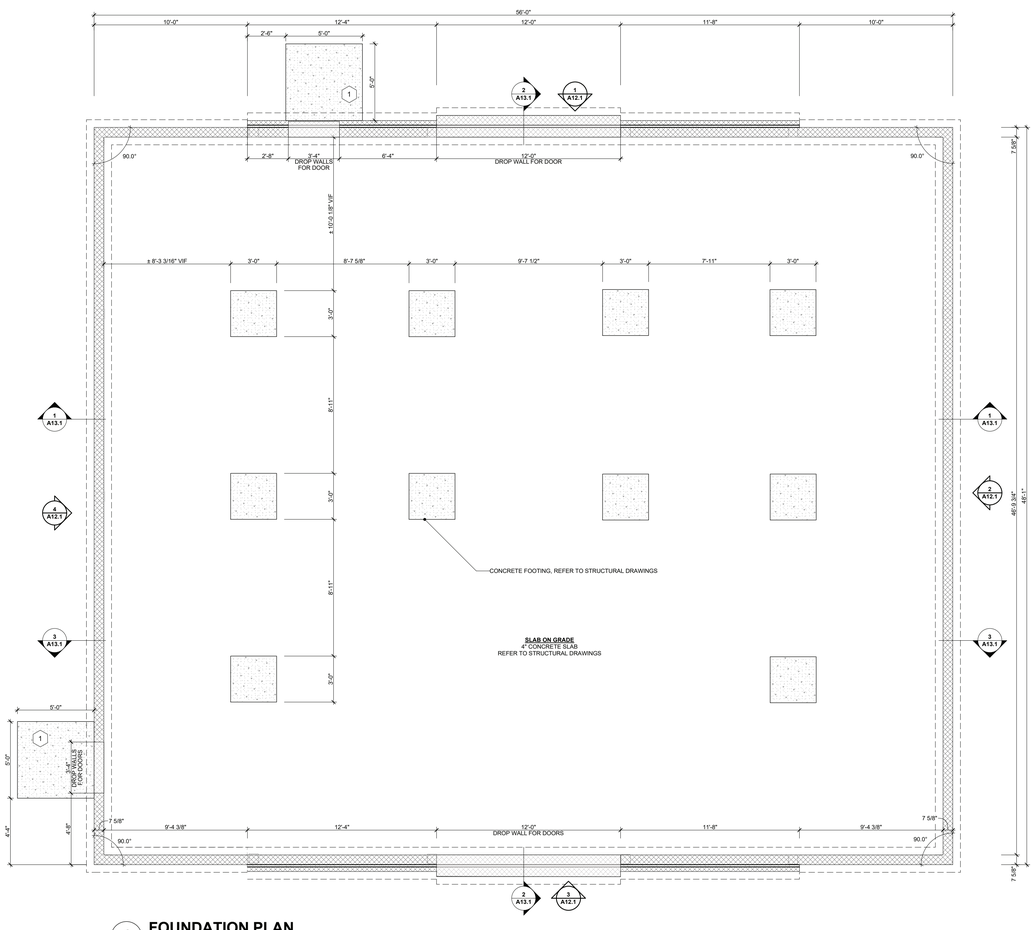
GYP. BOARD CONFIGURATION

1 - GYP. BOARD FULL HEIGHT, BOTH SIDES
2 - GYP. BOARD FULL HEIGHT, ONE SIDE
3 - 1/2" CEMENT BACKER BOARD

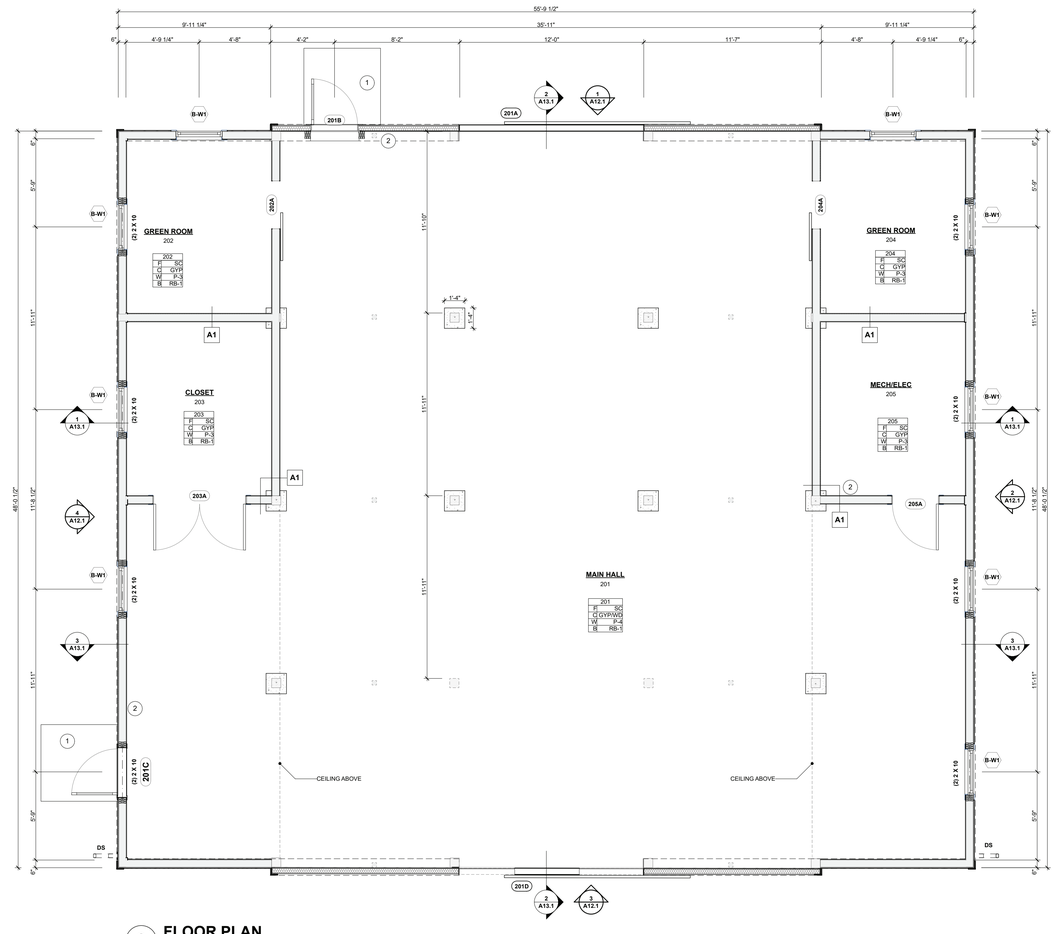
STUD WIDTH / TYPE DESIGNATION

A = 5 1/2" / WD
B = 3 1/2" / WD
C = 1 1/2" / WD
D = 7 1/4" / WD
E = 9 1/4" / WD
F = 11 1/4" / WD
G = RESERVED
H = RESERVED

TYPES:
WD DIMENSIONAL LUMBER
ST STRUCTURAL STUDS



1 FOUNDATION PLAN
SCALE: 1/4" = 1'-0"



2 FLOOR PLAN
SCALE: 1/4" = 1'-0"

FINISH PLAN LEGEND

ROOM NAME

	NUMBER
FLOOR	F WD-1
CEILING	C WD-1
WALL	W WD-1
BASE	B WD-1

FINISH PLAN GENERAL NOTES

1. APPROPRIATE TRANSITIONS TO BE PROVIDED AT EVERY LOCATION WHERE FLOOR FINISHES OF A DIFFERENT MATERIAL MEET. REFER TO SPECIFICATIONS FOR PROFILES. WHEN MATERIALS TRANSITION BETWEEN ROOMS, SEAM TO OCCUR ON CENTERLINE OF DOOR.
2. REFER TO REFLECTED CEILING PLAN FOR CEILING ACCENTS THAT DIFFER FROM FIELD INDICATED.
3. ALL UNFINISHED INSTALLED ELEMENTS INCLUDING BUT NOT LIMITED TO GRILL COVERS, FIRE EXTINGUISHER CABINETS AND METAL SUPPORTS TO BE PAINTED TO MATCH THE SURFACE ON WHICH THEY ARE MOUNTED UNLESS PROHIBITED BY MANUFACTURER. REFER TO MANUFACTURER'S SPECIFICATIONS.
4. PAINT SHEEN TO BE AS FOLLOWS FOR EACH SURFACE U.N.O.: PAINT ON CEILINGS AND SOFFITS TO BE FLAT. WALLS TO RECEIVE EGGSHELL/ SATIN. DOOR FRAMES TO RECEIVE SEMI-GLOSS. FOR OTHER SURFACES REFER TO FINISH SCHEDULE AND SPECIFICATIONS.
5. WALL AND CEILING FINISH IN ROOMS SHALL BE NOT LESS THAN CLASS C FLAME SPREAD (76-200) AND SMOKE DEVELOPMENT (0-450)
6. ALL INTERIOR WOOD TRIM TO BE POPLAR OR APPROVED EQUAL. SEE FINISH SCHEDULE FOR LOCATIONS

   WINDOW: 4" FLAT STOCK, PAINTED
7. CEILINGS AND SOFFITS TO BE SMOOTH FINISH AND PAINTED

FINISH SCHEDULE

FLOORING:

SEALED CONCRETE (SC) - COLOR TO BE SELECTED BY ARCHITECT

WALL:

PAINT (P-3)
MANUFACTURER: SHERWIN WILLIAMS
COLOR: TBD
SHEEN: TBD

PAINT (P-4)
MANUFACTURER: SHERWIN WILLIAMS
COLOR: TBD
SHEEN: TBD

DOOR AND HARDWARE GENERAL NOTES

1. FINAL HARDWARE SCHEDULE TO BE PROVIDED BY CONTRACTOR'S DOOR HARDWARE SUPPLIER AND APPROVED BY OWNER AND ARCHITECT.
2. FINAL LOCKSET FUNCTION AND KEYING SHALL BE COORDINATED WITH THE OWNER BY THE DOOR HARDWARE SUPPLIER. PROVIDE SUB AND GRAND MASTER LEVEL KEYING AND 4 KEYS FOR EACH LOCKSET.
3. ALL PASSAGE SETS, PRIVACY SETS AND LOCKSETS SHALL SHALL BE ANSI/ BHMA GRADE 1 COMMERCIAL WITH ADA COMPLIANT LEVER HARDWARE. ALL LOCKSETS SHALL BE THE PRODUCTS OF A SINGLE MANUFACTURER. ALL DOOR LOCKS SHALL ALLOW EGRESS WITHOUT THE USE OF A KEY AND BY MEANS OF A SINGLE OPERATION.
4. FURNISH NON-RISING TYPE PINS ON OUT SWINGING DOORS SCHEDULED TO RECEIVE LOCKSETS.
5. FINISH DOORS AND FRAMES WITH PAINT OR STAIN AS INDICATED (COLOR AS SELECTED BY OWNER) ALL SIDES.
6. PROVIDE WALL OR FLOOR MOUNTED STOP AS APPROPRIATE FOR EACH DOOR.
7. DOOR CLOSER CONFIGURATION SHALL BE IDENTIFIED AND COORDINATED BY THE DOOR HARDWARE SUPPLIER. ADJUST ALL CLOSER TO ADA 5 LBS. MAX. PULL FORCE.
8. PROVIDE SAFETY GLAZING IN THE FOLLOWING LOCATIONS PER OBC 2406.3:
   1) FIXED AND OPERABLE PANELS OF SWINGING DOORS
   2) PANELS ADJACENT TO DOORS WHERE NEAREST EXPOSED EDGE OF GLAZING IS WITHIN 24" ARC OF EITHER VERTICAL EDGE OF DOOR IN A CLOSED POSITION
   3) PANELS LARGER THAN 9 SF
   4) BOTTOM EDGE OF GLAZING IS LESS THAN 18" ABOVE THE FLOOR
   5) PANELS WITHIN 36" HORIZONTALLY OF A WALKING SURFACE
   6) PANELS WITHIN 36" HORIZONTALLY AND LESS THAN 60" ABOVE WALKING SURFACE OF STAIR
   7) PANELS WITHIN 60" HORIZONTALLY AND LESS THAN 60" ABOVE THE NOSE OF THE BOTTOM STAIR TREAD
9. HARDWARE AND ACCESSORIES TO BE BLACK FINISH OR EQUIVALENT.
10. ALL INTERIOR DOORS TO BE 1 3/4" SOLID CORE WOOD DOORS.

DOOR HARDWARE SETS

ENTRY
- LOCK LEVER HANDSET
- PANIC DEVICE (CONCEALED ROD FOR PAIRS)
- CLOSER
- BALL BEARING HINGES
- WALL STOP
- WEATHERSTRIPPING
- REPLACEABLE SWEEP
- ADA ALUMINUM THRESHOLD

STOREROOM
- LOCK LEVER HANDSET
- CYLINDER LOCK - STOREROOM
- BALL BEARING HINGES
- WALL STOP

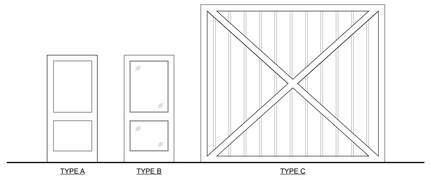
INTERIOR BARN DOOR
- MODERN RECTANGULAR BARN DOOR PRIVACY LOCK, BASIS OF DESIGN: EMTEK 222201US19, COLOR: FLAT BLACK

EXTERIOR BARN DOOR
- HASP AND PADLOCK, BASIS OF DESIGN: JQK DOOR HASP LOCK, 5 INCH 304 STAINLESS STEEL SAFETY PACKLOCK CLASP THICKNESS 1.9M, MATTE BLACK, DL130-PB
- GALVANIZED WALL MOUNT SLIDING DOOR BOX RAIL TRACK WITH CLIP ON ALUMINUM FASCIA
- STEEL BARN DOOR STAYROLLER
- ALUMINUM DOOR SWEEP BRUSH

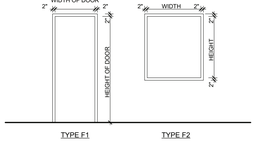
DOOR SCHEDULE

ID	ROOM NAME	DOOR LEAF NOMINAL WIDTH	DOOR LEAF NOMINAL HEIGHT	DOOR LEAF MATERIAL	DOOR LEAF PANEL TYPE	DOOR LEAF FINISH	OPERATION	REMARKS
201A	MAIN HALL	4	3	SC WOOD	C	PNT	EXTERIOR BARN	VERIFY OPENING SIZE IN FIELD
201B	MAIN HALL	1	2	ALUM / GLASS	B	PF	ENTRY	
201C	MAIN HALL	1	2	ALUM / GLASS	B	PF	ENTRY	
201D	MAIN HALL	4	3	SC WOOD	C	PNT	EXTERIOR BARN	VERIFY OPENING SIZE IN FIELD
202A	GREEN ROOM	1	2	SC WOOD	A	PF	INTERIOR BARN	
203A	CLOSET	2	2	SC WOOD	A	PNT	STOREROOM	
204A	GREEN ROOM	1	2	SC WOOD	A	PNT	INTERIOR BARN	
205A	MECH/ELEC	1	2	SC WOOD	A	PNT	STOREROOM	

DOOR PANEL TYPE



DOOR FRAME TYPE



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BATH TOWNSHIP — SINCE 1818

NORTH FORK PRESERVE BARN RENOVATION

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PROJECT # 2324
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PLANS

A11.1

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ELECTRICAL INFORMATION LEGEND

- SINGLE POLE LIGHT SWITCH
- 3 4 — MULTIPLE POLE LIGHT SWITCH
- R — RECESSED CAN LIGHT/ SQUARE FIXTURE
- S — SURFACE MOUNT FIXTURE
- WS — WALL SCONCE
- EXT — EXTERIOR WALL MOUNTED FIXTURE
- SD — SMOKE DETECTOR
- E — DUPLEX RECEPTACLE
- WP — WEATHERPROOF DUPLEX RECEPTACLE
- EXHAUST FAN
- SMALL CHANDLIER
- LARGE CHANDLIER
- LARGE CEILING FAN
- CAMERA

CEILING TYPE LEGEND

EXISTING CEILING TO REMAIN

PAINTED GYPSUM BOARD CEILING

CEILING PLAN NOTES

OUTLET SPACING & LOCATIONS
APPLIANCE RECEPTACLE OUTLETS FOR SPECIFIC APPLIANCES SHALL BE INSTALLED WITHIN 6 FT OF THE INTENDED LOCATION OF THE APPLIANCE.
RECEPTACLE OUTLETS SHALL BE INSTALLED SO THAT NO POINT ALONG THE WALL LINE IS MORE THAN 24 INCHES MEASURED HORIZONTALLY FROM A RECEPTACLE OUTLET IN THAT SPACE.

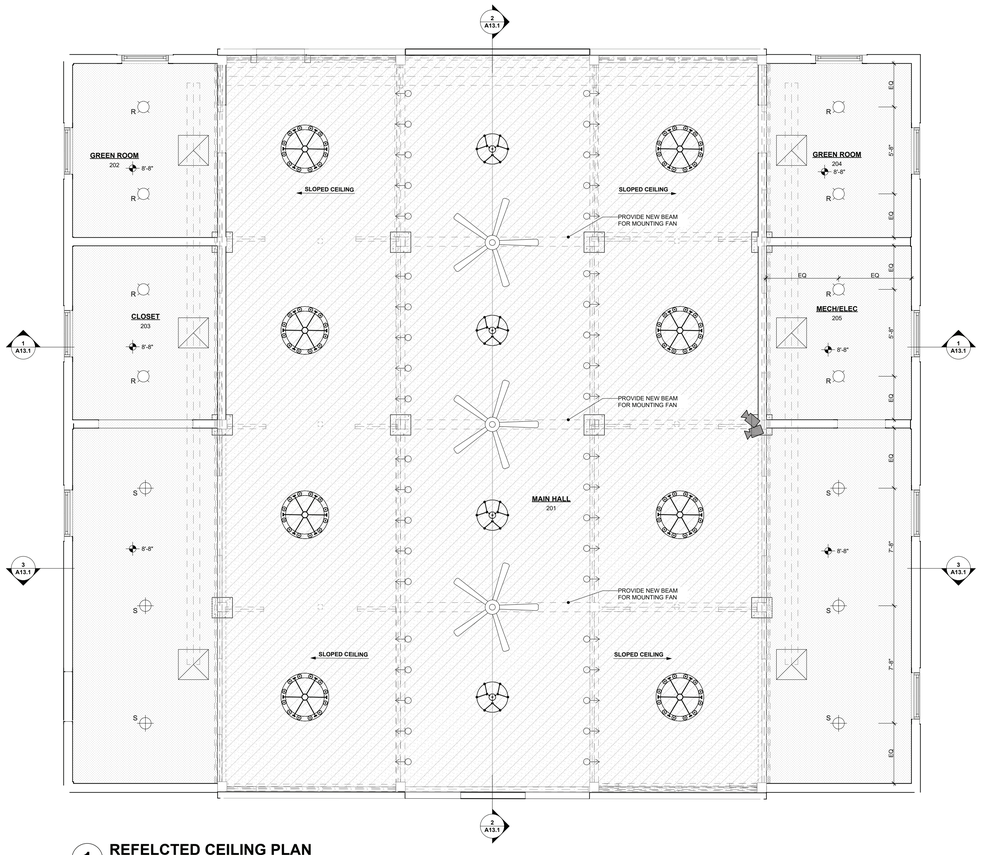
PER NEC 210.8, THE FOLLOWING LOCATIONS SHALL HAVE GROUND-FAULT CIRCUIT INTERRUPTER PROTECTION: 1) BATHROOMS, 2) GARAGES & ACCESSORY BUILDINGS THAT THAVE A FLOOR LOCATED AT OR BELOW GRADE LEVEL NOT INTENDED AS HABITABLE ROOMS AND LIMITED TO STORAGE AREAS, WORK AREAS, AND AREAS OF SIMILAR USE, 3) OUTDOORS 4) CRAWL SPACES 5) BASEMENTS 6) KITCHENS, 7) SINKS 8) BOATHOUSES, 9) BATHTUBS OR SHOWER STALLS, 10) LAUNDRY AREAS. FOR ADDITIONAL ELECTRICAL INFORMATION CONSULT NEC.

VERIFY LOCATION, NUMBER, AND SWITCHING OF FIXTURES WITH OWNER

LIGHTING LAYOUT FOR REFERENCE ONLY,LIGHTING LAYOUT TO BE FINALIZED PRIOR TO INSTALLATION

CEILING PLAN NOTES

1. CEILING MOUNTED FIXTURES INCLUDING, BUT NOT LIMITED TO, LIGHTS, DIFFUSERS, EXIT SIGNS FIRE ALARM STROBES, SMOKE DETECTORS TO BE CENTERED IN AREA IN WHICH THEY OCCUR UNLESS NOTED OTHERWISE.
2. EXIT SIGNS INDICATED ABOVE EGRESS DOORS TO BE LOCATED ON CENTERLINE OF DOOR SWING.
3. ARCHITECTURAL REFLECTED CEILING PLAN DISPLAYS GENERAL LOCATION AND LAYOUT SCHEME OF CEILING AND CEILING MOUNTED FIXTURES. CONSULTANT DRAWINGS SHOULD BE UTILIZED FOR FIXTURE TYPE AND QUANTITIES. WHERE MINOR DISCREPANCIES EXIST BETWEEN ARCHITECTURAL AND CONSULTANT DOCUMENTS RELATING TO LOCATION OF CEILING MOUNTED ITEMS, ARCHITECTURAL REFLECTED CEILING PLAN SHOULD GOVERN. FOR MAJOR DISCREPANCIES (GREATER THAN 2'), NOTIFY ARCHITECT PRIOR TO PROCEEDING WITH WORK. FINAL LOCATION TO BE VERIFIED PRIOR TO INSTALLATION.
4. ALL GYPSUM BOARD CEILINGS AND SOFFITS SHALL BE PAINTED UNLESS NOTED OTHERWISE. REFERENCE FINISH DRAWING AND SPECIFICATIONS FOR ADDITIONAL INFORMATION.
5. EXISTING LIGHT FIXTURES TO BE REMOVED. PATCHAND REPAIR AREAS AFFECTED BY CONSTRUCTION.
6. PATCHAND REPAIR EXISTING BEAM IN LOCATION WHERE EXISTING LIGHT FIXTURE WAS REMOVED.
7. PATCHAND REPAIR EXISTING BEAM IN LOCATIONS WHERE EXISTING CROSS JOIST WAS REMOVED.
8. PAINT EXISTING BEAMS, COLOR TO BE SELECTED BY ARCHITECT.



1 **REFELCTED CEILING PLAN**
SCALE: 1/4" = 1'-0"

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BATH TOWNSHIP SINCE 1826

NORTH FORK PRESERVE BARN RENOVATION

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PROJECT # 2324

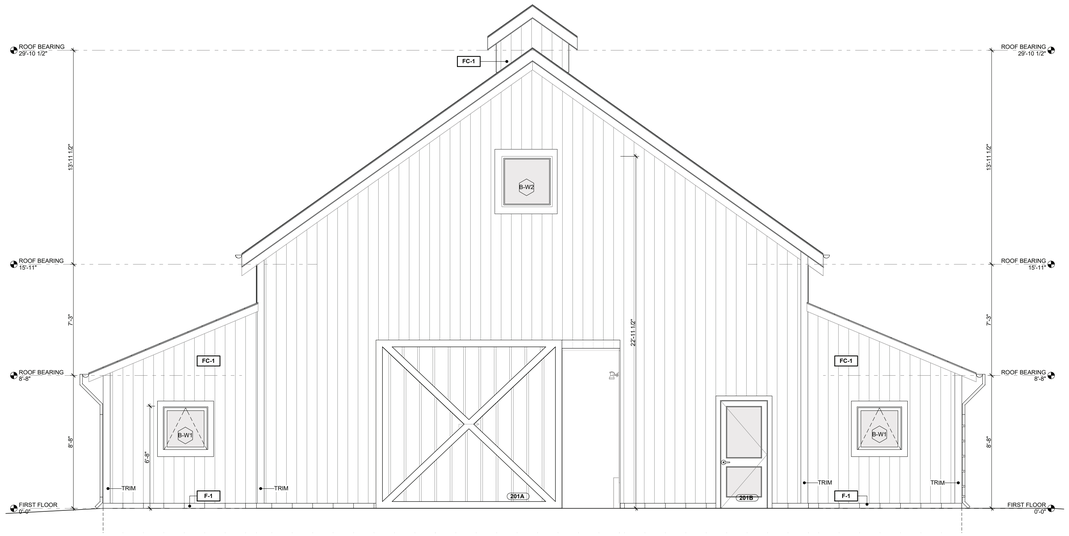
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REFLECTED CEILING PLAN

A11.2

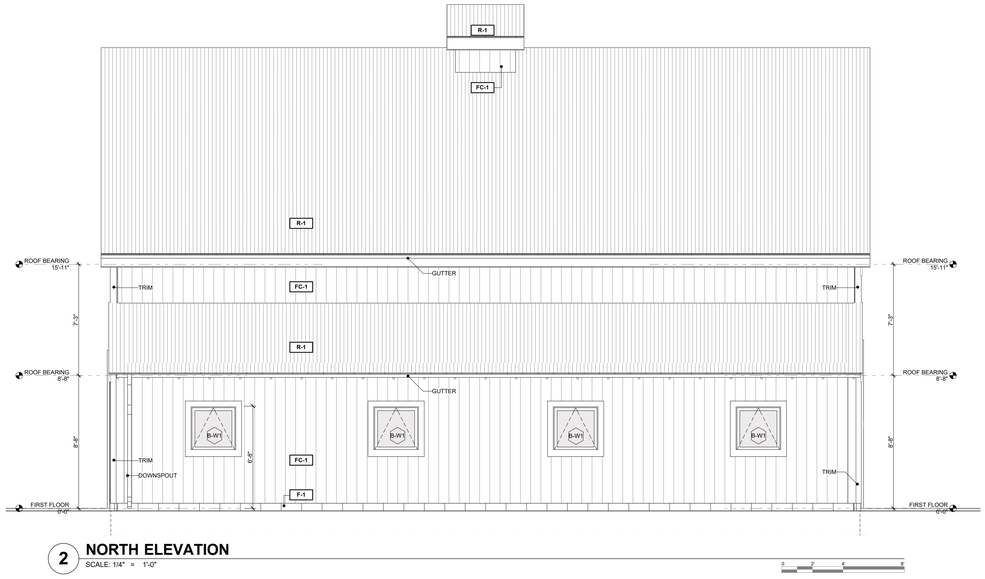
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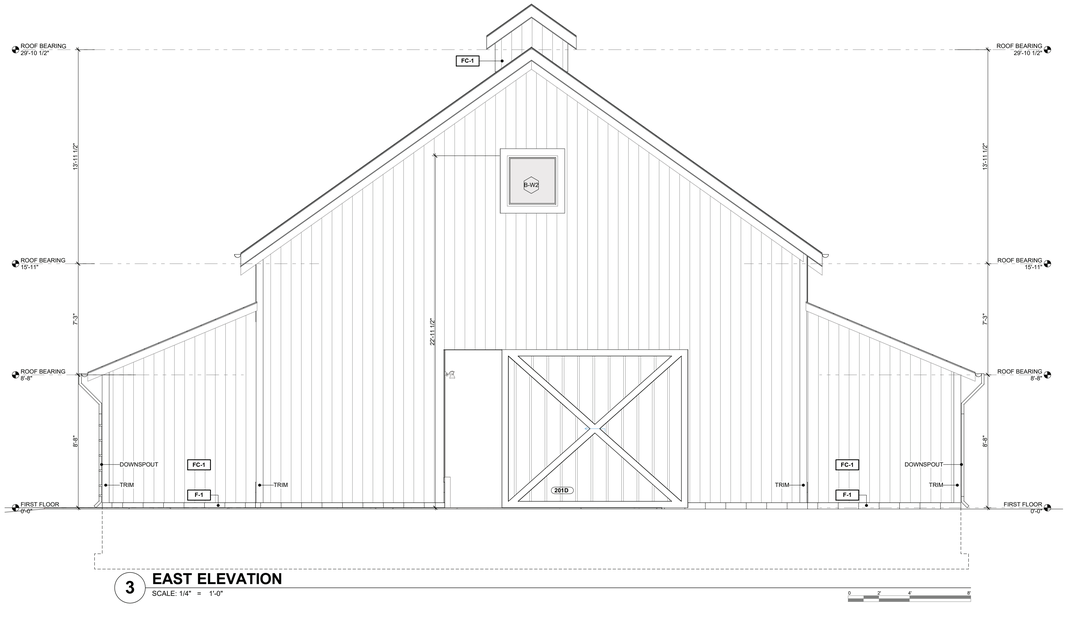
1 WEST ELEVATION

SCALE: 1/4" = 1'-0"



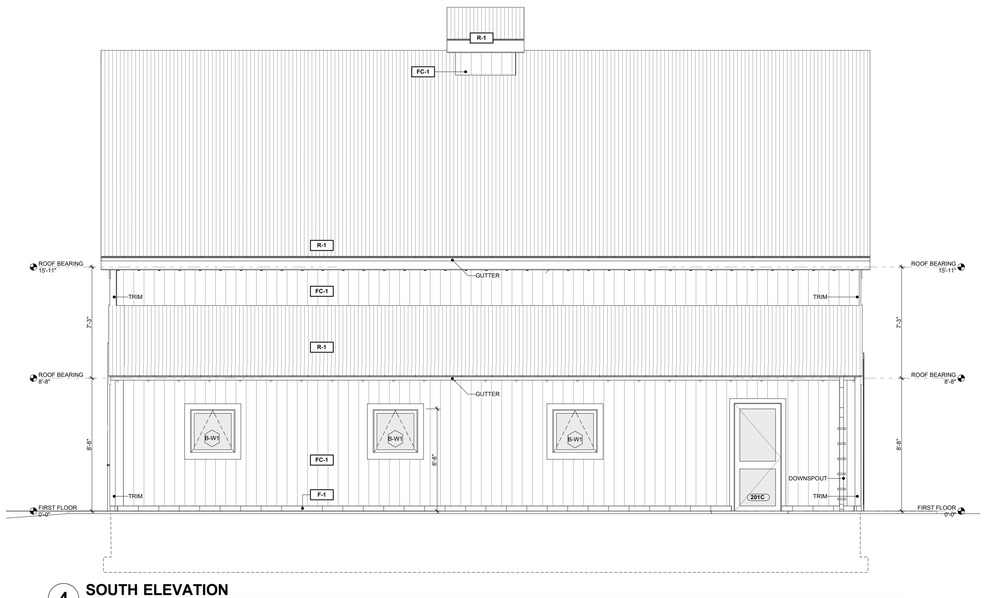
2 NORTH ELEVATION

SCALE: 1/4" = 1'-0"



3 EAST ELEVATION

SCALE: 1/4" = 1'-0"



4 SOUTH ELEVATION

SCALE: 1/4" = 1'-0"

MATERIAL SCHEDULE

ALL MATERIAL ASSEMBLIES LISTED BELOW TO OCCUR OVER THE FOLLOWING UNLESS NOTED OTHERWISE:

O/ WEATHER BARRIER
O/ 7/16" EXTERIOR GRADE OSB SHEATHING
O/ 2X6 STUDS W/ R-19 KRAFT FACED BATT INSULATION

F-1
SMOOTH FACED CMU FOUNDATION WALLS.

FC-1 - FIBER CEMENT SIDING
FIBER CEMENT LAP SIDING TO BE JAMES HARDIE SHEET (BOARD AND BATTEN) SIDING OR APPROVED EQUAL. REFER TO EXTERIOR ELEVATIONS AND WALL SECTIONS FOR EXPOSURE WIDTHS. SIDING IS TO BE PAINTED, COORDINATE FINAL COLOR WITH ARCHITECT AND OWNER.

R-1 - STANDING SEAM METAL ROOF
METAL STANDING SEAM ROOF
O/MANUFACTURER'S RECOMMENDED UNDERLAYMENT
O/ 15/32" APA RATED EXTERIOR GRADE SHEATHING
ICE GUARD SHOULD BE INSTALLED AT ALL EAVES AND VALLEYS, UP 72", AND WRAPPED OVER THE FACE OF ALL FASCIAS.

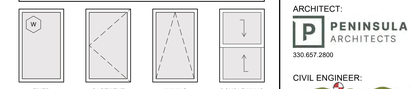
EXTERIOR ELEVATION GENERAL NOTES

ALL FIBER CEMENT EXTERIOR TRIM TO BE AZEK OR BORAL, PAINTED, OR APPROVED EQUAL.

ALL ROOF PENETRATIONS TO BE COORDINATED WITH ARCHITECT PRIOR TO INSTALLTION.

GUTTER PROFILES SHALL BE SUBMITTED FOR APPROVAL PRIOR TO ORDERING

WINDOW LEGEND



FIXED | CASEMENT | AWNING | DOUBLE HUNG

WINDOW HEAD GIVEN ABOVE FIRST AND SECOND FLOOR, CONFIRM WINDOW QUANTITIES WITH ELEVATIONS.

**** WINDOW COUNT PROVIDED FOR GENERAL REFERENCE AND VERIFICATION ONLY. CONTRACTOR TO VERIFY TOTAL NUMBER OF WINDOWS WITH DOCUMENTS.**

WINDOW SCHEDULE		
ID	W x H	REMARKS
B-W1	1×1	
B-W2	1×1	

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BATH TOWNSHIP
1836

NORTH FORK PRESERVE BARN RENOVATION

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PROJECT # 2324

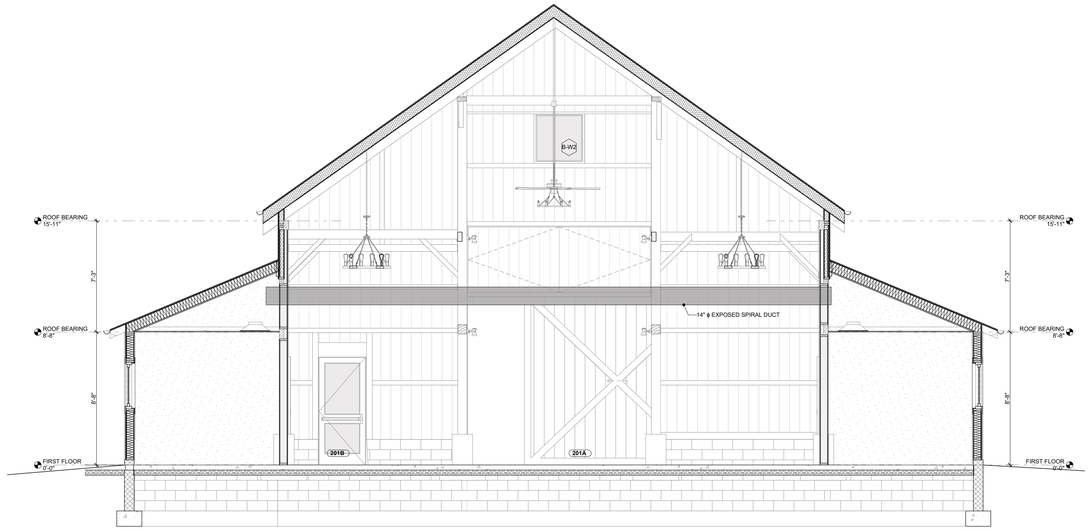
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EXTERIOR ELEVATIONS

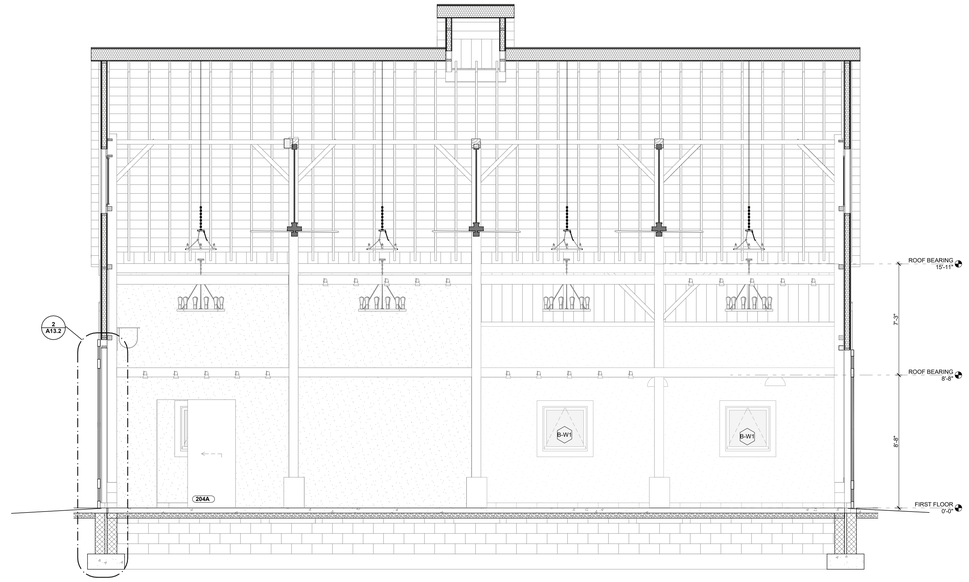
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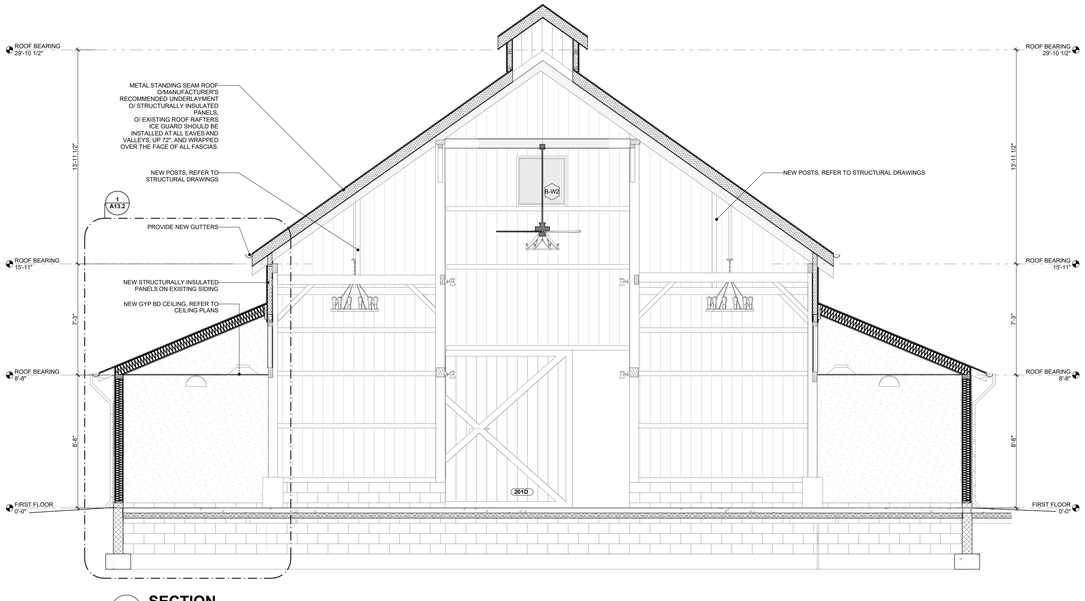
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1 **SECTION**
SCALE: 1/4" = 1'-0"



2 **SECTION**
SCALE: 1/4" = 1'-0"



3 **SECTION**
SCALE: 1/4" = 1'-0"

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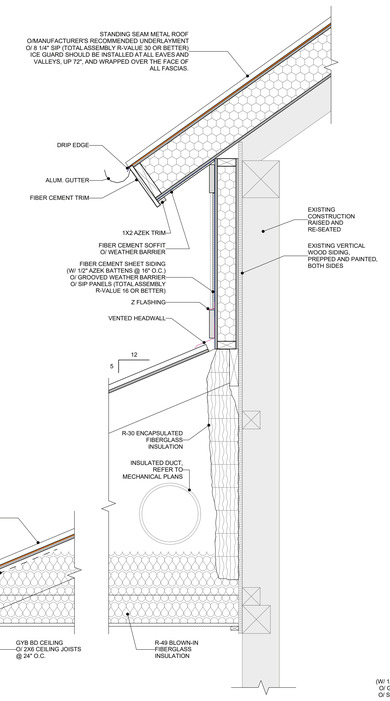
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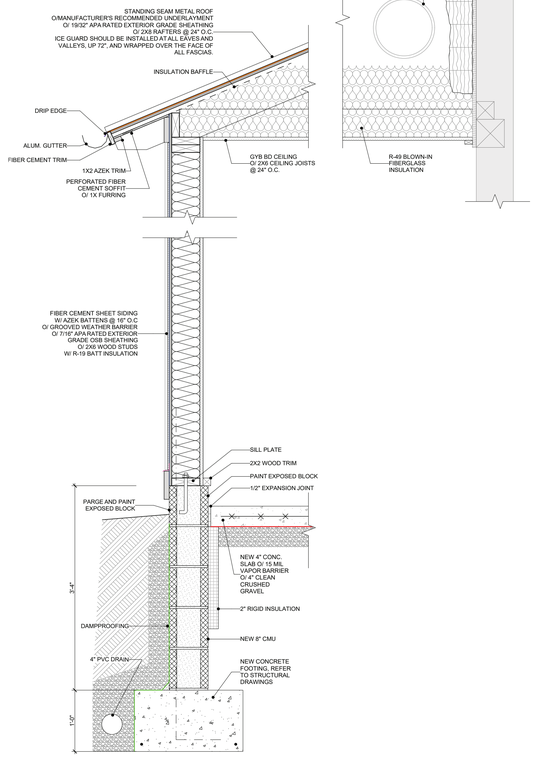
BUILDING SECTIONS

A13.1

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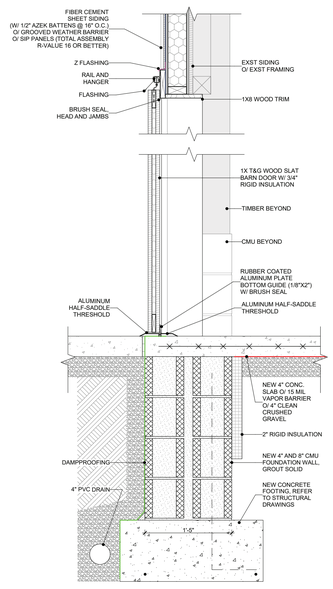




TYPICAL FOUNDATION WALLS @ ADDITIONS

1 WALL SECTION

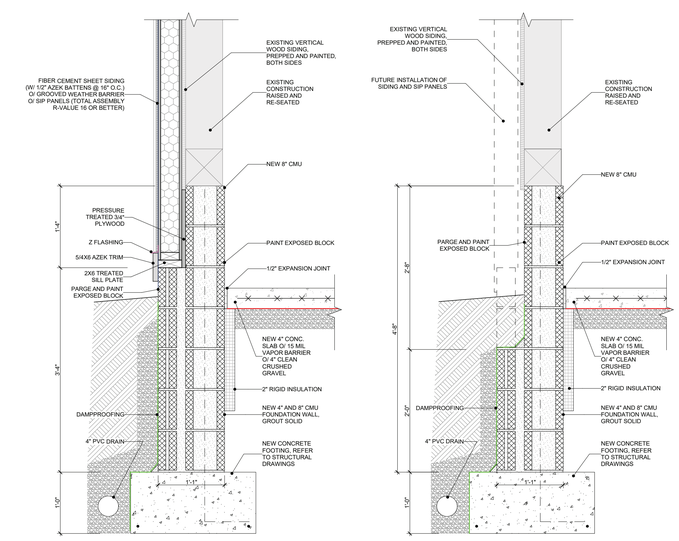
SCALE: 1" = 1'-0"



NEW FOUNDATION WALLS AT BARN DOOR OPENINGS

2 WALL SECTION

SCALE: 1" = 1'-0"



NEW FOUNDATION WALLS AT EXISTING GABLE ENDS

DEDUCT ALT: NEW FOUNDATION WALLS AT EXISTING GABLE ENDS

3 WALL SECTIONS

SCALE: 1" = 1'-0"

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BATH TOWNSHIP EST. 1818

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ISSUE:

BID SET	07-28-2025

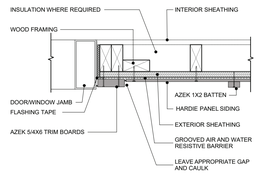
WALL SECTIONS

A13.2

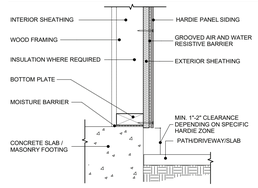
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Printed Thursday, March 27, 2025

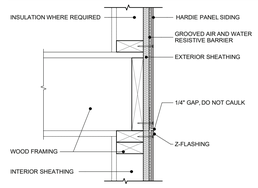
DOOR/WINDOW JAMB



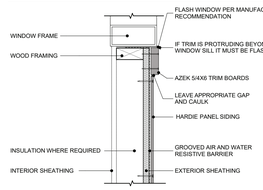
HARDSCAPE CLEARANCES, DECKS, PORCHES, PATIOS, WALKWAYS, ROOFS, ETC.



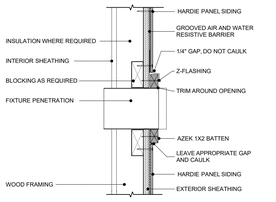
HORIZONTAL JOINT



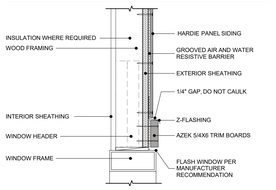
WINDOW SILL



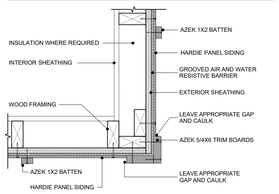
FIXTURE PENETRATION



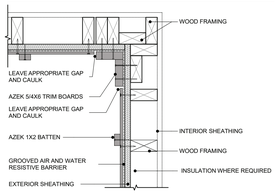
WINDOW/DOOR HEAD



OUTSIDE CORNER



INSIDE CORNER



1 TYPICAL SIDING DETAILS

SCALE: 1 1/2"= 1'-0"

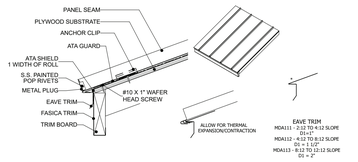
0 6" 12" 18"

BASIS OF DESIGN:

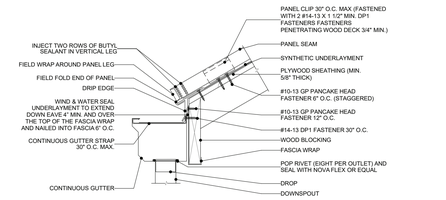
ATAS INTERNATIONAL "DUTCH SEAM" - ALUMINUM

A. THICKNESS: 0.040 ALUMINUM
B. WIDTH: 15"
C. SEAM HEIGHT: 1 1/2"
D. TEXTURE: SMOOTH (NO STIFFENING RIBS)
E. MINIMUM SLOPE: 2:12

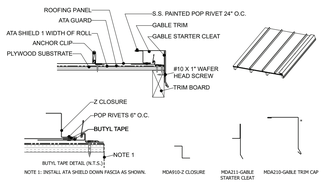
EAVE



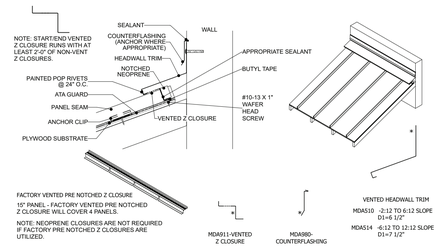
EAVE W/ GUTTER



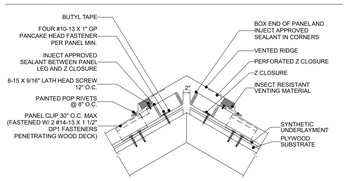
GABLE



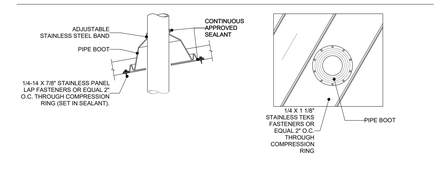
VENTED HEADWALL



VENTED RIDGE



PIPE PENETRATION



2 TYPICAL METAL ROOF DETAILS

SCALE: 1 1/2"= 1'-0"

0 6" 12" 18"

Peninsula

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T 330.657.2800

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JOSEPH MATAVA
0614145
REGISTERED ARCHITECT
JOSEPH MATAVA
0614145 | 12/31/25

PROJECT TEAM

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330.657.2800

CIVIL ENGINEER:
LEWIS LAND PROFESSIONALS INC.
Civil Engineering & Land Surveying
330.335.8232

STRUCTURAL ENGINEER:
TTR Engineers
330.733.8332

MEP ENGINEER:
DENK ASSOCIATES CONSULTING ENGINEERS
216.531.8880

BATH TOWNSHIP SINCE 1818

NORTH FORK PRESERVE BARN RENOVATION

4400 EVERETT ROAD, AKRON, OH 44333

PROJECT # 2324

ISSUE:

BID SET	07-28-2025

DETAILS

A13.3

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Printed: Friday, March 21, 2025

GENERAL CONDITIONS

1.01 GENERAL PROVISIONS

A. Provisions of instructions to bidders, general conditions, supplementary conditions, alternates, addendae, and specifications for associated trades are a part of this specification. contractors and subcontractors shall examine all items that will affect work under this division.
B. Contractors shall provide all labor, equipment, supplies services, and shall perform all work complete and in strict accordance with specifications and applicable drawings. Any deviations shall be clearly defined and itemized in accordance with these specifications.
C. Contractors are instructed to read carefully specifications for all parts of the work, which may include architectural, electrical, mechanical, plumbing, fire protection, civil, structural and all other drawings as well as specifications for all divisions that are part of the contract documents.
D. All items of labor, material, and equipment not specifically mentioned herein or shown on the plan, but are incidental to, or required for the complete installation and proper operation of the work, shall be furnished as if called for in detail by the specifications or drawings.

1.02 PERMITS, CODES, INSPECTIONS, AND TESTS

A. Contractor shall secure and pay for all permits and inspections required for the prosecution of the work. All permits and certificates of inspection and approval signed by the controlling building department shall become property of the owner.
B. Drawings indicate minimum design requirements. national, state, and local codes shall be followed. The Contractor shall include the cost of satisfying such codes and standards in the bid.

1.03 SITE VISIT

A. Contractor shall visit the site of the work and become familiar with all conditions affecting the work. Submission of a proposal/bid shall presuppose knowledge of all such conditions and no additional compensation shall be allowed where extra labor or materials are required because of ignorance of these conditions.

