ADDENDUM NO. 2

TO: PLANS AND SPECIFICATIONS FOR STATE OF MISSOURI

Wappapello Training Site
Construct New Soldier Dining Facility
Wappapello, MO
PROJECT No.: T2232-01

Bid Opening Date is: 1:30 PM, Tuesday, September 15th, 2026 (Changed)

Bidders are hereby informed that the Construction Plans and/or Specifications are modified as follows:

SPECIFICATION CHANGES:

1. Section 000110 – Table of Contents

   a. Revised number of pages for sections.
   b. Added specification sections. 133419, 263600, Appendix A
   c. Removed specification sections. 074113, 074113.13, 321216

2. Section 000115 – List of Drawings

   a. Added sheet M -102 to list.

3. Section 011000 – Summary of Work

   a. Revised Sentence 1.2-D-a, added number of working days from 180 to 270.

4. Section 015000 – Construction Facilities and Temporary Controls

   a. Revised section 1.4-C, for owner's representative.
   b. Removed sections 2.2-G, 3.3-B and 3.3-D-1
   c. Revised section 3.4-E, Secure area as needed by general contractor.

5. Section 033000 – Cast-In-Place Concrete

   a. REMOVE and REPLACE section in its entirety with the attached.

6. Section 074113 Metal Roof Panels

   a. REMOVE section in its entirety. Reference Section 133419.

7. Section 074113.13 Formed Metal Wall Panels

   a. REMOVE section in its entirety. Reference Section 133419.

8. Section 082110 – Flush Wood Doors

   a. REMOVE Sentence 2.3-B-2-a in its entirety. There shall be no reference to "existing".

9. Section 083600 – Sectional Overhead Doors

   a. REMOVE Section 2.6 Electric Door Operator in its entirety.

10. Section 087100 – Door Hardware

a. REVISE Paragraph 2.4-A as follows:

A. Keying System: Factory registered, complying with guidelines in BHMA A156.28, Appendix A. Provide all cylinders and keys master keyed to the Best Keying System. Incorporate decisions made in keying conference, and as follows:

11. Section 095100 – Acoustical Ceilings

a. REVISE Paragraph 2.2 Acoustical Units as follows:

A. Panel Types (Refer to drawings interior finish plan and schedule for additional requirements.)

1. Type Marked: C2
   a. Basis of Design: Armstrong "DUNE NO. 1774"
   b. Size: 24x24 inches
   c. Thickness: 5/8 inches
   d. Edge: Angled Tegular
   e. Surface Color: White
   f. Surface Finish: Factory applied latex paint
   g. Texture: Fine
2. Type Marked: C3
   a. Basis of Design: Armstrong "CLEAN ROOM VL UNPERFORATED NO. 868"
   b. Size: 24x24 inches
   c. Thickness: 5/8 inches
   d. Edge: Square
   e. Surface Color: White
   f. Surface Finish: Vinyl-faced membrane, Washable
   g. Texture: Smooth
   h. Humidity Resistance: HumiGuard Plus
   i. Clean Room Classification: Clean Room Class 100
   j. Anti-microbial: BioBlock

b. REVISE Paragraph 2.3-B Suspension Systems as follows:

B. Ceiling Grid Types (Refer to drawings interior finish plan and schedule for additional requirements.)

1. Type 1
   a. Basis of Design: Armstrong "PRELUDE PLUS XL ALUMINUM 15/16" EXPOSED TEE SYSTEM"
   b. Finish: White painted.

12. Section 114000 – Food Service Equipment

a. REVISE Item No. 16 Mobile Cold Food Counter Basis of Design to: Atlas Metal CAIH-4-SH-DME including CSG-4N-FL FOOD GUARD.
b. REVISE Item No. 17 Mobile Hot Food Counter Basis of Design to: Atlas Metal CARM-4-SH including CSG-4J-FW FOOD GUARD

13. Section 133419 – Metal Building Systems

a. REMOVE and REPLACE section in its entirety with the attached.

14. Section 223100 – Domestic Water Softeners

a. REMOVE 1.7, B., & C., 2.1, 5. ASME rating as this is typically in the specs for bigger pieces of equipment, since this is a smaller piece of equipment and is sized for the intended building water demand it does not need to be ASME as long as it meets the requirements in the schedule.

15. Section 263600 – Transfer Switches

    a. ADD this entire spec section.

16. Section 321216 Asphalt Paving

    a. REMOVE section in its entirety. Note: There is no asphalt work on this project. Disregard any references to asphalt work.

17. Appendix A – Geotechnical Investigation Report

    a. ADD Report in its entirety. (Note: Building foundation design was based on the attached report.)

DRAWING CHANGES:

1. SHEET C6.0 – Construction Details (2)

    a. Removed owner reference.

2. SHEET A-601 – DOOR AND WINDOW SCHEDULES AND DETAILS

    a. REVISE Door Schedule for Aluminum Frames.

3. SHEET S-002 – SPECIAL INSPECTION TABLES

    a. REVISE Statement of Special Inspections.

    b. REVISE Special Inspection Tables.

4. SHEET S-101 – FOUNDATION PLAN

    a. ADD grade beam and thickened slab along grid line 2 between B and C.

    b. REVISE foundation key notes 1 and 4 to clarify compacted granular base material.

5. SHEET S-301 – FOUNDATION SECTIONS

    a. ADD section 11 for grade beam along grid line 2 between B and C.

6. SHEET M-101 – HVAC PLAN

    a. ADD ACT2 to match location on K201 drawing.

7. SHEET M-102 - SHEDULES

    a. ADD entire sheet to include, Piping Material Schedule- HVAC, Ductwork HVAC Schedule, and Pipe Insulation-HVAC Schedule.

8. SHEET P-102 – PLUMBING PLAN

a. ADD Pipe Insulation Plumbing Schedule.
b. ADD Special note to drawings.
c. REVISE Piping Material Schedule to say Propane instead of Natural Gas.

9. SHEET P-202 – PLUMBING RISER DIAGRAMS
   a. REVISE Natural Gas Isometric to say Propane instead.

10. SHEET E-102 – ELECTRICAL SCHEDULES AND DETAILS
   a. REVISE main disconnect switch to be 2-pole in lieu of 3-pole.
   b. REVISE generator connection cabinet description.

11. SHEET E-104 – ELECTRICAL SCHEDULES AND DETAILS
   a. REVISE (2) circuit breakers on panel KP2 serving air curtains to be 15A in lieu of 20A.

GENERAL COMMENTS:

1. **Bidders needing additional site inspection should contact Gary Rice at 573-638-9740 to schedule a time if access to the facility is required.**
2. **Please contact Mandy Robertson, Contract Specialist, at 573-690-9411 or**
3. **Mandy.Roberson@oa.mo.gov, for questions about bidding procedures, MBE\WBE\SDVE goals, and submittal requirements.**
4. **The deadline for technical questions was Thursday, September 3rd, 2026, at noon.**
5. **Changes to, or clarification of, the bid documents are only made as issued in the addenda.**
6. **All correspondence with respect to this project must include the State of Missouri project number as indicated above.**
7. **Current Planholders list available online at: oa.mo.gov/facilities/bid-opportunities/bid-listing-electronic-plans**
8. **Prospective Bidders contact American Document Solutions, 1400 Forum Blvd Suite 1C, Columbia MO 65201, 573-446-7768 to order official plans and specifications.**
9. **All bids shall be submitted on the bid form without additional terms and conditions, modifications, or stipulations. Each space on the bid form shall be properly filled including a bid amount for the alternate. Failure to do so will result in rejection of the bid.**
10. **MBE/WBE/SDVE participation requirements can be found in DIVISION 00. The MBE/WBE/SDVE participation goals are 0%/0%/3%, respectively. Only certified firms as of the bid opening date can be used to satisfy the MBE/WBE/SDVE participation goals for this project. If a bidder is unable to meet a participation goal, a Good Faith Effort Determination Form must be completed. Failure to complete this process will result in rejection of the bid.**
11. **The Contractor shall pay not less than the prevailing hourly rate of wages for work of a similar character in the locality in which the work is performed, as determined by the Missouri Department of Labor and Industrial Relations. Bidders are to adhere to Prevailing Wage Hourly Rate of Wages, and the Department of Labor and Industrial Relations can be contacted to determine the applicable wage rate for the work on this project.**

ATTACHMENTS:

1. Specification Section 000110 Table of Contents
2. Specification Section 000115 List of Drawings
3. Specification Section 011000 Summary of Work
4. Specification Section 015000 Const. Facilities and Temporary Controls

5. Specification Section 033000 Cast-In-Place Concrete
6. Specification Section 082110 Flush Wood Doors
7. Specification Section 083600 Sectional Overhead Doors
8. Specification Section 087100 Door Hardware
9. Specification Section 114000 Food Service Equipment
10. Specification Section 223100 Domestic Water Softeners
11. Specification Section 263600 Transfer Switch
12. Appendix A – Geotechnical Investigation Report
13. Sheet C6
14. Sheet A-601
15. Sheet S-002
16. Sheet S-101
17. Sheet S-301
18. Sheet M-101
19. Sheet M-102
20. Sheet P-102
21. Sheet P-202
22. Sheet E-102
23. Sheet E-104

September 8, 2026

END ADDENDUM NO. 2

Addendum #2

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NOTICE TO BIDDERS

The following procurement forms can be found on our website at:
https://oa.mo.gov/facilities/bid-opportunities/bid-listing-electronic-plans
and shall be submitted with your bid to FMDCBids@oa.mo.gov

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Addendum #2

SECTION 000115 – LIST OF DRAWINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract including General and Supplementary Conditions, Bid Form, and other Division 1 Specification Sections apply to this Section.

1.2 SUMMARY

A. This Section provides a comprehensive list of the drawings that comprise the Bid Documents for this project.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION

3.1 LIST OF DRAWINGS

A. The following list of drawings is a part of the Bid Documents:

TITLE	SHEET #
G-001	TITLE SHEET
G-002	DRAWING INDEX, SITE LOCATION PLANS, LEGENDS, ABBREVIATIONS AND CODE ANALYSIS
C1.0	LEGEND / NOTES
C2.0	EXISTING SITE CONDITIONS / DEMO PLAN
C3.0	PROPOSED SITE PLAN
C4.0	PROPOSED GRADING PLAN
C5.0	CONSTRUCTION DETAILS
C6.0	CONSTRUCTION DETAILS
A-101	DIMENSION PLAN, NOTATED FLOOR PLAN, AND PARTITION SCHEDULE
A-102	ROOF PLAN, SYMBOL LEGEND, AND DETAILS
A-201	EXTERIOR ELEVATIONS AND DETAIL
A-301	BUILDING SECTIONS AND DETAIL
A-401	WALL SECTIONS AND DETAILS
A-402	WALL SECTIONS AND WINDOW DETAILS
A-403	WALL SECTIONS AND EXTERIOR DOOR DETAILS
A-404	ENLARGED PLANS, INTERIOR ELEVATIONS AND SCHEDULE

A-501	DETAILS
A-601	DOOR AND WINDOW SCHEDULES AND DETAILS
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MEP-101	MECHANICAL AND ELECTRICAL SITE PLAN
ME-101	MECHANICAL AND ELECTRICAL ROOF PLAN
M-101	HVAC PLAN
M-102	HVAC PLAN SCHEDULES AND DETAILS
P-101	UNDERSLAB PLUMBING PLAN
P-102	PLUMBING PLAN
P-201	ENLARGED PLUMBING PLAN AND DETAILS
P-202	PLUMBING RISER DIAGRAMS
E-101	LIGHTING PLAN
E-102	POWER PLAN
E-103	FIRE ALARM PLAN
E-104	ELECTRICAL SCHEDULES AND DETAILS

END OF SECTION 000115

Addendum #2

SECTION 011000 – SUMMARY OF WORK

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 WORK COVERED BY CONTRACT DOCUMENTS

A. The Project consists of Construction of New Soldier Dining Facility

1. Project Location: Wappapello Training Site, 461 County Road 517., Wappapello, MO, 63966

2. Project Identifiers:
   1) State Project Number: T2232-01
   2) Site Number: 6325
   3) Asset Number: 8136325016

3. Owner: State of Missouri, Office of Administration, Division of Facilities Management, Design and Construction, Harry S Truman State Office Building, Post Office Box 809, 301 West High Street, Jefferson City, Missouri 65102.

B. Contract Documents, dated July 10, 2026 were prepared for the Project by Dille Pollard Architecture, 266 S. Mount Auburn Road, Cape Girardeau, MO 63703.

C. The Work consists of Construction of a New Soldier Dining Facility

1. The Work includes, but is not limited to, construction of a new Soldier Dining Facility with associated kitchen, scullery, storage, and restrooms. The structure is a Pre-engineered Metal Building with metal wall panels and roof panels at exterior; metal framed partitions with gypsum board panels at interior. New finishes include exposed concrete floors and painted walls with an Alternate for resinous flooring and wall coverings, lay-in ceilings, and HPDE toilet and partitions. Essential Kitchen equipment including walk in coolers/freezers, serving, cooking, prep, and scullery equipment as well as storage shelving and exhaust hood.

D. The Work will be constructed under a single prime contract.
   a. Work will be substantially complete within 270 working days from the intent to award.

1.3 CONTRACTOR USE OF PREMISES

A. Use of the Site: Limit use of the premises to work in areas indicated. Confine operations to areas within contract limits indicated. Do not disturb portions of the site beyond the areas in which the Work is indicated.

1. Owner Occupancy: Owner will be on site but not occupying new dining facility, coordinate with owner's representative.

2. Driveways and Entrances: Keep driveways and entrances serving the premises clear and available to the Owner, the Owner's employees, and emergency

vehicles at all times. Do not use these areas for parking or storage of materials. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

1.4 OCCUPANCY REQUIREMENTS

A. Full Owner Occupancy: The Owner will occupy the site and existing buildings during the entire construction period. Cooperate with the Owner during construction operations to minimize conflicts and facilitate owner usage or existing buildings. Perform the Work so as not to interfere with the Owner's operations.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 011000

Addendum #2

SECTION 015000 – CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract including General and Supplementary Conditions, Bid Form, and other Division 1 Specification Sections apply to this Section.

1.2 SUMMARY

A. This Section includes requirements for construction facilities and temporary controls including temporary utilities, support facilities, security, and protection.

B. Temporary utilities include, but are not limited to, the following:

1. Water service and distribution
2. Temporary electric power and light
3. Temporary heat
4. Ventilation
5. Telephone service
6. Sanitary facilities, including drinking water
7. Storm and sanitary sewer

C. Support facilities include, but are not limited to, the following:

1. Field offices and storage sheds
2. Temporary roads and paving
3. Dewatering facilities and drains
4. Temporary enclosures
5. Hoists and temporary elevator use
6. Temporary project identification signs and bulletin boards
7. Waste disposal services
8. Rodent and pest control
9. Construction aids and miscellaneous services and facilities

D. Security and protection facilities include, but are not limited to, to following:

1. Temporary fire protection
2. Barricades, warning signs, and lights
3. Sidewalk bridge or enclosure fence for the site
4. Environmental protection

1.3 SUBMITTALS

A. Temporary Utilities: Submit reports of tests, inspections, meter readings, and similar procedures performed on temporary utilities.

B. Implementation and Termination Schedule: Within (15) days of the date established for commencement of the Work, submit a schedule indicating implementation and termination of each temporary utility.

1.4 QUALITY ASSURANCE

A. Regulations: Comply with industry standards and applicable laws and regulations including, but not limited to, the following:

1. Building code requirements
2. Health and safety regulations
3. Utility company regulations
4. Police, fire department, and rescue squad rules
5. Environmental protection regulations

B. Standards: Comply with NFPA 241 "Standard for Safeguarding Construction, Alterations, and Demolition Operations". ANSI A10 Series standards for "Safety Requirements for Construction and Demolition", and NECA Electrical Design Library "Temporary Electrical Facilities".

1. Electrical Service: Comply with NEMA, NECA, and UL standards and regulations for temporary electric service. Install service in compliance with NFPA 70 "National Electric Code".

C. Inspections: Arrange for owner's representative to inspect and test each temporary utility before use. Obtain required certifications and permits.

1.5 PROJECT CONDITIONS

A. Temporary Utilities: Prepare a schedule indicating dates for implementation and termination of each temporary utility. At the earliest feasible time, when acceptable to the Owner, change over from use of temporary service to use of permanent service.

B. Conditions of Use: Keep temporary services and facilities clean and neat in appearance. Operate in a safe and efficient manner. Relocate temporary services and facilities as the Work progresses. Do not overload facilities or permit them to interfere with progress. Take necessary fire-prevention measures. Do not allow hazardous, dangerous, or unsanitary conditions, or public nuisances to develop or persist onsite.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Provide new materials. If acceptable to the Designer, the Contractor may use undamaged, previously used materials in serviceable condition. Provide materials suitable for use intended.

B. Lumber and Plywood: Comply with requirements in Division 6 Section "Rough Carpentry".

1. For job-built temporary office, shops, and sheds within the construction area, provide UL-labeled, fire-treated lumber and plywood for framing, sheathing, and siding.

2. For signs and directory boards, provide exterior-type, Grade B-B high-density concrete form overlay plywood of sized and thicknesses indicated.

3. For fences and vision barriers, provide minimum 3/9" (9.5mm) thick exterior plywood.

4. For safety barriers, sidewalk bridges, and similar uses, provide minimum 5/8" (16mm) thick exterior plywood.

C. Gypsum Wallboard: Provide gypsum wallboard on interior walls of temporary offices.

D. Roofing Materials: Provide UL Class A standard-weight asphalt shingles or UL Class C mineral-surfaced roll roofing on roofs of job-built temporary office, shops, and shed.

E. Paint: Comply with requirements of Division 9 Section "Painting".

1. For job-built temporary offices, shops, sheds, fences, and other exposed lumber and plywood, provide exterior-grade acrylic-latex emulsion over exterior primer.

2. For sign panels and applying graphics, provide exterior-grade alkyd gloss enamel over exterior primer.

3. For interior walls of temporary offices, provide two (2) quarts interior latex-flat wall paint.

F. Tarpaulins: Provide waterproof, fire-resistant, UL-labeled tarpaulins with flame-spread rating of (15) or less. For temporary enclosures, provide translucent, nylon-reinforced laminated polyethylene or polyvinyl chloride, fire-retardant tarpaulins.

G. Water: Provide potable water approved by local health authorities.

H. Open-Mesh Fencing: Provide 0.120" (3mm) thick, galvanized 2" (50mm) chainlink fabric fencing 6' (2m) high with galvanized steel pipe posts, 1½" (38mm) ID for line posts and 2½" (64mm) ID for corner posts.

2.2 EQUIPMENT

A. General: Provide new equipment. If acceptable to the Designer, the Contractor may use undamaged, previously used equipment in serviceable condition. Provide equipment suitable for use intended.

B. Water Hoses: Provide ¾" (19mm), heavy-duty, abrasion-resistant, flexible rubber hoses 100' (30m) long, with pressure rating greater than the maximum pressure of the water distribution system. Provide adjustable shutoff nozzles at hose discharge.

C. Electrical Outlets: Provide properly configured, NEMA-polarized outlets to prevent insertion of 110 to 120V plugs into higher voltage outlets. Provide receptacle outlets equipped with ground-fault circuit interrupters, reset button, and pilot light for connection of power tools and equipment.

D. Electrical Power Cords: Provide grounded extension cords. Use hard-service cords where exposed to abrasion and traffic. Provide waterproof connectors to connect separate lengths of electric cords if single lengths will not reach areas where construction activities are in progress. Do not exceed safe length-voltage rating.

E. Lamps and Light Fixtures: Provide general service incandescent lamps of wattage required for adequate illumination. Provide guard cages or tempered-glass enclosures where exposed to breakage. Provide exterior fixture where exposed to moisture.

F. Heating Units: Provide temporary heating units that have been tested and labeled by UL, FM, or another recognized trade association related to the type of fuel being consumed.

~~G. Temporary Offices: Removed.~~

H. Temporary Toilet Units: Provide self-contained, single-occupant toilet units of the chemical, aerated re-circulation, or combustion type. Provide units properly vented and fully enclosed with a glass-fiber-reinforced polyester shell or similar nonabsorbent material.

I. Fire Extinguishers: Provide hand-carried, portable, UL-rated, Class A fire extinguishers for temporary offices and similar spaces. In other locations, provide hand-carried, portable, UL-rated, Class ABC, dry-chemical extinguishers, or a combination of extinguishers of NFPA-recommended classes for the exposures.

1. Comply with NFPA 10 and NFPA 241 for classification, extinguishing agent, and size required by location and class of fire exposure.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Use qualified personnel for installation of temporary facilities. Locate facilities where they will serve the Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required.

B. Provide each Facility ready for use when needed to avoid delay. Maintain and modify as required. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION

A. General: Engage the appropriate local utility company to install temporary service or connect to existing service. Where company provides only part of the service, provide the remainder with matching, compatible materials and equipment. Comply with company recommendations.

1. Arrange with company and existing users for a time when service can be interrupted, if necessary, to make connections for temporary services.

2. Provide adequate capacity at each stage of construction. Prior to temporary utility availability, provide trucked-in services.

3. Obtain easements to bring temporary utilities to the site where the Owner's easements cannot be used for that purpose.

4. Use Charges: Cost or use charges for temporary facilities are not chargeable to the Owner or Designer. Neither the Owner nor Designer will accept cost or use charges as a basis of claims for Change Order.

B. Temporary Water Service: Install water service and distribution piping of sizes and pressures adequate for construction until permanent water service is in use.

1. Sterilization: Sterilize temporary water piping prior to use.

C. Temporary Electric Power Service: Provide weatherproof, grounded electric power service and distribution system of sufficient size, capacity, and power characteristics during construction period. Include meters, transformers, overload-protected disconnects, automatic ground-fault interrupters, and main distribution switch gear.

1. Install electric power service underground, except where overhead service must be used.

2. Power Distribution System: Install wiring overhead and rise vertically where least exposed to damage. Where permitted, wiring circuits not exceeding 125V, AC 20ampere rating, and lighting circuits may be nonmetallic sheathed cable where overhead and exposed for surveillance.

D. Temporary Lighting: When overhead floor or roof deck has been installed, provide temporary lighting with local switching.

1. Install and operate temporary lighting that will fulfill security and protection requirements without operating the entire system. Provide temporary lighting that will provide adequate illumination for construction operations and traffic conditions.

E. Temporary Heating: Provide temporary heat required by construction activities for curing or drying of completed installations or for protection of installed construction from adverse effects of low temperatures or high humidity. Select safe equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce the ambient condition required and minimize consumption of energy.

1. Heating Facilities: Except where the Owner authorizes use of the permanent system, provide vented, self-contained, LP gas or fuel-oil heaters with individual space thermostatic control.

2. Use of gasoline-burning space heaters, open flame, or salamander heating units is prohibited.

F. Temporary Telephones: Provide temporary telephone service throughout the construction period for all personnel engaged in construction activities.

G. Temporary Toilets: Install self-contained toilet units. Use of pit-type privies will not be permitted. Comply with regulations and health codes for the type, number, location, operation, and maintenance of fixtures and facilities. Install where facilities will best serve the Project's needs.

1. Shield toilets to ensure privacy.

2. Provide separate facilities for male and female personnel.

3. Provide toilet tissue materials for each facility.

H. Wash Facilities: The Owner will provide wash facilities within the building. All construction personnel will be allowed access only to those specific facilities designated by the Construction Representative.

I. Provide earthen embankments and similar barriers in and around excavations and subgrade construction, sufficient to prevent flooding by runoff of storm water from heavy rains.

3.3 SUPPORT FACILITIES INSTALLATION

A. General: Locate field offices, storage sheds, and other temporary construction and support facilities for easy access.

1. Maintain support facilities until near Substantial Completion. Remove prior to Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to the Owner.

~~B. Field Offices: Removed.~~

C. Storage facilities: Install storage sheds sized, furnished, and equipped to accommodate materials and equipment involved, including temporary utility service. Sheds may be open shelters or fully enclosed spaces within the building or elsewhere onsite.

D. Temporary Paving: Construct and maintain temporary roads and paving to support the indicated loading adequately and to withstand exposure to traffic during the construction period. Locate temporary paving for roads, storage areas, and parking where the same permanent facilities will be located. Review proposed modifications to permanent paving with the Designer.

~~1. Paving: Removed.~~

2. Coordinate temporary paving development with subgrade grading, compaction, installation and stabilization of subbase, and installation of base and finish courses of permanent paving.

3. Install temporary paving to minimize the need to rework the installations and to result in permanent roads and paved areas without damage or deterioration when occupied by the Owner.

4. Delay installation of the final course of permanent asphalt concrete paving until immediately before Substantial Completion. Coordinate with weather conditions to avoid unsatisfactory results.

5. Extend temporary paving in and around the construction area as necessary to accommodate delivery and storage of materials, equipment usage, administration, and supervision.

E. Construction Parking: Parking at the site will be provided in the areas designated at the Pre-Construction Meeting.

F. Dewatering Facilities and Drains: For temporary drainage and dewatering facilities and operations not directly associated with construction activities included under individual Sections, comply with dewatering requirements of applicable Division 2 Sections. Where feasible, utilize the same facilities. Maintain the site, excavations, and construction free of water.

G. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities.

1. Where heat is needed and the permanent building enclosure is not complete, provide temporary enclosures where there is no other provision for containment of heat. Coordinate enclosure with ventilating and materials drying or curing requirements to avoid dangerous conditions and effects.

2. Install tarpaulins securely with incombustible wood framing and other materials. Close openings of 25SqFt (2.3SqM) or less with plywood or similar materials.

3. Close openings through floor or roof decks and horizontal surfaces with load-bearing, wood-framed construction.

4. Where temporary wood or plywood enclosure exceeds 100SqFt (9.2SqM) in area, use UL-labeled, fire-retardant-treated material for framing and main sheathing.

H. Temporary Lifts and Hoists: Provide facilities for hoisting materials and employees. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

I. Project Identification and Temporary Signs: Prepare project identification and other signs of size indicated. Install signs where indicated to inform the public and persons seeking entrance to the Project. Support on posts or framing of preservative-treated wood or steel. Do not permit installation of unauthorized signs.

1. Project Identification Signs: Engage an experienced sign painter to apply graphics. Comply with details indicated.

2. Temporary Signs: Prepare signs to provide directional information to construction personnel and visitors.

J. Temporary Exterior Lighting: Install exterior yard and sign lights so signs are visible when Work is being performed.

K. Collection and Disposal of Waste: Collect waste from construction areas and elsewhere daily. Comply with requirements of NFPA 241 for removal of combustible waste material and debris. Enforce requirements strictly. Do not hold materials more than seven (7) days during normal weather or three (3) days when the temperature is expected to rise above 80°F (27°C). Handle hazardous, dangerous, or unsanitary waste materials separately from other waste by containerizing properly. Dispose of material lawfully.

L. Rodent Pest Control: Before deep foundation work has been completed, retain a local exterminator or pest control company to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests. Employ this service to perform extermination and control procedures are regular intervals so the Project will be free of pests and their residues at Substantial Completion. Perform control operations lawfully, using environmentally safe materials.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Except for use of permanent fire protection as soon as available, do not change over from use of temporary security and protection facilities to permanent facilities until Substantial Completion, or longer, as requested by the Designer.

B. Temporary Fire Protection: Until fire-protection needs are supplied by permanent facilities, install and maintain temporary fire-protection facilities of the types needed to protect against reasonable predictable and controllable fire losses. Comply with NFPA

10 “Standard for Portable Fire Extinguishers” and NFPA 241 “Standard for Safeguarding Construction, Alterations, and Demolition Operations”.

1. Locate fire extinguishers where convenient and effective for their intended purpose, but not less than one (1) extinguisher on each floor at or near each usable stairwell.

2. Store combustible materials in containers in fire-safe locations.

3. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire-protection facilities, stairways, and other access routes for fighting fires. Prohibit smoking in hazardous fire-exposure areas.

4. Provide supervision of welding operations, combustion-type temporary heating units, and similar sources of fire ignition.

C. Permanent Fire Protection: At the earliest feasible date in each area of the Project complete installation of the permanent fire-protection facility including connected services and place into operation and use. Instruct key personnel on use of facilities.

D. Barricades, Warning Signs, and Lights: Comply with standards and code requirements for erection of structurally adequate barricades. Paint with appropriate colors, graphics, and warning signs to inform personnel and the public of the hazard being protected against. Where appropriate and needed, provide lighting including flashing red or amber lights.

E. Enclosure Fence: Secure area as needed by general contractor.

F. Security Enclosure and Lockup: Install substantial temporary enclosure of partially completed areas of construction. Provide locking entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security.

1. Storage: Where materials and equipment must be stored and are of value or attractive for theft, provide a secure lockup. Enforce discipline in connection with the installation and release of material to minimize the opportunity for theft and vandalism.

G. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations and minimize the possibility that air, waterways, and subsoil might be contaminated or polluted or that other undesirable effects might result. Avoid use of tools and equipment that produce harmful noise. Restrict use of noisemaking tools and equipment to hours that will minimize complaints from persons or firms near the site.

3.5 OPERATION, TERMINATION AND REMOVAL

A. Supervision: Enforce strict discipline in use of temporary facilities. Limit availability of temporary facilities to essential and intended uses to minimize waste and abuse.

B. Maintenance: Maintain facilities in good operating condition until removal. Protect from damage by freezing temperatures and similar elements.

1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.

2. Protection: Prevent water-filled piping from freezing. Maintain markers for underground lines. Protect from damage during excavation operations.

C. Termination and Removal: Unless the Designer requests that it be maintained longer, remove each temporary facility when the need has ended, when replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with the temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

1. Materials and facilities that constitute temporary facilities are the Contractor's property. The Owner reserves the right to take possession of project identification signs.

2. Remove temporary paving not intended for or acceptable for integration into permanent paving. Where the area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil in the area. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at the temporary entrances as required by the governing authority.

3. At Substantial Completion, clean and renovate permanent facilities used during the construction period including, but not limited to, the following:

   a. Replace air filters and clean inside of ductwork and housing.

   b. Replace significantly worn parts and parts subject to unusual operating conditions.

   c. Replace lamps burned out or noticeably dimmed by hours of use.

END OF SECTION 015000

Addendum #2

SECTION 033000 - CAST-IN-PLACE CONCRETE

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 cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes.

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B. Related Requirements:

1. Section 312000 "Earth Moving" for drainage fill under slabs-on-grade.
2. Section 320523 "Cement and Concrete for Exterior Improvements" for concrete pavement and walks.

1.3 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash, slag cement, other pozzolans, and silica fume; materials subject to compliance with requirements.

B. W/C Ratio: The ratio by weight of water to cementitious materials.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

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

1. Indicate amounts of mixing water to be withheld for later addition at Project site.

C. Steel Reinforcement Shop Drawings: Placing Drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.

D. Construction Joint Layout: Indicate proposed construction joints required to construct the structure.

1. Location of construction joints is subject to approval of the Architect.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Welding certificates.

C. Material Certificates: For each of the following, signed by manufacturers:

1. Cementitious materials.
2. Admixtures.
3. Form materials and form-release agents.
4. Steel reinforcement and accessories.
5. Adhesives.
6. Repair materials.

D. Material Test Reports: For the following, from a qualified testing agency:

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

E. Field quality-control reports.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs on Project personnel qualified as ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician.

B. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that 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."

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C. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.

1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.
2. Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician, Grade I. Testing agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician, Grade II.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.

1.8 FIELD CONDITIONS

A. 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 average high and low temperature is expected to fall below 40 deg F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.

B. Hot-Weather Placement: Comply with ACI 301 and ACI 305.1, and as follows:

1. 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. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL

A. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:

1. ACI 301.
2. ACI 117.

2.2 FORM-FACING MATERIALS

A. Smooth-Formed Finished Concrete: Form-facing panels that provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.

1. Plywood, metal, or other approved panel materials.

B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.

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

1. Formulate form-release agent with rust inhibitor for steel form-facing materials.

D. Form Ties: Factory-fabricated, removable or snap-off glass-fiber-reinforced plastic or metal form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.

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2.3 STEEL REINFORCEMENT

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

B. Low-Alloy-Steel Reinforcing Bars: ASTM A 706/A 706M, deformed.

C. Plain-Steel Wire: ASTM A 1064/A 1064M, as drawn.

D. Plain-Steel Welded-Wire Reinforcement: ASTM A 1064/A 1064M, plain, fabricated from as-drawn steel wire into flat sheets.

2.4 REINFORCEMENT ACCESSORIES

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

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

1. For concrete surfaces exposed to view, where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.

2.5 CONCRETE MATERIALS

A. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer.

B. Cementitious Materials:

1. Portland Cement: ASTM C 595, Type IL.
2. Fly Ash: ASTM C 618, Class F or C.

C. Normal-Weight Aggregates: ASTM C 33/C 33M, coarse aggregate or better, graded. Provide aggregates from a single source with documented service record data of at least 10 years' satisfactory service in similar 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.

D. Air-Entraining Admixture: ASTM C 260/C 260M.

E. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures and that do not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.

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.

F. Water: ASTM C 94/C 94M and potable.

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2.6 LIQUID FLOOR TREATMENTS

A. Penetrating Liquid Floor Treatment: Clear, chemically reactive, waterborne solution of inorganic silicate or siliconate materials and proprietary components; odorless; that penetrates, hardens, and densifies concrete surfaces.

2.7 CURING MATERIALS

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

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

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

D. Water: Potable.

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

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2.8 RELATED MATERIALS

A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber or ASTM D 1752, cork or self-expanding cork.

B. Joint Filler: Polyurethane elastomeric sealant conforming to ASTM C920, Type S or M, Grade P or Grade NS, Class 25or higher, Use T.

2.9 REPAIR MATERIALS

A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.

1. Cement Binder: ASTM C 150/C 150M, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by underlayment manufacturer.
4. Compressive Strength: Not less than 4100 psi at 28 days when tested according to ASTM C 109/C 109M.

B. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/4 inch and that can be filled in over a scarified surface to match adjacent floor elevations.

1. Cement Binder: ASTM C 150/C 150M, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by topping manufacturer.
4. Compressive Strength: Not less than 5000 psi at 28 days when tested according to ASTM C 109/C 109M.

2.10 CONCRETE MIXTURES, GENERAL

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.

1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.

B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:

1. Fly Ash: 25 percent.

C. Limit water-soluble, chloride-ion content in hardened concrete to 0.06 percent by weight of cement.

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

1. Use water-reducing high-range water-reducing or plasticizing 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.

2.11 CONCRETE MIXTURES FOR BUILDING ELEMENTS

A. Footings and Foundation Walls: Normal-weight concrete.

1. Minimum Compressive Strength: 4000 psi at 28 days.
2. Maximum W/C Ratio: 0.45.
3. Minimum Cementitious Materials Content: 564 lb/cu. yd.
4. Slump Limit: 4 inches, plus or minus 1 inch.
5. Air Content: 6 percent, plus or minus 1.5 percent at point of delivery for 3/4-inch nominal maximum aggregate size.

B. Slabs-on-Grade: Normal-weight concrete.

1. Minimum Compressive Strength: 4000 psi at 28 days.
2. Maximum W/C Ratio: 0.45.
3. Minimum Cementitious Materials Content: 564 lb/cu. yd.
4. Slump Limit: 8 inches for concrete with verified slump of 2 to 4 inches before adding high-range water-reducing admixture or plasticizing admixture, plus or minus 1 inch.
5. Air Content: Do not allow air content of trowel-finished floors to exceed 3 percent.

2.12 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.13 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M, and furnish batch ticket information.

1. When air temperature is between 85 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 mixer capacity 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 mixer capacity 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, mixture time, quantity, and amount of water added. Record approximate location of final deposit in structure.

PART 3 - EXECUTION

3.1 FORMWORK INSTALLATION

A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.

B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.

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C. Limit concrete surface irregularities, designated by ACI 347 as abrupt or gradual, as follows:

1. Class A, 1/8 inch for smooth-formed finished surfaces.
2. Class B, 1/4 inch for rough-formed finished surfaces.

D. Construct forms tight enough to prevent loss of concrete mortar.

E. Construct forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast-concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.

1. Install keyways, reglets, recesses, and the like, for easy removal.
2. Do not use rust-stained steel form-facing material.

F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.

G. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.

H. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.

I. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.

J. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

K. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

3.2 EMBEDDED ITEM INSTALLATION

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC 303.

3.3 REMOVING AND REUSING FORMS

A. General: Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F for 24 hours after placing concrete. Concrete has to be hard enough to not be damaged by form-removal operations, and curing and protection operations need to be maintained.

B. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material are not acceptable for exposed surfaces. Apply new form-release agent.

C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

3.4 VAPOR-RETARDER INSTALLATION

A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder according to ASTM E 1643 and manufacturer's written instructions.

1. Lap joints 6 inches and seal with manufacturer's recommended tape.

3.5 STEEL REINFORCEMENT INSTALLATION

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

1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that reduce bond to concrete.

C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.

1. Weld reinforcing bars according to AWS D1.4/D 1.4M, where indicated.

D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

E. Install welded-wire reinforcement in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.

3.6 JOINTS

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.

1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
2. Form keyed joints as indicated. Embed keys at least 1-1/2 inches into concrete.
3. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
4. Space vertical joints in walls as indicated. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.

C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:

1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool 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 does not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.

D. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.

1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated.
2. Terminate full-width joint-filler strips not less than 1/2 inch or more than 1 inch below finished concrete surface where joint sealants, specified in Section 079200 "Joint Sealants," are indicated.

3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.

E. 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.

3.7 CONCRETE PLACEMENT

A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections are completed.

B. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect.

C. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.

1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.

D. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete is placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.

1. Deposit concrete in horizontal layers of depth not to exceed formwork design pressures and in a manner to avoid inclined construction joints.
2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.

E. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.

1. Consolidate concrete during placement operations, so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
2. Maintain reinforcement in position on chairs during concrete placement.
3. Screed slab surfaces with a straightedge and strike off to correct elevations.
4. Slope surfaces uniformly to drains where required.
5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.

2

3.8 FINISHING FORMED SURFACES

A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.

1. Apply to concrete surfaces not exposed to public view.

B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.

1. Apply to concrete surfaces exposed to public view.

C. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.9 FINISHING FLOORS AND SLABS

A. General: Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

B. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power-driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture.

1. Apply float finish to surfaces indicated to receive trowel finish and to be covered with fluid-applied or sheet waterproofing.

C. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.

1. Apply a trowel finish to surfaces indicated, exposed to view, or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin-film-finish coating system.

2. Finish and measure surface, so gap at any point between concrete surface and an unleveled, freestanding, 10-ft.- long straightedge resting on two high spots and placed anywhere on the surface does not exceed 1/8 inch.

D. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces indicated or where ceramic or quarry tile is to be installed by either thickset or thinset method. While concrete is still plastic, slightly scarify surface with a fine broom.

2

1. Comply with flatness and levelness tolerances for trowel-finished floor surfaces.

E. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, ramps, and elsewhere as indicated.

1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

3.10 MISCELLANEOUS CONCRETE ITEM INSTALLATION

A. Filling In: Fill in holes and openings left in concrete structures after work of other trades is in place unless otherwise indicated. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.

B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

3.11 CONCRETE PROTECTING AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 305.1 for hot-weather protection during curing.

2

B. Evaporation Retarder: Apply evaporation retarder to unformed 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.

C. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.

D. Cure concrete according to ACI 308.1, by one or a combination of the following methods:

1. Moisture 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. Cure for not less than seven

2

days. Immediately repair any holes or tears during curing period, using cover material and waterproof tape.

a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.
b. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.
c. Cure concrete surfaces to receive floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer certifies does not interfere with bonding of floor covering used on Project.

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.

a. Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer unless manufacturer certifies curing compound does not interfere with bonding of floor covering used on Project.

3.12 LIQUID FLOOR TREATMENT APPLICATION

A. Penetrating Liquid Floor Treatment: Prepare, apply, and finish penetrating liquid floor treatment according to manufacturer's written instructions.

1. Remove curing compounds, sealers, oil, dirt, laitance, and other contaminants and complete surface repairs.
2. Do not apply to concrete that is less than 28 days' old.
3. Apply liquid until surface is saturated, scrubbing into surface until a gel forms; rewet; and repeat brooming or scrubbing. Rinse with water; remove excess material until surface is dry. Apply a second coat in a similar manner if surface is rough or porous.

B. Sealing Coat: Uniformly apply a continuous sealing coat of curing and sealing compound to hardened concrete by power spray or roller according to manufacturer's written instructions.

3.13 JOINT FILLING

A. Prepare, clean, and install joint filler according to manufacturer's written instructions.

1. Defer joint filling until concrete has aged at least one month(s). Do not fill joints until construction traffic has permanently ceased.

B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joints clean and dry.

3.14 CONCRETE SURFACE REPAIRS

A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.

B. Patching Mortar: Mix dry-pack patching mortar, consisting of 1 part portland cement to 2-1/2 parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.

C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.

1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension to solid concrete. Limit cut depth to 3/4 inch. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar matches surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.

D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.

1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
2. After concrete has cured at least 14 days, correct high areas by grinding.
3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.
5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
6. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least a 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent.

Mix patching concrete of same materials and mixture as original concrete, except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.

7. Repair random cracks and single holes 1 inch or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.

E. Repair materials and installation not specified above may be used, subject to Architect's approval.

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3.15 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.

B. Inspections:

1. Steel reinforcement placement.
2. Anchor rod placement.
3. Verification of use of required design mixture.

C. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172/C 172M shall be performed according to the following requirements:

1. Testing Frequency: Obtain at least one composite sample for each 100 cu. yd. or fraction thereof of each concrete mixture placed each day.

   a. When frequency of testing provides 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 mixture. Perform additional tests when concrete consistency appears to change.
3. Air Content: ASTM C 231/C 231M, pressure method, for normal-weight concrete;one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
4. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F and below or 80 deg F and above, and one test for each composite sample.
5. Compression Test Specimens: ASTM C 31/C 31M.

   a. Cast and laboratory cure three sets of two standard cylinder specimens for each composite sample.

6. Compressive-Strength Tests: ASTM C 39/C 39M; test one set of two laboratory-cured specimens at 7 days, one set of two specimens at 28 days, and hold one set of two specimens in reserve.

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a. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.

7. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
8. Strength of each concrete mixture will be satisfactory if every average of any three 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.
9. 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.
10. 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.
11. 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. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42/C 42M or by other methods as directed by Architect.
12. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
13. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.

3.16 PROTECTION OF LIQUID FLOOR TREATMENTS

A. Protect liquid floor treatment from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by liquid floor treatments installer.

END OF SECTION 033000

Addendum #2

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 wood face veneers exceeding 0.01 inch in a 3-inch span.

2. Warranty includes 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 DOOR CONSTRUCTION – GENERAL

A. WDMA I.S.1-A Performance Grade: Extra Heavy Duty; Aesthetic Grade: Premium.

2.2 CORE CONSTRUCTION

A. Particleboard Core Doors:

1. Particleboard: Wood fiber based materials complying with ANSI A208.1 Particleboard standard. Grade LD-2.

2. Adhesive: Fully bonded construction using Polyurethane (PUR) glue.

3. Blocking: As indicated under article "Blocking".

2.3 VENEERED DOORS FOR TRANSPARENT FINISH

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Eggers Industries: Premium Series.
2. Masonite Architectural - Graham: Cendura Series.
3. VT Industries: Heritage Collection.

B. Interior Solid Core Doors:

1. Grade: Premium.

2. Faces: Veneer grades as noted below; veneer minimum 1/50-inch (0.5mm) thickness at moisture content of 12% or less.

   ~~a. Match existing wood species and grain.~~ Omitted by Addendum No. 02

3. Vertical Edges: Matching same species as faces. Wood or composite material, one piece, laminated, or veneered. Minimum requirements per WDMA section P-1, Performance Standards for Architectural Wood Flush Doors.

Addendum #2

D. Provide a spring bumper at each horizontal track to cushion door at end of opening operation.

2.5 MANUAL DOOR OPERATION

A. Push-Up: Provide lift handles and pull rope for raising and lowering doors, operating with not more than 25 lb lift or pull.

~~2.6 ELECTRIC DOOR OPERATORS~~

~~A. General: Furnish electric door-operator assembly of size and capacity recommended and provided by door manufacturer; complete with electric motor and factory-prewired motor controls, gear-reduction unit, solenoid-operated brake, clutch, remote-control stations and control devices.~~

~~B. Provide hand-operated disconnect or mechanism for automatically engaging sprocket-chain operator and releasing brake for emergency manual operation. Include interlock device to automatically prevent motor from operating when emergency sprocket is engaged.~~

~~C. Design operator so that motor may be removed without disturbing limit-switch adjustment and without affecting emergency auxiliary operator.~~

~~D. Door Operator Type: Gear-reduction trolley type, with worm, and worm-gear reduction, enclosed running-in-oil primary drive, and chain or worm-gear secondary drive, quick-clutch disconnect-release for manual operation.~~

~~E. Electric Motors: Provide high-starting torque, reversible, constant-duty, Class A-insulated electric motors with overload protection, sized to move door in either direction, from any position, at not less than 2/3 foot per second or more than 1 foot per second. Coordinate wiring requirements and current characteristics of motors with building electrical system.~~

~~F. Remote Control Station: **Provide separate momentary-contact, three-button control stations with push button controls labeled "Open," "Close," and "Stop" for integration into Security Electronics Control for each overhead door.**~~

~~G. Automatic Reversing Control: Furnish each door with automatic electrically actuated automatic bottom bar safety switch, extending full width of door bottom, and located within neoprene or rubber astragal mounted to bottom door rail. Contact with switch will immediately reverse downward door travel. Furnish manufacturer's standard take-up reel or self-coiling cable.~~

~~PART 3 – EXECUTION~~

Omitted by Addendum No. 02

3.1 INSTALLATION

A. General: Install door, track, and operating equipment complete with necessary hardware, jamb and head mold stops, anchors, inserts, hangers, and equipment supports according to shop drawings, manufacturer's instructions, and as specified. Coordinate requirements with General Contractor.

B. Fasten vertical track assembly to framing at not less than 24 inches o.c. Hang horizontal track from structural overhead framing with angle or channel hangers, welded and bolt-fastened in place. Provide sway bracing, diagonal bracing, and reinforcing as required for rigid installation of track and door-operating equipment.

C. After completing installation, including work by other trades, lubricate, test, and adjust doors to operate easily, free from warp, twist, or distortion and fitting weather tight for entire perimeter.

END OF SECTION 083600

Addendum #2

2. Escutcheons: Wrought
3. Lockset Designs: Provide design indicated.

D. Lock Throw: Comply with testing requirements for length of bolts required for labeled fire doors, and as follows:

1. Bored Locks: Minimum 1/2-inch (13-mm) latchbolt throw.
2. Deadbolts: Minimum 1-inch (25-mm) bolt throw.

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, and as follows:

1. Strikes for Locks and Latches: BHMA A156.2.

G. Lock Functions: Function numbers and descriptions indicated in door hardware sets comply with the following:

1. Bored Locks: BHMA A156.2.

H. Bored Locks: BHMA A156.2, Grade 1; Series 4000

1. Required Manufacturer:

a. Best; an Dormakaba Group. 9K Series

2.2 AUXILIARY LOCKS AND LATCHES

A. Auxiliary Locks: BHMA A156.5, Grade 1

1. Available Manufacturers:

a. Adams Rite Manufacturing Co.; an Assa Abloy Group company
b. Yale Commercial; an Assa Abloy Group company

2.3 LOCK CYLINDERS

A. Cylinders: BHMA A156.5, Manufacturer's interchangeable core type, constructed from brass or bronze, stainless steel, or nickel silver, and complying with the following:

1. Number of Pins: As Required (Owner's standard is 7-pin)
2. Mortise Type: Threaded cylinders with rings and straight- or clover-type cam.
3. Rim Type: Cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.

2.4 KEYING

Changed by Addendum No. 02.

A. Keying System: Factory registered, complying with guidelines in BHMA A156.28, Appendix A. Provide all cylinders and keys master keyed to the ~~existing~~ Best Keying system. Incorporate decisions made in keying conference, and as follows:

Addendum #2

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acoustic Tiles/Panels:
   1. Armstrong World Industries, Inc: www.armstrong.com.
   2. CertainTeed Corporation: www.certainteed.com.
   3. USG: www.usg.com.

B. Suspension Systems:
   1. Same as for acoustical units.

REVISED PER ADDENDUM NO. 02

2.2 ACOUSTICAL UNITS

A. Panel Types (Refer to drawings interior finish plan and schedule for additional requirements.)

1. Type Marked: C2
   a. Basis of Design: Armstrong "DUNE NO. 1774"
   b. Size: 24x24 inches
   c. Thickness: 5/8 inches
   d. Edge: Angled Tegular
   e. Surface Color: White
   f. Surface Finish: Factory applied latex paint
   g. Texture: Fine

2. Type Marked: C3
   a. Basis of Design: Armstrong "CLEAN ROOM VL UNPERFORATED NO. 868"
   b. Size: 24x24 inches
   c. Thickness: 5/8 inches
   d. Edge: Square
   e. Surface Color: White
   f. Surface Finish: Vinyl-faced membrane, Washable
   g. Texture: Smooth
   h. Humidity Resistance: HumiGuard Plus
   i. Clean Room Classification: Clean Room Class 100
   j. Anti-microbial: BioBlock

2.3 SUSPENSION SYSTEM(S)

A. Suspension Systems - General: Complying with ASTM C635/C635M; die cut and interlocking components, with stabilizer bars, clips, splices, perimeter moldings, and hold down clips as required.

B. Ceiling Grid Types (Refer to drawings interior finish plan and schedule for additional requirements.)

1. Type 1
   a. Basis of Design: Armstrong "PRELUDE PLUS XL ALUMINUM 15/16" EXPOSED TEE SYSTEM"
   b. Finish: White painted.

Item #16 – Mobile Cold Food Counter
Contractor Furnished – Contractor Installed

TOP: Constructed of 16 gauge, type 304 stainless steel, die-formed, welded, ground and polished. The top is provided with an opening to receive the appropriately sized drop-in unit. An integral locking device shall be provided to align and retain cart positioning when two or more carts are joined.
BODY: Frame construction shall be of hi-tensile aluminum square tubing, 1-1/4" x 1-1/4". Frame sections are welded construction, ground and polished to a uniform finish. Body is complete with front panel and 7" rear apron of plastic laminate on .063 to aluminum. Owner to specify finish.
REFRIGERATED COLD PAN: The cart includes a RM series drop-in refrigerated cold pan installed in the top. Constructed of 18 gauge, type 304 stainless steel, with raised perimeter bead and solid vinyl gasket. The pan is fully insulated with high density polystyrene, 1" thick on all sides, 2" thick on the bottom and enclosed with a 22 gauge galvanized steel outer case. The interior liner is fabricated with 1/4" radius coved corners. The liner has copper tubing firmly soldered to the top 3" on all sides. A 3/4" dia. drain with strainer,4" PVC nipple, and valve is provided. Separator channels to hold 12" x 20" food pans are included.
REFRIGERATION SYSTEM: The compressor housing shall be fabricated from formed 14 gauge galvanized and bolted to the base of the unit. A fully self-contained condensing unit is provided with a hermetically sealed compressor and a digital electronic thermostat/thermometer. The system is fully charged with CFC free refrigerant and ready to operate.
ELECTRICAL: The unit will be wired for 15 amps., 120 volt, single phase operation, with an on/off thermostat switch and pilot light. A 6' long, 3-wire cord and plug (NEMA 5-15P) will be provided.
CASTERS: The casters shall be 5" diameter, non-marking rubber tired, swivel type with ball bearings in both swivel and axle raceways, provided with grease fittings. Both casters on operator's side have toe activated brakes.

Basis of Design: Atlas Metal CAIH-4-SH-DME W/ CSG-4J-FL FOOD GUARD
Acceptable Alternate Manufacturers:
Hatco
Vollrath

Item #17 – Mobile Hot Food Counter
Contractor Furnished – Contractor Installed

TOP: Constructed of 16 gauge, type 304 stainless steel, die-formed, welded, ground and polished. The top is provided with an opening to receive the appropriately sized drop-in unit. An integral locking device shall be provided to align and retain cart positioning when two or more carts are joined.
BODY: Frame construction shall be of hi-tensile aluminum square tubing, 1-1/4" x 1-1/4". Frame sections are welded construction, ground and polished to a uniform finish. Body is complete with front panel and 7" rear apron of plastic laminate on .063 aluminum. Owner to specify finish.
HOT FOOD PAN: The cart includes a WIH series drop-in hot pan installed in the top. Constructed of 18 gauge, type 304 stainless steel, with a raised perimeter bead and solid vinyl gasket. Individual 12" x 20" hot food wells are provided, fabricated of 18 gauge stainless steel, one piece construction, all welded, ground and polished to a uniform finish. All corners are coved with a minimum 1/4" radius. The pan is fully insulated with high density fiberglass insulation, 1" thick on all sides, 2" thick on the bottom and enclosed with a 22gauge galvanized steel outer case
ELECTRICAL: The unit is provided with 850 watt heating elements, pre-wired to individual thermostat controls, with a pilot light for each well. A 6'long, 3-wire cord and plug is provided, extending from the control box located under the unit, on operator's left. Bottom of outer case can be removed for access to electrical components.
CASTERS: The casters shall be 5" diameter, non-marking rubber tired,

swivel type with ball bearings in both swivel and axle raceways, provided with grease fittings. Both casters on operator's side have toe activated brakes.

Basis of Design: Atlas Metal CARM-4-SH W/ CSG-4J-FW FOOD GARD
Acceptable Alternate Manufacturers:
Hatco
Vollrath

Item #18 – Tray Slide
Government Furnished – Contractor Installed.

Item #19 – Food Warming Cabinet
Government Furnished – Contractor Installed.

Item #20 – Griddle & Stand
Contractor Furnished - Contractor Installed.

Griddle shall be a heavy-duty electric griddle, Stainless steel front and sides. 11" cooking height on 4" adjustable legs. 1⁄2" steel plate for 24", 36" and 48" units; 3⁄4" steel plate for 60" and 72" units. Tubular incoloy elements and one snap action thermostat for every 12"of griddle width. Thermostats adjust from 200° to 450° F. Stainless steel 4" back and tapered side splashes. 3 1⁄2" wide front grease trough empties into large capacity grease drawer. 240V 50/60 Hz, 1 phase. NSF Certified. Provide John Boos Model EES8-3036-X Equipment Stand, 36"W x 30"D x 24"H, 18/430 stainless steel top with 1-1/2" turned up edge on back & both sides, galvanized legs & adjustable undershelf, plastic bullet feet, NSF, KD, and one set of 4 John Boos Model CAS01-R-X Casters, 5", heavy duty, locking, for 1-5/8" diameter legs. Provide cutting board, condiment rail, plate rail, and banking strip accessories.

Basis of Design: Vulcan Model No. HEG36E
Acceptable Alternate Manufacturers:
Cooking Performance Group
Vollrath

Item #21 – Exhaust Hood
Contractor Furnished - Contractor Installed.

Exhaust hood shall be a factory built wall style canopy type exhaust only hood measuring overall approximately 4'-0" long x 2'-0" high x 4'-6" front to back. Hood shall be constructed and installed in accordance with Detail #3/ K101 on the drawings. The depth of the hood shall include an integral 3" air space at rear. The bottom edge of the exhaust hood shall be 6'-8" above the finished floor. The exhaust hood shall be constructed of type 430 stainless steel with a #4 finish on interior and exterior. Hood shall be of all welded construction with all exposed welds ground smooth and polished to the original metal finish. Hood shall be constructed to comply with NSF, NFPA-96 and ETL where such listings apply. Hood shall be delivered to the job site with a "ETL Listed without Fire Damper" label affixed to the hood. Hood shall be supplied with a full length stainless steel filter frame fitted with stainless steel high efficiency baffle type filters in sufficient numbers and sizes to ensure optimum performance as specified by the filter manufacturer. Hood shall be fitted with a stainless steel grease collection trough fitted with a stainless steel removable grease receptacle. The grease trough shall pitch to the right end. Interior of the hood on the front shall have a V shape baffle to direct air into the filters. Interior of hood shall be supplied with one vapor proof light fixture equipped with a 26 watt compact fluorescent bulb and a vapor proof globe. Light fixture shall be wired in a concealed manner to the control panel on Item #50 exhaust hood under Division 26 of the specifications. Each end of the hood shall have a 23" x 23" triangular quarter end

Addendum #2

SECTION 133419 – METAL BUILDING SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Structural-steel framing.
2. Metal roof panels.
3. Metal wall panels.
4. Metal soffit panels.
5. Thermal insulation.
6. Accessories.

B. Related Requirements:

1. Division 03 Concrete Sections for anchor rod installation, concrete, reinforcement, and formwork requirements.

2. Section 072130 Metal Building Insulation for Pre-Engineered Metal Building Insulation for New Construction.

3. Section 077253 "Snow Guards" for prefabricated devices designed to hold snow on the roof surface.

4. Section 083600 "Sectional Overhead Doors" for sectional vehicular doors in metal building systems.

1.2 DEFINITIONS

A. Terminology Standard: See MBMA's "Metal Building Systems Manual" for definitions of terms for metal building system construction not otherwise defined in this Section or in standards referenced by this Section.

1.3 COORDINATION

A. Coordinate sizes and locations of concrete foundations and casting of anchor-rod inserts into foundation walls and footings. Anchor rod installation, concrete, reinforcement, and formwork requirements are specified in Section 033000 "Cast-in-Place Concrete."

B. Coordinate metal panel assemblies with rain drainage work, flashing, trim, and construction of supports and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Shop Drawings: Indicate components by others. Include full building plan, elevations, sections, details and the following:

   1. Anchor-Rod Plans: Submit anchor-rod plans and templates before foundation work begins. Include location, diameter, and minimum required projection of anchor rods required to attach metal building to foundation. Indicate column reactions at each location.
   2. Structural-Framing Drawings: Show complete fabrication of primary and secondary framing; include provisions for openings. Indicate welds and bolted connections, distinguishing between shop and field applications. Include transverse cross-sections.

      a. Show provisions for attaching **roof curbs, exhaust hoods, and pipe racks**.

   3. Metal **Roof and Wall** Panel Layout Drawings: Show layouts of panels including methods of support. Include details of edge conditions, joints, panel profiles, corners, anchorages, clip spacing, trim, flashings, closures, and special details. Distinguish between factory- and field-assembled work; show locations of exposed fasteners.
      a. Show roof-mounted items including roof hatches, equipment supports, pipe supports and penetrations, lighting fixtures, and items mounted on roof curbs.
      b. Show wall-mounted items including personnel doors, vehicular doors, windows, louvers, and lighting fixtures.

   4. Accessory Drawings: Include details of the following items, at a scale of not less than **1-1/2 inches per 12 inches**:

      a. Flashing and trim.
      b. Gutters.
      c. Downspouts.

C. Samples for Initial Selection: Manufacturer's standard color sheets, showing full range of available colors for each type of exposed finish.

D. Delegated Design Submittals: For metal building systems.

   1. Include analysis data indicating compliance with performance requirements and design data signed and sealed by the qualified professional engineer responsible for their preparation.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For **erector**.

B. Welding certificates.

C. Letter of Design Certification: Signed and sealed by a qualified professional engineer. Include the following:

1. Name and location of Project.
2. Order number.
3. Name of manufacturer.
4. Name of Contractor.
5. Building dimensions including width, length, height, and roof slope.
6. Indicate compliance with AISC standards for hot-rolled steel and AISI standards for cold-rolled steel, including edition dates of each standard.
7. Governing building code and year of edition.
8. Design Loads: Include dead load, roof live load, collateral loads, roof snow load, deflection, wind loads/speeds and exposure, seismic design category or effective peak velocity-related acceleration/peak acceleration, and auxiliary loads (cranes).
9. Load Combinations: Indicate that loads were applied acting simultaneously with concentrated loads, according to governing building code.
10. Building-Use Category: Indicate category of building use and its effect on load importance factors.

D. Erector Certificates: For qualified erector, from manufacturer.

E. Material Test Reports: For each of the following products:

1. Structural steel including chemical and physical properties.
2. Bolts, nuts, and washers including mechanical properties and chemical analysis.
3. Tension-control, high-strength, bolt-nut-washer assemblies.
4. Shop primers.
5. Nonshrink grout.

F. Source quality-control reports.

G. Sample Warranties: For special warranties.

1.6 CLOSE-OUT SUBMITTALS

A. Maintenance Data: For metal panel finishes.

1.7 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer.

1. Accreditation: Manufacturer's facility accredited according to IAS AC472, "Accreditation Criteria for Inspection Programs for Manufacturers of Metal Building Systems."
2. Engineering Responsibility: Preparation of comprehensive engineering analysis and Shop Drawings by a professional engineer who is legally qualified to practice in jurisdiction where Project is located. See structural drawings for additional information.

B. Erector Qualifications: An experienced erector who specializes in erecting and installing work similar in material, design, and extent to that indicated for this Project and who is acceptable to manufacturer.

C. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
2. AWS D1.3, "Structural Welding Code - Sheet Steel."

1.8 DELIVERY, STORAGE, AND HANDLING

A. Structural members shall be loaded in such a manner that they may be transported and unloaded without being over-stressed, deformed, or otherwise damaged.

B. Structural steel members and packaged materials shall be protected from corrosion and deterioration. Material shall be stored in a dry area and shall not be placed in direct contact with the ground. Materials shall not be placed on the structure in a manner that might cause distortion or damage to the members or the supporting structures.

C. Deliver components, sheets, panels, and other manufactured items so as not to be damaged or deformed. Package metal panels for protection during transportation and handling.

1.9 FIELD CONDITIONS

A. Weather Limitations: Proceed with panel installation only when weather conditions permit metal panels to be installed according to manufacturers' written instructions and warranty requirements.

1.10 MANUFACTURER'S WARRANTY

A. All work performed on this project shall be free from defective materials and workmanship for a period of one year from date of acceptance. The CONTRACTOR shall provide a warranty on defective materials for a period of one year from acceptance.

B. Special Warranty on Metal Panel Finishes: Manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.
   1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
      a. Color fading more than 5 Hunter units when tested in accordance with ASTM D2244.
      b. Chalking in excess of a No. 8 rating when tested in accordance with ASTM D2414.
      c. Cracking, checking, peeling or failure of paint to adhere to bare metal.
   2. Finish Warranty Period: 25 years from date of Substantial Completion.
   3. Special Weathertightness Warranty for Standing Seam Metal Roof Panels: Manufacturer agrees to repair or replace standing-seam metal roof panel assemblies that leak or otherwise fail to remain weathertight within specified warranty period.
      a. Warranty Period: 20 years from date of Substantial Completion.

1.11 INSTALLER'S WARRANTY

A. Installer Warranty: Submit Installer's warranty, on Owner's designated warranty form (Refer Roofing Installer's Warranty Form section), signed by Installer, covering the Work of this Section, including all components of pre-engineered metal building system such as roof panels, wall panels, flashing, trim, accessories, fasteners, roof curbs, roof penetrations, insulation, vapor barriers, and sealant products, for the following warranty period:
   1. Warranty Period: Five (5) Years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

A. Obtain metal building system components, including primary and secondary framing and metal panel assemblies, from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer to design metal building system.

B. Structural Performance: Metal building systems to withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated according to procedures in MBMA's "Metal Building Systems Manual."

   1. Design Loads: As indicated on Drawings but not less than loads required by the 2018 International Building Code and ASCE 7-16.
   2. Deflection and Drift Limits:
      a. No greater than the following:

         1) Purlins and Rafters: Vertical deflection of 1/240 of the span.
         2) Girts: Horizontal deflection of 1/180 of the span.
         3) Metal Roof Panels: Vertical deflection of 1/150 of the span.
         4) Metal Wall Panels: Horizontal deflection of 1/180 of the span.
         5) Design secondary-framing system to accommodate deflection of primary framing and construction tolerances, and to maintain clearances at openings.
         6) Lateral Drift: Maximum of 1/400 of the building height.

C. Seismic Performance: Metal building system to withstand the effects of earthquake motions determined according to ASCE/SEI 7.

D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

   1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

E. Structural Performance for Metal Roof and Wall Panels: Provide metal panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E1592:

1. Wind Loads: As indicated on Drawings.

2.3 METAL BUILDING SYSTEMS

A. Manufacturers: Obtain metal building system components, including primary and secondary framing and metal panel assemblies, from single source from single manufacturer:

1. Shulte Building Systems, Hockley TX 77477.
2. NUCOR Building Systems, Terrell TX 75160
3. Star Building Systems, Oklahoma City, OK 73149
4. American Buildings
5. Alliance Steel Building Systems
6. Varco Pruden Buildings
7. Approved Alternated Manufacturer

B. System Description: Provide a complete, integrated set of mutually dependent components and assemblies that form a metal building system capable of withstanding structural and other loads, thermally induced movement, and exposure to weather without failure or infiltration of water into building interior.
1. Primary-Frame Type:
   a. Rigid Clear Span: Solid-member, structural-framing system without interior columns.
2. End-Wall Framing:
   a. Manufacturer's standard, for buildings not required to be expandable, consisting of load-bearing end-wall and corner columns and rafters.
3. Secondary-Frame Type: Manufacturer's standard purlins and joists and flush-framed girts.
4. Eave Height: Manufacturer's standard height, as indicated by nominal height on Drawings.
5. Bay Spacing: As indicated on Drawings.
6. Roof Slope: As indicated on Drawings.
7. Roof System: Manufacturer's standard **standing-seam, trapezoidal-rib,** metal roof panels.
   a. Liner Panels: Tapered rib.
8. Exterior Wall System: Manufacturer's standard **exposed-fastener, tapered-rib,** metal wall panels.
   a. Liner Panels: **Flush profile**.

2.4 STRUCTURAL-STEEL FRAMING

A. Structural Steel: Comply with AISC 360, "Specification for Structural Steel Buildings."

B. Bolted Connections: Comply with RCSC's "Specification for Structural Joints Using High-Strength Bolts."

C. Cold-Formed Steel: Comply with AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members" for design requirements and allowable stresses.

D. Primary Framing: Manufacturer's standard primary-framing system, designed to withstand required loads and specified requirements. Primary framing includes transverse and lean-to frames; rafters, rake, and canopy beams; sidewall, intermediate, end-wall, and corner columns; and wind bracing.

1. General: Provide frames with attachment plates, bearing plates, and splice members. Factory drill for field-bolted assembly. Provide frame span and spacing indicated.

a. Slight variations in span and spacing may be acceptable if necessary to comply with manufacturer's standard, as approved by Architect.

2. Rigid Clear-Span Frames: I-shaped frame sections fabricated from shop-welded, built-up steel plates or structural-steel shapes. Interior columns are not permitted.
3. Frame Configuration: Single gable.
4. Exterior Column: Uniform depth.
5. Rafter: Uniform depth.

E. End-Wall Framing: Manufacturer's standard primary end-wall framing fabricated for field-bolted assembly to comply with the following:

1. End-Wall and Corner Columns: I-shaped sections fabricated from structural-steel shapes; shop-welded, built-up steel plates; or C-shaped, cold-formed, structural-steel sheet.
2. End-Wall Rafters: C-shaped, cold-formed, structural-steel sheet; or I-shaped sections fabricated from shop-welded, built-up steel plates or structural-steel shapes.

F. Secondary Framing: Manufacturer's standard secondary framing, including purlins, girts, eave struts, flange bracing, base members, gable angles, clips, headers, jambs, and other miscellaneous structural members. Unless otherwise indicated, fabricate framing from either cold-formed, structural-steel sheet or roll-formed, metallic-coated steel sheet, prepainted with coil coating, to comply with the following:

1. Purlins:

a. C- or Z-shaped sections; fabricated from built-up steel plates, steel sheet, or structural-steel shapes; minimum 2-1/2-inch-wide flanges.

1) Depth: As needed to comply with system performance requirements.

2. Girts: C- or Z-shaped sections; fabricated from built-up steel plates, steel sheet, or structural-steel shapes. Form ends of Z-sections with stiffening lips angled 40 to 50 degrees from flange, with minimum 2-1/2-inch-wide flanges.

a. Depth: As required to comply with system performance requirements.

3. Eave Struts: Unequal-flange, C-shaped sections; fabricated from built-up steel plates, steel sheet, or structural-steel shapes; to provide adequate backup for metal panels.
4. Flange Bracing: Minimum 2-by-2-by-1/8-inch structural-steel angles or 1-inch-diameter, cold-formed structural tubing to stiffen primary-frame flanges.

5. Sag Bracing: Minimum 1-by-1-by-1/8-inch structural-steel angles.
6. Base or Sill Angles: Manufacturer's standard base angle, minimum 3-by-2-inch, fabricated from zinc-coated (galvanized) steel sheet.
7. Purlin and Girt Clips: Manufacturer's standard clips fabricated from steel sheet. Provide galvanized clips where clips are connected to galvanized framing members.
8. Framing for Openings: Channel shapes; fabricated from cold-formed, structural-steel sheet or structural-steel shapes. Frame head and jamb of door openings and head, jamb, and sill of other openings.
9. Miscellaneous Structural Members: Manufacturer's standard sections fabricated from cold-formed, structural-steel sheet; built-up steel plates; or zinc-coated (galvanized) steel sheet; designed to withstand required loads.

G. Bracing: Provide adjustable wind bracing using any method as follows:

1. Rods: ASTM A36/A36M; ASTM A572/A572M, Grade 50; or ASTM A529/A529M, Grade 50; minimum 1/2-inch-diameter steel; threaded full length or threaded a minimum of 6 inches at each end.
2. Rigid Portal Frames: Fabricated from shop-welded, built-up steel plates or structural-steel shapes to match primary framing; of size required to withstand design loads.

H. Anchor Rods: Headed anchor rods as indicated in Anchor Rod Plan for attachment of metal building to foundation.

I. Materials:

1. W-Shapes: ASTM A992/A992M; ASTM A572/A572M, Grade 50 or 55; or ASTM A529/A529M, Grade 50 or 55.
2. Channels, Angles, M-Shapes, and S-Shapes: ASTM A36/A36M; ASTM A572/A572M, Grade 50 or 55; or ASTM A529/A529M, Grade 50 or 55.
3. Plate and Bar: ASTM A36/A36M; ASTM A572/A572M, Grade 50 or 55; or ASTM A529/A529M, Grade 50 or 55.
4. Steel Pipe: ASTM A53/A53M, Type E or S, Grade B.
5. Cold-Formed Hollow Structural Sections: ASTM A500, Grade B or C, structural tubing.
6. Structural-Steel Sheet: Hot-rolled, ASTM A1011/A1011M, Structural Steel (SS), Grades 30 through 55, or High-Strength Low-Alloy Steel (HSLAS) or High-Strength Low-Alloy Steel with Improved Formability (HSLAS-F), Grades 45 through 70; or cold-rolled, ASTM A1008/A1008M, Structural Steel (SS), Grades 25 through 80, or HSLAS, Grades 45 through 70.
7. Metallic-Coated Steel Sheet: ASTM A653/A653M, SS, Grades 33 through 80, or HSLAS or HSLAS-F, Grades 50 through 80; with G60 coating designation; mill phosphatized.
8. Metallic-Coated Steel Sheet Prepainted with Coil Coating: Steel sheet, metallic coated by the hot-dip process and prepainted by the coil-coating process to comply with ASTM A755/A755M.

    a. Zinc-Coated (Galvanized) Steel Sheet: ASTM A653/A653M, SS, Grades 33 through 80, or HSLAS or HSLAS-F, Grades 50 through 80; with G90 coating designation.
    b. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A792/A792M, SS, Grade 50 or 80; with Class AZ50 coating.

9. Non-High-Strength Bolts, Nuts, and Washers: ASTM A307, Grade A, carbon-steel, hex-head bolts; ASTM A563 carbon-steel hex nuts; and ASTM F844 plain (flat) steel washers.

    a. Finish: Plain.

10. High-Strength Bolts, Nuts, and Washers, Grade A325: ASTM F3125/F3125M, Type 1, heavy-hex steel structural bolts; ASTM A563, Grade DH, heavy-hex carbon-steel nuts; and ASTM F436/F436M, Type 1, hardened carbon-steel washers.

    a. Finish: Plain.

11. High-Strength Bolts, Nuts, and Washers, Grade A490: ASTM F3125/F3125M, Type 1, heavy-hex steel structural bolts or Grade F2280 tension-control, bolt-nut-washer assemblies with splined ends; ASTM A563, Grade DH, heavy-hex carbon-steel nuts; and ASTM F436/F436M, Type 1, hardened carbon-steel washers; all with plain finish.

12. Tension-Control, High-Strength Bolt-Nut-Washer Assemblies: ASTM F3125/F3125M, Grade F1852, Type 1, round head assemblies consisting of steel structural bolts with splined ends; ASTM A563, Grade DH, heavy-hex carbon-steel nuts; and ASTM F436/F436M, Type 1 hardened carbon-steel washers.

    a. Finish: Plain.

13. Unheaded Anchor Rods: ASTM F1554, Grade 36.

    a. Configuration: Straight.
    b. Nuts: ASTM A563 heavy-hex carbon steel.
    c. Plate Washers: ASTM A36/A36M carbon steel.
    d. Washers: ASTM F436 hardened carbon steel.
    e. Finish: Plain.

14. Threaded Rods: ASTM A36/A36M.

    a. Nuts: ASTM A563 heavy-hex carbon steel.
    b. Washers: ASTM F436 hardened carbon steel.
    c. Finish: Plain.

J. Finish: Factory primed. Apply specified primer immediately after cleaning and pretreating.

1. Clean and prepare in accordance with SSPC-SP2.
2. Coat with manufacturer's standard primer. Apply primer to primary and secondary framing to a minimum dry film thickness of 1 mil.

    a. Prime secondary framing formed from uncoated steel sheet to a minimum dry film thickness of 0.5 mil on each side.

2.5 METAL ROOF PANELS

A. Standing-Seam, Trapezoidal-Rib, Metal Roof Panels: Machine-seamed, double-lock, roll-formed with raised trapezoidal ribs at panel edges and intermediate striations symmetrically spaced between ribs; designed for sequential installation by mechanically attaching panels to supports using concealed clips located under 1 side of panels and engaging opposite edge of adjacent panels. Panels shall include side lap sealant.

2.5.1.1.1 Material: Zinc-coated (galvanized) or aluminum-zinc alloy-coated steel sheet, 0.024-inch nominal uncoated steel thickness. Prepainted by the coil-coating process to comply with ASTM A755.

a. Exterior Finish: Two-coat fluoropolymer.

2. Clips: Two-piece floating to accommodate thermal movement.
3. Joint Type: Mechanically seamed.
4. Panel Coverage: 24 inches.
5. Panel Height: 2 inches (2 3/4 inches including seam).
6. Uplift Rating: UL 90.
7. Panel Profile: Refer to drawings for basis of design. Cross flutes 6 inches on center, perpendicular to major corrugations in entire length of panel to reduce wind noise. Unless otherwise indicated, match nearest existing building on site with similar standing-seam roof panel specified.