2.01 WORK COVERED BY CONTRACT DOCUMENTS

A. Provide and pay for all materials, labor, services, equipment, licenses, taxes, and other items necessary for the execution, installation and completion of the work indicated in the contract documents.
B. The work involves construction of a maintenance building using post frame / pole building construction with metal siding and roofing.

2.02 CONTRACT METHOD

A. Construction of the work under single prime contracts for general trades, with plumbing, heating and ventilating, and electrical as subcontractors to the prime.

2.03 CONTRACTOR'S DUTIES

A. Except as specifically noted, provide and pay for:
1. Labor, materials, and equipment.
2. Tools, construction equipment and machinery.
3. Water, heat, and utilities including electrical power required for construction.
4. Other facilities and services necessary for proper execution and completion of work.
B. The Contractor shall obtain and pay for all permits required by law for the execution of this work unless noted otherwise.
C. The Contractor shall also obtain and pay for certificates, inspections and other legal fees required, both permanent and temporary, including electrical and highway permits.
D. The Contractor shall also obtain and pay for material testing as indicated in the contract documents. this may include, but is not limited to concrete and soils testing, and structural steel framing inspection and testing.
E. The Contractor shall provide engineered drawings for the post frame / pole building structure, including but not limited to:
1. post sizes, types, and layout
2. roof trusses, purlins
3. post footings / foundations
4. cross bracing, shear connections

2.04 COORDINATION

A. The General Trades Contractor shall act as project expediter for all subcontracts and shall prepare and monitor the project schedule.
B. Coordinate work for the various sections of specifications to ensure efficient and orderly sequence of installation of construction elements, with provisions for accommodating items installed later.
C. Verify that the characteristics of elements of interrelated operating equipment are compatible; coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
D. Coordinate space requirements and installation of mechanical and electrical work that are indicated diagrammatically on drawings. Follow routing shown for pipes, ducts and conduits, as closely as practicable; make runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

2.05 REFERENCE STANDARDS

A. For products specified by association or trade standards, comply with requirements of the standards, except when more rigid requirements are specified or required by applicable codes.
B. The date of the standard is that which was in effect as of the bid date, unless a specific date is indicated.
C. Obtain copies of standards when required by contract documents. Maintain copy at job site during progress of the specific work.

2.06 CONSTRUCTION TIME

A. Start Date and Substantial Completion of the Work (to be certified by the Architect) shall be agreed to by the Owner and Contractor. Any materials/equipment obtained before the official start date must be stored off-site by the contractor.

2.07 CONTRACTOR'S USE OF PREMISES

A. Contractor shall assume full responsibility for protection and safekeeping of products under this contract stored on the site.
B. Contractor shall move any stored products, under contractor's control, which interfere with operations of the owner.
C. Contractor shall, at his option, obtain and pay for the use of additional storage or work areas needed for operations.

2.08 SPECIAL REQUIREMENTS

A. Fire protection: Provide and maintain an adequate number of hand fire extinguishers at convenient and appropriate locations during construction. Avoid all accumulations of flammable debris by removing rubbish promptly. take all other precautions necessary to prevent fire. Supervise closely the storage of paint materials and other combustible products.
B. Accident prevention and safety: Comply with all applicable laws, ordinances, rules, regulations and orders of governing authorities having jurisdiction for the safety of persons and property to protect them from damage, injury or loss. Erect and maintain, as required by conditions and progress of the work, all necessary safeguards for safety and protection, including fences, railings, barricades, lighting, posting of danger signs and other warnings against hazards. Where prevention of construction accidents is not regulated by code or ordinance, comply with AGC's "Manual of Accident Prevention in Construction." Contractor shall be solely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the project. All scaffolds shall be built in accordance with all requirements of local state, and federal laws and regulations.

2.09 EXAMINATION

A. Existing conditions: The existence and location of site improvements, utilities, and other construction indicated as existing are not guaranteed. Before beginning work, investigate and verify the existence and location of mechanical and electrical systems and other construction affecting the work.
1.Before construction, verify the location and points of connection of utility services.
B. Existing utilities: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning work, investigate and verify the existence and location of underground utilities and other construction affecting the work.
1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; and underground electrical services.
2. Furnish location data for work related to project that must be performed by public utilities serving project site.
C. Acceptance of conditions: Examine substrates, areas, and conditions, with installer or applicator present where indicated, for conditions that may compromise installation for installation tolerances and other conditions affecting performance. Record observations.
1. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
2. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
3. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
4. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the work indicates acceptance of surfaces and conditions.

2.10 PREPARATION

A. Existing utility information: Furnish information to local utility that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.
B. Field measurements: Take field measurements as required to fit the work properly. Recheck measurements before installing each product. Where portions of the work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. coordinate fabrication schedule with construction progress to avoid delaying the work.
C. Space requirements: Verify space requirements and dimensions of items shown diagrammatically on drawings.
D. Review of contract documents and field conditions: Immediately on discovery of the need for clarification of the contract documents, submit a request for information to owner and architect. Include a detailed description of problem encountered, together with recommendations for changing the contract document.

2.11 PROJECT SUPERINTENDENT RESPONSIBILITIES

A. Coordinate the work of the contractor and the subcontractors for the work of all trades.
B. Coordinate the schedules of the contractor, the subcontractors and suppliers of materials and equipment.
C. Verify timely deliveries of products for installation by the trades.
D. Verify that labor and materials are adequate to maintain schedules.
E. Conduct conferences and maintain communications with subcontractors, suppliers, and other concerned parties as necessary to:
1. Maintain coordination and schedules.
2. Resolve matters in dispute.
F. Participate in project meetings.
G. Report progress of work.
H. Recommend needed changes in schedules.
I. Assist in compiling and assembling project record information.
J. Observe required testing. Maintain a record of tests including:
1. Testing agency and name of inspector.
2. Subcontractor.
3. Date and time of testing.
4. Type of test, and results.
5. Retesting required.
K. Verify that subcontractors maintain accurate record documents.
L. Attend all punch list inspections.

3.01 SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES

A. Prior to submittal, review for compliance with Contract Documents. Contractor shall stamp submittals approving them for materials, fit and coordination, prior to submission to Owner.
B. Check field dimensions and clearance dimensions.
C. Check relation to available space.
D. Check anchor bolt settings.
E. Review the effect of any changes on the work of other contracts or trades.
F. Check compatibility with equipment and work of other trades.
G. Identify details by reference to sheet and detail numbers shown on Contract Drawings.
H. Submit the number required for use by the Contractor plus three (3) copies for the Architect/Owner/Engineer. The Contractor has the option to provide submittals electronically. In this case, reviewed submittals will be returned in the same manner.
I. Provide physical samples of sufficient size to illustrate functional characteristics of material and full range of color, texture, and/or pattern.
J. Certified Test Reports: Before delivery of materials and equipment, certified copies of the reports of all tests listed in the technical sections shall be submitted and approved. The testing shall have been performed in a laboratory meeting the requirements specified herein. Unless otherwise specified the tests shall have been performed within three years of submittal of the reports for approval. Test reports shall be accompanied by the certificate from the manufacturer certifying that the material and equipment proposed to be supplied is of the same type, quality, manufacturer, and make as that tested.
K. Manufacturer's Certificates of Conformance or Compliance: Manufacturer's certification furnished by the Contractor on items of materials and equipment incorporated into the work will be accepted only when this method will assure full compliance with the provisions of the Contract, as determined by the Architect. Pre-printed certifications will not be acceptable. All certifications shall be in the original. The original of all manufacturer's certifications shall name the appropriate item of equipment or material, specification, standard, or other document specified as controlling the quality of that item and shall have attached thereto certified copies of test data upon which the certifications are based. All certificates shall be signed by the manufacturer's official authorized to sign certificates of conformance or compliance.
L. Laboratory Reports: Reports shall cite the contract requirements, the test or analysis procedures used, the actual test results, and include a statement that the item tested or analyzed conforms or fails to conform to the specification requirements. All test reports shall be signed by a representative of the testing laboratory authorized to sign certified test reports.
M. Schedule submissions at least 14 days before the date that reviewed submittals will be needed; give special consideration to time constraints required by "long lead" items or equipment.
N. Architect's duties:
1. Review for design concept and for coordination with Contract Documents.
2. Review of separate item does not constitute review of an assembly in which item functions.

3.02 QUALITY CONTROL

A. The Contractor shall maintain an adequate inspection system and perform such inspections and tests as will assure that the work performed under the Contract conforms to the Contract Documents and shall maintain and make available to the Architect adequate records of such inspections and tests.
B. Factory Tests: Tests made on various products and component parts prior to shipment to the job site, including but not limited to such items as transformer, boilers, air conditioning equipment, electrical equipment, and precast concrete.
C. Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
1. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
2. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
3. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each such service.
4. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
5. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.

3.03 SPECIAL TESTS AND INSPECTIONS

A. Contractor will engage a qualified testing agency or special inspector to conduct special tests and inspections required by authorities having jurisdiction as indicated in individual Specification Sections, and as follows:
1. Notifying Architect and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
2. Submitting a certified written report of each test, inspection, and similar quality-control service to Architect with copy to Contractor and to authorities having jurisdiction.
3. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
4. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
5. Retesting and reinspecting corrected work.

4.01 PRODUCT REQUIREMENTS

A. Where a specific manufacturer's product is named, it is done to establish the significant qualities related to type, function, dimension, service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of other manufacturers.
B. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, product selected shall be compatible with products previously selected, even if previously selected products were also options.

4.02 COMPARABLE PRODUCTS

A. Voluntarily submitted products differing from, but comparable to, those named in the contract documents shall being submitted during bidding in the space allocated on the Bid Form. Attach list of additional items if necessary. The Owner will request additional information for comparable products, if necessary, and accept or reject substitutions at their discretion.
B. Conditions: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
1. Evidence that the proposed product does not require extensive revisions to the Contract Documents, that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
3. Evidence that proposed product provides specified warranty.
4. The proposed product will result in either a no-cost or deduct change order.
5. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
6. Samples, if requested.

5.01 CONSTRUCTION LAYOUT

A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect promptly.
B. Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.
C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and invert elevations.
D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.
E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect.

5.02 INSTALLATION

A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
1. Make vertical work plumb and make horizontal work level.
2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.
B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
D. Conduct construction operations so no part of the Work is subjected to damaging operations or loadings in excess of that expected during normal conditions of occupancy.
E. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.
F. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field templates, including Sleeve, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
H. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
I. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

5.03 PROGRESS CLEANING

A. General: Clean Project site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. Enforce requirements strictly. Dispose of materials lawfully.
1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
2. Do not hold materials more than 7 days during normal weather or 3 days if the temperature is expected to rise above 80 deg F.
3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
B. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
C. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
D. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
E. Waste Disposal: Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.
F. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
G. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
H. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

5.04 STARTING AND ADJUSTING

A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
B. Adjust operating components for proper operation without binding. Adjust equipment for proper operation.
C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
D. Manufacturer's Field Service: If a factory-authorized service representative is required to inspect field-assembled components and equipment installation, comply with sections 3.02 and 3.03.

5.05 PROTECTION OF INSTALLED CONSTRUCTION

A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
B. Comply with manufacturer's written instructions for temperature and relative humidity.

5.06 CORRECTION OF THE WORK

A. Repair or remove and replace defective construction. Restore damaged substrates and finishes.
1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.
B. Restore permanent facilities used during construction to their specified condition.
C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.
D. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.
E. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

5.07 FINAL CLEANING

A. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
B. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:
1. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
2. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
3. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
4. Remove tools, construction equipment, machinery, and surplus material from Project site.
5. Remove snow and ice to provide safe access to building.
6. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
7. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
8. Sweep concrete floors broom clean in unoccupied spaces.
9. Vacuum carpet and similar soft surfaces, removing debris and excess nap; shampoo if visible soil or stains remain.
10. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.
11. Remove labels that are not permanent.
12. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration. (Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates.)
13. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
14. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
15. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
16. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
17. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.
18. Leave Project clean and ready for occupancy.

6.01 CLOSEOUT SUBMITTALS

A. Format: Submit operations and maintenance manuals in the following format:
1. PDF electronic file. Assemble each manual into a composite electronically-indexed file. Submit on digital media acceptable to Owner.
a. Name each indexed document file in composite electronic index with applicable item name. Include a complete table of contents for each electronically-indexed volume.
b. Enable inserted reviewer comments on draft submittals.
2. Three paper copies. Include a complete operation and maintenance directory. Enclose title pages and directories in clear plastic sleeves. Architect will return two copies.
B. Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least 15 days before commencing demonstration and training. Architect and Engineer will return copy with comments.
1. Correct or modify each manual to comply with Architect's and Engineer's comments. Submit copies of each corrected manual within 15 days of receipt of Architect's and Commissioning Agent's comments and prior to commencing demonstration and training.
C. Emergency Manual: Assemble a complete set of emergency information indicated in other Specification Sections in a binder separate from those assembled by Owner's operating personnel for types of emergencies indicated.
D. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.
E. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.
F. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.
G. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.
H. Record on a set of "As-Built" prints any deviations from Design Drawings. Deliver this set to the Owner before submitting request for final payment. The "As-Built" prints shall be an accurate depiction of the Project as completed.
I. Do not use original project record documents as part of operation and maintenance manuals.

SECTION 01 50 00 – TEMPORARY CONSTRUCTION FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS
A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Specification Sections, apply to this Section.

1.2 SUMMARY
1.Section includes requirements for temporary utilities, support facilities, and security and protection facilities.

1.3 WASTE DISPOSAL FACILITIES (DUMPSTERS)
A. Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Waste Disposal Facilities shall be provided for the Work of all Contracts.

1.4 FIRE EXTINGUISHERS
1. Provide portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

1.5 PROJECT SIGNS
A. Identification Signs: Provide Project identification signs when indicated on Drawings.
B. Temporary Signs: Provide other signs as indicated and as required to inform public and individuals seeking entrance to Project.
C. Provide temporary, directional signs for construction personnel and visitors.
D. Maintain and touchup signs so they are legible at all times.
E. Unauthorized signs are not permitted.

1.6 ELECTRIC POWER - USE OF EXISTING FACILITY POWER
A. Use of Owner's existing electric power service will be permitted. Provide connections and extensions of services as required for construction operations. Clean and maintain electric power service facilities in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.
1. Usage Charges to be paid by the Owner.
2. Provide temporary power stands or pedestals for use by all Contracts. Stands shall have multiple 110v-120v outlets and circuits. Each Contract requiring power greater than 110v-120v power shall provide its at their own expense.
3. Coordinate with the Owner prior to the commencement of work, regarding which existing panels and circuits are to be used for temporary power and lighting.

1.7 TEMPORARY ELECTRIC POWER
A. Provide electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations.
1. All fees, permits, connection charges, utility company equipment, usage charges, etc. are to be paid by the Contract responsible for providing the temporary electric power service.

1.8 TEMPORARY LIGHTING
A. Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.
1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.
2. In existing facilities where the construction activities may occur over a series of phases, temporarily relocate directional egress signage and lighting to direct building occupants and construction personnel away from hazards or dead-end pathways created by the construction activities. Coordinate the temporary relocation of egress signage with the authority having jurisdiction.

1.9 WATER SERVICE – USE OF EXISTING FACILITY WATER SERVICE
A. Use of the Owner's existing domestic water service will be permitted. Provide connections and extensions of services as required for construction operations. Clean and maintain water service in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.
1. Usage Charges to be paid by the Owner.
2. Each contract is responsible for its own hoses, nozzles, etc.

1.10 TEMPORARY WATER SERVICE
A. Install water service and distribution piping in sizes and pressures adequate for construction. All fees, permits, connection charges, utility company equipment, usage charges, etc. are to be paid by the Contract responsible for providing the temporary water service.

1.11 SANITARY FACILITIES – USE OF EXISTING FACILITY RESTROOMS
A. Provide temporary restroom facilities on-site.

1.12 PROTECTION OF FINISHES
A. Provide surface protection material to protect existing and new flooring, walls, ceiling, etc. surfaces.
1. The Project Coordinator shall be responsible for the protection of all floor finishes installed as new construction, as it pertains to this project.
2. Each Contract shall be responsible for the protection of all finishes, unless noted otherwise. Finishes may include but not be limited to: existing flooring and new/existing (walls, ceilings, countertops, furniture, equipment, etc.).

1.13 SECURITY ENCLOSURE AND LOCKUP
A. Install temporary enclosure around partially completed areas of construction.

1.14 BARRICADES, WARNING SIGNS AND LIGHTS
A. Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.

1.15 PROTECTION OF EXISTING FACILITIES
A. Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.
B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.

03 30 00 - CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.0 SUMMARY
A. Extent of concrete work is indicated on the drawings.

1.01 SECTION INCLUDES
A. Concrete formwork.
B. Floors and slabs on grade.
C. Concrete foundations and anchor bolts.
D. Concrete reinforcement.
E. Miscellaneous concrete elements, including equipment pads, equipment pits, light pole bases, flagpole bases, thrustblocks, splash blocks, and manholes.
F. Concrete curing.

1.02 RELATED REQUIREMENTS
A. Division 07 - Joint Sealants: Products and installation for sealants and joint fillers for saw cut joints and isolation joints in slabs.

1.03 SUBMITTALS
A. Product Data: Submit manufacturers' data on manufactured products showing compliance with specified requirements and installation instructions.
1. For curing compounds, provide data on methods of removal in the event of incompatibility with floor covering adhesives.
2. For membrane-forming, moisture emission-reducing, curing and sealing compound, provide manufacturer's installation instructions.
B. Mix Design: Submit proposed concrete mix design.
1. Indicate proposed mix design complies with requirements of ACI 301, Section 4 - Concrete Mixtures.
2. Indicate proposed mix design complies with requirements of ACI 318, Chapter 5 - Concrete Quality, Mixing and Placing.
3. Indicate proposed mix design complies with fiber reinforcing manufacturer's written recommendations.
4. Indicate proposed mix design complies with admixture manufacturer's written recommendations.
5. Indicate proposed mix design complies with expansive component manufacturer's written recommendations.
C. Test Reports: Submit a report for each test or series of tests specified.

1.04 QUALITY ASSURANCE
A. Perform work of this section in accordance with ACI 301 and ACI 318.
1. Maintain one copy of each document on site.
B. Follow recommendations of ACI 305R when concreting during hot weather.
C. Follow recommendations of ACI 306R when concreting during cold weather.

PART 2 PRODUCTS

2.01 FORMWORK
A. Formwork Design and Construction: Comply with guidelines of ACI 347R to provide formwork that will produce concrete complying with tolerances of ACI 117.
B. Form Materials: Contractor's choice of standard products with sufficient strength to withstand hydrostatic head without distortion in excess of permitted tolerances.
1. Form Facing for Exposed Finish Concrete: Contractor's choice of materials that will provide smooth, stain-free final appearance.
2. Form Coating: Release agent that will not adversely affect concrete or interfere with application of coatings.
3. Form Ties: Cone snap type that will leave no metal within 1-1/2 inches of concrete surface.

2.02 REINFORCEMENT MATERIALS
A. Reinforcing Steel (Bar): ASTM A615/A615M, Grade 60 (60,000 psi).
1. Type: new billet-steel bars.
2. Finish: Unfinished, unless otherwise indicated.
B. Reinforcing Steel (Welded Wire Fabric): ASTM A1064
1. Type: Flat Sheets
2. Finish: Unfinished, unless otherwise indicated.
3. Placement: Installed on top of chairs.
C. Reinforcement Accessories:
1. Tie Wire: Annealed, minimum 16-gauge, 0.0508 inch.
2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.

2.03 CONCRETE MATERIALS
A. Cement: ASTM C150/C150M, Type I - Normal Portland type.
1. Acquire cement for the entire project from one source.
2. Minimum of 75% of Cementitious material by Weight.
B. Fine and Coarse Aggregates: ASTM C33/C33M.
C. Fly Ash: ASTM C618, Class C or F.
1. Maximum 20% of Cementitious material by weight.
2. Fly Ash is not permitted in mixes for flat horizontal exposed surfaces.
D. Ground Granulated Blast Furnace Slag is only permitted in concrete mixes that will not be exposed.
E. Silica Fume: ASTM C1240, proportioned in accordance with ACI 211.1.
F. Water: ASTM C1602/C1602M; clean, potable, and not detrimental to concrete.

2.04 ADMIXTURES
A. General Use of Admixtures shall be in accordance with the following.
1. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of cement.
2. All admixtures shall be sourced from one manufacturer and the combination of those admixtures shall be approved by the manufacturer.
3. Approved manufactures are Euclid Chemical, www.euclidchemical.com#tsle and Sika USA, https://usa.sika.com and any other manufacture of equal or better quality that is approved in writing by the architect.
B. Air Entrainment Admixture: ASTM C260/C260M
a. Euclid Chemical Company; EUCON AEA-92S
b. Sika USA; Sika Air-260
C. High Range Water Reducing: ASTM C494/C494M Type A & F
a. Euclid Chemical Company; EUCON 1037
b. Sika USA; Sikament 610;
D. Concrete Retarder Admixture: ASTM C494/C494M Type B & D.
a. Euclid Chemical Company; Eon Retarder 75
b. Sika USA; Sika Plastiment
E. Concrete Accelerating Admixture: ASTM C494/C494M Type C & E.
a. Euclid Chemical Company; ACCELGUARD 80
b. Sika USA; Sika Set NC
F. Water Reducing Admixture: ASTM C494/C494M Type A & D.
a. Euclid Chemical Company; EUCON NW
b. Sika USA; Sika Plastocrete-10N
G. Shrinkage Reducing Admixture: ASTM C494/C494M, Type S.
a. Euclid Chemical Company; EUCON SRA Floor:
b. Sika USA; SikaControl-75

2.05 CURING MATERIALS
A. Evaporation Reducer: Liquid thin-film-forming compound that reduces rapid moisture loss caused by high temperature, low humidity, and high winds; intended for application immediately after concrete placement.
1. Products:
a. Dayton Superior Corporation; AquaFilm; www.daytonsuperior.com
b. Euclid Chemical Company; EUCOBAR: www.euclidchemical.com
c. Kaufman Products Inc; VaporAid: www.kaufmanproducts.net
d. Nox-Crete Inc; Monofilm: www.nox-crete.com
e. SpecChem, LLC; SpecFilm Concentrate or SpecFilm: www.specchemllc.com
f. W. R. Meadows, Inc; Evapre or Evapre-RTU: www.wrmeadows.com

2.06 CONCRETE MIX DESIGN
A. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.
B. Concrete Strength: Establish required average strength for each type of concrete on the basis of historic test data, as specified in ACI 301.
1. For test data provide for all mixes used, test data to be from tests within the last 10 years.
C. Admixtures: Add acceptable admixtures as recommended in ACI 211.1 and at rates recommended or required by manufacturer.
D. Normal Weight Concrete:
1. Compressive Strength, when tested in accordance with ASTM C39/C39M at 28 days: 4,000 pounds-force per square inch (psi).
2. Fly Ash Content: Maximum 15 percent of cementitious materials by weight.
3. Water-Cement Ratio: Maximum 40 percent by weight.
4. Total Air Content: 6 percent, determined in accordance with ASTM C173/C173M, only required in exterior exposed concrete.
5. Maximum Slump: 4 inches in mixes to be placed manually and 6 inches in mixes to be pumped.
6. Maximum Aggregate Size: 5/8 inch.

PART 3 EXECUTION

3.01 EXAMINATION
A. Verify lines, levels, and dimensions before proceeding with the work of this section.

3.02 PREPARATION
A. Formwork: Comply with requirements of ACI 301. Design and fabricate forms to support all applied loads until concrete is cured, and for easy removal without damage to concrete.
B. Verify that forms are clean and free of rust before applying release agent.
C. Interior Slabs on Grade: Install vapor retarder under interior slabs on grade. Comply with ASTM E1643. Lap joints minimum 6 inches. Seal joints, seams, and penetrations watertight with manufacturer's recommended products and follow manufacturer's written instructions. Repair damaged vapor retarder before covering.

3.03 INSTALLING REINFORCEMENT AND OTHER EMBEDDED ITEMS
A. Comply with requirements of ACI 301. Clean reinforcement of loose rust and mill scale, and accurately position, support, and secure in place to achieve not less than minimum concrete coverage required for protection.
B. Install welded wire reinforcement in maximum possible lengths and offset end laps in both directions. Splice laps with tie wire.
C. Verify that anchors, seats, plates, reinforcement, and other items to be cast into concrete are accurately placed, positioned securely, and will not interfere with concrete placement.

3.04 PLACING CONCRETE
A. Place concrete in accordance with ACI 304R.
B. Place concrete for floor slabs in accordance with ACI 302.1R.
C. Notify Architect not less than 24 hours prior to commencement of placement operations.
D. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.
E. Ensure reinforcement, inserts, waterstops, embedded parts, and formed construction joint devices will not be disturbed during concrete placement.
F. Finish floors level and flat, unless otherwise indicated, within the tolerances specified below.

3.05 SLAB JOINTING
A. Locate joints as indicated on drawings.
B. Anchor joint fillers and devices to prevent movement during concrete placement.
C. Isolation Joints: Use preformed joint filler with removable top section for joint sealant, total height equal to thickness of slab; set flush with top of slab.
D. Saw Cut Contraction Joints: Saw cut joints before concrete begins to cool, within 4 to 12 hours after placing; use 3/16-inch-thick blade and cut at least 1 inch deep but not less than one quarter (1/4) the depth of the slab.

3.06 FLOOR FLATNESS AND LEVELNESS TOLERANCES
A. Maximum Variation of Surface Flatness:
1. Exposed Concrete Floors: 1/4 inch in 10 feet (F_F = 25).
2. Under Seamless Resilient Flooring: 1/4 inch in 10 feet (F_F = 25).
3. Under Carpeting: 1/4 inch in 10 feet (F_F = 25).
B. Floor Levelness (F_L) shall be a minimum of 20.
C. Correct the slab surface if tolerances are less than specified.
D. Correct defects by grinding or by removal and replacement of the defective work. Areas requiring corrective work will be identified. Re-measure corrected areas by the same process.

3.07 CONCRETE FINISHING
A. Repair surface defects, including tie holes, immediately after removing formwork.
B. Concrete Slabs: Finish to requirements of ACI 302.1R, and as follows:
1. Surfaces to Receive Thick Floor Coverings: "Wood float" as described in ACI 302.1R; thick floor coverings include quarry tile, ceramic tile, and Portland cement terrazzo with full bed setting system.
2.

H. Touch-Up Primer for Galvanized Surfaces: Fabricator's standard zinc rich paint, complying with VOC limitations of authorities having jurisdiction.

2.02 FABRICATION
A. Shop to fabricate to greatest extent possible.
B. Continuously seal joined members by continuous, uniform welds. Grind exposed welds surfaces to a smooth finish.
C. Fabricate connections for bolt, nut, and washer connectors.
D. Remove weld spatter, slivers, and similar surface discontinuities.
E. Remove blemishes and surface irregularities resulting from temporary braces or fixtures by filling or grinding, before cleaning, treating, and galvanizing.

2.03 FINISH
A. Prepare structural component surfaces in accordance with SSPC-SP 3.
B. Galvanize structural steel members to comply with ASTM A123/A123M. Provide minimum 1.7 oz/sq ft galvanized coating.

2.04 SOURCE QUALITY CONTROL
A. Welded Connections: Visually inspect all shop-welded connections, document, and record results.

PART 3 EXECUTION

3.01 EXAMINATION
A. Verify that conditions are appropriate for erection of structural steel and that the work may properly proceed.

3.02 ERECTION
A. Erect structural steel in compliance with AISC 303.
B. Allow for erection loads and provide sufficient temporary bracing to maintain structure in safe condition, plumb, and in true alignment until completion of erection and installation of permanent bracing.
C. Use carbon steel bolts only for temporary bracing during construction, unless otherwise specifically permitted on drawings. Install high-strength bolts in accordance with RCSC (HSBOLT) "Specification for Structural Joints Using High-Strength Bolts".
D. Do not field cut or alter structural members without approval of Architect.
E. Grout solidly between column plates and bearing surfaces, complying with manufacturer's instructions for non-shrink grout. Trowel grouted surfaces to a smooth finish, splaying neatly to 45 degrees.

3.03 TOLERANCES
A. Maximum Variation from Plumb: 1/4 inch per story, non-cumulative.
B. Maximum Offset from True Alignment: 1/4 inch.

3.04 FIELD QUALITY CONTROL
A. An independent testing agency will perform field quality control tests, as specified in Division 01 - Quality Requirements.
B. Welded Connections: Visually inspect all field-welded connections, document, and record results.

SECTION 06 10 00 – ROUGH CARPENTRY

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Structural dimension lumber framing.
B. Exposed timber structural framing.
C. Non-structural dimension lumber framing.
D. Preservative treated wood materials.

1.02 RELATED REQUIREMENTS
A. Section 061500 - Wood Decking.

1.03 SUBMITTALS
A. See Division 01 - Administrative Requirements for submittal procedures.
B. Product Data: Provide technical data on wood preservative materials and application instructions.
C. Samples: For rough carpentry members that will be exposed to view, submit two samples, 6by12 inch in size illustrating wood grain, color, and general appearance.

1.04 DELIVERY, STORAGE, AND HANDLING
A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.

1.05 WARRANTY
A. See Division 01 - Closeout Submittals for additional warranty requirements.
B. Correct defective work within a one-year period commencing on Date of Substantial Completion.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS
A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
1. Species:
a. Exposed Framing: Douglas Fir-Larch, unless otherwise indicated.
b. Concealed Framing: SPF, SYP, or Doug Fir, unless otherwise indicated.
2. If no species is specified, provide species graded by the agency specified; if no grading agency is specified, provide lumber graded by grading agency meeting the specified requirements.
3. Grading Agency: Grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee at www.alsc.org, and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.

2.02 DIMENSION LUMBER
A. Grading Agency: Western Wood Products Association; WWPA G-5.
B. Sizes: Nominal sizes as indicated on drawings, S4S.
C. Moisture Content: S-dry or MC19.
D. Joist, Rafter, and Small Beam Framing (2 by 6 through 4 by 16):
1. Species: Allowed under grading rules.
2. Species:
a. Exposed Framing; Douglas Fir-Larch, unless otherwise indicated.
b. Concealed Framing: SPF, SYP, or Doug Fir, unless otherwise indicated.
3. Grade: No. 1 and Better.
E. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
1. Lumber: S4S, No. 2 or Standard Grade.
2. Boards: Standard or No. 3.

2.03 HEAVY TIMBER
A. Heavy timber includes naturally occurring round wood members used as structural columns.
1. Douglas fir-larch, Douglas fir-larch (North), or Douglas fir-south; NLGA, WCLIB, or WWPA.

2. Maximum Moisture Content: Provide timber with 19 percent maximum moisture content at time of dressing.

2.04 WOOD-PRESERVATIVE-TREATED MATERIALS
A. Preservative-Treated Materials: AWPA U1; Use Category UC2 for interior construction not in contact with the ground, Use Category UC3b for exterior construction not in contact with the ground, and Use Category UC4a for items in contact with the ground.
1. Use treatment containing no arsenic or chromium. Do not use inorganic boron (SBX) for sill plates.
2. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent.
3. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.
B. Provide preservative-treated materials for items indicated on Drawings, and the following:
1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
2. Wood sills, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.
3. Wood floor plates that are installed over concrete slabs-on-grade.

2.05 PLYWOOD BACKING PANELS
A. Equipment Backing Panels: Plywood, Exterior, AC, 3/4-inch nominal thickness.

2.06 ACCESSORIES
A. Fasteners and Anchors:
1. Metal and Finish: Hot-dipped galvanized steel complying with ASTM A153/A153M for high humidity and preservative-treated wood locations, unfinished steel elsewhere.
B. Die-Stamped Connectors: Hot dipped galvanized steel, sized to suit framing conditions.
1. For contact with preservative treated wood in exposed locations, provide minimum G185 galvanizing complying with ASTM A653/A653M.

PART 3 EXECUTION

3.01 PREPARATION
A. Coordinate installation of rough carpentry members specified in other sections.

3.02 INSTALLATION - GENERAL
A. Select material sizes to minimize waste.
B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including shims, bracing, and blocking.

3.03 FRAMING INSTALLATION
A. Set structural members level, plumb, and true to line. Discard pieces with defects that would lower required strength or result in unacceptable appearance of exposed members.
B. Make provisions for temporary construction loads and provide temporary bracing sufficient to maintain structure in true alignment and safe condition until completion of erection and installation of permanent bracing.
C. Install structural members full length without splices unless otherwise specifically detailed.
D. Comply with member sizes, spacing, and configurations indicated, and fastener size and spacing indicated, but not less than required by applicable codes, AWC (WFCM) Wood Frame Construction Manual, and 2017 OBC.
E. Install horizontal spanning members with crown edge up and not less than 3 inches of bearing at each end.
F. Construct double joist headers at floor and ceiling openings and under wall stud partitions that are parallel to floor joists; use metal joist hangers unless otherwise detailed.
G. Frame wall openings with two or more studs at each jamb; support headers on cripple studs.

3.04 BLOCKING, NAILERS, AND SUPPORTS
A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.

3.05 SITE APPLIED WOOD TREATMENT
A. Apply preservative treatments compatible with factory applied treatment at site-sawn cuts, complying with manufacturer's instructions.
B. Allow preservative to dry prior to erecting members.

3.06 TOLERANCES
A. Framing Members: 1/4 inch from true position, maximum.
B. Variation from Plane, Other than Floors: 1/4 inch in 10 feet maximum, and 1/4 inch in 30 feet maximum.

3.07 FIELD QUALITY CONTROL
A. See Division 01 - Quality Requirements for additional requirements.

3.08 CLEANING
A. Waste Disposal: See Division 01 - Construction Waste Management and Disposal.
1. Comply with applicable regulations.
2. Do not burn scrap on project site.
3. Do not burn scraps that have been pressure treated.
4. Do not send materials treated with pentachlorophenol, CCA, or ACA to co-generation facilities or "waste-to-energy" incinerators.
B. Do not leave wood, shavings, sawdust, etc. on the ground or buried in fill.
C. Prevent sawdust and wood shavings from entering the storm drainage system.

3.09 SCHEDULES
A. Roof Beams: Doug Fir, No. 1 Grade.

SECTION 06 12 16 - STRUCTURAL INSULATED PANELS

PART 1 GENERAL

1.1 SECTION INCLUDES
A. Structural insulated panels (SIPs) with expanded polystyrene core.

1.2 RELATED SECTIONS
A. Section 06 10 00 – Rough Carpentry.
B. Section 06 16 00 – Sheathing.
C. Section 07 46 46 – Fiber Cement Siding.

1.3 SUBMITTALS
A. Submit under provisions of Section 01 30 00.
B. Product Data: Manufacturer's data sheets on each product; manufacturer-specific installation instructions for SIP system, including preparation instructions and recommendations, and storage and handling requirements and recommendations.
C. Shop Drawings: Submit shop drawings for SIPs showing layout, elevations, SIP details, product components and accessories. SIP installation drawing shall be reviewed by and sealed by a registered professional engineer qualified to perform such work. Deviations from standard detail and load design values shall be calculated and signed and sealed by a registered professional engineer.
D. Samples: Submit 12 inch by 12 inch (305 mm by 305 mm) sample panel.
E. SIP Code Compliance Report: Submit manufacturer's ICC-ES evaluation report for the International Building Code.

1.4 QUALITY ASSURANCE
A. Installer Qualifications: Installer shall be experienced in performing work of this section and shall specialize in installation of work similar to that required for this project. All work shall be performed in accordance with the manufacturer's installation manuals, and in accordance with manufacturer's panel layout drawings when supplied.
B. Source Limitations: Obtain all SIPs from one manufacturer, through one source. Accessories shall be acceptable to the SIP manufacturer.
C. Field Measurements: Provide field measurements of structure to SIPs manufacturer prior to fabrication of panels. Coordinate fabrication schedule to comply with project schedule requirements.
D. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
1. Erect panels in area designated by Architect.
2. Do not proceed with remaining work until workmanship is approved by Architect.
3. Correct mock-up area as required to produce acceptable work.

1.5 DELIVERY, STORAGE, AND HANDLING
A. Ordering: Comply with SIP manufacturer ordering instructions and coordinate lead time requirements to avoid construction delays.
B. Delivery: Deliver materials from SIP manufacturer with identification labels or markings intact.
C. Unloading: Off-load SIPs from delivery vehicle using method which will not damage SIPs, and as acceptable to the manufacturer.
D. Storage: SIPS shall be fully supported using wood stickers, placed in level storage, and prevented from contact with the ground. Stickers shall be placed as recommended by manufacturer.
E. Protection: SIPs shall remain in the manufacturer's protective wrap until needed for installation. Unused panels will be rewrapped and/or covered with a suitable covering that will prevent exposure to rain, snow, water, sunlight, dirt, mud, and any foreign matter that may affect SIP performance.
F. Subsequent Construction: Coordinate installation of subsequent construction to avoid exposure of SIPs to rain, snow, high moisture, and ultraviolet light and as recommended by the manufacturer.

1.6 PROJECT CONDITIONS
A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer to the greatest extent practical. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.7 WARRANTY
A. Panel manufacturer will provide lamination warranty documents for building Owner acceptance and execution upon completion. Manufacturer's standard forms shall be submitted.

PART 2 PRODUCTS

2.1 MANUFACTURERS
A. Basis of Design: The Murus Company, Inc.
B. Subject to compliance requirements, products may be supplied by other manufacturers, including but not limited to the following:
1. Greenix Panel
2. ICS Eco SIPs
3. Thermocore

2.2 STRUCTURAL INSULATED PANELS
A. Murus EPS Structural Insulated Panel (SIP) with Expanded Polystyrene Core: A stress skin panel manufactured by a pressure lamination process complying with the following:
1. Panel Type: MURUS OSB-2100EPS Structural Insulated Panel, OSB/EPS Foam Core.
2. Panel Type: MURUS NB-2100EPS Insulated Panel, OSB/EPS Foam Core.
3. Thermal Characteristics: 4-1/2 inches (114 mm) thick SIP with R-15.
4. Thermal Characteristics: 8-1/4 inches (210 mm) thick SIP with R-29.
5. Expanded Polystyrene Core: Minimum of .95 pcf (15 kg/cu m) insulation meeting manufacturer's quality standards and the following. Insulation manufacturer shall provide confirmation of Third Party Certification.
a. K Factor: .26, ASTM C 518.
b. Compressive Strength: 10 psi, ASTM D 1621.
c. Flexural Strength: 25 psi min, ASTM C 203.
d. Tensile Strength: 28 psi min, ASTM C 297.
e. Shear Strength: 16 psi min, ASTM C 273.
f. Shear Modulus: 440 psi min, ASTM C 273.
g. Modulus of Elasticity: 915 psi min, ASTM C 203.
h. WVTR: 4.5 Perms, ASTM E 96.
i. Water Absorption (by volume): 4% max, ASTM C 272.
j. Maximum Service Temperature: 165 degrees F.
k. Foam Fire Rating: Class 1, ASTM E 84.
l. Flame Spread: <25, ASTM E 84.
m. Smoke Developed: <450, ASTM E 84.
n. Transverse Load: 34 psi min.
o. Combined Axial and Bending: ASTM E 72.
6. OSB: APA performance rating mark shall be identified on the panel, with an Exposure 1 durability rating; minimum physical properties shall be tested and described in APA PRP-108 or NIST PS 2. 7/16 inch (11 mm) thickness unless noted otherwise.
7. Adhesives: Manufacturer-approved one part urethane laminating adhesive having an in-use temperature range of - 40 degree F to +250 degree F (-40 degree C to 121 degree C).
8. Wiring Chases: If indicated or required, shall be cut into the panel during the manufacturing process.
9. Sizes: As indicated; Murus NEOPOR SIPs are available in widths of 4 feet or 8 feet by lengths of 8 feet to 24 feet (1219 mm or 2438 mm by 1219 mm to 7315 mm).

2.3 ACCESSORIES
A. Fasteners: Galvanized ring shank panel nails, or panel screws, as specified by panel manufacturer, for attachment of panel to frames, roofs, and corners. All fasteners to be sized and provided by manufacturer and installed per manufacturer's requirements. Do not use common fasteners.
B. Foam Sealant: Compatible with all components of the panel and adjacent materials, provided by manufacturer.
C. Construction Adhesive for Installing Dimensional Lumber: Supplied by contractor, acceptable to manufacturer.
D. Dimensional Lumber: SPF #2 kiln-dried or better, or pre-engineered equivalent.

PART 3 EXECUTION

3.1 EXAMINATION
A. Do not begin installation until foundation or slab have been properly prepared.
B. If supporting framing and level line are the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION
A. Clean surfaces thoroughly prior to installation.
B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION
A. Installation shall be in strict accordance with manufacturer's published instructions, details, and the drawings that are part of the contract documents for this project. Conflicts between these documents shall be resolved in writing prior to start of construction.

3.4 PROTECTION
A. Protect installed products until completion of project.
B. When storing panels, do not allow them to come into contact with the ground. Stored panels shall remain dry and in the manufacturer's original packaging. Do not allow panels to be stored in an unsupported manner.
C. Roof panels shall be fully protected from weather by roofing materials or other means to provide temporary protection at the end of the day, or when rain or snow is imminent.
D. Remove and replace insulated wall or roof panels which have become excessively wet or damaged before proceeding with installation of additional panels or other work.

SECTION 06 16 00 - SHEATHING

PART 1 - GENERAL

1.1 SUMMARY
A. This Section includes: Plywood sheathing.

1.2 SUBMITTALS
B. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
1. Include data for research/evaluation reports from chemical treatment manufacturer and certification by treating plant that treated plywood complies with requirements. Indicate type of treatment and net amount of preservative retained.
2. For products receiving waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
3. Include copies of warranties from chemical treatment manufacturers for each type of treatment.
C. Evaluation Reports: For the following, from ICC-ES:
1. Wood-preservative-treated plywood.

1.3 QUALITY ASSURANCE
A. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant-treated material, an inspection agency acceptable to authorities having jurisdiction that specifically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

1.4 DELIVERY, STORAGE, AND HANDLING
A. Stack panels flat with spacers between each and between each bundle to provide air circulation. Protect sheathing from weather by covering it with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under temporary cover.

PART 2 - PRODUCTS

2.1 WOOD PANEL PRODUCTS
A. Plywood: Either DOC PS 1 or DOC PS 2 unless otherwise indicated.
B. Thickness: As needed to comply with requirements specified, but not less than thickness indicated.
C. Factory mark panels to indicate compliance with applicable standard.

2.2 THWOOD SHEATHING
A. Plywood Wall and Parapet Sheathing: Either DOC PS 1 or DOC PS 2, Exposure 1, Fire Retardant Treated, Exterior sheathing.
1. Span Rating: Not less than 24/0.
2. Nominal Thickness: As indicated on Drawings, but not less than 1/2 inch.

2.3 FASTENERS
A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.
1. For sheathing, provide fasteners with organic-polymer or other corrosion-protective coating having a salt-spray resistance of more than 800 hours according to ASTM B 117.
2. For plywood sheathing, provide fasteners of Type 304 stainless steel.
B. Power-Driven Fasteners: Power systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES-AC70.
C. Screws for Fastening Plywood Sheathing to Cold-Formed Metal Framing: ASTM C 954, except with wafer heads and reamer wings, length as recommended by screw manufacturer for material being fastened.
D. Screws for Fastening Gypsum Sheathing to Cold-Formed Metal Framing: Steel drill screws, in length recommended by sheathing manufacturer for thickness of sheathing to be attached.
1. For steel framing less than 0.0329 inch thick, use screws that comply with ASTM C 1002.
2. For steel framing from 0.033 to 0.112 inch thick, use screws that comply with ASTM C 954.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL
A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement. Arrange joints so that pieces do not span between fewer than three support members.
B. Cut panels at perimeters, edges, and other obstructions of work; fit tightly against abutting construction, unless otherwise indicated.
C. Securely attach to substrate by fastening as indicated, complying with the following:
1. Table 2304.9.1, "Fastening Schedule," in ICC's "International Building Code."
2. ICC-ES evaluation report for fastener.
D. Coordinate sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.
E. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.
F. Coordinate sheathing installation with installation of materials installed over sheathing so sheathing is not exposed to precipitation or left exposed at end of the workday when rain is forecast.

3.2 PLYWOOD SHEATHING INSTALLATION
A. General: Comply with applicable recommendations in APA Form No. E30, "Engineered Wood Construction Guide," for types of structural-use panels and applications indicated.
B. Fastening Methods: Fasten panels as indicated below:
1. Wall, Parapet and Soffit Sheathing:
a. Screw to cold-formed metal framing.
b. Space panels 1/8 inch apart at edges and ends.

SECTION 06 20 20 - INTERIOR FINISH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY
A. This Section includes the following:
1. Standing and running trim.
2. Paneling.

1.2 SUBMITTALS
A. Product Data: For each type of process and factory-fabricated product.
B. Samples: For each type of trim, molding, or paneling indicated.
C. Finishes: Physical samples of stain color and finish sheen (to match existing) for all transparent and semi-transparent finishes.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL
A. Lumber: DOC PS 20 and applicable grading rules of inspection agencies certified by ALSC's Board of Review.
B. Hardwood Plywood
C. Hardboard: AHA A135.4.
D. MDF: ANSI A208.2, Grade 130, made with binder containing no urea-formaldehyde resin.
E. Particleboard: ANSI A208.1, Grade M-2, made with binder containing no urea-formaldehyde resin.
F. Melamine-Faced Particleboard: Particleboard complying with ANSI A208.1, Grade M-2, finished on both faces with thermally fused, melamine-impregnated decorative paper complying with LMA SAT-1.

2.2 STANDING AND RUNNING TRIM
A. Moldings/Trim for Transparent Finish (Stain or Clear Finish): Clear (better than FAS)
1. Species: Douglas fir or Pine (as required to match existing)
2. Maximum Moisture Content: 15 percent.
B. Moldings for Opaque Finish (Painted): Made to patterns included in WMMPA WM 12.
1. Moldings grade: WMMPA WM 4, P-grade.
a. Species: pine or poplar.
b. Maximum Moisture Content: 15 percent.

2.3 PLYWOOD PANELING
A. "A" grade face hardwood veneer panels
1. Face species: Birch
2. Thickness: 1/4" thickness (or as required to match existing conditions).

2.4 MISCELLANEOUS MATERIALS
A. Glue: Aliphatic-resin, polyurethane, or resorcinol wood glue.
1. Use wood glue that has a VOC content of 30 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

PART 3 - EXECUTION

3.1 PREPARATION
A. Before installing interior finish carpentry, condition materials to average prevailing humidity in installation areas for a minimum of 24 hours.

3.2 INSTALLATION, GENERAL
A. Install interior finish carpentry level, plumb, true, and aligned with adjacent materials. Use concealed shims where necessary for alignment.
1. Scribe and cut interior finish carpentry to fit adjoining work.
2. Countersink fasteners, fill surface flush, and sand where face fastening is unavoidable.
3. Install to tolerance of 1/8 inch in 96 inches (3 mm in 2438 mm) for level and plumb. Install adjoining interior finish carpentry with 1/32-inch (0.8-mm) maximum offset.
4. Install stairs with no more than 3/16-inch (4.7-mm) variation between adjacent treads and risers and with no more than 3/8-inch (9.5-mm) variation between largest and smallest treads and risers within each flight.

3.3 STANDING AND RUNNING TRIM INSTALLATION
A. Install trim with minimum number of joints practical, using full-length pieces from maximum lengths of lumber available. Do not use pieces less than 24 inches long except where necessary.
1. Use scarf joints for end-to-end joints.
2. Stagger end joints in adjacent and related members.

SECTION 07 21 00 - INSULATION

PART 1 - GENERAL

1.1 SUMMARY
A. This Section includes the following:
1. Perimeter wall and under slab insulation.

2. Concealed building insulation.
3. Vapor retarders and accessories.

1.2 SUBMITTALS
A. Product Data: For each type of product indicated.
B. Samples for Verification: Full-size units for each type of exposed insulation indicated.
C. Product test reports.

1.3 QUALITY ASSURANCE
A. Fire-Test-Response Characteristics: Provide insulation and related materials with the fire-test-response characteristics indicated, as determined by testing identical products per ASTM E 84 for surface-burning characteristics and other methods indicated with product, by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.
B. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.
F. Coordinate sheathing installation with installation of materials installed over sheathing so sheathing is not exposed to precipitation or left exposed at end of the workday when rain is forecast.

3.2 PLYWOOD SHEATHING INSTALLATION
A. General: Comply with applicable recommendations in APA Form No. E30, "Engineered Wood Construction Guide," for types of structural-use panels and applications indicated.
B. Fastening Methods: Fasten panels as indicated below:
1. Wall, Parapet and Soffit Sheathing:
a. Screw to cold-formed metal framing.
b. Space panels 1/8 inch apart at edges and ends.

SECTION 06 20 20 - INTERIOR FINISH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY
A. This Section includes the following:
1. Standing and running trim.
2. Paneling.

1.2 SUBMITTALS
A. Product Data: For each type of process and factory-fabricated product.
B. Samples: For each type of trim, molding, or paneling indicated.
C. Finishes: Physical samples of stain color and finish sheen (to match existing) for all transparent and semi-transparent finishes.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL
A. Lumber: DOC PS 20 and applicable grading rules of inspection agencies certified by ALSC's Board of Review.
B. Hardwood Plywood
C. Hardboard: AHA A135.4.
D. MDF: ANSI A208.2, Grade 130, made with binder containing no urea-formaldehyde resin.
E. Particleboard: ANSI A208.1, Grade M-2, made with binder containing no urea-formaldehyde resin.
F. Melamine-Faced Particleboard: Particleboard complying with ANSI A208.1, Grade M-2, finished on both faces with thermally fused, melamine-impregnated decorative paper complying with LMA SAT-1.

2.2 STANDING AND RUNNING TRIM
A. Moldings/Trim for Transparent Finish (Stain or Clear Finish): Clear (better than FAS)
1. Species: Douglas fir or Pine (as required to match existing)
2. Maximum Moisture Content: 15 percent.
B. Moldings for Opaque Finish (Painted): Made to patterns included in WMMPA WM 12.
1. Moldings grade: WMMPA WM 4, P-grade.
a. Species: pine or poplar.
b. Maximum Moisture Content: 15 percent.

2.3 PLYWOOD PANELING
A. "A" grade face hardwood veneer panels
1. Face species: Birch
2. Thickness: 1/4" thickness (or as required to match existing conditions).

2.4 MISCELLANEOUS MATERIALS
A. Glue: Aliphatic-resin, polyurethane, or resorcinol wood glue.
1. Use wood glue that has a VOC content of 30 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

PART 3 - EXECUTION

3.1 PREPARATION
A. Before installing interior finish carpentry, condition materials to average prevailing humidity in installation areas for a minimum of 24 hours.

3.2 INSTALLATION, GENERAL
A. Install interior finish carpentry level, plumb, true, and aligned with adjacent materials. Use concealed shims where necessary for alignment.
1. Scribe and cut interior finish carpentry to fit adjoining work.
2. Countersink fasteners, fill surface flush, and sand where face fastening is unavoidable.
3. Install to tolerance of 1/8 inch in 96 inches (3 mm in 2438 mm) for level and plumb. Install adjoining interior finish carpentry with 1/32-inch (0.8-mm) maximum offset.
4. Install stairs with no more than 3/16-inch (4.7-mm) variation between adjacent treads and risers and with no more than 3/8-inch (9.5-mm) variation between largest and smallest treads and risers within each flight.

3.3 STANDING AND RUNNING TRIM INSTALLATION
A. Install trim with minimum number of joints practical, using full-length pieces from maximum lengths of lumber available. Do not use pieces less than 24 inches long except where necessary.
1. Use scarf joints for end-to-end joints.
2. Stagger end joints in adjacent and related members.

written instructions. Seal butt joints with vapor-retarder tape. Locate all joints over framing members or other solid substrates.
D. Firmly attach vapor retarders to metal framing and solid substrates with vapor-retarder fasteners as recommended by vapor-retarder manufacturer.
E. Seal joints caused by pipes, conduits, electrical boxes, and similar items penetrating vapor retarders with vapor-retarder tape to create an airtight seal between penetrating objects and vapor retarder.
F. Repair tears or punctures in vapor retarders immediately before concealment by other work. Cover with vapor-retarder tape or another layer of vapor retarder.

SECTION 07 41 13 - METAL ROOF PANELS

PART 1 GENERAL

1.1 SUMMARY
A. Section Includes: Factory-formed metal roof and wall panels, including fascia, soffit and liner panels and includes:
1. Factory-formed roof panels.
2. Metal flashings and trim.
B. Related Sections: Section(s) related to this section include:
1. Division 05 – Cold Formed Metal Framing: Metal framing.
2. Division 06 – Wood Framing: Framing, sheathing.
3. Division 07 – Insulation, Weather Resistive and Air Barriers, Sheet Metal Flashing and Trim, Joint Sealers

1.2 ADMINISTRATIVE REQUIREMENTS
A. Pre-installation Meetings:
1. Schedule meeting to discuss project requirements, substrate conditions, manufacturer's installation instructions and manufacturer's warranty requirements before start of work onsite. Comply with Division 1 Project Management and Coordination (Project Meetings) Section.

1.3 SYSTEM DESCRIPTION
A. Panel Performance Requirements: Provide panels, which have been manufactured, fabricated and installed to withstand structural and thermal movement, wind loading and weather exposure to maintain manufacturer's performance criteria without defects, damage, failure or infiltration of water.
1. Fire rating: Class A
2. Uplift Tests:
a. UL 580 Class 90
3. Class 4 Impact Resistance: UL 2218
B. Finish Performance Requirements:
1. Two coat coil applied, baked on full strength (70% resin, PVF2) fluorocarbon coating:
a. Consisting of a nominal 0.25 mil dry film thickness primer, and a nominal dry film thickness of 0.7 -0.8 mil color coat for a total 0.9 to 1.1 mil total system dry film thickness.
b. Color change and chalk resistance: No cracking, peeling, blistering or loss of adhesion when tested in accordance with ASTM G23; color change, after removal of surface deposits such as dirt or chalk, maximum 5 NBS units.
c. Humidity resistance: No blistering, peeling or loss of adhesion after 1000 hours testing, in accordance with ASTM D2247.

1.4 SUBMITTALS
A. General: Submit listed submittals in accordance with Conditions of the Contract and Division 1 Submittal Procedures Section.
B. Product Data: Submit manufacturer's product data for specified products.
C. Shop Drawings: Submit shop drawings showing layout, profiles and product components, including anchorage, accessories, finish colors and textures.
1. Indicate layout of metal panels and metal panel sizes, including custom-fabricated metal panels if indicated; include each item of trim and accessories.
2. Indicate in detailed drawings profile and gauge of interior and exterior sheets, and locations and types of fasteners; indicate locations, gauges, shapes and methods of attachment of metal panels, trim and accessory items.
3. Include sealant location and denote those that are factory and field applied.
4. Indicate products/materials required for construction activities and field worked conditions of this section not supplied by manufacturer of products of this section.
D. Samples: Submit selection and verification samples for finishes, colors and textures.
1. Selection Samples: For each product requiring color selection, 2 sets of manufacturer's sample chips representing full range of colors and finishes available.
2. Verification Samples: For each color and finish selected, 2 chips indicating match to selected color and finish.
E. Warranties:
1. Substrate Warranty
2. Finish Warranty
F. Test and Evaluation Reports: Showing compliance with specified performance characteristics and physical properties.
G. Quality Assurance Submittals: Submit the following:
1. Contractor Certificates: Contractor's certification that:
a. Manufacturer of products of this section meets specified qualifications.
b. Installer of products of this section meets specified qualifications.
2. Manufacturer's Instructions: Manufacturer's installation instructions.
3. Manufacturer's Field Reports: Manufacturer's field reports if required.
H. Closeout Submittals: Submit the following:
1. Warranty: Warranty documents specified herein.

1.5 QUALITY ASSURANCE
A. Manufacturer Qualifications:
1. Provider of 'hands on' installer training programs at manufacturer facility.
2. Minimum of ten years' experience in manufacturing metal roof and wall systems.
3. Provider of product produced in a permanent factory environment with fixed roll-forming equipment.
B. Installer Qualifications:
1. Experience on at least five projects of similar size, type and complexity as this project that have been in service for a minimum of two years with satisfactory performance of the metal panel system.
2. Employer of workers for this project who are competent in techniques required by manufacturer for installation indicated and who shall be supervised at all times when material is being installed.

1.6 DELIVERY, STORAGE & HANDLING
A. General: Comply with Division 1 Product Requirements Sections.
1. Ordering: Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.
B. Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact. Identify fabricated components with UL 90 label where appropriate.
C. Delivery and Acceptance Requirements: Ensure all panels are received in good condition. In cases where damage is visible, note all paperwork; inform architect and project superintendent.
D. Packing, Shipping, Handling and Unloading:
1. Bundle panels in waterproof wrapping paper when nested, or wooden crates when panels cannot be nested.
2. Package trim and accessories in waterproof wrapping paper.
E. Storage and Protection: Store materials protected from exposure to harmful conditions. Store material in dry, above-ground location.
1. Stack prefinished material to prevent twisting, bending, abrasion, scratching and denting. Elevate one end of each skid to allow for moisture runoff.
2. Store products of this section in manufacturer's unopened packaging until installation of products
3. Maintain dry, heated storage area for products of this section until installation of products.
4. Provide temporary plastic film before storage under high-heat conditions.

1.7 PROJECT CONDITIONS
A. Field Measurements: Verify actual measurements/openings by field measurements before fabrication; show recorded measurements on shop drawings. Coordinate field measurements, fabrication schedule with construction progress to avoid construction delays.
B. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of metal panels to be performed in accordance with manufacturers' written instructions and warranty requirements.

1.8 WARRANTY
A. Project Warranty: Refer to Conditions of the Contract for project warranty provisions.
1. Panel Material: Furnish manufacturers 25 year warranty covering the panel against rupture, structural failure, or perforation.
2. Panel Coating:
a. Polyvinylidene Fluoride: Furnish manufacturer's 40-year warranty covering cracking, checking, and peeling, and 30 year warranty covering fade and chalk on the two coat coil applied, baked on full strength (70% resin, PVF2) fluorocarbon coating. Manufacturer's warranty may exclude surface deterioration due to physical damage and corrosive environments.
B. Special Warranty: Installer's standard form in which installer agrees to repair or replace panels that fail due to poor workmanship or faulty installation within the specified warranty period.
1. Warranty Period: one year from date of Substantial Completion.

PART 2 PRODUCTS

2.1 METAL PANELS
i. Basis of Design: Multi-Cor corrugated by McElroy Metal, Inc.
B. Subject to compliance requirements, products may be supplied by other manufacturers, including but not limited to the following:
1. Econoclap 3/4" by Centria
2. 7/8" corrugated by Berridge Steel
3. 7/8" corrugated by Sheffield Metals International
C. Crimp: Use continuous end rolling method. No end laps are permitted on panels without architect approval. No portable roll-forming machines will be permitted on this project, no in-staller—owner or installer-rented machines will be permitted. It is the intent of the Architect to provide factory-manufactured panel systems only for this project.

2.2 MANUFACTURED PANELS
A. McElroy Metal Multi-Cor Corrugated Panels:
1. Profile: Longitudinal ribs 7/8" (22.2 mm) deep, spaced 2.67" (68 mm) on center, 35 1/2" (902 mm) sheet width.
2. Size: 31 3/8" (813 mm) cover width, continuous length along slope of roof.

2.3 MATERIALS
A. Material: Galvalume steel sheet conforming to ASTM A792, AZ55 coating for bare; AZ50 coating for painted; 24 gauge sheet thickness.

2.4 METAL ROOF PANEL ACCESSORIES
A. General: Provide complete metal panel assembly incorporating trim, copings, fasciae, gutters and downspouts, and miscellaneous flashings, in [manufacturer's standard profiles] [profiles as indicated]. Provide required fasteners, closure strips, and sealants as indicated in manufacturer's written instructions.
B. Flashing and Trim: Match material, thickness, and finish of metal panel face sheet.
C. Panel Fasteners: Self-tapping screws and other acceptable corrosion-resistant fasteners recommended by metal panel manufacturer. Where exposed fasteners cannot be avoided, supply fasteners with EPDM or neoprene gaskets, with heads matching color of metal panels by means of factory-applied coating.
D. Joint Sealers: Manufacturer's standard or recommended liquid and preformed sealers and tapes, and as follows:
1. Tape Sealers: Manufacturer's standard non-curing butyl tape, AAMA 809.2.
2. Concealed Joint Sealant: Non-curing butyl, AAMA 809.2.
E. Steel Sheet Miscellaneous Framing Components: ASTM C 645, with ASTM A 653/A 653M, G60 (Z180) hot-dip galvanized zinc coating.
F. Metal Accessories: Approved by metal panel manufacturer. Refer to [Section 07 72 00] "Metal Accessories" for requirements for metal accessories.

2.5 SNOW RETENTION SYSTEMS
A. Basis of Design Product: S-5 ColorGard bar type snow guard
1. Bar and color insert shall match metal roof.
2. CorruBracket attachments

2.6 FABRICATION
A. General: Provide factory fabricated and finished metal panels and accessories meeting performance requirements, indicated profiles, and structural requirements.
B. Fabricate metal panel joints configured to accommodate providing weathertight seal and preventing metal-to-metal contact and minimizing noise resulting from thermal movement.
C. Form panels in continuous lengths for full length of detailed runs, except where otherwise indicated on approved shop drawings.
D. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's written instructions, approved shop drawings, and project drawings. Form from materials matching

1. Joint Locations:
   a. Joints on exposed interior surfaces of exterior walls.
   b. Perimeter joints of exterior openings where sealant is indicated.
   c. Perimeter joints between interior wall surfaces and frames of interior doors windows and trim.
   d. Other joints as indicated.
2. Joint Sealant: Latex.
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors or to be painted.

C. Joint-Sealant Application: Mildew-resistant interior joints in vertical surfaces and horizontal nontraffic surfaces.
1. Joint Sealant Location:
   a. Joints between plumbing fixtures and adjoining walls, floors, and counters.
   b. Tile control and expansion joints where indicated.
   c. Other joints as indicated.
2. Joint Sealant: Silicone.
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

08 11 13 - HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY
A. Section includes hollow-metal work.

1.2 DEFINITIONS
A. Minimum Thickness: Minimum thickness of base metal without coatings according to NAAMM- HMMA 803 or SDI A250.8.

1.3 COORDINATION
A. Coordinate anchorage installation for hollow-metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

1.4 SUBMITTALS
A. Product Data: For each type of product.
   1. Include construction details, material descriptions, core descriptions, and finishes.
B. Shop Drawings: Include the following:
   1. Elevations of each door type.
   2. Details of doors, including vertical- and horizontal-edge details and metal thicknesses.
   3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
   4. Locations of reinforcement and preparations for hardware.
   5. Details of each different wall opening condition.
   6. Details of anchorages, joints, field splices, and connections.
   7. Details of accessories.
C. Schedule: Provide a schedule of hollow-metal work prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with final Door Hardware Schedule.

1.5 DELIVERY, STORAGE, AND HANDLING
A. Deliver hollow-metal work palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.
B. Provide additional protection to prevent damage to factory-finished units.
C. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.
D. Store hollow-metal work vertically under cover at Project site with head up. Place on minimum 4-inch-high wood blocking. Provide minimum 1-inch spacer between each stacked door to permit air circulation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS
A. Manufacturers may include, but are not limited to, the following:
   1. Amweld International, LLC.
   2. Ceco Door Products.
   3. Karpen Steel Custom Doors & Frames.
   4. Pioneer Industries, Inc.
   5. Republic Doors and Frames.
   6. Steelcraft.
B. Source Limitations: Obtain hollow-metal work from single source from single manufacturer.

2.2 EXTERIOR HOLLOW-METAL DOORS AND FRAMES
A. Construct exterior doors and frames to comply with the standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.
B. Extra-Heavy-Duty Doors and Frames: SDI A250.8, Level 3.
   1. Physical Performance: Level A according to SDI A250.4.
   2. Doors:
      a. Type: As indicated in the Door and Frame Schedule.
      b. Thickness: 1-3/4 inches
      c. Face: Metallic-coated steel sheet, minimum thickness of 0.053 inch, with minimum A40 coating.
      d. Edge Construction: Model 1, Full Flush.
      e. Core: Polyurethane or polyisocyanurate.
         1) Thermal-Rated Doors: Provide doors fabricated with thermal-resistance value (R-value) of not less than 2.1 deg F x h x sq. ft./Btu when tested according to ASTM C 1363.
   3. Frames:
      a. Materials: Metallic-coated steel sheet, minimum thickness of 0.053 inch, with minimum A40 coating.
      b. Construction: Full profile welded.
   4. Exposed Finish: Prime.

2.3 FRAME ANCHORS
A. Jamb Anchors:
   1. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch thick.
B. Floor Anchors: Formed from same material as frames, minimum thickness of 0.042 inch, and as follows:
   1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.

2.4 MATERIALS
A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
B. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.
C. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B.
D. Frame Anchors: ASTM A 879/A 879M, Commercial Steel (CS), 04Z coating designation; mill phosphatized.
   1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M, hot-dip galvanized according to ASTM A 153/A 153M, Class B.
E. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.
F. Mineral-Fiber Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool; with maximum flame-spread and smoke- developed indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.

2.5 FABRICATION
A. Fabricate hollow-metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for metal thickness. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.
B. Hollow-Metal Doors:
   1. Steel-Stiffened Door Cores: Provide minimum thickness 0.026 inch, steel vertical stiffeners of same material as face sheets, extending full-door height, with vertical webs spaced not more than 6 inches apart. Spot weld to face sheets no more than 5 inches o.c. Fill spaces between stiffeners with glass- or mineral-fiber insulation.
   2. Vertical Edges for Single-Acting Doors: Bevel edges 1/8 inch in 2 inches.
   3. Top Edge Closures: Close top edges of doors with flush closures of same material as face sheets.
   4. Bottom Edge Closures: Close bottom edges of doors with end closures or channels of same material as face sheets.
   5. Exterior Doors: Provide weep-hole openings in bottoms of exterior doors to permit moisture to escape. Seal joints in top edges of doors against water penetration.
C. Hollow-Metal Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
   1. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
   2. Grout Guards: Weld guards to frame at back of hardware mortises in frames to be grouted.
   3. Floor Anchors: Weld anchors to bottoms of jambs with at least four spot welds per anchor; however, for slip-on drywall frames, provide anchor clips or countersunk holes at bottoms of jambs.
   4. Jamb Anchors: Provide number and spacing of anchors as follows:
      a. Stud-Wall Type: Locate anchors not more than 16 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
         1) Four anchors per jamb from 60 to 90 inches high.
   5. Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers as follows: Keep holes clear during construction.
      a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
D. Fabricate concealed stiffeners and edge channels from either cold- or hot-rolled steel sheet.
E. Hardware Preparation: Factory prepare hollow-metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to SDI A250.6, the Door Hardware Schedule, and templates.
   1. Reinforce doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.
   2. Comply with applicable requirements in SDI A250.6 and BHMA A156.115 for preparation of hollow-metal work for hardware.

2.6 STEEL FINISHES
A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.
   1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with SDI A250.10; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

PART 3 - EXECUTION

3.1 EXAMINATION
A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
B. Examine roughing-in for embedded and built-in anchors to verify actual locations before frame installation.
C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION
A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.
B. Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

3.3 INSTALLATION
A. General: Install hollow-metal work plumb, rigid, properly aligned, and securely fastened in place. Comply with Drawings and manufacturer's written instructions.
B. Hollow-Metal Frames: Install hollow-metal frames of size and profile indicated. Comply with SDI A250.11 or NAAMM-HMMA 840 as required by standards specified.
   1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.
      a. Install door silencers in frames before grouting.
      b. Remove temporary braces necessary for installation only after frames have been properly set and secured.
   c. Check plumb, square, and twist of frames as walls are constructed.
   d. Shim as necessary to comply with installation tolerances.
   e. Field apply bituminous coating to backs of frames that will be filled with grout containing antifreezing agents.
2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with post-installed expansion anchors.
   a. Floor anchors may be set with power-actuated fasteners instead of post-installed expansion anchors if so indicated and approved on Shop Drawings.
3. Metal-Stud Partitions: Solidly pack mineral-fiber insulation inside frames.
4. Installation Tolerances: Adjust hollow-metal door frames for squareness, alignment, twist, and plumb to the following tolerances:
   a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
   b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
   c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
   d. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.

C. Hollow-Metal Doors: Fit hollow-metal doors accurately in frames, within clearances specified below. Shim as necessary.
   1. Non-Fire-Rated Steel Doors:
      a. Between Door and Frame Jambs and Head: 1/8 inch plus or minus 1/32 inch.
      b. At Bottom of Door: 3/4 inch plus or minus 1/32 inch.

3.4 ADJUSTING AND CLEANING
A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow-metal work that is warped, bowed, or otherwise unacceptable.
B. Remove grout and other bonding material from hollow-metal work immediately after installation.
C. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.
D. Metallic-Coated Surface Touchup: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.

SECTION 08 14 16 - WOOD DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS
A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY
A. Section Includes:
   1. Solid-core doors with wood-veneer faces.
   2. Factory finishing flush wood doors.
B. Related Sections:
   1. Division 08 Section "Door Hardware" for hardware.
   2. Division 08 Section "Glazing" for glass view panels in flush wood doors.

1.3 SUBMITTALS
A. Product Data: For each type of door indicated. Include details of core and edge construction and trim for openings. Include factory-finishing specifications.
B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; location and extent of hardware blocking; and other pertinent data.
   1. Indicate dimensions and locations of mortises and holes for hardware.
   2. Indicate dimensions and locations of cutouts.
   3. Indicate requirements for veneer matching.
   4. Indicate doors to be factory finished and finish requirements.
   5. Indicate fire-protection ratings for fire-rated doors.
C. Samples for Verification:
   1. Factory finishes applied to actual door face materials, approximately 8 by 10 inches, for each species and finish. For each wood species and transparent finish, provide set of three samples showing typical range of color and grain to be expected in the finished work.
D. Warranty: Sample of special warranty.

1.4 QUALITY ASSURANCE
A. Source Limitations: Obtain flush wood doors and wood paneling from single manufacturer.
B. Quality Standard: In addition to requirements specified, comply with AWI's "Architectural Woodwork Quality Standards Illustrated."
   1. Provide AWI Quality Certification Labels or an AWI letter of licensing for Project indicating that doors comply with requirements of grades specified.
C. Fire-Rated Wood Doors: Doors complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252.
   1. Oversize Fire-Rated Door Assemblies: For units exceeding sizes of tested assemblies, provide certification by a qualified testing agency that doors comply with standard construction requirements for tested and labeled fire-rated door assemblies except for size.
D. Preinstallation Conference: Conduct conference at Project site.

1.5 DELIVERY, STORAGE, AND HANDLING
A. Comply with requirements of referenced standard and manufacturer's written instructions.
B. Package doors individually in cardboard cartons and wrap bundles of doors in plastic sheeting.
C. Mark each door on top and bottom rail with opening number used on Shop Drawings.

1.6 PROJECT CONDITIONS
A. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining temperature between 60 and 90 deg F and relative humidity between 25 and 55 percent during the remainder of the construction period.

1.7 WARRANTY
A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Warping (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section.
      b. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch span.
   2. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.
   3. Warranty Period for Solid-Core Interior Doors: Life of installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS
A. Basis of Design: Subject to compliance with requirements, provide Master Flush Doors by Eggers Industries or comparable products by one of the following:
   1. Graham.
   2. VT Industries.
   3. Marshfield Door Systems, Inc.
   4. Oshkosh Wood Doors.

2.2 DOOR CONSTRUCTION, GENERAL
A. Particleboard-Core Doors:
   1. Particleboard: ANSI A208.1, Grade LD-2.
   2. Blocking: Provide wood blocking in particleboard-core doors as follows:
      a. 5-inch top-rail blocking, in doors indicated to have closers.
      b. 5-inch bottom-rail blocking, in exterior doors and doors indicated to have kick, mop, or armor plates.
      c. 5-inch midrail blocking, in doors indicated to have exit devices.
B. Structural-Composite-Lumber-Core Doors:
   1. Structural Composite Lumber: WDMA I.S.10.
   2. Provide at doors with full glass lite, and where required to maintain warranty with indicated cutouts.

2.3 VENEERED-FACED DOORS FOR TRANSPARENT FINISH
A. Interior Solid-Core Doors:
   1. Grade: Custom (Grade A faces).
   2. Species: Birch, riff cut.
   3. Cut: Plain sliced (flat sliced).
   4. Match between Veneer Leaves: Book match.
   5. Assembly of Veneer Leaves on Door Faces: Running match.
   6. Pair and Set Match: Provide for doors hung in same opening or separated only by mullions.
   7. Door Edges: Minimum ¼ inch solid lumber, same species as faces or a compatible species. No veneer edges except rated doors with concealed intumescent seals.
   8. Core: Particleboard.
   9. Construction: Five plies. Stiles and rails are bonded to core, then entire unit abrasive planed before veneering.

2.4 LIGHT FRAMES
A. Wood Beads for Light Openings in Wood Doors: Provide manufacturer's standard wood beads as follows unless otherwise indicated.
   1. Wood Species: Species compatible with door faces.
   2. Profile: Flush rectangular beads.
   3. At wood-core doors with 20-minute fire-protection ratings, provide wood beads and metal glazing clips approved for such use.
B. Metal Frames for Light Openings in Fire-Rated Doors: Manufacturer's standard frame formed of 0.048-inch- thick, cold-rolled steel sheet; factory primed for paint finish; and approved for use in doors of fire-protection rating indicated.

2.5 FABRICATION
A. Factory fit doors to suit frame-opening sizes indicated. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.
   1. Comply with requirements in NFPA 80 for fire-rated doors.
B. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Comply with final hardware schedules, door frame Shop Drawings, DHI A115-W series standards, and hardware templates.
   1. Coordinate with hardware mortises in metal frames to verify dimensions and alignment before factory machining.
   2. Metal Astragals: Factory machine astragals and formed-steel edges for hardware for pairs of fire-rated doors.
C. Transom and Side Panels: Fabricate matching panels with same construction, exposed surfaces, and finish as specified for associated doors. Finish bottom edges of transoms and top edges of rabbeted doors same as door stiles.
   1. Fabricate door and transom panels with full-width, solid-lumber meeting rails. Provide factory-installed spring bolts for concealed attachment into jambs of metal door frames.
D. Openings: Cut and trim openings through doors in factory.
   1. Light Openings: Trim openings with moldings of material and profile indicated.
   2. Glazing: Factory install glazing in doors indicated to be factory finished. Comply with applicable requirements in Division 08 Section "Glazing."
   3. Louvers: Factory install louvers in prepared openings.

2.6 FACTORY FINISHING
A. General: Comply with referenced quality standard for factory finishing. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.
   1. Finish faces, all four edges, edges of cutouts, and mortises. Stains and fillers may be omitted on top and bottom edges, edges of cutouts, and mortises.
B. Finish doors at factory.
C. Transparent Finish:
   1. Grade: Custom.
   2. Finish: AWI catalyzed polyurethane system.
   3. Staining: Color to be selected from manufacturers full range.
   4. Effect: Semifilled finish, produced by applying an additional finish coat to partially fill the wood pores.
   5. Sheen: Satin.

PART 3 - EXECUTION

3.1 EXAMINATION
A. Examine doors and installed door frames before hanging doors.
   1. Verify that frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
   2. Reject doors with defects.
B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION
A. Hardware: For installation, see Division 08 Section "Door Hardware."
B. Installation Instructions: Install doors to comply with manufacturer's written instructions and the referenced quality standard, and as indicated.
C. Job-Fitted Doors: Align and fit doors in frames with uniform clearances and bevels as indicated below; do not trim stiles and rails in excess of limits set by manufacturer or permitted for fire-rated doors. Machine doors for hardware. Seal edges of doors, edges of cutouts, and mortises after fitting and machining.
   1. Clearances: Provide 1/8 inch at heads, jambs, and between pairs of doors. Provide 1/8 inch from bottom of door to top of decorative floor finish or covering unless otherwise indicated. Where threshold is shown or scheduled, provide 1/4 inch from bottom of door to top of threshold unless otherwise indicated.
   2. Bevel non-fire-rated doors 1/8 inch in 2 inches at lock and hinge edges.
D. Factory-Fitted Doors: Align in frame for uniform clearance at each edge.
E. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

3.3 ADJUSTING
A. Operation: Rehang or replace doors that do not swing or operate freely.
B. Finished Doors: Replace doors that are damaged or that do not comply with requirements. Doors may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing.

SECTION 08 54 13 - FIBERGLASS WINDOWS

PART 1 GENERAL

1.1 SECTION INCLUDES
A. Fiberglass windows.

1.2 REFERENCES
A. American Architectural Manufacturers Association (AAMA):
   1. AAMA 502 - Voluntary Specification for Field Testing of Windows and Sliding Doors.
   2. AAMA 624-10 - Voluntary Performance Requirements and Test Procedures for Organic Coatings on Fiber Reinforced Thermoset Profiles.
B. American Society for Testing and Materials (ASTM):
   1. ASTM C 1036 - Flat Glass.
   2. ASTM C 1048 - Heat-Treated Flat Glass--Kind HS, Kind FT Coated and Uncoated Glass.
   3. ASTM E 283 - Rate of Air Leakage Through Exterior Windows, Curtain Walls and Doors Under Specified Pressure Difference Across the Specimen.
   4. ASTM E 330 – Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.
   5. ASTM E 547 - Water Penetration of Exterior Windows, Curtain Walls and Doors by Cyclic Static Air Pressure Differential.
   6. ASTM E 1105 – Standard Test Method for Field Determination of Water Penetration of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.
   7. ASTM F 2090 – Standard Specification for Window Fall Prevention Devices With Emergency Escape (Egress) Release Mechanisms
C. Window and Door Manufacturers Association (WDMA):
   1. ANSI/AAMA/NWWDA 101/I.S.2 - Voluntary Specifications for Aluminum, Vinyl (PVC) and Wood Windows and Glass Doors.
D. Screen Manufacturers Association (SMA):
   SMA 1201 – Specifications for Insect Screens for Windows, Sliding Doors and Swinging Doors.
E. Window and Door Manufacturers Association (WDMA):
   AAMA/WDMA/CSA 101/I.S.2/A440-11 – North American Fenestration Standard/Specification for Windows, Doors, and Skylights.

1.3 PERFORMANCE REQUIREMENTS
A. Windows shall meet a rating of LC-PG70, specifications in accordance with ANSI/AAMA/WWDMA 101/I.S.2/A440-17.
B. Window Air Leakage, ASTM E 283: Window air leakage when tested at 1.57 psf (25 mph) shall be 0.05 cfm/ft² of frame or less.
C. Window Water Penetration, ASTM E 547: No water penetration through window when tested under static pressure of 7.5 psf (42 mph) after 4 cycles of 5 minutes each, with water being applied at a rate of 5 gallons per hour per square foot.

1.4 SUBMITTALS
A. Submit in accordance with Division 1 requirements.
B. Product Data: Submit manufacturer's product data, including installation instructions.
C. Shop Drawings: Submit manufacturer's shop drawings, indicating dimensions, construction, component connections and locations, anchorage methods and locations, hardware locations, and installation details.
D. Samples: Submit full-size or partial full-size sample of window illustrating glazing system, quality of construction, and color of finish.

1.5 DELIVERY, STORAGE, AND HANDLING
A. Delivery: Deliver materials to site undamaged in manufacturer's or sales branch's original, unopened containers and packaging, with labels clearly identifying manufacturer and product name. Include installation instructions.
B. Storage:
   1. Store materials in accordance with manufacturer's instructions.
   2. Store materials off ground and under cover.
   3. Protect materials from weather, direct sunlight, and construction activities.
C. Handling: Protect materials and finish during handling and installation to prevent damage.

PART 2 PRODUCTS

2.1 BASISI OF DESIGN FIBERGLASS WINDOWS
A. Windows: Pella Impervia.
   1. Factory-assembled fiberglass awning windows with outward-opening sash installed in frame.
   2. Frame and Sash Material: 5-layer, pultruded-fiberglass material, reinforced with interlocking mat.
B. Frame:
   1. Type: Integral Nail Fin.
   2. Interior and Exterior Frame: Pultruded, fiberglass composite with foam inserts.
   3. Overall Frame Depth: as appropriated for wall framing depth, see drawings.
   4. Nominal Wall Thickness of Fiberglass Members: 0.050 inch to 0.090 inch.
   5. Frame Corners:
      a. Mitered.
      b. Joined and bonded with Neutral-cure Room Temperature Vulcanizing silicone hot-melt adhesive, with corner lock.
   6. Jambs: Contain factory-drilled installation screw holes.
C. Sash:
   1. Sash Corners:
      a. Mitered.
      b. Bonded and sealed with injected Neutral-cure Room Temperature Vulcanizing silicone hot-melt adhesive.
D. Glazing:
   1. Float Glass: ASTM C 1036, Quality 1
      a. Tempered Glass: ASTM C 1048.
      OPTIONS
2.2 Insect Screens:
   1. Compliance: ASTM D 3656 and SMA 1201.
   2. Screen Cloth: Black Vinyl-coated fiberglass, 18/16 mesh.
   3. Set in aluminum frame.
   4. Complete with necessary hardware.
   5. Screen Frame Finish: Baked enamel.
      a. Color: as selected by architect

2.4 HARDWARE
A. Casement and Awning:
   1. Gear Type Rotary Operators: Complying with AAMA 901 when tested in accordance with ASTM E405, Method A. Provide operators that function without requiring the removal of interior screens or using screen wickets -Slide Operator Assembly
      a. Finish to be selected by Architect.
   2. Locking System: Multi-lock System.
      a. Single-handle locking system.
      b. Operate positive-acting arms that reach out and pull sash into locked position.
      c. Finish to be selected by Architect.

2.5 TOLERANCES
A. Windows shall accommodate the following opening tolerances:
   1. Vertical Dimensions Between High and Low Points: Plus 1/4-inch, minus 0 inch.
   2. Width Dimensions: Plus 1/4-inch, minus 0 inch.
   3. Building Columns or Masonry Openings: Plus or minus 1/4-inch from plumb.

2.6 FINISH
A. Exterior and Interior Finish: Factory-applied powder-coat paint, comply with AAMA 624-10.
   1. Color: To be selected by Architect.

2.7 INSTALLATION ACCESSORIES
A. Flashing/Sealant Tape:
   1. Aluminum foil-backed butyl window and door flashing tape.
   2. Maximum Total Thickness: 0.013 inch.
   3. UV resistant.
   4. Verify sealant compatibility with sealant manufacturer.
B. Interior Insulating-Foam Sealant: Low-expansion, low-pressure polyurethane insulating window and door foam sealant.
C. Exterior Perimeter Sealant: high quality, multi-purpose sealant as specified in the joints sealant section.

PART 3 EXECUTION

3.1 EXAMINATION
A. Examine areas to receive windows. Notify Architect of conditions that would adversely affect installation or subsequent use. Do not proceed with installation until unsatisfactory conditions are corrected.

3.2 INSTALLATION
A. Install windows in accordance with manufacturer's instructions.
B. Install windows to be weather-tight.
C. Maintain alignment with adjacent work.
D. Secure assembly to framed openings, plumb and square, without distortion.
E. Integrate window system installation with exterior water-resistant barrier using flashing/sealant tape. Apply and integrate flashing/sealant tape with water-resistant barrier using water-shed principles in accordance with window manufacturer's instructions.
F. Place interior seal around window perimeter to maintain continuity of building thermal and air barrier using insulating foam sealant.
G. Seal window to exterior wall cladding with sealant and related backing materials at perimeter of assembly.

3.3 CLEANING
A. Clean window frames and glass in accordance with Division 1 requirements.
B. Do not use harsh cleaning materials or methods that would damage finish or glass.
C. Remove labels and visible markings.

3.5 PROTECTION
A. Protect installed windows to ensure that, except for normal weathering, windows will be without damage or deterioration at time of substantial completion.

SECTION 08 71 00 - DOOR HARDWARE

PART 1 - GENERAL

1.1 SUMMARY
A. This Section includes the following:
   1. Commercial door hardware.
   2. Specialty hardware for sliding door panel operation, latching and locking.

1.2 SUBMITTALS
A. Product Data: For each type of product indicated.
B. Shop Drawings: Details of door hardware.
C. Samples: For each exposed finish.
D. Product certificates and test reports.
E. Other Action Submittals:
   1. Door Hardware Sets: Prepared by or under the supervision of Architectural Hardware Consultant, detailing fabrication and assembly of door hardware, as well as procedures and diagrams.
      a. Format: Use same scheduling sequence and format and use same door numbers as in the Contract Documents.
      b. Content: Include the following information:
         1) Identification number, location, hand, fire rating, and material of each door and frame.
         2) Type, style, function, size, quantity, and finish of each door hardware item. Include description and function of each lockset and exit device.
         3) Complete designation of every item required for each door or opening including name and manufacturer.
      2. Keying Schedule: Prepared by or under the supervision of Architectural Hardware Consultant, detailing Owner's final keying instructions for locks.

1.3 QUALITY ASSURANCE
A. Installer Qualifications: An employer of workers trained and approved by lock manufacturer.
   1. Installer's responsibilities include supplying and installing door hardware and providing a qualified Architectural Hardware Consultant available during the course of the Work to consult with Contractor, Architect, and Owner about door hardware and keying.
B. Architectural Hardware Consultant Qualifications: A person who is currently certified by DHI as an Architectural Hardware Consultant and who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project.
C. Source Limitations: All lock and latch sets shall be the product of a single manufacturer.
D. Keying Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Coordination." Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system.
E. Preinstallation Conference: Conduct conference at Project site.

1.4 DELIVERY, STORAGE, AND HANDLING
A. Deliver keys to manufacturer of key control system for subsequent delivery to Owner.
B. Deliver keys and permanent cores to Owner by registered mail or overnight package service.

1.5 COORDINATION
A. Templates: Distribute door hardware templates for doors, frames, and other work specified to be factory prepared for installing door hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

1.6 WARRANTY
A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.
   1. Warranty Period: Three years from date of Substantial Completion, except as follows:
      a. Exit Devices: Two years from date of Substantial Completion.
      b. Manual Closers: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE
A. General: Provide door hardware for each door to comply with requirements in this Section and door hardware sets indicated in door and frame schedule.
   1. Door Hardware Sets: Provide quantity, item, size, finish or color indicated, and products complying with BHMA standard referenced.
B. Designations: Requirements for design, grade, function, finish, size, and other distinctive qualities of each type of door hardware are indicated in Part 3 "Door Hardware Sets" Article. Products are identified by using door hardware designations, as follows:
   1. References to BHMA Standards: Provide products complying with these standards and requirements for description, quality, and function.

2.2 HINGES, GENERAL
A. Template Hinges: Except for hinges and pivots to be installed entirely (both leaves) into wood doors and frames, provide only template-produced units.
B. Hinge Base Metal: Unless otherwise indicated, provide the following:
   1. Exterior Hinges: Stainless steel, with stainless-steel pin.
   2. Interior Hinges: Stainless steel, with stainless-steel pin.
   3. Hinges for Fire-Rated Assemblies: Stainless steel, with stainless-steel pin.
C. Nonremovable Pins: Provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for outswinging exterior doors and outswinging corridor doors with locks.
D. Hinders: Comply with the following:
   1. Machine Screws: For metal doors and frames. Install into drilled and tapped holes.
   2. Wood Screws: For wood doors and frames.
   3. Threaded-to-the-Head Wood Screws: For fire-rated wood doors.
   4. Screws: Phillips flat-head; machine screws (drilled and tapped holes) for metal doors wood screws for wood doors and frames. Finish screw heads to match surface of hinges.

2.3 HINGES
A. Butts and Hinges: BHMA A156.1.
B. Template Hinge Dimensions: BHMA A156.7.
C. Possible Manufacturers:
   1. Baldwin Hardware Corporation (BH).
   2. Hager Companies (HAG).
   3. Stanley Commercial Hardware; STH).

2.4 LOCKS AND LATCHES, GENERAL
A. Accessibility Requirements: Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 5 lbf.
B. Latches and Locks for Means of Egress Doors: Comply with NFPA 101. Latches shall not require more than 15 lbf to release the latch. Locks shall not require use of a key, tool, or special knowledge for operation.
C. Lock Trim:
   1. Levers: Selected from manufacturer's full line of at least 8 lever profiles.
   2. Dummy Trim: Match lever lock trim and escutcheons.
D. Lock Throw: Comply with testing requirements for length of bolts required for labeled fire doors.
E. Backset: 2-3/4 inches, unless otherwise indicated.
F. Strikes: Manufacturer's standard strike with strike box for each latchbolt or lock bolt, with curved lip extended to protect frame, finished to match door hardware set.

2.5 MECHANICAL LOCKS AND LATCHES
A. Lock Functions: Function numbers and descriptions indicated in door hardware sets comply with the following:
   1. Bored Locks: BHMA A156.2. Grade 1; Series 4000.
   2. Mortise Locks: BHMA A156.13. Grade 1; Series 1000. Stamped steel case with steel or brass parts
B. Possible Manufacturers:
   1. Best Access Systems; (BAS).
   2. Corbin Russwin Architectural Hardware; (CR).
   3. Medeco Security Locks, Inc.; (MED).
   4. SARGENT Manufacturing Company; (SGT).
   5. Schlage Commercial Lock Division; (SCH).
   6. Yale Commercial Locks and Hardware; (YAL).

2.6 EXIT DEVICES
A. Exit Devices: BHMA A156.3, Grade 1.
B. Accessibility Requirements: Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 5 lbf.
C. Exit Devices for Means of Egress Doors: Comply with NFPA 101. Exit devices shall not require more than 15 lbf to release the latch. Locks shall not require use of a key, tool, or special knowledge for operation.
D. Outside Trim: As scheduled, material and finish to match locksets, unless otherwise indicated.
   1. Match design for locksets and latchsets, unless otherwise indicated.

2.7 LOCK CYLINDERS
A. Standard Lock Cylinders: BHMA A156.5, Grade 1.
B. Cylinders: Manufacturer's standard tumbler type, constructed from brass or bronze, stainless steel, or nickel silver, and complying with the following:
   1. Number of Pins: Seven.
C. Construction Keying: Comply with the following:
   1. Construction Master Keys: Provide cylinders with feature that permits voiding of construction keys without cylinder removal. Provide 8 construction master keys.
   2. Construction Cores: Provide construction cores that are replaceable by permanent cores. Provide 8 construction master keys.
      a. Furnish permanent cores to Owner for installation.
D. Manufacturer: Same manufacturer as for locks and latches.

2.8 KEYING
A. Keying System: Factory registered, complying with guidelines in BHMA A156.28, Appendix A. Incorporate decisions made in keying conference into master key system.
   1. Existing System: Master key or grand master key locks to Owner's existing system.
B. Keys: Nickel silver ; permanently inscribed with a visual key control number and including the notation "DO NOT DUPLICATE."
   4. Quantity: In addition to one extra key blank for each lock, provide three cylinder change keys and five master keys.

2.9 OPERATING TRIM
A. Standard: BHMA A156.6.
B. Materials: Fabricate from stainless steel, unless otherwise indicated.

2.10CLOSERS
A. Accessibility Requirements: Comply with the following maximum opening-force requirements:
   1. Interior, Non-Fire-Rated Hinged Doors: 5 lbf applied perpendicular to door.
   2. Sliding or Folding Doors: 5 lbf applied parallel to door at latch.
   3. Fire Doors: Minimum opening force allowable by authorities having jurisdiction.
B. Door Closers for Means of Egress Doors: Comply with NFPA 101. Door closers shall not require more than 30 lbf to set door in motion and not more than 15 lbf to open door to minimum required width.
C. Size of Units: Unless otherwise indicated, comply with manufacturer's written recommendations for size of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force.
D. Surface Closers: BHMA A156.4, Grade 1. Provide type of arm required for closer to be located on non-public side of door, unless otherwise indicated.
   1. Available Manufacturers:
      a. Corbin Russwin Architectural Hardware
      b. DORMA Architectural Hardware
      c. LCN Closers
      d. Norton Door Controls
      e. Rixson Specialty Door Controls
      f. SARGENT Manufacturing Company
      g. Yale Commercial Locks and Hardware

2.11PROTECTIVE TRIM UNITS (KICK and PUSH PLATES)
A. Size: 1-1/2 inches less than door width on push side and 1/2 inch less than door width on pull side, by height specified in door hardware sets.
B. Metal Protective Trim Units: BHMA A156.6; beveled top and 2 sides; fabricated from the following material:
   1. Material: 0.050-inch- thick stainless steel.

2.12STOPS AND HOLDERS
A. Stops and Bumpers: BHMA A156.16, Gr

K. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subject to movement.
L. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

3.4 TAPE GLAZING
A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.
B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.
C. Cover vertical framing joints by applying tapes to heads and sills first, then to jambs. Cover horizontal framing joints by applying tapes to jambs, then to heads and sills.
D. Place joints in tapes at corners of openings where framing members join and butt together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.
E. Do not remove release paper from tape until right before each glazing unit is installed.
F. Center glass lites in openings on setting blocks, and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.

3.5 GASKET GLAZING (DRY)
A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.
B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.
C. Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
D. Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
E. Install gaskets so they protrude past face of glazing stops.

3.6 SEALANT GLAZING (WET)
A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep system until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.
B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.
C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

3.7 CLEANING AND PROTECTION
A. Protect exterior glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels and clean surfaces.
B. Protect glass from contact with contaminating substances resulting from construction operations. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer.
C. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains; remove as recommended in writing by glass manufacturer.
D. Remove and replace glass that is broken, chipped, cracked, or abraded or that is damaged from natural causes, accidents, and vandalism, during construction period.

SECTION 09 29 00 - GYPSUM BOARD

PART 1 - GENERAL

1.1 RELATED DOCUMENTS
A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY
A. This Section includes the following:
1. Interior gypsum board.

1.3 SUBMITTALS
A. Product Data: For each type of product indicated.
B. Samples: For the following products:
1. Aluminum Trim: Full-size Sample in 12-inch- long length for each trim accessory indicated.

1.4 STORAGE AND HANDLING
A. Store materials inside under cover and keep them dry and protected against damage from weather, condensation, direct sunlight, construction traffic, and other causes. Stack panels flat to prevent sagging.

1.5 PROJECT CONDITIONS
A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written recommendations, whichever are more stringent.
B. Do not install interior products until installation areas are enclosed and conditioned.
C. Do not install panels that are wet, moisture damaged, or mold damaged.
1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS
A. Sound Control Partitions: For sound-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

2.2 GYPSUM BOARD, GENERAL
A. Size: Provide in maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2.3 INTERIOR GYPSUM BOARD
A. General: ASTM C 1396/C 1396M.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
a. CertainTeed Corporation.
b. Continental Building Products, LLC.
c. Georgia-Pacific Building Products.
d. National Gypsum Company.
e. USG Corporation.
B. Gypsum Wallboard:
1. Regular Type: For vertical surfaces unless indicated otherwise.
a. Thickness: Refer to wall type schedule on drawings.
b. Long Edges: Tapered.
2. Type X: Where indicated or required for fire resistance rated assemblies.
a. Thickness: 5/8 inch.
b. Long Edges: Tapered.
3. Ceiling Type: Manufactured to have more sag resistance than regular-type gypsum board.
a. Thickness: 1/2 inch.
b. Long Edges: Tapered.
4. Moisture- and Mold-Resistant Type: With moisture- and mold-resistant core and surfaces.
a. Core: 5/8 inch, Type X.
b. Long Edges: Tapered.
c. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

2.4 TRIM ACCESSORIES
A. Interior Trim: ASTM C 1047.
1. Material: Galvanized or aluminum-coated steel sheet.
2. Shapes:
a. Cornerbead.
b. LC-Bead: J-shaped; exposed long flange receives joint compound.
c. L-Bead: L-shaped; exposed long flange receives joint compound.
d. U-Bead: J-shaped; exposed short flange does not receive joint compound.
e. Expansion (control) joint.
f. Curved-Edge Cornerbead: With notched or flexible flanges.
B. Aluminum Trim: Extruded accessories of profiles and dimensions indicated.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
a. Fry Reglet Corp.
b. Gordon, Inc.
c. Pittcon Industries.
2. Aluminum: Alloy and temper with not less than the strength and durability properties of ASTM B 221, Alloy 6063-T5.
3. Finish: Corrosion-resistant primer compatible with joint compound and finish materials specified.

2.5 JOINT TREATMENT MATERIALS
A. General: Comply with ASTM C 475/C 475M.
B. Joint Tape:
1. Interior Gypsum Board: Paper.
2. Tile Backing Panels: As recommended by panel manufacturer.
C. Joint Compound for Interior Gypsum Board: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.
1. Prefilling: At open joints, rounded or beveled panel edges, and damaged surface areas, use setting-type taping compound.
2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound.
3. Fill Coat: For second coat, use setting-type, sandable topping or drying-type, all-purpose compound.
4. Finish Coat: For third coat, use setting-type, sandable topping or drying-type, all-purpose compound.
5. Skim Coat: For final coat of Level 5 finish, use setting-type, sandable topping compound or drying-type, all-purpose compound.
a. High-build interior coating product designed for application by airless sprayer may be used instead of skim coat to produce Level 5 finish.
D. Joint Compound for Tile Backing Panels:
1. Glass-Mat, Water-Resistant Backing Panel: As recommended by backing panel manufacturer.

2.6 AUXILIARY MATERIALS
A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written instructions.
B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.
C. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.
1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch thick.
2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.
D. Sound-Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.
1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.
E. Acoustical Sealant: As specified in Division 07 Section "Joint Sealants."
F. Thermal Insulation: As specified in Division 07 Section "Thermal Insulation."

PART 3 - EXECUTION

3.1 EXAMINATION
A. Examine areas and substrates, with Installer present, including welded hollow-metal frames and support framing, for compliance with requirements and other conditions affecting performance of the Work.
B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 APPLYING AND FINISHING PANELS, GENERAL
A. Comply with ASTM C 840.
B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.
C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.
D. Install panels off of base floor substrate. Provide 1/8 inch to 1/4 inch high maximum space at floor.
E. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.
F. Form control and expansion joints with space between edges of adjoining gypsum panels. Each board should be supported by separate framing members.
1. Install control joints in accordance with the manufacturer's recommendations and where shown on the drawings, in addition to the following:
a. Locate joints at points of maximum stress and/or at points of natural weak planes, such as at openings, juncture of dissimilar materials, and at re-entrant corners.
b. Locate joints in interior walls directly over building control and expansion joints.
c. Install control joints where partition abuts structural elements and dissimilar construction.
d. Locate joints in ceilings with a maximum of 50' between joints and a maximum of 2500 sq. ft. per undivided panel and where wings of "L", "U", and "T" shaped areas are joined.
e. Locate joints in interior partitions and walls without openings, with a maximum spacing of thirty feet (30') between joints.
G. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
1. Fit gypsum panels around ducts, pipes, and conduits and install required sealant.
2. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch- wide joints to install sealant.
H. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments, except floors. Provide 1/4- to 1/2-inch- wide spaces at these locations, and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
I. Sound Control Partitions and STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written recommendations for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.
J. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

3.3 APPLYING INTERIOR GYPSUM BOARD
A. Single-Layer Application:
1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing, unless otherwise indicated.
2. On partitions/walls, apply gypsum panels vertically (parallel to framing), unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.
a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
b. At stairwells and other high walls, install panels horizontally, unless otherwise indicated or required by fire-resistance-rated assembly.
3. On Z-furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
4. Fastening Methods: Apply gypsum panels to supports with steel drill screws.
B. Multilayer Application:
1. On ceilings, apply gypsum board indicated for base layers before applying base layers on walls/partitions; apply face layers in same sequence. Apply base layers at right angles to framing members and offset face-layer joints 1 framing member, 16 inches minimum, from parallel base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly.
2. On partitions/walls, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and offset at least one stud or furring member with base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.
3. On Z-furring members, apply base layer vertically (parallel to framing) and face layer either vertically (parallel to framing) or horizontally (perpendicular to framing) with vertical joints offset at least one furring member. Locate edge joints of base layer over furring members.
4. Fastening Methods: Fasten base layers and face layers separately to supports with screws.
C. Laminating to Substrate: Where gypsum panels are indicated as directly adhered to a substrate (other than studs, joists, furring members, or base layer of gypsum board), comply with gypsum board manufacturer's written recommendations and temporarily brace or fasten gypsum panels until fastening adhesive has set.
D. Wall Terminations:
1. Fire Rated Assemblies: Where walls are indicated as a fire rated assembly, terminate top of wall per designated UL assembly.
2. Non-Rated Assemblies: Where non-rated walls are indicated to extend to the underside of the deck, terminate top of wall as follows;
a. Do not utilize fire rated sealants in non-rated assemblies.
b. All side terminations are to be installed to prohibit visible gaps. Extend gypsum board tight to terminating item or extend gypsum board to within ½ inch and provide acoustical sealant.
E. Wall Penetrations: At all penetrations including but not limited to ducts, pipes, conduit, and wires/cables.
1. Fire Rated Assemblies: Where walls are indicated as a fire rated assembly, install materials to meet the designated UL assembly.
2. Smoke Partitions: Intent is to prohibit all visible gaps in wall system.
a. Install gypsum board to within ½ inch of penetrating item and provide acoustical sealant to prohibit all visible gaps through wall. Utilize backer material (mineral wool) for sealant back up.
b. Do not utilize fire rated sealants in smoke partitions.
3. Non-Rated Assemblies:
a. Install gypsum board to within ½ inch of penetrating item and provide acoustic sealant to prohibit all visible gaps through wall. Utilize backer material (mineral wool) for sealant back up.
b. Do not utilize fire rated sealants in non-rated assemblies.