B. Finishes:

1. Colors: Refer to drawing finish schedules. Colors to be selected by Architect from manufacturer's full range of finishes available.

2. Exposed Coil-Coated Finish: Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

3. Concealed Finish: Apply pretreatment and manufacturer's standard white or light colored acrylic or polyester backer finish, consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil.

2.6 METAL WALL PANELS

A. Standing-Seam, Trapezoidal-Rib, Metal Roof Panels: Machine-seamed, double-lock, roll-formed with raised trapezoidal ribs at panel edges and intermediate striations symmetrically spaced between ribs; designed for sequential installation by mechanically attaching panels to supports using concealed clips located under 1 side of panels and engaging opposite edge of adjacent panels. Panels shall include side lap sealant.

1. Material: Zinc-coated (galvanized) or aluminum-zinc alloy-coated steel sheet, 0.024-inch nominal uncoated steel thickness. Prepainted by the coil-coating process to comply with ASTM A755.

   a. Exterior Finish: Two-coat fluoropolymer.

2. Major Rib Spacing: 12 inches on center, with 2 minor corrugations between each major rib entire length of panel.
3. Panel Coverage: 36 inches.
4. Panel Height: 1-1/2 inches

5. Panel Profile: Refer to drawings for basis of design. Unless otherwise indicated, match nearest existing building on site with similar standing-seam roof panel specified.

B. Finishes:

1. Colors: Refer to drawing finish schedules. Colors to be selected by Architect from manufacturer's full range of finishes available.

2. Exposed Coil-Coated Finish: Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

3. Concealed Finish: Apply pretreatment and manufacturer's standard white or light colored acrylic or polyester backer finish, consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil.

2.7 METAL SOFFIT PANELS

A. General: Provide factory-formed metal soffit panels designed to be installed by lapping and interconnecting side edges of adjacent panels and mechanically attaching through panel to supports using concealed fasteners in side laps. Include accessories required for weathertight installation.

K. Metal Soffit Panels: Match profile and material of metal **wall** panels.

1. Finish: **As indicated on Drawings**.

L. Exposed-Fastener, Tapered-Rib-Profile, Metal Soffit Panels: Formed with raised, trapezoidal major ribs and flat pan between major ribs; designed to be installed by lapping side edges of adjacent panels and mechanically attaching panels to supports using exposed fasteners in side laps.

1. Material: Zinc-coated (galvanized) or aluminum-zinc alloy-coated steel sheet, **0.024-inch** nominal uncoated steel thickness. Prepainted by the coil-coating process to comply with ASTM A755/A755M.

a. Exterior Finish: **Two-coat fluoropolymer**
b. Color: as **selected by Architect from manufacturer's full range**.

2. Major-Rib Spacing: **6 inches** o.c.
3. Panel Coverage: **36 inches**.
4. Panel Height: **0.75 inch**.

2.8 ACCESSORIES

A. General: Provide accessories as standard with metal building system manufacturer and as specified. Fabricate and finish accessories at the factory to greatest extent possible, by manufacturer's standard procedures and processes. Comply with indicated profiles and with dimensional and structural requirements.

1. Form exposed sheet metal accessories that are without excessive oil-canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.

B. Roof Panel Accessories: Provide components required for a complete metal roof panel assembly including copings, fasciae, corner units, ridge closures, clips, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal roof panels unless otherwise indicated.

1. Closures: Provide closures at eaves and ridges, fabricated of same material as metal roof panels.
2. Clips: Manufacturer's standard, formed from **steel** sheet, designed to withstand negative-load requirements.
3. Cleats: Manufacturer's standard, mechanically seamed cleats formed from **steel**.
4. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
5. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch-thick, flexible closure strips; cut or premolded to match metal roof panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.
6. Thermal Spacer Blocks: Where metal panels attach directly to purlins, provide thermal spacer blocks of thickness required to provide 1-inch standoff; fabricated from extruded polystyrene.

C. Wall Panel Accessories: Provide components required for a complete metal wall panel assembly including copings, fascia, mullions, sills, corner units, clips, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal wall panels unless otherwise indicated.

1. Closures: Provide closures at eaves and rakes, fabricated of same material as metal wall panels.
2. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
3. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch-thick, flexible closure strips; cut or premolded to match metal wall panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.

D. Flashing and Trim: Zinc-coated (galvanized) or aluminum-zinc alloy-coated steel sheet, 0.018-inch nominal uncoated steel thickness, prepainted with coil coating; finished to match adjacent metal panels.

1. Provide flashing and trim as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, eaves, rakes, corners, bases, framed openings, ridges, fasciae, and fillers.
2. Opening Trim: Zinc-coated (galvanized) or aluminum-zinc alloy-coated steel sheet, 0.018-inch nominal uncoated steel thickness, prepainted with coil coating. Trim head and jamb of door openings, and head, jamb, and sill of other openings.

E. Gutters: Zinc-coated (galvanized) or aluminum-zinc alloy-coated steel sheet, 0.018-inch nominal uncoated steel thickness, prepainted with coil coating; finished to match roof fascia and

rake trim. Match profile of gable trim, complete with end pieces, outlet tubes, and other special pieces as required. Fabricate in minimum 96-inch-long sections, sized according to SMACNA's "Architectural Sheet Metal Manual."

1. Gutter Supports: Fabricated from same material and finish as gutters.
2. Strainers: Bronze, copper, or aluminum wire ball type at outlets.

F. Downspouts: Zinc-coated (galvanized) or aluminum-zinc alloy-coated steel sheet, 0.018-inch nominal uncoated steel thickness, prepainted with coil coating; finished to match metal wall panels. Fabricate in minimum 10-foot-long sections, complete with formed elbows and offsets.

1. Mounting Straps: Fabricated from same material and finish as gutters.

G. Roof Curbs: Zinc-coated (galvanized) or aluminum-zinc alloy-coated steel sheet, 0.048-inch nominal uncoated steel thickness prepainted with coil coating; finished to match metal roof panels; with welded top box and bottom skirt, and integral full-length cricket; capable of withstanding loads of size and height indicated.

1. Curb Subframing: Zinc-coated (galvanized) or aluminum-zinc alloy-coated steel sheet, 0.060-inch nominal uncoated steel thickness, angle-, C-, or Z-shaped metallic-coated steel sheet.
2. Insulation: 1-inch-thick, rigid type.

H. Pipe Flashing: Premolded, EPDM pipe collar with flexible aluminum ring bonded to base.

2.9 FABRICATION

A. General: Design components and field connections required for erection to permit easy assembly.

1. Mark each piece and part of the assembly to correspond with previously prepared erection drawings, diagrams, and instruction manuals.
2. Fabricate structural framing to produce clean, smooth cuts and bends. Punch holes of proper size, shape, and location. Members to be free of cracks, tears, and ruptures.

B. Tolerances: Comply with MBMA's "Metal Building Systems Manual" for fabrication and erection tolerances.

C. Primary Framing: Shop fabricate framing components to indicated size and section, with baseplates, bearing plates, stiffeners, and other items required for erection welded into place. Cut, form, punch, drill, and weld framing for bolted field assembly.

1. Make shop connections by welding or by using high-strength bolts.
2. Join flanges to webs of built-up members by a continuous, submerged arc-welding process.
3. Brace compression flange of primary framing with steel angles or cold-formed structural tubing between frame web and purlin web or girt web, so flange compressive strength is within allowable limits for any combination of loadings.
4. Weld clips to frames for attaching secondary framing if applicable, or punch for bolts.

5. Shop Priming: Prepare surfaces for shop priming according to SSPC-SP 2. Shop prime primary framing with specified primer after fabrication.

D. Secondary Framing: Shop fabricate framing components to indicated size and section by roll forming or break forming, with baseplates, bearing plates, stiffeners, and other plates required for erection welded into place. Cut, form, punch, drill, and weld secondary framing for bolted field connections to primary framing.

1. Make shop connections by welding or by using non-high-strength bolts.
2. Shop Priming: Prepare uncoated surfaces for shop priming according to SSPC-SP 2. Shop prime uncoated secondary framing with specified primer after fabrication.

E. Metal Panels: Fabricate and finish metal panels at the factory to greatest extent possible, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements. Comply with indicated profiles and with dimensional and structural requirements.

1. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of metal panel.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with erector present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Before erection proceeds, survey elevations and locations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments to receive structural framing, with erector present, for compliance with requirements and metal building system manufacturer's tolerances.

1. Engage land surveyor to perform surveying.

C. Proceed with erection only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean and prepare surfaces to be painted according to manufacturer's written instructions for each particular substrate condition.

B. Provide temporary shores, guys, braces, and other supports during erection to keep structural framing secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural framing, connections, and bracing are in place unless otherwise indicated.

3.3 ERECTION OF STRUCTURAL FRAMING

A. Erect metal building system according to manufacturer's written instructions and drawings.

B. Do not field cut, drill, or alter structural members without written approval from metal building system manufacturer's professional engineer.

C. Set structural framing accurately in locations and to elevations indicated, according to AISC specifications referenced in this Section. Maintain structural stability of frame during erection.

D. Align and adjust structural framing before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact with framing. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.

1. Level and plumb individual members of structure.

E. Primary Framing and End Walls: Erect framing level, plumb, rigid, secure, and true to line. Level baseplates to a true even plane with full bearing to supporting structures, set with double-nutted anchor bolts. Use grout to obtain uniform bearing and to maintain a level base-line elevation. Moist-cure grout for not less than seven days after placement.

1. Make field connections using high-strength bolts installed according to RCSC's "Specification for Structural Joints Using High-Strength Bolts" for bolt type and joint type specified.

a. Joint Type: Snug tightened or pretensioned as required by manufacturer.

F. Secondary Framing: Erect framing level, plumb, rigid, secure, and true to line. Field bolt secondary framing to clips attached to primary framing.

1. Provide rake or gable purlins with tight-fitting closure channels and fasciae.
2. Locate and space wall girts to suit openings such as doors and windows.
3. Provide supplemental framing at entire perimeter of openings, including doors, windows, louvers, ventilators, and other penetrations of roof and walls.

G. Bracing: Install bracing in roof and sidewalls where indicated on erection drawings.

1. Tighten rod and cable bracing to avoid sag.
2. Locate interior end-bay bracing only where indicated.

H. Framing for Openings: Provide shapes of proper design and size to reinforce openings and to carry loads and vibrations imposed, including equipment furnished under mechanical and electrical work. Securely attach to structural framing.

I. Erection Tolerances: Maintain erection tolerances of structural framing within AISC 303.

3.4 METAL PANEL INSTALLATION, GENERAL

A. Fabricate and finish metal panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.

B. On-Site Fabrication: Subject to compliance with requirements of this Section, metal panels may be fabricated on-site using UL-certified, portable roll-forming equipment if panels are of same

profile and warranted by manufacturer to be equal to factory-formed panels. Fabricate according to equipment manufacturer's written instructions and to comply with details shown.

C. Examination: Examine primary and secondary framing to verify that structural-panel support members and anchorages have been installed within alignment tolerances required by manufacturer.

1. Examine roughing-in for components and systems penetrating metal panels, to verify actual locations of penetrations relative to seams before metal panel installation.

D. General: Anchor metal panels and other components of the Work securely in place, with provisions for thermal and structural movement.

1. Field cut metal panels as required for doors, windows, and other openings. Cut openings as small as possible, neatly to size required, and without damage to adjacent metal panel finishes.

a. Field cutting of metal panels by torch is not permitted unless approved in writing by manufacturer.

2. Install metal panels perpendicular to structural supports unless otherwise indicated.
3. Flash and seal metal panels with weather closures at perimeter of openings and similar elements. Fasten with self-tapping screws.
4. Locate and space fastenings in uniform vertical and horizontal alignment.
5. Locate metal panel splices over structural supports with end laps in alignment.
6. Lap metal flashing over metal panels to allow moisture to run over and off the material.

E. Lap-Seam Metal Panels: Install screw fasteners using power tools with controlled torque adjusted to compress EPDM washers tightly without damage to washers, screw threads, or metal panels. Install screws in predrilled holes.

1. Arrange and nest side-lap joints so prevailing winds blow over, not into, lapped joints. Lap ribbed or fluted sheets one full rib corrugation. Apply metal panels and associated items for neat and weathertight enclosure. Avoid "panel creep" or application not true to line.

F. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with corrosion-resistant coating, by applying rubberized-asphalt underlayment to each contact surface, or by other permanent separation as recommended by metal roof panel manufacturer.

G. Joint Sealers: Install gaskets, joint fillers, and sealants where indicated and where required for weatherproof performance of metal panel assemblies. Provide types of gaskets, fillers, and sealants indicated; or, if not indicated, provide types recommended by metal panel manufacturer.

1. Seal metal panel end laps with double beads of tape or sealant the full width of panel. Seal side joints where recommended by metal panel manufacturer.
2. Prepare joints and apply sealants to comply with requirements in Section 079200 "Joint Sealants."

3.5 METAL ROOF PANEL INSTALLATION

A. General: Provide metal roof panels of full length from eave to ridge unless otherwise indicated or restricted by shipping limitations.
   1. Install ridge caps as metal roof panel work proceeds.
   2. Flash and seal metal roof panels with weather closures at eaves and rakes. Fasten with self-tapping screws.

B. Standing-Seam Metal Roof Panels: Fasten metal roof panels to supports with concealed clips at each standing-seam joint, at location and spacing and with fasteners recommended by manufacturer.
   1. Install clips with thermal blocks to supports with self-drilling or self-tapping fasteners.
   2. Install pressure plates at locations indicated in manufacturer's written installation instructions.
   3. Seamed Joint: Crimp standing seams with manufacturer-approved motorized seamer tool so that clip, metal roof panel, and factory-applied sealant are completely engaged.
   4. Rigidly fasten eave end of metal roof panels and allow ridge end free movement for thermal expansion and contraction. Predrill panels for fasteners.
   5. Provide metal closures at rake edges, rake walls and each side of ridge caps.

C. Night Seals or Night Tie-Offs: At the end of each day's work, seal off roof construction to prevent water penetration into new roof system.

3.5 METAL ROOF PANEL INSTALLATION

A. General: Install metal wall panels in orientation, sizes, and locations indicated on Drawings. Install panels perpendicular to girts, extending full height of building, unless otherwise indicated. Anchor metal wall panels and other components of the Work securely in place, with provisions for thermal and structural movement.
   1. Install continuous insulative foam adhesive tape to face of girts per manufacturer's instructions.
   2. Unless otherwise indicated, begin metal panel installation at corners with center of rib lined up with line of framing.
   3. Shim or otherwise plumb substrates receiving metal wall panels.
   4. When 2 rows of metal panels are required, lap panels 4 inches minimum.
   5. When building height requires 2 rows of metal panels at gable ends, align lap of gable panels over metal wall panels at eave height.
   6. Rigidly fasten base end of metal wall panels and allow eave end free movement for thermal expansion and contraction. Predrill panels.
   7. Flash and seal metal wall panels with weather closures at eaves and rakes, and at perimeter of all openings. Fasten with self-tapping screws.
   8. Install screw fasteners in predrilled holes.
   9. Install flashing and trim as metal wall panel work proceeds.
   10. Apply elastomeric sealant continuously between metal base channel (sill angle) andconcrete, and elsewhere as indicated on Drawings; if not indicated, as necessary for waterproofing.
   11. Align bottom of metal wall panels and fasten with blind rivets, bolts, or self-drilling or self-tapping screws.
   12. Provide weatherproof escutcheons for pipe and conduit penetrating exterior walls.

B. Metal Wall Panels: Install metal wall panels on exterior side of girts. Attach metal wall panels to supports with fasteners as recommended by manufacturer.

3.6 METAL SOFFIT PANEL INSTALLATION

D. Provide metal soffit panels the full width of soffits. Install panels perpendicular to support framing.

E. Flash and seal metal soffit panels with weather closures where panels meet walls and at perimeter of all openings.

3.7 ACCESSORY INSTALLATION

A. General: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.

1. Install components required for a complete metal roof panel assembly, including trim, copings, ridge closures, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.
2. Install components for a complete metal wall panel assembly, including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.
3. Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with corrosion-resistant coating, by applying rubberized-asphalt underlayment to each contact surface, or by other permanent separation as recommended by manufacturer.

B. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.

1. Install exposed flashing and trim that is without excessive oil-canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof and weather-resistant performance.
2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped or bayonet-type expansion provisions cannot be used or would not be sufficiently weather resistant and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).

C. Gutters: Join sections with riveted-and-soldered or lapped-and-sealed joints. Attach gutters to eave with gutter hangers spaced as required for gutter size, but not more than 36 inches o.c. using manufacturer's standard fasteners. Provide end closures and seal watertight with sealant. Provide for thermal expansion.

D. Downspouts: Join sections with 1-1/2-inch telescoping joints. Provide fasteners designed to hold downspouts securely 1 inch away from walls; locate fasteners at top and bottom and at approximately 60 inches o.c. in between.

1. Provide elbows at base of downspouts to direct water away from building.

E. Circular Roof Ventilators: Set ventilators complete with necessary hardware, anchors, dampers, weather guards, rain caps, and equipment supports. Mount ventilators on flat level base. Install preformed filler strips at base to seal ventilator to metal roof panels.

F. Continuous Roof Ventilators: Set ventilators complete with necessary hardware, anchors, dampers, weather guards, rain caps, and equipment supports. Join sections with splice plates and end-cap skirt assemblies where required to achieve indicated length. Install preformed filler strips at base to seal ventilator to metal roof panels.

G. Roof Curbs: Install curbs at locations indicated on Drawings. Install flashing around bases where they meet metal roof panels.

H. Pipe Flashing: Form flashing around pipe penetration and metal roof panels. Fasten and seal to panel as recommended by manufacturer.

3.8 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a qualified special inspector to perform field quality control special inspections and to submit reports.

B. Product will be considered defective if it does not pass tests and inspections.

C. Prepare test and inspection reports.

D. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.

E. Touchup Painting:

1. After erection, promptly clean, prepare, and prime or reprime field connections, rust spots, and abraded surfaces of prime-painted structural framing**, bearing plates,** and accessories.

   a. Clean and prepare surfaces by SSPC-SP 2, "Hand Tool Cleaning," or by SSPC-SP 3, "Power Tool Cleaning."
   b. Apply a compatible primer of same type as shop primer used on adjacent surfaces.

2. Cleaning and touchup painting are specified in Section 099100 "Painting".

END OF SECTION 133419

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Addendum #2

~~B. ASME Compliance for Steel Tanks: Fabricate and label mineral tanks to comply with ASME Boiler and Pressure Vessel Code: Section VIII, Division 1, where indicated.~~

~~C. ASME Compliance for FRP Tanks: Fabricate and label mineral tanks to comply with ASME Boiler and Pressure Vessel Code: Section X, where indicated.~~

D. UL Compliance: Fabricate and label water softeners to comply with UL 979, "Water Treatment Appliances."

1.8 COORDINATION

A. Coordinate sizes and locations of concrete bases with actual equipment provided.

1.9 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of water softeners that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Structural failures of mineral and brine tanks.
      b. Faulty operation of controls.
      c. Deterioration of metals, metal finishes, and other materials beyond normal use.
      d. Attrition loss of resin exceeding 3 percent per year.
      e. Mineral washed out of system during service run or backwashing period.
      f. Effluent turbidity greater and color darker than incoming water.
      g. Fouling of underdrain system, gravel, and resin with turbidity or by dirt, rust, or scale from water softener or soft water, while operating according to manufacturer's written operating instructions.
   2. Commercial Water Softeners, Warranty Period: From date of Substantial Completion.
      a. Mineral Tanks: Five years.
      b. Brine Tanks: 10 years.
      c. Control Valve: One year(s).

1.10 MAINTENANCE SERVICE

A. Initial Maintenance Service: Beginning at Substantial Completion, provide three months' full maintenance by skilled employees of water softener Installer. Include monthly preventive maintenance, repair or replacement of worn or defective components, cleaning, and adjusting as required for proper water softener operation at rated capacity. Provide parts and supplies the same as those used in the manufacture and installation of original equipment.

PART 2 - PRODUCTS

2.1 COMMERCIAL WATER SOFTENERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Culligan International Company.
   2. Marlo Incorporated.
   3. WaterSoft; a division of Amtrol, Inc.

B. Description: Factory-assembled, pressure-type water softener.
   1. Standard: Comply with NSF 61, "Drinking Water System Components - Health Effects."

2. Configuration: Mineral tank units, refer to schedule on drawings for exact number and one brine tank.
3. Mounting: On skids.
4. Wetted Components: Suitable for water temperatures from 40 to at least 100 deg F.
5. Mineral Tanks: FRP, pressure-vessel quality.
   a. Construction: Fabricated and built per manufacturer compliance. ~~Fabricated and stamped to comply with ASME Boiler and Pressure Vessel Code: Section X, "Fiber-Reinforced Plastic Pressure Vessels." Where possible subject to ASME ratings based upon tank size.~~
   b. ~~Pressure Rating: 100 psig minimum.~~
   c. Freeboard: 50 percent minimum for backwash expansion above normal resin bed level.
   d. Support Legs or Skirt: Constructed of structural steel, welded to tank.
   e. Upper Distribution System: Single, point type, fabricated from galvanized-steel pipe and fittings.
   f. Lower Distribution System: Hub and radial-arm or header-lateral type; fabricated from nonmetallic pipe and fittings with individual, fine-slotted, nonclogging plastic strainers, and arranged for even flow distribution through resin bed.
   g. Liner: PE, ABS, or other material suitable for potable water.
6. Controls: Fully automatic; factory wired and factory mounted on unit.
   a. Adjustable duration of various regeneration steps.
   b. Push-button start and complete manual operation.
   c. Electric time clock and switch for fully automatic operation, adjustable to initiate regeneration at any hour of day and any day of week or at fixed intervals.
   d. Sequence of Operation: Multiport pilot-control valve automatically pressure-actuates main operating valve through steps of regeneration and return to service.
   e. Pointer on pilot-control valve shall indicate cycle of operation.
   f. Includes means of manual operation of pilot-control valve if power fails.
7. Main Operating Valves: Industrial, automatic, multiport, diaphragm type with the following features:
   a. Slow opening and closing, nonslam operation.
   b. Diaphragm guiding on full perimeter from fully open to fully closed.
   c. Isolated, dissimilar metals within valve.
   d. Self-adjusting, internal, automatic brine injector that draws brine and rinses at constant rate independent of pressure.
   e. Sampling cocks for soft water.
   f. Special tools are not required for service.
8. Flow Control: Automatic, to control backwash and flush rates over wide variations in operating pressure; does not require field adjustments.
   a. Demand-Initiated Control: Each multiple mineral-tank unit is equipped with automatic-reset-head water meter, in common outlet header, that electrically activates cycle controller to automatically regenerate one mineral tank at preset total in gallons and divert flow to other tanks. Automatically repeats with other tanks. Electrical lockout prevents simultaneous regeneration of more than one tank.
9. Brine Tank: Combination measuring and wet-salt storing system.
   a. Tank and Cover Material: Fiberglass, 3/16 inch thick; or molded PE, 3/8 inch thick.
   b. Brine Valve: Float operated and plastic fitted for automatic control of brine withdrawal and freshwater refill.
   c. Size: Large enough for at least four regenerations at full salting.
10. Factory-Installed Accessories:
   a. Piping, valves, tubing, and drains.
   b. Sampling cocks.

Addendum #2

SECTION 263600 - TRANSFER SWITCHES

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. Nonautomatic transfer switches.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for transfer switches.
   2. Include rated capacities, operating characteristics, electrical characteristics, and accessories.

B. Shop Drawings:
   1. Include plans, elevations, sections, details showing minimum clearances, conductor entry provisions, gutter space, and installed features and devices.
   2. Include material lists for each switch specified.

C. Seismic Qualification Data: Certificates, for transfer switches, accessories, and components, from manufacturer.
   1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
   2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
   3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For each type of product to include in emergency, operation, and maintenance manuals.
   1. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following:
      a. Features and operating sequences.
      b. List of all factory settings of relays; provide relay-setting and calibration instructions, including software, where applicable.

1.5 WARRANTY

A. Manufacturer's Warranty: Manufacturer agrees to repair or replace components of transfer switch or transfer switch components that fail in materials or workmanship within specified warranty period.
   1. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Comply with NEMA ICS 1.

C. Comply with NFPA 99.

D. Comply with NFPA 110.

E. Comply with UL 1008 unless requirements of these Specifications are stricter.

F. Indicated Current Ratings: Apply as defined in UL 1008 for continuous loading and total system transfer, including tungsten filament lamp loads not exceeding 30 percent of switch ampere rating, unless otherwise indicated.

G. Tested Fault-Current Closing and Short-Circuit Ratings: Adequate for duty imposed by protective devices at installation locations in Project under the fault conditions indicated, based on testing according to UL 1008.
   1. Where transfer switch includes internal fault-current protection, rating of switch and trip unit combination shall exceed indicated fault-current value at installation location.
   2. Short-time withstand capability for three cycles.

H. Repetitive Accuracy of Solid-State Controls: All settings shall be plus or minus 2 percent or better over an operating temperature range of minus 20 to plus 70 deg C.

I. Resistance to Damage by Voltage Transients: Components shall meet or exceed voltage-surge withstand capability requirements when tested according to IEEE C62.62. Components shall meet or exceed voltage-impulse withstand test of NEMA ICS 1.

J. Electrical Operation: Accomplish by a nonfused, momentarily energized solenoid or electric-motor-operated mechanism. Switches for emergency or standby purposes shall be mechanically and electrically interlocked in both directions to prevent simultaneous connection to both power sources unless closed transition.

K. Neutral Switching: Where four-pole switches are indicated, provide neutral pole switched simultaneously with phase poles.

L. Battery Charger: For generator starting batteries.
   1. Float type, rated 10 A.
   2. Ammeter to display charging current.
   3. Fused ac inputs and dc outputs.

M. Annunciation, Control, and Programming Interface Components: Devices at transfer switches for communicating with remote programming devices, annunciators, or annunciator and control panels shall have communication capability matched with remote device.

N. Factory Wiring: Train and bundle factory wiring and label, consistent with Shop Drawings, by color-code or by numbered or lettered wire and cable markers at terminations. Color-coding and wire and cable markers are specified in Section 260553 "Identification for Electrical Systems."
   1. Designated Terminals: Pressure type, suitable for types and sizes of field wiring indicated.
   2. Power-Terminal Arrangement and Field-Wiring Space: Suitable for top, side, or bottom entrance of feeder conductors as indicated.
   3. Control Wiring: Equipped with lugs suitable for connection to terminal strips.
   4. Accessible via front access.

O. Enclosures: General-purpose NEMA 250, Type 1 or Type 3R, complying with NEMA ICS 6 and UL 508, unless otherwise indicated.

2.2 NONAUTOMATIC TRANSFER SWITCHES

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. ASCO Power Technologies.
   2. Caterpillar, Inc.; Electric Power Division.
   3. Cummins Power Generation.
   4. ESL Power Systems, Inc.
   5. Eaton.
   6. Russelectric, Inc.

B. Electrically Operated: Electrically actuated by push buttons designated "Normal Source" and "Alternative Source." Switch shall be capable of transferring load in either direction with either or both sources energized.

C. Double-Throw Switching Arrangement: Incapable of pauses or intermediate position stops during switching sequence.

D. Include overload protection on the “Alternative Source” connection for use with portable Emergency generator during scheduled maintenance.

E. Pilot Lights: Indicate source to which load is connected.

F. Source-Available Indicating Lights: Supervise sources via transfer-switch normal- and alternative-source sensing circuits.
   1. Normal Power Supervision: Green light with nameplate engraved "Normal Source Available."
   2. Emergency Power Supervision: Red light with nameplate engraved "Alternative Source Available."

G. Unassigned Auxiliary Contacts: Switch shall have one set of normally closed contacts for each switch position, rated 10 A at 240-V ac.

H. Switch Characteristics: Designed for continuous-duty repetitive transfer of full-rated current between active power sources.
   1. Switch Action: Double throw; mechanically held in both directions.
   2. Contacts: Silver composition or silver alloy for load-current switching.
   3. Conductor Connectors: Suitable for use with conductor material and sizes.
   4. Material: Tin-plated aluminum or Hard-drawn copper, 98 percent conductivity.
   5. Main and Neutral Lugs: Mechanical type.
   6. Ground Lugs and Bus-Configured Terminators: Mechanical type.

7. Ground bar.
8. Connectors shall be marked for conductor size and type according to UL 1008.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Floor-Mounting Switch: Anchor to floor by bolting.
   1. Install transfer switches on cast-in-place concrete equipment base(s). Comply with requirements for equipment bases and foundations specified in Section 033000 "Cast-in-Place Concrete."
   2. Comply with requirements for seismic control devices specified in Section 260548.16 "Seismic Controls for Electrical Systems."
   3. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases.
   4. Provide workspace and clearances required by NFPA 70.

B. Annunciator and Control Panel Mounting: Flush in wall unless otherwise indicated.

C. Identify components according to Section 260553 "Identification for Electrical Systems."

D. Set field-adjustable intervals and delays, relays, and engine exerciser clock.

E. Comply with NECA 1.

3.2 CONNECTIONS

A. Wiring Method: Install cables in raceways and cable trays except within electrical enclosures. Conceal raceway and cables except in unfinished spaces.
   1. Comply with requirements for raceways and boxes specified in Section 260533 "Raceways and Boxes for Electrical Systems."

B. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points with no excess and without exceeding manufacturer's limitations on bending radii.

C. Ground equipment according to Section 260526 "Grounding and Bonding for Electrical Systems."

D. Connect wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

E. Connect twisted pair cable according to Section 260523 "Control-Voltage Electrical Power Cables."

F. Route and brace conductors according to manufacturer's written instructions and Section 260529 "Hangers and Supports for Electrical Systems." Do not obscure manufacturer's markings and labels.

G. Brace and support equipment according to Section 260548.16 "Seismic Controls for Electrical Systems."

H. Final connections to equipment shall be made with liquidtight, flexible metallic conduit no more than 18 inches in length.

3.3 FIELD QUALITY CONTROL

A. Administrant for Tests and Inspections:
   1. Administer and perform tests and inspections with assistance of factory-authorized service representative.

B. Tests and Inspections:
   1. After installing equipment, test for compliance with requirements according to NETA ATS.
   2. Visual and Mechanical Inspection:
      a. Compare equipment nameplate data with Drawings and Specifications.
      b. Inspect physical and mechanical condition.
      c. Inspect anchorage, alignment, grounding, and required clearances.
      d. Verify that the unit is clean.
      e. Verify appropriate lubrication on moving current-carrying parts and on moving and sliding surfaces.
      f. Verify that manual transfer warnings are attached and visible.
      g. Verify tightness of all control connections.
      h. Inspect bolted electrical connections for high resistance using one of the following methods, or both:
         1) Use of low-resistance ohmmeter.
         2) Verify tightness of accessible bolted electrical connections by calibrated torque-wrench method according to manufacturer's published data.
      i. Perform manual transfer operation.
      j. Verify positive mechanical interlocking between normal and alternate sources.
      k. Perform visual and mechanical inspection of surge arresters.
      l. Inspect control power transformers.
         1) Inspect for physical damage, cracked insulation, broken leads, tightness of connections, defective wiring, and overall general condition.
         2) Verify that primary and secondary fuse or circuit-breaker ratings match Drawings.
         3) Verify correct functioning of drawout disconnecting contacts, grounding contacts, and interlocks.
   3. Electrical Tests:
      a. Perform insulation-resistance tests on all control wiring with respect to ground.
      b. Perform a contact/pole-resistance test. Compare measured values with manufacturer's acceptable values.
      c. Verify settings and operation of control devices.
      d. Calibrate and set all relays and timers.
      e. Verify phase rotation, phasing, and synchronized operation.
      f. Verify correct operation and timing of the following functions:
         1) Normal source voltage-sensing and frequency-sensing relays.
         2) Engine start sequence.
         3) Time delay on transfer.
         4) Alternative source voltage-sensing and frequency-sensing relays.
         5) Interlocks and limit switch function.
         6) Time delay and retransfer on normal power restoration.
         7) Engine cool-down and shutdown feature.
   4. Measure insulation resistance phase-to-phase and phase-to-ground with insulation-resistance tester. Include external annunciation and control circuits. Use test voltages and procedure recommended by manufacturer. Comply with manufacturer's specified minimum resistance.
      a. Check for electrical continuity of circuits and for short circuits.

b. Inspect for physical damage, proper installation and connection, and integrity of barriers, covers, and safety features.
c. Verify that manual transfer warnings are properly placed.
d. Perform manual transfer operation.

5. After energizing circuits, perform each electrical test for transfer switches stated in NETA ATS and demonstrate interlocking sequence and operational function for each switch at least three times.
   a. Simulate power failures of normal source to transfer switches and retransfer from emergency source with normal source available.
   b. Simulate loss of phase-to-ground voltage for each phase of normal source.
   c. Verify time-delay settings.
   d. Verify pickup and dropout voltages by data readout or inspection of control settings.
   e. Perform contact-resistance test across main contacts and correct values exceeding 500 microhms and values for one pole deviating by more than 50 percent from other poles.
   f. Verify proper sequence and correct timing of engine starting, transfer time delay, retransfer time delay on restoration of normal power, and engine cool-down and shutdown.
6. Ground-Fault Tests: Coordinate with testing of ground-fault protective devices for power delivery from both sources.
   a. Verify grounding connections and locations and ratings of sensors.

C. Coordinate tests with tests of generator and run them concurrently.

D. Report results of tests and inspections in writing. Record adjustable relay settings and measured insulation and contact resistances and time delays. Attach a label or tag to each tested component indicating satisfactory completion of tests.

E. Transfer switches will be considered defective if they do not pass tests and inspections.

F. Remove and replace malfunctioning units and retest as specified above.

G. Prepare test and inspection reports.

H. Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each switch. Remove all access panels so joints and connections are accessible to portable scanner.
   1. Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
   2. Record of Infrared Scanning: Prepare a certified report that identifies switches checked and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.
   3. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each switch 11 months after date of Substantial Completion.

3.4 DEMONSTRATION

A. Train Owner's maintenance personnel to adjust, operate, and maintain transfer switches and related equipment.

B. Training shall include testing ground-fault protective devices and instructions to determine when the ground-fault system shall be retested. Include instructions on where ground-fault sensors are located and how to avoid negating the ground-fault protection scheme during testing and circuit modifications.

C. Coordinate this training with that for generator equipment.

END OF SECTION 263600

Addendum #2

Geotechnical Investigation Report

Wappapello Training Site - T2232-01
200 Soldier Dining Facility
461 County Road 517
Wappapello, MO 63966

Prepared For:

Dille & Pollard Architecture
266 S Mt. Auburn Road
Cape Girardeau, MO 63703

May 10, 2023

Prepared By:
William J. Cobb, PE
&
Matthew B. Foster
Project Engineer

Smith&Co. Project No. P220249

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STATE OF MISSOURI
WILLIAM J. COBB
NUMBER PE-2004017146
PROFESSIONAL ENGINEER
5/16/23

May 10, 2023

Dille & Pollard Architecture
266 S Mt. Auburn Road
Cape Girardeau, MO 63703

RE: Geotechnical Investigation Report
Wappapello Training Site – T2232-01 – 200 Soldier Dining Facility

Dear Ms. Uhrhan:

At your request, Smith&Co., has completed a geotechnical investigation for the proposed dining facility to be located at 461 County Road 517, Wappapello, Missouri in Wayne County.

The subsurface consists of mostly of clay soil described as a tan to tannish-brown, stiff to very stiff, **SANDY LEAN CLAY (CL)**, encountered at elevation (506-502'). Previous drilling and characterization identified clay soils below elevation 502', described as a tannish-brown, stiff to hard, dry **SANDY FAT CLAY (CH),** with trace moisture and trace gravel near the base; encountered at elevation (502'-481').

Expansive and potentially compressible soils were not identified at the time of drilling. However, previous investigations have identified expansive soils across the site. Expansive soils should not be placed within three feet of the bottom of footings or within one foot of the base of pavements or building slabs. If encountered, expansive soils should be removed within these zones and replaced with structural fill compacted to 95% maximum standard density. Footing subgrades should be checked for expansive material at the time of excavation per ASTM D4318.

Foundations should consist of reinforced concrete spread or strip footings supported by in situ soils and/or structural fill. **Shallow foundations may be sized for a maximum net allowable bearing pressure of 3,000 psf**. The proposed net allowable bearing pressures would be the maximum applied load to the foundations with a possible total settlement of one inch or less and a differential settlement of one-half of the total settlement. The footing base should be placed at least 24" below finished grade for adequate frost protection and foundations should be protected from surface runoff with adequate site grading.

An IBC full depth boring of 100 feet was not completed. However, using Hazards by Design, https://hazards.atcouncil.org software the site would be classified as Site Class "C" with the maximum considered earthquake spectral response accelerations at short period (Ss) and second period (S1) are approximately 0.998g and 0.35g, respectively.

If you have questions or require additional information, please contact the undersigned at 573-785-9621.

Sincerely,
SMITH&CO.
ENGINEERS

STATE OF MISSOURI
WILLIAM J. COBB
NUMBER
PE-2004017146
PROFESSIONAL ENGINEER

5/16/23

William J. Cobb, PE
Engineering Department Manager

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STATE OF MISSOURI
WILLIAM J. COBB
NUMBER
PE-2004017146
PROFESSIONAL ENGINEER

5/16/23

1. INTRODUCTION

1.1. Project Understanding

The proposed building site is located at 461 County Road 517, Wappapello, Missouri in Wayne County. It is our understanding; the project will consist of erecting a 50' x 100' single story structure which when finished will be used as a soldier dining facility. Smith&Co. was contracted to perform a geotechnical investigation for the proposed building. All findings and recommendations are summarized in this report.