3.4 APPLYING TILE BACKING PANELS
A. Glass-Mat, Water-Resistant Backing Panel: Comply with manufacturer's written installation instructions and install where indicated. Install with 1/4-inch gap where panels abut other construction or penetrations.
B. Where tile backing panels abut other types of panels in same plane, shim surfaces to produce a uniform plane across panel surfaces.

3.5 INSTALLING TRIM ACCESSORIES
A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
B. Control Joints: Install control joints at locations indicated on Drawings according to ASTM C 840 and in specific locations approved by Architect for visual effect.
C. Interior Trim: Install in the following locations:
1. Cornerbead: Use at outside corners.
2. Bullnose Bead: Use where indicated.
3. LC-Bead: Use at exposed panel edges where back flange can be secured to framing prior to placing panel.
4. L-Bead: Use where edge trim can only be installed after panels are installed.
5. U-Bead: Use where indicated.
6. Curved-Edge Cornerbead: Use at curved openings.
D. Aluminum Trim: Install in locations indicated on Drawings.

3.6 FINISHING GYPSUM BOARD
A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.
B. Prefill open joints and damaged surface areas.
C. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.
D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:
1. Level 1: Ceiling plenum areas, concealed areas, and where indicated, unless a higher level of finish is required for fire-resistance-rated assemblies and sound rated assemblies.
2. Level 2: Panels that are substrate for tile.
3. Level 3: Where indicated on Drawings.
4. Level 4: At panel surfaces that will be exposed to view, unless otherwise indicated.
a. Primer and its application to surfaces are specified in other Division 09 Sections.
5. Level 5: Where indicated on Drawings.
a. Primer and its application to surfaces are specified in other Division 09 Sections.
E. For Level 1 gypsum board, embed tape in joint compound. Tape and fastener heads need not be covered with joint compound.
F. For Level 2 gypsum board, embed tape in joint compound and cover tape, trim and fasteners with one coat of joint compound. Surface shall be free of excess joint compound. Tool marks and ridges are acceptable.
G. For Level 4 gypsum board, perform level 2 work and then apply two separate coats of joint compound on all joints, trim and fastener. Sand between all coats and after last coat. Surface shall be smooth and free of all visual defects.
H. For Level 5 gypsum board, perform level 4 work and then a thin skim coat of joint compound shall be trowel applied over the entire surface (leaving a skim coating of compound completely covering the paper surface).
1. As an alternative to a skim coat, an approved special surface primer may be applied
2. Final surface must be smooth and free of all defects.

3.7 PROTECTION
A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.
B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
C. Remove and replace panels that are wet, moisture damaged, or mold damaged.
1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

SECTION 09 30 00 - STAINING AND TRANSPARENT FINISHING

PART 1 - GENERAL

1.1 SUMMARY
A. This Section includes surface preparation and the application of wood finishes on the following substrates:
1. Interior Substrates:
a. Exposed dimension lumber.
b. Dressed lumber and trim.
2. Exterior Substrates:
a. Exterior wood siding and trim.
b. Exposed dimension lumber.

1.2 SUBMITTALS
A. Product Data: For each type of product indicated.
B. Samples: For each finish and for each color and texture required.

1.3 QUALITY ASSURANCE
A. MPI Standards:
1. Products: Complying with MPI standards indicated.
2. Preparation and Workmanship: Comply with requirements in "MPI Architectural Painting Specification Manual" for products and finish systems indicated.
B. Mockups: Apply benchmark samples of each finish system indicated and each color selected to verify preliminary selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
1. Architect will select one surface to represent surfaces and conditions for application of each type of finish system and substrate.
a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft.
b. Other Items: Architect will designate items or areas required.
2. Final approval of stain color selections will be based on benchmark samples.
a. If preliminary stain color selections are not approved, apply additional benchmark samples of additional stain colors selected by Architect at no added cost to Owner.

1.4 EXTRA MATERIALS
A. Furnish extra materials described below that are from same production run (batch mix) as materials applied and that are packaged for storage and identified with labels describing contents.
1. Quantity: Furnish an additional new container of not less than 1 gal. of each material and color applied.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL
A. Material Compatibility:
1. Provide materials for use within each finish system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a finish system, provide products recommended in writing by manufacturers of topcoat for use in finish system and on substrate indicated.
B. VOC Content of Field-Applied Interior Primers, Stains, and Transparent Finishes: Provide products that comply with the following limits for VOC content, exclusive of colorants added to a tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24); these requirements do not apply to primers, stains, and transparent finishes that are applied in a fabrication or finishing shop:
1. Flat Primers: VOC content of not more than 50 g/L.
2. Nonflat Primers: VOC content of not more than 150 g/L.
3. Primers, Sealers, and Undercoaters: VOC content of not more than 200 g/L.
4. Clear Wood Finishes, Varnishes: VOC not more than 350 g/L.
5. Clear Wood Finishes, Lacquers: VOC not more than 550 g/L.
6. Floor Coatings: VOC not more than 100 g/L.
7. Shellacs, Clear: VOC not more than 730 g/L.
8. Stains: VOC not more than 250 g/L.
C. Stain Colors: As selected by Architect from manufacturer's full range.

2.2 WOOD FILLERS
A. Wood Filler Paste: Compatible with specified finish coats.
B. Sanding Sealer: Compatible with specified finish coats.

2.3 STAINS
A. Interior Wood Stain and Finish
1. All siding and trim, two coats (color to be selected) and clear finish coat
2. All exposed structural framing, two coats (color to be selected) and clear finish coat
B. Exterior Wood Stain and Finish
1. All vertical siding, two coats, color to be selected
2. All horizontal siding, two coats, color to be selected
3. All exposed structural framing, two coats, color to be selected

2.4 WATERBORNE ACRYLIC FINISHES
A. Waterborne Clear Acrylic (Semigloss): MPI #129, Gloss Level 5.

PART 3 - EXECUTION

3.1 EXAMINATION
A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of work.
1. Maximum Moisture Content of Wood Substrates: 15 percent when measured with an electronic moisture meter.
2. Verify compatibility with and suitability of substrates, including compatibility with existing finishes.
3. Begin finish application only after unsatisfactory conditions have been corrected and surfaces are dry.
4. Beginning application of finish system constitutes Contractor's acceptance of substrate and conditions.

3.2 PREPARATION AND APPLICATION
A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates indicated.
B. Apply wood filler paste to open-grain woods, as defined in "MPI Architectural Painting Specification Manual," to produce smooth, glasslike finish.
C. Protect work of other trades against damage from finish application. Correct damage by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
D. At completion of construction activities of other trades, touch up and restore damaged or defaced finished wood surfaces.

3.3 EXTERIOR WOOD-FINISH-SYSTEM SCHEDULE
A. Exposed Wood Substrates:
1. Semitransparent Stain System: Sherwin Williams Woodscapes waterborne semitransparent finish or other MPI approved product.
a. Two Stain Coats: Exterior semitransparent stain with 150% of manufacturer's recommended pigment.

3.4 INTERIOR WOOD-FINISH-SYSTEM SCHEDULE
A. Exposed Framing, and Finish Carpentry, Wood Panel-Product Substrates:
1. Minwax Performance Series, Tintable Interior Stain, Low VOC
a. Apply filler and sanding sealer coat.
b. Stain Coat: Interior wood stain (semitransparent).
c. Two Finish Coats: Low VOC clear acrylic semigloss.

SECTION 09 91 13 - EXTERIOR PAINTING AND STAINING

PART 1 - GENERAL

1.1 SUMMARY
A. This Section includes surface preparation and the application of paint systems.

1.2 SUBMITTALS
A. Product Data: For each type of product indicated.
B. Samples for Verification: For each type of paint system and each color and gloss of topcoat indicated.
1. Submit Samples on rigid backing, 8 inches square.
2. Step coats on Samples to show each coat required for system.
3. Label each coat of each Sample.
4. Label each Sample for location and application area.
C. Product List: For each product indicated, include the following:
1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
1.3 DELIVERY, STORAGE, AND HANDLING
D. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.
1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

1.4 PROJECT CONDITIONS
A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.
B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS
A. Basis of Design: Subject to compliance with requirements provide products by the Sherwin Williams Company or comparable products by the following:
1. Benjamin Moore & Co.
2. Pratt and Lambert.

2.2 PAINT, GENERAL
A. Material Compatibility:
1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.
B. Colors: As selected by Architect from manufacturer's full range

PART 3 - EXECUTION

3.1 EXAMINATION
A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of work.
B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
1. Concrete: 12 percent.
2. Masonry (Clay and CMU): 12 percent.
3. Wood: 15 percent.
4. Plaster: 12 percent.
5. Gypsum Board: 12 percent.
6. Fiber Cement Board: 14 percent.
C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
D. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.

3.2 PREPARATION
A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates indicated.
B. Remove plates, machined surfaces, and similar items already in place that are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
2. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
C. Clean substrates of substances that could impair bond of paints, including dirt, oil, grease, and incompatible paints and encapsulants.
1. Remove incompatible primers and reprime substrate with compatible primers as required to produce paint systems indicated.
D. Steel Substrates: Remove rust and loose mill scale. Clean using methods recommended in writing by paint manufacturer.
E. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.
F. Aluminum Substrates: Remove surface oxidation.
G. Wood Substrates (Staining and Transparent Finishes):
1. Clean and prepare surfaces to be finished according to manufacturer's written instructions for each particular substrate condition and as specified.
a. Remove surface dirt, oil, or grease by washing with a detergent solution; rinse thoroughly with clean water and allow to dry. Remove grade stamps and pencil marks by sanding lightly. Remove loose wood fibers by brushing.
b. Remove mildew by scrubbing with a commercial wash formulated for mildew removal and as recommended by stain manufacturer.
c. Countersink steel nails, if used, and fill with putty tinted to final color to eliminate rust leach stains.
2. Apply wood filler paste to open-grain woods, as defined in "MPI Architectural Painting Specification Manual," to produce smooth, glasslike finish.
M. Plastic Trim Fabrication Substrates: Remove dust, dirt, and other foreign material that might impair bond of paints to substrates.
N. Plaster Substrates: Do not begin paint application until plaster is fully cured and dry.

3.3 APPLICATION
A. Apply paints according to manufacturer's written instructions.
1. Use applicators and techniques suited for paint and substrate indicated.
2. Paint surfaces behind movable items same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed items with prime coat only.
B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.
C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

3.4 CLEANING AND PROTECTION
A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

SECTION 09 91 23 - INTERIOR PAINTING AND STAINING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS
A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY
A. This Section includes surface preparation and the application of paint systems on the following interior substrates:
1. Steel.
2. Galvanized metal.
3. Aluminum (not anodized or otherwise coated).
4. Wood.
5. Gypsum board.
6. Concrete slabs and equipment bases / pads.
B. This Section includes surface preparation and the application off wood finishes on the following in substrates:
1. Exposed dimension lumber (rough carpentry).
2. Dressed lumber (finish carpentry).
3. Exposed wood panel products.

1.3 SUBMITTALS
A. Product Data: For each type of product indicated.
B. Samples for Verification: For each type of paint system and in each color and gloss of topcoat indicated.
1. Submit Samples on rigid backing, 8 inches square.
2. Step coats on Samples to show each coat required for system.
3. Label each coat of each Sample.
4. Label each Sample for location and application area.
C. Product List: For each product indicated, include the following:
1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.

1.4 DELIVERY, STORAGE, AND HANDLING
A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.
1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

1.5 PROJECT CONDITIONS
A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.
B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS
A. Basis of Design: Subject to compliance with requirements provide paints by the Sherwin Williams Company or comparable products by the following:
1. Benjamin Moore & Co.
2. Pratt and Lambert.

2.2 PAINT, GENERAL
A. Material Compatibility:
1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.
B. Colors: As noted on drawings.

PART 3 - EXECUTION

3.1 EXAMINATION
A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of work.
B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
1. Concrete: 12 percent.
2. Wood: 15 percent.
3. Gypsum Board: 12 percent.
4. Plaster: 12 percent.
C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
D. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.
1. Beginning coating application constitutes Contractor's acceptance of substrates and conditions.

3.2 PREPARATION
A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates indicated.
B. Remove plates, machined surfaces, and similar items already in place that are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
2. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
C. Clean substrates of substances that could impair bond of paints, including dirt, oil, grease, and incompatible paints and encapsulants.
1. Remove incompatible primers and reprime substrate with compatible primers as required to produce paint systems indicated.
D. Steel Substrates: Remove rust and loose mill scale. Clean using methods recommended in writing by paint manufacturer.
E. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.
F. Aluminum Substrates: Remove surface oxidation.
G. Wood Substrates (Paint):
1. Scrape and clean knots, and apply coat of knot sealer before applying primer.
2. Sand surfaces that will be exposed to view, and dust off.
3. Prime edges, ends, faces, undersides, and backsides of wood.
4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.
H. Wood Substrates (Staining and Transparent Finishes):
1. Clean and prepare surfaces to be finished according to manufacturer's written instructions for each particular substrate condition and as specified.
a. Remove surface dirt, oil, or grease by washing with a detergent solution; rinse thoroughly with clean water and allow to dry. Remove grade stamps and pencil marks by sanding lightly. Remove loose wood fibers by brushing.
b. Remove mildew by scrubbing with a commercial wash formulated for mildew removal and as recommended by stain manufacturer.
c. Countersink steel nails, if used, and fill with putty tinted to final color to eliminate rust leach stains.
2. Apply wood filler paste to open-grain woods, as defined in "MPI Architectural Painting Specification Manual," to produce smooth, glasslike finish.
I. Gypsum Board Substrates: Do not begin paint application until finishing compound is dry and sanded smooth.
J. Plaster Substrates: Do not begin paint application until plaster is fully cured and dry.
K. Cotton or Canvas Insulation Covering Substrates: Remove dust, dirt, and other foreign material that might impair bond of paints to substrates.

3.3 APPLICATION
A. Apply paints according to manufacturer's written instructions.
1. Use applicators and techniques suited for paint and substrate indicated.
2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
B. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
C. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
D. Painting Mechanical and Electrical Work: Paint items exposed in equipment rooms and occupied spaces including, but not limited to, the following:
1. Mechanical Work:
a. Uninsulated metal piping.
b. Uninsulated plastic piping.
c. Pipe hangers and supports.
d. Tanks that do not have factory-applied final finishes.
e. Visible portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets.
f. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
g. Mechanical equipment that is indicated to have a factory-primed finish for field painting.
2. Electrical Work:
a. Electrical equipment that is indicated to have a factory-primed finish for field painting.
b. Electrical conduit that is surface mounted on painted walls.

3.4 FIELD QUALITY CONTROL
A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure at any time and as often as Owner deems necessary during the period when paints are being applied:
1. Owner will engage the services of a qualified testing agency to sample paint materials being used. Samples of materials delivered to Project site will be taken, identified, sealed, and certified in presence of Contractor.
2. Testing agency will perform tests for compliance with product requirements.
3. Owner may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

3.5 CLEANING AND PROTECTION
A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 INTERIOR PAINTING SCHEDULE
A. Paint systems

SECTION 23 0500 - COMMON WORK RESULTS FOR HVAC

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Piping materials and installation instructions common to most piping systems.
2. Dielectric fittings.
3. Mechanical sleeve seals.
4. Sleeves.
5. Escutcheons.
6. HVAC demolition.
7. Equipment installation requirements common to equipment sections.
8. Supports and anchorages.

1.2 DEFINITIONS

A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct chases, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.

B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.

C. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.

D. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and chases.

E. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.

1.3 QUALITY ASSURANCE

A. Steel Support Welding: Qualify processes and operators according to AWS D1.1, "Structural Welding Code--Steel."

B. Steel Pipe Welding: Qualify processes and operators according to ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications."

1. Comply with provisions in ASME B31 Series, "Code for Pressure Piping."
2. Certify that each welder has passed AWS qualification tests for welding processes involved and that certification is current.

C. Electrical Characteristics for HVAC Equipment: Equipment of higher electrical characteristics may be furnished provided such proposed equipment is approved in writing and connecting electrical services, circuit breakers, and conduit sizes are appropriately modified. If minimum energy ratings or efficiencies are specified, equipment shall comply with requirements.

PART 2 - PRODUCTS

2.1 PIPE, TUBE, AND FITTINGS

A. Refer to individual Division 23 piping Sections for pipe, tube, and fitting materials and joining methods.

B. Pipe Threads: ASME B1.20.1 for factory-threaded pipe and pipe fittings.

2.2 JOINING MATERIALS

A. Refer to individual Division 23 piping Sections for special joining materials not listed below.

B. Pipe-Flange Gasket Materials: ASME B16.21, nonmetallic, flat, asbestos-free, 1/8-inch maximum thickness unless thickness or specific material is indicated.

C. Plastic, Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer, unless otherwise indicated.

D. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.

E. Brazing Filler Metals: AWS A5.8, BCuP Series or BAg1, unless otherwise indicated.

F. Welding Filler Metals: Comply with AWS D10.12.

G. Solvent Cements for Joining Plastic Piping:

1. CPVC Piping: ASTM F 493.
2. PVC Piping: ASTM D 2564. Include primer according to ASTM F 656.

2.3 DIELECTRIC FITTINGS

A. Description: Combination fitting of copper alloy and ferrous materials with threaded, solder-joint, plain, or weld-neck end connections that match piping system materials.

B. Insulating Material: Suitable for system fluid, pressure, and temperature.

C. Dielectric Unions: Factory-fabricated, union assembly, for 250-psig minimum working pressure at 180 deg F.

D. Dielectric Flanges: Factory-fabricated, companion-flange assembly, for 150- or 300-psig minimum working pressure as required to suit system pressures.

E. Dielectric Couplings: Galvanized-steel coupling with inert and noncorrosive, thermoplastic lining; threaded ends; and 300-psig minimum working pressure at 225 deg F.

F. Dielectric Nipples: Electroplated steel nipple with inert and noncorrosive, thermoplastic lining; plain, threaded, or grooved ends; and 300-psig minimum working pressure at 225 deg F.

2.4 MECHANICAL SLEEVE SEALS

A. Description: Modular sealing element unit, designed for field assembly, to fill annular space between pipe and sleeve.

B. Sealing Elements: EPDM interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.

C. Pressure Plates: Stainless steel. Include two for each sealing element.

D. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements. Include one for each sealing element.

2.5 SLEEVES

A. Galvanized-Steel Sheet: 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint.

B. Steel Pipe: ASTM A 53, Type E, Grade B, Schedule 40, galvanized, plain ends.

C. Cast Iron: Cast or fabricated "wall pipe" equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.

D. Stack Sleeve Fittings: Manufactured, cast-iron sleeve with integral clamping flange. Include clamping ring and bolts and nuts for membrane flashing.

1. Underdeck Clamp: Clamping ring with set screws.

2.6 ESCUTCHEONS

A. Description: Manufactured wall and ceiling escutcheons and floor plates, with an ID to closely fit around pipe, tube, and insulation of insulated piping and an OD that completely covers opening.

B. One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped brass with polished chrome-plated finish.

C. One-Piece, Cast-Brass Type: With set screw.

1. Finish: Polished chrome-plated.

D. Split-Casting, Cast-Brass Type: With concealed hinge and set screw.

1. Finish: Polished chrome-plated.

2.7 GROUT

A. Description: ASTM C 1107, Grade B, nonshrink and nonmetallic, dry hydraulic-cement grout.

1. Characteristics: Post-hardening, volume-adjusting, nonstaining, noncorrosive, nongaseous, and recommended for interior and exterior applications.
2. Design Mix: 5000-psi, 28-day compressive strength.
3. Packaging: Premixed and factory packaged.

PART 3 - EXECUTION

3.1 HVAC DEMOLITION

A. Refer to Division 01 Section "Cutting and Patching" and Division 02 Section "Selective Structure Demolition" for general demolition requirements and procedures.

B. Disconnect, demolish, and remove HVAC systems, equipment, and components indicated to be removed.

1. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
2. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material.
3. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
4. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material.
5. Equipment to Be Removed: Disconnect and cap services and remove equipment.
6. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
7. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.

C. If pipe, insulation, or equipment to remain is damaged in appearance or is unserviceable, remove damaged or unserviceable portions and replace with new products of equal capacity and quality.

3.2 PIPING SYSTEMS - COMMON REQUIREMENTS

A. Install piping according to the following requirements and Division 23 Sections specifying piping systems.

B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.

C. Install piping in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.

D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.

F. Install piping to permit valve servicing.

G. Install piping at indicated slopes.

H. Install piping free of sags and bends.

I. Install fittings for changes in direction and branch connections.

J. Install piping to allow application of insulation.

K. Select system components with pressure rating equal to or greater than system operating pressure.

L. Install escutcheons for penetrations of walls, ceilings, and floors.

M. Install sleeves for pipes passing through concrete and masonry walls, gypsum-board partitions, and concrete floor and roof slabs.

N. Aboveground, Exterior-Wall Pipe Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.

1. Install steel pipe for sleeves smaller than 6 inches in diameter.
2. Install cast-iron "wall pipes" for sleeves 6 inches and larger in diameter.
3. Mechanical Sleeve Seal Installation: Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

O. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Refer to Division 07 Section "Penetration Firestopping" for materials.

P. Verify final equipment locations for roughing-in.

Q. Refer to equipment specifications in other Sections of these Specifications for roughing-in requirements.

3.3 PIPING JOINT CONSTRUCTION

A. Join pipe and fittings according to the following requirements and Division 23 Sections specifying piping systems.

B. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.

C. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.

D. Soldered Joints: Apply ASTM B 813, water-flushable flux, unless otherwise indicated, to tube end. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook," using lead-free solder alloy complying with ASTM B 32.

E. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter, using copper-phosphorus brazing filler metal complying with AWS A5.8.

F. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:

1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

G. Welded Joints: Construct joints according to AWS D10.12, using qualified processes and welding operators according to Part 1 "Quality Assurance" Article.

H. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.

I. Plastic Piping Solvent-Cement Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:

1. Comply with ASTM F 402, for safe-handling practice of cleaners, primers, and solvent cements.
2. CPVC Piping: Join according to ASTM D 2846/D 2846M Appendix.
3. PVC Pressure Piping: Join schedule number ASTM D 1785, PVC pipe and PVC socket fittings according to ASTM D 2672. Join other-than-schedule-number PVC pipe and socket fittings according to ASTM D 2855.
4. PVC Nonpressure Piping: Join according to ASTM D 2855.

J. Plastic Pressure Piping Gasketed Joints: Join according to ASTM D 3139.

K. Plastic Nonpressure Piping Gasketed Joints: Join according to ASTM D 3212.

3.4 PIPING CONNECTIONS

A. Make connections according to the following, unless otherwise indicated:

1. Install unions, in piping NPS 2 and smaller, adjacent to each valve and at final connection to each piece of equipment.
2. Install flanges, in piping NPS 2-1/2 and larger, adjacent to flanged valves and at final connection to each piece of equipment.
3. Dry Piping Systems: Install dielectric unions and flanges to connect piping materials of dissimilar metals.
4. Wet Piping Systems: Install dielectric coupling and nipple fittings to connect piping materials of dissimilar metals.

3.5 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS

A. Install equipment to allow maximum possible headroom unless specific mounting heights are not indicated.

B. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.

C. Install HVAC equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.

D. Install equipment to allow right of way for piping installed at required slope.

3.6 ERECTION OF METAL SUPPORTS AND ANCHORAGES

A. Refer to Division 05 Section "Metal Fabrications" for structural steel.

B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor HVAC materials and equipment.

C. Field Welding: Comply with AWS D1.1.

3.7 ERECTION OF WOOD SUPPORTS AND ANCHORAGES

A. Cut, fit, and place wood grounds, nailers, blocking, and anchorages to support, and anchor HVAC materials and equipment.

B. Select fastener sizes that will not penetrate members if opposite side will be exposed to view or will receive finish materials. Tighten connections between members. Install fasteners without splitting wood members.

C. Attach to substrates as required to support applied loads.

END OF SECTION

SECTION 230700 - HVAC INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Insulation Materials:
   a. Mineral fiber.
2. Field-applied jackets.
3. Securements.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated.

1.3 QUALITY ASSURANCE

A. Fire-Test-Response Characteristics: Insulation and related materials shall have fire-test-response characteristics indicated, as determined by testing identical products per ASTM E 84, by a testing and inspecting agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing and inspecting agency.

1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.
2. Insulation Installed Outdoors: Flame-spread index of 75 or less, and smoke-developed index of 150 or less.

PART 2 - PRODUCTS

2.1 INSULATION MATERIALS

A. Comply with requirements in Part 3 schedule articles for where insulating materials shall be applied.

B. Products shall not contain asbestos, lead, mercury, or mercury compounds.

C. Products that come in contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested according to ASTM C 871.

D. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable according to ASTM C 795.

E. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.

F. Flexible Elastomeric: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type I for tubular materials and Type II for sheet materials.

1. Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
   a. Aeroflex USA Inc.; Aerocel.
   b. Armacell LLC; AP Armaflex.
   c. RBX Corporation; Insul-Sheet 1800 and Insul-Tube 180.

G. Mineral-Fiber Blanket Insulation: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 553, Type II and ASTM C 1290, Type III with factory-applied FSK jacket.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
   a. CertainTeed Corp.; Duct Wrap.
   b. Johns Manville; Microlite.
   c. Knauf Insulation; Duct Wrap.
   d. Manson Insulation Inc.; Alley Wrap.
   e. Owens Corning; All-Service Duct Wrap.

2.2 ADHESIVES

A. Flexible Elastomeric and Polyolefin Adhesive: Comply with MIL-A-24179A, Type II, Class I.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
   a. Aeroflex USA Inc.; Aeroseal.
   b. Armacell LCC; 520 Adhesive.
   c. Foster Products Corporation, H. B. Fuller Company; 85-75.
   d. RBX Corporation; Rubatex Contact Adhesive.
2. For indoor applications, use adhesive that has a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.3 FACTORY-APPLIED JACKETS

A. Insulation system schedules indicate factory-applied jackets on various applications. When factory-applied jackets are indicated, comply with the following:

1. FSK Jacket: Aluminum-foil, fiberglass-reinforced scrim with kraft-paper backing; complying with ASTM C 1136, Type II.

PART 3 - EXECUTION

3.1 PREPARATION

A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.

3.2 GENERAL INSTALLATION REQUIREMENTS

A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of equipment, ducts and fittings, and piping including fittings, valves, and specialties.

B. Install insulation materials, forms, vapor barriers or retarders, jackets, and thicknesses required for each item of equipment, duct system, and pipe system as specified in insulation system schedules.

C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.

D. Install insulation with longitudinal seams at top and bottom of horizontal runs.

E. Install multiple layers of insulation with longitudinal and end seams staggered.

F. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.

G. Keep insulation materials dry during application and finishing.

H. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.

I. Install insulation with least number of joints practical.

J. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.

1. Install insulation continuously through hangers and around anchor attachments.
2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends at attachment to structure with vapor-barrier mastic.
3. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.
4. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect jacket from tear or puncture by hanger, support, and shield.

K. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.

L. Install insulation with factory-applied jackets as follows:

1. Draw jacket tight and smooth.
2. Cover circumferential joints with 3-inch- wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip, spaced 4 inches o.c.
3. Overlap jacket longitudinal seams at least 1-1/2 inches. Install insulation with longitudinal seams at bottom of pipe. Clean and dry surface to receive self-sealing lap.
   a. For below ambient services, apply vapor-barrier mastic over staples.
4. Cover joints and seams with tape as recommended by insulation material manufacturer to maintain vapor seal.
5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to duct and pipe flanges and fittings.

M. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.

N. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.

O. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.

P. For above ambient services, do not install insulation to the following:

1. Vibration-control devices.
2. Testing agency labels and stamps.
3. Nameplates and data plates.
4. Manholes.
5. Handholes.
6. Cleanouts.

3.3 FLEXIBLE ELASTOMERIC INSULATION INSTALLATION

A. Seal longitudinal seams and end joints with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

B. Insulation Installation on Pipe Flanges:

1. Install pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of sheet insulation of same thickness as pipe insulation.
4. Secure insulation to flanges and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install mitered sections of pipe insulation.
2. Secure insulation materials and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed valve covers manufactured of same material as pipe insulation when available.
2. When preformed valve covers are not available, install cut sections of pipe and sheet insulation to valve body. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
3. Install insulation to flanges as specified for flange insulation application.
4. Secure insulation to valves and specialties and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

3.4 MINERAL-FIBER INSULATION INSTALLATION

A. Insulation Installation on Straight Pipes and Tubes:

1. Secure each layer of preformed pipe insulation to pipe with wire or bands and tighten bands without deforming insulation materials.
2. Where vapor barriers are indicated, seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.
3. For insulation with factory-applied jackets on above ambient surfaces, secure laps with outward clinched staples at 6 inches o.c.
4. For insulation with factory-applied jackets on below ambient surfaces, do not staple longitudinal tabs but secure tabs with additional adhesive as recommended by insulation material manufacturer and seal with vapor-barrier mastic and flashing sealant.

B. Blanket Insulation Installation on Ducts and Plenums: Secure with adhesive and insulation pins.

1. Apply adhesive to entire circumference of ducts and to all surfaces of fittings and transitions.
2. Install either capacitor-discharge-weld pins and speed washers or cupped-head, capacitor-discharge-weld pins on sides and bottom of horizontal ducts and sides of vertical ducts as follows:
   a. On duct sides with dimensions 18 inches and smaller, place pins along longitudinal centerline of duct. Space 3 inches maximum from insulation end joints, and 16 inches o.c.
   b. On duct sides with dimensions larger than 18 inches, place pins 16 inches o.c. each way, and 3 inches maximum from insulation joints. Install additional pins to hold insulation tightly against surface at cross bracing.
   c. Pins may be omitted from top surface of horizontal, rectangular ducts and plenums.
   d. Do not overcompress insulation during installation.
   e. Impale insulation over pins and attach speed washers.
   f. Cut excess portion of pins extending beyond speed washers or bend parallel with insulation surface. Cover exposed pins and washers with tape matching insulation facing.
3. For ducts and plenums with surface temperatures below ambient, install a continuous unbroken vapor barrier. Create a facing lap for longitudinal seams and end joints with insulation by removing 2 inches from 1 edge and 1 end of insulation segment. Secure laps to adjacent insulation section with 1/2-inch outward-clinching staples, 1 inch o.c. Install vapor barrier consisting of factory- or field-applied jacket, adhesive, vapor-barrier mastic, and sealant at joints, seams, and protrusions.
   a. Repair punctures, tears, and penetrations with tape or mastic to maintain vapor-barrier seal.
   b. Install vapor stops for ductwork and plenums operating below 50 deg F at 18-foot intervals. Vapor stops shall consist of vapor-barrier mastic applied in a Z-shaped pattern over insulation face, along butt end of insulation, and over the surface. Cover insulation face and surface to be insulated a width equal to 2 times the insulation thickness but not less than 3 inches.
4. Overlap unfaced blankets a minimum of 2 inches on longitudinal seams and end joints. At end joints, secure with steel bands spaced a maximum of 18 inches o.c.
5. Install insulation on rectangular duct elbows and transitions with a full insulation section for each surface. Install insulation on round and flat-oval duct elbows with individually mitered gores cut to fit the elbow.
6. Insulate duct stiffeners, hangers, and flanges that protrude beyond insulation surface with 6-inch-wide strips of same material used to insulate duct. Secure on alternating sides of stiffener, hanger, and flange with pins spaced 6 inches o.c.

3.5 INDOOR DUCT AND PLENUM INSULATION SCHEDULE

A. SEE SCHEDULE ON DRAWINGS.

3.6 ABOVEGROUND, OUTDOOR DUCT AND PLENUM INSULATION SCHEDULE

A. SEE SCHEDULE ON DRAWINGS.

3.7 INDOOR PIPING INSULATION SCHEDULE

A. Refrigerant Suction and Hot-Gas Piping: Flexible elastomeric, 1 inch thick.

B. Refrigerant Suction and Hot-Gas Flexible Tubing: Flexible elastomeric 1 inch thick.

C. Dual-Service Heating and Cooling, 40 to 200 Deg F: Insulation shall be[one of] the following:

END OF SECTION 230700

SECTION 230993 - SEQUENCE OF OPERATIONS FOR HVAC CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes control sequences for HVAC systems, subsystems, and equipment.

B. See Division 23 Section "Instrumentation and Control for HVAC" for control equipment and devices and for submittal requirements.

1.2 TERMINAL UNIT OPERATING SEQUENCE

A. Unit Heater, Electric: Integral thermostat cycles fan and sequences stages of heating.

B. Constant-Volume, Warm-air Furnace, with Split DX coil

1. Programmable thermostat initiates mode of operation
   a. Heating Mode – On a fall in space temperature below setpoint, warm-air furnace shall initiate manufacturer's pre-programmed heating start up sequence. Supply fan shall operate at heating cfm as set by EC motor and control board.
   b. Cooling Mode – On a rise in space temperature above setpoint, warm-air furnace shall initiate manufacturer's pre-programmed cooling start up sequence. Supply fan shall operate at cooling cfm as set by EC motor and control board.
   c. Continuous Fan Mode – On a call for continuous fan operation, warm-air furnace shall operate at continuous fan CFM as set by EC motor and control board.
   d. Dehumidification Mode – On a call for dehumidification without a call for cooling, warm-air furnace shall initiate manufacturer's dehumidification mode by energizing DX cooling and condensing unit while operating supply fan at a reduced supply air cfm, Programmable thermostat and control board shall limit space overcooling to 3°F.

1.3 VENTILATION SEQUENCES

A. Exhaust Fan: Interlock with light switch, cycles fan. Fan shall operate with a 90 second delay OFF.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 230993

SECTION 232300 - REFRIGERANT PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes refrigerant piping used for air-conditioning applications.

1.2 SUBMITTALS

A. Product Data: For each type of valve and refrigerant piping specialty indicated. Include pressure drop based on manufacturer's test data.

1. Refrigerant piping indicated on Drawings is schematic only. Size piping and design actual piping layout, including oil traps, double risers, specialties, and pipe and tube sizes to accommodate, as a minimum, equipment provided, elevation difference between compressor and evaporator, and length of piping to ensure proper operation and compliance with warranties of connected equipment.

B. Field quality-control test reports.

C. Operation and maintenance data.

1.3 QUALITY ASSURANCE

A. Comply with ASHRAE 15, "Safety Code for Refrigeration Systems."

B. Comply with ASME B31.5, "Refrigeration Piping and Heat Transfer Components."

1.4 PRODUCT STORAGE AND HANDLING

A. Store piping in a clean and protected area with end caps in place to ensure that piping interior and exterior are clean when installed.

PART 2 - PRODUCTS

2.1 COPPER TUBE AND FITTINGS

A. Copper Tube: ASTM B 280, Type ACR.

B. Wrought-Copper Fittings: ASME B16.22.

C. Wrought-Copper Unions: ASME B16.22.

D. Solder Filler Metals: ASTM B 32. Use 95-5 tin antimony or alloy HB solder to join copper socket fittings on copper pipe.

E. Brazing Filler Metals: AWS A5.8.

2.2 VALVES AND SPECIALTIES

A. Service Valves:

1. Body: Forged brass with brass cap including key end to remove core.
2. Core: Removable ball-type check valve with stainless-steel spring.
3. Seat: Polytetrafluoroethylene.
4. End Connections: Copper spring.
5. Working Pressure Rating: 500 psig.

B. Moisture/Liquid Indicators:

1. Body: Forged brass.
2. Window: Replaceable, clear, fused glass window with indicating element protected by filter screen.
3. Indicator: Color coded to show moisture content in ppm.
4. Minimum Moisture Indicator Sensitivity: Indicate moisture above 60 ppm.
5. End Connections: Socket or flare.
6. Working Pressure Rating: 500 psig.
7. Maximum Operating Temperature: 240 deg F.

C. Permanent Filter Dryers: Comply with ARI 730.

1. Body and Cover: Painted-steel shell.
2. Filter Media: 10 micron, pleated with integral end rings; stainless-steel support.
3. Desiccant Media: Activated charcoal.
4. End Connections: Socket.
5. Access Ports: NPS 1/4 connections at entering and leaving sides for pressure differential measurement.
6. Maximum Pressure Loss: 2 psig.
7. Working Pressure Rating: 500 psig.
8. Maximum Operating Temperature: 240 deg F.

2.3 REFRIGERANTS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Atofina Chemicals, Inc.
2. DuPont Company; Fluorochemicals Div.
3. Honeywell, Inc.; Genetron Refrigerants.
4. INEOS Fluor Americas LLC.

B. ASHRAE 34, R-410A

PART 3 - EXECUTION

3.1 PIPING APPLICATIONS

A. Suction Lines NPS 1-1/2 and Smaller for Conventional Air-Conditioning Applications: Copper, Type ACR, annealed-temper tubing and wrought-copper fittings with brazed joints.

B. Suction Lines NPS 4 and Smaller for Conventional Air-Conditioning Applications: Copper, Type ACR], drawn-temper tubing and wrought-copper fittings with brazed joints.

C. Hot-Gas and Liquid Lines: Copper, Type ACR, annealed-temper tubing and wrought-copper fittings with brazed joints.

3.2 VALVE AND SPECIALTY APPLICATIONS

A. Install service valves for gage taps at strainers if they are not an integral part of strainers.

B. Install thermostatic expansion valves as close as possible to distributors on evaporators.

1. Install valve so diaphragm case is warmer than bulb.
2. Secure bulb to clean, straight, horizontal section of suction line using two bulb straps. Do not mount bulb in a trap or at bottom of the line.
3. If external equalizer lines are required, make connection where it will reflect suction-line pressure at bulb location.

C. Install safety relief valves where required by ASME Boiler and Pressure Vessel Code. Pipe safety-relief-valve discharge line to outside according to ASHRAE 15.

D. Install moisture/liquid indicators in liquid line at the inlet of the thermostatic expansion valve or at the inlet of the evaporator coil capillary tube.

E. Install filter dryers in liquid line between compressor and thermostatic expansion valve.

3.3 PIPING INSTALLATION

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems; indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Shop Drawings.

B. Install refrigerant piping according to ASHRAE 15.

C. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.

D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.

F. Install piping adjacent to machines to allow service and maintenance.

G. Install piping free of sags and bends.

H. Install fittings for changes in direction and branch connections.

I. Select system components with pressure rating equal to or greater than system operating pressure.

J. Refer to Division 23 Sections "Instrumentation and Control for HVAC" and "Sequence of Operations for HVAC Controls" for solenoid valve controllers, control wiring, and sequence of operation.

K. Install piping as short and direct as possible, with a minimum number of joints, elbows, and fittings.

L. Arrange piping to allow inspection and service of refrigeration equipment. Install valves and specialties in accessible locations to allow for service and inspection. Install access doors or panels as specified in Division 08 Section "Access Doors and Frames" if valves or equipment requiring maintenance is concealed behind finished surfaces.

M. Install refrigerant piping in protective conduit where installed belowground.

N. Install refrigerant piping in rigid or flexible conduit in locations where exposed to mechanical injury.

O. Slope refrigerant piping as follows:

1. Install horizontal hot-gas discharge piping with a uniform slope downward away from compressor.
2. Install horizontal suction lines with a uniform slope downward to compressor.
3. Install traps and double risers to entrain oil in vertical runs.
4. Liquid lines may be installed level.

P. When brazing or soldering, remove solenoid-valve coils and sight glasses; also remove valve stems, seats, and packing, and accessible internal parts of refrigerant specialties. Do not apply heat near expansion-valve bulb.

Q. Install pipe sleeves at penetrations in exterior walls and floor assemblies.

R. Seal penetrations through fire and smoke barriers according to Division 07 Section "Penetration Firestopping."

S. Install piping with adequate clearance between pipe and adjacent walls and hangers or between pipes for insulation installation.

T. Install sleeves through floors, walls, or ceilings, sized to permit installation of full-thickness insulation.

U. Seal pipe penetrations through exterior walls according to Division 07 Section "Joint Sealants" for materials and methods.

V. Identify refrigerant piping and valves according to Division 23 Section "Identification for HVAC Piping and Equipment."

3.4 PIPE JOINT CONSTRUCTION

A. Soldered Joints: Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook."

B. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," Chapter "Pipe and Tube."

1. Use Type BCuP, copper-phosphorus alloy for joining copper socket fittings with copper pipe.
2. Use Type BAg, cadmium-free silver alloy for joining copper with bronze or steel.

3.5 HANGERS AND SUPPORTS

A. Install the following pipe attachments:

1. Copper-clad hangers and supports for hangers and supports in direct contact with copper pipe.

B. Install hangers for copper tubing with the following maximum spacing and minimum rod sizes:

1. NPS 1/2: Maximum span, 60 inches; minimum rod size, 1/4 inch.
2. NPS 5/8: Maximum span, 60 inches; minimum rod size, 1/4 inch.

C. Support multifloor vertical runs at least at each floor.

3.6 FIELD QUALITY CONTROL

A. Perform tests and inspections and prepare test reports.

B. Tests and Inspections:

1. Comply with ASME B31.5, Chapter VI.
2. Test refrigerant piping and specialties. Isolate compressor, condenser, evaporator, and safety devices from test pressure if they are not rated above the test pressure.
3. Test high- and low-pressure side piping of each system separately at not less than the pressures indicated in Part 1 "Performance Requirements" Article.
   a. Fill system with nitrogen to the required test pressure.
   b. System shall maintain test pressure at the manifold gage throughout duration of test.
   c. Test joints and fittings with electronic leak detector or by brushing a small amount of soap and glycerin solution over joints.
   d. Remake leaking joints using new materials, and retest until satisfactory results are achieved.

3.7 SYSTEM CHARGING

A. Charge system using the following procedures:

1. Install core in filter dryers after leak test but before evacuation.
2. Evacuate entire refrigerant system with a vacuum pump to 500 micrometers. If vacuum holds for 12 hours, system is ready for charging.
3. Break vacuum with refrigerant gas, allowing pressure to build up to 2 psig.
4. Charge system with a new filter-dryer core in charging line.

3.8 ADJUSTING

A. Adjust thermostatic expansion valve to obtain proper evaporator superheat.

B. Adjust high- and low-pressure switch settings to avoid short cycling in response to fluctuating suction pressure.

C. Adjust set-point temperature of air-conditioning or chilled-water controllers to the system design temperature.

D. Perform the following adjustments before operating the refrigeration system, according to manufacturer's written instructions:

1. Open shutoff valves in condenser water circuit.
2. Verify that compressor oil level is correct.
3. Open compressor suction and discharge valves.
4. Open refrigerant valves except bypass valves that are used for other purposes.
5. Check open compressor-motor alignment and verify lubrication for motors and bearings.

E. Replace core of replaceable filter dryer after system has been adjusted and after design flow rates and pressures are established.

END OF SECTION 232300

2024-02-06 - 1/4" = 1'-0"

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PROJECT #: 2324

ISSUE:
BID SET 07-28-2025

HVAC
SPECIFICATIONS 1 OF 2

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SECTION 23 3113 – METAL DUCTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Rectangular ducts and fittings.
2. Round ducts and fittings.
3. Sheet metal materials.
4. Sealants and gaskets.
5. Hangers and supports.
6. Seismic-restraint devices.

B. Related Sections:

1. Division 23 Section "Testing, Adjusting, and Balancing for HVAC" for testing, adjusting, and balancing requirements for metal ducts.
2. Division 23 Section "Nonmetal Ducts" for fibrous-glass ducts, thermoset fiber-reinforced plastic ducts, thermoplastic ducts, PVC ducts, and concrete ducts.
3. Division 23 Section "HVAC Casings" for factory- and field-fabricated casings for mechanical equipment.
4. Division 23 Section "Air Duct Accessories" for dampers, sound-control devices, duct-mounting access doors and panels, turning vanes, and flexible ducts.

1.2 PERFORMANCE REQUIREMENTS

A. Delegated Duct Design: Duct construction, including sheet metal thicknesses, seam and joint construction, reinforcements, and hangers and supports, shall comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" and performance requirements and design criteria indicated in "Duct Schedule" Article.

B. Structural Performance: Duct hangers and supports shall withstand the effects of gravity loads and stresses within limits and under conditions described in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible".

C. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1-2004.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings:

1. Fabrication, assembly, and installation, including plans, elevations, sections, components, and attachments to other work.
2. Factory- and shop-fabricated ducts and fittings.
3. Duct layout indicating sizes, configuration, and static-pressure classes.
4. Elevation of top of ducts.
5. Dimensions of main duct runs from building grid lines.
6. Fittings.
7. Reinforcement and spacing.
8. Seam and joint construction.
9. Penetrations through fire-rated and other partitions.
10. Equipment installation based on equipment being used on Project.
11. Locations for duct accessories, including dampers, turning vanes, and access doors and panels.
12. Hangers and supports, including methods for duct and building attachment and vibration isolation.

C. Coordination Drawings: Plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:

1. Duct installation in congested spaces, indicating coordination with general construction, building components, and other building services. Indicate proposed changes to duct layout.
2. Suspended ceiling components.
3. Structural members to which duct will be attached.
4. Size and location of initial access modules for acoustical tile.
5. Penetrations of smoke barriers and fire-rated construction.
6. Items penetrating finished ceiling including the following:
   a. Lighting fixtures.
   b. Air outlets and inlets.
   c. Speakers.
   d. Sprinklers.
   e. Access panels.
   f. Perimeter moldings.

D. Welding certificates.

1.4 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel," for hangers and supports.

B. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel," for hangers and supports.
2. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum," for aluminum supports.
3. AWS D9.1M/D9.1, "Sheet Metal Welding Code," for duct joint and seam welding.

C. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1-2004, Section 5 - "Systems and Equipment" and Section 7 - "Construction and System Start-Up."

D. ASHRAE/IESNA Compliance: Applicable requirements in ASHRAE/IESNA 90.1-2004, Section 6.4.4 - "HVAC System Construction and Insulation."

PART 2 - PRODUCTS

2.1 RECTANGULAR DUCTS AND FITTINGS

A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" based on indicated static-pressure class unless otherwise indicated.

B. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 1-4, "Transverse (Girth) Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

C. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 1-5, "Longitudinal Seams - Rectangular Ducts," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

D. Elbows, Transitions, Offsets, Branch Connections, and Other Duct Construction: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 2, "Fittings and Other Construction," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

2.2 ROUND DUCTS AND FITTINGS

A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 3, "Round, Oval, and Flexible Duct," based on indicated static-pressure class unless otherwise indicated.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   a. Lindab Inc.
   b. McGill AirFlow LLC.
   c. SEMCO Incorporated.
   d. Sheet Metal Connectors, Inc.
   e. Spiral Manufacturing Co., Inc.

B. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-2, "Transverse Joints - Round Duct," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

1. Transverse Joints in Ducts Larger Than 60 Inches in Diameter: Flanged.

C. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-1, "Seams - Round Duct and Fittings," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

1. Fabricate round ducts larger than 90 inches in diameter with butt-welded longitudinal seams.

D. Tees and Laterals: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-4, "90 Degree Tees and Laterals," and Figure 3-5, "Conical Tees," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

2.3 SHEET METAL MATERIALS

A. General Material Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.

B. Galvanized Sheet Steel: Comply with ASTM A 653/A 653M.

1. Galvanized Coating Designation: G60.
2. Finishes for Surfaces Exposed to View: Mill phosphatized.

C. Carbon-Steel Sheets: Comply with ASTM A 1008/A 1008M, with oiled, matte finish for exposed ducts.

D. Aluminum Sheets: Comply with ASTM B 209 Alloy 3003, H14 temper; with mill finish for concealed ducts, and standard, one-side bright finish for duct surfaces exposed to view.

E. Reinforcement Shapes and Plates: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.

1. Where black- and galvanized-steel shapes and plates are used to reinforce aluminum ducts, isolate the different metals with butyl rubber, neoprene, or EPDM gasket materials.

F. Tie Rods: Galvanized steel, 1/4-inch minimum diameter for lengths 36 inches or less; 3/8-inch minimum diameter for lengths longer than 36 inches.

2.4 SEALANT AND GASKETS

A. General Sealant and Gasket Requirements: Surface-burning characteristics for sealants and gaskets shall be a maximum flame-spread index of 25 and a maximum smoke-developed index of 50 when tested according to UL 723; certified by an NRTL.

B. Two-Part Tape Sealing System:

1. Tape: Woven cotton fiber impregnated with mineral gypsum and modified acrylic/silicone activator to react exothermically with tape to form hard, durable, airtight seal.
2. Tape Width: 4 inches.
3. Sealant: Modified styrene acrylic.
4. Water resistant.
5. Mold and mildew resistant.
6. Maximum Static-Pressure Class: 10-inch wg, positive and negative.
7. Service: Indoor and outdoor.
8. Service Temperature: Minus 40 to plus 200 deg F.
9. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum.
10. For indoor applications, use sealant that has a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

C. Water-Based Joint and Seam Sealant:

1. Application Method: Brush on.
2. Solids Content: Minimum 65 percent.
3. Shore A Hardness: Minimum 20.
4. Water resistant.
5. Mold and mildew resistant.
6. VOC: Maximum 75 g/L (less water).
7. Maximum Static-Pressure Class: 10-inch wg, positive and negative.
8. Service: Indoor or outdoor.
9. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum sheets.

D. Flanged Joint Sealant: Comply with ASTM C 920.

1. General: Single-component, acid-curing, silicone, elastomeric.
2. Type: S.
3. Grade: NS.
4. Class: 25.
5. Use: O.
6. For indoor applications, use sealant that has a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

E. Flange Gaskets: Butyl rubber, neoprene, or EPDM polymer with polyisobutylene plasticizer.

F. Round Duct Joint O-Ring Seals:

1. Seal shall provide maximum leakage class of 3 cfm/100 sq. ft. at 1-inch wg and shall be rated for 10-inch wg static-pressure class, positive or negative.
2. EPDM O-ring to seal in concave bead in coupling or fitting spigot.
3. Double-lipped, EPDM O-ring seal, mechanically fastened to factory-fabricated couplings and fitting spigots.

2.5 HANGERS AND SUPPORTS

A. Hanger Rods for Noncorrosive Environments: Cadmium-plated steel rods and nuts.

B. Hanger Rods for Corrosive Environments: Electrogalvanized, all-thread rods or galvanized rods with threads painted with zinc-chromate primer after installation.

C. Strap and Rod Sizes: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 4-1, "Rectangular Duct Hangers Minimum Size," and Table 4-2, "Minimum Hanger Sizes for Round Duct."

D. Steel Cables for Galvanized-Steel Ducts: Galvanized steel complying with ASTM A 603.

E. Steel Cables for Stainless-Steel Ducts: Stainless steel complying with ASTM A 492.

F. Steel Cable End Connections: Cadmium-plated steel assemblies with brackets, swivel, and bolts designed for duct hanger service; with an automatic-locking and clamping device.

G. Duct Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.

H. Trapeze and Riser Supports:

1. Supports for Galvanized-Steel Ducts: Galvanized-steel shapes and plates.
2. Supports for Stainless-Steel Ducts: Stainless-steel shapes and plates.
3. Supports for Aluminum Ducts: Aluminum or galvanized steel coated with zinc chromate.

PART 3 - EXECUTION

3.1 DUCT INSTALLATION

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of duct system. Indicated duct locations, configurations, and arrangements were used to size ducts and calculate friction loss for air-handling equipment sizing and for other design considerations. Install duct systems as indicated unless deviations to layout are approved on Shop Drawings and Coordination Drawings.

B. Install ducts according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" unless otherwise indicated.

C. Install round ducts in maximum practical lengths.

D. Install ducts with fewest possible joints.

E. Install factory- or shop-fabricated fittings for changes in direction, size, and shape and for branch connections.

F. Unless otherwise indicated, install ducts vertically and horizontally, and parallel and perpendicular to building lines.

G. Install ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building.

H. Install ducts with a clearance of 1 inch, plus allowance for insulation thickness.

I. Route ducts to avoid passing through transformer vaults and electrical equipment rooms and enclosures.

J. Where ducts pass through non-fire-rated interior partitions and exterior walls and are exposed to view, cover the opening between the partition and duct or duct insulation with sheet metal flanges of same metal thickness as the duct. Overlap openings on four sides by at least 1-1/2 inches.

K. Where ducts pass through fire-rated interior partitions and exterior walls, install fire dampers. Comply with requirements in Division 23 Section "Air Duct Accessories" for fire and smoke dampers.

L. Protect duct interiors from moisture, construction debris and dust, and other foreign materials.

3.2 INSTALLATION OF EXPOSED DUCTWORK

A. Protect ducts exposed in finished spaces from being dented, scratched, or damaged.

B. Trim duct sealants flush with metal. Create a smooth and uniform exposed bead. Do not use two-part tape sealing system.

C. Grind welds to provide smooth surface free of burrs, sharp edges, and weld splatter. When welding stainless steel with a No. 3 or 4 finish, grind the welds flush, polish the exposed welds, and treat the welds to remove discoloration caused by welding.

D. Maintain consistency, symmetry, and uniformity in the arrangement and fabrication of fittings, hangers and supports, duct accessories, and air outlets.

E. Repair or replace damaged sections and finished work that does not comply with these requirements.

3.3 DUCT SEALING

A. Seal ducts for duct static-pressure, seal classes, and leakage classes specified in "Duct Schedule" Article according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

B. Seal ducts to the following seal classes according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible":

1. Refer to duct sealing table on drawings.
2. Hood exhaust shall be sealed to Class A seal including all traverse and longitudinal seams and all fasteners.

3.4 HANGER AND SUPPORT INSTALLATION

A. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 4, "Hangers and Supports."

B. Building Attachments: Concrete inserts, powder-actuated fasteners, or structural-steel fasteners appropriate for construction materials to which hangers are being attached.

1. Where practical, install concrete inserts before placing concrete.
2. Install powder-actuated concrete fasteners after concrete is placed and completely cured.
3. Use powder-actuated concrete fasteners for standard-weight aggregate concretes or for slabs more than 4 inches thick.
4. Do not use powder-actuated concrete fasteners for lightweight-aggregate concretes or for slabs less than 4 inches thick.
5. Do not use powder-actuated concrete fasteners for seismic restraints.

C. Hanger Spacing: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 4-1, "Rectangular Duct Hangers Minimum Size," and Table 4-2, "Minimum Hanger Sizes for Round Duct," for maximum hanger spacing; install hangers and supports within 24 inches of each elbow and within 48 inches of each branch intersection.

D. Hangers Exposed to View: Threaded rod and angle or channel supports.

E. Support vertical ducts with steel angles or channel secured to the sides of the duct with welds, bolts, sheet metal screws, or blind rivets; support at each floor and at a maximum intervals of 16 feet.

F. Install upper attachments to structures. Select and size upper attachments with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

3.5 CONNECTIONS

A. Make connections to equipment with flexible connectors complying with Division 23 Section "Air Duct Accessories."

B. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for branch, outlet and inlet, and terminal unit connections.

3.6 START UP

A. Air Balance: Comply with requirements in Division 23 Section "Testing, Adjusting, and Balancing for HVAC."

3.7 DUCT SCHEDULE

A. Fabricate ducts with galvanized sheet steel except as otherwise indicated and as

B. Supply Ducts:

1. Ducts Connected to Fan Coil Units, and Terminal Units:
   a. Pressure Class: Positive 1-inch wg.
   b. Minimum SMACNA Seal Class: B.
   c. SMACNA Leakage Class for Rectangular: 12.
   d. SMACNA Leakage Class for Round and Flat Oval: 6.
2. Ducts Connected to Variable-Air-Volume Air-Handling Units:
   a. Pressure Class: Positive 4-inch wg.
   b. Minimum SMACNA Seal Class: A.
   c. SMACNA Leakage Class for Rectangular: 6.
   d. SMACNA Leakage Class for Round and Flat Oval: 3.
3. Ducts Connected to Equipment Not Listed Above:
   a. Pressure Class: Positive 2-inch wg.
   b. Minimum SMACNA Seal Class: A.
   c. SMACNA Leakage Class for Rectangular: 6.
   d. SMACNA Leakage Class for Round and Flat Oval: 3.

C. Return Ducts:

1. Ducts Connected to Fan Coil Units and Terminal Units Insert equipment:
   a. Pressure Class: Positive or negative 1-inch wg.
   b. Minimum SMACNA Seal Class: C.
   c. SMACNA Leakage Class for Rectangular: 24.
   d. SMACNA Leakage Class for Round and Flat Oval: 12.
2. Ducts Connected to Air-Handling Units:
   a. Pressure Class: Positive or negative 3-inch wg.
   b. Minimum SMACNA Seal Class: A.
   c. SMACNA Leakage Class for Rectangular: 6 .
   d. SMACNA Leakage Class for Round and Flat Oval: 3.
3. Ducts Connected to Equipment Not Listed Above:
   a. Pressure Class: Negative 3-inch wg.
   b. Minimum SMACNA Seal Class: A.
   c. SMACNA Leakage Class for Rectangular: 6.
   d. SMACNA Leakage Class for Round and Flat Oval: 3.

D. Exhaust Ducts:

1. Ducts Connected to Fans Exhausting (ASHRAE 62.1, Class 1 and 2) Air:
   a. Pressure Class: Negative 4-inch wg.
   b. Minimum SMACNA Seal Class: B if negative pressure, and A if positive pressure.
   c. SMACNA Leakage Class for Rectangular: 12.
   d. SMACNA Leakage Class for Round and Flat Oval: 6.

E. Intermediate Reinforcement:

1. Galvanized-Steel Ducts: Galvanized steel or carbon steel coated with zinc-chromate primer.

F. Elbow Configuration:

1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-2, "Rectangular Elbows."
   a. Velocity 1000 fpm or Lower:
      1) Radius Type RE 1 with minimum 0.5 radius-to-diameter ratio.
      2) Mitered Type RE 4 without vanes.
   b. Velocity 1000 to 1500 fpm:
      1) Radius Type RE 1 with minimum 1.0 radius-to-diameter ratio.
      2) Radius Type RE 3 with minimum 0.5 radius-to-diameter ratio and two vanes.
      3) Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-3, "Vanes and Vane Runners," and Figure 2-4, "Vane Support in Elbows."
   c. Velocity 1500 fpm or Higher:
      1) Radius Type RE 1 with minimum 1.5 radius-to-diameter ratio.
      2) Radius Type RE 3 with minimum 1.0 radius-to-diameter ratio and two vanes.
      3) Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-3, "Vanes and Vane Runners," and Figure 2-4, "Vane Support in Elbows."
2. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-2, "Rectangular Elbows."
   a. Radius Type RE 1 with minimum 1.5 radius-to-diameter ratio.
   b. Radius Type RE 3 with minimum 1.0 radius-to-diameter ratio and two vanes.
   c. Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-3, "Vanes and Vane Runners," and Figure 2-4, "Vane Support in Elbows."
3. Round Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-3, "Round Duct Elbows."
   a. Minimum Radius-to-Diameter Ratio and Elbow Segments: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 3-1, "Mitered Elbows." Elbows with less than 90-degree change of direction have proportionately fewer segments.
      1) Velocity 1000 fpm or Lower: 0.5 radius-to-diameter ratio and three segments for 90-degree elbow.
      2) Velocity 1000 to 1500 fpm: 1.0 radius-to-diameter ratio and four segments for 90-degree elbow.
      3) Velocity 1500 fpm or Higher: 1.5 radius-to-diameter ratio and five segments for 90-degree elbow.
      4) Radius-to Diameter Ratio: 1.5.
   b. Round Elbows, 12 Inches and Smaller in Diameter: Stamped or pleated.
   c. Round Elbows, 14 Inches and Larger in Diameter: Standing seam.

G. Branch Configuration:

1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-6, "Branch Connections."
   a. Rectangular Main to Rectangular Branch: 45-degree entry.
   b. Rectangular Main to Round Branch: Spin in.
2. Round: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-4, "90 Degree Tees and Laterals," and Figure 3-5, "Conical Tees." Saddle taps are permitted in existing duct.
   a. Velocity 1000 fpm or Lower: 90-degree tap.
   b. Velocity 1000 to 1500 fpm: Conical tap.
   c. Velocity 1500 fpm or Higher: 45-degree lateral.

END OF SECTION

SECTION 23 3713 – DIFFUSERS, REGISTERS, AND GRILLES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Rectangular and square ceiling diffusers.
2. Linear slot diffusers.
3. Adjustable bar registers and grilles.
4. Fixed face registers and grilles.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated, include the following:

1. Data Sheet: Indicate materials of construction, finish, and mounting details; and performance data including throw and drop, static-pressure drop, and noise ratings.
2. Diffuser, Register, and Grille Schedule: Indicate drawing designation, room location, quantity, model number, size, and accessories furnished.

PART 2 - PRODUCTS

2.1 TYPES AND DESIGNATIONS

A. See schedule on drawings.

2.2 SOURCE QUALITY CONTROL

A. Verification of Performance: Rate diffusers, registers, and grilles according to ASHRAE 70, "Method of Testing for Rating the Performance of Air Outlets and Inlets."

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install diffusers, registers, and grilles level and plumb.

B. Ceiling-Mounted Outlets and Inlets: Drawings indicate general arrangement of ducts, fittings, and accessories. Air outlet and inlet locations have been indicated to achieve design requirements for air volume, noise criteria, airflow pattern, throw, and pressure drop. Make final locations where indicated, as much as practical. For units installed in lay-in ceiling panels, locate units in the center of panel. Where architectural features or other items conflict with installation, notify Architect for a determination of final location.

C. Install diffusers, registers, and grilles with airtight connections to ducts and to allow service and maintenance of dampers, air extractors, and fire dampers.

3.2 ADJUSTING

A. After installation, adjust diffusers, registers, and grilles to air patterns indicated, or as directed, before starting air balancing.

B. Do not use air pattern controllers for air balancing.

END OF SECTION

SECTION 238126 - SPLIT-SYSTEM AIR-CONDITIONERS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes split-system air-conditioning and heat pump units consisting of separate evaporator-fan and compressor-condenser components. Units are designed for exposed or concealed mounting, and may be connected to ducts.

1.2 SUBMITTALS

A. Product Data: For each unit indicated. Include performance data in terms of capacities, outlet velocities, static pressures, sound power characteristics, motor requirements, and electrical characteristics.

B. Operation and maintenance data.

1.3 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1-2016, Section 5 - "Systems and Equipment" and Section 7 - "Construction and Startup."

C. ASHRAE/IESNA 90.1-2016 Compliance: Applicable requirements in ASHRAE/IESNA 90.1-2004, Section 6 - "Heating, Ventilating, and Air-Conditioning."

1.4 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace split-system air-conditioning units that fail in materials and workmanship within five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Carrier Air Conditioning; Div. of Carrier Corp.
2. Lennox Industries Inc.
3. Trane Co. (The); Unitary Products Group.
4. York International Corp.

2.2 AIR-COOLED, COMPRESSOR-CONDENSER UNIT

A. Casing steel, finished with baked enamel, with removable panels for access to controls, weep holes for water drainage, and mounting holes in base. Provide brass service valves, fittings, and gage ports on exterior of casing.

B. Compressor: Hermetically sealed scroll type with crankcase heater and mounted on vibration isolation. Compressor motor shall have thermal- and current-sensitive overload devices, start capacitor, relay, and contactor.

1. Refrigerant: R-410A.

C. Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins, complying with ARI 210/240, and with liquid subcooler.

D. Fan: Aluminum-propeller type, directly connected to motor.

E. Mounting Base: Polyethylene.

F. Minimum Energy Efficiency: Comply with ASHRAE/IESNA 90.1-2019, "Energy Standard for Buildings except Low-Rise Residential Buildings" and Department of Energy 2023 requirements.

2.3 ACCESSORIES

A. Programmable thermostat: Low voltage with subbase to control compressor and evaporator fan.

B. Refrigerant Line Kits: Soft-annealed copper suction and liquid lines factory cleaned, dried, pressurized, and sealed; factory-insulated suction line with flared fittings at both ends.

1. Minimum Insulation Thickness: 1 inch thick.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install evaporator-fan components using manufacturer's standard mounting devices securely fastened to building structure.

B. Install ground-mounted, compressor-condenser components on wall bracket condensing unit stand, steel construction with powder coat finish. Bracket elevate condensing unit a minimum of 18" above adjacent grade.

3.2 CONNECTIONS

A. Connect precharged refrigerant tubing to component's quick-connect fittings. Install tubing to allow access to unit.

B. Connect supply and return water coil with shutoff-duty valve and union or flange on the supply connection and with throttling-duty valve and union or flange on the return connection.

C. Connect supply and return condenser connections with shutoff-duty valve and union or flange on the supply connection and with throttling-duty valve and union or flange on the return connection.

D. Install piping adjacent to unit to allow service and maintenance.

3.3 FIELD QUALITY CONTROL

A. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.

B. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation. Remove malfunctioning units, replace with new components, and retest.

C. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

END OF SECTION 238126

SECTION 23 8239 - UNIT HEATERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Wall and ceiling heaters with propeller fans and electric-resistance heating coils.

1.2 SUBMITTALS

A. Product Data: Include rated capacities, operating characteristics, furnished specialties, and accessories for each product indicated.

B. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.

1. Plans, elevations, sections, and details.
2. Location and size of each field connection.
3. Equipment schedules to include rated capacities, furnished specialties, and accessories.

C. Field quality-control test reports.

D. Operation and maintenance data.

1.3 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction and marked for intended use.

PART 2 - PRODUCTS

2.1 WALL AND CEILING HEATERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Indeeco.
2. Markel Products; a division of TPI Corporation.
3. Marley Electric Heating; a division of Marley Engineered Products.
4. QMark Electric Heating; a division of Marley Engineered Products.

B. Description: An assembly including chassis, electric heating coil, fan, motor, and controls. Comply with UL 2021.

C. Cabinet:

1. Front Panel: Stamped-steel louver, with removable panels fastened with tamperproof fasteners.
2. Finish: Baked enamel over baked-on primer with manufacturer's standard color selected by Architect, applied to factory-assembled and -tested wall and ceiling heaters before shipping.

D. Surface-Mounting Cabinet Enclosure: Steel with finish to match cabinet.

E. Electric-Resistance Heating Coil: Nickel-chromium heating wire, free from expansion noise and hum, embedded in magnesium oxide refractory and sealed in corrosion-resistant metallic sheath. Terminate elements in stainless-steel, machine-staked terminals secured with stainless-steel hardware, and limit controls for high temperature protection. Provide integral circuit breaker for overcurrent protection.

F. Fan: Aluminum propeller directly connected to motor.

1. Motor: Permanently lubricated, multispeed. Comply with requirements in Division 23 Section "Common Motor Requirements for HVAC Equipment."

G. Controls: Unit-mounted thermostat.

H. Electrical Connection: Factory wire motors and controls for a single field connection with disconnect switch.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install unit heaters to comply with NFPA 90A.

B. Suspend cabinet unit heaters from structure with elastomeric hangers.

C. Suspend propeller unit heaters from structure with all-thread hanger rods and elastomeric hangers. Hanger rods and attachments to structure are specified in Division 23 Section "Hangers and Supports for HVAC Piping and Equipment." Vibration hangers are specified in Division 23 Section "Vibration and Seismic Controls for HVAC Piping and Equipment."

D. Install wall-mounting thermostats and switch controls in electrical outlet boxes at heights to match lighting controls. Verify location of thermostats and other exposed control sensors with Drawings and room details before installation.

E. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."

F. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

3.2 FIELD QUALITY CONTROL

A. Perform the following field tests and inspections and prepare test reports:

1. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
2. Operate electric heating elements through each stage to verify proper operation and electrical connections.
3. Test and adjust controls and safety devices. Replace damaged and malfunctioning controls and equipment.

B. Remove and replace malfunctioning units and retest as specified above

END OF SECTION

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PROJECT #: 2324
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HVAC
SPECIFICATIONS 2 OF 2

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SECTION 22 0500 - COMMON WORK RESULTS FOR PLUMBING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Piping materials and installation instructions common to most piping systems.
2. Dielectric fittings.
3. Mechanical sleeve seals.
4. Sleeves.
5. Escutcheons.
6. Grout.
7. Plumbing demolition.
8. Equipment installation requirements common to equipment sections.
9. Concrete bases.
10. Supports and anchorages.

1.2 DEFINITIONS

A. Finished Spaces: Spaces other than plumbing and electrical equipment rooms, furred spaces, pipe chases, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.

B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and plumbing equipment rooms.

C. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.

D. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in chases.

E. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.

1.3 QUALITY ASSURANCE

A. Electrical Characteristics for Plumbing Equipment: Equipment of higher electrical characteristics may be furnished provided such proposed equipment is approved in writing and connecting electrical services, circuit breakers, and conduit sizes are appropriately modified. If minimum energy ratings or efficiencies are specified, equipment shall comply with requirements.

PART 2 - PRODUCTS

2.1 PIPE, TUBE, AND FITTINGS

A. Refer to individual Division 22 piping Sections for pipe, tube, and fitting materials and joining methods.

B. Pipe Threads: ASME B1.20.1 for factory-threaded pipe and pipe fittings.

2.2 JOINING MATERIALS

A. Refer to individual Division 22 piping Sections for special joining materials not listed below.

B. Pipe-Flange Gasket Materials: ASME B16.21, nonmetallic, flat, asbestos-free, 1/8-inch maximum thickness unless thickness or specific material is indicated.

C. Plastic, Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer, unless otherwise indicated.

D. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.

E. Brazing Filler Metals: AWS A5.8, BCuP Series or BAg1, unless otherwise indicated.

F. Welding Filler Metals: Comply with AWS D10.12.

G. Solvent Cements for Joining Plastic Piping:

1. ABS Piping: ASTM D 2235.
2. CPVC Piping: ASTM F 493.
3. PVC Piping: ASTM D 2564. Include primer according to ASTM F 656.
4. PVC to ABS Piping Transition: ASTM D 3138.

2.3 DIELECTRIC FITTINGS

A. Description: Combination fitting of copper alloy and ferrous materials with threaded, solder-joint, plain, or weld-neck end connections that match piping system materials.

B. Insulating Material: Suitable for system fluid, pressure, and temperature.

C. Dielectric Unions: Factory-fabricated, union assembly, for 250-psig minimum working pressure at 180 deg F.

D. Dielectric Flanges: Factory-fabricated, companion-flange assembly, for 150- or 300-psig minimum working pressure as required to suit system pressures.

E. Dielectric Couplings: Galvanized-steel coupling with inert and noncorrosive, thermoplastic lining; threaded ends; and 300-psig minimum working pressure at 225 deg F.

F. Dielectric Nipples: Electroplated steel nipple with inert and noncorrosive, thermoplastic lining; plain, threaded, or grooved ends; and 300-psig minimum working pressure at 225 deg F.

2.4 MECHANICAL SLEEVE SEALS

A. Description: Modular sealing element unit, designed for field assembly, to fill annular space between pipe and sleeve.

B. Sealing Elements: EPDMinterlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.

C. Pressure Plates: Stainless steel. Include two for each sealing element.

D. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements. Include one for each sealing element.

2.5 SLEEVES

A. Galvanized-Steel Sheet: 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint.

B. Steel Pipe: ASTM A 53, Type E, Grade B, Schedule 40, galvanized, plain ends.

C. Cast Iron: Cast or fabricated "wall pipe" equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.

D. Stack Sleeve Fittings: Manufactured, cast-iron sleeve with integral clamping flange. Include clamping ring and bolts and nuts for membrane flashing.

1. Underdeck Clamp: Clamping ring with set screws.

2.6 ESCUTCHEONS

A. Description: Manufactured wall and ceiling escutcheons and floor plates, with an ID to closely fit around pipe, tube, and insulation of insulated piping and an OD that completely covers opening.

B. One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped brass with polished chrome-plated finish.

C. One-Piece, Cast-Brass Type: With set screw.

1. Finish: Polished chrome-plated.

D. Split-Casting, Cast-Brass Type: With concealed hinge and set screw.

1. Finish: Polished chrome-plated.

2.7 GROUT

A. Description: ASTM C 1107, Grade B, nonshrink and nonmetallic, dry hydraulic-cement grout.

1. Characteristics: Post-hardening, volume-adjusting, nonstaining, noncorrosive, nongaseous, and recommended for interior and exterior applications.
2. Design Mix: 5000-psi, 28-day compressive strength.
3. Packaging: Premixed and factory packaged.

PART 3 - EXECUTION

3.1 PLUMBING DEMOLITION

A. Refer to Division 01 Section "Cutting and Patching" and Division 02 Section "Selective Structure Demolition" for general demolition requirements and procedures.

B. Disconnect, demolish, and remove plumbing systems, equipment, and components indicated to be removed.

1. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
2. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material.
3. Equipment to Be Removed: Disconnect and cap services and remove equipment.
4. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
5. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.

C. If pipe, insulation, or equipment to remain is damaged in appearance or is unserviceable, remove damaged or unserviceable portions and replace with new products of equal capacity and quality.

3.2 PIPING SYSTEMS - COMMON REQUIREMENTS

A. Install piping according to the following requirements and Division 22 Sections specifying piping systems.

B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.

C. Install piping in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.

D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.

F. Install piping to permit valve servicing.

G. Install piping at indicated slopes.

H. Install piping free of sags and bends.

I. Install fittings for changes in direction and branch connections.

J. Install piping to allow application of insulation.

K. Select system components with pressure rating equal to or greater than system operating pressure.

L. Install escutcheons for penetrations of walls, ceilings, and floors.

M. Install sleeves for pipes passing through concrete and masonry walls, gypsum-board partitions, and concrete floor and roof slabs.

N. Aboveground, Exterior-Wall Pipe Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.

1. Install steel pipe for sleeves smaller than 6 inches in diameter.
2. Install cast-iron "wall pipes" for sleeves 6 inches and larger in diameter.
3. Mechanical Sleeve Seal Installation: Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

O. Underground, Exterior-Wall Pipe Penetrations: Install cast-iron "wall pipes" for sleeves. Seal pipe penetrations using mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.

1. Mechanical Sleeve Seal Installation: Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

P. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Refer to Division 07 Section "Penetration Firestopping" for materials.

Q. Verify final equipment locations for roughing-in.

R. Refer to equipment specifications in other Sections of these Specifications for roughing-in requirements.

3.3 PIPING JOINT CONSTRUCTION

A. Join pipe and fittings according to the following requirements and Division 22 Sections specifying piping systems.

B. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.

C. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.

D. Soldered Joints: Apply ASTM B 813, water-flushable flux, unless otherwise indicated, to tube end. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook," using lead-free solder alloy complying with ASTM B 32.

E. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter, using copper-phosphorus brazing filler metal complying with AWS A5.8.

F. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:

1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

G. Welded Joints: Construct joints according to AWS D10.12, using qualified processes and welding operators according to Part 1 "Quality Assurance" Article.

H. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.

I. Plastic Piping Solvent-Cement Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:

1. Comply with ASTM F 402, for safe-handling practice of cleaners, primers, and solvent cements.
2. ABS Piping: Join according to ASTM D 2235 and ASTM D 2661 Appendixes.
3. CPVC Piping: Join according to ASTM D 2846/D 2846M Appendix.
4. PVC Pressure Piping: Join schedule number ASTM D 1785, PVC pipe and PVC socket fittings according to ASTM D 2672. Join other-than-schedule-number PVC pipe and socket fittings according to ASTM D 2855.
5. PVC Nonpressure Piping: Join according to ASTM D 2855.
6. PVC to ABS Nonpressure Transition Fittings: Join according to ASTM D 3138 Appendix.

J. Plastic Pressure Piping Gasketed Joints: Join according to ASTM D 3139.

K. Plastic Nonpressure Piping Gasketed Joints: Join according to ASTM D 3212.

L. PE Piping Heat-Fusion Joints: Clean and dry joining surfaces by wiping with clean cloth or paper towels. Join according to ASTM D 2657.

1. Plain-End Pipe and Fittings: Use butt fusion.
2. Plain-End Pipe and Socket Fittings: Use socket fusion.

M. Fiberglass Bonded Joints: Prepare pipe ends and fittings, apply adhesive, and join according to pipe manufacturer's written instructions.

3.4 PIPING CONNECTIONS

A. Make connections according to the following, unless otherwise indicated:

1. Install unions, in piping NPS 2 and smaller, adjacent to each valve and at final connection to each piece of equipment.
2. Install flanges, in piping NPS 2-1/2 and larger, adjacent to flanged valves and at final connection to each piece of equipment.
3. Dry Piping Systems: Install dielectric unions and flanges to connect piping materials of dissimilar metals.
4. Wet Piping Systems: Install dielectric coupling and nipple fittings to connect piping materials of dissimilar metals.

3.5 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS

A. Install equipment to allow maximum possible headroom unless specific mounting heights are not indicated.

B. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.

C. Install plumbing equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.

D. Install equipment to allow right of way for piping installed at required slope.

3.6 CONCRETE BASES

A. Concrete Bases: Anchor equipment to concrete base according to equipment manufacturer's written instructions and according to seismic codes at Project.

1. Construct concrete bases of dimensions indicated, but not less than 4 inches larger in both directions than supported unit.
2. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around the full perimeter of the base.
3. Install epoxy-coated anchor bolts for supported equipment that extend through concrete base, and anchor into structural concrete floor.
4. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
5. Install anchor bolts to elevations required for proper attachment to supported equipment.
6. Install anchor bolts according to anchor-bolt manufacturer's written instructions.
7. Use 3000-psi 28-day compressive-strength concrete and reinforcement as specified in Division 03 Section "Cast-in-Place Concrete."

3.7 ERECTION OF METAL SUPPORTS AND ANCHORAGES

A. Refer to Division 05 Section "Metal Fabrications" for structural steel.

B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor plumbing materials and equipment.

C. Field Welding: Comply with AWS D1.1.

3.8 ERECTION OF WOOD SUPPORTS AND ANCHORAGES

A. Cut, fit, and place wood grounds, nailers, blocking, and anchorages to support, and anchor plumbing materials and equipment.

B. Select fastener sizes that will not penetrate members if opposite side will be exposed to view or will receive finish materials. Tighten connections between members. Install fasteners without splitting wood members.

C. Attach to substrates as required to support applied loads.

3.9 GROUTING

A. Mix and install grout for plumbing equipment base bearing surfaces, pump and other equipment base plates, and anchors.

B. Clean surfaces that will come into contact with grout.

C. Provide forms as required for placement of grout.

D. Avoid air entrapment during placement of grout.

E. Place grout, completely filling equipment bases.

F. Place grout on concrete bases and provide smooth bearing surface for equipment.

G. Place grout around anchors.

H. Cure placed grout.

END OF SECTION

SECTION 220700 - PLUMBING INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Insulation Materials:
   a. Flexible elastomeric.
   b. Mineral fiber.
2. Adhesives.
3. Mastics.
4. Sealants.
5. Factory-applied jackets.
6. Tapes.
7. Securements.
8. Corner angles.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated.

1.3 QUALITY ASSURANCE

A. Fire-Test-Response Characteristics: Insulation and related materials shall have fire-test-response characteristics indicated, as determined by testing identical products per ASTM E 84, by a testing and inspecting agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing and inspecting agency.

1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.

PART 2 - PRODUCTS

2.1 INSULATION MATERIALS

A. Comply with requirements in Part 3 schedule articles for where insulating materials shall be applied.

B. Products shall not contain asbestos, lead, mercury, or mercury compounds.

C. Products that come in contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested according to ASTM C 871.

D. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable according to ASTM C 795.

E. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.

F. Flexible Elastomeric: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type I for tubular materials and Type II for sheet materials.

1. Products: Subject to compliance with requirements, [provide the following] [provide one of the following] [available products that may be incorporated into the Work include, but are not limited to, the following]:
   a. Aeroflex USA Inc.; Aerocel.
   b. Armacell LLC; AP Armaflex.
   c. RBX Corporation; Insul-Sheet 1800 and Insul-Tube 180.
   d. <Insert manufacturer's name; product name or designation.>

G. Mineral-Fiber, Preformed Pipe Insulation:

1. Products: Subject to compliance with requirements, [provide the following] [provide one of the following] [available products that may be incorporated into the Work include, but are not limited to, the following]:
   a. Fibrex Insulations Inc.; Coreplus 1200.
   b. Johns Manville; Micro-Lok.
   c. Knauf Insulation; 1000 Pipe Insulation.
   d. Manson Insulation Inc.; Alley-K.
   e. Owens Corning; Fiberglas Pipe Insulation.
2. Type I, 850 deg F Materials: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 547, Type I, Grade A, with factory-applied ASJ-SSL. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.

2.2 ADHESIVES

A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated, unless otherwise indicated.

B. Flexible Elastomeric and Polyolefin Adhesive: Comply with MIL-A-24179A, Type II, Class I.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
   a. Aeroflex USA Inc.; Aeroseal.
   b. Armacell LCC; 520 Adhesive.
   c. Foster Products Corporation, H. B. Fuller Company; 85-75.
   d. RBX Corporation; Rubatex Contact Adhesive.
2. For indoor applications, use adhesive that has a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

C. Mineral-Fiber Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
   a. Childers Products, Division of ITW; CP-82.
   b. Foster Products Corporation, H. B. Fuller Company; 85-20.
   c. ITW TACC, Division of Illinois Tool Works; S-90/80.
   d. Marathon Industries, Inc.; 225.
   e. Mon-Eco Industries, Inc.; 22-25.
2. For indoor applications, use adhesive that has a VOC content of 80 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.3 MASTICS

A. Materials shall be compatible with insulation materials, jackets, and substrates; comply with MIL-C-19565C, Type II.

1. For indoor applications, use mastics that have a VOC content of <Insert value> g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

B. Vapor-Barrier Mastic: Water based; suitable for indoor and outdoor use on below ambient services.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
   a. Childers Products, Division of ITW; CP-35.
   b. Foster Products Corporation, H. B. Fuller Company; 30-90.
   c. ITW TACC, Division of Illinois Tool Works; CB-50.
   d. Marathon Industries, Inc.; 590.
   e. Mon-Eco Industries, Inc.; 55-40.
   f. Vimasco Corporation; 749.
2. Water-Vapor Permeance: ASTM E 96, Procedure B, 0.013 perm at 43-mil dry film thickness.
3. Service Temperature Range: Minus 20 to plus 180 deg F.
4. Solids Content: ASTM D 1644, 59 percent by volume and 71 percent by weight.
5. Color: White.

2.4 TAPES

A. ASJ Tape: White vapor-retarder tape matching factory-applied jacket with acrylic adhesive, complying with ASTM C 1136.

1. Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
   a. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0835.
   b. Compac Corp.; 104 and 105.
   c. Ideal Tape Co., Inc., an American Biltrite Company; 428 AWF ASJ.
   d. Venture Tape; 1540 CW Plus, 1542 CW Plus, and 1542 CW Plus/SQ.
2. Width: 3 inches.
3. Thickness: 11.5 mils.
4. Adhesion: 90 ounces force/inch in width.
5. Elongation: 2 percent.
6. Tensile Strength: 40 lbf/inch in width.
7. ASJ Tape Disks and Squares: Precut disks or squares of ASJ tape.

B. FSK Tape: Foil-face, vapor-retarder tape matching factory-applied jacket with acrylic adhesive; complying with ASTM C 1136.

1. Products: Subject to compliance with requirements, [provide the following] [provide one of the following] [available products that may be incorporated into the Work include, but are not limited to, the following]:
   a. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0827.
   b. Compac Corp.; 110 and 111.
   c. Ideal Tape Co., Inc., an American Biltrite Company; 491 AWF FSK.
   d. Venture Tape; 1525 CW, 1528 CW, and 1528 CW/SQ.
   e. <Insert manufacturer's name; product name or designation.>
2. Width: 3 inches.
3. Thickness: 6.5 mils.
4. Adhesion: 90 ounces force/inch in width.
5. Elongation: 2 percent.
6. Tensile Strength: 40 lbf/inch in width.
7. FSK Tape Disks and Squares: Precut disks or squares of FSK tape.

C. Aluminum-Foil Tape: Vapor-retarder tape with acrylic adhesive.

1. Products: Subject to compliance with requirements, [provide the following] [provide one of the following] [available products that may be incorporated into the Work include, but are not limited to, the following]:
   a. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0800.
   b. Compac Corp.; 120.
   c. Ideal Tape Co., Inc., an American Biltrite Company; 488 AWF.
   d. Venture Tape; 3520 CW.
   e. <Insert manufacturer's name; product name or designation.>
2. Width: 2 inches.
3. Thickness: 3.7 mils.
4. Adhesion: 100 ounces force/inch in width.
5. Elongation: 5 percent.
6. Tensile Strength: 34 lbf/inch in width.

PART 3 - EXECUTION

3.1 PREPARATION

A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect installation application.

B. Mix insulating cements with clean potable water; if insulating cements are to be in contact with stainless-steel surfaces, use demineralized water.

3.2 GENERAL INSTALLATION REQUIREMENTS

A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of equipment and piping including fittings, valves, and specialties.

B. Install insulation materials, forms, vapor barriers or retarders, jackets, and thicknesses required for each item of equipment and pipe system as specified in insulation system schedules.

C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.

D. Install insulation with longitudinal seams at top and bottom of horizontal runs.

E. Install multiple layers of insulation with longitudinal and end seams staggered.

F. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.

G. Keep insulation materials dry during application and finishing.

H. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.

I. Install insulation with least number of joints practical.

J. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.

1. Install insulation continuously through hangers and around anchor attachments.
2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends at attachment to structure with vapor-barrier mastic.
3. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.
4. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect jacket from tear or puncture by hanger, support, and shield.

K. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.

L. Install insulation with factory-applied jackets as follows:

1. Draw jacket tight and smooth.
2. Cover circumferential joints with 3-inch wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip, spaced 4 inches o.c.
3. Cover joints and seams with tape as recommended by insulation material manufacturer to maintain vapor seal.
4. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to pipe flanges and fittings.

M. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.

N. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.

O. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.

3.3 GENERAL PIPE INSULATION INSTALLATION

A. Requirements in this article generally apply to all insulation materials except where more specific requirements are specified in various pipe insulation material installation articles.

B. Insulation Installation on Fittings, Valves, Strainers, Flanges, and Unions:

1. Install insulation over fittings, valves, strainers, flanges, unions, and other specialties with continuous thermal and vapor-retarder integrity, unless otherwise indicated.
2. Insulate pipe elbows using preformed fitting insulation or mitered fittings made from same material and density as adjacent pipe insulation. Each piece shall be butted tightly against adjoining piece and bonded with adhesive. Fill joints, seams, voids, and irregular surfaces with insulating cement finished to a smooth, hard, and uniform contour that is uniform with adjoining pipe insulation.
3. Insulate tee fittings with preformed fitting insulation or sectional pipe insulation of same material and thickness as used for adjacent pipe. Cut sectional pipe insulation to fit. Butt each section closely to the next and hold in place with tie wire. Bond pieces with adhesive.
4. Insulate valves using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. For valves, insulate up to and including the bonnets, valve stuffing-box studs, bolts, and nuts. Fill joints, seams, and irregular surfaces with insulating cement.
5. Insulate strainers using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. Fill joints, seams, and irregular surfaces with insulating cement. Insulate strainers so strainer basket flange or plug can be easily removed and replaced without damaging the insulation and jacket. Provide a removable reusable insulation cover. For below ambient services, provide a design that maintains vapor barrier.
6. Insulate flanges and unions using a section of oversized preformed pipe insulation. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker.
7. Cover segmented insulated surfaces with a layer of finishing cement and coat with a mastic. Install vapor-barrier mastic for below ambient services and a breather mastic for above ambient services. Reinforce the mastic with fabric-reinforcing mesh. Trowel the mastic to a smooth and well-shaped contour.
8. For services not specified to receive a field-applied jacket except for flexible elastomeric and polyolefin, install fitted PVC cover over elbows, tees, strainers, valves, flanges, and unions. Terminate ends with PVC end caps. Tape PVC covers to adjoining insulation facing using PVC tape.
9. Stencil or label the outside insulation jacket of each union with the word "UNION." Match size and color of pipe labels.

C. Insulate instrument connections for thermometers, pressure gages, pressure temperature taps, test connections, flow meters, sensors, switches, and transmitters on insulated pipes, vessels, and equipment. Shape insulation at these connections by tapering it to and around the connection with insulating cement and finish with finishing cement, mastic, and flashing sealant.

D. Install removable insulation covers at locations indicated. Installation shall conform to the following:

1. Make removable flange and union insulation from sectional pipe insulation of same thickness as that on adjoining pipe. Install same insulation jacket as adjoining pipe insulation.
2. When flange and union covers are made from sectional pipe insulation, extend insulation from flanges or union long at least two times the insulation thickness over adjacent pipe insulation on each side of flange or union. Secure flange cover in place with stainless-steel or aluminum bands. Select band material compatible with insulation and jacket.
3. Construct removable valve insulation covers in same manner as for flanges except divide the two-part section on the vertical center line of valve body.
4. When covers are made from block insulation, make two halves, each consisting of mitered blocks wired to stainless-steel fabric. Secure this wire frame, with its attached insulation, to flanges with tie wire. Extend insulation at least 2 inches over adjacent pipe insulation on each side of valve. Fill space between flange or union cover and pipe insulation with insulating cement. Finish cover assembly with insulating cement applied in two coats. After first coat is dry, apply and trowel second coat to a smooth finish.
5. Unless a PVC jacket is indicated in field-applied jacket schedules, finish exposed surfaces with a metal jacket.

3.4 FLEXIBLE ELASTOMERIC INSULATION INSTALLATION

A. Seal longitudinal seams and end joints with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

B. Insulation Installation on Pipe Flanges:

1. Install pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of sheet insulation of same thickness as pipe insulation.
4. Secure insulation to flanges and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install mitered sections of pipe insulation.
2. Secure insulation materials and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed valve covers manufactured of same material as pipe insulation when available.
2. When preformed valve covers are not available, install cut sections of pipe and sheet insulation to valve body. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
3. Install insulation to flanges as specified for flange insulation application.
4. Secure insulation to valves and specialties and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

3.5 MINERAL-FIBER INSULATION INSTALLATION

A. Insulation Installation on Straight Pipes and Tubes:

1. Secure each layer of preformed pipe insulation to pipe with wire or bands and tighten bands without deforming insulation materials.
2. Where vapor barriers are indicated, seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.
3. For insulation with factory-applied jackets on above ambient surfaces, secure laps with outward clinched staples at 6 inches o.c.
4. For insulation with factory-applied jackets on below ambient surfaces, do not staple longitudinal tabs but secure tabs with additional adhesive as recommended by insulation material manufacturer and seal with vapor-barrier mastic and flashing sealant.

B. Insulation Installation on Pipe Flanges:

1. Install preformed pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with mineral-fiber blanket insulation.
4. Install jacket material with manufacturer's recommended adhesive, overlap seams at least 1 inch, and seal joints with flashing sealant.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install preformed sections of same material as straight segments of pipe insulation when available.
2. When preformed insulation elbows and fittings are not available, install mitered sections of pipe insulation, to a thickness equal to adjoining pipe insulation. Secure insulation materials with wire or bands.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed sections of same material as straight segments of pipe insulation when available.
2. When preformed sections are not available, install mitered sections of pipe insulation to valve body.
3. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
4. Install insulation to flanges as specified for flange insulation application.

3.6 PIPING INSULATION SCHEDULE, GENERAL

A. SEE DRAWINGS FOR PIPING INSULATION SCHEDULE

B. Items Not Insulated: Unless otherwise indicated, do not install insulation on the following:

1. Drainage piping located in crawl spaces.
2. Underground piping.
3. Chrome-plated pipes and fittings unless there is a potential for personnel injury.

END OF SECTION 220700

2024-02-08 - 1-/4" = 1'-0"

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ISSUE:
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PLUMBING SPECIFICATIONS 1 OF 3

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SECTION 22 1116 - DOMESTIC WATER PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Under-building slab and aboveground domestic water pipes, tubes, fittings, and specialties inside the building.
2. Specialty valves.
3. Flexible connectors.
4. Escutcheons.
5. Sleeves and sleeve seals.

B. Related Section:

1. Division 22 Section "Facility Water Distribution Piping" for water-service piping and water meters outside the building from source to the point where water-service piping enters the building.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated.

1.3 QUALITY ASSURANCE

A. Piping materials shall bear label, stamp, or other markings of specified testing agency.

B. Comply with NSF 61 for potable domestic water piping and components.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

A. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.

2.2 COPPER TUBE AND FITTINGS

A. Hard Copper Tube: ASTM B 88, Type L water tube, drawn temper.

1. Cast-Copper Solder-Joint Fittings: ASME B16.18, pressure fittings.
2. Wrought-Copper Solder-Joint Fittings: ASME B16.22, wrought-copper pressure fittings.
3. Bronze Flanges: ASME B16.24, Class 150, with solder-joint ends.
4. Copper Unions: MSS SP-123, cast-copper-alloy, hexagonal-stock body, with ball-and-socket, metal-to-metal seating surfaces, and solder-joint or threaded ends.
5. Copper Pressure-Seal-Joint Fittings:
   a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      1) Elkhart Products Corporation; Industrial Division.
      2) NIBCO INC.
      3) Viega; Plumbing and Heating Systems.
   b. NPS 2 and Smaller: Wrought-copper fitting with EPDM-rubber O-ring seal in each end.
   c. NPS 2-1/2 to NPS 4: Cast-bronze or wrought-copper fitting with EPDM-rubber O-ring seal in each end.

B. Soft Copper Tube: ASTM B 88, Type K and ASTM B 88, Type L water tube, annealed temper.

1. Copper Solder-Joint Fittings: ASME B16.22, wrought-copper pressure fittings.
2. Copper Pressure-Seal-Joint Fittings:
   a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      1) Elkhart Products Corporation; Industrial Division.
      2) NIBCO INC.
      3) Viega; Plumbing and Heating Systems.
   b. NPS 2 and Smaller: Wrought-copper fitting with EPDM-rubber O-ring seal in each end.
   c. NPS 3 and NPS 4: Cast-bronze or wrought-copper fitting with EPDM-rubber O-ring seal in each end.

2.3 GALVANIZED-STEEL PIPE AND FITTINGS

A. Galvanized-Steel Pipe: ASTM A 53/A 53M, Type E, Grade B, Standard Weight. Include ends matching joining method.

1. Galvanized-Steel Pipe Nipples: ASTM A 733, made of ASTM A 53/A 53M or ASTM A 106/A 106M, Standard Weight, seamless steel pipe with threaded ends.
2. Galvanized, Gray-Iron Threaded Fittings: ASME B16.4, Class 125, standard pattern.
3. Malleable-Iron Unions: ASME B16.39, Class 150, hexagonal-stock body with ball-and-socket, metal-to-metal, bronze seating surface, and female threaded ends.
4. Flanges: ASME B16.1, Class 125, cast iron.

2.4 CPVC PIPING

A. CPVC Tubing System: ASTM D 2846/D 2846M, SDR 11, tube and socket fittings.

2.5 PIPING JOINING MATERIALS

A. Pipe-Flange Gasket Materials: AWWA C110, rubber, flat face, 1/8 inch thick or ASME B16.21, nonmetallic and asbestos free, unless otherwise indicated; full-face or ring type unless otherwise indicated.

B. Metal, Pipe-Flange Bolts and Nuts: ASME B18.2.1, carbon steel unless otherwise indicated.

C. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.

D. Brazing Filler Metals: AWS A5.8/A5.8M, BCuP Series, copper-phosphorus alloys for general-duty brazing unless otherwise indicated.

E. Solvent Cements for Joining CPVC Piping and Tubing: ASTM F 493.

1. Use CPVC solvent cement that has a VOC content of 490 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
2. Use adhesive primer that has a VOC content of 550 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.6 SPECIALTY VALVES

A. Comply with requirements in Division 22 Section "General-Duty Valves for Plumbing Piping" for general-duty metal valves.

B. Comply with requirements in Division 22 Section "Domestic Water Piping Specialties" for balancing valves, drain valves, backflow preventers, and vacuum breakers.

2.7 DIELECTRIC FITTINGS

A. General Requirements: Assembly of copper alloy and ferrous materials or ferrous material body with separating nonconductive insulating material suitable for system fluid, pressure, and temperature.

B. Dielectric Unions:

1. Description:
   a. Pressure Rating: 150 psig at 180 deg F.
   b. End Connections: Solder-joint copper alloy and threaded ferrous.

C. Dielectric Flanges:

1. Description:
   a. Factory-fabricated, bolted, companion-flange assembly.
   b. Pressure Rating: 150 psig.
   c. End Connections: Solder-joint copper alloy and threaded ferrous; threaded solder-joint copper alloy and threaded ferrous.

D. Dielectric-Flange Kits:

1. Description:
   a. Nonconducting materials for field assembly of companion flanges.
   b. Pressure Rating: 150 psig.
   c. Gasket: Neoprene or phenolic.
   d. Bolt Sleeves: Phenolic or polyethylene.
   e. Washers: Phenolic with steel backing washers.

E. Dielectric Couplings:

1. Description:
   a. Galvanized-steel coupling.
   b. Pressure Rating: 300 psig at 225 deg F.
   c. End Connections: Female threaded.
   d. Lining: Inert and noncorrosive, thermoplastic.

F. Dielectric Nipples:

1. Description:
   a. Electroplated steel nipple complying with ASTM F 1545.
   b. Pressure Rating: 300 psig at 225 deg F.
   c. End Connections: Male threaded or grooved.
   d. Lining: Inert and noncorrosive, propylene.

2.8 FLEXIBLE CONNECTORS

A. Bronze-Hose Flexible Connectors: Corrugated-bronze tubing with bronze wire-braid covering and ends brazed to inner tubing.

1. Working-Pressure Rating: Minimum 200 psig.
2. End Connections NPS 2 and Smaller: Threaded copper pipe or plain-end copper tube.
3. End Connections NPS 2-1/2 and Larger: Flanged copper alloy.

B. Stainless-Steel-Hose Flexible Connectors: Corrugated-stainless-steel tubing with stainless-steel wire-braid covering and ends welded to inner tubing.

1. Working-Pressure Rating: Minimum 200 psig.
2. End Connections NPS 2 and Smaller: Threaded steel-pipe nipple.
3. End Connections NPS 2-1/2 and Larger: Flanged steel nipple.

2.9 ESCUTCHEONS

A. General: Manufactured ceiling, floor, and wall escutcheons and floor plates.

B. One Piece, Cast Brass: Polished, chrome-plated or rough-brass finish with setscrews.

C. One Piece, Deep Pattern: Deep-drawn, box-shaped brass with chrome-plated finish.

D. One Piece, Stamped Steel: Chrome-plated finish with setscrew or spring clips.

E. Split Casting, Cast Brass: Polished, chrome-plated or rough-brass finish with concealed hinge and setscrew.

F. Split Plate, Stamped Steel: Chrome-plated finish with concealed hinge, setscrew or spring clips.

G. One-Piece Floor Plates: Cast-iron flange with holes for fasteners.

H. Split-Casting Floor Plates: Cast brass with concealed hinge.

2.10 SLEEVES

A. Cast-Iron Wall Pipes: Fabricated of cast iron, and equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop unless otherwise indicated.

B. Galvanized-Steel-Sheet Sleeves: 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint.

C. Galvanized-Steel-Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, zinc-coated, with plain ends.

D. Stack Sleeve Fittings: Manufactured, cast-iron sleeve with integral clamping flange. Include clamping ring and bolts and nuts for membrane flashing.

1. Underdeck Clamp: Clamping ring with setscrews.

2.11 SLEEVE SEALS

A. Description: Modular sealing element unit, designed for field assembly, used to fill annular space between pipe and sleeve.

1. Sealing Elements: EPDM-rubber interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
2. Pressure Plates: Stainless steel.
3. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements.

2.12 GROUT

A. Standard: ASTM C 1107, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.

B. Characteristics: Nonshrink; recommended for interior and exterior applications.

C. Design Mix: 5000-psi, 28-day compressive strength.

D. Packaging: Premixed and factory packaged.

PART 3 - EXECUTION

3.1 PIPING INSTALLATION

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of domestic water piping. Indicated locations and arrangements are used to size pipe and calculate friction loss, expansion, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.