1.2. General Site Conditions

At the time of the subsurface investigation the proposed building site was formerly the vacant lot and wooded area east of the dining facility. The lot was gravel with surface drainage primarily to the south and west. At the time of the investigation the site was dry and free of encumbrances. Figure 1: Project Location Map is included in Appendix A.

1.3. General Site Geology

The subject property is located on the southeastern edge of the Salem Plateau at approximately 506 feet above sea level. The dominant area surficial soil type is the Loring Silt Loam, a moderately well drained soil with a high runoff class, a moderately low to moderately high capacity to transmit water with moderate storage capacity[1].

Bedrock at the site consists of the Roubidoux and Gasconade Formations.

The Roubidoux consists of dolomite, cherty dolomite, sandy dolomite, dolomitic sandstone, and sandstone[2].

The Gasconade is commonly subdivided into an upper unit, a lower unit, and the basal Gunter Sandstone Member. The upper Gasconade is a massively bedded, medium-crystalline dolomite with relatively little chert. The lower Gasconade is a very cherty, coarsely crystalline dolomite[2].

The Gunter Sandstone Member consist of sandy dolomite and/or sandstone.

2. FIELD INVESTIGATIONS AND LABORATORY TESTING

2.1. Field Investigation Methods

Six (6) boreholes (BH1A-BH6A) were advanced at the proposed site on April 30, 2023, by Smith&Co. using a GeoProbe 7822DT equipped with 2.75-inch ID hollow stem augers. Boreholes (BH1A – BH4A) were located within the proposed building footprint and were advanced 21 feet below ground surface (bgs). Boreholes (BH5A and BH6A) were in the proposed parking area and were advanced to 11 feet bgs.

Disturbed samples were collected using Standard Penetration Tests (SPTs) at selected intervals until either terminal depth was reached and/or auger/sampler refusal was encountered. Figure 2: Borehole Location Map is included in Appendix A.

After each borehole was drilled, it was checked for the presence of groundwater and then backfilled using drill cuttings. No groundwater was encountered at the time of drilling.

Overall, SPT N values ranged from 3-50 with an average of 15.

N values ranging from 4 to 10 are indicative of medium stiff clay and/or silt; and loose sand and/or gravel. While N values ranging from 10 to 30 are suggestive of medium dense sand and/or gravel; and stiff to very stiff clay and/or silt. In addition, N values ranging from 30 to 50+ are characteristic of dense to very dense sands and/or gravels; and hard to very hard clays and/or silts.

2.2. Laboratory Testing Results

Soil testing consisted of moisture content, sieve analysis, and Atterberg limits.

Moisture content was moderately low 19.4%. The liquid limit, plastic limit and plasticity index values were 34, 20, and 14 respectively. The sample contained approximately 6% sand, with 93.6% of the total sample passing the #200 sieve. The Laboratory Testing Report is included in Appendix C.

2.3. Subsurface Characterization

The subsurface is comprised of mostly clay soil and described as a tan to tannish-brown soft to very stiff, **SANDY LEAN CLAY (CL)**, encountered at elevation (506'-502').

Previous drilling and characterization identified clay soils below elevation 502', these soils are described as a tannish-brown, stiff to hard, dry **SANDY FAT CLAY (CH),** with trace moisture and trace gravel near the base, previously encountered at elevation (502'-481')

The surface and terminal depth elevation of each borehole are listed below:

Borehole ID	EST Surface Elev. (ft, Google Earth, 2021)	Terminal Depth Elev. (ft, MSL)
BH1A	506	480
BH2A	502	477
BH3A	505	479
BH4A	506	480
BH5A	506	495
BH6A	506	495

No encumbrances or irregularities were encountered at the time of drilling. Complete descriptions of subsurface material can be found on the Geotechnical Drilling Logs in Appendix B.

3. DESIGN RECOMMENDATIONS.

3.1. Expansive/Compressible Soils

Expansive and potentially compressible soils were not identified at the time of drilling.

However, previous investigations have identified expansive soils across the site.

Expansive soils should not be placed within three feet of the bottom of footings or within one foot of the base of pavements or building slabs. Expansive soils should be removed within these zones and replaced with structural fill compacted to 95% maximum standard density. Footing subgrades should be checked for expansive material at the time of excavation per ASTM D4318.

3.2. Proposed Foundations

Foundations should consist of reinforced concrete spread or strip footings supported by in situ soils and/or structural fill. **Shallow foundations may be sized for a maximum net allowable bearing pressure of 3,000 psf.**

The soil below exterior wall footings and non-heated areas should be protected from freezing by providing a minimum soil cover depth of 24 inches.

In the absence of a rigorous lateral bearing capacity analysis, lateral bearing capacity and lateral sliding friction parameters were developed based on published values in IBC, 2012. For sandy clay the published allowable lateral pressure is 100 psf/ft below natural grade. At no time shall the combination of lateral bearing

In the absence of a rigorous lateral bearing capacity analysis, lateral bearing capacity and lateral sliding friction parameters should be based on published values in IBC, 2015 for the following soil classifications.

- Class 4 (SW SP, SM, SC, GM, and GC) – 150psf/ft
- Class 5 (CH, CL, ML, and MH) – 100psf/ft

The proposed net allowable bearing pressures would be the maximum applied load to the foundations with a possible total settlement of one inch or less and a differential settlement of one-half of the total settlement.

3.3. Settlement

A rigorous settlement analysis is beyond the scope of this report. The proposed net allowable bearing pressures would be the maximum applied load to the foundations with a possible total settlement of one inch or less and a differential settlement of one-half of the total settlement.

3.4. Footing Spacing Considerations

All spread or pad footings should be spaced with no edge closer than the width/diameter of the larger footing for applying the above allowable bearing values. Increase the footing size or reduce the above maximum allowable bearing value by one-half if the edges of two footings are closer than the width/diameter of the larger footing. The minimum width of shallow footings should be 24 inches for continuous strip footings and 36 inches for spread footings.

3.5 Pavement Design

Pavement sections for both Portland cement and asphaltic concrete were calculated using AASHTO,19931. The effective modulus of subgrade reaction (k) for subgrade was estimated from the CBR values and a design value of 2 was selected. The design equivalent single axel loads (ESALs) were assumed. From this information and other standard pavement parameters the pavement sections were calculated as outlined in the sections below.

Portland Cement Concrete Pavement

The calculation results using 80% reliability for Portland cement concrete pavement utilized the traffic loading provided above are summarized below in Table 5.1.

Table 3.1 – Portland Cement Concrete Pavement Calculation Summary

Aggregate Base Thickness (in.)	Concrete Pavement Thickness (in.)
4.0	6.0

Portland Cement Concrete Pavement should also be provided at all trash enclosures, loading areas, and other areas that receive continuous truck loading. All non-reinforced concrete pavements should have a 28 day unconfined compressive strength of 4,000 psi (min), crushed aggregate, and a minimum of 5% entrained air.

Asphaltic Concrete Pavement

In this analysis, calculated asphalt pavement thicknesses are more sensitive to changes in the geotechnical parameters. The result from an asphalt pavement calculation is a structural number. The course thicknesses are multiplied by the calculated coefficients, the sum of which must add up to at least the structural number. Using the parameters described herein,

reliability values of 80% and a structural number 4.0. Table 5.2 summarizes the resulting asphalt thickness with variations in aggregate base and bituminous-treated base thickness.

Table 3.2 – Asphaltic Concrete Pavement Calculation Summary

Aggregate Base Thickness (in.)	Asphalt Pavement Thickness (in.)
6	4

[1] AASHTO (1993). *Guide for Design of Pavement Structures.* American Association of State Highway and Transportation Officials.

4. SEISMIC CONSIDERATIONS

An IBC full depth boring of 100 feet was not completed. However, using Hazards by Design, https://hazards.atcouncil.org software the site would be classified as Site Class "C" with the maximum considered earthquake spectral response accelerations at short period (Ss) and second period (S1) are approximately 0.998g and 0.35g, respectively[4].

ATC Hazards by Design Report can be found in Appendix F.

5. CONSTRUCTION RECOMMENDATIONS

5.1. Site Preparation

Turf and topsoil material should be stripped and may be stockpiled for use in final topsoil lift or in landscaping. After the topsoil is stripped, the project area should be proof rolled with a large roller or a loaded 12 yard dump truck. If the existing subgrade soils are soft or pumping, the project engineer or geotechnical engineer may approve corrective actions before the placement of fill materials. The corrective actions may include placing bridging lifts or installing a geotechnical fabrics or geotextiles to improve the strength of the lower soils.

5.2. Fill Material

For roadway and embankment construction, fill material meeting the criteria Missouri Standard Specifications for Highway Construction (MoDOT, 2011)[3] Section 200 should be used and compacted, except as noted. Cohesive soils should be compacted with padded (sheep's foot) rollers and cohesionless soils should be compacted with vibratory rollers.

Fill materials for roadways and structures should be free of organic materials, roots, large gravel or rock pieces more than six inches in diameter (top two feet), frozen soils, and debris.

Fill materials should consist of low or medium plasticity clays (CL or CL-ML), high plasticity clay (CH), sands (SC, SM, SW, or SP), or gravels (GC, GM, GW, or GP). High plasticity clay (CH) shall be limited below the top three feet of fill beneath building slabs/footings and one foot beneath exterior pavements. Silts (ML or MH), organic soils (OL or OH), or peat (PT) should only be used outside the roadway and structure fill zone. All fill materials beneath proposed roadways and slabs should be placed and re-compacted to 95% of Standard Proctor density at a target average moisture content of -2% to +4% as determined by ASTM D-698.

All fill materials beneath proposed building footings should be placed and re-compacted to 98% of Standard Proctor density at a target average moisture content of -2% to +4% as determined by ASTM D-698Backfill materials for utilities, trenches, drainage trenches, structures, or foundation walls in paving and structure area should be MoDOT Section 1007 Type I or V base materials compacted to 95% standard compaction.

5.3. Footing Excavation Considerations

Soils, especially silts, can lose significant strength if they become wet; therefore, precautions should be taken during footing construction to prevent water from standing in the excavations. Protect the undisturbed bearing soil from surface and subsurface moisture.

Spread footing and grade beam excavations should not be allowed to have water standing in them. Place the concrete footing on the same day of the footing excavation or protect the bearing soils with a non-reinforced concrete seal slabs (2,000 psi) having a minimum thickness of four inches. If bearing soils become wet or disturbed, then the soils should be dried and re-compacted or removed and replaced to obtain the required bearing.

5.4. Existing Structures, Utilities, & Other Objects

Utilities that will interfere with project construction should be relocated. Depressions from the removal of structures, boulders, utilities, and other objects should be filled with compacted select fill material or base materials.

5.5. Construction Monitoring Program

Roadways, foundations, and structure construction should be conducted under the supervision of a geotechnical engineer or a qualified engineering technician working under their supervision.

6. LIMITATIONS

The conclusions presented in this report have been formulated using that degree of skill and care normally exercised by similar professionals in the engineering profession. No warranty can be made regarding the continuity of the subsurface conditions between the boreholes. Should the project conditions as stated in this report change, the engineer preparing this report should be contacted so that the conclusions may be adjusted accordingly.

7. REFERENCES

[1] USDA, Web *Soil Survey:* https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm
[2] Thompson, Thomas L., *The Stratigraphic Succession in Missouri*, 1995.
[3] MoDOT (2011). Missouri Standard Specifications for Highway Construction. Missouri Highways and Transportation Commission, Jefferson City, MO
[4] https://hazards.atcouncil.org

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APPENDIX A

Figure 1: Project Location Map

Figure 2: Borehole Location Map

WAPPAPELLO TRAINING SITE (T2232-01)
COUNTY ROAD 517, WAPPAPELLO, MISSOURI

FIGURE 1: PROJECT LOCATION MAP

DRAWN BY: RDS DATE: 5/23
CHECKED BY: MBF DATE: 5/23
DRAWING FILE: T2232-01-MAPS.dwg
JOB: P210017

0 200 400

THIS BAR WILL MEASURE 1" WHEN PRINTED AT FULL SCALE.

SMITH&CO. ENGINEERS
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CIVIL ENGINEERING • SURVEYING •
GEOTECHNICAL & ENVIRONMENTAL SERVICES • MATERIAL TESTING

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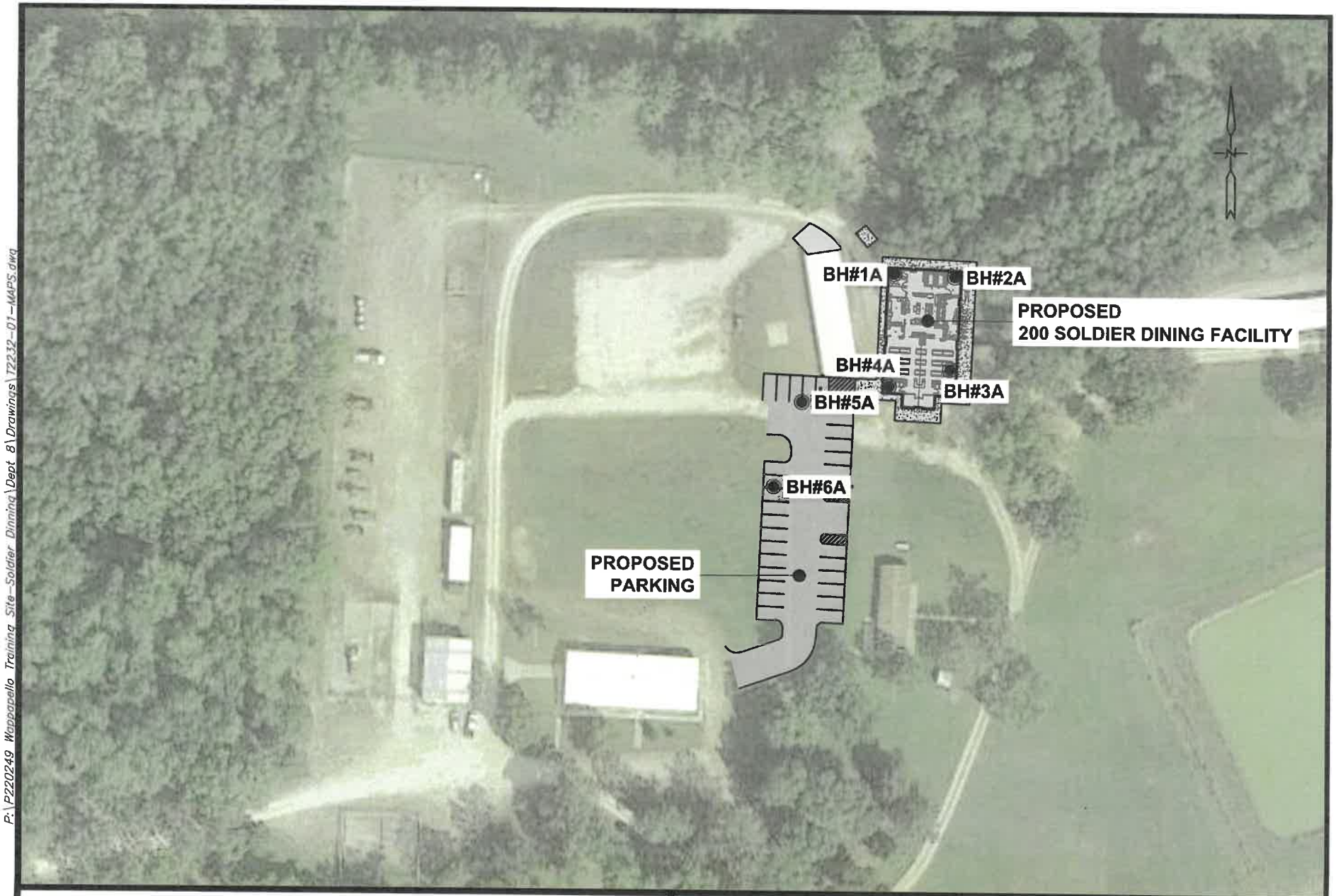

WAPPAPELLO TRAINING SITE (T2232-01)
COUNTY ROAD 517, WAPPAPELLO, MISSOURI

FIGURE 2: BOREHOLE LOCATION MAP

DRAWN BY: RDS DATE: 5/23
CHECKED BY: MBF DATE: 5/23
DRAWING FILE: T2232-01-MAPS.dwg
JOB: P210017

0 50 100

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APPENDIX B

Geotechnical Drilling Logs

SMITH&CO. ENGINEERS
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Poplar Bluff, MO 63901
Ph: 573.785.9621 Fax: 573.785.2651
URL: www.shsmithco.com; email: info@shsmithco.com

GEOTECHNICAL BOREHOLE LOG

BH - 1A

Client: Dille&Pollard
Project No: P220249
Project Name: Wappapello Training Site Dining Facility
Project Location: CR 517, Wappapello, MO

Date(s) Drilled:	3/30/2023	Drill Rig Type	GeoProbe 7822DT	Water Level:	None ATD
Logged By:	RAB	Drill Bit Size/Type	2.75" ID	Backfill Type:	Drill Cuttings
Drilled By:	JAM	Drilling Method	HSA	Boring Location:	See Attached Map
Reviewed/ Approved By:	WJC	Depth Drilled: 25'	Surface Elevation: 506.00		

Comments: Elevation in reference to Google Earth Pro, Dec. 2022

BOREHOLE Depth	Elevation	SAMPLES & FIELD TESTS: Sample Type	Number	Recovery, Inches	SPT Blow Counts @ 6"	SPT N-value, RQD-inches	PP Reading, RQD%	Graphic Log	MATERIAL DESCRIPTION	NOTES
0	506								Surface: Gravel	Start Time: 1:00 Finish ime: 2:30
			1	14	1 1 4	5	1.5		**SANDY LEAN CLAY (CL)**, tannish-brown, damp, medium stiff	w=19.4%, LL=34 PL=20 PI=14; %passing: #4 - 100, #10 - 99, #40 - 95, #200 -94
5	501		2	17	4 8 10	18	4.5		very stiff	
			3	15	9 15 18	23	4.5		very stiff	
10	496		4	16	8 10 10	20	4		dry, very stiff	
15	491		5	20	1 2 2	4	2		damp, soft	
20	486		6	21	2 3 4	7	2.5		medium stiff	
25	481									

LEGEND/NOTES (SEE GEOTECHNICAL NOTES TERMS, AND SYMBOLS FOR ADDITIONAL INFORMATION)

- 2" O.D. split-barrel sampler driven with 140-lb SPT hammer
- 3" O.D. thin-walled (Shelby) tube push sampler
- 2" O.D. Continuous rock core (NQ unless otherwise specified)
- 2-3/4" I.D. CME continuous soil sampler
- 3" O.D. split-barrel sampler with or without liners driven with 140-lb hammer

2 5 8 — Standard Penetration Test (SPT) Blow Counts with 140 pound hammer falling 30" to drive split spoon sample in 3 - 6" increments. Sum of last two numbers is the blow count per foot (or as listed) or the SPT N-value.

Free water depth in boring

ATD — At Time Drilled

RQD — Rock Quality Designation = Amount, in percent, of intact rock core pieces greater than 4 inches in length in each coring interval; calculated as the sum of the lengths of intact core, divided by the length of the core run. Recovery typically expressed in inches for soil or rock recovered in sampler. Percent recovery is the ratio of recovery to sampling interval advancement.

PP — Pocket Penetrometer Reading of unconfined strength (approximate TSF) on undisturbed samples. PP Reading on disturbed SPT samples are higher than actual.

Qu — Laboratory Unconfined Compressive Strength (PSF)

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URL: www.shsmithco.com email: info@shsmithco.com

GEOTECHNICAL BOREHOLE LOG

Client: Dille&Pollard
Project No: P220249
Project Name: Wappapello Training Site Dining Facility
Project Location: CR 517, Wappapello, MO

Drilled By: JAM
Logged By: RAB
Approved By: WJC
Comments: Elevation in reference to Google Earth Pro, Dec. 2022
Other:

BOREHOLE		SAMPLES & FIELD TESTS							MATERIAL DESCRIPTION	NOTES
Depth	Elevation	Sample Type	Number	Recovery, Inches	SPT Blow Counts @ 6"	SPT N-value, RQD-inches	PP Reading, RQD%	Graphic Log		
25	481		7	23	8 10 13	23	4		very stiff	
									BORING TERMINATED AT 26', 3/30/23	Abandoned using drill cuttings
30	476									
35	471									
40	466									
45	461									
50	456									
55	451									
60	446									
65	441									

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GEOTECHNICAL BOREHOLE LOG

BH - 2A

Client: Dille&Pollard
Project No: P220249
Project Name: Wappapello Training Site Dining Facility
Project Location: CR 517, Wappapello, MO

Date(s) Drilled:	3/30/2023	Drill Rig Type	GeoProbe 7822DT	Water Level:	None ATD
Logged By:	RAB	Drill Bit Size/Type	2.75" ID	Backfill Type:	Drill Cuttings
Drilled By:	JAM	Drilling Method	HSA	Boring Location:	See Attached Map
Reviewed/ Approved By:	WJC	Depth Drilled: 25'	Surface Elevation: 502.00		

Comments: Elevation in reference to Google Earth Pro, Dec. 2022

Depth	Elevation	Sample Type	Number	Recovery, Inches	SPT Blow Counts @ 6"	SPT N-value, RQD-inches	PP Reading, RQD%	Graphic Log	MATERIAL DESCRIPTION	NOTES
0	502								Surface: topsoil	Start Time: 7:50 Finish ime: 9:15
			1	20	4 6 10	16	4.0		CLAY, tan, damp, very stiff, with trace sand	
5	497		2	17	6 11 14	25	4.5+		very stiff	
			3	17	7 17 22	39	4.5+		hard	
10	492		4	16	7 16 17	33	4.5+		hard	
15	487		5	16	7 10 14	24	4.5+		very stiff	15-25' hard drilling
20	482		6	18	8 12 16	28	4.5+		very stiff	
25	477									

LEGEND/NOTES (SEE GEOTECHNICAL NOTES TERMS, AND SYMBOLS FOR ADDITIONAL INFORMATION)

- 2" O.D. split-barrel sampler driven with 140-lb SPT hammer
- 3" O.D. thin-walled (Shelby) tube push sampler
- 2" O.D. Continuous rock core (NQ unless otherwise specified)
- 2-3/4" I.D. CME continuous soil sampler
- 3" O.D. split-barrel sampler with or without liners driven with 140-lb hammer

2 5 8 — Standard Penetration Test (SPT) Blow Counts with 140 pound hammer falling 30" to drive split spoon sample in 3 - 6" increments. Sum of last two numbers is the blow count per foot (or as listed) or the SPT N-value.

Free water depth in boring

ATD — At Time Drilled

RQD — Rock Quality Designation = Amount, in percent, of intact rock core pieces greater than 4 inches in length in each coring interval; calculated as the sum of the lengths of intact core, divided by the length of the core run. Recovery typically expressed in inches for soil or rock recovered in sampler. Percent recovery is the ratio of recovery to sampling interval advancement.

PP — Pocket Penetrometer Reading of unconfined strength (approximate TSF) on undisturbed samples. PP Reading on disturbed SPT samples are higher than actual.

Qu — Laboratory Unconfined Compressive Strength (PSF)

SMITH&CO. ENGINEERS
901 Vine Street, P.O. Box 72
Poplar Bluff, MO 63901
Ph: 573.785.9621 Fax: 573.785.2651
URL: www.shsmithco.com email: info@shsmithco.com

GEOTECHNICAL BOREHOLE LOG

Client Dille&Pollard
Project No: P220249
Project Name: Wappapello Training Site Dining Facility
Project Location: CR 517, Wappapello, MO

Drilled By: JAM
Logged By: RAB
Approved By: WJC
Comments: Elevation in reference to Google Earth Pro, Dec. 2022
Other:

BOREHOLE		SAMPLES & FIELD TESTS							MATERIAL DESCRIPTION	NOTES
Depth	Elevation	Sample Type	Number	Recovery, Inches	SPT Blow Counts @ 6"	SPT N-value, RQD-inches	PP Reading, RQD%	Graphic Log		
25	477		7	13	12 50+1		4.5+		hard, some rock	
									BORING TERMINATED AT 26', 3/30/23	Abandoned using drill cuttings
30	472									
35	467									
40	462									
45	457									
50	452									
55	447									
60	442									
65	437									

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GEOTECHNICAL BOREHOLE LOG

BH - 3A

Client: Dille&Pollard
Project No: P220249
Project Name: Wappapello Training Site Dining Facility
Project Location: CR 517, Wappapello, MO

Date(s) Drilled:	3/30/2023	Drill Rig Type	GeoProbe 7822DT	Water Level:	None ATD
Logged By:	RAB	Drill Bit Size/Type	2.75" ID	Backfill Type:	Drill Cuttings
Drilled By:	JAM	Drilling Method	HSA	Boring Location:	See Attached Map
Reviewed/ Approved By:	WJC	Depth Drilled:	25'	Surface Elevation:	505.00

Comments: Elevation in reference to Google Earth Pro, Dec. 2022

Depth	Elevation	Sample Type	Number	Recovery, Inches	SPT Blow Counts @ 6"	SPT N-value, RQD-inches	PP Reading, RQD%	Graphic Log	MATERIAL DESCRIPTION	NOTES
0	505								Surface: Gravel	Start Time: 9:30 Finish Time: 10:50
			1	17	1 4 5	9	3.5		CLAY, tan, damp, stiff, with trace sand	
5	500		2	19	6 7 7	14	3.5		stiff	
			3	19	2 3 3	6	2.50		medium stiff	
10	495		4	22	2 2 4	6	2.50		medium stiff	
15	490		5	24	1 1 2	3	1.50		soft	15-25' hard drilling
20	485		6	23	3 3 4	7	2.00		medium stiff	
25	480									

LEGEND/NOTES (SEE GEOTECHNICAL NOTES TERMS, AND SYMBOLS FOR ADDITIONAL INFORMATION)

- 2" O.D. split-barrel sampler driven with 140-lb SPT hammer
- 3" O.D. thin-walled (Shelby) tube push sampler
- 2" O.D. Continuous rock core (NQ unless otherwise specified)
- 2-3/4" I.D. CME continuous soil sampler
- 3" O.D. split-barrel sampler with or without liners driven with 140-lb hammer

2 5 8 — Standard Penetration Test (SPT) Blow Counts with 140 pound hammer falling 30" to drive split spoon sample in 3 - 6" increments. Sum of last two numbers is the blow count per foot (or as listed) or the SPT N-value.

Free water depth in boring

ATD — At Time Drilled

RQD — Rock Quality Designation = Amount, in percent, of intact rock core pieces greater than 4 inches in length in each coring interval; calculated as the sum of the lengths of intact core, divided by the length of the core run. Recovery typically expressed in inches for soil or rock recovered in sampler. Percent recovery is the ratio of recovery to sampling interval advancement.

PP — Pocket Penetrometer Reading of unconfined strength (approximate TSF) on undisturbed samples. PP Reading on disturbed SPT samples are higher than actual.

Qu — Laboratory Unconfined Compressive Strength (PSF)

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GEOTECHNICAL BOREHOLE LOG

BH - 3A

Client: Dille&Pollard
Project No: P220249
Project Name: Wappapello Training Site Dining Facility
Project Location: CR 517, Wappapello, MO

Drilled By: JAM
Logged By: RAB
Approved By: WJC
Comments: Elevation in reference to Google Earth Pro, Dec. 2022
Other:

BOREHOLE		SAMPLES & FIELD TESTS								MATERIAL DESCRIPTION	NOTES
Depth	Elevation	Sample Type	Number	Recovery, Inches	SPT Blow Counts @ 6"	SPT N-value, RQD-inches	PP Reading, RQD%	Graphic Log			
25	480										
			7	21	2 2 3	5	2			medium stiff, with some rock	
										BORING TERMINATED AT 26', 3/30/23	Abandoned using drill cuttings
30	475										
35	470										
40	465										
45	460										
50	455										
55	450										
60	445										
65	440										

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GEOTECHNICAL BOREHOLE LOG

BH - 4A

Client: Dille&Pollard
Project No: P220249
Project Name: Wappapello Training Site Dining Facility
Project Location: CR 517, Wappapello, MO

Date(s) Drilled:	3/30/2023	Drill Rig Type	GeoProbe 7822DT	Water Level:	None ATD
Logged By:	RAB	Drill Bit Size/Type	2.75" ID	Backfill Type:	Drill Cuttings
Drilled By:	JAM	Drilling Method	HSA	Boring Location:	See Attached Map
Reviewed/ Approved By:	WJC	Depth Drilled: 25'	Surface Elevation: 506.00		

Comments: Elevation in reference to Google Earth Pro, Dec. 2022

Depth	Elevation	Sample Type	Number	Recovery, Inches	SPT Blow Counts @ 6"	SPT N-value, RQD-inches	PP Reading, RQD%	Graphic Log	Material Description	Notes
0	506								Surface: Gravel	Start Time: 11:25 Finish Time: 12:30
			1	15	2 4 6	10	3.5		CLAY, tan, damp, stiff, with trace sand	
5	501		2	22	4 6 10	16	4.0		very stiff	
			3	21.5	2 1 3	4	2.00		soft	
10	496		4	25	1 1 1	3	1.00		soft, very damp	
15	491		5	22	1 1 2	3	1.50		soft	15-25' hard drilling
20	486		6	21	2 2 4	6	2.50		medium stiff	
25	481									

LEGEND/NOTES (SEE GEOTECHNICAL NOTES TERMS, AND SYMBOLS FOR ADDITIONAL INFORMATION)

- 2" O.D. split-barrel sampler driven with 140-lb SPT hammer
- 3" O.D. thin-walled (Shelby) tube push sampler
- 2" O.D. Continuous rock core (NQ unless otherwise specified)
- 2-3/4" I.D. CME continuous soil sampler
- 3" O.D. split-barrel sampler with or without liners driven with 140-lb hammer

2 / 5 / 8 — Standard Penetration Test (SPT) Blow Counts with 140 pound hammer falling 30" to drive split spoon sample in 3 - 6" increments. Sum of last two numbers is the blow count per foot (or as listed) or the SPT N-value.

Free water depth in boring

ATD — At Time Drilled

RQD — Rock Quality Designation = Amount, in percent, of intact rock core pieces greater than 4 inches in length in each coring interval; calculated as the sum of the lengths of intact core, divided by the length of the core run. Recovery typically expressed in inches for soil or rock recovered in sampler. Percent recovery is the ratio of recovery to sampling interval advancement.

PP — Pocket Penetrometer Reading of unconfined strength (approximate TSF) on undisturbed samples. PP Reading on disturbed SPT samples are higher than actual.

Qu — Laboratory Unconfined Compressive Strength (PSF)

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GEOTECHNICAL BOREHOLE LOG

Client: Dille&Pollard
Project No: P220249
Project Name: Wappapello Training Site Dining Facility
Project Location: CR 517, Wappapello, MO

Drilled By: JAM
Logged By: RAB
Approved By: WJC
Comments: Elevation in reference to Google Earth Pro, Dec. 2022
Other:

BOREHOLE		SAMPLES & FIELD TESTS							MATERIAL DESCRIPTION	NOTES
Depth	Elevation	Sample Type	Number	Recovery, Inches	SPT Blow Counts @ 6"	SPT N-value, RQD-inches	PP Reading, RQD%	Graphic Log		
25	481									
			7	23	2 3 2	5	3		medium stiff, with some rock	
									BORING TERMINATED AT 26', 3/30/23	Abandoned using drill cuttings
30	476									
35	471									
40	466									
45	461									
50	456									
55	451									
60	446									
65	441									

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GEOTECHNICAL BOREHOLE LOG

BH - 5A

Client: Dille&Pollard
Project No: P220249
Project Name: Wappapello Training Site Dining Facility
Project Location: CR 517, Wappapello, MO

Date(s) Drilled:	3/30/2023	Drill Rig Type	GeoProbe 7822DT	Water Level:	None ATD
Logged By:	RAB	Drill Bit Size/Type	2.75" ID	Backfill Type:	Drill Cuttings
Drilled By:	JAM	Drilling Method	HSA	Boring Location:	See Attached Map
Reviewed/ Approved By:	WJC	Depth Drilled: 11'	Surface Elevation: 506.00		

Comments: Elevation in reference to Google Earth Pro, Dec. 2022

Depth	Elevation	Sample Type	Number	Recovery, Inches	SPT Blow Counts @ 6"	SPT N-value, RQD-inches	PP Reading, RQD%	Graphic Log	MATERIAL DESCRIPTION	NOTES
0	506								Surface: topsoil	Start Time: 4:50 Finish Time: 5:15
			1	15	2 4 6	10	4.0		CLAY, brown-tan, damp, stiff, with trace sand	
5	501		2	17	4 6 10	16	4.5		very stiff	
			3	18	2 3 3	6	3.00		medium stiff	
10	496		4	20	1 1 2	3	1.50		soft	
									BORING TERMINATED AT 11', 3/30/23	Abandoned using drill cuttings
15	491									
20	486									
25	481									

LEGEND/NOTES (SEE GEOTECHNICAL NOTES TERMS, AND SYMBOLS FOR ADDITIONAL INFORMATION)

- 2" O.D. split-barrel sampler driven with 140-lb SPT hammer
- 3" O.D. thin-walled (Shelby) tube push sampler
- 2" O.D. Continuous rock core (NQ unless otherwise specified)
- 2-3/4" I.D. CME continuous soil sampler
- 3" O.D. split-barrel sampler with or without liners driven with 140-lb hammer

2 5 8 — Standard Penetration Test (SPT) Blow Counts with 140 pound hammer falling 30" to drive split spoon sample in 3 - 6" increments. Sum of last two numbers is the blow count per foot (or as listed) or the SPT N-value.

Free water depth in boring

ATD — At Time Drilled

RQD — Rock Quality Designation = Amount, in percent, of intact rock core pieces greater than 4 inches in length in each coring interval; calculated as the sum of the lengths of intact core, divided by the length of the core run. Recovery typically expressed in inches for soil or rock recovered in sampler. Percent recovery is the ratio of recovery to sampling interval advancement.

PP — Pocket Penetrometer Reading of unconfined strength (approximate TSF) on undisturbed samples. PP Reading on disturbed SPT samples are higher than actual.

Qu — Laboratory Unconfined Compressive Strength (PSF)

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GEOTECHNICAL BOREHOLE LOG

BH - 6A

Client: Dille&Pollard
Project No: P220249
Project Name: Wappapello Training Site Dining Facility
Project Location: CR 517, Wappapello, MO

Date(s) Drilled:	3/30/2023	Drill Rig Type	GeoProbe 7822DT	Water Level:	None ATD
Logged By:	RAB	Drill Bit Size/Type	2.75" ID	Backfill Type:	Drill Cuttings
Drilled By:	JAM	Drilling Method	HSA	Boring Location:	See Attached Map
Reviewed/ Approved By:	WJC	Depth Drilled: 11'	Surface Elevation: 506.00		

Comments: Elevation in reference to Google Earth Pro, Dec. 2022

Depth	Elevation	Sample Type	Number	Recovery, Inches	SPT Blow Counts @ 6"	SPT N-value, RQD-inches	PP Reading, RQD%	Graphic Log	MATERIAL DESCRIPTION	NOTES
0	506								Surface: topsoil	Start Time: 4:10 Finish Time: 4:38
			1	17	3 6 10	16	4.0		CLAY, tan, damp, very stiff, with trace sand	
5	501		2	17	4 6 10	16	4.5		very stiff	
			3	16	4 8 12	20	3.50		very stiff	
10	496		4	18	8 11 15	26	4.5+		very stiff	
									BORING TERMINATED AT 11', 3/30/23	Abandoned using drill cuttings
15	491									
20	486									
25	481									

LEGEND/NOTES (SEE GEOTECHNICAL NOTES TERMS, AND SYMBOLS FOR ADDITIONAL INFORMATION)

- 2" O.D. split-barrel sampler driven with 140-lb SPT hammer
- 3" O.D. thin-walled (Shelby) tube push sampler
- 2" O.D. Continuous rock core (NQ unless otherwise specified)
- 2-3/4" I.D. CME continuous soil sampler
- 3" O.D. split-barrel sampler with or without liners driven with 140-lb hammer

2, 5, 8 — Standard Penetration Test (SPT) Blow Counts with 140 pound hammer falling 30" to drive split spoon sample in 3 - 6" increments. Sum of last two numbers is the blow count per foot (or as listed) or the SPT N-value.

Free water depth in boring

ATD — At Time Drilled

RQD — Rock Quality Designation = Amount, in percent, of intact rock core pieces greater than 4 inches in length in each coring interval; calculated as the sum of the lengths of intact core, divided by the length of the core run. Recovery typically expressed in inches for soil or rock recovered in sampler. Percent recovery is the ratio of recovery to sampling interval advancement.

PP — Pocket Penetrometer Reading of unconfined strength (approximate TSF) on undisturbed samples. PP Reading on disturbed SPT samples are higher than actual.