B. Install copper tubing under building slab according to CDA's "Copper Tube Handbook."

C. Install ductile-iron piping under building slab with restrained joints according to AWWA C600 and AWWA M41.

D. Install shutoff valve, hose-end drain valve, strainer, pressure gage, and test tee with valve, inside the building at each domestic water service entrance. Comply with requirements in Division 22 Section "Meters and Gages for Plumbing Piping" for pressure gages and Division 22 Section "Domestic Water Piping Specialties" for drain valves and strainers.

E. Install shutoff valve immediately upstream of each dielectric fitting.

F. Install water-pressure-reducing valves downstream from shutoff valves. Comply with requirements in Division 22 Section "Domestic Water Piping Specialties" for pressure-reducing valves.

G. Install domestic water piping level without pitch and plumb.

H. Install seismic restraints on piping. Comply with requirements in Division 22 Section "Vibration and Seismic Controls for Plumbing Piping and Equipment" for seismic-restraint devices.

I. Install piping concealed from view and protected from physical contact by building occupants unless otherwise indicated and except in equipment rooms and service areas.

J. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

K. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal, and coordinate with other services occupying that space.

L. Install piping adjacent to equipment and specialties to allow service and maintenance.

M. Install piping to permit valve servicing.

N. Install nipples, unions, special fittings, and valves with pressure ratings the same as or higher than system pressure rating used in applications below unless otherwise indicated.

O. Install piping free of sags and bends.

P. Install fittings for changes in direction and branch connections.

Q. Install unions in copper tubing at final connection to each piece of equipment, machine, and specialty.

R. Install pressure gages on suction and discharge piping from each plumbing pump and packaged booster pump. Comply with requirements in Division 22 Section "Meters and Gages for Plumbing Piping" for pressure gages.

S. Install thermostats in hot-water circulation piping. Comply with requirements in Division 22 Section "Domestic Water Pumps" for thermostats.

T. Install thermometers on inlet and outlet piping from each water heater. Comply with requirements in Division 22 Section "Meters and Gages for Plumbing Piping" for thermometers.

3.2 JOINT CONSTRUCTION

A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.

B. Remove scale, slag, dirt, and debris from inside and outside of pipes, tubes, and fittings before assembly.

C. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:

1. Apply appropriate tape or thread compound to external pipe threads.
2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged.

D. Brazed Joints: Join copper tube and fittings according to CDA's "Copper Tube Handbook," "Brazed Joints" Chapter.

E. Soldered Joints: Apply ASTM B 813, water-flushable flux to end of tube. Join copper tube and fittings according to ASTM B 828 or CDA's "Copper Tube Handbook."

F. Pressure-Sealed Joints: Join copper tube and pressure-seal fittings with tools recommended by fitting manufacturer.

G. Flanged Joints: Select appropriate asbestos-free, nonmetallic gasket material in size, type, and thickness suitable for domestic water service. Join flanges with gasket and bolts according to ASME B31.9.

H. Dissimilar-Material Piping Joints: Make joints using adapters compatible with materials of both piping systems.

3.3 VALVE INSTALLATION

A. General-Duty Valves: Comply with requirements in Division 22 Section "General-Duty Valves for Plumbing Piping" for valve installations.

B. Install shutoff valve close to water main on each branch and riser serving plumbing fixtures or equipment, on each water supply to equipment, and on each water supply to plumbing fixtures that do not have supply stops. Use ball or gate valves for piping NPS 2 and smaller. Use butterfly or gate valves for piping NPS 2-1/2 and larger.

C. Install drain valves for equipment at base of each water riser, at low points in horizontal piping, and where required to drain water piping. Drain valves are specified in Division 22 Section "Domestic Water Piping Specialties."

1. Hose-End Drain Valves: At low points in water mains, risers, and branches.
2. Stop-and-Waste Drain Valves: Instead of hose-end drain valves where indicated.

D. Install balancing valve in each hot-water circulation return branch and discharge side of each pump and circulator. Set balancing valves partly open to restrict but not stop flow. Use ball valves for piping NPS 2 and smaller and butterfly valves for piping NPS 2-1/2 and larger. Comply with requirements in Division 22 Section "Domestic Water Piping Specialties" for balancing valves.

3.4 DIELECTRIC FITTING INSTALLATION

A. Install dielectric fittings in piping at connections of dissimilar metal piping and tubing.

B. Dielectric Fittings for NPS 2 and Smaller: Use dielectric couplings or nipples.

C. Dielectric Fittings for NPS 2-1/2 to NPS 4: Use dielectric flanges.

D. Dielectric Fittings for NPS 5 to NPS 6: Use dielectric flange kits.

3.5 FLEXIBLE CONNECTOR INSTALLATION

A. Install flexible connectors in suction and discharge piping connections to each domestic water pump and in suction and discharge manifold connections to each domestic water booster pump.

B. Install bronze-hose flexible connectors in copper domestic water tubing.

C. Install stainless-steel-hose flexible connectors in steel domestic water piping.

3.6 HANGER AND SUPPORT INSTALLATION

A. Comply with requirements in Division 22 Section "Hangers and Supports for Plumbing Piping and Equipment" for pipe hanger and support products and installation.

1. Vertical Piping: MSS Type 8 or 42, clamps.
2. Individual, Straight, Horizontal Piping Runs:
   a. 100 Feet and Less: MSS Type 1, adjustable, steel clevis hangers.
   b. Longer Than 100 Feet: MSS Type 43, adjustable roller hangers.
3. Base of Vertical Piping: MSS Type 52, spring hangers.

B. Support vertical piping and tubing at base and at each floor.

C. Rod diameter may be reduced one size for double-rod hangers, to a minimum of 3/8 inch.

D. Install hangers for copper tubing with the following maximum horizontal spacing and minimum rod diameters:

1. NPS 3/4 and Smaller: 60 inches with 3/8-inch rod.
2. NPS 1 and NPS 1-1/4: 72 inches with 3/8-inch rod.
3. NPS 1-1/2 and NPS 2: 96 inches with 3/8-inch rod.
4. NPS 2-1/2: 108 inches with 1/2-inch rod.
5. NPS 3 to NPS 5: 10 feet with 1/2-inch rod.
6. NPS 6: 10 feet with 5/8-inch rod.

E. Install supports for vertical copper tubing every 10 feet.

F. Install hangers for steel piping with the following maximum horizontal spacing and minimum rod diameters:

1. NPS 1-1/4 and Smaller: 84 inches with 3/8-inch rod.
2. NPS 1-1/2: 108 inches with 3/8-inch rod.
3. NPS 2: 10 feet with 3/8-inch rod.
4. NPS 2-1/2: 11 feet with 1/2-inch rod.
5. NPS 3 and NPS 3-1/2: 12 feet with 1/2-inch rod.
6. NPS 4 and NPS 5: 12 feet with 5/8-inch rod.
7. NPS 6: 12 feet with 3/4-inch rod.

G. Install supports for vertical steel piping every 15 feet.

H. Install vinyl-coated hangers for CPVC piping with the following maximum horizontal spacing and minimum rod diameters:

1. NPS 1 and Smaller: 36 inches with 3/8-inch rod.
2. NPS 1-1/4 to NPS 2: 48 inches with 3/8-inch rod.

I. Install supports for vertical CPVC piping every 60 inches for NPS 1 and smaller, and every 72 inches for NPS 1-1/4 and larger.

J. Support piping and tubing not listed in this article according to MSS SP-69 and manufacturer's written instructions.

3.7 CONNECTIONS

A. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Install piping adjacent to equipment and machines to allow service and maintenance.

C. Connect domestic water piping to existing water service. Use transition fitting to join dissimilar piping materials.

D. Connect domestic water piping to water-service piping with shutoff valve; extend and connect to the following:

E.

1. Water Heaters: Cold-water inlet and hot-water outlet piping in sizes indicated, but not smaller than sizes of water heater connections.
2. Plumbing Fixtures: Cold- and hot-water supply piping in sizes indicated, but not smaller than required by plumbing code. Comply with requirements in Division 22 plumbing fixture Sections for connection sizes.
3. Equipment: Cold- and hot-water supply piping as indicated, but not smaller than equipment connections. Provide shutoff valve and union for each connection. Use flanges instead of unions for NPS 2-1/2 and larger.

3.8 ESCUTCHEON INSTALLATION

A. Install escutcheons for penetrations of walls, ceilings, and floors.

B. Escutcheons for New Piping:

1. Piping with Fitting or Sleeve Protruding from Wall: One piece, deep pattern.
2. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One piece, cast brass with polished chrome-plated finish.
3. Bare Piping at Ceiling Penetrations in Finished Spaces: One piece, cast brass with polished chrome-plated finish.
4. Bare Piping in Unfinished Service Spaces: One piece, cast brass with polished chrome-plated finish.
5. Bare Piping in Equipment Rooms: One piece, cast brass.
6. Bare Piping at Floor Penetrations in Equipment Rooms: One-piece floor plate.

3.9 SLEEVE INSTALLATION

A. General Requirements: Install sleeves for pipes and tubes passing through penetrations in floors, partitions, roofs, and walls.

B. Sleeves are not required for core-drilled holes.

C. Permanent sleeves are not required for holes formed by removable PE sleeves.

D. Cut sleeves to length for mounting flush with both surfaces unless otherwise indicated.

E. Install sleeves in new partitions, slabs, and walls as they are built.

F. For interior wall penetrations, seal annular space between sleeve and pipe or pipe insulation using joint sealants appropriate for size, depth, and location of joint. Comply with requirements in Division 07 Section "Joint Sealants" for joint sealants.

G. For exterior wall penetrations above grade, seal annular space between sleeve and pipe using joint sealants appropriate for size, depth, and location of joint. Comply with requirements in Division 07 Section "Joint Sealants" for joint sealants.

H. For exterior wall penetrations below grade, seal annular space between sleeve and pipe using sleeve seals specified in this Section.

I. Seal space outside of sleeves in concrete slabs and walls with grout.

J. Install sleeves that are large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation unless otherwise indicated.

K. Install sleeve materials according to the following applications:

1. Sleeves for Piping Passing through Concrete Floor Slabs: Steel pipe.
2. Sleeves for Piping Passing through Concrete Floor Slabs of Mechanical Equipment Areas or Other Wet Areas: Steel pipe.
   a. Extend sleeves 2 inches above finished floor level.
   b. For pipes penetrating floors with membrane waterproofing, extend cast-iron sleeve fittings below floor slab as required to secure clamping ring if ring is specified. Secure flashing between clamping flanges. Install section of cast-iron soil pipe to extend sleeve to 2 inches above finished floor level. Comply with requirements in Division 07 Section "Sheet Metal Flashing and Trim" for flashing.
3. Sleeves for Piping Passing through Gypsum-Board Partitions:
   a. Steel pipe sleeves for pipes smaller than NPS 6.
   b. Exception: Sleeves are not required for water supply tubes and waste pipes for individual plumbing fixtures if escutcheons will cover openings.
4. Sleeves for Piping Passing through Concrete Roof Slabs: Steel pipe.
5. Sleeves for Piping Passing through Exterior Concrete Walls:
   a. Steel pipe sleeves for pipes smaller than NPS 6.
   b. Install sleeves that are large enough to provide 1-inch annular clear space between sleeve and pipe or pipe insulation when sleeve seals are used.

L. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Comply with requirements in Division 07 Section "Penetration Firestopping" for firestop materials and installations.

3.10 SLEEVE SEAL INSTALLATION

A. Install sleeve seals in sleeves in exterior concrete walls at water-service piping entries into building.

B. Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble sleeve seal components and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.11 IDENTIFICATION

A. Identify system components. Comply with requirements in Division 22 Section "Identification for Plumbing Piping and Equipment" for identification materials and installation.

B. Label pressure piping with system operating pressure.

3.12 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Piping Inspections:

1. Do not enclose, cover, or put piping into operation until it has been inspected and approved by authorities having jurisdiction.
2. During installation, notify authorities having jurisdiction at least one day before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction:
   a. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.
   b. Final Inspection: Arrange final inspection for authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.
3. Reinspection: If authorities having jurisdiction find that piping will not pass tests or inspections, make required corrections and arrange for reinspection.
4. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.

C. Piping Tests:

1. Fill domestic water piping. Check components to determine that they are not air bound and that piping is full of water.
2. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit a separate report for each test, complete with diagram of portion of piping tested.
3. Leave new, altered, extended, or replaced domestic water piping uncovered and unconcealed until it has been tested and approved. Expose work that was covered or concealed before it was tested.
4. Cap and subject piping to static water pressure of 50 psig above operating pressure, without exceeding pressure rating of piping system materials. Isolate test source and allow to stand for four hours. Leaks and loss in test pressure constitute defects that must be repaired.
5. Repair leaks and defects with new materials and retest piping or portion thereof until satisfactory results are obtained.
6. Prepare reports for tests and for corrective action required.

D. Domestic water piping will be considered defective if it does not pass tests and inspections.

E. Prepare test and inspection reports.

3.13 CLEANING

A. Clean and disinfect potable domestic water piping as follows:

1. Purge new piping and parts of existing piping that have been altered, extended, or repaired before using.
2. Use purging and disinfecting procedures prescribed by authorities having jurisdiction; if methods are not prescribed, use procedures described in either AWWA C651 or AWWA C652 or follow procedures described below:
   a. Flush piping system with clean, potable water until dirty water does not appear at outlets.
   b. Fill and isolate system according to either of the following:
      1) Fill system or part thereof with water/chlorine solution with at least 50 ppm of chlorine. Isolate with valves and allow to stand for 24 hours.
      2) Fill system or part thereof with water/chlorine solution with at least 200 ppm of chlorine. Isolate and allow to stand for three hours.
   c. Flush system with clean, potable water until no chlorine is in water coming from system after the standing time.
   d. Submit water samples in sterile bottles to authorities having jurisdiction. Repeat procedures if biological examination shows contamination.

B. Prepare and submit reports of purging and disinfecting activities.

C. Clean interior of domestic water piping system. Remove dirt and debris as work progresses.

3.14 PIPING SCHEDULE

A. Transition and special fittings with pressure ratings at least equal to piping rating may be used in applications below unless otherwise indicated.

B. Flanges and unions may be used for aboveground piping joints unless otherwise indicated.

C. Under-building-slab, domestic water, building service piping, NPS 3 and smaller, shall be one of the following:

1. Soft copper tube, ASTM B 88, Type K; wrought-copper solder-joint fittings and brazed joints.
2. Hard copper tube, ASTM B 88, Type L; wrought-copper solder-joint fittings and brazed joints.
3. Soft copper tube, ASTM B 88, Type L; wrought-copper solder-joint fittings and brazed joints.

D. Under-building-slab, domestic water, building-service piping, NPS 4 to NPS 6, shall be one of the following:

1. Push-on-joint, ductile-iron pipe; standard pattern push-on-joint fittings and gasketed joints.

E. Under-building-slab, domestic water piping, NPS 2 and smaller, shall be one of the following:

1. Hard copper tube, ASTM B 88, Type L wrought copper solder-joint fittings and brazed joints.

F. Aboveground domestic water piping, NPS 2 and smaller, shall be one of the following:

1. Hard copper tube, ASTM B 88, Type L wrought copper solder-joint fittings and brazed soldered joints.
2. Hard copper tube, ASTM B 88, Type L copper pressure-seal-joint fittings and pressure-sealed joints.
3. CPVC Tubing System: CPVC tube; CPVC socket fittings; and solvent-cemented joints.

G. Aboveground domestic water piping, NPS 2-1/2 to NPS 4, shall be one of the following:

1. Hard copper tube, ASTM B 88, Type L wrought copper solder-joint fittings and brazed soldered joints.
2. Hard copper tube, ASTM B 88, Type L copper pressure-seal-joint fittings and pressure-sealed joints.

3.15 VALVE SCHEDULE

A. Drawings indicate valve types to be used. Where specific valve types are not indicated, the following requirements apply:

1. Shutoff Duty: Use ball or gate valves for piping NPS 2 and smaller. Use butterfly, ball, or gate valves with flanged ends for piping NPS 2-1/2 and larger.
2. Throttling Duty: Use ball or globe valves for piping NPS 2 and smaller. Use butterfly or ball valves with flanged ends for piping NPS 2-1/2 and larger.
3. Hot-Water Circulation Piping, Balancing Duty: Memory-stop balancing valves.
4. Drain Duty: Hose-end drain valves.

B. Use check valves to maintain correct direction of domestic water flow to and from equipment.

C. Iron grooved-end valves may be used with grooved-end piping.

END OF SECTION

SECTION 22 1316 – SANITARY WASTE AND VENT PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following soil and waste, sanitary drainage and vent piping inside the building:

1. Pipe, tube, and fittings.
2. Special pipe fittings.

1.2 PERFORMANCE REQUIREMENTS

A. Components and installation shall be capable of withstanding the following minimum working pressure, unless otherwise indicated:

1. Soil, Waste, and Vent Piping: 10-foot head of water.

1.3 QUALITY ASSURANCE

A. Piping materials shall bear label, stamp, or other markings of specified testing agency.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

A. Hub-and-Spigot, Cast-Iron Pipe and Fittings: ASTM A 74, Service class.

1. Gaskets: ASTM C 564, rubber.

B. Hubless Cast-Iron Pipe and Fittings: ASTM A 888 or CISPI 301.

1. Shielded Couplings: ASTM C 1277 assembly of metal shield or housing, corrosion-resistant fasteners, and rubber sleeve with integral, center pipe stop.
   a. Standard, Shielded, Stainless-Steel Couplings: CISPI 310, with stainless-steel corrugated shield; stainless-steel bands and tightening devices; and ASTM C 564, rubber sleeve.
   b. Heavy-Duty, Shielded, Stainless-Steel Couplings: With stainless-steel shield, stainless-steel bands and tightening devices, and ASTM C 564, rubber sleeve.

C. Copper DWV Tube: ASTM B 306, drainage tube, drawn temper.

1. Copper Drainage Fittings: ASME B16.23, cast copper or ASME B16.29, wrought-copper, solder-joint fittings.

D. Solid-Wall PVC Pipe: ASTM D 2665, solid-wall drain, waste, and vent.

1. PVC Socket Fittings: ASTM D 2665, socket type, made to ASTM D 3311, drain, waste, and vent patterns.
2. Solvent Cement and Adhesive Primer:
   a. Use PVC solvent cement that has a VOC content of 510 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
   b. Use adhesive primer that has a VOC content of 550 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

PART 3 - EXECUTION

3.1 PIPING APPLICATIONS

A. Special pipe fittings with pressure ratings at least equal to piping pressure ratings may be used in applications below, unless otherwise indicated.

B. Flanges and unions may be used on aboveground pressure piping, unless otherwise indicated.

C. Aboveground, soil, waste, and vent piping NPS 4 and smaller shall be any of the following:

1. Service class, hub-and-spigot, cast-iron soil pipe and fittings; gaskets; and compression joints.
2. Hubless cast-iron soil pipe and fittings; standard, shielded, stainless-steel couplings; and hubless-coupling joints.
   a. Equivalent couplings manufactured by Husky, MG are acceptable.
3. Copper DWV tube, copper drainage fittings, and soldered joints.
4. Solid-wall PVC pipe, PVC socket fittings, and solvent-cemented joints.

D. Underground, soil, waste, and vent piping NPS 4 and smaller shall be any of the following:

1. Service class, hub-and-spigot, cast-iron soil pipe and fittings; gaskets; and compression joints.
2. Hubless cast-iron soil pipe and fittings; standard, shielded, stainless-steel couplings; and hubless-coupling joints.
   a. Equivalent couplings manufactured by Husky, MG are acceptable.
3. Solid-wall PVC pipe, PVC socket fittings, and solvent-cemented joints.

E. Underground, soil and waste Piping NPS 5 and larger shall be any of the following:

1. Service class, cast-iron soil pipe and fittings; gaskets; and compression joints.
2. Hubless cast-iron soil pipe and fittings; heavy-duty shielded, stainless-steel couplings; and hubless-coupling joints.
   a. Equivalent couplings manufactured by Husky, MG are acceptable.

3.2 PIPING INSTALLATION

A. Sanitary sewer piping outside the building is specified in Division 22 Section "Facility Sanitary Sewers."

B. Basic piping installation requirements are specified in Division 22 Section "Common Work Results for Plumbing."

C. Install cleanouts at grade and extend to where building sanitary drains connect to building sanitary sewers.

D. Install cast-iron sleeve with water stop and mechanical sleeve seal at each service pipe penetration through foundation wall. Select number of interlocking rubber links required to make installation watertight. Sleeves and mechanical sleeve seals are specified in Division 22 Section "Common Work Results for Plumbing."

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PROJECT #: 2324

ISSUE:
BID SET 07-26-2025

PLUMBING SPECIFICATIONS 2 OF 3

M4.05

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2024-02-06 - 1/4" = 1'-0"

E. Install wall penetration system at each service pipe penetration through foundation wall. Make installation watertight. Wall penetration systems are specified in Division 22 Section "Common Work Results for Plumbing."

F. Install cast-iron soil piping according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook," Chapter IV, "Installation of Cast Iron Soil Pipe and Fittings."

G. Make changes in direction for soil and waste drainage and vent piping using appropriate branches, bends, and long-sweep bends. Sanitary tees and short-sweep 1/4 bends may be used on vertical stacks if change in direction of flow is from horizontal to vertical. Use long-turn, double Y-branch and 1/8-bend fittings if 2 fixtures are installed back to back or side by side with common drain pipe. Straight tees, elbows, and crosses may be used on vent lines. Do not change direction of flow more than 90 degrees. Use proper size of standard increasers and reducers if pipes of different sizes are connected. Reducing size of drainage piping in direction of flow is prohibited.

H. Lay buried building drainage piping beginning at low point of each system. Install true to grades and alignment indicated, with unbroken continuity of invert. Place hub ends of piping upstream. Install required gaskets according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements. Maintain swab in piping and pull past each joint as completed.

I. Install soil and waste drainage and vent piping at the following minimum slopes, unless otherwise indicated:

1. Building Sanitary Drain: 2 percent downward in direction of flow for piping NPS 3 and smaller; 1 percent downward in direction of flow for piping NPS 4 and larger.
2. Horizontal Sanitary Drainage Piping: 2 percent downward in direction of flow.
3. Vent Piping: 1/2 percent down toward vertical fixture vent or toward vent stack.

J. Sleeves are not required for cast-iron soil piping passing through concrete slabs-on-grade if slab is without membrane waterproofing.

K. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.

3.3 JOINT CONSTRUCTION

A. Basic piping joint construction requirements are specified in Division 22 Section "Common Work Results for Plumbing."

B. Cast-Iron, Soil-Piping Joints: Make joints according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook," Chapter IV, "Installation of Cast Iron Soil Pipe and Fittings."

1. Gasketed Joints: Make with rubber gasket matching class of pipe and fittings.
2. Hubless Joints: Make with rubber gasket and sleeve or clamp.

C. Soldered Joints: Use ASTM B 813, water-flushable, lead-free flux; ASTM B 32, lead-free-alloy solder; and ASTM B 828 procedure, unless otherwise indicated.

D. PVC Nonpressure Piping Joints: Join piping according to ASTM D 2665.

3.4 HANGER AND SUPPORT INSTALLATION

A. Seismic-restraint devices are specified in Division 22 Section "Vibration and Seismic Controls for Plumbing Piping and Equipment."

B. Pipe hangers and supports are specified in Division 22 Section "Hangers and Supports for Plumbing Piping and Equipment." Install the following:

1. Vertical Piping: MSS Type 8 or Type 42, clamps.
2. Individual, Straight, Horizontal Piping Runs: According to the following:
   a. 100 Feet and Less: MSS Type 1, adjustable, steel clevis hangers.
   b. Longer Than 100 Feet: MSS Type 43, adjustable roller hangers.
   c. Longer Than 100 Feet, if Indicated: MSS Type 49, spring cushion rolls.
3. Multiple, Straight, Horizontal Piping Runs 100 Feet or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
4. Base of Vertical Piping: MSS Type 52, spring hangers.

C. Install supports according to Division 22 Section "Hangers and Supports for Plumbing Piping and Equipment."

D. Support vertical piping and tubing at base and at each floor.

E. Rod diameter may be reduced 1 size for double-rod hangers, with 3/8-inch minimum rods.

F. Install hangers for cast-iron soil piping with the following maximum horizontal spacing and minimum rod diameters:

1. NPS 1-1/2 and NPS 2: 60 inches with 3/8-inch rod.
2. NPS 3: 60 inches with 1/2-inch rod.
3. NPS 4 and NPS 5: 60 inches with 5/8-inch rod.
4. NPS 6: 60 inches with 3/4-inch rod.
5. Spacing for 10-foot lengths may be increased to 10 feet. Spacing for fittings is limited to 60 inches.

G. Install supports for vertical cast-iron soil piping every 15 feet.

H. Install hangers for steel piping with the following maximum horizontal spacing and minimum rod diameters:

1. NPS 1-1/4: 84 inches with 3/8-inch rod.
2. NPS 1-1/2: 108 inches with 3/8-inch rod.
3. NPS 2: 10 feet with 3/8-inch rod.
4. NPS 2-1/2: 11 feet with 1/2-inch rod.
5. NPS 3: 12 feet with 1/2-inch rod.
6. NPS 4 and NPS 5: 12 feet with 5/8-inch rod.
7. NPS 6: 12 feet with 3/4-inch rod.

I. Install hangers for copper tubing with the following maximum horizontal spacing and minimum rod diameters:

1. NPS 1-1/4: 72 inches with 3/8-inch rod.
2. NPS 1-1/2 and NPS 2: 96 inches with 3/8-inch rod.
3. NPS 2-1/2: 108 inches with 1/2-inch rod.
4. NPS 3 to NPS 5: 10 feet with 1/2-inch rod.
5. NPS 6: 10 feet with 5/8-inch rod.

J. Install supports for vertical copper tubing every 10 feet.

K. Install hangers for PVC piping with the following maximum horizontal spacing and minimum rod diameters:

1. NPS 1-1/2 and NPS 2 : 48 inches with 3/8-inch rod.
2. NPS 3 : 48 inches with 1/2-inch rod.
3. NPS 4 and NPS 5: 48 inches with 5/8-inch rod.
4. NPS 6: 48 inches with 3/4-inch rod.

L. Install supports for vertical PVC piping every 48 inches.

M.

N. Support piping and tubing not listed above according to MSS SP-69 and manufacturer's written instructions.

3.5 CONNECTIONS

A. Connect soil and waste piping to exterior sanitary sewerage piping. Use transition fitting to join dissimilar piping materials.

B. Connect drainage and vent piping to the following:

1. Plumbing Fixtures: Connect drainage piping in sizes indicated, but not smaller than required by plumbing code. Refer to Division 22 Section "Sanitary Waste Piping Specialties."
2. Plumbing Fixtures and Equipment: Connect atmospheric vent piping in sizes indicated, but not smaller than required by authorities having jurisdiction.
3. Plumbing Specialties: Connect drainage and vent piping in sizes indicated, but not smaller than required by plumbing code. Refer to Division 22 Section "Sanitary Waste Piping Specialties."
4. Equipment: Connect drainage piping as indicated. Provide shutoff valve, if indicated, and union for each connection. Use flanges instead of unions for connections NPS 2-1/2 and larger.

3.6 FIELD QUALITY CONTROL

A. During installation, notify authorities having jurisdiction at least 24 hours before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction.

1. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.
2. Final Inspection: Arrange for final inspection by authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.

B. Reinspection: If authorities having jurisdiction find that piping will not pass test or inspection, make required corrections and arrange for reinspection.

C. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.

D. Test sanitary drainage and vent piping according to procedures of authorities having jurisdiction.

1. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.
2. Prepare reports for tests and required corrective action.

3.7 CLEANING

A. Clean interior of piping. Remove dirt and debris as work progresses.

B. Protect drains during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work.

C. Place plugs in ends of uncompleted piping at end of day and when work stops.

3.8 PROTECTION

A. Exposed PVC Piping: Protect plumbing vents exposed to sunlight with two coats of water-based latex paint.

END OF SECTION

SECTION 221429 - SUMP PUMPS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes submersible sump pumps and accessories, inside the building, for building storm drainage systems.

1.2 SUBMITTALS

A. Product Data: For each type and size of sump pump specified. Include certified performance curves with operating points plotted on curves, and rated capacities of selected models, furnished specialties, and accessories.

B. Shop Drawings: Diagram power, signal, and control wiring.

C. Operation and maintenance data.

1.3 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.

2.2 SUBMERSIBLE SUMP PUMPS

A. Available Manufacturers:

1. Liberty Pumps.
2. Weil Pump Company, Inc.
3. Zoeller Company.

B. Description: Factory-assembled and -tested, simplex, single-stage, centrifugal, end-suction, submersible, direct-connected sump pumps complying with UL 778 and HI 1.1-1.2 and HI 1.3 for submersible sump pumps.

C. Casing: Cast iron; with cast-iron inlet strainer, legs that elevate pump to permit flow into impeller, and vertical discharge with companion flange for piping connection.

D. Casing and Impeller: Cast iron casing with metal inlet strainer and brass, bronze, or cast-iron impeller.

E. Casing and Impeller: Cast iron or plastic casing with inlet strainer and metal or plastic impeller.

F. Pump and Motor Shaft: Factory-sealed, grease-lubricated ball bearings.

G. Motor: Hermetically sealed, capacitor-start type, with built-in overload protection; three-conductor waterproof power cable of length required, and with grounding plug and cable-sealing assembly for connection at pump.

H. Pit Cover: Cast iron or steel with bituminous coating and strong enough to support controls.

I. Controls: NEMA 250, Type 6, 120-V ac, float switch, mounted on discharge piping.

2.3 SUMP PUMP BASINS

A. Description: Factory fabricated basin with sump, pipe connections, and separate cover.

B. Sump: Fabricate watertight, with sidewall openings for pipe connections.

1. Material: Cast iron or fiberglass
2. Reinforcement: Mounting plates for pumps, fittings, and accessories.
3. Anchor Flange: Same material as or compatible with sump, cast in or attached to sump, in location and of size required to anchor basin in concrete slab.

C. Cover: Fabricate with openings having gaskets, seals, and bushings, for access to pumps, pump shafts, control rods, discharge piping, vent connections, and power cables,

1. Material: Cast iron or steel with bituminous coating.
2. Reinforcement: Steel or cast iron, capable of supporting foot traffic for basins installed in foot-traffic areas.

PART 3 - EXECUTION

3.1 CONCRETE

A. Install concrete bases of dimensions indicated for pumps and controllers. Refer to Division 22 Section "Common Work Results for Plumbing."

1. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around full perimeter of base.
2. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete floor.
3. Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
4. Install anchor bolts to elevations required for proper attachment to supported equipment.

B. Cast-in-place concrete materials and placement requirements are specified in Division 03.

3.2 SUMP PUMP INSTALLATION

A. Excavating, trenching, and backfilling are specified in Division 31 Section "Earth Moving."

B. Install sump pumps according to applicable requirements in HI 1.4.

C. Install pumps and arrange to provide access for maintenance including removal of motors, impellers, couplings, and accessories.

D. Suspend wet-pit-mounted, vertical sump pumps from [basin] [basin and pit] [pit] covers. Make direct connections to storm drainage piping.

E. Set submersible sump pumps on [basin] [basin or pit] [pit] floor. Make direct connections to storm drainage piping.

F. Install sump pump basins and connect to drainage piping. Brace interior of basins according to manufacturer's written instructions to prevent distortion or collapse during concrete placement. Set basin cover and fasten to basin top flange. Install cover so top surface is flush with finished floor.

G. Support piping so weight of piping is not supported by pumps.

H. Drawings indicate general arrangement of piping, fittings, and specialties.

I. Install piping adjacent to sump pumps to allow service and maintenance.

J. Install discharge piping equal to or greater than size of pump discharge piping.

1. Install flexible connectors adjacent to pumps in discharge piping.
2. Install check and shutoff valves on discharge piping from each pump. Install unions on pumps having threaded pipe connections. Install valves same size as connected piping. Refer to Division 22 Section "General-Duty Valves for Plumbing Piping" for general-duty valves for drainage piping.

K. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

END OF SECTION 221429

SECTION 224000 - PLUMBING FIXTURES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Faucets for lavatories and sinks.
2. Toilet seats.
3. Protective shielding guards.
4. Fixture supports.
5. Water closets.
6. Lavatories.
7. Bathtubs.
8. Kitchen sinks.

1.2 DEFINITIONS

A. ABS: Acrylonitrile-butadiene-styrene plastic.

B. Accessible Fixture: Plumbing fixture that can be approached, entered, and used by people with disabilities.

C. FRP: Fiberglass-reinforced plastic.

D. PMMA: Polymethyl methacrylate (acrylic) plastic.

E. PVC: Polyvinyl chloride plastic.

F. Solid Surface: Nonporous, homogeneous, cast-polymer-plastic material with heat-, impact-, scratch-, and stain-resistance qualities.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Diagram power, signal, and control wiring.

C. Operation and maintenance data.

1.4 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Regulatory Requirements: Comply with requirements in ICC A117.1, "Accessible and Usable Buildings and Facilities" for plumbing fixtures for people with disabilities.

C. Regulatory Requirements: Comply with requirements in Public Law 102-486, "Energy Policy Act," about water flow and consumption rates for plumbing fixtures.

D. NSF Standard: Comply with NSF 61, "Drinking Water System Components--Health Effects," for fixture materials that will be in contact with potable water.

E. Select combinations of fixtures and trim, faucets, fittings, and other components that are compatible.

F. Comply with the following applicable standards and other requirements specified for plumbing fixtures:

1. Stainless-Steel Residential Sinks: ASME A112.19.3.
2. Vitreous-China Fixtures: ASME A112.19.2M.
3. Water-Closet, Flushometer Tank Trim: ASSE 1037.

G. Comply with the following applicable standards and other requirements specified for lavatory and sink faucets:

1. Backflow Protection Devices for Faucets with Side Spray: ASME A112.18.3M.
2. Backflow Protection Devices for Faucets with Hose-Thread Outlet: ASME A112.18.3M.
3. Diverter Valves for Faucets with Hose Spray: ASSE 1025.
4. Faucets: ASME A112.18.1.
5. Hose-Connection Vacuum Breakers: ASSE 1011.
6. Hose-Coupling Threads: ASME B1.20.7.
7. Integral, Atmospheric Vacuum Breakers: ASSE 1001.
8. NSF Potable-Water Materials: NSF 61.
9. Pipe Threads: ASME B1.20.1.
10. Sensor-Actuated Faucets and Electrical Devices: UL 1951.
11. Supply Fittings: ASME A112.18.1.
12. Brass Waste Fittings: ASME A112.18.2.

H. Comply with the following applicable standards and other requirements specified for miscellaneous components:

1. Off-Floor Fixture Supports: ASME A112.6.1M.
2. Pipe Threads: ASME B1.20.1.
3. Plastic Toilet Seats: ANSI Z124.5.
4. Supply and Drain Protective Shielding Guards: ICC A117.1.

PART 2 - PRODUCTS

2.1 LAVATORY FAUCETS

A. Lavatory Faucets:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   a. American Standard Companies, Inc.
   b. Chicago Faucets.
   c. Delta Faucet Company.
   d. Elkay Manufacturing Co.
   e. Just Manufacturing Company.
   f. Kohler Co.
   g. Moen, Inc.
   h. T & S Brass and Bronze Works, Inc.
   i. Zurn Plumbing Products Group; Commercial Brass Operation.

2.2 SINK FAUCETS

A. Sink Faucets:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   a. American Standard Companies, Inc.
   b. Chicago Faucets.
   c. Delta Faucet Company.
   d. Elkay Manufacturing Co.
   e. Just Manufacturing Company.
   f. Kohler Co.
   g. Moen, Inc.
   h. T & S Brass and Bronze Works, Inc.
   i. Zurn Plumbing Products Group; Commercial Brass Operation.

2.3 TOILET SEATS

A. Toilet Seats:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
3. Basis-of-Design Product: Subject to compliance with requirements, provide [the product indicated on Drawings] <Insert manufacturer's name; product name or designation> or a comparable product by one of the following:
   a. American Standard Companies, Inc.
   b. Bemis Manufacturing Company.
   c. Church Seats.
   d. Kohler Co.
   e. Olsonite Corp.
   f. Sanderson Plumbing Products, Inc.; Beneke Div.
   g. Sperzel.
4. Description: Toilet seat for water-closet-type fixture.
   a. Material: Molded, solid plastic with antimicrobial agent.
   b. Configuration: Open front with cover.
   c. Size: Elongated.
   d. Hinge Type: SS, self-sustaining.
   e. Class: Standard commercial.
   f. Color: White.

2.4 PROTECTIVE SHIELDING GUARDS

A. Protective Shielding Pipe Covers.

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the
   a. Engineered Brass Co.
   b. Insul-Tect Products Co.; a Subsidiary of MVG Molded Products.
   c. McGuire Manufacturing Co., Inc.
   d. Plumberex Specialty Products Inc.
   e. TRUEBRO, Inc.
2. Description: Manufactured plastic wraps for covering plumbing fixture [hot-water supply] [hot- and cold-water supplies] and trap and drain piping. Comply with Americans with Disabilities Act (ADA) requirements.

2.5 FIXTURE SUPPORTS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. MIFAB Manufacturing Inc.
2. Smith, Jay R. Mfg. Co.
3. Tyler Pipe; Wade Div.
4. Watts Drainage Products Inc.; a div. of Watts Industries, Inc.
5. Zurn Plumbing Products Group; Specification Drainage Operation.

B. Lavatory Supports:

1. Description: Type III, lavatory carrier with hanger plate and tie rod for wall-mounting, lavatory-type fixture.
2. Accessible-Fixture Support: Include rectangular steel uprights.

2.6 WATER CLOSETS

A. Water Closets, Insert drawing designation:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   a. American Standard Companies, Inc.
   b. Crane Plumbing, L.L.C./Fiat Products.
   c. Kohler Co.
   d. Mansfield Plumbing Products, Inc.
2. Description: Accessible, floor-mounting, floor-outlet, vitreous-china fixture designed for gravity-type tank operation.
3. Style: Close couple.
   a. Bowl Type: Elongated with siphon-jetdesign. Include bolt caps matching fixture.
   b. Height: Accessible.
   c. Design Consumption: 1.6 gal./flush.
   d. Tank: Gravity type with trim Include cover with vandal resistant mechanism.
   e. Trip Mechanism: Lever-handle actuator.
   f. Color: White.
4. Supply: NPS 1/2 chrome-plated brass or copper with loose-key stop.

2.7 LAVATORIES

A. Lavatories:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   a. American Standard Companies, Inc.
   b. Kohler Co.
   c. Crane Plumbing, L.L.C./Fiat Products.
2. Description: Accessible, wall fixture.

2.8 KITCHEN SINKS

A. Kitchen Sinks:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   a. American Standard Companies, Inc.
   b. Elkay.
   c. Just Manufacturing Company.
   d. Kohler Co.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Assemble plumbing fixtures, trim, fittings, and other components according to manufacturers' written instructions.

B. Install off-floor supports, affixed to building substrate, for wall-mounting fixtures.

1. Use carrier supports with waste fitting and seal for back-outlet fixtures.
2. Use carrier supports without waste fitting for fixtures with tubular waste piping.
3. Use chair-type carrier supports with rectangular steel uprights for accessible fixtures.

C. Install floor-mounting fixtures on closet flanges or other attachments to piping or building substrate.

D. Install wall-mounting fixtures with tubular waste piping attached to supports.

E. Install fixtures level and plumb according to roughing-in drawings.

F. Install water-supply piping with stop on each supply to each fixture to be connected to water distribution piping. Attach supplies to supports or substrate within pipe spaces behind fixtures. Install stops in locations where they can be easily reached for operation.

G. Install trap and tubular waste piping on drain outlet of each fixture to be directly connected to sanitary drainage system.

H. Install tubular waste piping on drain outlet of each fixture to be indirectly connected to drainage system.

I. Install tanks for accessible, tank-type water closets with lever handle mounted on wide side of compartment.

J. Install toilet seats on water closets.

K. Install faucet-spout fittings with specified flow rates and patterns in faucet spouts if faucets are not available with required rates and patterns. Include adapters if required.

L. Install water-supply flow-control fittings with specified flow rates in fixture supplies at stop valves.

M. Install faucet flow-control fittings with specified flow rates and patterns in faucet spouts if faucets are not available with required rates and patterns. Include adapters if required.

N. Install traps on fixture outlets.

1. Exception: Omit trap on fixtures with integral traps.
2. Exception: Omit trap on indirect wastes, unless otherwise indicated.

O. Install escutcheons at piping wall and ceiling penetrations in exposed, finished locations and within cabinets and millwork. Use deep-pattern escutcheons if required to conceal protruding fittings. Escutcheons are specified in Division 22 Section "Common Work Results for Plumbing."

P. Seal joints between fixtures and walls, floors, and countertops using sanitary-type, one-part, mildew-resistant silicone sealant. Match sealant color to fixture color.

3.2 CONNECTIONS

A. Connect fixtures with water supplies, stops, and risers, and with traps, soil, waste, and vent piping. Use size fittings required to match fixtures.

3.3 FIELD QUALITY CONTROL

A. Verify that installed plumbing fixtures are categories and types specified for locations where installed.

B. Check that plumbing fixtures are complete with trim, faucets, fittings, and other specified components.

C. Inspect installed plumbing fixtures for damage. Replace damaged fixtures and components.

D. Test installed fixtures after water systems are pressurized for proper operation. Replace malfunctioning fixtures and components, then retest. Repeat procedure until units operate properly.

E. Install fresh batteries in sensor-operated mechanisms.

3.4 PROTECTION

A. Provide protective covering for installed fixtures and fittings.

B. Do not allow use of plumbing fixtures for temporary facilities unless approved in writing by Owner.

END OF SECTION 224000

2024-02-06 - 1/4" = 1'-0"

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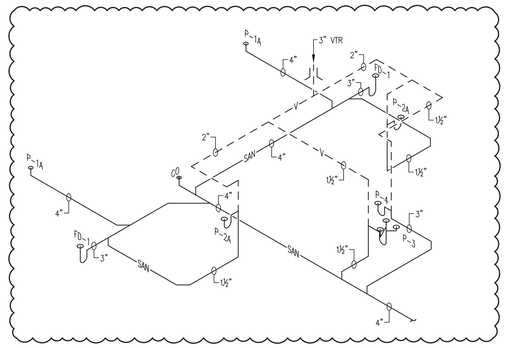
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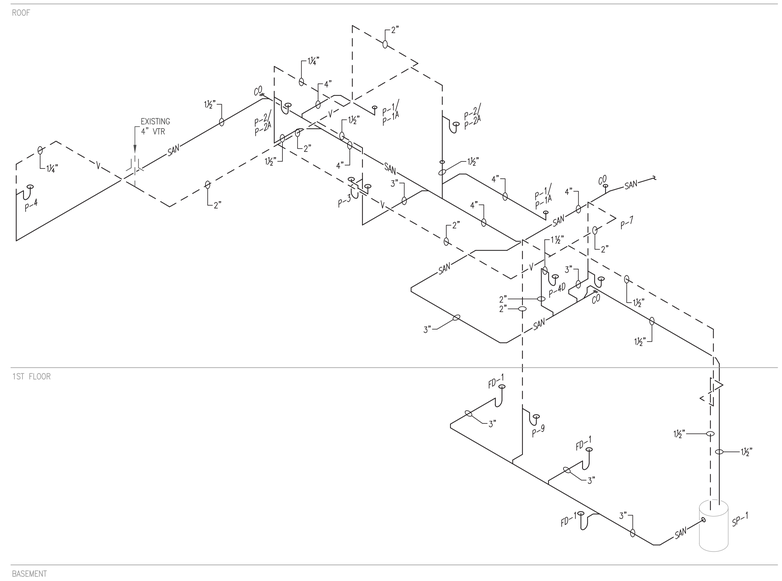
PLUMBING SPECIFICATIONS 3 OF 3

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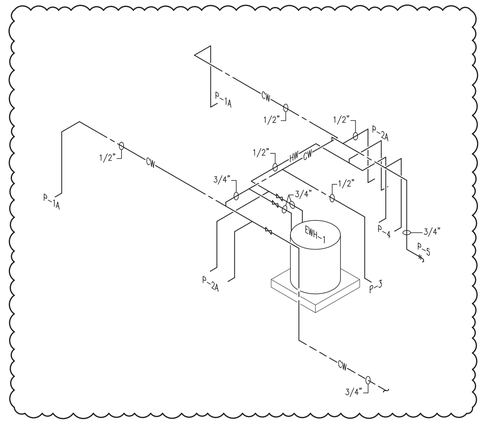
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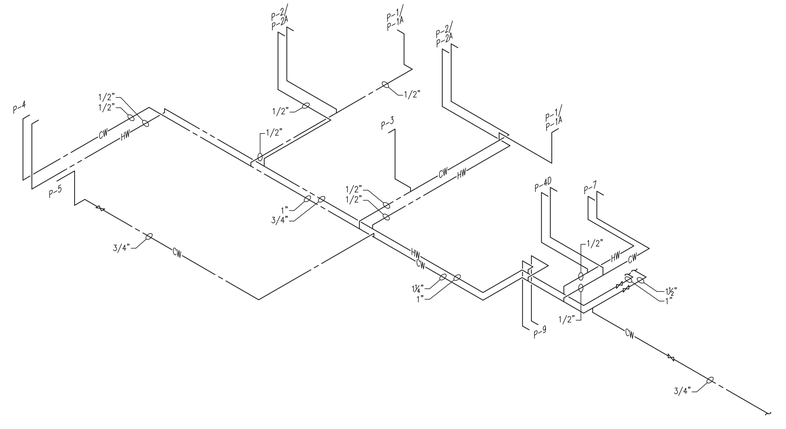
2 TRAIL HEAD RESTROOM SANITARY STACK DIAGRAM
NTS



1 COMMUNITY CENTER SANITARY STACK DIAGRAM
NTS



4 TRAIL HEAD RESTROOM PIPING DIAGRAM
NTS



3 COMMUNITY CENTER PIPING DIAGRAM
NTS

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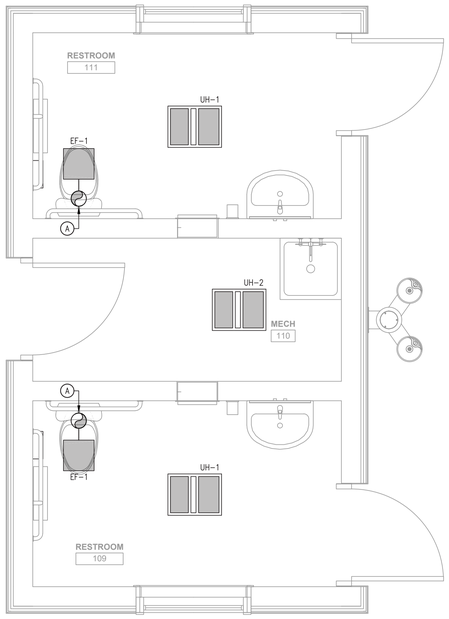
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PLUMBING DIAGRAMS

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2025-05-30 - 1/4" = 1'-0"

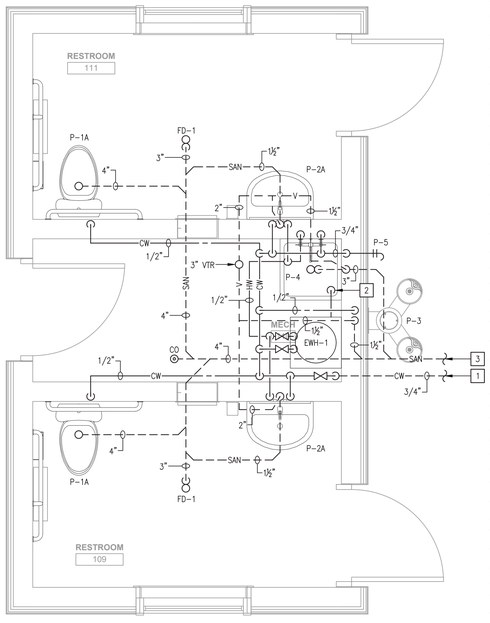


2 TRAIL HEAD RESTROOM HVAC PLAN

Scale: 1/2" = 1'-0"

CODED NOTES:

(A) 6"ø EXHAUST DUCT UP TO ROOF AND TERMINATE WITH EXHAUST PORT WINDCAP WITH BIRDSCREEN.

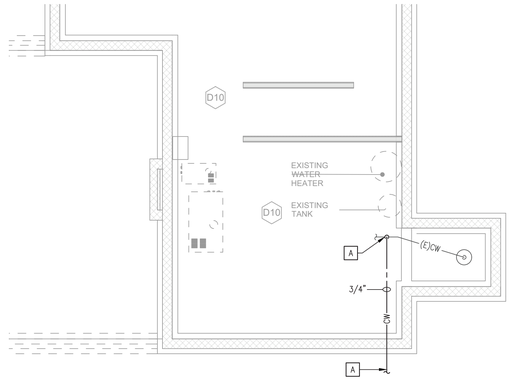


3 TRAIL HEAD RESTROOM PLUMBING PLAN

Scale: 1/2" = 1'-0"

CODED NOTES:

1. 3/4" CW LINE FROM CONNECTION AT EXISTING WELL PUMP.
2. DRAIN PAN TO DRAIN INDIRECTLY INTO MOP SINK.
3. EXTEND 4" SANITARY TO SEPTIC TANK ON NORTHERN SIDE OF EXISTING HOUSE.