Qu — Laboratory Unconfined Compressive Strength (PSF)

APPENDIX C

Laboratory Testing Report

SMITH & COMPANY 901 Vine St., Poplar Bluff, MO 63901 573-785-9621

CLIENT: Dille & Pollard Architecture
PROJECT: Wappapello Training Site - T2232-01 - Dining Facility
ADDRESS: County Road 517, Wappapello, Wayne County, Missouri

SUMMARY OF LABORATORY TESTS & MOISTURE CONTENTS

SERVICES: Soil Analysis
TEST METHOD: ASTM D-2216 Oven; ASTM D-4643 Microwave Oven; ASTM D-4318 Soil Limits; ASTM C136 C117 Sieve Analysis

SAMPLE LOCATION: Proposed Building Site
SOURCE: BH1A; SAMPLED: 3/30/2023; DELIVERED: 4/3/2023
TESTED-Bari P. Chase; REPORTED-Bari P. Chase; REVIEWED-William Cobb, PE

Soil Boring	Sample Depth			Sample Type	Unified Soil Classification	Sample Moisture Content	Soil Limits			Sieve Analysis - Percent Passing						
	Depth	Top	Bottom													
No.	feet	feet	feet	--	percent	percent	LL %	PL %	PI %	6"	3"	3/4"	#4	#10	#40	#200
BH1A	3	2.5	4.0	SPT	CL	19.4%	34	20	14	100%	100%	100%	100%	99%	95%	94%

SMITH & COMPANY 901 Vine Street, Poplar Bluff, MO 573-785-9621

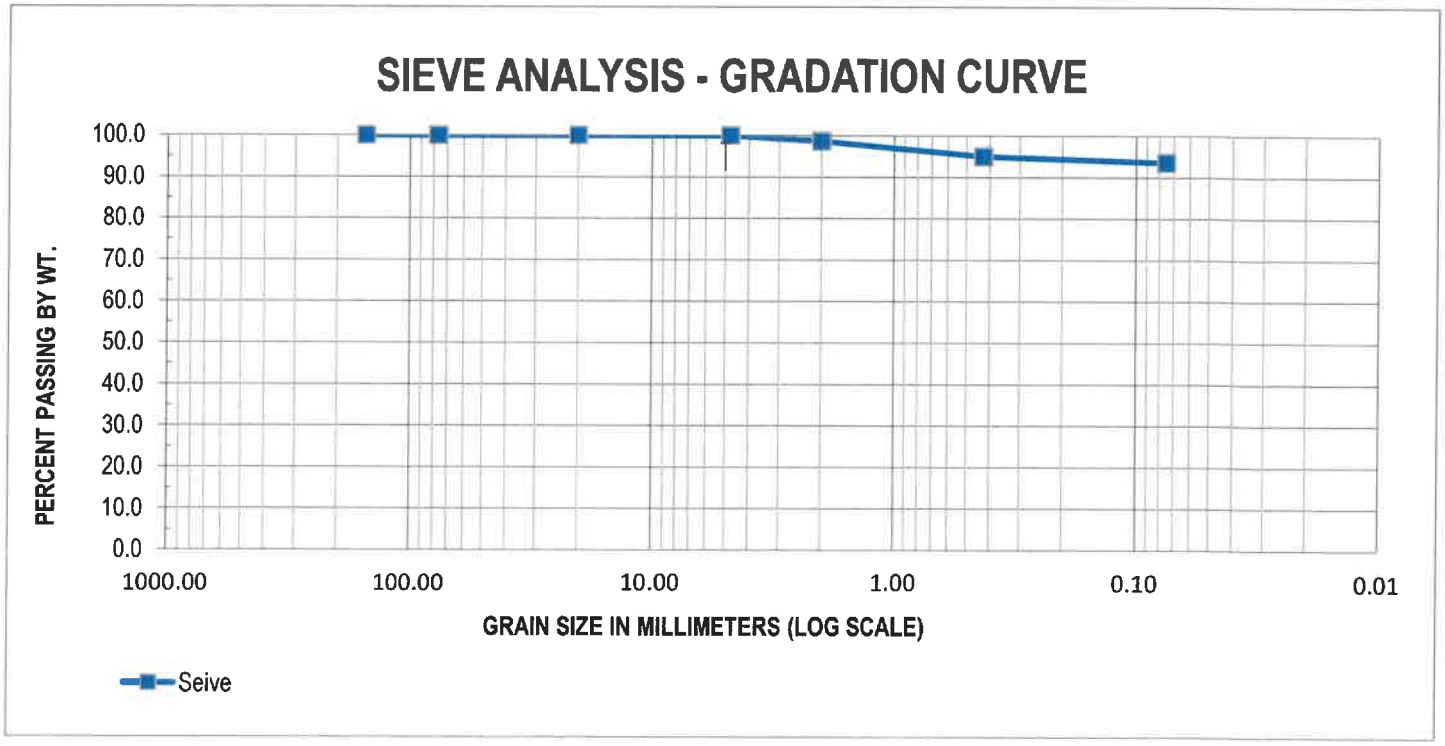
CLIENT: Dille & Pollard Architecture
PROJECT: Wappapello Training Site - T2232-01 - Dining Facility
ADDRESS: County Road 517, Wappapello, Wayne County, Missouri

Soil or Aggregate Report - Classification for Engineering Purposes ASTM D2487

ASTM/AASHTO: Sieve Analysis ASTM C136 C117; Moisture Content ASTM D2216; Soil Limits ASTM D4318

DESCRIPTION: SANDY LEAN CLAY (CL), tannish-brown, medium stiff
SOURCE: BH1A; SAMPLED: 3/30/2023; DELIVERED: 4/3/2023
SAMPLE LOCATION: BH1A; 2.5' - 4.0'
TESTED-Bari P. Chase; REPORTED-Bari P. Chase; REVIEWED-William Cobb, PE

U. S. Sieve Sizes	Opening, Inches			Opening Per Inch				Hydrometer Values					
Sieve Size or Number	6	3	3/4"	#4	#10	#40	#200						
Sieve Size, Millimeters	152.4	76.2	19.950	4.750	2.000	0.425	0.075						
Test Results, % Passing	100%	100%	100%	100%	99%	95%	94%						
Particle Diameter at % Passing:	D100=	D95=	D90=	D60=	D50=	D30=	D15=	D10=	MC=	19.4%	LL	PL	PI
Particle Diameter (mm)	19.95	0.40	NA	NA	NA	NA	NA	NA	Cu=	NA	34	20	14
									Cc=	NA			



SMITH & COMPANY 901 Vine Street, Poplar Bluff, MO 573-785-9621

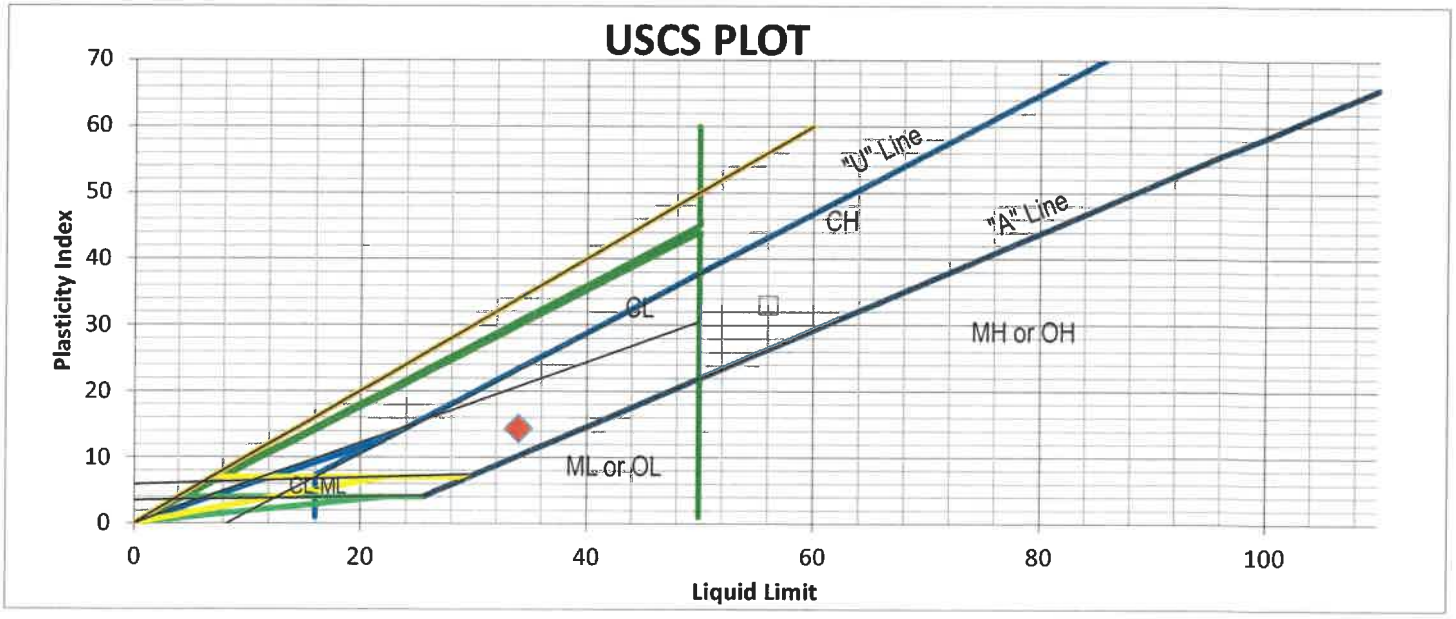
CLIENT: Dille & Pollard Architecture
PROJECT: Wappapello Training Site - T2232-01 - Dining Facility
ADDRESS: County Road 517, Wappapello, Wayne County, Missouri

Soil or Aggregate Report - Classification for Engineering Purposes ASTM D2487

ASTM/AASHTO: Sieve Analysis ASTM C136 C117; Moisture Content ASTM D2216; Soil Limits ASTM D4318

DESCRIPTION: SANDY LEAN CLAY (CL), tannish-brown, medium stiff
SOURCE: BH1A; SAMPLED: 3/30/2023; DELIVERED: 4/3/2023
SAMPLE LOCATION: BH1A; 2.5' - 4.0'
TESTED-Bari P. Chase; REPORTED-Bari P. Chase; REVIEWED-William Cobb, PE

	Liquid Limit			Plastic Limit	
No. of Blows	25	25		Test 1	
Container I.D.	13	1		15	17
Mass of Wet Soil + Container (grams)	23	22.88		22.26	19.33
Mass of Dry Soil + Container (grams)	20.02	19.85		20.49	18
Mass of Water (grams)	2.98	3.03	0	1.77	1.33
Mass of Empty Container (grams)	11.31	10.95		11.34	11.3
Mass of Dry Soil (grams)	8.71	8.9	0	9.15	6.7
% Moisture	34.21	34.04	0.00	19.34	19.85
Liquid Limit from Flow Curve	34				
Plastic Limit				20	
	######	#####			



APPENDIX D

ATC Hazards by Design Report

This is a beta release of the new ATC Hazards by Location website. Please contact us with feedback.

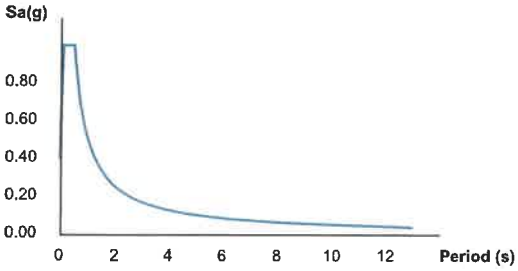
The ATC Hazards by Location website will not be updated to support ASCE 7-22. Find out why.

Hazards by Location

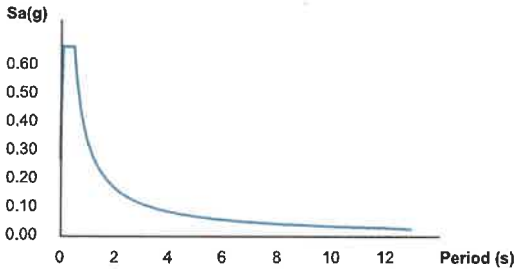
Search Information

Address:	County Rd 517, Wappapello, MO 63966, USA
Coordinates:	36.940166, -90.27368729999999
Elevation:	407 ft
Timestamp:	2023-05-10T17:50:42.975Z
Hazard Type:	Seismic
Reference Document:	IBC-2015
Risk Category:	III
Site Class:	C

MCER Horizontal Response Spectrum



Design Horizontal Response Spectrum



Basic Parameters

Name	Value	Description
S_S	0.998	MCE_R ground motion (period=0.2s)
S_1	0.35	MCE_R ground motion (period=1.0s)
S_{MS}	0.999	Site-modified spectral acceleration value
S_{M1}	0.508	Site-modified spectral acceleration value
S_{DS}	0.666	Numeric seismic design value at 0.2s SA
S_{D1}	0.339	Numeric seismic design value at 1.0s SA

Additional Information

Name	Value	Description
SDC	D	Seismic design category
F_a	1.001	Site amplification factor at 0.2s
F_v	1.45	Site amplification factor at 1.0s
CR_S	0.812	Coefficient of risk (0.2s)
CR_1	0.799	Coefficient of risk (1.0s)
PGA	0.573	MCE_G peak ground acceleration
F_{PGA}	1	Site amplification factor at PGA
PGA_M	0.573	Site modified peak ground acceleration
T_L	12	Long-period transition period (s)
SsRT	0.998	Probabilistic risk-targeted ground motion (0.2s)
SsUH	1.229	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	1.5	Factored deterministic acceleration value (0.2s)
S1RT	0.35	Probabilistic risk-targeted ground motion (1.0s)
S1UH	0.438	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)

S1D	0.6	Factored deterministic acceleration value (1.0s)
PGAd	0.6	Factored deterministic acceleration value (PGA)

The results indicated here DO NOT reflect any state or local amendments to the values or any delineation lines made during the building code adoption process. Users should confirm any output obtained from this tool with the local Authority Having Jurisdiction before proceeding with design.

Please note that the ATC Hazards by Location website will not be updated to support ASCE 7-22. Find out why.

Disclaimer

Hazard loads are provided by the U.S. Geological Survey Seismic Design Web Services.

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APPENDIX E

General Geotechnical Notes and Terms

SMITH & CO. ENGINEERS

GENERAL GEOTECHNICAL NOTES AND TERMS

SAMPLE CLASSIFICATION SYMBOLS

The Unified Soil Classification System (USCS), as described in ASTM D-2487 "Classification of Soils for Engineering Purposes" and ASTM D-2488 "Description and Identification of Soils by Visual-Manual Procedure" are the only systems used in the preceding document to describe soils.

ABBREVIATIONS

SPT: The standard penetration resistance test (SPT) per ASTM D-1586 gives the number of blows from a 140 pound hammer falling 30 inches to drive a two inch O.D. split spoon sampling tube six inches. Blows for each of three consecutive six inch penetrations are listed for completeness of record. Penetrations less than six inches are noted on the borehole logs.

N: The value N is the sum of the last two SPT blow counts. The N-Value is the blows per foot of penetration. If the total of the last two SPT values is less than 12 inches, the penetration in inches is noted on the borehole logs.

Refusal: Standard penetration resistance hammer refusal is defined at 50 blows per six inches, 100 blows per any twelve inches, or no observed advance in ten blows.

psf: Pounds per square foot.

psf/ft: Pounds per square foot per foot of depth.

Tsf: Tons per square foot.

ksf: Kips per square foot.

Qu (PP, Tsf): The approximate unconfined compressive strength of soil in tons per square foot measured with a pocket penetrometer.

Qu: The unconfined compressive strength of soil per ASTM D-2166 measured with a laboratory compression device.

DCP Test: A dual-mass dynamic cone penetrometer (DCP) is a field device with a 39" probe that indicates an approximate California Bearing Ratio (CBR) strength of in-situ soils. The CBR value is a percentage that compares a material to an ideal base material. The CBR values from the dual-mass dynamic cone penetrometer can be used to estimate the soil bearing values.

w: Moisture content of soil expressed as a percentage of dry weight.

ABBREVIATIONS (continued)

LL: Liquid limit: the moisture content of soil between the plastic and liquid states.

PL: Plastic limit: the moisture content of soil between the solid and plastic states.

PI: Plasticity index: the difference between the liquid limit and the plastic limit.

% passing: In a particle size distribution analysis, the percentage by dry weight that passes (i.e., is finer than) a standard sieve size.

k: Modulus of subgrade reaction, defined as the bearing pressure per inch of settlement.

SG: Specific gravity of soil solids

e: Void ratio: the volumetric ratio of voids to solids

RD: Relative density: a ratio expressing in-situ or current density of cohesionless soil. 0% RD represents soil in the loosest possible condition and 100% RD represents the densest possible condition.

SOIL DESCRIPTIONS

Descriptions of soils found on the bore hole logs and elsewhere are structured as follows: soil type, color, moisture, density or consistency, grain size and/or plasticity (as applicable), secondary material, and other notes. Predominant soil types are shown with capital letters.

RELATIVE DENSITY DESCRIPTION OF COHESIONLESS SOIL (SAND AND GRAVEL)

Description	N	RD
Very Loose	0-4	0% to 20%
Loose	4-10	20% to 40%
Medium Dense	10-30	40% to 70%
Dense	30-50	70% to 95%
Very Dense	>50	More than 95%

RELATIVE CONSISTENCY DESCRIPTION OF COHESIVE SOIL (CLAY AND SILT)

Description	N	Field test
Very Soft	0-2	Thumb will penetrate soil more than 1".
Soft	2-4	Thumb will penetrate soil about 1".
Medium Stiff	4-8	Thumb will penetrate soil about 1/2".
Stiff	8-15	Thumb will penetrate soil about 1/4 ".
Very Stiff	15-30	Thumb will indent soil.
Hard	30-60	Thumbnail will indent soil.
Very Hard	> 60	Thumbnail will not indent soil.

PARTICLE SIZE DESCRIPTIONS

Particle sizes of soils are categorized as follows and represent the least dimension of the particle. The actual subsurface field particle size may be large than reported due to rock fractured by sampling. Subsurface particles larger than fine gravel cannot be sampled with an SPT sampler.

PARTICLE DESCRIPTION	U.S. STANDARD SIEVE SIZES	PARTICLE AND GRAIN DIMENSION INCHES	MILLIMETERS
Boulders	N/A	>12	>300
Cobbles	3" to 12"	3 to 12	75.0 to 300
Coarse Gravel	3/4" to 3"	3/4 to 3	19.0 to 75.0
Fine Gravel	No. 4 to 3/4"	0.187 to 3/4	4.75 to 19.0
Coarse Sand	No. 10 to No. 4	0.0787 to 0.187	2.0 to 4.75
Medium Sand	No. 40 to No. 10	0.0164 to 0.0787	0.425 to 2.0
Fine Sand	No. 200 to No. 40	0.0029 to 0.0164	0.075 to 0.425
Silt	passing No. 200	0.0002 to 0.0029	0.005 to 0.075
Clay	passing No. 200	0.00004 to 0.0002	0.001 to 0.005

Sand or gravel described with f for fine, m for medium, or c for coarse indicate the range of particle sizes in the sample. Silts and clays are generally classified according to their plasticity characteristics as per ASTM D-4318 except when noted.

UNIFIED SOIL CLASSIFICATION SYSTEM (USCS) SYMBOLS

USCS soil symbols are indicated below with modifiers indicated in parentheses.

SYMBOL	DESCRIPTION
GW	Well-graded gravel (with sand)
GP	Poorly-graded gravel (with sand)
GW-GM	Well-graded gravel with silt (with sand)
GW-GC	Well-graded gravel with clay (with sand or with silty clay and sand)
GP-GM	Poorly-gravel with silt (with sand)
GP-GC	Poorly-graded gravel with clay (with sand or with silty clay and sand)
GM	Silty gravel (with sand)
GC	Clayey gravel (with sand)
GC-GM	Silty, clayey gravel (with sand)
SW	Well-graded sand (with gravel)
SP	Poorly-graded sand (with gravel)
SW-SM	Well-graded sand with silt (with gravel)
SW-SC	Well-graded sand with clay (with gravel or with silty clay and gravel)
SP-SM	Poorly-graded sand with silt (with gravel)
SP-SC	Poorly-graded sand with clay (with gravel or with silty clay and gravel)
SM	Silty sand (with gravel)
SC	Clayey sand (with gravel)
SC-SM	Silty, Clayey sand (with gravel)
CL	(sandy or gravelly) Lean Clay (with sand or gravel)
CL-ML	(sandy or gravelly) Silty Clay (with sand or gravel)
ML	(sandy or gravelly) Silt (with sand or gravel)
CH	(sandy or gravelly) Fat Clay (with sand or gravel)
MH	(sandy or gravelly) Elastic Silt (with sand or gravel)

SOIL HORIZON BOUNDARIES

Boundaries between soil horizons (layers) are depicted as solid lines where observed and dashed lines where inferred between samples. The soil strata boundaries are generally separated by soil type or classification, but may also be separated by strength, color, moisture content, or debris in the samples.

ROCK CORE DESCRIPTIONS

Rock cores are collected with a five-foot long continuous NQ rock core barrel. The total of soil layers, rock layers, and voids should total the core run length. A total length less than the core run length indicates the presence of voids or material that was washed out during coring.

Descriptions of rock core found on the test hole logs and elsewhere are structured as follows: rock type, color, hardness, crystallinity, bedding, weathering, jointing, voids, quality, and other notes. Predominant rock types are shown with capital letters. The descriptions are defined below:

Hardness

Description	Criteria
Very Soft	Easily indented with the thumb
Soft	Able to be scratched with a fingernail
Moderately Hard	Easily scratched with a knife; cannot be scratched with the fingernail
Hard	Difficult to scratch with a knife
Very Hard	Cannot be scratched with a knife

Crystallinity

Description	Criteria
Aphanitic	Crystals cannot be distinguished with the naked eye
Very Finely Crystalline	Crystals are barely discernable with the naked eye
Finely Crystalline	Crystals are easily discernable with the naked eye
Medium Crystalline	Crystals are medium size; up to 1/8" in diameter
Coarsely Crystalline	Crystals are 1/8" to 1/4" in diameter
Very Coarsely Crystalline	Crystals are larger than 1/4" in diameter

Bedding

Description	Criteria
Parted	Less than 0.02 ft
Banded	0.02 to 0.2 ft
Thin Bedded	0.2 to 0.5 ft
Medium Bedded	0.5 to 1.0 ft
Thick Bedded	1.0 to 2.0 ft
Massive	Greater than 2.0 ft

ROCK CORE DESCRIPTIONS (continued)

Weathering

Description	Criteria
Fresh	No visible signs of decomposition
Slightly Weathered	Slight discoloration inward from open fractures
Moderately Weathered	Discoloration throughout, slight loss of strength, texture intact
Highly Weathered	Specimens can be broken by hand, texture indistinct, fabric intact
Completely Weathered	Specimens easily crumbled, minerals decomposed to soil
Residual	Advanced state of decomposition resulting in soil

Jointing

Description	Criteria
Very Wide	> 3.25 ft
Wide	1.1 - 3.25 ft
Moderately Wide	0.3 ft - 1.1 ft
Close	0.05 - 0.5 ft
Very Close	< 0.05 ft

Voids

Description	Criteria
Dense	Usually not discernable with the naked eye
Pitted	Discernable to 1/4" in diameter
Vuggy	1/4" to 3" in diameter
Cavity	Larger than 3" in diameter

Quality

Rock quality designation (RQD) - the sum of recovered rock core pieces that are longer than twice the core diameter divided by the total core run.

RQD	Criteria
90 to 100	Excellent
75 to 90	Good
50 to 75	Fair
25 to 50	Poor
0 to 25	Very Poor

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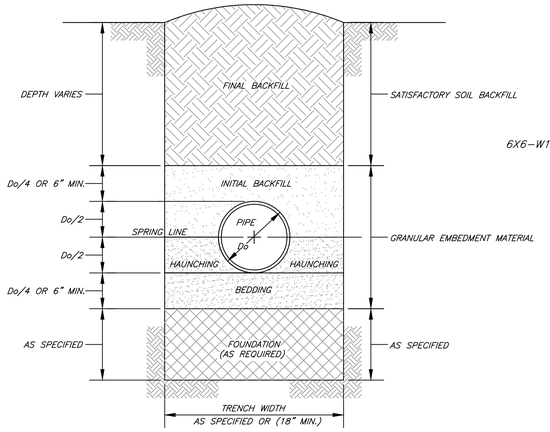
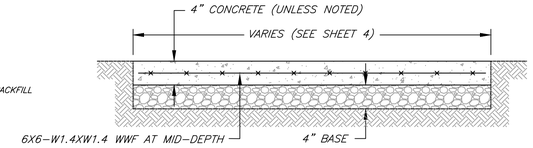
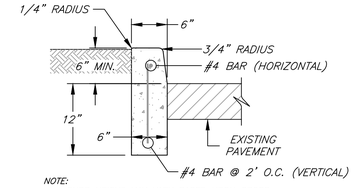


* Do=OUTSIDE DIAMETER OF PIPE
* COMPACT ALL MATERIALS PER SPECIFICATIONS

GRAVITY PIPE TRENCH DETAIL
N.T.S

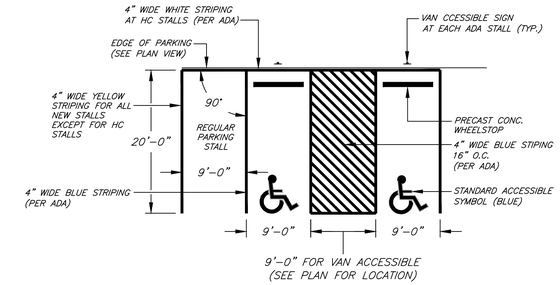


TYPICAL SIDEWALK DETAIL
N.T.S



NOTE:
1. CURB HEIGHT MAY VARY BASED UPON CROSS SLOPE OF SIDEWALK.
2. PROVIDE CONTROL JOINTS AT 15' INTERVALS.
3. CURBS CAN BE POURED INTEGRAL WITH PAVEMENT IF CONCRETE PAVEMENT IS USED.

TYPICAL CURB DETAIL
N.T.S.



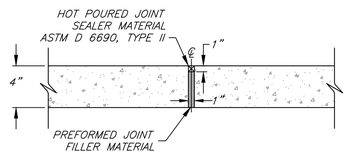
(SEE SHEET C3.0 FOR STALL LOCATIONS)

9'x19' STALL AND ADA STALLS

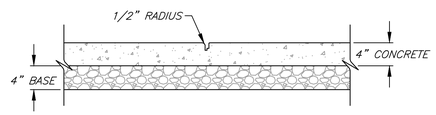
NOTES:
1.) MAXIMUM SLOPE IN ALL DIRECTIONS SHALL NOT EXCEED 2%.
2.) WHEELSTOPS ARE NOT REQUIRED AT 6" CURB.
3.) TYPICAL DETAIL SHOWN, FOLLOW PLAN FOR EXACT LAYOUT

02 PARKING STALL DETAILS
N.T.S.

OWNER REFERENCE OMITTED BY ADDENDUM NO. 02

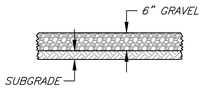


EXPANSION JOINT
EXPANSION JOINT SHALL BE PLACED EVERY 200 FEET MIN.

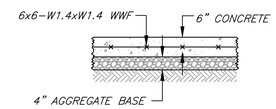


HAND TOOLED
CONTROL JOINT ON SIDEWALKS
CONTROL JOINTS SHALL BE PLACED EVERY 6 FEET

CONSTRUCTION JOINT DETAILS FOR SIDEWALKS
N.T.S

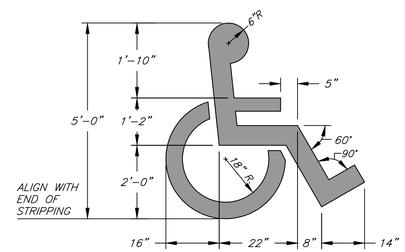


STANDARD GRAVEL DETAIL (BASE BID)
N.T.S



CONCRETE PAVEMENT (ALTERNATE)
N.T.S

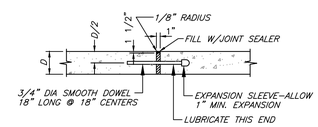
NOTE:
ADA PARKING STALL AS SHOWN ON PLAN SHALL BE CONCRETE AS PART OF BASE BID.



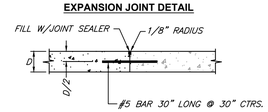
ALL LINES TO BE 6" WIDE CENTER IN PARKING STALL COLOR BLUE

ADA EMBLEM (AT END OF EACH STALL)
N.T.S

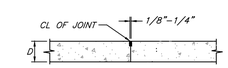
OWNER REFERENCE OMITTED BY ADDENDUM NO. 02



EXPANSION JOINT DETAIL



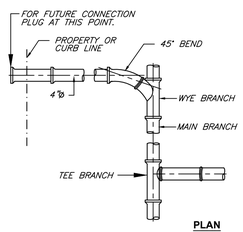
END OF CONSTRUCTION DETAIL



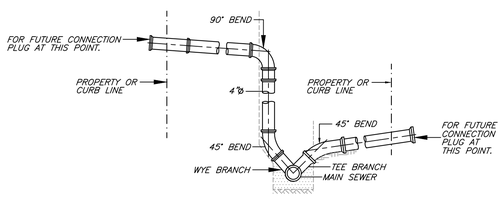
TYPICAL SAW JOINT DETAIL

NOTE: SAW JOINTS TO BE PLACED A MINIMUM OF EVERY 15'

CONCRETE CONSTRUCTION JOINT DETAILS
N.T.S.

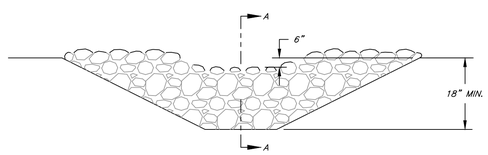


PLAN

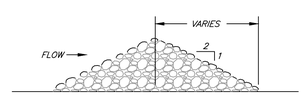


ELEVATION

SERVICE CONNECTION
N.T.S

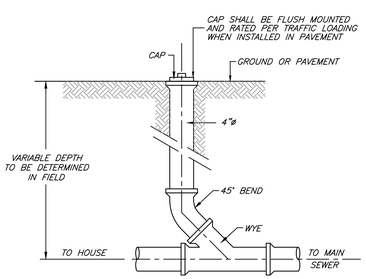


END VIEW



SECTION VIEW

SEDIMENT TRAP
TEMPORARY ROCK DITCH CHECK
N.T.S



CLEAN OUT DETAIL
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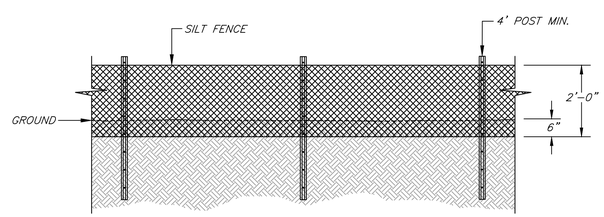

SILT FENCE DETAIL
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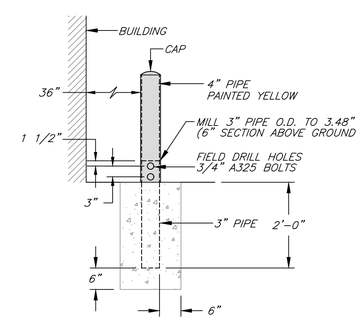

SECTION

BOLLARD DETAIL
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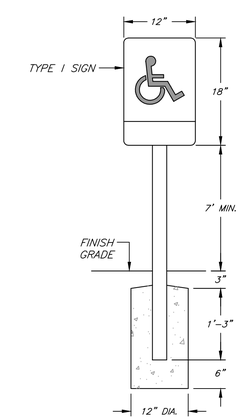


POLE MOUNT

02 ADA SIGN DETAIL
N.T.S

OWNER REFERENCE OMITTED BY ADDENDUM NO. 02

STATE OF MISSOURI
MIKE KEHOE,
GOVERNOR

STATE OF MISSOURI JOSEPH M. LEAHY NUMBER E-28698 REGISTERED PROFESSIONAL ENGINEER 9/3/26

JOSEPH M. LEAHY
MO# E-28698

S.H. SMITH & COMPANY
CERT.# E-616-D

PROFESSIONAL SEAL

ESTABLISHED 1958
SMITH&CO. ENGINEERS
AN EMPLOYEE OWNED COMPANY
901 VINE STREET; P.O. BOX 72
POPLAR BLUFF, MISSOURI 63902
(573) 785-9821 FAX: (573) 785-2651 WWW.SHSMITHCO.COM
CIVIL ENGINEERING • SURVEYING •
ENVIRONMENTAL & GEOTECHNICAL SERVICES • MATERIAL TESTING

PROJECT # 220249

OFFICE OF ADMINISTRATION
DIVISION OF FACILITIES MANAGEMENT,
DESIGN AND CONSTRUCTION

DEPARTMENT OF PUBLIC SAFETY
MISSOURI ARMY NATIONAL GUARD

CONSTRUCT NEW SOLDIER DINING FACILITY

WAPPAPELLO TRAINING SITE
461 COUNTY ROAD 517
WAPPAPELLO, MO 63966

PROJECT #	T2232-01
SITE #	6325
ASSET #	8136325016

REVISION:	ADDENDUM NO. 02 REMOVED "BY OWNER" FROM ADA DETAILS
DATE:	9/3/26
REVISION:	
DATE:	
ISSUE DATE:	JULY 10, 2026

CAD DWG FILE:	T2232-01-6325-8136325016-C-1-6.DWG
DRAWN BY:	RDS
CHECKED BY:	JML
DESIGNED BY:	JML

SHEET TITLE:

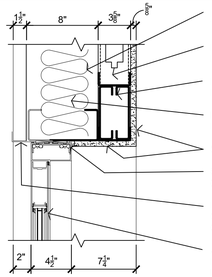
CONSTRUCTION DETAILS (2)

SHEET NUMBER:

C6.0

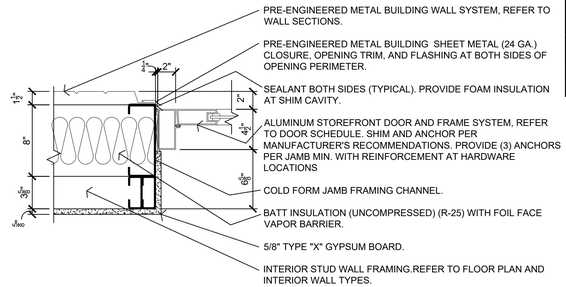
OF 40 SHEETS

9/3/2026 6:58 AM P:\220249 Wappapello Training Site-Soldier Dining\Eng\Drawings\T2232-01-6325-8136325016-C-1-6.dwg



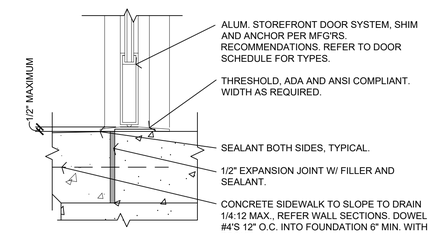
1 EXTERIOR ALUMINUM DOOR HEAD DETAIL

1 1/2" = 1'-0"



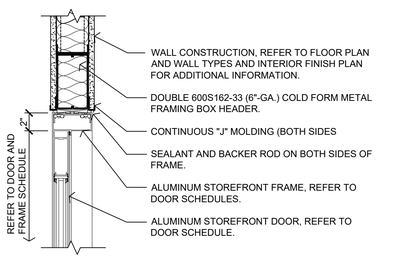
2 EXTERIOR ALUMINUM DOOR JAMB DETAIL

1 1/2" = 1'-0"



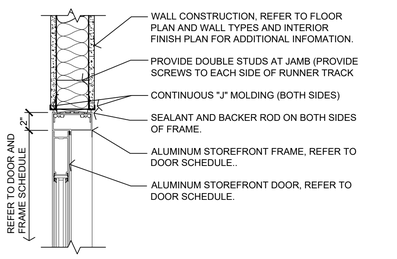
3 EXTERIOR ALUMINUM DOOR SILL DETAIL

1 1/2" = 1'-0"



4 INTERIOR ALUMINUM DOOR HEAD DETAIL

1 1/2" = 1'-0"



5 INTERIOR ALUMINUM DOOR JAMB DETAIL

1 1/2" = 1'-0"

DOOR SCHEDULE

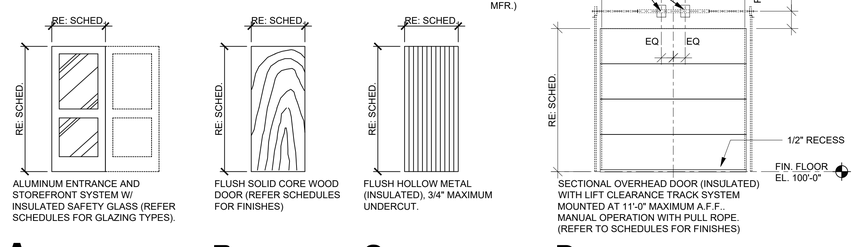
MARK	DOOR					HARDWARE		FRAME				DETAILS			FIRE RATING	REMARKS (REFER NOTES)
	SIZE (W x H x D)	TYPE	SWING	MATERIAL	GLAZ. TYPE	SET #	KEYED	TYPE	MATERIAL	HEAD WIDTH	HEAD	JAMB	SILL		
100	(PAIR) 3'-0" X 7'-0" X 1 3/4"	AA	RHR/LHR	ALUMINUM	1	1	LEVEL 1	1	ALUMINUM	--	1/A-601	2/A-601	3/A-601	---	1 & 2
101A	(PAIR) 3'-0" X 7'-0" X 1 3/4"	AA	RHR/LHR	ALUMINUM	2	2	---	2	ALUMINUM	--	4/A-601	5/A-601	---	---	1
101B	(PAIR) 3'-0" X 7'-0" X 1 3/4"	AA	RHR/LHR	ALUMINUM	1	1	LEVEL 1	1	ALUMINUM	--	1/A-601	2/A-601	3/A-601	---	1 & 2
101C	(PAIR) 3'-0" X 7'-0" X 1 3/4"	AA	RHR/LHR	ALUMINUM	1	1	LEVEL 1	1	ALUMINUM	--	1/A-601	2/A-601	3/A-601	---	1 & 2
102	3'-0" X 7'-0" X 1 3/4"	B	RH	SOLID WOOD	---	3	---	4	HOL. METAL	--	7/A-501	8/A-501	---	---	1
103	3'-0" X 7'-0" X 1 3/4"	B	LH	SOLID WOOD	---	3	---	4	HOL. METAL	--	7/A-501	8/A-501	---	---	1
108	3'-0" X 7'-0" X 1 3/4"	B	RH	SOLID WOOD	---	4	LEVEL 2	3	HOL. METAL	--	7/A-601	8/A-601	---	---	1
109	3'-0" X 7'-0" X 1 3/4"	B	LH	SOLID WOOD	---	5	LEVEL 2	3	HOL. METAL	--	7/A-601	8/A-601	---	---	1
110	3'-0" X 7'-0" X 1 3/4"	B	RH	SOLID WOOD	---	5	LEVEL 3	3	HOL. METAL	--	7/A-601	8/A-601	---	---	1
111	3'-0" X 7'-0" X 1 3/4"	C	RHR	HOL. METAL	---	7	LEVEL 1	3	HOL. METAL	--	9/A-601	10/A-601	3/A-601 SIM.	---	1 & 2
113A	4'-0" X 7'-0" X 1 3/4"	C	RH	HOL. METAL	---	6	LEVEL 2	4	HOL. METAL	--	7/A-501	8/A-501	---	---	1
113B	8'-0" X 8'-0"	D	SEC. O.H.	HOL. METAL	---	9	---	MFGR'S STANDARDS		--	4/A-403	5/A-403	---	---	1
114	4'-0" X 7'-0" X 1 3/4"	C	RHR	HOL. METAL	---	8	LEVEL 3	3	HOL. METAL	--	6/A-403	7/A-403	3/A-601 SIM.	---	1 & 2

NOTES:
1. ALL DOORS SHALL BE SHOP PREPARED FOR HARDWARE.
2. REFER TO HARDWARE NOTES FOR ADDITIONAL REQUIREMENTS.