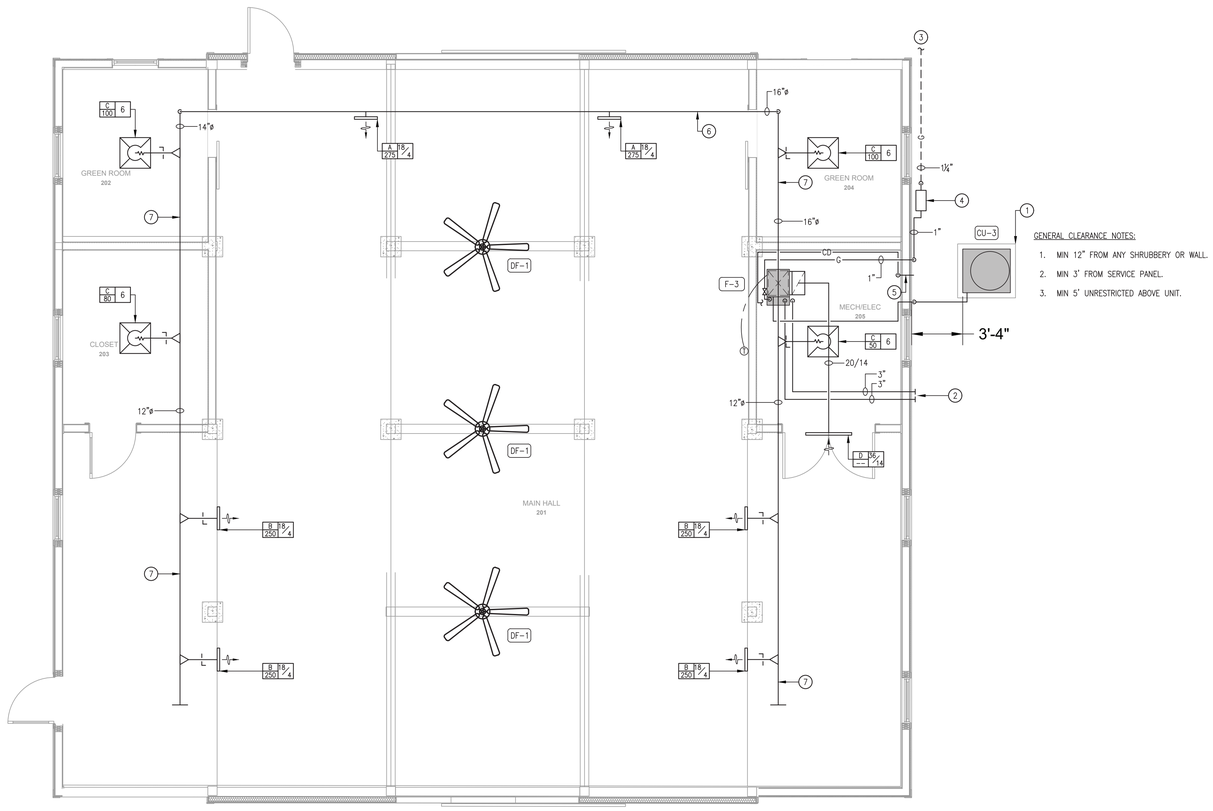
4 PARTIAL HOUSE DEMOLITION PLAN

Scale: 1/4" = 1'-0"

1' 2' 4' 8'

CODED NOTES:

(A) EXTEND 3/4" CW LINE TO TRAIL HEAD RESTROOM AND CONNECT TO EXISTING CW LINE.



1 BARN MECHANICAL PLAN

Scale: 1/4" = 1'-0"

1' 2' 4' 8'

CODED NOTES:

1. SET CONDENSING UNIT ON 4" CONCRETE PAD.
2. DIRECT VENT FURNACE FLUE AND INTAKE.
3. NEW NATURAL GAS SERVICE LINE FROM SITE.
4. PROVIDE NEW NATURAL GAS METER SET.
5. 3/4" CONDENSATE PIPE SHALL BE DAYLIGHTED.
6. EXPOSED SPIRAL SEAM DUCT WITH DUCT MOUNTED REGISTERS.
7. SUPPLY AIR DUCT IN CONCEALED SPACE. INSULATE SUPPLY AIR DUCT WITH R-12 DUCT WRAP AND SEAL DUCTS TO CLASS A SMACNA STANDARDS.

2025-05-30 - 1/4" = 1'-0"

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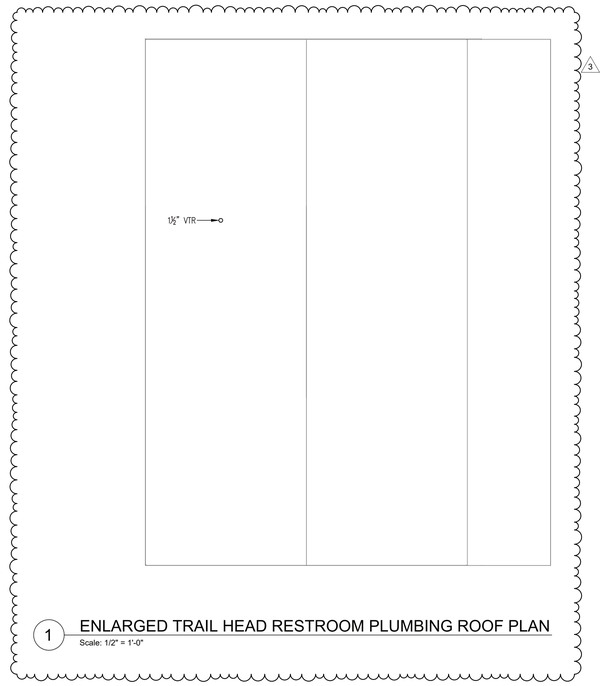
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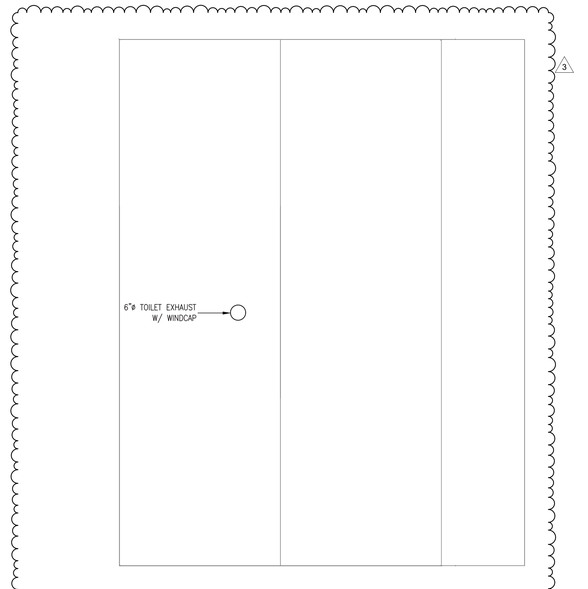
BARN / RESTROOM MECHANICAL PLAN

M11.1

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1 ENLARGED TRAIL HEAD RESTROOM PLUMBING ROOF PLAN
Scale: 1/2" = 1'-0"



2 ENLARGED TRAIL HEAD RESTROOM HVAC ROOF PLAN
Scale: 1/2" = 1'-0"

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RESTROOM ROOF PLANS

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ABBREVIATIONS

Ø	ROUND	LVR	LOUVER
ABV	ABOVE	LWT	LEAVING WATER TEMPERATURE
AC	AIR CONDITIONING	MA	MIXED AIR
AD	AREA DRAIN	MAX	MAXIMUM
ADD	ADDENDUM	MBH	ONE THOUSAND BTU PER HOUR
AFF	ABOVE FINISHED FLOOR	MCF	ONE THOUSAND CUBIC FEET
AFUE	ANNUAL FUEL UTILIZATION EFFICIENCY	MD	MOTORIZED DAMPER
ALT	ALTERNATE	MECH	MECHANICAL
AP	ACCESS PANEL	MFR	MANUFACTURER
ARCH	ARCHITECT/ARCHITECTURAL	MIN	MINIMUM
BFF	BELOW FINISHED FLOOR	MISC	MISCELLANEOUS
BLW	BELOW	MTR	MOTOR
BTU	BRITISH THERMAL UNITS	MU/A	MAKE-UP/AIR
BTUH	BRITISH THERMAL UNITS PER HOUR	NC	NOISE CRITERIA
CAP	CAPACITY	NC	NORMALLY CLOSED
CB	CATCH BASIN	NIC	NOT IN CONTRACT
CFM	CUBIC FEET PER MINUTE	NO	NUMBER
CLG	CEILING	NO	NORMALLY OPEN
CO	CLEAN OUT	NTS	NOT TO SCALE
CW	COLD WATER	O	OXYGEN
D	DEGREE	O/A	OUTSIDE AIR
DB	DRY BULB	ORD	OVERFLOW ROOF DRAIN
DIA	DIAMETER	PD	PRESSURE DROP
DN	DOWN	PIV	POST INDICATOR VALVE
DW	DISTILLED WATER	PLBG	PLUMBING
EA	EACH	PRESS	PRESSURE
EAT	ENTERING AIR TEMPERATURE	PRV	PRESSURE REDUCING VALVE
ELEC	ELECTRICAL	PSI	POUNDS PER SQUARE INCH
EQUIP	EQUIPMENT	PSIG	POUNDS PER SQUARE INCH GAUGE
EWC	ELECTRIC WATER COOLER	PWR	POWER
EWT	ENTERING WATER TEMPERATURE	R	DUCT RISER
E/A	EXHAUST AIR	R/A	RETURN AIR
EXIST	EXISTING	RCP	RADIANT CEILING PANEL
F	DEGREES FAHRENHEIT	RD	ROOF DRAIN
FCO	FLOOR CLEAN OUT	REC	RECESSED
FD	FLOOR DRAIN	RED	REDUCER
FD	FIRE DAMPER	RH	RELATIVE HUMIDITY
FDV	FIRE DEPARTMENT VALVE	RL/A	RELIEF AIR
FL	FLOOR	RM	ROOM
FO	FUEL OIL	RPM	REVOLUTIONS PER MINUTE
FOV	FUEL OIL VENT	RW	RAIN WATER
FOR	FUEL OIL RETURN	SF	SQUARE FOOT
FOS	FUEL OIL SUPPLY	S/A	SUPPLY AIR
FPM	FEET PER MINUTE	SAN	SANITARY
FS	FLOOR SINK	SF	SQUARE FOOT
FT	FOOT/FEET	SD	SMOKE DAMPER
FTR	FIN TUBE RADIATION	SM	SURFACE MOUNT
GAL	GALLON	SP	STANDPIPE
GC	GENERAL CONTRACTOR	SP	STATIC PRESSURE
GPM	GALLONS PER MINUTE	STM	STEAM
GW	GREASE WASTE	T	THERMOSTAT
HB	HOSE BIB	TD	TEMPERATURE DROP
HP	HORSE POWER	TDR	TRENCH DRAIN
HTG	HEATING	TEMP	TEMPERATURE
HTR	HEATER	TYP	TYPICAL
HW	HOT WATER	U/G	UNDERGROUND
HYD	HYDRANT	VAC	VACUUM
ID	INDIRECT	V	VENT
IN	INCH	VAV	VARIABLE AIR VOLUME
INV	INVERT	VENT	VENTILATION
LB	POUND	VTR	VENT THROUGH ROOF
LB/HR	POUNDS PER HOUR	W	WASTE
LAT	LEAVING AIR TEMPERATURE	WB	WET BULB
LP	LOW PRESSURE	WCO	WALL CLEAN OUT
LPG	LIQUEFIED PETROLEUM GAS	WH	WALL HYDRANT

HVAC GENERAL NOTES

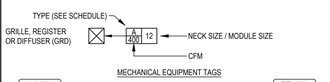
HVAC GENERAL NOTES:

1. ALL MECHANICAL EQUIPMENT AND INSTALLATIONS SHALL CONFORM WITH THE REQUIREMENTS OF THE OHIO BUILDING CODE, OHIO MECHANICAL CODE, OHIO PLUMBING CODE, THE STATE ENERGY CODE, NFPA 90A, 101, AND ALL APPLICABLE CODES AND ORDINANCES.
2. CONTRACTOR SHALL COORDINATE ELECTRICAL CHARACTERISTICS AND REQUIREMENTS OF ALL MECHANICAL EQUIPMENT WITH ELECTRICAL DRAWINGS PRIOR TO ORDERING EQUIPMENT OR SUBMITTING SHOP DRAWINGS, AND SHALL FURNISH EQUIPMENT WIRED FOR THE VOLTAGES SHOWN THEREIN.
3. ALL MECHANICAL EQUIPMENT REQUIRING ELECTRICAL POWER SHALL BE INSTALLED WITH DISCONNECT SWITCHES AT EACH PIECE OF EQUIPMENT. COORDINATE SWITCH TYPE (FUSED OR NON-FUSED) WITH EQUIPMENT CHARACTERISTICS, MANUFACTURER'S RECOMMENDATIONS AND ELECTRICAL DRAWINGS. MECHANICAL CONTRACTOR SHALL PURCHASE ALL DISCONNECTS.
4. ALL REQUIRED CONTROL WIRING NOT SHOWN ON THE ELECTRICAL DRAWINGS SHALL BE INCLUDED AS PART OF THE MECHANICAL WORK.
5. UNLESS NOTED OTHERWISE, STARTERS, SMOKE DETECTORS, TRANSFORMERS, CONTROLS AND CONTROL WIRING REQUIRED FOR ALL MECHANICAL SYSTEMS SHALL BE FURNISHED AND INSTALLED BY THE MECHANICAL CONTRACTOR.
6. ALL MECHANICAL EQUIPMENT SHALL BE INSTALLED ACCORDING TO MANUFACTURER'S RECOMMENDATIONS.
7. DUCT SHALL BE SIZED AT 0.1"/100 FT STATIC PRESSURE DROP WHERE A SIZE IS NOT NOTED ON DRAWINGS. FLEXIBLE DUCTWORK SHALL BE INSTALLED AS STRAIGHT AS POSSIBLE, AND SHALL BE ROUTED AND SUPPORTED WITHOUT FORMING CRIMPS OR OTHER AIR FLOW RESTRICTIONS. PROVIDE SQUARE TO ROUND ADAPTERS OR BOOTS TO CONNECT TO AIR DEVICE NECK WHEN REQUIRED.
8. ROUND AND FLEXIBLE DUCTWORK SHALL BE CONNECTED TO MAIN DUCTS WITH SPIN-IN FITTINGS WITH BALANCING DAMPERS.
9. ALL WORK SHALL BE COORDINATED AND PERFORMED WITH PRIOR APPROVAL FROM THE OWNER TO SUIT HIS OPERATING CONDITIONS.
10. CONTRACTOR SHALL COORDINATE THE INSTALLATION OF ALL MECHANICAL EQUIPMENT, DUCTWORK, ETC. TO FIT WITHIN THE SPACE ALLOWED BY THE ARCHITECTURAL AND STRUCTURAL CONDITIONS. CUTTING OR OTHERWISE ALTERING ANY STRUCTURAL MEMBERS SHALL NOT BE PERMITTED WITHOUT WRITTEN PERMISSION FROM THE ARCHITECT. IN GENERAL, DUCTWORK SHALL BE ROUTED AS HIGH AS POSSIBLE. PROVIDE ALL OFFSETS REQUIRED TO MAINTAIN ARCHITECTURAL CEILING HEIGHTS AND OPEN SPACE CLEARANCES. THIS INCLUDES ANY OFFSETS NOT SPECIFICALLY SHOWN ON THE DRAWINGS. OFFSETS SHOWN ARE DIAGRAMMATIC AND ARE NOT MEANT TO INDICATE THE ONLY OFFSETS REQUIRED.
11. MOUNT THERMOSTATS 4' - 4" AFF UNLESS NOTED OTHERWISE. PROVIDE SPACE TEMPERATURE SENSORS FOR THERMOSTATS LOCATED IN CORRIDORS.
12. LOCATIONS OF GRILLES, REGISTERS, & DIFFUSERS SHOWN ON THE DRAWINGS ARE APPROXIMATE. COORDINATE EXACT LOCATIONS WITH LIGHTS, CEILING GRID, ETC.
13. PROVIDE ACCESS PANELS IN NON-ACCESSIBLE CEILINGS AND IN WALL STRUCTURE TO ALLOW ADEQUATE ROOM FOR MAINTENANCE OF EQUIPMENT AND BALANCING OF SYSTEM.
14. ACCESS DOORS IN CEILINGS/WALLS SHALL BE A MINIMUM OF 12X12, HINGED, AND FIRE RATED TO MATCH CEILING/WALL RATING. DUCT ACCESS DOORS SHALL BE DOUBLE WALL IF INSTALLED ON SUPPLY DUCT, AND PROVIDED WITH THUMB LATCHES FOR AN AIR TIGHT FIT.
15. PROVIDE MVDs AT TAKE-OFFS, WHERE ACCESSIBLE CEILING (LAY-IN) IS PROVIDED, OF RUNOUTS TO DIFFUSERS AND WHERE SHOWN ON PLANS. WHERE BALANCING DAMPERS ARE ALSO PROVIDED AT THE SUPPLY GRILLE/DIFFUSER (SEE SCHEDULE), BALANCE THE SYSTEM WITH THE DAMPER AT THE TAKE-OFF (NOT AT GRILLE). GRILLE DAMPER SHOULD BE 100% OPEN AFTER TEST AND BALANCE.
16. DUCT ROUTING, OFFSETS AND LOCATIONS ARE DIAGRAMMATIC. EXACT LOCATIONS, ELEVATIONS, AND OFFSETS SHALL BE DETERMINED FROM COORDINATION DRAWINGS PRODUCED FROM A COMPOSITE OF ARCHITECTURAL, STRUCTURAL AND OTHER TRADE'S DRAWINGS. ROUTE DUCT HIGH AS POSSIBLE. SEE SPECIFICATIONS FOR COMPLETE MULTI TRADE COORDINATION DRAWING REQUIREMENTS.
17. PROVIDE FIRE DAMPERS AND FIRE/SMOKE DAMPERS IN RATED WALLS AS REQUIRED BY THE OHIO BUILDING CODE AND OHIO MECHANICAL CODE.

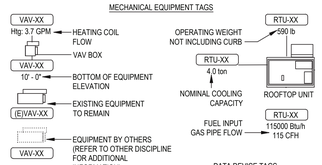
HVAC SYMBOLS

- 16/8 — SQUARE DUCT SIZE TAG (WIDTH x HEIGHT)
- 16/8Ø — OVAL DUCT SIZE TAG (WIDTH / HEIGHT)
- 16"Ø — ROUND DUCT SIZE TAG (DIAMETER)
- (E) — EXISTING DUCT TAG
- DUCT BEING DEMOLISHED
- SA — SUPPLY AIR
- S-OA — CONDITIONED OUTSIDE AIR
- OA — OUTSIDE AIR
- RA — RETURN AIR
- TA — TRANSFER AIR
- EA — EXHAUST AIR
- LA — RELIEF AIR
- G-EXH — GREASE EXHAUST AIR
- S-EXH — SMOKE EXHAUST AIR
- FLUE — EXHAUST GAS FLUE
- CA — COMBUSTION AIR
- DROP — RECTANGULAR SUPPLY/OUTSIDE AIR DUCT RISE
- DROP — ROUND SUPPLY/OUTSIDE AIR DUCT RISE
- DROP — RECTANGULAR RETURN/TRANSFER AIR DUCT RISE
- DROP — ROUND RETURN/TRANSFER AIR DUCT RISE
- DROP — RECTANGULAR EXHAUST/RELIEF AIR DUCT RISE
- DROP — ROUND EXHAUST/RELIEF AIR DUCT RISE

GRILLES, REGISTERS & DIFFUSERS TAG



MECHANICAL EQUIPMENT TAGS



DATA DEVICE TAGS

SYMBOL
EQUIPMENT ID

CARBON DIOXIDE SENSOR	RTU-XX	TEMPERATURE & HUMIDITY SENSOR
CARBON MONOXIDE SENSOR	VAV-XX	TEMPERATURE SENSOR
NITROGEN DIOXIDE SENSOR		THERMOSTAT
HUMIDITY SENSOR		MANUAL SWITCH
HUMIDISTAT		SENSOR

DAMPER TAGS

FIRE DAMPER	F	B	MANUAL BALANCING DAMPER
SMOKE DAMPER	S	D	BACKDRAFT DAMPER
MOTORIZED DAMPER	M	C	COMBINATION FIRE/SMOKE DAMPER

EQUIPMENT ABBREVIATIONS

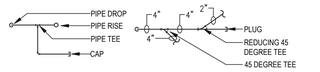
AC	AIR CONDITIONING UNIT	EWH	ELECTRIC WATER HEATER
ACC	AIR COOLED CONDENSER	FCU	FAN COIL UNIT
ACCU	AIR COOLING CONDENSING UNIT	FP	FIRE PUMP
AHU	AIR HANDLING UNIT	GI	GREASE INTERCEPTOR
AS	AIR SEPARATOR	GRV	GRAVITY ROOF VENTILATOR
B	BOILER	HWP	HEATING WATER PUMP
CH	CHILLER	HX	HEAT EXCHANGER
CT	COOLING TOWER	HRU	HEAT RECOVERY UNIT
CUH	CABINET UNIT HEATER	PRV	POWER ROOF VENTILATOR
CWP	CONDENSER WATER PUMP	RE	RETURN/EXHAUST FAN
CHWP	CHILLED WATER PUMP	RTU	ROOFTOP UNIT
DBP	DOMESTIC WATER BOOSTER PUMP	SEP	SEWAGE EJECTOR PUMP
DC	DUCT MOUNTED COIL	SF	SUPPLY FAN
DCP	DOMESTIC WATER CIRCULATING PUMP	SP	SUMP PUMP
EF	EXHAUST FAN	UH	UNIT HEATER
EDC	ELECTRIC DUCT COIL	WH	WATER HEATER
ET	EXPANSION TANK		

* NOTE *

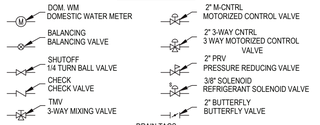
ALL OF GENERAL NOTES ON THIS SHEET ARE TO BE APPLIED TO ALL OTHER DRAWINGS IN THIS SET.THE SYMBOLS AND ABBREVIATIONS SHOWN ON THIS SHEET MAY OR MAY NOT BE USED IN THIS SET OF DRAWINGS.

PLUMBING PIPING SYMBOLS

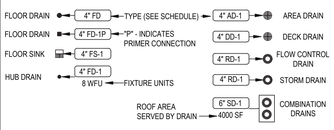
- CW — DOMESTIC COLD WATER
- H-CW — HARD COLD WATER
- S-CW — SOFT COLD WATER
- F-CW — FILTERED COLD WATER
- RO — REVERSE OSMOSIS WATER
- HW — HOT WATER
- HW 140° — HOT WATER 140°
- HWR — HOT WATER RECIRCULATION
- HWR 140° — HOT WATER RECIRCULATION 140°
- GV — GREASE VENT
- GW — GREASE WASTE
- IW — INDIRECT WASTE
- OV — OIL VENT
- OW — OIL WASTE
- PD — PUMP DISCHARGE
- V — SANITARY VENT
- SS — SANITARY SEWER
- SHWR — SOLAR HOT WATER RETURN
- SHWS — SOLAR HOT WATER SUPPLY
- SD — STORM DRAINAGE
- OSD — OVERFLOW STORM DRAINAGE
- CD — CONDENSATE DRAINAGE
- G — NATURAL GAS
- PG — PROPANE GAS
- CWV — COMBINATION WASTE & VENT
- CA — COMPRESSED AIR



PIPE ACCESSORY TAGS



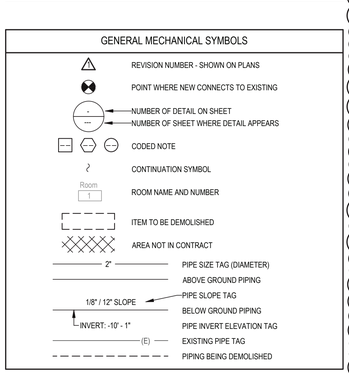
DRAIN TAGS



PLUMBING FIXTURE TAGS



GENERAL MECHANICAL SYMBOLS



FURNACE AND CONDENSING UNIT SCHEDULE

MARK	SERVICE	INDOOR													OUTDOOR					REMARKS
		FAN				COOLING			HEATING			ELECTRICAL			MANUFACTURER MODEL		ELECTRICAL			MANUFACTURER MODEL	
		CFM	OA	ESP	HP	TOTAL	SENSIBLE	SEER2	INPUT MBH	OUTPUT MBH	EFFICIENCY	VOLTAGE	MCA	MOCP			VOLTAGE	MCA	MOCP		
F-3	BARN	1,875	N/A	0.5	1	53,509	42,365	15.2	100.0	96.0	96%	208/230	14.4	15	TRANE S9X2C100U 5PSB	CU-3	208/230	43	60	TRANE 5TTR7060A1	1-6.

NOTE: EQUIVALENT UNITS BY CARRIER, LENNOX, YORK.

REMARKS:
1. VARIABLE SPEED BLOWER MOTOR.
2. DIRECT VENT APPLIANCE WITH CPVC VENT.
3. TWO STAGE HEATING.
4. GALVANIZED STEEL CABINET.
5. SELF-DIAGNOSTIC INTEGRATED FURNACE CONTROL BOARD.
6. 3" FLUE AND COMBUSTION AIR INTAKE.

DESTRATIFICATION FAN SCHEDULE

MARK	LOCATION	BLADE SWEEP	ELECTRICAL	POWER	RPM	MANUFACTURER MODEL	REMARKS
DF-1	BARN	6'	120V-1Ø	18.3W	128 RPM	MINKA AIRE XTREME	1, 2, 3

REMARKS:
1. 5 FT DOWN ROD, OIL RUBBED BRONZE.
2. BRUSHLESS MOTOR.
3. MINKA AIRE WC400 WALL CONTROLLER (1 CONTROLLER FOR ALL 3 FANS). INSTALLED BY THE EC.

GRILLE AND DIFFUSER SCHEDULE

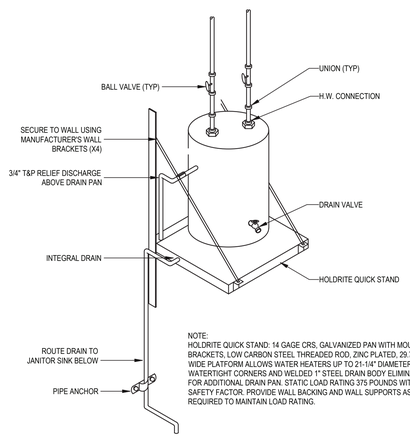
MARK	MANUFACTURER MODEL	DESCRIPTION	DAMPER NUMBER	FRAME/ BORDER	MODULE SIZE	PATTERN	FINISH	REMARKS
A	PRICE SDG	SPIRAL DUCT GRILLE	VCS3 OBD	DUCT MOUNTED	AS NOTED	45° FIXED DEFLECTION	CUSTOM	1.
B	PRICE 520	LOUVERED SUPPLY GRILLE	VCS3 OBD	SURFACE	AS NOTED	22° FIXED DEFLECTION	CUSTOM	2.
C	PRICE SPD	SQUARE FLAT PLAQUE DIFFUSER	VCR7 OBD	SURFACE	AS NOTED	4 - WAY	WHITE	--
D	PRICE 530	FIXED, LOUVERED EXHAUST GRILLE	VCS3 OBD	SURFACE	AS NOTED	3/4", FIXED 45 DEFLECTION	CUSTOM	--

REMARKS:
1. AIR SCOOP DAMPER.
2. FACE OPERATOR FOR DAMPER.

FLOOR DRAIN SCHEDULE

MARK	TYPE	MANUFACTURER	MODEL	MATERIAL DESCRIPTION		SAN	VENT	DESCRIPTION
				DRAIN BODY	STRAINER			
FD-1	FLOOR DRAIN	WATTS	FD-100-A	EPOXY COATED CAST IRON	NICKEL BRONZE	3"	1-1/2"	ANCHOR FLANGE. REVERSIBLE CLAMPING COLLAR WITH PRIMARY AND SECONDARY WEEP HOLES, ADJUSTABLE ROUND HEEL PROOF STRAINER. PROVIDE TRAP SEAL INSERT.

NOTE: EQUIVALENT BY JRSMITH, ZURN, MIFAB.



NOTE:
HOLDRITE QUICK STAND: 14 GAGE CRS, GALVANIZED PAN WITH MOUNTING BRACKETS. LOW CARBON STEEL THREADED ROD, ZINC PLATED, 29.75" LONG. WIDE PLATFORM ALLOWS WATER HEATERS UP TO 21-1/4" DIAMETER. WATERTIGHT CORNERS AND WELDED 1" STEEL DRAIN BODY ELIMINATE NEED FOR ADDITIONAL DRAIN PAN. STATIC LOAD RATING 375 POUNDS WITH 2X SAFETY FACTOR. PROVIDE WALL BACKING AND WALL SUPPORTS AS REQUIRED TO MAINTAIN LOAD RATING.

1 TRAIL HEAD RESTROOM ELECTRIC WATER HEATER HANGING DETAIL
Scale: NTS

ELECTRIC WATER HEATER SCHEDULE

MARK	SERVICE	TYPE	STORAGE		ELEMENTS				WEIGHT	ELECTRICAL				MANUFACTURER MODEL	REMARKS
			RECOVERY	VOLUME	NUMBER	EACH KW	TOTAL KW	SIMUL Y / N		VOLTAGE	FLA	MCA	MOCP		
EWH-1	TRAIL TOILET MECHANICAL ROOM	TANK	11.7 GPH	10	1	2.0	2.0	N	124	120V 1Ø	16.7	--	--	A O SMITH EJC-10	1-4.

NOTE: EQUIVALENT BY BRADFORD WHITE, STATE, RHEEM.

REMARKS:
1. SINGLE ELEMENT, ELECTRIC WATER HEATER WITH FACTORY T&P.
2. RECOVERY BASED ON 70°F TEMPERATURE RISE.
3. SET WATER HEATER TO 125°F MAINTENANCE TEMPERATURE.
4. PROVIDE HOLDRITE WATER HEATER SUPPORT AND DRAIN PAN.

EXHAUST FAN SCHEDULE

MARK	SERVICE	CFM	S.P.	RPM	ELECTRICAL			MANUFACTURER MODEL	REMARKS
					VOLTAGE	HP	POWER		
EF-1	TRAIL TOILET ROOM	70	0.375	838	115	-	23.3W	GREENHECK SP-A50-90-VG	1-3.

NOTE: EQUIVALENT BY COOK, TWIN-CITY FANS.

REMARKS:
1. DIRECT DRIVE, PREMIUM EC MOTOR.
2. 0.29 FLA, FAN ENERGIZES WITH LIGHT SWITCH.
3. GALVANIZED STEEL HOUSING AND GRILLE, WHITE.

ELECTRIC UNIT HEATER SCHEDULE

MARK	AREA SERVED	CFM	LAT	ELECTRIC		MANUFACTURER MODEL	REMARKS
				KW	VOLT / PH		
UH-1	TRAIL TOILET ROOM	--	--	3	240/1	MARKEL HF3380D-RP	1, 2, 3.
UH-2	TRAIL TOILET MECHANICAL ROOM	--	--	1.5	120/1	MARKEL E3383D-RP	1, 2, 3.

NOTE: EQUIVALENT BY QMARK, INDEECO.

REMARKS:
1. INTEGRAL TAMPER-PROOF THERMOSTAT.
2. 18 GAUGE STEEL GRILLE, WHITE POWDER COAT.
3. RECESS MOUNT BETWEEN JOISTS.

FIXTURE CONNECTION SCHEDULE

MARK	FIXTURE	SUPPLIES		WASTE		REMARKS
		HW	CW	SAN	VENT	
P-1 / P-1A	WATER CLOSET FLUSH TANK	--	1/2"	4"	2"	--
P-2 / P-2A	LAVATORY WALL MOUNT	1/2"	1/2"	1-1/2"	1-1/4"	--
P-3	BI-LEVEL WATER COOLER	--	3/8"	1-1/2"	1-1/4"	--
P-4	MOP SINK	1/2"	1/2"	3"	1-1/2"	--
P-5	FROST-PROOF HOSE BIB	--	3/4"	--	--	--

FIXTURE SPECIFICATIONS

P-1/P-1A WATER CLOSET, FLUSH TANK: AMERICAN STANDARD CADET PRO RIGHT HEIGHT 215AA.105.020, 16-1/2" HIGH TOILET, VITREOUS CHINA, FLOOR MOUNTED, 1.28 GPF, ELONGATED BOWL, SIPHON JET, TWO-PIECE GRAVITY FLUSH TANK. AMERICAN STANDARD #5910.110.020, 'COMMERCIAL', EXTRA HEAVY-DUTY TOILET SEAT, WHITE FINISH SOLID POLYPROPYLENE PLASTIC WITH EVERCLEAN SURFACE, OPEN FRONT LESS COVER. MCGUIRE LFH1660 TOILET SUPPLY ANGLE STOP, CHROME PLATED FINISH, ESCUTCHEON AND FLEXIBLE COPPER RISER. PROVIDE FLOOR FLANGE WITH ALL BRASS BOLTS AND WITH RUBBER GASKET. PROVIDE TANK WITH TANK COVER LOCKING DEVICE.

P-2/P-2A LAVATORY, WALL HUNG: AMERICAN STANDARD #0355.012.020 'LUCERNE' BASIN, WHITE FINISH. AMERICAN STANDARD #6114116.002, 'MONTERREY', SINGLE HANDLE FAUCET. POWERS #LFE480, POWERS #LFE480-00, ASSE 1070, POINT OF USE THERMOSTATIC MIXING VALVE. MCGUIRE #LFH170BV, CHROME POLISHED BRASS FAUCET SUPPLIES, #155WC OFFSET OPEN GRID DRAIN AND 'PROWRAP' #PW2000WC SANITARY COVERING. #8872CB P-TRAP WITH CLEAN-OUT. PROVIDE FLOOR MOUNTED FIXTURE CARRIER WITH CONCEALED ARMS. PROVIDE BRAIDED STAINLESS STEEL FLEXIBLE SUPPLIES TO AS REQUIRED FOR INSTALLATION. MOUNT AT ACCESSIBLE ADA HEIGHT.

P-3 WATER COOLER, BI-LEVEL: ELKAY #LK4409BF, OUTDOOR WALL MOUNT BI-LEVEL WATER COOLER, VANDAL RESISTANT, NON-REFRIGERATED, NON-FILTERED. FINISH SELECTED BY OWNER / ARCHITECT. PROVIDE MCGUIRE #LFHST02LK, CHROME POLISHED BRASS DRINKING FOUNTAIN SUPPLY AND #8872CB, CHROME POLISHED BRASS P-TRAP.

P-4 MOP SINK: FIAT MODEL MSB2424 MOLDED STONE, 24" x 24" x 10" WITH 3" STAINLESS STEEL DRAIN BODY, 24" STAINLESS STEEL BUMPER GUARDS. FAUCET: CHICAGO 897-RCF WALL-MOUNTED MANUAL SINK FAUCET WITH 8" CENTERS, CERAMIC DISC CARTRIDGES, VACUUM BREAKER, INTEGRAL CHECKS AND SERVICE STOPS, WALL ESCUTCHEONS.

P-5 FROST PROOF HOSE BIB: WATTS HY-725 CONCEALED NON-FREEZE KEY OPERATED WALL HYDRANT WITH NICKEL BRONZE BOX AND DOOR, CHROME PLATED HYDRANT FACE, INTEGRAL VACUUM BREAKER, 3/4" HOSE CONNECTION, 3/4" FEMALE X 1" MALE PIPE CONNECTION, ALL BRONZE HEAD, SEAT CASTING AND INTERNAL WORKING PARTS, BRONZE WALL CASING, AND LOOSE KEY. COMPLIES WITH ASME B1.20.7 AND ASSE 1019-2004. UPC/IAMPO LISTED.

NOTE: EQUIVALENT UNITS BY KOHLER, CRANE, ELKAY, MOEN, CHICAGO, DELTA.

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BATH TOWNSHIP

NORTH FORK PRESERVE BARN RENOVATION

4400 EVERETT ROAD, AKRON, OH 44333

N

PROJECT #: 2324

ISSUE:
BID SET 07-28-2025

MECHANICAL LEGENDS AND SCHEDULES

M12.1

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2025-05-00 - 1/4" = 1'-0"

ELECTRICAL SPECIFICATIONS

SECTION 16010

PART 1 – GENERAL

1.01 GENERAL

A. The provisions of the Instructions to Bidders, General Conditions, Supplementary Conditions, Alternates, Addenda, and Division 1 are a part of this Specification. A requirement occurring in one is as binding as though occurring in all. They are intended to be complementary and to describe and provide for a complete work. Contractors and Sub-contractors shall examine same as well as other Divisions of the Specifications which affect work under this Division.

B. Material or labor which is not indicated on the Drawings or Specifications, but which is obviously necessary to complete the work (and is usually included in similar work), shall be provided. Drawings and Specifications are to be considered as supplementing each other. Work specified but not indicated, or indicated but not specified, shall be provided as though mentioned in both Specifications and Drawings.

C. These Specifications establish quality standards of materials and equipment to be provided. Specific items are identified by Manufacturer, Trade Name or Catalog Designation. The Contractor shall submit his base bid price based upon specified equipment described herein and as detailed on drawings and associated contract documents

D. Definitions

1. "Contractor" as used within the Electrical Specifications shall refer to the Electrical Contractor.

2. "Equal" or "Equivalent" shall be understood to mean of the same quantity, size, number, value, degree, intensity and the items are similar in all respects. The Engineer will make the final decision of acceptance of these items.

3. "Contract Documents" shall be understood to encompass drawings and specifications for architectural, structural, civil, mechanical, electrical and all other pertinent disciplines.

4. "Provide" shall be interpreted to mean the Contractor shall furnish all labor, materials, equipment and supplies including tests and inspections necessary to install, connect, apply, erect, construct, and place in operating condition.

5. "Furnish" shall be interpreted to mean the Contractor shall supply and deliver to the job site specified material, equipment, and supplies.

6. "Install" shall be interpreted to mean assembling, placing, erecting, wiring and to make fully operational.

E. The Contractor shall furnish all materials and do all work in accordance with these specifications, and any supplementary documents provided by the Architect. The work shall include everything shown on the drawings and/or required by the specifications as interpreted by the Architect, regardless of where such information is indicated (Architectural, HVAC, Plumbing, Fire Protection, etc.). All work and materials furnished and installed shall be new and of the best quality and workmanship. The Contractor shall cooperate with the Architect so that no error or discrepancy in the Contract Documents shall cause defective materials to be used or poor workmanship to be performed.

F. Visit the site of the work and become familiar with conditions affecting the installation. The contractor shall ascertain the location of existing structures, utilities, equipment, etc. that may affect contract work and advise the engineer no later than five (5) working days prior to bid due date. Submission of a proposal shall presuppose knowledge of such conditions and no additional compensation shall be allowed where extra labor or materials are required because of ignorance of these conditions.

G. The contractor shall advise the architect and/or engineer of any code violations occurring in the Contract Documents prior to award of contract. In case of conflict between the Contract Documents and the requirements of any Code or Authorities having jurisdiction, the most stringent requirements of the aforementioned shall govern.

1.02 WORK INCLUDES

A. Include all labor, material, equipment, services, permits and certificates of inspection necessary for the proper completion of all electrical work. Items omitted, but necessary to make the electrical system complete and workable, shall be understood to form part of the work.

B. It is the purpose of the Electrical Drawings to indicate the approximate location of all equipment, outlets, etc. Ascertain exact locations and arrange work accordingly. The right is reserved to effect reasonable changes in the location of outlets up to the time of roughing-in with out additional cost to the Owner. Changes in location of outlets or equipment necessitated by interference with the work of other trades shall be made only with the consent of the Architect's or Owner's representative and at no additional cost.

C. Work shall include, but not be limited to, the following general systems and equipment:

Lighting and controls
Power and lighting conduit/wiring
Receptacles
Panelboards
Disconnect switches
Fire alarm system
New utility service and power distribution system
Extension/modification of the existing power distribution system
Temporary lighting and power distribution equipment for construction
Telecommunications conduit system complete with pull wires
Connections to Owner furnished equipment

D. All materials and workmanship shall comply with all applicable Codes, Specifications, Local and State Ordinances, Industry Standards, and Utility Company regulations and latest editions. In case of difference between Building Codes, State Laws, Local Ordinances, and the Contract Documents, the Contractor shall promptly notify the Architect in writing of any such difference.

E. The Electrical Design is based on the National Electrical Code. Work shall be installed in accordance with the provisions of the code as interpreted by the local board having jurisdiction, as well as any further modifications or regulations of local or state authorities. The Contractor shall include in his bid the cost of providing materials and equipment necessary to satisfy local or regional codes.

F. Provisions of the latest revisions to the Federal Occupational Safety and Health Act (OSHA) shall be satisfied.

G. Secure and pay for all permits and inspections required electrical work. Turn over all certificates of approval, by governing agencies, to the Architect for transmittal to Owner before payment is made for the work.

H. Give the proper authorities notices as required by law relative to the work in his charge. Comply with the regulations regarding temporary enclosures, obstructions or excavations and pay all legal fees involved.

I. The Electrical Contractor shall provide temporary electrical services adequate in size and characteristics, for use by all trades on site during project construction.

1.03 TESTS & DEMONSTRATION OF SYSTEMS

A. After installation but prior to energization, perform tests for grounds, short circuits and proper function. Faults in the installation shall be corrected.

B. Insulation resistance tests shall be made on the electrical system with not less than 1000V D.C. for 30 seconds using an approved megohmeter (Biddle Megger or equal). Also, complete resistance/continuity tests on the grounding system.

C. The Contractor shall torque down all accessible bolts and perform rotation tests for all distribution and utilization equipment

D. At each test site, the Contractor shall provide any test control power necessary to perform these tests.

E. Conduct such tests and adjustments of the equipment as required by the Architect as necessary to verify performance requirements. Submit data to the Architect.

F. Before final payment, demonstrate to the Owner's satisfaction the proper operation of each of the systems comprising this Contract.

G. Instruct the Owner's maintenance personnel in the operation and maintenance of all electrical equipment and controls.

1.04 CLEANING AND FINISHING

A. After all tests have been completed, clean all equipment leaving everything in working order at the completion of this work.

B. All debris created by the execution of this work shall be removed.

1.05 CUTTING, PATCHING AND PAINTING

A. Avoid cutting into the work of others by using sleeves, inserts, chases and similar items necessary for the installation.

B. Except where otherwise specified or noted on drawings, do all cutting and patching of the building as required to install sleeves, inserts, conduits and electrical equipment. Patching shall be done by mechanics skilled in the various trades. Work shall match the general construction work. All cutting shall be done in a manner to retain the structural integrity of the unit being cut. Where existing equipment is removed or relocated, patch to match the existing building finishes (walls, ceilings, floors, etc.).

C. Painting shall be provided under other Divisions of this Specification unless otherwise specified.

1.06 COORDINATION WITH OTHER TRADES

A. The Contract Drawings are diagrammatic only intending to show general runs and locations of conduit, equipment, terminals and specialties and not necessarily showing all required offsets, details and accessories and equipment to be connected. Take all field measurements necessary and assume responsibility for their accuracy. All work shall be accurately laid out with other Trades to avoid conflicts and to obtain a neat and workmanlike installation that will afford maximum accessibility for operation, maintenance and headroom.

B. Keep fully informed of the progress of the general construction. Install work that is to be concealed within the building construction in sufficient time to secure proper location without delay to the work of other trades. All conduit and outlet boxes concealed in masonry construction shall be installed during wall construction. Attend electrical work during the progress of building-in to prevent misalignments and damages to the electrical work.

C. The Contractor shall be responsible for coordinating with other trades (mechanical, plumbing, etc.), and shall verify any equipment and device voltage, phase and ampacity specifications. They shall furnish and install all necessary wiring, protective devices, etc., as recommended by the manufacturer and as required for the correct and proper operation of the installed equipment.

D. Examine the work of other trades when their work comes in contact with or is covered by this work. Do not attach to, cover up, or finish against any defective work, or install work in a manner which will prevent proper installation of the work of other trades.

E. All outlets, switches and receptacles shall be centered with regard to paneling, trim equipment, etc., and shall line up with either bottom or top of masonry courses.

F. Locate all electrical equipment, devices, equipment, etc. in the field in conjunction with drawings and building engineer. Coordinate routing of all feeders, conduit runs, pullboxes, etc. to avoid conflicts with existing ductwork, plumbing, and structural components.

1.07 GUARANTEE AND WORKMANSHIP

A. All materials and workmanship provided under the contract shall carry the standard warranty against all defects in material and workmanship. Any fault due to defective or improper material, equipment, workmanship or design which may develop shall be made good, forthwith, by and at the expense of the Contractor for the work under his Contract, including all other damage done to areas, materials and other systems resulting from this failure.

B. Manufacturers shall provide their standard guarantees for work under the Electrical Trades. However, such guarantees shall be in addition to and not in lieu of all other liabilities that the manufacturer and the Contractor may have by law or by other provisions of the Contract Documents

C. Workmanship shall be in accordance with the best practices of the trade. Journeymen electricians under the supervision of a competent foreman shall install electrical work

1.08 SUBMITTALS

A. Submit drawings and wiring diagrams in accordance with Division 1 on all items of equipment provided for review by the Engineer. These shall include, but not be limited to, the following:

Lighting and controls
Disconnect switches
Panelboards and transformer
Fire alarm devices

B. The submittals will be reviewed only for general compliance and not for dimensions, quantities, etc. The submittals that are returned shall be used for procurement. The responsibility of correct procurement remains solely with the Contractor. The submittal review shall not relieve the Contractor of responsibility for errors or omissions and deviations from the contract requirements.

C. The Contractor shall insure submittals bear the Contractors' dated approval stamp and indicate all options. If the submittal shows variations from the requirements of the contract documents, for any reason, the Contractor shall make specific mention of such variation in his letter of transmittal. The Contractor shall note in red on the submittal any change in design or dimension on the item submitted including changes made by the manufacturer that may differ from catalog information.

D. Acceptance or rejection of the proposed substitutions shall be subject to approval by the Architect and Engineer. If requested, the Contractor shall submit (at their cost) inspection samples of both the specified and the proposed substitute items for review by the Engineer.

E. Contractor further agrees that if deviations, discrepancies, or conflicts between shop drawing submittals and the contract documents in the form of design drawings and specifications are discovered either prior to or after shop drawing submittals are processed by the Engineer, the design drawings and specifications shall control and shall be followed.

1.09 RECORD DRAWINGS

A. Each Contractor or Sub-contractor for Electrical work shall keep one complete set of the contract working drawings on the job site on which he shall record any deviations or changes from such contract drawings made during construction.

B. These Drawings shall be kept clean and undamaged, and shall not be used for any purpose other than recording deviations from working drawings and exact locations of concealed work.

1.10 LAYOUT DRAWINGS

A. Layouts for conduit runs, floor holes and sleeves must be made to coordinate with the General Contractor, Mechanical Contractors, Plumbing Contractor and all other trades and reviewed by the Architect.

1.11 OPERATING, MAINTENANCE AND SERVICE MANUALS

A. The Contractor shall thoroughly instruct the representative of the Owner, to the complete satisfaction of the Architect, in the proper operation of all systems and equipment provided by him. The Contractor shall make arrangements, via the Architect, as to whom the instructions are to be given in the operation of the basic and auxiliary systems and the period of time in which they are to be given. The Architect shall be completely satisfied that the representative of the Owner has been thoroughly and completely instructed in the proper operation of all systems and equipment before final payment is made. If the Architect determines that complete and thorough instructions have not been given by the Contractor to the Owner's representative, then the Contractor shall be directed by the Architect to provide whatever instructions are necessary until the intent of this paragraph of the specification has been complied with.

B. Deliver to the Owner all keys, special tools and appurtenances for proper operation and maintenance of the equipment. Provide complete bound set of operating and maintenance instructions for all electrical equipment and controls.

PART 2 – PRODUCTS

2.01 EQUIPMENT AND MATERIALS

A. Equipment and materials used on this job shall be new, U.L. labeled, and O.S.H.A. approved.

B. Equipment and materials shall be protected and be the responsibility of this Contractor until formally accepted by the Owner.

C. Material and equipment built into the work for which examination service is provided shall bear the Underwriter's Label.

D. Materials and equipment provided under this Contract shall be new and of the quality herein specified. Each class of materials shall be of the same type and make throughout the building.

E. All manufacturers of electrical equipment shall demonstrate to the satisfaction of the Contractor and Engineer that their equipment will function properly under the conditions of use as indicated on the drawings and as specified herein. Dimensions, weights, operating characteristics and all other related appurtenances should be verified before submittal of shop drawings.

F. All equipment of one type (such as cable, panelboards, wiring devices, etc.) shall be the product of one manufacturer.

G. Fire Stopping

1. In addition to the requirements specified herein, refer to Division 1 Specifications for fire stopping guidelines.

2. All openings in fire rated floors, shafts, and walls accommodating penetrating items such as cables, conduits, raceways, cable trays, or busways shall be fire stopped.

a. Provide fire stopping for steel electrical outlet boxes that exceed 16 square inches in area and/or when the aggregate surface of the boxes exceeds 100 square inches in any 100 square foot of wall area. In addition, provide fire stopping for steel electrical outlet boxes on opposite sides of the wall that are not separated by a horizontal distance of 24 inches.

b. Provide fire stopping where a penetration occurs through a structural floor or roof and a space would otherwise remain open between the surface of the penetration and the edge of the adjoining structural floor or roof.

c. Provide fire stopping to completely fill spaces around penetrations where penetrations occur at fire rated shafts and walls of hollow-type construction.

3. The installation of fire stopping materials shall conform to the latest Fire Resistance Directory as published by U.L.

4. Fire stopping shall be performed by a contractor trained or approved by the fire stopping manufacturer. Equipment used shall be in accordance with the fire stopping manufacturer's written installation instructions.

5. Acceptable Manufacturers: Specified Technologies, Inc.; Tremco, Inc.; 3M; and Hilti.

PART 3 – EXECUTION

3.01 EQUIPMENT CONNECTIONS

A. Serve and connect equipment being installed during the construction period, but provide facilities only for serving equipment that will be moved in, set and connected later by the Owner. Provide cords and caps where required and fusetron fuses in switches left for future equipment connections.

3.02 SERVICE SHUTDOWNS

A. Prior to any isolation of systems, shutdowns or demolition the Contractor shall provide necessary investigation and notify the Facilities Engineering/Maintenance personnel of work to be performed so as to avoid any detrimental shutdown of systems to adjacent spaces.

B. Maintain existing electrical systems in service until the new systems are complete and ready for service. Disable the systems only to make switchovers and connections. Any service shutdowns that may be required shall be scheduled with and approved by the Owner. All shutdowns shall be scheduled with and approved by the Owner. A minimum of a one-week notice shall be given prior to any service shutdown. No additional compensation shall be allowed for these shutdown periods even though overtime work may be required.

END OF SECTION

SECTION 16020 – ELECTRICAL DEMOLITION

PART 1 – GENERAL

1.01 WORK INCLUDES

A. The information indicated on the Demolition Drawings is a composite of information obtained from readily observable field conditions and/or existing drawings. The Demolition Drawings may not show every existing receptacle, luminaire, switch, conduit, etc and shall therefor be considered diagrammatic. Field verification of all existing devices and systems will be required to be made by the Contractor prior to commencement of work. Note that electrical or electronic circuit tracers were not used to verify these plans.