DOOR TYPES

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

NOTE:
DASHED IN DOOR AND DOUBLE LETTER INDICATE PAIRED DOOR LOCATIONS.

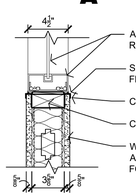


A — ALUMINUM ENTRANCE AND STOREFRONT SYSTEM W/ INSULATED SAFETY GLASS (REFER SCHEDULES FOR GLAZING TYPES).

B — FLUSH SOLID CORE WOOD DOOR (REFER SCHEDULES FOR FINISHES)

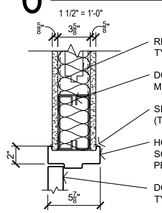
C — FLUSH HOLLOW METAL (INSULATED), 3/4" MAXIMUM UNDERCUT.

D — SECTIONAL OVERHEAD DOOR (INSULATED) WITH LIFT CLEARANCE TRACK SYSTEM MOUNTED AT 11'-0" MAXIMUM A.F.F.. MANUAL OPERATION WITH PULL ROPE. (REFER TO SCHEDULES FOR FINISHES)



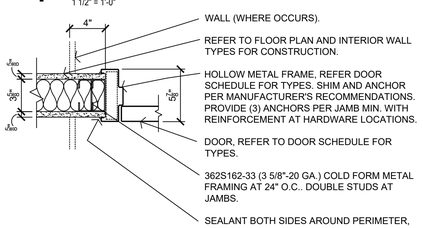
6 ALUMINUM WINDOW SILL DETAIL

1 1/2" = 1'-0"



7 INTERIOR HM DOOR HEAD DETAIL

1 1/2" = 1'-0"

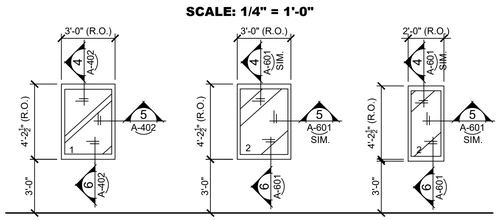


8 INTERIOR HM DOOR JAMB DETAIL

1 1/2" = 1'-0"

WINDOW TYPES

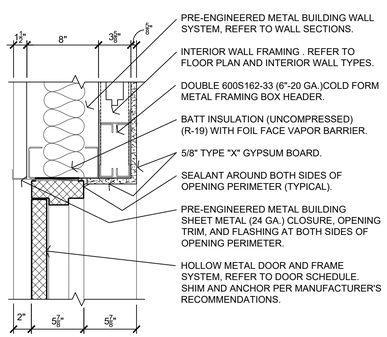
SCALE: 1/4" = 1'-0"



A — (FIXED) ALUMINUM ENTRANCE AND STOREFRONT FRAMING (2" X 4 1/2") SYSTEM, THERMALLY BROKEN. (FRAME TYPE 1)

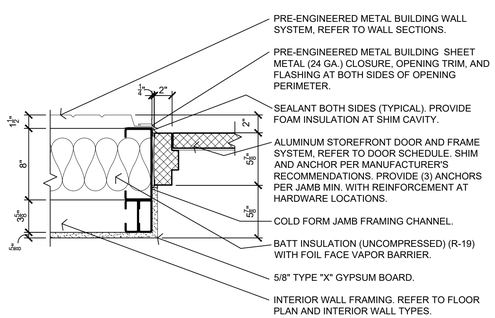
B — (FIXED) ALUMINUM STOREFRONT FRAMING (2" X 4 1/2") SYSTEM, (FRAME TYPE 2)

C — (FIXED) ALUMINUM STOREFRONT FRAMING (2" X 4 1/2") SYSTEM, (FRAME TYPE 2)



9 EXTERIOR HM DOOR HEAD DETAIL

1 1/2" = 1'-0"



10 EXTERIOR HM DOOR JAMB DETAIL

1 1/2" = 1'-0"

HARDWARE SCHEDULE

SET NO. 1
(DOORS 100, 101B, 101C)
2 CONTINUOUS GEARED HINGES
2 EXTERIOR CYLINDERS WITH REMOVABLE CORES
2 (ANSI FUNCTION NO. 08) ENTRY LOCK AND EXIT PANIC WITH TWO POINT LOCKING SURFACE VERTICAL RODS, COVER GUARDS, DUST PROOF BOTTOM STRIKES, EXTERIOR LEVER HANDLES WITH ESCUTCHEON TRIM, THRU-BOLT MOUNTED
2 CLOSERS WITH COVER, PARALLEL ARM, HOLD OPEN WITH SPRING CUSH, ACCESSORY PLATES AND SPACERS (AS REQUIRED), THRU-BOLT MOUNTED
1 SET PERIMETER WEATHER SEAL GASKETS
1 SET WEATHER SEAL MEETING STILE GASKETS
2 WEATHER SEAL DOOR BOTTOM SWEEPS
1 THRESHOLD (ADA / ANSI COMPLIANT)
1 RAIN DRIP

SET NO. 2
(DOOR 101A)
2 CONTINUOUS GEARED HINGES:
2 SETS PUSH / PULL (1" DIAMETER STRAIGHT BENT BARS)
2 CLOSERS WITH COVER, PARALLEL ARM, HOLD OPEN WITH SPRING CUSH, ACCESSORY PLATES AND SPACERS (AS REQUIRED), THRU-BOLT MOUNTED
1 SET PERIMETER WEATHER SEAL GASKETS
1 SET WEATHER SEAL MEETING STILE GASKETS
2 WEATHER SEAL DOOR BOTTOM SWEEPS

SET NO. 3
(DOORS 102, 103)
3 BALL BEARING HINGES
1 SET PUSH / PULL (1" DIAMETER STRAIGHT BENT BAR 10" C.T.C. WITH 4" X 16" PLATES)
1 CLOSER WITH COVER, PARALLEL ARM, CUSH, THRU-BOLT MOUNTED
1 KICK PLATE (0.050"T X 12"H X 2" L.D.W.)
1 WALL STOP

SET NO. 4
(DOOR: 108)
3 BALL BEARING HINGES
1 (ANSI FUNCTION NO. F82A) OFFICE LOCK WITH LEVER HANDLES
1 KICK PLATE (0.050"T X 12"H X 2" L.D.W.)
1 WALL STOP

SET NO. 5
(DOOR: 109, 110)
3 BALL BEARING HINGES
1 (ANSI FUNCTION NO. F86) STOREROOM LOCK WITH LEVER HANDLES
1 KICK PLATE (0.050"T X 12"H X 2" L.D.W.)
1 WALL STOP

SET NO. 6
(DOOR: 113A)
4 BALL BEARING HINGES
1 (ANSI FUNCTION NO. F86) STOREROOM LOCK WITH LEVER HANDLES
1 CLOSER WITH COVER, PARALLEL ARM, CUSH, THRU-BOLT MOUNTED
1 KICK PLATE (0.050"T X 12"H X 2" L.D.W.)
1 DOOR BOTTOM SWEEP
1 SET PERIMETER SEAL GASKETS
1 WALL STOP

SET NO. 7
(DOOR: 111)
3 BALL BEARING HINGES
1 EXTERIOR CYLINDER WITH REMOVABLE CORE
1 (ANSI FUNCTION NO. F04) MORTISE ENTRY LOCK WITH LEVER HANDLES ESCUTCHEON TRIM
1 CLOSER WITH COVER, PARALLEL ARM, HOLD OPEN WITH SPRING CUSH, THRU-BOLT MOUNTED
1 KICKPLATE (0.050"T X 12"H X 2" L.D.W.)
1 SET PERIMETER WEATHER SEAL GASKETS
1 WEATHER SEAL DOOR BOTTOM SWEEP
1 THRESHOLD (ADA / ANSI COMPLIANT)
1 RAIN DRIP

SET NO. 8
(DOOR: 114)
4 BALL BEARING HINGES
1 EXTERIOR CYLINDER WITH REMOVABLE CORE
1 (ANSI FUNCTION NO. F04) MORTISE ENTRY LOCK WITH LEVER HANDLES AND ESCUTCHEON TRIM
1 CLOSER WITH COVER, PARALLEL ARM, HOLD OPEN WITH SPRING CUSH, THRU-BOLT MOUNTED
1 KICKPLATE (0.050"T X 12"H X 2" L.D.W.)
1 SET PERIMETER WEATHER SEAL GASKETS
1 WEATHER SEAL DOOR BOTTOM SWEEP
1 THRESHOLD (ADA / ANSI COMPLIANT)
1 RAIN DRIP

SET NO. 9
(DOOR 113B)
NOTE: REQUIRED HARDWARE PROVIDED BY SECTIONAL OVERHEAD DOOR MANUFACTURER

GENERAL NOTES

A. REFER TO PROJECT MANUAL FOR ADDITIONAL REQUIREMENTS.

B. REFER TO BUILDING CODE SUMMARY AND STRUCTURAL DRAWINGS FOR PROJECT STRUCTURAL DESIGN CRITERIA. SUBMITTALS SHALL INCLUDE MANUFACTURER'S REQUIREMENTS FOR ANCHOR TYPES, SPACING, AND LOCATIONS REQUIRED FOR PROJECT CONDITIONS.

C. DIMENSIONS TO ROUGH FACE OF OPENING UNLESS OTHERWISE INDICATED. FIELD VERIFY FINAL ROUGH OPENING DIMENSIONS PRIOR TO OPENING ASSEMBLY FABRICATION.

D. WINDOW TYPE ELEVATIONS SHOWN VIEWED FROM EXTERIOR SIDE.

E. REFER TO EXTERIOR FINISH SCHEDULE AND INTERIOR FINISH PLAN FOR ADDITIONAL REQUIREMENTS.

HARDWARE NOTES

HARDWARE NOTES:
1. ALL HARDWARE TO BE ADA AND ANSI A117.1 COMPLIANT. CLOSURE SPEEDS SHALL BE ADJUSTED SO THAT FROM AN OPEN POSITION OF 90 DEGREES, THE TIME REQUIRED TO MOVE THE DOOR TO AN OPEN POSITION OF 12 DEGREES SHALL BE 5 SECONDS MINIMUM. DOOR OPENING FORCE FOR PUSHING OR PULLING OPEN DOORS, OTHER THAN FIRE DOORS, SHALL BE AS FOLLOWS:
- INTERIOR HINGED DOORS: 5.0 POUNDS MAXIMUM.

2. VERIFY COMPATIBILITY OF HARDWARE SPECIFIED. NOTIFY ARCHITECT OF INCOMPATIBILITY ISSUES PRIOR TO ORDERING AND INSTALLATION.

3. ALL HARDWARE TO BE GRADE 1 (HEAVY DUTY COMMERCIAL).

4. ALL KEYED HARDWARE TO BE COMPATIBLE WITH OWNER'S KEYING (BEST 7 PIN) SYSTEM. ALL EXTERIOR DOORS TO BE KEYED ALIKE. ALL HARDWARE CONTRACTOR FURNISHED AND INSTALLED. COORDINATE ORDERING AND DELIVERY REQUIREMENTS WITH OWNER. SUBMIT CORE SCHEDULE AS SPECIFIED.

KEYING LEGEND

LEVEL 1:
UPGRADED SECURITY: PERIMETER ENTRANCE

LEVEL 2:
BASIC SECURITY: OFFICE, GENERAL STORAGE

LEVEL 3:
BASIC SECURITY: MAINTENANCE, MECHANICAL / ELECTRICAL, JANITOR

GLAZING SCHEDULE

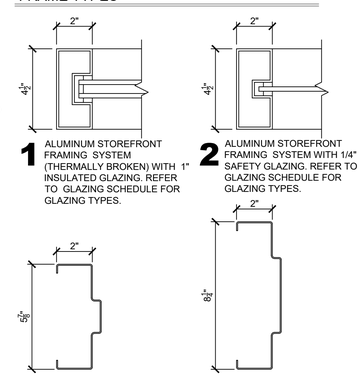
TYPE 1:
1" INSULATED SAFETY (FULLY TEMPERED) GLAZING: (REFER TO PROJECT MANUAL SECTION 08 80 00 GLAZING FOR ADDITIONAL REQUIREMENTS).

EXTERIOR PANE: 1/4" TINTED (GRAY) - (2) SURFACE, HEAT-TREATED (FT)
AIR CAVITY: 1/2"
INTERIOR PANE: 1/4" SPUTTER-COATED (LOW-E) - (3) SURFACE, HEAT-TREATED (FT)

PERFORMANCE REQUIREMENTS:
VISIBLE LIGHT TRANSMITTANCE (VLT): 13
VISIBLE LIGHT REFLECTANCE (EXTERIOR %): 11
VISIBLE LIGHT REFLECTANCE (INTERIOR %): 27
(NFRC) U-VALUE (WINTER NIGHTTIME): 0.28
SOLAR HEAT GAIN COEFFICIENT (SHGC): 0.21
LIGHT TO SOLAR GAIN (LSG): 0.93

TYPE 2:
1/4" CLEAR SAFETY (FULLY TEMPERED) GLASS: (REFER TO PROJECT MANUAL SECTION 08 80 00 GLAZING FOR ADDITIONAL REQUIREMENTS).

FRAME TYPES



1 ALUMINUM STOREFRONT FRAMING SYSTEM (THERMALLY BROKEN) WITH 1" INSULATED GLAZING. REFER TO GLAZING SCHEDULE FOR GLAZING TYPES.

2 ALUMINUM STOREFRONT FRAMING SYSTEM WITH 1/4" SAFETY GLAZING. REFER TO GLAZING SCHEDULE FOR GLAZING TYPES.

3 WELDED HOLLOW METAL FRAME (16 GA.) WITH (3) MIN. ANCHORS PER JAMB, (1) AT EACH JAMB SILL, AND ADDITIONAL ANCHORS AT HARDWARE LOCATIONS.

4 WELDED HOLLOW METAL FRAME (16 GA.) WITH (3) MIN. ANCHORS PER JAMB, (1) AT EACH JAMB SILL, AND ADDITIONAL ANCHORS AT HARDWARE LOCATIONS.

STATE OF MISSOURI
MIKE KEHOE,
GOVERNOR

STATE OF MISSOURI
KRISTEN RAE UHRHAN
NUMBER A-2003027998
ARCHITECT
07/10/2026

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OFFICE OF ADMINISTRATION
DIVISION OF FACILITIES MANAGEMENT,
DESIGN AND CONSTRUCTION

DEPARTMENT OF PUBLIC SAFETY
MISSOURI ARMY NATIONAL GUARD

CONSTRUCT NEW SOLDIER DINING FACILITY

WAPPAPELLO TRAINING SITE
461 COUNTY ROAD 517
WAPPAPELLO, MO 63966

PROJECT #	T2232-01
SITE #	6325
ASSET #	8136325016

REVISION:	1 ADD NO. 01
DATE:	AUG. 26, 2026
REVISION:	2 ADD NO. 02
DATE:	SEPT. 03, 2026
REVISION:	
DATE:	
ISSUE DATE:	JULY 10, 2026

CAD DWG FILE:	A-601.DWG
DRAWN BY:	BB
CHECKED BY:	KU
DESIGNED BY:	KU

SHEET TITLE:
DOOR AND WINDOW SCHEDULES AND DETAILS

SHEET NUMBER:
A-601

SPECIAL INSPECTION TABLES

STATEMENT OF STRUCTURAL SPECIAL INSPECTIONS
THE AUTHORIZED OWNER'S AGENT SHALL CONDUCT SPECIAL INSPECTIONS AND TESTING AS REQUIRED BY CHAPTER 17 OF THE INTERNATIONAL BUILDING CODE. THE TYPES OF STRUCTURAL WORK NOTED IN THE SPECIAL INSPECTION TABLES BELOW REQUIRE SPECIAL INSPECTION. COORDINATE REQUIREMENTS IN THE TABLES WITH SPECIFICATION DIVISION 1 AND THE STRUCTURAL MATERIALS SECTIONS.

SOILS IBC TABLE 1705.6

TASK	CONTINUOUS	PERIODIC
1. VERIFY MATERIALS BELOW SHALLOW FOUNDATIONS ARE ADEQUATE TO ACHEIVE THE DESIGN BEARING CAPACITY.	-	X
2. VERIFY EXCAVATIONS ARE EXTENDED TO PROPER DEPTH AND HAVE REACHED PROPER MATERIAL.	-	X
3. PERFORM CLASSIFICATION AND TESTING OF COMPACTED FILL MATERIALS.	-	X
4. VERIFY USE OF PROPER MATERIALS, DENSITIES AND LIFT THICKNESSES DURING PLACEMENT AND COMPACTION OF COMPACTED FILL.	X	-
5. PRIOR TO PLACEMENT OF COMPACTED FILL, INSPECT SUBGRADE AND VERIFY THAT THE SITE HAS BEEN PREPARED PROPERLY.	-	X

CONCRETE CONSTRUCTION IBC TABLE 1705.3

TASK	CONTINUOUS	PERIODIC
1. INSPECT REINFORCEMENT, AND VERIFY PLACEMENT.	-	X
2. REINFORCING BAR WELDING: a. VERIFY WELDABILITY OF REINFORCING BARS OTHER THAN ASTM A 706; b. INSPECT SINGLE-PASS FILLET WELDS, MAXIMUM 5/16"; AND c. INSPECT ALL OTHER WELDS.	 - - X	 X X -
3. INSPECT ANCHORS CAST IN CONCRETE.	-	X
4. INSPECT ANCHORS POST-INSTALLED IN HARDENED CONCRETE MEMBERS. a. ADHESIVE ANCHORS INSTALLED IN HORIZONTALLY OR UPWARDLY INCLINED ORIENTATION TO RESIT SUSTAINED TENSION LOADS. b. MECHANICAL ANCHORS AND ADHESIVE ANCHORS NOT DEFINDED IN 4.a.	 X -	 - X
5. VERIFY USE OF REQUIRED DESIGN MIX.	-	X
6. PRIOR TO CONCRETE PLACEMENT, FABRICATE SPECIMENS FOR STRENGTH TEST, PERFORM SLUMP AND AIR CONTENT TESTS, AND DETERMINE THE TEMPERATURE OF THE CONCRETE.	X	-
7. VERIFY MAINTENANCE OF SPECIFIED CURING TEMPERTURE AND TECHNIQUES.	-	X
8. INSPECT FORMWORK FOR SHAPE, LOCATION AND DIMENSIONS OF THE CONCRETE MEMBER BEING FORMED.	-	X

2

LIST OF ABBREVIATIONS

ABOVE FINISH FLOOR	AFF
ADDITIONAL	ADDNL
ALTERNATE	ALT
ANCHOR, ANCHORAGE	ANCH
B/	BOTTOM OF
BALANCE	BAL
BETWEEN	BTWN
BLOCKING	BLKG
BOTTOM	BOTT
BOTTOM OF METAL DECK	BMD
BOTTOM OF PIER	BP
BUILDING	BLDG
CENTER	CTR
CENTER-LINE	CL
CLEAR	CLR
COLUMN, COLUMNS	COL
CONCRETE	CONC
CONCRETE MASONRY UNIT	CMU
CONNECT, CONNECTION	CONN
CONSTRUCTION	CONST
CONSTRUCTION OR CONTROL JOINT	CJ
CONTINUE, CONTINUOUS	CONT
CONTRACTOR	CONTR
DEAD LOAD	DL
DIAMETER	DIA
DOWEL	DWL
DOWN	DN
DRAWING	DWG
EACH	EA
EACH FACE	EF
EACH WAY	EW
ELEVATION	EL
EMBEDMENT	EMBED, EMB
ENGINEER	ENG
EQUAL	EQ
EXISTING	EXIST OR (E)
EXPANSION	EXP
EXPANSION JOINT	EJ
EXTERIOR	EXT
FAR FACE	FF
FAR SIDE	FS
FINISH, FINISHED	FIN
FLANGE	FLG
FLOOR	FLR
FOOTING	FTG
FOUNDATION	FDN
GALVANIZED	GALV
GAUGE	GA
GRADE	GR
GRADE BEAM	GB
HEADED STUD	HS
HEIGHT	HT
HOOK	HK
HORIZONTAL	HORIZ, HOR
INFORMATION	INFO
INSIDE DIAMETER	ID
INTERIOR	INT
JOINT	JT
JOIST	JST
KIPS FOR ROOF EDGE	K
KNEE BRACE	KB
LIVE LOAD	LL
LONG LEG HORIZONTAL	LLH
LONG LEG VERTICAL	LLV
MANUFACTURER	MFR
MASONRY	MAS
MAXIMUM	MAX
MECHANICAL	MECH
MEZZANINE	MEZZ
MIDDLE	MID
MINIMUM	MIN
MISCELLANEOUS	MISC
NEAR FACE	NF
NEAR SIDE	NS
NOT IN CONTRACT	NIC
NOT TO SCALE	NTS
ON CENTER	OC
OPENING	OPNG
OPPOSITE	OPP
OPPOSITE HAND	OPPHD
OUT TO OUT	O.O.
OUTSIDE DIAMETER	OD
PIER CAP, PILE CAP	PC
PLATE	PL
PLYWOOD	PLYWD
POINT	PT
POUND PER SQUARE FOOT	PSF
POUND PER SQUARE INCH	PSI
PRECAST	PIC
PREFABRICATED	PREFAB
RADIUS	RAD
REFER, REFERENCE	REF
REINFORCING OR REINFORCEMENT	REINF
REQUIRED	REQD
ROOF TOP UNIT	RTU
SCHEDULE	SCHED
SECTION	SECT
SHEAR WALL	SW
SHEET	SHT
SIMILAR	SIM
SPACE	SPA
SPECIFICATIONS	SPEC
STAINLESS STEEL	S.S.
STANDARD	STD
STEEL	STL
STIFFENER	STIFF
STRUCTURAL	STRUC
SYMETRICAL	SYM
THREAD, THREADED	THD
TOP OF	T/
TOP & BOTTOM	T&B
TOP OF CONCRETE	TC
TOP OF FOOTING	TF
TOP OF MASONRY	TM
TOP OF PIER CAP	TP
TOP OF STEEL	TS
TOP OF WALL	TW
TYPICAL	TYP
UNLESS NOTED OTHERWISE	UNO
VERTICAL, VERTICALLY	VT OR VERT
WELDED WIRE FABRIC	WWF
WITH	w/
WORKING POINT	WP
X-BRACING	X-BR

22139.01

STATE OF MISSOURI
MIKE KEHOE,
GOVERNOR

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OFFICE OF ADMINISTRATION
DIVISION OF FACILITIES MANAGEMENT,
DESIGN AND CONSTRUCTION

DEPARTMENT OF
PUBLIC SAFETY
MISSOURI ARMY
NATIONAL GUARD

CONSTRUCT NEW
SOLDIER DINING FACILITY

WAPPAPELLO
TRAINING SITE
461 COUNTY ROAD 517
WAPPAPELLO, MO 63966

PROJECT #	T2232-01
SITE #	6325
ASSET #	8136325016
BUILDING #	X

REVISION:	2 ADD NO. 02
DATE:	SEPT. 03, 2026
REVISION:	
DATE:	
REVISION:	
DATE:	
ISSUE DATE:	JULY 10, 2026

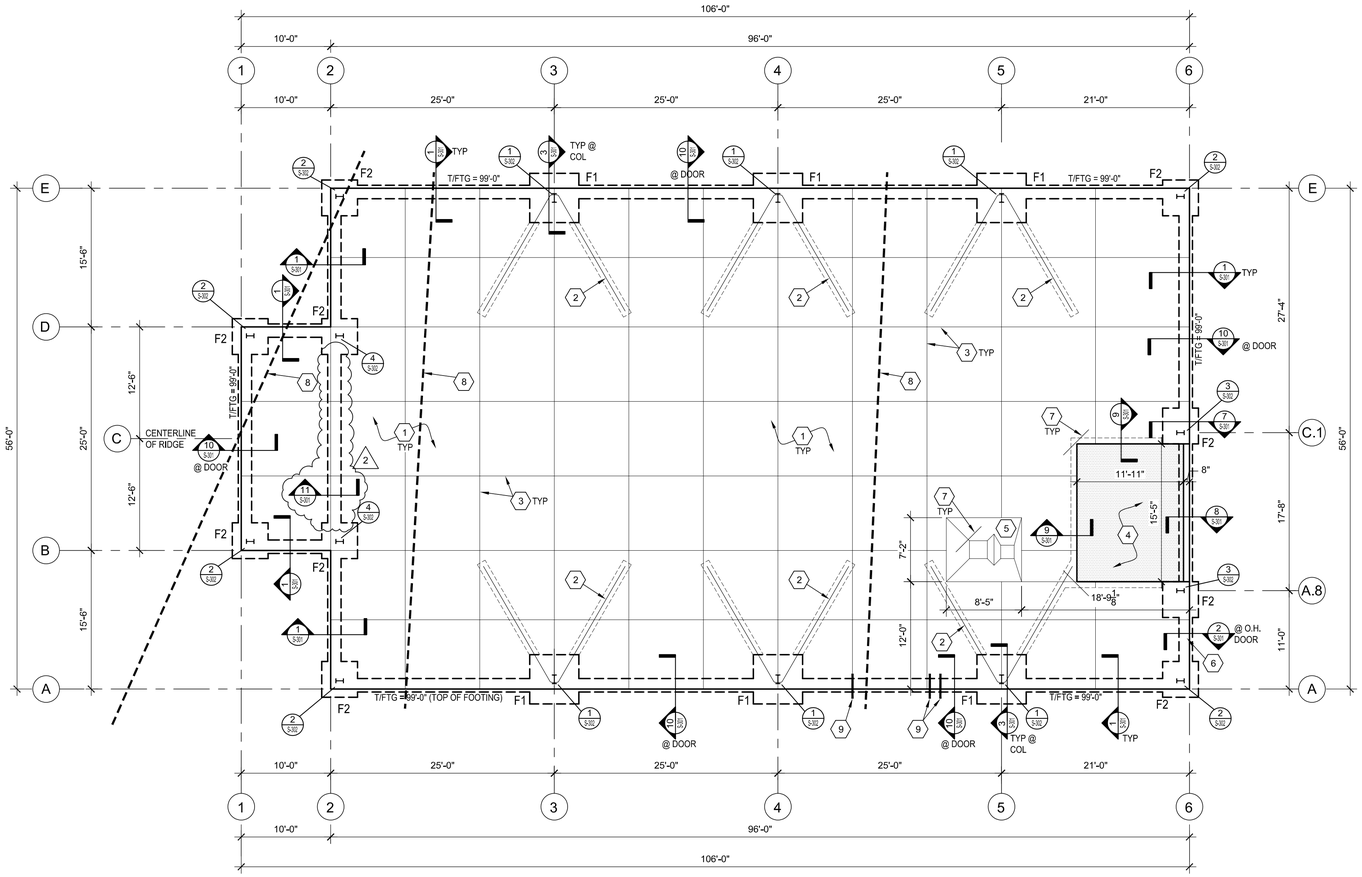
CAD DWG FILE:	T2232-01-6325-8136325016-S-002
DRAWN BY:	KMW
CHECKED BY:	VLC
DESIGNED BY:	VLC

SHEET TITLE:

SPECIAL
INSPECTION
TABELS

SHEET NUMBER:

S-002



1 S-101 FOUNDATION PLAN
1/8" = 1'-0"

FOUNDATION KEY NOTES:

1. 5" THICK CONCRETE SLAB REINFORCED W/ #3's @ 18" O.C. EACH WAY (PLACED AT MID-HEIGHT OF SLAB) OVER POLYETHYLENE VAPOR RETARDER OVER A 4" LAYER OF 3/4" MINUS COMPACTED CRUSHED STONE SUCH AS MoDOT Type 5 AGGREGATE OR CA-6 OVER PROPERLY PREPARED SUBGRADE. FINISH FLOOR EL. = 100'-0" (SITE PLAN EQUIVALENT = 506.50'). COORDINATE INSTALLATION OF DRAINS AND UNDER SLAB MECHANICAL, ELECTRICAL AND PLUMBING SYSTEMS WITH MEP AND ARCHITECTURAL DRAWINGS. 2
2. SLAB HAIR PIN, REFER TO DETAIL 5/S-301
3. CONTROL OR CONSTRUCTION JOINT SEE DETAILS 1 & 2/S-501
4. 5" THICK RECESSED CONCRETE SLAB REINFORCED W/ #3's @ 18" O.C. EACH WAY (PLACED AT MID-HEIGHT OF SLAB) OVER POLYETHYLENE VAPOR RETARDER OVER A 4" LAYER OF 3/4" MINUS COMPACTED CRUSHED STONE SUCH AS MoDOT Type 5 AGGREGATE OR CA-6 OVER PROPERLY PREPARED SUBGRADE. RECESS DIMENSIONS SHOWN ARE APPROXIMATE, CONTRACTOR TO COORDINATE DIMENSIONS WITH COOLOR/FREEZER SUPPLIER. COORDINATE INSTALLATION OF DRAINS AND UNDER SLAB MECHANICAL, ELECTRICAL AND PLUMBING SYSTEMS WITH MEP AND ARCHITECTURAL DRAWINGS. 2
5. SLOPE SLAB TO DRAIN. REFER TO FOOD SERVICE DRAWINGS FOR ADDITIONAL REQUIREMENTS.
6. SLOPE SLAB EDGE AT OVERHEAD DOOR. SEE SECTION 2/S-301.
7. #4x4'-0" LONG DOWEL TURNED 45 DEGREES AT ALL SLAB INSIDE CORNERS (TYPICAL).
8. EXISTING UNDERGROUND UTILITIES TO BE REMOVED. SEE CIVIL DRAWINGS FOR INFORMATION. TRENCHES TO BE FILLED WITH LEAN CONCRETE OR COMPACTED ENGINEERED FILL PER THE PROJECT GEOTECHNICAL REPORT.
9. INDICATES PIPE SLEEVE THROUGH FOUNDATION PER 10/S-501 OR PIPE SLEEVE AND LEAN CONCRETE FILL BELOW FOUNDATION PER 7/S-501. SEE MEP DRAWINGS FOR ADDITIONAL INFORMATION AND ADDITIONAL LOCATIONS NOT SHOWN.

NOTE: PEMB SUPPLIER MUST SUBMIT SHOP DRAWINGS FOR REVIEW BY ENGINEER OF RECORD PRIOR TO FABRICATION.
MINIMUM ANCHOR BOLT EDGE DISTANCE = 3½"
MINIMUM ANCHOR BOLT SPACING = 4"
MINIMUM ANCHOR BOLT DIAMETER = ¾"Ø

NOTE: COORDINATE UNDER-SLAB MEP REQUIREMENTS PRIOR TO POURING CONCRETE. REFER TO PLUMBING DRAWINGS AND FLOOR PLAN FOR FLOOR DRAIN INSERT QUANTITY, SIZE AND LOCATION.

FOUNDATION SCHEDULE

MARK	FOOTING SIZE (W x L x T)	FOOTING REINFORCEMENT (E.W. TOP & BOTTOM)	TOP OF FOOTING ELEVATION	MARK
F1	5'-6"x5'-6"x2'-6"	(9) #4's EACH WAY (T&B)	99'-0"	F1
F2	4'-0"x4'-0"x2'-6"	(6) #4's EACH WAY (T&B)	99'-0"	F2

NOTES:
1. ALL ANCHOR BOLTS SHALL BE SIZE, QUANTITY AND SPACING AS SPECIFIED BY THE PRE-ENGINEERED METAL BUILDING MANUFACTURER. MAINTAIN 3" MINIMUM CONCRETE COVER AROUND BOLTS. TIES SHALL WRAP AROUND ANCHOR BOLTS.
2. COLUMN BASE PLATES ARE TO REST ON TOP OF SLAB. PROVIDE LEVEL BEARING SURFACE FOR EVEN CONTACT.
3. COLUMN FOOTING REINFORCEMENT TO BE INTEGRAL WITH CONTINUOUS FOUNDATION REINFORCEMENT (WHERE APPLICABLE).
4. ALL SPREAD FOOTINGS ARE TO BE CENTERED BENEATH COLUMNS UNLESS NOTED OTHERWISE.
5. PROVIDE ANCHOR BOLT TEMPLATES AT COLUMNS.

22139.01

STATE OF MISSOURI
MIKE KEHOE,
GOVERNOR

STATE OF MISSOURI
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OFFICE OF ADMINISTRATION
DIVISION OF FACILITIES MANAGEMENT,
DESIGN AND CONSTRUCTION

DEPARTMENT OF PUBLIC SAFETY
MISSOURI ARMY NATIONAL GUARD

CONSTRUCT NEW SOLDIER DINING FACILITY

WAPPAPELLO TRAINING SITE
461 COUNTY ROAD 517
WAPPAPELLO, MO 63966

PROJECT # T2232-01
SITE # 6325
ASSET # 8136325016
BUILDING # X

REVISION: 2 ADD NO. 02
DATE: SEPT. 03, 2026
REVISION:
DATE:
REVISION:
DATE:
ISSUE DATE: JULY 10, 2026

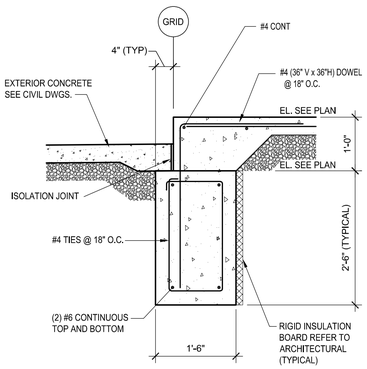
CAD DWG FILE: T2232-01-6325-8136325016-S-101
DRAWN BY: KMW
CHECKED BY: VLC
DESIGNED BY: VLC

SHEET TITLE:

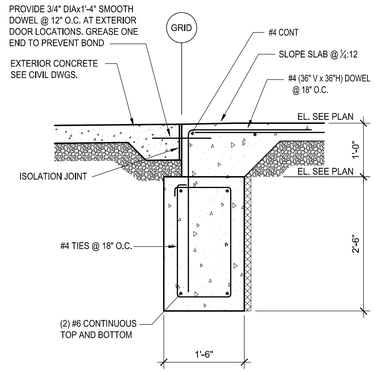
FOUNDATION PLAN

SHEET NUMBER:

S-101



SECTION 1 S-301
3/4" = 1'-0"



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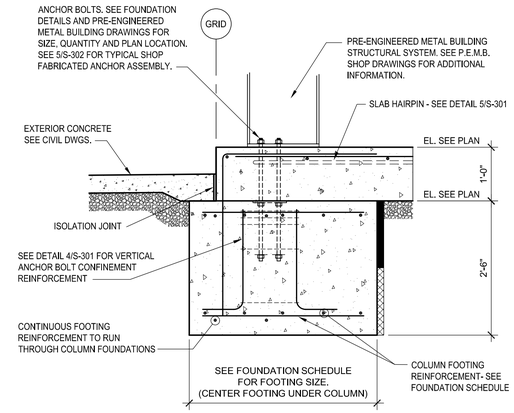

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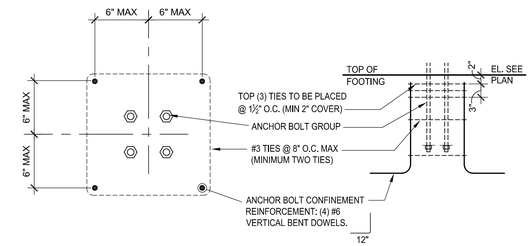
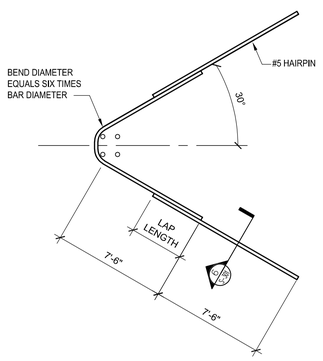
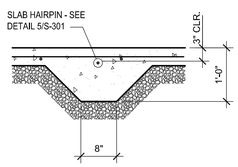


DETAIL 4 S-301



SLAB HAIRPIN 5 S-301



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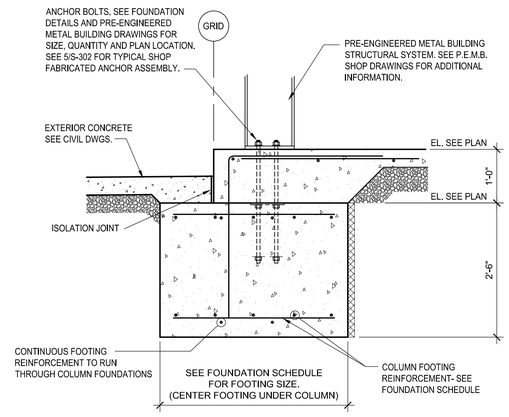

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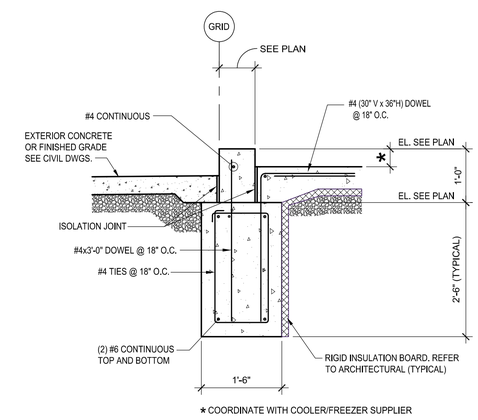

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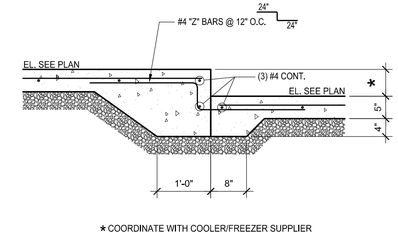

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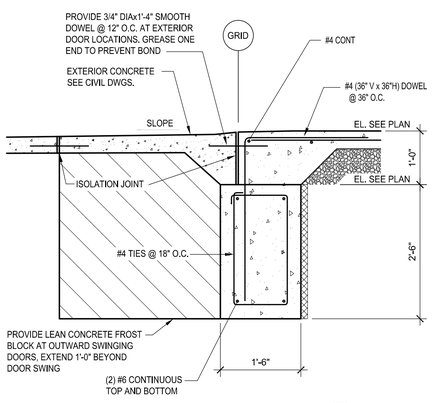

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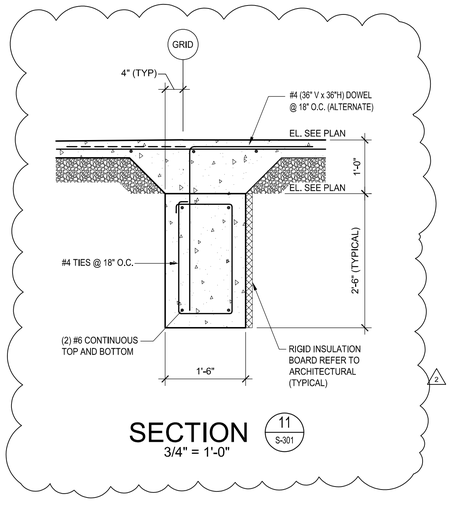

SECTION 11 S-301
3/4" = 1'-0"

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DRAWN BY:	KMW
CHECKED BY:	VLC
DESIGNED BY:	VLC

SHEET TITLE:

FOUNDATION SECTIONS

SHEET NUMBER:

S-301

AIR CURTAIN SCHEDULE

MARK	BASIS OF DESIGN MANUFACTURER	MODEL #	MOUNTING	HEATING (KW/GPM)	AIRFLOW (CFM)	NOZZLE WIDTH	MAX. VELOCITY @ NOZZLE (FPM)	MOTOR(S) HP	VOLTAGE/ PHASE	MCA	MOCP	NOTES
ACT1	BERNER	SHD07-1036A	WALL	-	1,846	36"	5,917	3/4 HP	120/1	7.5	15	1,2,3
ACT2	BERNER	SHD07-1036A	WALL	-	1,846	36"	5,917	3/4 HP	120/1	7.5	15	1,2,3

NOTES:
1. PROVIDE FACTORY WALL MOUNTING PLATE.
2. PROVIDE MAGNETIC DOOR SWITCH.
3. WASHABLE FILTER.

SPECIAL NOTE:

PROVIDE ALL MECHANICAL CONNECTIONS TO ALL KITCHEN EQUIPMENT. PROVIDE ALL FITTINGS, VALVES AND DRAIN ACCESSORIES AS REQUIRED. VERIFY ALL REQUIREMENTS WITH THE KITCHEN EQUIPMENT SUPPLIER AND THE KITCHEN CONSULTANT.

KITCHEN HOOD SCHEDULE

MARK	BASIS OF DESIGN MANUFACTURER	MODEL #	SIZE		HOOD TYPE	COOKING LOAD DUTY RATING	HOOD MATERIAL	EXHAUST SECTION			LIGHTS			FILTERS			HOOD WEIGHT	NOTES
			LENGTH	WIDTH				CFM	RISER SIZE / QTY	P.D. (IN. W.C.)	TYPE	WATTS	QTY.	TYPE	SIZE	QTY.		
KEH1 SECTION 1	ACCUREX	XXEW-122-S	122"	54"	I	HEAVY	300 SS	2,033	9"x20" / 2	0.53"	A19	100	3	SS HIGH EFF. CENTRIFUGAL	16x20	6	390 LBS.	1,2,3,4,5,7,8,9
KEH1 SECTION 2	ACCUREX	XEW-88-S	88"	54"	I	MEDIUM	300 SS	1,063	10"x10" / 2	0.39"	A19	100	3	SS HIGH EFF. CENTRIFUGAL	16x20 20x20	3 2	280 LBS.	1 THRU 10
KEH2	ACCUREX	XXEW-48-S	48"	54"	I	MEDIUM	300 SS	800	8"x9" / 1	0.52"	A19	100	2	SS HIGH EFF. CENTRIFUGAL	16x20	3	160 LBS.	1,2,3,4,5,7,8,9
KEH3	ACCUREX	XD1-42-S	42"	42"	II	0	300 SS	525	11"x13"	0.034"	-	-	-	-	-	-	120 LBS.	1 THRU 5

NOTES:
1. PROVIDE PERFORATED MAKE-UP AIR SUPPLY AND AIR CONDITIONING PLENUMS.
2. PROVIDE FIELD WRAPPER TO CEILING FOR EXPOSED SIDES.
3. PROVIDE 3" STANDOFF WITH 1" LAYER OF FACTORY INSTALLED, UL LISTED FIRE-RATED INSULATION INSIDE OF STANDOFF ON TOP AND BACK OF HOOD.
4. PROVIDE STAINLESS STEEL QUARTER END PANELS AND SIDESPLASHES.
5. PROVIDE HANGING ANGLES.
6. PROVIDE HOOD MOUNTED UTILITY CABINET WITH CONTROLS, MOTOR STARTERS FOR ASSOCIATED EQUIPMENT & PRE-ENGINEERED ANSUL FIRE SUPPRESSION SYSTEM FOR KH1 AND KH2, MOUNTED ON RIGHT SIDE OF KH2
7. PROVIDE GREASE DRAIN SYSTEM AND GREASE CUP.
8. PROVIDE HOOD MOUNTED FAN AND LIGHT SWITCH, HOODS TO HAVE CONTROL FOR OPERATION INDEPENDENT OF EACH OTHER.
9. PROVIDE STAINLESS STEEL WALL BACKSPLASH.

KEYNOTES:

1. 20x9 GREASE EXHAUST DUCT CONNECT TO KITCHEN EXHAUST HOOD, ROUTE UP AND TRANSITION TO EXHAUST FAN "KEF1" ON ROOF.
2. 10x10 GREASE EXHAUST DUCT CONNECT TO KITCHEN EXHAUST HOOD, ROUTE UP AND TRANSITION TO EXHAUST FAN "KEF2" ON ROOF.
3. 20x18 MAKE-UP AIR DUCT UP AND TRANSITION TO MAKE-UP AIR UNIT "MAU1" ON ROOF.
4. 12x14 EXHAUST DUCT CONNECT TO EXHAUST HOOD, ROUTE UP AND TRANSITION TO EXHAUST FAN "KEF3" ON ROOF.
5. 22x16 SUPPLY DUCT UP AND TRANSITION TO MAKE-UP AIR UNIT ON ROOF.
6. 12x10 EXHAUST DUCT DOWN AND CONNECT TO DISHWASHER CONDENSATE HOOD.
7. 12x10 EXHAUST DUCT UP AND TRANSITION TO EXHAUST FAN "KEF4" ON ROOF.
8. 20x10 SUPPLY DUCT DOWN AND CONNECT TO SUPPLY PLENUM CONNECTION AT KITCHEN EXHAUST HOOD. BALANCE TO 683 CFM EACH.
9. 16x10 SUPPLY DUCT DOWN AND CONNECT TO SUPPLY PLENUM CONNECTION AT KITCHEN EXHAUST HOOD. BALANCE TO 556 CFM EACH.
10. 18x16 RETURN DUCT OPEN ENDED TO CEILING PLENUM.
11. 18x16 SUPPLY DUCT DOWN AND TRANSITION TO FURNACE SUPPLY AIR CONNECTION.
12. 18x16 RETURN DUCT DOWN TO RETURN PLENUM OF FURNACE. REFER TO GAS FURNACE DETAIL.
13. 2" PVC COMBUSTION AIR AND VENT FROM FURNACE. ROUTE UP TO CONCENTRIC VENT THRU ROOF.
14. LINED TRANSFER AIR BOOT IN WALL ABOVE CEILING. REFER TO PLAN FOR SIZE.
15. ROUTE REFRIGERANT LINES TO ASSOCIATED EVAPORATOR COIL. SEAL WALL PENETRATION WEATHERTIGHT.
16. REFER TO ARCHITECTURAL DRAWINGS FOR ELEVATION OF LOUVER IN WALL.
17. LOCATE RETURN AIR DUCT TAKEOFF FOR RETURN GRILLE UP HIGH ABOVE OUTSIDE AIR DUCT CONNECTION. INCLUDE BALANCING DAMPER.
18. SECURE AIR CURTAIN TO WALL JUST ABOVE DOOR, APPROXIMATELY 84" ABOVE FLOOR. INSTALL DOOR SWITCH PER MANUFACTURER'S INSTALLATION INSTRUCTIONS.
19. 6" DIAMETER EXHAUST DUCT UP TO CURB MOUNTED ROOF CAP.
20. PROVIDE TRANE PIVOT SMART THERMOSTAT.

AIR DEVICE SCHEDULE

MARK	BASIS OF DESIGN MANUFACTURER	MODEL	DUCT CONNECTION SIZE	SERVICE	MODULE SIZE	FRAME	FINISH	DAMPER	MAX. NC	DELTA P (STATIC)	NOTES
S1	KRUEGER	PLQ	6": 0-100 CFM	SUPPLY	24x24	LAY-IN	WHITE	-	30	0.08"	1,2
			8": 105-215 CFM								
			10": 220-360 CFM								
			12": 365-510 CFM								
			14": 515-605 CFM								
S2	KRUEGER	5PLQ	6": 0-100 CFM	SUPPLY	24x24	LAY-IN	WHITE	-	30	0.08"	1,2,3
			8": 105-215 CFM								
			10": 220-360 CFM								
			12": 365-510 CFM								
			14": 515-605 CFM								
S3	KRUEGER	880H	6x6: 0-110 CFM	SUPPLY	-	SURFACE	WHITE	SUPPLYO.B.D.	30	0.08"	-
			8x8: 115-230 CFM								
			12x8: 235-350 CFM								
			18x10: 355-650 CFM								
S4	KRUEGER	EG5	24x24 0-1500 CFM	SUPPLY	24x24	LAY-IN	WHITE	-	25	0.03"	1,3
R1	KRUEGER	6490	12x12: 0-400 CFM	RETURN	24x24	LAY-IN	WHITE	-	30	0.06"	1,2
			18x18: 405-950 CFM								
			22x22: 955-1500 CFM								
R2	KRUEGER	5649O	22x22: 955-1500 CFM	RETURN	24x24	LAY-IN	WHITE	-	30	0.06"	1,2,3
R3	KRUEGER	580 H	12x8: 0-360 CFM	RETURN	-	SURFACE	WHITE	-	25	0.06"	1

NOTES:
1. GRILLE/DIFFUSER NECK SHALL BE SAME SIZE AS BRANCH DUCTWORK UNLESS NOTED OTHERWISE ON PLAN.
2. DIFFUSER DISCHARGE AIR PATTERN SHALL BE 4-WAY UNLESS NOTED BY DIRECTION ON PLANS.
3. ALL ALUMINUM CONSTRUCTION.
4. PROVIDE BORDER FOR SURFACE MOUNT INSTALLATION WHEN INSTALLED IN HARD CEILINGS WHICH ALLOWS DIFFUSER/GRILLE TO BE LIFTED UP FOR ABOVE CEILING ACCESS.

FAN SCHEDULE

MARK	BASIS OF DESIGN MANUFACTURER	MODEL #	CFM	ESP (IN. W.C.)	MOUNTING	FINISH	DAMPER	VOLTAGE/ PHASE	MOTOR HP/WATTS	WEIGHT (LB)	NOTES & ACCESSORIES
KEF1	XCUE-140-VG	XRUD-140-VG	2,033	1.28	ROOF	* H.T.	--	120/1	1 HP	100	1,2,3,5,6
KEF2	XCUE-140-VG	XRUD-140-VG	1,063	1.1"	ROOF	* H.T.	--	120/1	3/4 HP	100	1,2,3,5,6
KEF3	XCUE-140HP-A	XRUD-140HP-A	800	1.3"	ROOF	* H.T.	--	120/1	1/2 HP	125	1,2,3,5,6
KEF4	XCUR-099-A	XRUD-099-A	525	0.53"	ROOF	STD	--	120/1	1/3 HP	100	1,2,4,5
EF1	COOK	GC-148	70	0.25"	CEILING	STD	B.D.D.	120/1	29 W	--	1,2,5,7
EF2	COOK	GC-168	160	0.25"	CEILING	STD	B.D.D.	120/1	53.2 W	--	1,2,5,7
EF3	COOK	GC-168	160	0.25"	CEILING	STD	B.D.D.	120/1	53.2 W	--	1,2,5,7

* H.T. = HIGH TEMPERATURE COATING

NOTES & ACCESSORIES:
1. FACTORY MOUNTED DISCONNECTING MEANS.
2. SPEED CONTROLLER.
3. INCLUDE GREASE BOX.
4. ALL ALUMINUM CONSTRUCTION.
5. PITCHED INSULATED ROOF CURB PROVIDED BY P.E.M.B. MANUFACTURER. COORDINATE HEIGHT OF CURB TO MAINTAIN EQUIPMENT AT 1+4" CLEAR ABOVE FINISHED ROOF SURFACE.
6. INCLUDE HIGH TEMPERATURE PACKAGE, U.L. 762 LISTED WITH DRAIN, ACCESS DOOR AND MOTOR HEAT SHIELD.
7. INCLUDE CURB MOUNTED ROOF CAP ACCESSORY.

GAS FURNACE/COIL/CONDENSING UNIT SCHEDULE

FURNACE

MARK	BASIS OF DESIGN MFGR.	MODEL #	CFM	OA CFM	DELTA P (STATIC)	INPUT (MBH)	OUTPUT (MBH)	VOLTAGE/ PHASE	MCA	MOCP	NOTES
F1	TRANE	S8X2D	1800	425	0.5"	120	98	120/1	14	15	1,2,3
F2	TRANE	S8X2D	1800	450	0.5"	120	98	120/1	14	15	1,2,3
F3	TRANE	S8X2D	1800	450	0.5"	120	98	120/1	14	15	1,2,3
F4	TRANE	S8X2D	1920	250	0.5"	120	98	120/1	14	15	1,2,3
F5	TRANE	S8X2D	1920	250	0.5"	120	98	120/1	14	15	1,2,3

FURNACE NOTES:
1. EXTERNAL STATIC PRESSURE INCLUDES WET COIL, EXCLUDES FILTER LOSS.
2. PROVIDE ACCESSIBLE FILTER RACK AND 2" FILTER EQUAL TO FARR 30/30 WITH MERV 7 MINIMUM RATING.
3. PROVIDE DIRECT VENT, CONCENTRIC ROOF TERMINATION KIT.

COIL / CONDENSING UNIT

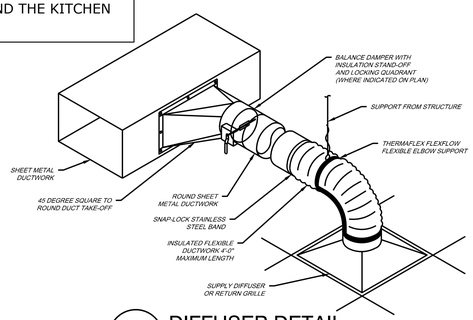
MARK	BASIS OF DESIGN MANUFACTURER	EVAP. COIL MODEL #	COND. UNIT MODEL #	ENTERING AIR DB/WB	SENSIBLE MBH	TOTAL MBH	VOLTAGE/ PHASE	SEER2	MCA	MOCP	NOTES
CU1	TRANE	5TXC	5TTR7060A1	75.5/62.0	42.7	54.7	240/1	16.5	43	60	1,2
CU2	TRANE	5TXC	5TTR7060A1	75.5/62.0	42.7	54.7	240/1	16.5	43	60	1,2
CU3	TRANE	5TXC	5TTR7060A1	75.5/62.0	42.7	54.7	240/1	16.5	43	60	1,2
CU4	TRANE	5TXC	5TTR7060A1	75.8/62.1	45.7	55.8	240/1	16.5	43	60	1,2
CU5	TRANE	5TXC	5TTR7060A1	75.8/62.1	45.7	55.8	240/1	16.5	43	60	1,2

COIL / CONDENSING UNIT NOTES:
1. PROVIDE REFRIGERANT LINE SET(S) SIZED PER MANUFACTURER'S RECOMMENDATIONS.
2. PROVIDE ALL REFRIGERATION SYSTEM ACCESSORIES REQUIRED BY MANUFACTURER FOR GIVEN LINE SET ROUTING.

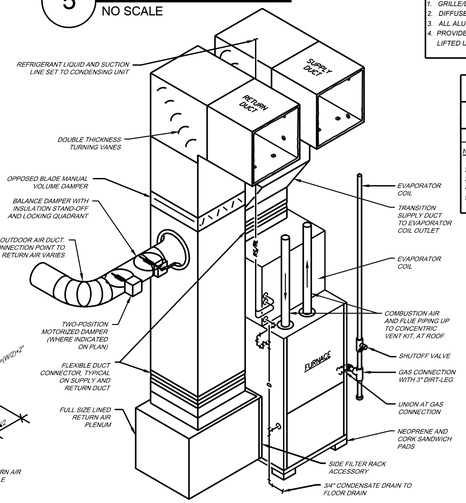
LOUVER SCHEDULE

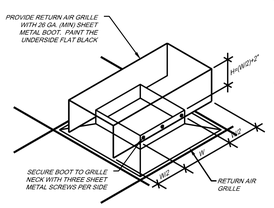
MARK	BASIS OF DESIGN MANUFACTURER	MODEL #	SERVICE	CFM	DELTA P (STATIC)	WIDTH X HEIGHT (IN)	DEPTH (IN)	FREE AREA MIN (SQ.FT.)	VELOCITY (FPM)	NOTES
L1	POTTORFF	EFD-637	INTAKE	1,825	0.04"	30" x 24"	6"	2.5	800	1,2,3,4,5

NOTES:
1. BIRD SCREEN
2. DRAINABLE BLADE
3. FLANGE FRAME
4. FACTORY PAINTED BAKED ENAMEL FINISH, DARK BRONZE COLOR, COORDINATE WITH ARCHITECT.
5. PROVIDE 120-VOLT, TWO-POSITION MOTORIZED DAMPER INTERCONNECTED TO TIME CLOCK. DAMPER TO OPEN DURING OCCUPIED HOURS.



5 DIFFUSER DETAIL
NO SCALE



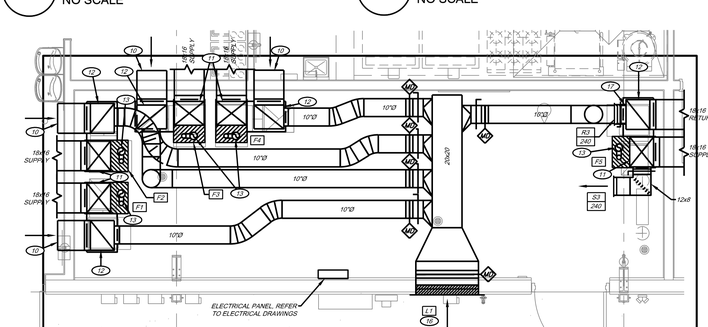


NOTE: WHERE RETURN AIR GRILLE NECK IS RECTANGULAR, W. SHALL BE THE LARGER OF THE TWO NECK DIMENSIONS.

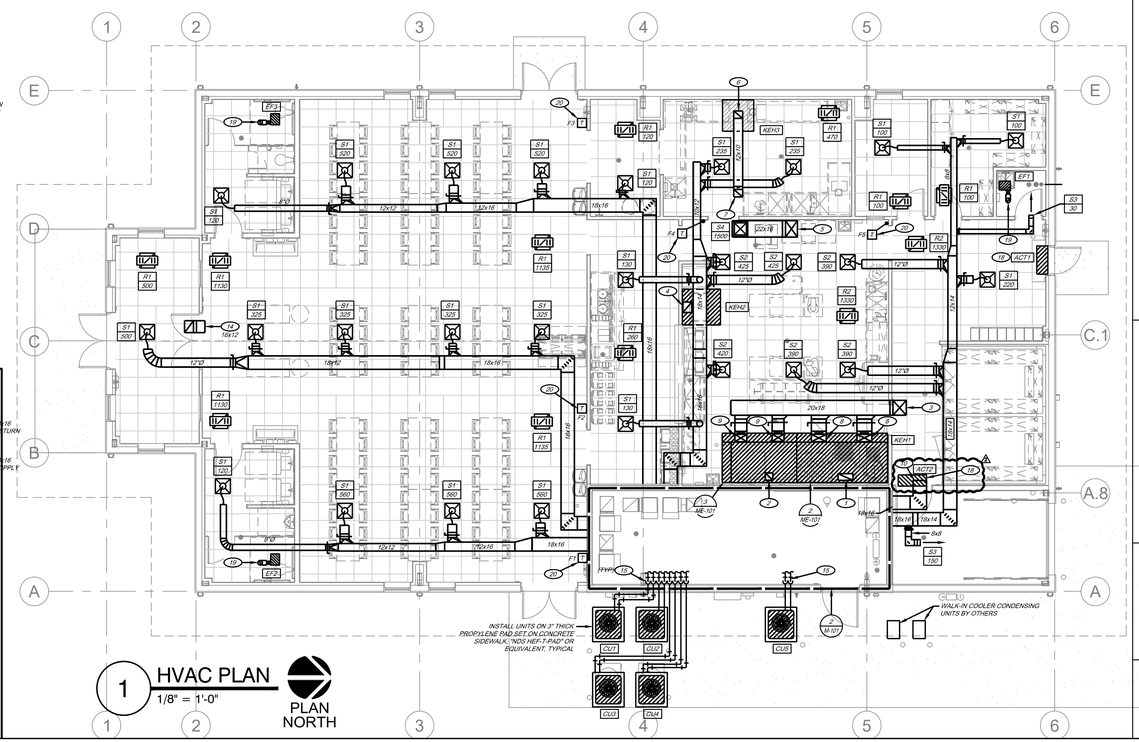
4 RETURN GRILLE DETAIL
NO SCALE

NOTE: LOCATION AND ORIENTATION OF DUCTWORK, PLENUM ORIENTATION, PIPE ROUTING, DAMPER LOCATIONS, ETC. SHALL VARY BASED ON EQUIPMENT MANUFACTURER AVAILABLE OPTIONS. COMPONENTS OF DETAIL SHALL BE ALTERED BASED ON EQUIPMENT MANUFACTURER CONNECTION LOCATIONS.

3 GAS FURNACE DETAIL
NO SCALE



2 ENLARGED MECHANICAL ROOM HVAC PLAN
1/4" = 1'-0"
PLAN NORTH



1 HVAC PLAN
1/8" = 1'-0"
PLAN NORTH

GENERAL HVAC NOTES:

1. THE PLANS ARE DIAGRAMMATIC AND SHALL NOT BE SCALED. REFER TO ARCHITECTURAL DRAWINGS FOR DIMENSIONS.
2. EQUIPMENT AND DUCTWORK LAYOUTS ARE DIAGRAMMATIC. FIELD COORDINATE EXACT LOCATIONS AND ROUTINGS WITH STRUCTURE, PIPING, CONDUITS, LIGHT FIXTURES, ETC. FINAL RESULT SHALL BE EQUIVALENT TO THAT INDICATED ON DRAWINGS.
3. COOPERATE CLOSELY WITH ALL OTHER TRADES TO EXPEDITE CONSTRUCTION AND AVOID INTERFERENCES AND CONFLICTS. BEFORE ANY PIPING, DUCTWORK, CONDUIT, ETC. IS INSTALLED, IT SHALL BE COORDINATED CAREFULLY BETWEEN ALL TRADES.
4. CONTRACTOR SHALL FIELD VERIFY EXTENT OF EXISTING CONSTRUCTION.
5. MAINTAIN ALL CLEARANCES REQUIRED FOR EQUIPMENT. DO NOT ROUTE PIPING, DUCTWORK, ETC. ABOVE ELECTRICAL PANELS.
6. PROVIDE UNISTRUTS AND ACCESSORIES AS REQUIRED FOR SUPPORT OF DUCTWORK, EQUIPMENT, ETC.
7. SEAL AROUND ALL RATED WALL PENETRATIONS WITH FIRE STOPPING/CAULKING PER SPECIFICATIONS.
8. BRANCH DUCTS SHALL BE THE SAME SIZE AS DIFFUSER NECK UNLESS NOTED OTHERWISE.
9. COORDINATE CEILING DIFFUSER AND GRILLE LOCATIONS WITH ARCHITECTURAL REFLECTED CEILING PLANS.
10. REFER TO EQUIPMENT SCHEDULES FOR OUTSIDE AIR QUANTITIES TO INDIVIDUAL HVAC UNITS.
11. REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.

HVAC DUCTWORK:

- FLEXIBLE DUCT
- 12x12 — RECTANGULAR DUCT DIMENSIONS (WIDTH x HEIGHT)
- VOLUME DAMPER WITH LOCKING QUADRANT
- BRANCH DUCT WITH 45° BOOT FITTING
- BRANCH DUCT WITH BELLMOUTH SPIN-IN FITTING WITH MANUAL VOLUME DAMPER
- BRANCH DUCT WITH HIGH EFFICIENCY RECTANGULAR TO ROUND TAKE-OFF WITH MANUAL VOLUME DAMPER
- ELBOW WITH DOUBLE WALL TURNING VANES
- RETURN, EXHAUST OR FRESH AIR DUCT UP
- RETURN, EXHAUST OR FRESH AIR DUCT DOWN
- SUPPLY AIR DUCT UP
- SUPPLY AIR DUCT DOWN
- EQUIPMENT WITH FLEXIBLE DUCT CONNECTION

HVAC EQUIPMENT:

- SUPPLY DIFFUSER
- RETURN, EXHAUST GRILLE
- LINEAR DIFFUSER
- S1 / 150 — DIFFUSER/GRILLE TYPE, AIRFLOW
- FD — FIRE DAMPER
- SD — SMOKE DAMPER
- FSD — FIRE/SMOKE DAMPER
- MD — MOTORIZED DAMPER

HVAC CONTROLS:

- T RTU — THERMOSTAT AND EQUIPMENT SERVED
- S CO2 — SPACE CO2 SENSOR

NOTE: INSTALL THERMOSTATS AND SENSORS AT 48" ABOVE FINISH FLOOR UNLESS NOTED OTHERWISE.

NOTATION:

E.A.	EXHAUST AIR
O.A.	OUTSIDE AIR
R.A.	RETURN AIR
S.A.	SUPPLY AIR

smith & boucher engineers
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STATE OF MISSOURI
MIKE KEHOE,
GOVERNOR

STATE OF MISSOURI — RYAN JEROD DIEDIKER — NUMBER PE-2015006551 — REGISTERED PROFESSIONAL ENGINEER — 7/10/26

PROFESSIONAL SEAL

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OFFICE OF ADMINISTRATION
DIVISION OF FACILITIES MANAGEMENT,
DESIGN AND CONSTRUCTION

DEPARTMENT OF PUBLIC SAFETY
MISSOURI ARMY NATIONAL GUARD

CONSTRUCT NEW SOLDIER DINING FACILITY

WAPPAPELLO TRAINING SITE
461 COUNTY ROAD 517
WAPPAPELLO, MO 63966

PROJECT #
SITE #
ASSET #

REVISION: 2 ADD NO. 02
DATE: SEPT. 03, 2026
REVISION:
DATE:
REVISION:
DATE:
ISSUE DATE: JULY 10, 2026

CAD DWG FILE:
DRAWN BY: SBI
CHECKED BY: RJD
DESIGNED BY: JEB

SHEET TITLE:
HVAC PLAN

SHEET NUMBER:
M-101
OF 40 SHEETS

AUTOCAD FILE LOCATION \ NAME: X:\22\22277\2227701\Drawings\04-2227701_M-101.dwg
LAST CORRECTION BY ◆ DATE ◆ TIME: Jwelch Thursday, September 3, 2026 9:26:25 AM
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DUCTWORK SCHEDULE

SERVICE	DUCT SHAPE	SMACNA REQUIREMENTS			LINER REQUIREMENTS	INSULATION REQUIREMENTS	OTHER REQUIREMENTS
		CLASSIFICATION	SEAL CLASS	LEAKAGE CLASS			
LOW PRESSURE SUPPLY DUCTWORK CONNECTED TO SINGLE ZONE AIR HANDLING UNITS	RECTANGULAR	2" WG POSITIVE	B	12	1", 3LB DENSITY LINER	---	PAINTABLE WHERE EXPOSED
	ROUND (CONCEALED)	4" WG POSITIVE SPIRAL SEAM	B	3	---	1-1/2", 1.5 LB. FIBERGLASS BLANKET, VAPOR-BARRIER FACED, WITH HEAVY DUTY FOIL-SCRIM-KRAFT FACING	
	ROUND (EXPOSED)	4" WG POSITIVE SPIRAL SEAM	B	3	---	---	PAINTABLE WHERE EXPOSED
RETURN/TRANSFER AIR DUCTWORK	RECTANGULAR	2" WG NEGATIVE	B	12	1", 3LB DENSITY LINER	---	PAINTABLE WHERE EXPOSED
	ROUND	2" WG NEGATIVE	A	3	---	---	PAINTABLE WHERE EXPOSED
OUTSIDE AIR DUCTWORK	ALL (CONCEALED)	2" WG POSITIVE	B	12	---	1-1/2", 1.5 LB. FIBERGLASS BLANKET, VAPOR-BARRIER FACED, WITH HEAVY DUTY FOIL-SCRIM-KRAFT FACING	
	ALL (EXPOSED)	2" WG POSITIVE	B	12	---	1-1/2", 3 LB. RIGID FIBERGLASS BOARD, VAPOR-BARRIER FACED, WITH HEAVY DUTY FOIL-SCRIM-KRAFT FACING AND PAINTABLE JACKET	PAINTABLE WHERE EXPOSED
GENERAL EXHAUST AIR DUCTWORK	RECTANGULAR	2" WG NEGATIVE	B	12	---	---	PAINTABLE WHERE EXPOSED
	ROUND	2" WG NEGATIVE	A	3	---	---	PAINTABLE WHERE EXPOSED
TYPE I KITCHEN HOOD EXHAUST DUCTWORK	RECTANGULAR	4" WG NEGATIVE, 16-GAUGE CARBON STEAL	WELDED SEAMS AND JOINTS	3	---	2-HR RATED DUCT WRAP COMPOSED OF REFRACTORY CERAMIC FIBER BLANKET ENCAPSULATED WITH FOIL SCRIM. INSTALLATION SHALL BE PERFROMED BY MANUFACTURER'S QUALIFIED CONTRACTOR. SUBMIT INSTALLATION REQUIREMENTS WITH SHOP DRAWINGS.	DUCT SHALL SLOPE TOWARDS KITCHEN HOOD. DUCT SHALL SLOPE TOWARDS GREASE CATCH POINTS IF THEY ARE NECESSARY. PROVIDE CLEANOUTS WITH RATED ACCESS DOOR AT ALL CHANGES IN DIRECTION.
TYPE II DISHWASHER HOOD EXHAUST DUCTWORK	ALL	4" WG, TYPE 316 SS NEGATIVE	WELDED SEAMS AND JOINTS	3	---	---	EXPOSED - NO. 4 FINISH CONCEALED - NO. 2D FINISH DUCT SHALL SLOPE TOWARDS DISHWASHER HOOD.

SPECIAL NOTE:
PROVIDE ALL MECHANICAL CONNECTIONS TO ALL KITCHEN EQUIPMENT. PROVIDE ALL FITTINGS, VALVES AND DRAIN ACCESSORIES AS REQUIRED. VERIFY ALL REQUIREMENTS WITH THE KITCHEN EQUIPMENT SUPPLIER AND THE KITCHEN CONSULTANT.

PIPING MATERIAL SCHEDULE - HVAC

SERVICE	PIPE SIZE	PIPE MATERIAL	FITTINGS
CONDENSATE DRAIN	1/2" - 1-1/2"	DRAWN-TEMPER COPPER TUBE, SEAMLESS, TYPE K OR L	WROUGHT COPPER SOLDER OR PRESSFIT
	2" AND LARGER	SCHEDULE 40, GRADE B, STEEL PIPE	SCHEDULE 40 STEEL, THREADED
REFRIGERANT SUCTION REFRIGERANT HOT GAS REFRIGERANT LIQUID	ALL	COPPER, TYPE ACR OR TYPE L, DRAWN COPPER TUBING	WROUGHT COPPER FITTINGS WITH BRAZED OR SOLDERED JOINTS

PIPE INSULATION SCHEDULE - HVAC

SERVICE	PIPE SIZE	INSULATION	NOTES
CONDENSATE DRAIN	1/2" - 1-1/2"	1/2" FIBERGLASS, ASJ	1,2,3,4,5
	2" AND LARGER	1" FIBERGLASS, ASJ	
REFRIGERANT SUCTION REFRIGERANT HOT GAS REFRIGERANT LIQUID	ALL	1/2" FLEXIBLE CLOSED CELL ELASTOMERIC	
REFRIGERANT SUCTION (EXTERIOR) REFRIGERANT HOT GAS (EXTERIOR)	ALL	1/2"FIBERGLASS, ASJ WITH PVC (ALUMINUM) JACKET	

NOTES:
1: FOR ALL PIPING 2-1/2" AND LARGER, PROVIDE RIGID FOAM INSERTS AT ALL HANGERS AND SUPPORT LOCATIONS.
2: ELBOW AND FITTING INSULATION SHALL BE OF SAME THICKNESS AS ADJACENT STRAIGHT PIPE INSULATION.
3: FITTING INSULATION TO HAVE ASJ OR SUPPLEMENTAL VAPOR BARRIER SEALED TO ADJACENT PIPE INSULATION.
4: PROVIDE PVC JACKET ON ALL FITTINGS AND ELBOWS IN EXPOSED AREAS.
5: PROVIDE PVC JACKET ON ALL PIPING IN MECHANICAL ROOMS.
6: PROVIDE PRE-FORMED, RIGID PIPE INSULATION ON ALL ELBOWS AND FITTINGS.