B. Include all costs and labor, materials, equipment, services, and permits necessary for completion of the demolition work. Provide protection for all personnel and adjacent areas before, during, and after execution of the demolition work.

C. Electrical equipment indicated on the Demolition Drawings is shown to indicate the extent of demolition only, and is not intended to be a record drawing of the existing conditions. The Drawings and Specifications establish the minimum standards for workmanship and materials.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Provide materials and equipment for completion of the demolition work as described within the Specifications and on the Drawings.

PART 3 – EXECUTION

3.01 GENERAL DEMOLITION WORK

A. The Contractor shall remove and/or relocate all of the existing electrical work made necessary because of project alterations as indicated or implied on the Contract Documents of all trades. All existing electrical equipment and systems not affected by these changes shall remain and shall be protected whether shown on the Drawings or not. The Contractor shall maintain existing circuit continuity as described in the Specifications and on the Drawings, or as required for continued operation of the electrical equipment and systems.

B. Where required, resupport existing conduits and cabling above ceilings being removed. Electrically disconnect equipment to be removed at the point of power supply. Remove conduit and wiring from equipment to be removed complete to the point of power supply. Existing panelboards being modified/utilized shall be provided with new typewritten directories to reflect any changes made through this demolition.

C. All wiring (Branch Circuit, Fire alarm, etc.) that is to be demolished shall be removed completely back to source including all conduit, supports, conductors, etc. Do not abandon any materials above ceilings or in walls. The associated circuit breakers shall be turned off and marked as spare if not reused for the new construction.

D. Where building systems or circuits are interrupted because of the demolition work, they shall be rerouted or relocated, modified and reconnected to provide a continuous system.

E. All cutting, patching, finishing, etc., for removal and relocating electrical equipment shall be included as part of the Electrical Work unless otherwise noted. All damage caused by the demolition work shall be properly patched with suitable materials to match existing surfaces. All abandoned electrical conduits or other openings made by removal of existing electrical components shall be fire stopped with approved U.L. rated mineral wool and/or fire caulk. U.L. approved fire stop method/material shall match the existing and/or new rated assembly.

F. All equipment to be salvaged by the Owner shall be carefully removed and securely stored on site by the Contractor for salvage by the Owner. All other materials, equipment and debris shall become the property of the Contractor and shall be removed from the site.

G. Where existing electrical equipment is indicated on the Drawings to remain, the existing wiring shall remain, along with the related conduit system, unless otherwise shown or noted on the Drawings. Clean, repair, and refurbish existing materials and equipment that are to remain.

H. In all cases where existing branch circuit conduit and wiring is to be re-used or extended within the remodeled area, the Contractor shall test for grounding continuity and shall test the existing branch circuit wiring as though new, in accordance with the testing procedures outlined elsewhere n these Specifications.

I. Existing flush outlet boxes may be reused if at proper height, location and in good condition. Existing concealed raceways may be reused if in good condition.

J. Cap existing empty conduits and plug open knockouts in existing electrical equipment.

K. In all existing or new areas specified or shown to be painted, the Contractor shall remove all electrical items as required including but not limited to luminaires, device plates, devices, etc. Reinstall after completion of painting. Any item not removed and painted over shall be suitably cleaned or replaced with a new item by the Contractor.

END OF SECTION

SECTION 16050 – BASIC MATERIALS AND METHODS

PART 1 – GENERAL

1.01 GENERAL

A. Work Includes

Conduits
Wire and Cable
Wiring Devices
Supporting Devices

B. Related Work Specified Elsewhere

Section 16010 – General Electrical Provisions
Section 16060 – Grounding and Bonding

C. Products

1. Material and equipment built into the work for which examination service is provided shall bear the Underwriter's Label.

2. Materials and equipment provided under this Contract shall be new and of the quality herein specified. Each class of materials shall be of the same type and make throughout the building.

PART 2 – PRODUCTS AND EXECUTION

2.01 CONDUITS

A. Materials

1. Conduit shall be rigid galvanized or intermediate grade in exterior masonry walls; masonry walls below grade; concrete floors, walls or slabs; damp or wet locations; or exposed below 8 feet above finished floor. Use P.V.C. in ground applications. All other interior conduits may be EMT or MC as approved by the NEC.

2. Rigid conduit fittings shall be threaded fittings. Rigid conduit couplings and hubs to have no less than five (5) threads of conduit engaged and screwed up tight.

3. All conduits that pass through the roof shall be in pipe portals.

4. All conduits that cross expansion joints shall have expansion seismic couplings.

5. All conduits that are indicated on the drawings to be run exposed on the building roof shall be supplied with pipe roller supports.

6. Exterior underground conduit shall be P.V.C. schedule 40, and must be encased in 6" of concrete under drives or roadways. The transition to rigid conduit must be made before the conduit enters the building.

B. Execution

1. Conduits shall be continuous and be secured to all boxes in a manner that each system shall be electrically continuous from point of service to all outlets. Terminals of all conduits shall be provided with locknuts and bushings. Plug ends of each conduit with an approved cap or disc to prevent the entrance of foreign materials during construction.

2. Conduits run in floor slab or concrete work shall have a minimum of one (1") inch of concrete cover and clean threads.

3. All conduit terminating in sheet steel enclosures shall have double locknuts and a bushing. Locknuts shall be a type which will "bite" into the metal of the box. All bushings shall be of the insulating type.

4. Conduit shall be run concealed in finished areas. The routing of all surface mounted/exposed conduit in finished areas shall be coordinated with, and shall be approved by the architect prior to installation.

5. Where conduits passing through openings are exposed in finished rooms, finishes of filling materials shall match and be flush with adjoining floor, ceiling and wall finishes

6. Conduits shall not be run on the exterior of the building or on the roof unless specifically indicated on the drawings. The routing of such conduits shall be approved by the Architect.

7. Homeruns to panels shall be 3/4" minimum.

8. Conduit in ground floor shall be run under the slab, but may not be run in slag.

9. Exterior underground conduits shall be 30" below grade, minimum.

10. Conduit passing through exterior walls for entry into building and floors below grade shall be made watertight with caulking compound and pipe sleeves with wall collar extending 8" all around the conduit. Collar shall be 1/8" thick steel welded to sleeve. Coordinate material requirements with the Contractor. Underground joints shall be sealed.

11. Where conduits pass through masonry or concrete walls, foundations or floors, the Electrical Contractor shall set such sleeves as are necessary for passage of the conduits. Sleeves shall be of sufficient size to provide air space around the conduit passing through for fireproofing. The Electrical Contractor shall be responsible for the exact location of sleeves provided under his Contract.

12. Conduit supporting systems shall be attached to the deck, slab, or structural framing only and not to any other appurtenances at the ceiling such as mechanical ducts, pipes and suspended ceiling hanger wires or framing members.

13. Conduits or other raceway systems that penetrate fire or smoke rated walls, ceilings, decks, partitions, etc. shall be constructed so as to maintain the integrity of the fire or smoke rated areas.

14. A separate ground must be run in all P.V.C. conduit. Conduit size shall be increased to accept ground when required. Vertical transitions shall be made with rigid steel ells.

2.02 WIRE AND CABLE

A. Materials

1. Wire and cable for lighting feeders shall be 600 volt type THHN/THWN or XHHW copper. Aluminum wiring is an acceptable alternate for feeders 100 amperes or larger.

2. Wire and cable for power and lighting branch circuits shall be TW/UF copper for #8 and smaller and THHW or XHHW copper for #6 and larger. Wire sizes shall be based on the 60°C ampacities for wire sizes #14 through #1AWG, and 75°C ampacities for wire sizes #1/0 AWG and larger.

3. Minimum wire size for power and lighting circuits shall be #12. Wire sizes #12 and smaller shall be solid. Wire sizes #10 and larger shall be stranded.

4. Where size is not indicated, Conductor size #12 minimum shall be used for circuits less than 120 feet and size #10 minimum shall be used for circuits greater than 120 feet.

5. Joints in #10 and smaller wire shall be made with Minnesota Mining and Manufacturing Co. insulated "Scotch Locks", Ideal Co. "Wing_Nut", T & B Co. "Piggy" connectors, or with mechanically crimped sleeves as manufactured by T & B Co., or Ideal Co. Connector sleeves shall be insulated with pressure sensitive electrical tape equal to Minnesota Mining and Manufacturing Co. Scotch No. 33 "plus" or Raychem Corp. heat shrinkable tape.

6. Joints in #8 and larger shall be made with pressure type mechanical connectors and insulated with electrical tape to 150% of the insulating value of the conductor insulation.

7. Color code wire and cable for circuits as called for in the National Electric Code.

8. All mechanical wire & cable terminations shall be torque-tightened with torque wrench or torque screwdriver to manufacturer's recommended torque values.

2.03 WIRING DEVICES

A. Materials

1. Local light switches shall be back and side wired, 20 ampere, 120/277 volts, AC Specification Grade. The following manufacturers indicated are acceptable: Hubbell, Legrand, Leviton, Bryant.

2. Convenience outlets for 120 volt general use shall be duplex 20 ampere, 125 volt, 3 wire, grounding type. The top shall be of high impact thermoplastic such as nylon. The strap shall be heavy duty steel that wraps around the device. Ground contacts shall be brass and riveted to the strap. Automatic ground clip shall be provided. Manufacturers and their catalog numbers listed are acceptable.

Hubbell	Legrand	Leviton	Bryant
5362	5362	5362	5362

3. All switch and convenience outlet plates shall be smooth finish, UV-resistant thermoplastic material such as nylon to suit outlets provided. To insure uniform color, plates and devices shall be of one manufacturer. In unfinished areas, use of cadmium plated round corner steel cover plates is permitted.

4. All 15– and 20–ampere, 120–volt nonlocking type receptacles in the areas specified in NEC 406.12(1) through (7) shall be listed tamper resistant.

5. Ground fault circuit interrupter (G.F.C.I.) receptacles, where required by local code, shall be Hubbell #AFGF15TR.

6. Weatherproof receptacles shall be Hubbell #HBL5262WR duplex outlet with Hubbell #HBL5221 polycarbonate gray plate, box mount.

B. Execution

1. Provide receptacles and switches as indicated. Colors of device and plates shall be selected by the Architect. Verify before installation.

2. Adjacent devices shall be mounted in ganged boxes.

3. Junction boxes shall not be installed above gypboard ceilings, due to inaccessibility.

2.04 DISCONNECT SWITCHES

A. Disconnect switches, unfused or fused, single throw, shall be installed where indicated on the Drawings and/or where required by Code. Switches shall be heavy duty for indoors or outdoors as required and manufactured by Square D, General Electric, Siemens or Cutler–Hammer.

B. If double lugging or oversized wires are required, provide a wireway or splice box.

C. The means of disconnect/control for all equipment and disconnects shall be installed in a readily accessible location and shall have proper working space as defined in NEC Article 100 and 110.

2.05 SUPPORTING DEVICES

A. All hardware, supports, hangers, angle iron, channels, rods, clamps necessary to install electrical equipment and lighting fixtures shall be supplied to suit conditions and application. The use of perforated straps will not be permitted.

B. Supporting devices shall be galvanized or aluminum material.

2.06 EQUIPMENT MOUNTING

A. All equipment mounted on exterior walls shall be attached to 3/4" plywood boards furred out 1" from wall. Provide painting of plywood boards _ finish as selected by the Architect.

2.07 EXCAVATION, CONCRETE AND BACKFILL

A. Provide all excavation, concrete and backfill required for electrical work exclusively. All concrete work shall be in accordance with the requirements of The State of Ohio.

2.08 PADS, FOUNDATIONS AND ENCLOSURES

A. Provide pads, foundations, and enclosures required for electrical equipment. All floor mounted or exterior equipment is to be on 4" concrete pads unless otherwise indicated.

B. Exterior concrete shall be thourosealed.

C. Pads for Utility Company transformers: follow Utility Company requirements.

END OF SECTION

SECTION 16400 – SERVICE AND DISTRIBUTION

PART 1 – GENERAL

1.01 GENERAL

A. Work Includes:

Grounding
Branch Circuit Panelboards
Transformers

B. Related Work Specified Elsewhere

Section 16010 – General Electrical Provisions
Section 16050 – Basic Electrical Materials and Methods
Section 16400 – Power Distribution Equipment

1.02 GROUNDING

A. Ground all conduits, cabinets, motors, panels and other exposed non–current carrying metal parts of electrical equipment in accordance with all provisions of the National Electric Code and local codes.

B. Ground all conduits by means of grounding bushings on terminations at panelboards with an installed #12 conductor to grounding bus

C. The preferred method of grounding to earth is by an underground water piping system, if available, supplemented by the use of driven rods. Ground rods shall be copper–weld not less than 3/4" in diameter and ten (10) feet long.

D. Grounding of the electrical system shall be by means of an insulated grounding conductor installed with circuit conductors in all conduits. Grounding conductors shall be sized in accordance with N.E.C. 250.95 and shall run from grounding bus of serving panel to ground bus of served panel, grounding screw of receptacles, lighting fixture housings, light switch outlet boxes or metal enclosures of served equipment.

E. Install bonding jumpers across all buildings, expansion joints, and across conduit expansion fittings

F. Conductors for grounding system shall be soft or medium hard drawn, stranded, bare copper except where otherwise noted.

4. All conductors #8AWG and smaller shall be insulated

PART 2 – PRODUCTS AND EXECUTION

2.01 CIRCUIT BREAKER PANELBOARDS

A. Materials

1. Panelboards shall be of the dead front safety type. Bus bars shall have anti–turn solderless lug connections for attaching feeders. Where two or three–pole breakers are required, they shall be common trip. Panelboards shall be Square D, Siemens, General Electric, or equivalent.

2. Name Plates

a. Provide nameplates on all equipment of the type listed in the following schedule: Panel boards, Safety Switches

b. Lettering shall include name of equipment, horsepower, voltage rating and service designation.

c. Name plates shall be laminated phenolic with a black surface and white core. Nameplates may be attached to wall adjacent to equipment if area for attachment is too small. Identification with a Dymo–type instrument is not permissible.

d. Nameplates on panel boards recessed in walls in finished areas may be on inside of door.

e. Nameplates on panel boards, distribution panels, etc., in unfinished areas should be on exterior trim near top.

3. All branch circuit panelboards shall be circuit breaker type with provisions for bolt–on type circuit breakers.

4. Circuit breakers shall be bolt on type, 10,000 ampere symmetrical short circuit capacity minimum unless otherwise shown on the drawings.

5. Branch Circuit Identification:

a. Identification of branch circuits shall be typewritten on directory cards furnished with all panels and placed in the cardholder on the door. Descriptions shall list type of load and location (i.e., RCPT–RM 101/102). Spare circuits shall be left blank for future identification.

A. Execution

1. Panels shall be mounted so that the top is at 6'–0" above floor.

2. A glazed directory frame shall be provided inside the door and shall be of sufficient size to give description of each circuit. Typed directory cards shall be provided listing each circuit served.

3. Provide new directory cards in existing panels modified due to the contract work.

2.02 TRANSFORMERS

A. Transformers shall be dry type, 115 deg. centigrade rise, with four 2–1/2% full capacity taps (two above – two below normal voltage) for 30 KVA and below. 150 deg. centigrade rise, with six 2–1/1% full capacity taps (two above – four below normal voltage) above 30 KVA. Transformer sound levels shall not exceed NEMA Standards. Provide all mounting platforms for wall or truss mounted transformers as required. Primary and secondary connections shall be made with flexible conduit. Transformers shall be as manufactured by Square D, General Electric, Siemens, Acme, or Hevi–Duty.

B. All transformers indicated to be supported from the structure shall be supported by Unistrut frame.

PART 3 – EXECUTION

3.01 GROUNDING

A. All connections of ground conductors to bus bars, structural members, pipes, or fences and splices of ground conductors shall be made by exothermic welds except where otherwise noted. All connections to bar lugs shall be exothermic weld or compression type. Bolted type connection of ground conductors may only be made where terminal lugs or blocks have been furnished and installed in equipment by the manufacturer.

B. The resistance to ground for the entire grounding system shall not exceed 25 ohms under normal dry conditions.

C. Tests of grounding resistance shall not be made within 24 hours after a rainfall. If after testing the system, it is found that the resistance to absolute earth exceeds 15 ohms, the Contractor shall install the necessary number of ground rods to reduce the resistance to less than 15 ohms. These tests shall be conducted in the presence of the local Electrical Inspector. The test results shall be submitted to the Owner/Engineer.

END OF SECTION

SECTION 16500 – LIGHTING

PART 1 – GENERAL

1.01 GENERAL

A. Work Includes

Interior Lighting
Exterior Lighting

PART 2 – PRODUCTS AND EXECUTION

2.01 EXECUTION

A. Light fixtures (luminaire) shall be as specified on the lighting fixture schedule as indicated on the drawings. Where fixture types are indicated as a manufacturer's series, the contractor shall provide the correct trim, mounting hardware, lengths, etc., to complete the installation as indicated on the electrical/architectural drawings.

B. All fixtures shall be securely supported with approved hangers. Fixtures shall be supported from structural ceiling or structural supports, not suspended ceiling supports, independent of ceiling material. Fixtures shall be secured per IBC, state and local seismic requirements. Surface mounted fixtures must have additional ceiling support as acceptable by the Architect.

END OF SECTION

SECTION 16700 – COMMUNICATIONS

PART 1 – GENERAL

1.01 GENERAL

A. Work Includes:

Telephone/data conduit system and junction boxes

B. Related Work Specified Elsewhere

Section 16010 – General Electrical Provisions
Section 16050 – Basic Electrical Materials And Methods

PART 2 – PRODUCTS AND EXECUTION

2.01 DESCRIPTION

A. The Contractor shall provide a complete system of telephone/data cabinets, outlet boxes, conduit and miscellaneous fittings and materials to provide a complete data raceway system. Data equipment, terminals, cable and the associated labor shall be furnished and installed by low voltage contractor under a separate agreement with the Owner. All work shall be provided in accordance with the requirements of the local telecommunications company and as indicated on the drawings.

B. Execution

1. All conduits required for telephone/data outlets as shown on the drawings shall be provided complete with pull wires. Conduit shall be 3/4" minimum and the complete system shall conform with the telephone company requirements. Provide empty conduits with appropriately sized pull strings from each outlet to conduit stub above ceiling space.

2. All low voltage and system cabling located above ceilings shall be properly rated for the application. Without exception, all cabling shall be hung from bridal type rings or placed in cable tray by the E.C. in exposed ceiling areas. All cabling shall be run in conduit to the nearest accessible ceiling location.

3. The E.C. shall coordinate the exact location of all device boxes for security system, conduit for low voltage cable and 120V power for card readers/sensors with the Owner's security system vendor prior to rough–in.

4. Coordinate communications cabling, routing, mounting boxes, and terminations with the Owner, Architect and Owner's communications consultant prior to rough–in.

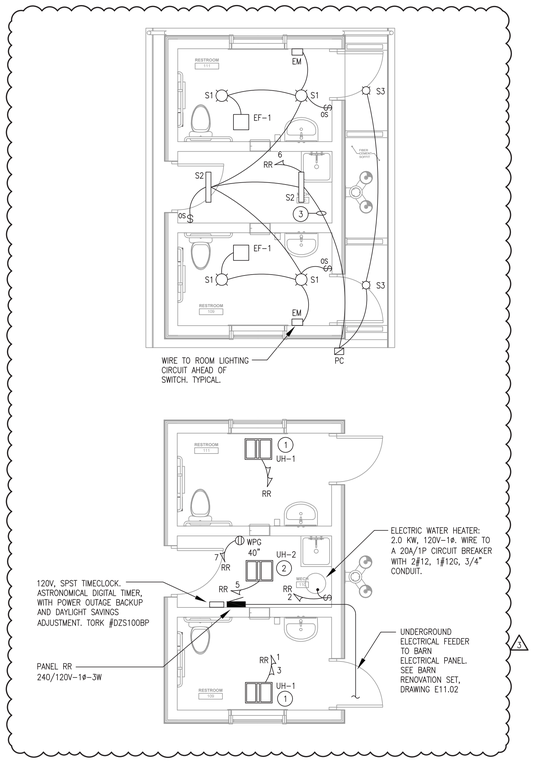
END OF SECTION

ELECTRICAL SYMBOL LEGEND

SYMBOL	DESCRIPTION
3 A	INDICATES HOMERUN [2#12AWG,1#12AWG(G)–3/4"C] TO PANEL "A" CIRCUIT 3
	UNDER FLOOR/UNDERGROUND BRANCH CIRCUIT WIRING
$	SWITCH – SINGLE POLE – MOUNTED AT 48" A.F.F. OS – DUAL TECHNOLOGY OCCUPANCY SENSOR SWITCH
	LINE VOLTAGE, DIMMER WITH OCCUPANCY SENSOR MOUNTED AT 48" AFF. SENSORSWITCH #WSXPDT D OR EQUAL.
	DUPLEX RECEPTACLE – MOUNTED AT 18" A.F.F. VERIFY EXACT LOCATION WITH ARCHITECT PRIOR TO ROUGH–IN. G – G.F.C.I. TYPE C – MOUNTED 7" ABOVE COUNTERTOP WPG – WEATHERPROOF WHILE IN USE METAL COVER, AND G.F.C.I. TYPE RECEPTACLE MOUNTED AT 24" ABOVE GRADE
	DUPLEX RECEPTACLE – MOUNTED AT 48" A.F.F.
	DOUBLE DUPLEX (QUADPLEX) RECEPTACLE
	SPECIAL PURPOSE RECEPTACLE – SEE PLANS FOR DESCRIPTIONS
	JUNCTION BOX – MOUNTING HEIGHT/LOCATION AS INDICATED
	CIRCUIT BREAKER PANELBOARD
	EXHAUST FAN – SINGLE PHASE MOTOR, U.O.N.
	UNFUSED DISCONNECT SWITCH
	FIRE ALARM PULL STATION WITH AUDIBLE SAFETY GUARD – MOUNTED AT 48" A.F.F.
	FIRE ALARM SYSTEM HORN/STROBE WITH FLASHING STROBE LIGHT – MOUNTED AT 80" A.F.F.
	FIRE ALARM SYSTEM SMOKE DETECTOR
R.E.X.	REMOVE EXISTING DEVICE AND WIRING COMPLETE BACK TO SOURCE
N.E.X.	NEW DEVICE IN EXISTING WALL
R.R.	EXISTING DEVICE LOCATION TO REMAIN. REMOVE EXISTING DEVICE AND WIRING AND REPLACE WITH NEW
PC	LINE VOLTAGE PHOTOCELL – SPST. TORK # 2129A OR EQUAL
	SECURITY SYSTEM CLOSED CIRCUIT CAMERA BY OTHERS. PROVIDE JUNCTION BOX FOR MOUNTING AND CONDUIT STUB FOR WIRING.

GENERAL ELECTRICAL NOTES:

1. ALL WIRING SHALL BE IN CONDUIT, SIZE AND TYPE SUITABLE FOR THE CONDITIONS.
2. EQUIPMENT ABOVE CEILINGS SHALL BE PLENUM–RATED.
3. COORDINATE/VERIFY EXACT LOCATIONS OF ALL EQUIPMENT PRIOR TO ROUGH–IN OF OUTLETS.
4. WIRE SIZES SHALL BE BASED ON THE 60°C. AMPACITIES FOR WIRE SIZES No. 14–1 A.W.G., AND 75°C. AMPACITIES FOR WIRE SIZES #1/0 A.W.G. AND LARGER, UNLESS OTHERWISE NOTED.
5. REFER TO MECHANICAL PLANS FOR EXACT LOCATION OF MECHANICAL EQUIPMENT WITH THE MECHANICAL CONTRACTOR AND LOCATE DISCONNECT SWITCHES IN ACCORDANCE WITH THE N.E.C. THE EXACT ELECTRICAL REQUIREMENTS SHALL BE VERIFIED IN THE FIELD WITH THE EQUIPMENT NAMEPLATE DATA. THE CONTRACTOR SHALL MAKE APPROPRIATE ADJUSTMENTS TO WIRE AND FUSE SIZES IN ACCORDANCE WITH THE NAMEPLATE DATA.
6. ALL BRANCH CIRCUITS AND FEEDERS SHALL CONTAIN INSULATED GROUNDING CONDUCTOR IN ACCORDANCE WITH THE SPECIFICATIONS.
7. UTILIZATION OF THE PHRASE "PROVIDED BY" WITHIN THE CONTEXT OF THESE DOCUMENTS SHALL EXPLICITLY REPRESENT "FURNISHED AND INSTALLED BY".
8. THE ROUTING OF ALL SURFACE MOUNTED/EXPOSED CONDUIT IN FINISHED AREAS (OR WHERE NOTED ON THE DRAWINGS) SHALL BE COORDINATED WITH, AND SHALL BE APPROV



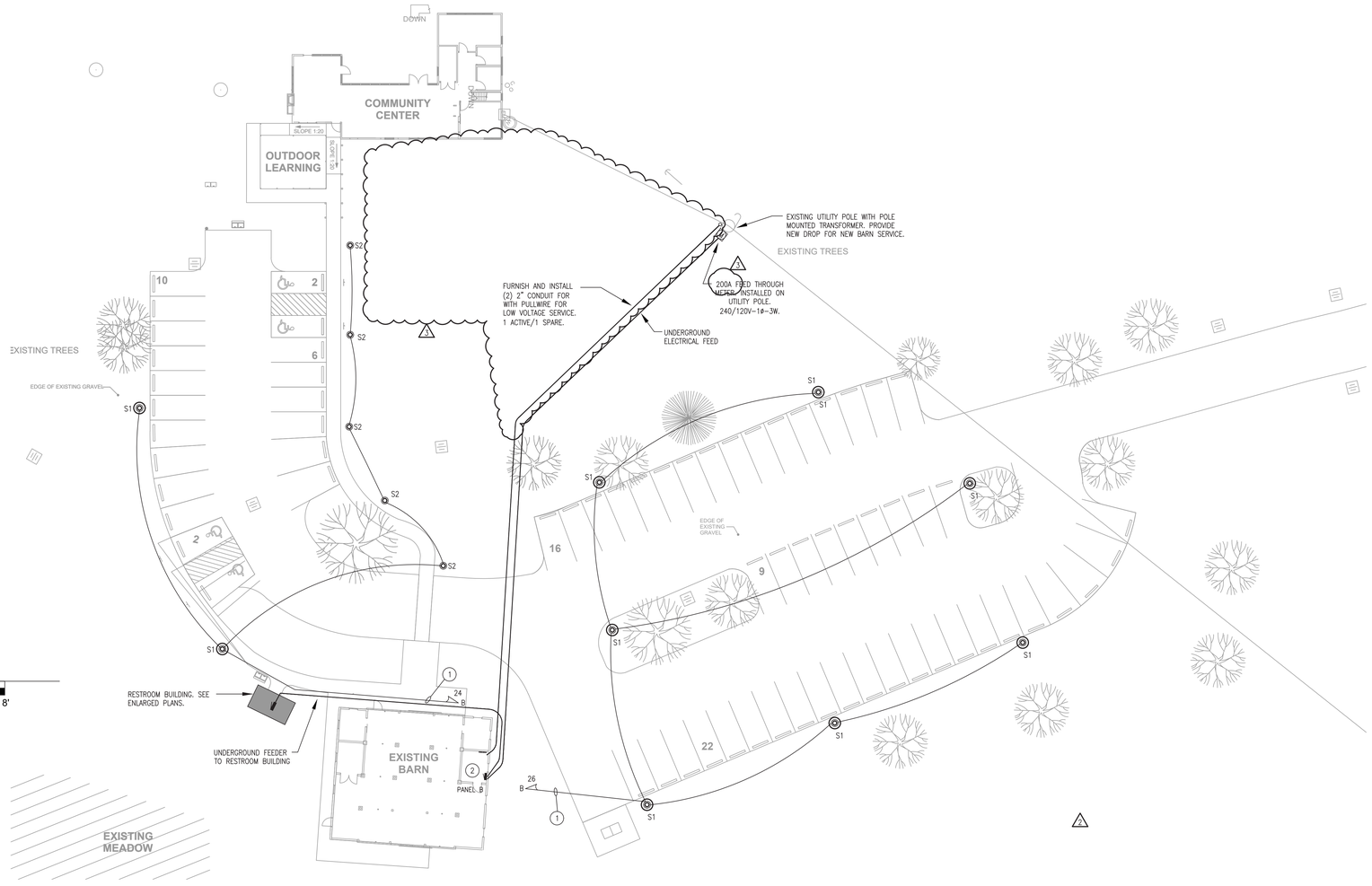
2 RESTROOM BUILDING ELECTRICAL PLANS

Scale: 1/4" = 1'-0"

1' 2' 4' 8'

RESTROOM BUILDING ELECTRICAL CODED NOTES:

1. RECESSED ELECTRIC UNIT HEATER: 3.0 KW, 240V-1ø. EQUIPMENT IS PROVIDED WITH AN INTEGRAL DISCONNECT SWITCH. WIRE WITH 2#12, 1#12G, 3/4" CONDUIT TO A 20A/2P CIRCUIT BREAKER.
2. RECESSED ELECTRIC UNIT HEATER: 1.5 KW, 120V-1ø. EQUIPMENT IS PROVIDED WITH AN INTEGRAL DISCONNECT SWITCH.
3. ROUTE LIGHTING BRANCH CIRCUIT THROUGH LINE PHOTOCELL MOUNTED HIGH ON BUILDING.



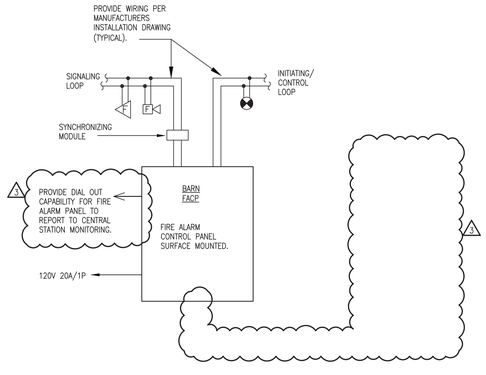
1 ELECTRICAL SITE PLAN

Scale: 1" = 20'

1' 2' 4' 8'

ELECTRICAL SITE PLAN CODED NOTES:

1. 2#10, 1#10G, 3/4" PVC CONDUIT, 18" BELOW GRADE MINIMUM. ROUTE THROUGH SITE LIGHTING TIMECLOCK.
2. PROVIDE 2 CIRCUIT TIMECLOCK WITH PHOTOCELL FOR PARKING LOT LIGHTING CIRCUITS. PHOTOCELL ON/TIMECLOCK OFF. SYSTEM SHALL BE CAPABLE OF INDEPENDENT TIME SETTINGS FOR EACH CIRCUIT.



2 ADDRESSABLE FIRE ALARM SYSTEM RISER

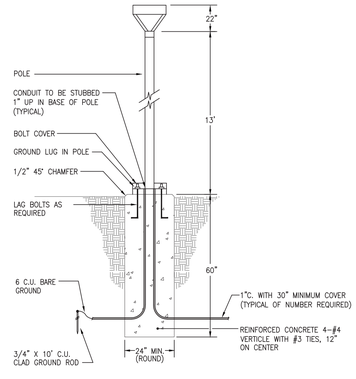
Scale: NTS

FIRE ALARM SYSTEM GENERAL NOTES:

1. THIS RISER REPRESENTS A TYPICAL SYSTEM AND IS NOT INTENDED FOR INSTALLATION. SYSTEM SUPPLIER SHALL PROVIDE INSTALLATION DRAWINGS AND SCHEMATIC WIRING DIAGRAMS. EXACT SYSTEM REQUIREMENTS SHALL BE COORDINATED WITH THE SYSTEM SUPPLIER. SYSTEM INSTALLER SHALL BE NICET CERTIFIED, IF REQUIRED BY LOCAL AUTHORITY HAVING JURISDICTION.
2. SYSTEM SUPPLIER SHALL SUPERVISE INSTALLATION, PROGRAM AND TEST SYSTEM AND INSTRUCT OWNER ON SYSTEM OPERATION.
3. ALL FIRE ALARM WIRING SHALL BE INSTALLED IN CONDUIT.
4. ALL CONTROL CABINETS SHALL BE GROUNDED PER NEC REQUIREMENTS AND PER SPECIFICATIONS.
5. FIRE ALARM SYSTEM DESIGNER SHALL BE RESPONSIBLE FOR ALL SHOP DRAWINGS, COORDINATION WITH OTHER TRADES AND INSTALLATION. SUBMIT PLANS FOR CITY TO REVIEW. PLANS SHALL INCLUDE DEVICE LOCATIONS ON SCALED FLOOR PLANS, WIRING INFORMATION AND DIAGRAMS, AND BATTERY CALCULATIONS.
6. ALL STROBES SHALL BE SYNCHRONIZED WITHIN LINE OF SIGHT. COORDINATE SCOPE IN THE FIELD AND WITH THE GENERAL CONTRACTOR.
7. FIRE ALARM SYSTEM SHALL BE THE SAME MANUFACTURER AS THE COMMUNITY CENTER.

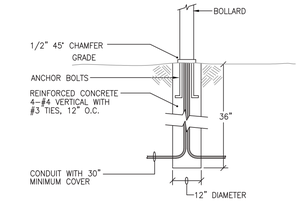
SITE LIGHTING FIXTURE SCHEDULE

TYPE	WATTAGE LAMP	WATTAGE FIXTURE	DESCRIPTION	CATALOG #
S1	LED 3000K 9000L	80W	LED ROUND POST TOP FIXTURE MOUNTED ON 13' ROUND STEEL POLE	E-CONOLIGHT C-LITE #C-AR-A-PTA-59L-SCCT-UL-BZ POLE: RSS-13
S2	LED 3000K 4000L	37W	LED 36" TALL BOLLARD WITH 8" ROUND BASE AND DOME TOP	E-CONOLIGHT C-LITE #C-BD-GRRD-DOME-55L-SCCT-UL-BZ



3 TYPE "S1" POLE BASE DETAIL

Scale: NTS



4 TYPE "S2" BOLLARD BASE DETAIL

Scale: NTS

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MEP ENGINEER: DENK ASSOCIATES 216.531.8880

BATH TOWNSHIP

NORTH FORK PRESERVE RENOVATION

4400 EVERETT ROAD, AKRON, OH 44333

PROJECT # 2324

ISSUE:

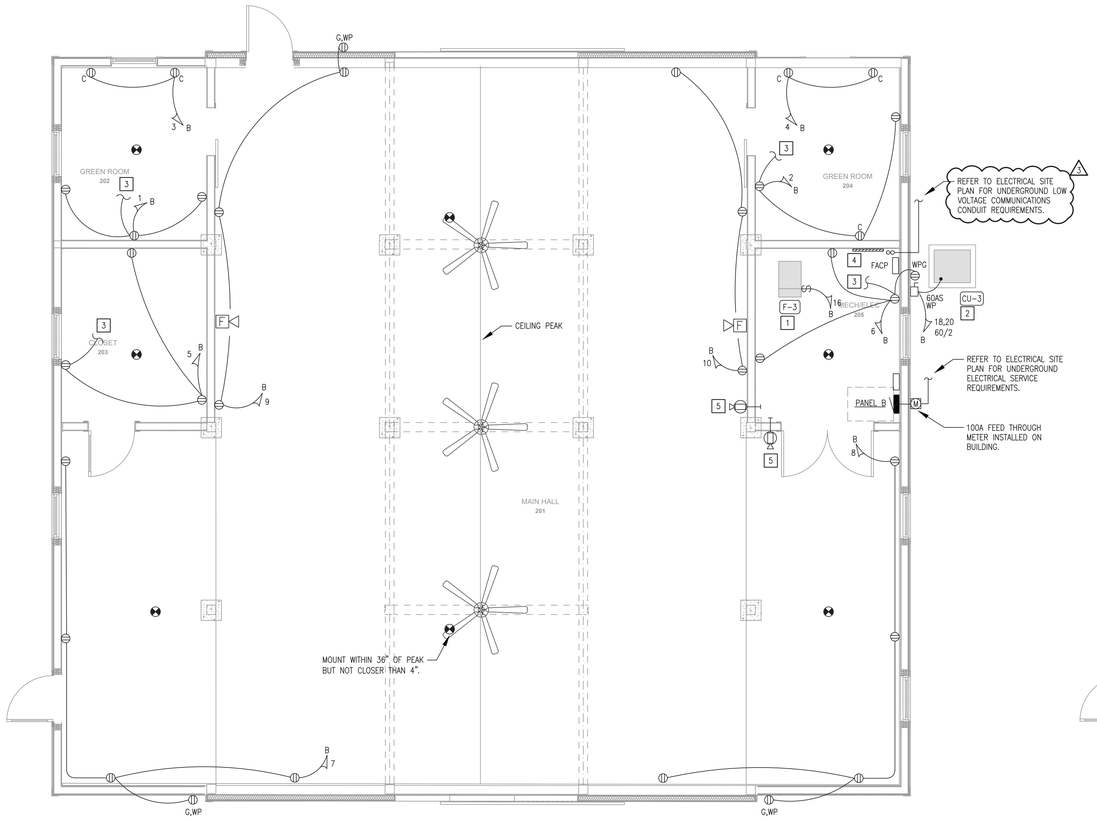
BID SET	07-28-2025

ELECTRICAL SITE PLAN

E11.01

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2025-09-21 - 1/4" = 1'-0"



1 BARN POWER PLAN

Scale: 1/4" = 1'-0"

1' 2' 4' 8'

BARN POWER GENERAL NOTES:

1. ALL CONDUIT AND WIRING SHALL BE INSTALLED CONCEALLED IN NEW WALLS AMD CEILING. COORDINATE ANY LOCATIONS THAT MAY REQUIRE SURFACE CONDUIT WITH THE ARCHITECT.

BARN POWER PLAN CODED NOTES:

1. FURNACE: 1.3 KW, 120V–1ø
2. CONDENSING UNIT: 8.9 KW, 240V–1ø, WIRE WITH 2#4, 1#8G, 1" CONDUIT.
3. EXTEND BRANCH CIRCUIT TO ROOM LIGHTING FIXTURES.
4. FURNISH AND INSTALL 2' X 4' X 3/4" THICK FIRE RATED PLYWOOD BACKBOARD FOR LOW VOLTAGE EQUIPMENT
5. PROVIDE MOUNTING DEVICE BOX AND 3/4" CONDUIT ABOVE THE CEILING TO THE LOW VOLTAGE BACK BOARD. COORDINATE MOUNTING HEIGHT AND BOX REQUIREMENTS WITH SECURITY CAMERA INSTALLER.

NEW PANELBOARD "B" SCHEDULE

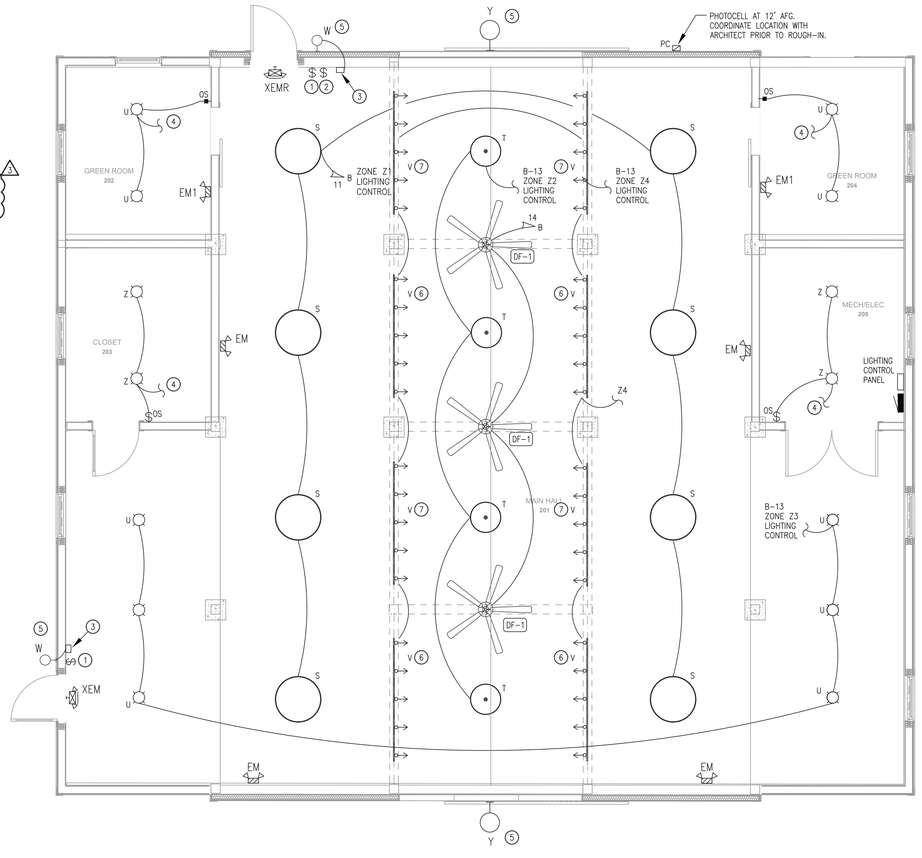
VOLTAGE: 120/240V-1PH-3W MAINS 150A/2P MCB (1) MOUNTING SURFACE REMARKS:
BUS SIZE: 200 AMP TOTAL LOAD 26.2 KVA

No.	SERVES	LOAD (KVA) LTG	RCPT	MTR	A/C	HTG	MISC	BRKR TRIP	P	PH A	B	P	BRKR TRIP	LOAD (KVA) MISC	HTG	A/C	MTR	RCPT	LTG	SERVES	No.
1	RM 202 RECEPT/LTG	0.1	0.6					20	1			1	20					0.6	0.1	RM 204 RECEPT/LTG	2
3	RM 202 RECEPT		0.4					20	1			1	20					0.4		RM 204 RECEPT	4
5	RM 203 RECEPT/LTG	0.1	0.6					20	1			1	20					0.6	0.1	RM 205 RECEPT/LTG	6
7	RM 201 SE RECEPT		1.2					20	1			1	20					1.2		RM 201 NE RECEPT	8
9	RM 201 SW RECEPT		0.8					20	1			1	20					0.6		RM 201 NW RECEPT	10
11	TYPE S LTG	1.2						20	1			1	20						0.1	EXTERIOR LIGHTING	12
13	TYPE T, U & V LTG	1.0						20	1			1	20	0.6						FANS	14
15	FIRE ALARM						0.4	20	1			1	20			1.3				FURNANCE	16
17	SPARE							20	1			2	60			4.5				CU-1	18
19	SPARE							20	1							4.5					20
21	SPARE							20	1			-	-							SPACE	22
23	SPACE							-	-			-	-						0.6	SITE LIGHTING	24
25	SPACE							-	-			-	-						0.6	SITE LIGHTING	26
27	SPACE							-	-			2	60	3.0						RESTROOM BUILDING	28
29	SPACE							-	-					3.0							30
														7.0	0.0	10.3	0.0	7.0	3.9	CONNECTED KVA	28.2
																				DEMAND KVA	26.1

NEW PANELBOARD "RR" SCHEDULE

VOLTAGE: 120/240V-1PH-3W MAINS 60A MCB MOUNTING SURFACE REMARKS:
BUS SIZE: 60 AMP TOTAL LOAD 9.7 KVA

No.	SERVES	LOAD (KVA) LTG	RCPT	MTR	A/C	HTG	MISC	BRKR TRIP	P	PH A	B	P	BRKR TRIP	LOAD (KVA) MISC	HTG	A/C	MTR	RCPT	LTG	SERVES	No.
1	UH-1 RM #109					3.0		20	2			1	20	2.0						WATER HEATER	2
3												1	20							SPARE	4
5	UH-2					1.0		20	1			1	20					0.5		LIGHTING/RECEPT	6
7	RECEPTACLE					0.2		20	1			1	20							SPARE	8
9	UH-1 RM #111					3.0		20	2			-	-							SPACE	10
11												-	-							SPACE	12
13	SPACE							-	-			-	-							SPACE	14
15	SPACE							-	-			-	-							SPACE	16
17	SPACE							-	-			-	-							SPACE	18
														2.0	7.2	0.0	0.0	0.5	0.0	CONNECTED KVA	9.7
																				DEMAND KVA	7.2



2 BARN LIGHTING PLAN

Scale: 1/4" = 1'-0"

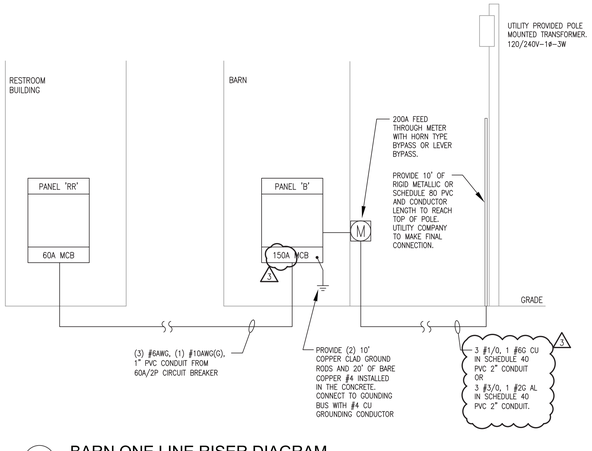
1' 2' 4' 8'

BARN LIGHTING GENERAL NOTES:

1. ALL CONDUIT AND WIRING SHALL BE INSTALLED CONCEALLED IN NEW CEILING. PROVIDE SURFACE CONDUIT FOR TRACK LIGHTING AND FANS SURFACE MOUNTED TO THE WOOD BEAMS.

BARN LIGHTING PLAN CODED NOTES:

1. 6 BUTTON SCENE CONTROLLER.
2. FAN CONTROLLER, PROVIDED BY THE MC, INSTALLED AND WIRED BY THE EC. PROVIDE CATEGORY 5 CABLE FROM CONTROLLER, DAISY CHAINED TO EACH FAN.
3. REMOTE MOUNTED EMERGENCY BATTERY PACK. PROVIDE BRANCH CIRCUIT WIRING AHEAD OF LIGHTING CONTROL (PHOTOCELL) FOR SENSING CIRCUIT.
4. EXTEND ROOM RECEPTACLE BRANCH CIRCUIT.
5. CIRCUIT EXTERIOR LIGHTING TO PANEL B, CIRCUIT #12 THROUGH LINE VOLTAGE PHOTOCELL FOR DUSK TO DAWN OPERATION.
6. MOUNTED ON TOP OF LOW BEAM AT APPROXIMATELY 9'–0" AFF
7. MOUNTED ON TOP OF HIGH BEAM AT APPROXIMATELY 16'–0" AFF



3 BARN ONE LINE RISER DIAGRAM

Scale: NTS

LIGHTING CONTROL SCHEDULE

ZONE	DESCRIPTION	DIMMING	WATTAGE	PANEL/CKT
Z1	TYPE 'S'	TRIAC DIMMING	1152W	B – 11
Z2	TYPE 'T'	TRIAC DIMMING	384W	B – 13
Z3	TYPE 'U'	TRIAC DIMMING	960W	B – 15
Z4	TYPE 'V'	TRIAC DIMMING	100W	B – 13

1. SYSTEM SHALL BE CAPABLE OF PRESET SCENES
2. PROGRAM 6 BUTTON SCENE CONTROLLERS FOR ALL ON/ALL OFF AND 4 PRE–SET SCENES. PROVIDE ON SITE PROGRAMMING WITH OWNER FOR 4 DESIRED SCENE SETTING.
3. PROVIDE OWNER TRAINING ON SYSTEM USE AND PROGRAMMING.

LIGHTING FIXTURE SCHEDULE

TYPE	WATTAGE LAMP	WATTAGE FIXTURE	DESCRIPTION	CATALOG #
S	(15) E26 LED 2800K ST64 STYLE 1400 LUMEN	180W	36" DIAMETER 15–LIGHT 2–RING CHANDELIER WITH BLACK FINISH. CHAIN MOUNTED TO 12'–6" AFF TO BOTTOM OF THE FIXTURE. PROVIDE (15) 100 WATT LED EQUIVALENT EDISON STYLE ST64 LAMPS.	GOLDEN LIGHTING #1019–96
T	(9) E26 LED 2800K ST64 STYLE 1400 LUMEN	108W	32" DIAMETER 9–LIGHT FARMHOUSE CHANDELIER WITH BLACK FINISH. CHAIN MOUNTED TO 12'–6" AFF TO BOTTOM OF THE FIXTURE. PROVIDE (9) 100 WATT LED EQUIVALENT EDISON STYLE ST64 LAMPS.	GOLDEN LIGHTING #1019–9
U	(2) E26 LED 2800K ST64 STYLE 1400 LUMEN	24	DECORATIVE 10" DIAMETER SURFACE MOUNTED LIGHT FIXTURE WITH DECORATIVE BLACK STEEL HOUSING	LIGHTOLOGY #DMD1230814
V	LED 2800K 900L/ HEAD	50W	8' TRACK SINGLE CIRCUIT WITH (5) TRACK HEADS INDICATED. INSTALL ON TOP OF BEAM. PROVIDE WITH IN–FEED, END CAP, AND ALL MOUNTING ACCESSORIES.	WAC LIGHTING TRACK: H–BK–8' HEAD: H–5010–CS–BK
W	LED 2800K 1250L	10W	10" DIAMETER LED GOOSENECK RLM WALL SCONCE WITH BLACK SHADE AND DEDICATED LED	HI LITE H–15010–91/HL–D–91/DCC/WGR–118–10LED427WBCM
Y	LED 2800K 3000L	23W	SAME AS TYPE W, EXCEPT 16" DIAMETER AND HIGHER OUTPUT.	HI LITE H–15116–91/HL–D–91/DCC/WGR–118–23LED427WBCM
Z	LED 2800K 1100L	11W	LED 6" SURFACE MOUNT DOWNLIGHT.	PRESCOLITE LBSES–6RD–CS9–WH
EM	LED	6W	HIGH CAPACITY 2 HEAD EMERGENCY LIGHTING UNIT WITH INTEGRAL BATTERY AND CHARGER MOUNTED AT 15' AFF	DUAL LITE EVHC6–WH
EM1	LED	3W	2 HEAD EMERGENCY LIGHTING UNIT WITH INTEGRAL BATTERY AND CHARGER MOUNTED AT 8' AFF	DUAL LITE EV2
XEM	LED	3W	LED UNIVERSAL MOUNT EXIT SIGN WITH WHITE HOUSING AND RED LETTERS AND INTEGRAL DUAL HEADS	DUAL–LITE EVC–URW

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PROJECT #: 2324

ISSUE:
BID SET 07-28-2025

BARN ELECTRICAL PLANS AND ONE LINE DIAGRAM

E11.02

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2025-05-21 - 1/4" = 1'-0"