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project number 2227701

STATE OF MISSOURI
MIKE KEHOE,
GOVERNOR

STATE OF MISSOURI
RYAN JEROD DIEDIKER
NUMBER PE-2015006571
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CONSTRUCT NEW
SOLDIER DINING FACILITY

WAPPAPELLO
TRAINING SITE
461 COUNTY ROAD 517
WAPPAPELLO, MO 63966

PROJECT #
SITE #
ASSET #

REVISION: 2 ADD NO. 02
DATE: SEPT. 03, 2026
REVISION:
DATE:
REVISION:
DATE:
ISSUE DATE: JULY 10, 2026

CAD DWG FILE:
DRAWN BY: SBI
CHECKED BY: RJD
DESIGNED BY: JEB

SHEET TITLE:
HVAC PLAN
SCHEDULES
AND DETAILS

SHEET NUMBER:
M-102
OF 40 SHEETS

PROJECT NAME: New Soldier Dining Facility - Wappapello MO (T233-01)
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PIPING MATERIAL SCHEDULE

SYSTEM	PIPING SIZE	PIPING TYPE	PIPING SCHEDULE	PIPING GRADE	PIPING ASTM	PIPING MATERIAL	FITTINGS MATERIAL	FITTINGS TYPE	MAXIMUM WORKING PRESSURE (PSI)	MAXIMUM WORKING TEMP (DEG F)	FIELD TEST PRESSURE (PSI)	FIELD TEST TIME (HOURS)	NOTES
CONDENSATE DRAIN ABOVE GRADE	ALL	M	-	-	B88	COPPER	COPPER	DR \ SJ	10 FT	40-70	10 FT	1	-
DOMESTIC WATER ABOVE GRADE	0.5"-3"	L	-	-	B88	COPPER	COPPER	SJ	120	40-180	150	1	7
DOMESTIC WATER BELOW GRADE	ALL	K	-	-	B88	COPPER	COPPER	SJ	120	40-180	150	1	-
DOMESTIC WATER SERVICE BELOW GRADE	ALL	PVC	-	-	AWWA C900	PVC	DI	MJ	200	50-90	200	2	6
FIRE PROTECTION	ALL	PER NFPA 13 AND FIRE SPRINKLER DRAWINGS									200	2	2
FIRE SPRINKLER SERVICE BELOW GRADE	ALL	PER NFPA 13 AND FIRE SPRINKLER DRAWINGS									200	2	-
2 PROPANE GAS ABOVE GRADE	0.5" - 2.5"	CW	40	A	A53	CS / BLK	MI	THRD	5	--	150	2	4,5
REFRIGERANT PIPING	ALL	ACR	--	--	B280	CP	CP	SJ	150	40-180	200	4	-
SANITARY WASTE BELOW GRADE	ALL	DWV	40	-	2665	PVC	PVC	DR \ SW	10 FT	50-180	10 FT	1	1
SANITARY WASTE AND VENT - RETURN AIR PLENUMS	ALL	NH	SS	-	A74	CI	CI	DR \ NH	10 FT	50-180	10 FT	1	3
SANITARY WASTE AND VENT ABOVE GRADE	ALL	DWV	40	-	2665	PVC	PVC	DR \ SW	10 FT	50-180	10 FT	1	1,3
TEMPERATURE & PRESSURE RELIEF DRAIN	ALL	M	-	-	B88	COPPER	COPPER	DR \ SJ	10 FT	40-70	10 FT	1	-

NOTES:
1. THE USE OF CELLULAR CORE PVC WASTE AND VENT PIPING IS STRICTLY PROHIBITED.
2. THE USE OF CPVC AND POLYBUTYLENE PIPING IS STRICTLY PROHIBITED.
3. SANITARY WASTE/VENT AND ROOF DRAIN PIPING LOCATED WITHIN RETURN AIR PLENUMS SHALL BE CAST IRON OR SHALL BE ENCLOSED IN A GYPSUM BOARD SOFFIT.
4. NATURAL GAS PIPING INSTALLED IN RETURN AIR PLENUMS AND CONCEALED SPACES SHALL HAVE APPROVED FITTINGS ONLY. VALVES, UNIONS, THREADED FITTINGS, ETC. ARE NOT PERMITTED.
5. NATURAL GAS INSTALLED OUTSIDE SHALL BE PAINTED WITH TWO COATS OF UV RESISTANT ENAMEL PAINT. COLOR TO MATCH WALL COLOR ON EXTERIOR WALL AND YELLOW ON THE ROOF. VERIFY PAINT COLOR WITH ARCHITECT BEFORE INSTALLATION.
6. PROVIDE PIPING MATERIAL PER LOCAL WATER COMPANY REQUIREMENTS IF DIFFERENT THAN SCHEDULED.
7. AT CONTRACTORS OPTION, PEX CROSSLINKED POLYETHYLENE TUBING MAY BE USED FOR DOMESTIC WATER ABOVE GROUND PIPING. REFER TO SPECIFICATIONS.

APPROVED PIPE & FITTING MANUFACTURERS:
CAST IRON - CHARLOTTE, TYLER, CENTRAL FOUNDRY OR PRE-BID APPROVED EQUAL.
COPPER - CERRO, CHASE, MUELLER, REVERE COPPER OR PRE-BID APPROVED EQUAL.
PEX-B - WATTS, VIEGA, OR PRE-BID APPROVED EQUAL.
PVC (SOLID) - CHARLOTTE, TYLER, CHEMTROL OR PRE-BID APPROVED EQUAL.
CARBON STEEL - ARMCO, YOUNGSTOWN, UNITED STATES STEEL OR PRE-BID APPROVED EQUAL. GROOVED FITTINGS - VICTAULIC, GRUVLOK OR PRE-BID APPROVED EQUAL.

ABBREVIATIONS:
BS - BELL AND SPIGOT
CI - CAST IRON
CS - CARBON STEEL
CW - CONTINUOUS WELD
DI - DUCTILE IRON
DR - DRAINAGE FITTING
FRP - FIBERGLASS REINFORCED
DWV - DRAINAGE WASTE AND VENT
HDPE - HIGH DENSITY POLYETHYLENE
MJ - MECHANICAL JOINT
NG - NEOPRENE GASKET
PI-FRP - PRE-INSULATED FIBERGLASS REINFORCED PLASTIC
RPF-HDPE - RIGID POLYURETHANE INSULATION WITH HDPE JACKET
PEX - PEX CROSSLINKED POLYETHYLENE TUBING
NH - NO-HUB
SJ - 95-5 TIN-ANTIMONY SOLDER JOINT
SS - STANDARD STRENGTH / SERVICE WEIGHT
SW - SOLVENT WELD
TEAH - THERMOSETING EPOXY ADHESIVE WITH HEAT

PLUMBING PUMP SCHEDULE

MARK	SERVICE	BASIS OF DESIGN MANUFACTURER	SERIES	SIZE	INLET	DISCH.	GPM	HEAD (FT.)	NPSH	TYPE	WORKING CLASS	H.P. (W)	RPM	VOLTAGE/ PHASE	CONST.	FLUID TYPE	FLUID TEMP.	NOTES/ ACCESSORIES
HWP1	WH1	BELL & GOSSETT	NRF	22	0.75"	0.75"	4	10	--	IL	150	92W	2940	120/1	AB	WATER	100-140	1,2

GENERAL NOTES:
1. PROVIDE TIME CLOCK AND AQUASTAT KIT. INSTALL REMOTE TEMPERATURE SENSOR WHERE HOT WATER RETURN PIPING CONNECTS TO HOT WATER PIPNG.
2. PROVIDE BALANCE, CHECK AND SERVICE VALVES AT ALL BRANCH PIPING FROM MAIN HOT WATER RECIRCULATION PIPE.

EQUIVALENT MANUFACTURER'S
1. GRUNDFOSS
2. TACO
3. WATTS

ABBREVIATIONS:
NPSH - NET POSITIVE SUCTION HEAD
DHW - DOMESTIC HOT WATER
AB - ALL BRONZE
AI - ALL IRON
AS - AQUASTAT KIT
IL - IN-LINE

WATER SOFTENER SCHEDULE

MARK	BASIS OF DESIGN MANUFACTURER	MODEL NO.	NORMAL FLOW RATE (GPM) @ 15 PSI LOSS	DESIGN FLOW RATE (GPM) @ 21.5 PSI LOSS	MAX. FLOW RATE (GPM) @ 25 PSI LOSS	BACKWASH FLOW RATE (GPM)	RESIN VOLUME (CU. FT.)	DAILY WATER USAGE (GALLONS)	BRINE TANK SALT CAPACITY (LBS.)	VOLTAGE/ PHASE	ACCESSORIES
WS1	CULLIGAN	CTM-120-DF	55	58	73	8	4	1,000	900	120/1	1,2

ACCESSORIES:
1. BASIS OF DESIGN CULLIGAN CONTACT INFORMATION: MARCUS MONTEZ, (417) 434-4091, rmontez@hallswater.com
2. INCLUDE PROGRAMMABLE SYSTEM CONTROLLER WITH DIGITAL KEYPAD WITH BATTERY BACKUP.

EQUIVALENT MANUFACTURER'S
1. EASY WATER
2. FLECK
3. ROBERT B HILL

WATER HEATER SCHEDULE

MARK	BASIS OF DESIGN MANUFACTURER	MODEL #	TYPE	GALLON CAPACITY	RECOVERY GPH @ 100F RISE	INPUT BTUH	OUTPUT BTUH	%AFUE	KW	VOLTAGE/ PHASE	ACCESSORIES
WH1	AO SMITH	BTH-500	PROPANE	119	576	500	475	95%	-	120/1	1,2,3,4,5

ACCESSORIES:
1. THERMAL EXPANSION TANK EQUIVALENT TO AMTROL MODEL ST-12.
2. DRAIN VALVE WITH THREADED HOSE CONNECTION.
3. ASME PRESSURE & TEMPERATURE RELIEF VALVE.
4. INCLUDE CONDENSATE NEUTRALIZATION KIT.
5. INCLUDE CONCENTRIC VENT KIT.

EQUIVALENT MANUFACTURER'S
1. BRADFORD-WHITE
2. LOCHINVAR
3. STATE

2

PIPE INSULATION SCHEDULE - PLUMBING

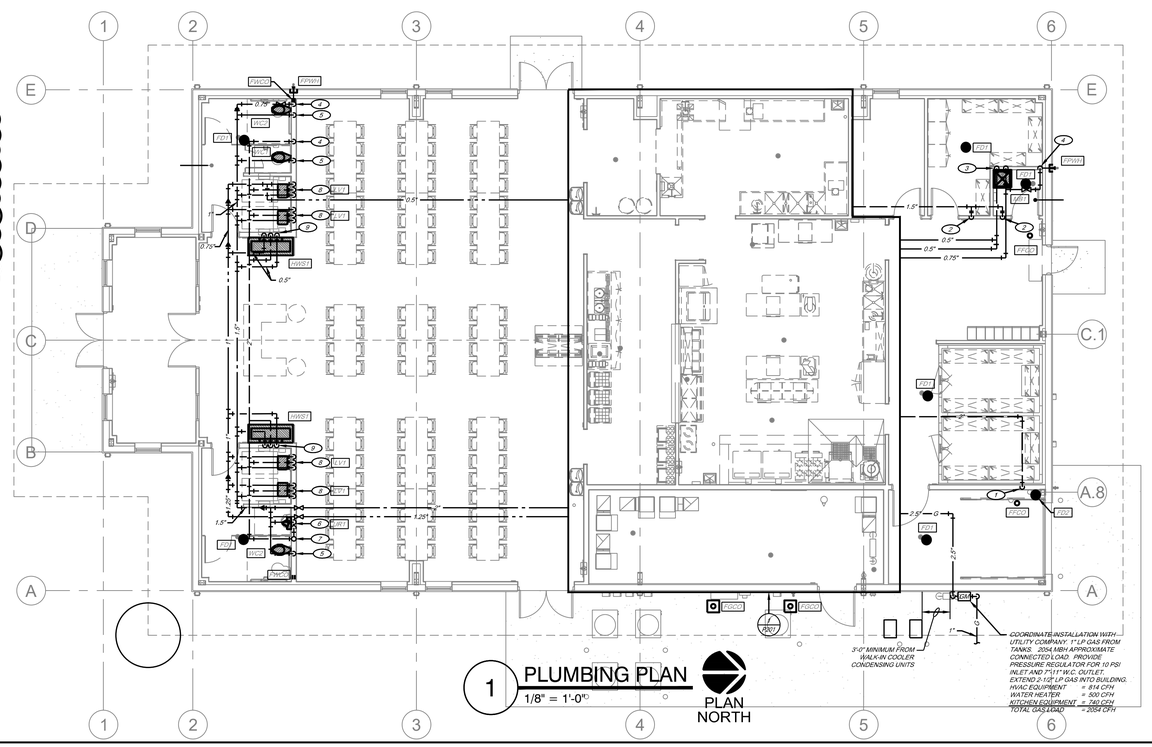
SERVICE	PIPE SIZE	INSULATION
DOMESTIC COLD WATER	1/2" - 2"	1/2" FIBERGLASS, ASJ
	2-1/2" AND LARGER	1" FIBERGLASS, ASJ
DOMESTIC HOT WATER	1/2" - 1-1/4"	1" FIBERGLASS, ASJ
RECIRCULATING HOT WATER	1-1/2" AND LARGER	1-1/2" FIBERGLASS, ASJ
EXPOSED FIXTURE WASTETRAPS AND DOMESTIC HOT WATER AT HANDICAPPED ACCESSIBLE SINKS AND LAVATORIES	ALL	TRUBRO LAV AGUARD MOLDED PROTECTIVE PIPE COVER OVER 1/2" FIBERGLASS INSULATION

NOTES:
1. FOR ALL PIPING 2-1/2" AND LARGER, PROVIDE RIGID FOAM INSERTS AT ALL HANGERS AND SUPPORT LOCATIONS.

PLUMBING FIXTURE & EQUIPMENT SCHEDULE

MARK	DESCRIPTION	BASIS OF DESIGN MANUFACTURER	MODEL NUMBER	ACCESSORIES	PIPING CONNECTION SIZES COLD WATER	HOT WATER	WASTE	VENT	NOTES	EQUIVALENT MANUFACTURERS
BFP1	BACKFLOW PREVENTER	WATTS	LF009	LEAD FREE BRONZE CONSTRUCTION, TWO IN LINE INDEPENDENT CHECK VALVES, REPLACEABLE CHECK SEATS WITH AN INTERMEDIATE RELIEF VALVE, AND BALL VALVE TEST COCKS	2"	-	-	-	-	FEBCO
DF1	BI-LEVEL ELECTRIC WATER COOLER WITH BOTTLE FILLER	ELKAY	EMABFTL8WSSK	ZURN Z1225-BL CARRIER, 1.25" TRAP, SUPPLY AND STOP VALVE, MATCHING ACCESSORY CANE APRON FOR ADA PROTECTION.	0.5"	-	2"	1.5"	1,2,3,4,7	HAWS, OASIS
FD1	LIGHT DUTY FLOOR DRAIN	ZURN	FD2210	NICKEL BRONZE GRATE, PROSET TRAPGUARD	-	-	SEE PLAN	SEE PLAN	1	JOSAM, SIOUX CHIEF, SMITH, WATTS
FD2	FLOOR DRAIN WITH FUNNEL	ZURN	FD2210 WITH Z328	POLISHED NICKEL BRONZE FUNNEL, PROSET TRAPGUARD	-	-	SEE PLAN	SEE PLAN	1	JOSAM, SIOUX CHIEF, SMITH, WATTS
FFCO	FINISH FLOOR CLEANOUT	ZURN	ZN1400	NICKEL BRONZE TOP	-	-	SEE PLAN	-	1	JOSAM, SIOUX CHIEF, SMITH, WATTS
FGCO	FINISH GRADE CLEANOUT	ZURN	ZN1400-HD	HEAVY DUTY TOP	-	-	SEE PLAN	-	1	JOSAM, SIOUX CHIEF, SMITH, WATTS
FWCO	FINISH WALL CLEANOUT	ZURN	Z1446	STAINLESS STEEL COVER	-	-	SEE PLAN	-	1	JOSAM, SIOUX CHIEF, SMITH, WATTS
FPWH	FREEZEPROOF WALL HYDRANT	ZURN	Z1320	1/4 TURN, NON-FREEZE WALL HYDRANT W/INTEGRAL VACUUM BREAKER LOOSE KEY	0.75"	-	-	-	1	SMITH, WATTS, WOODFORD
GI1	GREASE INTERCEPTOR	SCHIER	GB-75	75 GPM, 125 GALLON CAPACITY, 616 LB2. GREASE CAPACITY, PEDESTRIAN RATED COVER, PROVIDE 24" COVER RISER	-	-	4"	-	-	SUBMIT FOR APPROVAL
FS1	12" SQUARE FLOOR SINK	ZURN	Z-566-GT-Y	CAST IRON 12x12 FLOOR DRAIN W/ DUCTILE IRON GRATE, ALUMINUM SEDIMENT BUCKET	-	-	3"	SEE PLAN	1	JOSAM, SIOUX CHIEF, SMITH
HB1	HOSE BIBB	ZURN	Z1341XL-PC	POLISHED CHROME WALL HOSE BIBB W/VACUUM BREAKER	0.5"	-	-	-	1,2	WATTS, WOODFORD, PRIER
HWS1	HAND WASH STATION	SLOAN	ELRF-82000	INCLUDE TWO SLOAN EAF-150-BAT-SM-CP-1-1.0 GPM, SENSOR FAUCETS WITH BATTERY POWER, 1.25" TAILPIECE AND TRAP, SUPPLIES AND STOP VALVES. PROVIDE TRUEBRO ADA WRAP FOR SUPPLIES AND TRAP. INLCUDE "WATTS" LFUSG-B-SG THERMOSTATIC MIXING VALVE. WASH STATION COLOR AS SELECTED BY ARCHITECT.	0.5"	0.5"	2"	1.5"	1,2,3,4,5,9	ACORN, BRADLEY
IB1	ICE MAKER BOX	WATER-TITE	AB9702HA	QUARTER TURN VALVE, WATTS F510 DUAL CHECK BACKFLOW PREVENTER, HAMMER ARRESTER, FLEXIBLE SUPPLY	0.5"	-	-	-	1	GUY GRAY, OATEY
KD1	24" SQUARE STAINLESS STEEL KETTLE DRAIN	ZURN	Z1761	24" SQUARE X 8" DEEP 14 GAGE TYPE 304 STAINLES STEEL KETTLE DRAIN WITH LOOSE SET FULL GRATE.	-	-	3"	SEE PLAN	1	JOSAM, SIOUX CHIEF, SMITH
KD2	24"X12" STAINLESS STEEL KETTLE DRAIN	ZURN	Z1762	24"X12" RECTANGULAR x 8" DEEP TYPE 304 STAINLES STEEL KETTLE DRAIN WITH STAINLESS STEEL TWO SECTION GRATE.	-	-	3"	SEE PLAN	1	JOSAM, SIOUX CHIEF, SMITH
LV1	INTEGRAL LAVATORY BY OTHERS, REFER TO ARCHITECTURAL DRAWINGS	-	-	DELTA 520-MPU-DST 1.2 GPM FAUCET WITH POLISHED CHROME FINISH, 1.25" TAILPIECE AND TRAP, SUPPLIES AND STOP VALVES. PROVIDE TRUEBRO ADA WRAP FOR SUPPLIES AND TRAP AT ACCESSIBLE UNITS. INLCUDE "WATTS" LFUSG-B-SG THERMOSTATIC MIXING VALVE.	0.5"	0.5"	2"	1.5"	1,2,4,5	AMERICAN STANDARD, KOHLER, TOTO
MB1	MOP BASIN	FIAT	MSB-2424	830-AA FAUCET WITH INTEGRAL MIXER, WATTS USG-B MIXING VALVE (SET AT 120F), 838-AA HOSE AND BRACKET, 889-CC MOP HANGER, MSG2424 WALL GUARD	0.5"	0.5"	3"	1.5"	1,2	STERN WILLIAMS, ZURN, PROFLO
PRV1	PRESSURE REDUCING VALVE	ZURN	500XL		SEE PLAN	-	-	-	1	FEBCO, WATTS
UR1	URINAL	AMERICAN STANDARD	WASHBROOK 6515001.02	ZURN BATTERY POWERED FLUSH VALVE ZTR6203-ULF. ZURN Z1222 CARRIER. VERIFY WITH ARCHITECTURAL PLANS FOR URINALS THAT SHALL BE MOUNTED AT ADA HEIGHT.	0.75"	-	2"	1.5"	C	AMERICAN STANDARD, KOHLER, TOTO
WC1	WATER CLOSET	ZURN	Z5655-BWL	Z5955SS-EL ELONGATED, STANDARD WHITE OPEN FRONT SEAT, SUPPLY & STOP VALVE, ZURN ZTR6200-HET AQUASENSE FLUSH VALVE.	1.25"	-	4"	2"	1,6	AMERICAN STANDARD, KOHLER, TOTO
WC2	ADA WATER CLOSET	ZURN	Z5665-BWL	Z5955SS-EL ELONGATED, STANDARD WHITE OPEN FRONT SEAT, SUPPLY & STOP VALVE, ZURN ZTR6200-HET AQUASENSE FLUSH VALVE.	1.25"	-	4"	2"	1,3,6	AMERICAN STANDARD, KOHLER, TOTO
WHF1	WALL MOUNTED HOSE FAUCET	ZURN	Z8431M1	0.75" HOSE THREADED OUTLET, ADJUSTABLE WALL BRACE, VACUUM BREAKER	0.5"	0.5"	-	-	-	AMERICAN STANDARD, DELTA, FIAT

NOTES:
1. ACCESSORIES SHALL BE SAME MANUFACTURER AS FIXTURE / EQUIPMENT UNLESS NOTED OTHERWISE.
2. REFER TO ARCHITECTURAL DRAWINGS FOR MOUNTING HEIGHT.
3. INSTALL ACCESSORIES AS RECOMMENDED BY MANUFACTURER FOR ADA COMPLIANCE.
4. ALL COLORS AND FINISHES SELECTED BY ARCHITECT.
5. TRUEBRO ADA LAV SHIELD ON SUPPLIES, WASTE, AND MIXING VALVES.
6. PROVIDE SHOCK ABSORBER FOR ALL INDIVIDUAL FIXTURES OR BATTERIES. SIZE UNITS SERVING FIXTURE BATTERIES PER MANUFACTURERS RECOMMENDATIONS.
7. PROVIDE RECTANGULAR STEEL TUBE CARRIER AT FRAMED WALLS. WALL HANGER AT CMU WALLS.
8. FRAME TO EXTEND CONTINUOUS UNDER SHOWER SEPARATING WALLS WITH GRATES SEPARATED BETWEEN SHOWER WALLS. REFER TO PLUMBING PLAN. COORDINATE EXACT DIMENSIONS WITH ARCHITECTURAL PLANS. REFER TO UNDERFLOOR PLUMBING PLAN FOR APPROXIMATE LOCATIONS OF DRAIN OUTLET IN FRAME.
9. INCLUDE TWO FAUCETS AND SUPPLIES FOR HAND WASH STATION.



1 PLUMBING PLAN
1/8" = 1'-0"

KEYNOTES:

1. 2" VENT DOWN TO UNDERSLAB.
2. 1.5" VENT DOWN TO UNDERSLAB.
3. 0.5" COLD AND HOT WATER DOWN TO MOP BASIN.
4. 0.75" COLD WATER DOWN TO FREEZE-PROOF WALL HYDRANT. LOCATE HYDRANT AT APPROXIMATELY 24" ABOVE GRADE.
5. 1.25" COLD WATER DOWN TO WATER CLOSET.
6. 1.5" VENT AND 0.75" COLD WATER DOWN TO URINAL.
7. 2" VENT DOWN TO UNDERSLAB. 2" VENT UP TO 3" VENT THRU ROOF.
8. 1.5" VENT, 0.5" COLD AND HOT WATER DOWN TO LAVATORY.
9. 1.5" VENT, 0.75" COLD AND HOT WATER DOWN TO HAND WASH STATION. TEE 0.5" COLD AND HOT WATER IN WALL TO EACH OF THE TWO FAUCETS.

2

SPECIAL NOTES:

PROVIDE ALL PLUMBING CONNECTIONS TO ALL KITCHEN EQUIPMENT. PROVIDE ALL FITTINGS, VALVES AND DRAIN ACCESSORIES AS REQUIRED. VERIFY ALL REQUIREMENTS WITH THE KITCHEN EQUIPMENT SUPPLIER AND THE KITCHEN CONSULTANT.

FIRE SPRINKLER GENERAL NOTES:

1. PROVIDE DESIGN, MATERIALS, EQUIPMENT, FABRICATION, INSTALLATION, ETC. FOR A WET PIPE FIRE SPRINKLER SYSTEM THROUGHOUT THE ENTIRE BUILDING. ALL PORTIONS OF THE FIRE SPRINKLER SYSTEM SHALL BE THE RESPONSIBILITY OF THE FIRE SPRINKLER CONTRACTOR/ENGINEER. ANY PIPING SHOWN AT BUILDINGS OR ON SITE IS FOR REFERENCE ONLY.
2. THE FIRE SPRINKLER SYSTEM DESIGN AND INSTALLATION SHALL COMPLY WITH THE LATEST EDITION OF NFPA 13, STATE AND LOCAL CODES AS ADOPTED BY THE COUNTY OF NEWTON, MISSOURI. ALL FIRE SPRINKLER SYSTEM MATERIALS SHALL BE U.L. LISTED. FIRE SPRINKLER SYSTEM CONTRACTOR SHALL ENGINEER AND INSTALL THE FIRE SPRINKLER SYSTEM AS REQUIRED TO PROVIDE PROPER COVERAGE FOR THE AREA OF WORK.
3. SECURE ALL FEES, PERMITS, ETC. NECESSARY IN CONJUNCTION WITH THIS WORK. CONTRACTOR SHALL PAY ALL TAP AND EQUIPMENT FEES.
4. THE FIRE SPRINKLER CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING HIS OWN FLOW READINGS FOR PURPOSES OF DESIGN.
5. SPRINKLER HEADS LOCATED IN GYPSUM AND LAY-IN CEILING AREAS SHALL BE CONCEALED RECESSED HEADS WITH COVERPLATES IN COLOR AS SELECTED BY ARCHITECT. HEADS IN AREAS WITH EXPOSED STRUCTURE SHALL BE BRASS, UPRIGHT HEADS.
6. CONTRACTOR SHALL SUBMIT AN ELECTRONIC SET OF SCALED LAYOUT DRAWINGS, CALCULATIONS, AND CUT SHEETS TO ARCHITECT/ENGINEER FOR COORDINATION AND APPROVAL. LAYOUT DRAWINGS SHALL INCLUDE SPRINKLER HEAD AND PIPING LOCATIONS, SERVICE DETAILS, ETC. SUBMIT REQUIRED MATERIALS TO AGENCY HAVING JURISDICTION FOR APPROVAL AND PERMIT.
7. FIRE SPRINKLER WORK SHALL BE PERFORMED BY A QUALIFIED CONTRACTOR WITH AT LEAST 3 YEARS OF INSTALLATION EXPERIENCE ON PROJECTS WITH FIRE PROTECTION WORK SIMILAR TO THAT REQUIRED FOR THE PROJECT. THE FIRE SPRINKLER SYSTEM SHALL BE ENGINEERED BY A REGISTERED PROFESSIONAL ENGINEER LICENSED IN THE STATE OF MISSOURI. AND THE DESIGN DRAWINGS AND CALCULATIONS SHALL BEAR HIS/HER MISSOURI SEAL AND SIGNATURE.
8. PROVIDE FIRE DEPARTMENT CONNECTIONS IN ACCORDANCE WITH LOCAL FIRE DEPARTMENT REQUIREMENTS.
9. CENTER SPRINKLER HEADS IN CEILING TILES AND BETWEEN LIGHTING FIXTURES AS APPLICABLE. HEAD PLACEMENT SHALL BE SUBJECT TO ARCHITECTURAL APPROVAL BASED ON AESTHETICS.

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25618 west 103rd St olathe, ks 66061
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project number 2227701

STATE OF MISSOURI
MIKE KEHOE,
GOVERNOR

STATE OF MISSOURI
RYAN JEROD DIEDIKER
NUMBER A-2015006551
REGISTERED PROFESSIONAL ENGINEER
7/10/26

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OFFICE OF ADMINISTRATION
DIVISION OF FACILITIES MANAGEMENT,
DESIGN AND CONSTRUCTION

DEPARTMENT OF PUBLIC SAFETY
MISSOURI ARMY NATIONAL GUARD

CONSTRUCT NEW SOLDIER DINING FACILITY

WAPPAPELLO TRAINING SITE
461 COUNTY ROAD 517
WAPPAPELLO, MO 63966

PROJECT #
SITE #
ASSET #

REVISION: 2 ADD NO. 02
DATE: SEPT. 03, 2026
REVISION:
DATE:
REVISION:
DATE:
ISSUE DATE: JULY 10, 2026

CAD DWG FILE:
DRAWN BY: SBI
CHECKED BY: RJD
DESIGNED BY: JEB

SHEET TITLE:
PLUMBING PLAN

SHEET NUMBER:
P-102
OF 40 SHEETS

New Soldier Dining Facility - Wappapello MO (72233-01)
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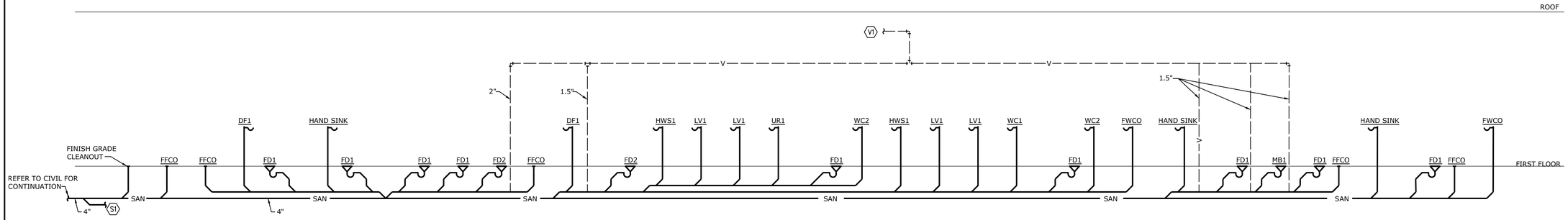
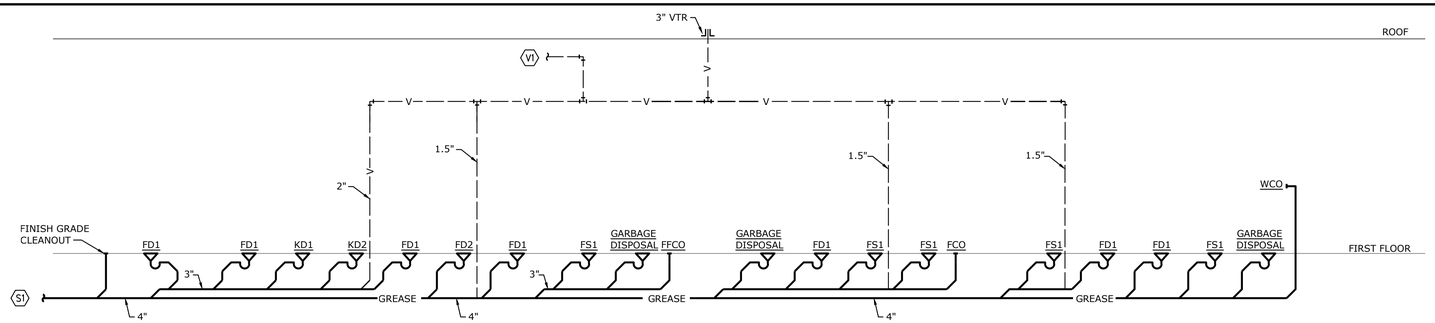
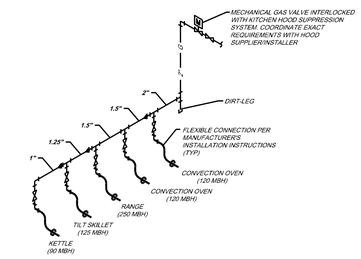
AUTOCAD FILE LOCATION \ NAME:
LAST CORRECTION: BY ◆ DATE ◆ TIME:
PLOTTED: BY ◆ DATE ◆ TIME:



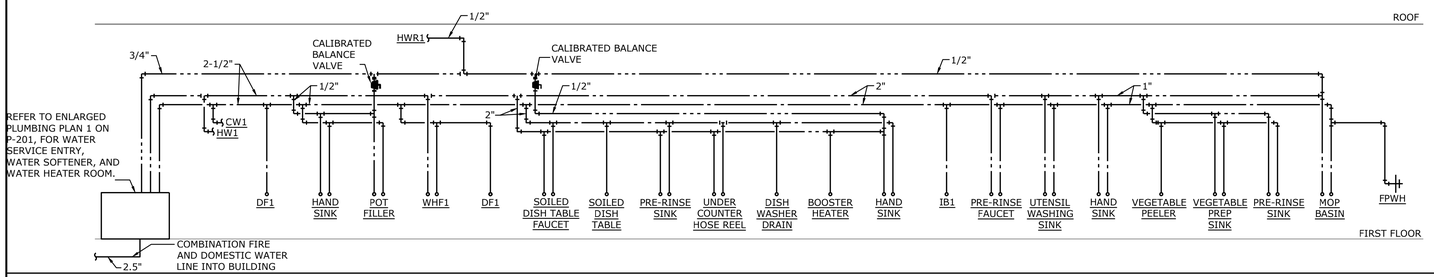
1 PLUMBING RISER DIAGRAM
NOT TO SCALE



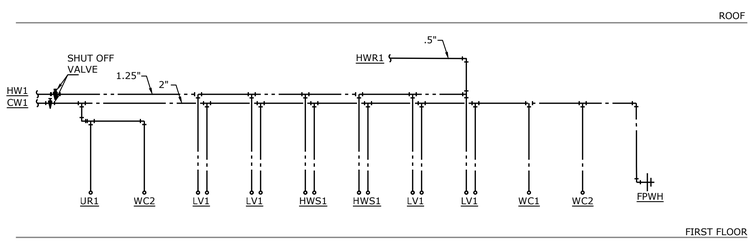
3 PLUMBING RISER DIAGRAM
NOT TO SCALE



2 PROPANE GAS ISOMETRIC
NO SCALE



4 DOMESTER WATER RISER DIAGRAM
NOT TO SCALE



5 DOMESTER WATER RISER DIAGRAM
NOT TO SCALE

PROJECT NAME: New Soldier Dining Facility - Wappapello MO (T2233-01)
AUTOCAD FILE LOCATION \\ NAME: X:\22\2277\2227701\Drawings\04-2227701_P-202.dwg
LAST CORRECTION BY ◆ DATE ◆ TIME: Tuesday, September 1, 2026 1:45:34 PM
PLOTTED BY ◆ DATE ◆ TIME: Scopeland Booby Charles Wednesday, September 2, 2026 1:31:13 PM

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project number 2227701

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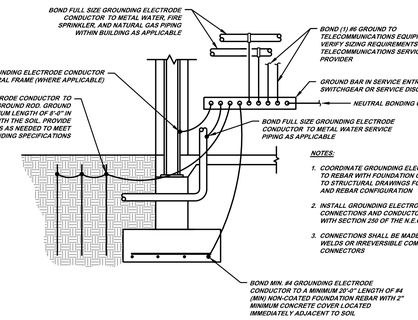
CAD DWG FILE:
DRAWN BY: SBI
CHECKED BY: RJD
DESIGNED BY: JEB

SHEET TITLE:
PLUMBING RISER DIAGRAMS

SHEET NUMBER:
P-202
OF 40 SHEETS

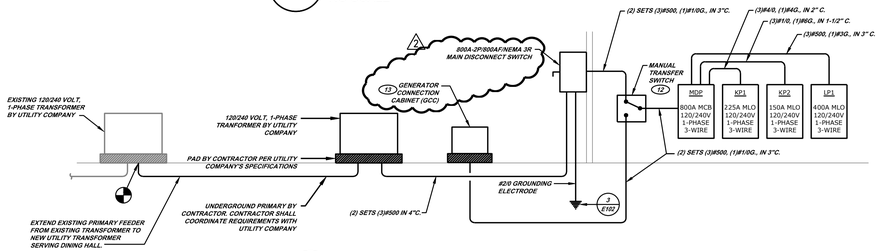


NOTES:

1. COORDINATE GROUNDING ELECTRODE CONNECTION TO REBAR WITH FOUNDATION CONTRACTOR. REFER TO STRUCTURAL DRAWINGS FOR ACTUAL FOOTING AND REBAR CONFIGURATION
2. INSTALL GROUNDING ELECTRODE SYSTEM, CONNECTIONS AND CONDUCTORS IN ACCORDANCE WITH SECTION 250 OF THE N.E.C.
3. CONNECTIONS SHALL BE MADE WITH EXOTHERMIC WELDS OR IRREVERSIBLE COMPRESSION CONNECTORS

3 GROUNDING ELECTRODE DETAIL

NO SCALE



2 ELECTRICAL RISER DIAGRAM

NO SCALE

DISCONNECT SWITCH SCHEDULE

MARK	LOAD		SWITCH			OVERCURRENT PROTECTION					NEMA ENCLOSURE	NOTES & ACCESS.
	EQUIPMENT SERVED	VOLTAGE	DUTY	AMP	POLE	TYPE	MFR	MODEL	AMP	KAIC		
DS1	CONDENSING UNIT - CU1	240	GD	60	1	NF	--	--	--	--	3R	1
DS2	CONDENSING UNIT - CU2	240	GD	60	1	NF	--	--	--	--	3R	1
DS3	CONDENSING UNIT - CU3	240	GD	60	1	NF	--	--	--	--	3R	1
DS4	CONDENSING UNIT - CU4	240	GD	60	1	NF	--	--	--	--	3R	1
DS5	CONDENSING UNIT - CU5	240	GD	60	1	NF	--	--	--	--	3R	1
DS6	REFRIGERATOR CONDENSING UNIT	240	GD	30	1	NF	--	--	--	--	3R	1
DS7	REFRIGERATOR CONDENSING UNIT	240	GD	30	1	NF	--	--	--	--	3R	1

ACCESSORIES:
1. GROUND LUG KIT
2. SOLID NEUTRAL
3. SERVICE ENTRANCE RATING
4. DISCONNECT SHALL BE LOCKABLE IN THE OPEN POSITION

ABBREVIATIONS:
CB - ENCLOSED CIRCUIT BREAKER
GD - GENERAL DUTY
HD - HEAVY DUTY
NF - NON-FUSIBLE

APPROVED MANUFACTURERS:
EATON, GE, SIEMENS, SQUARE D

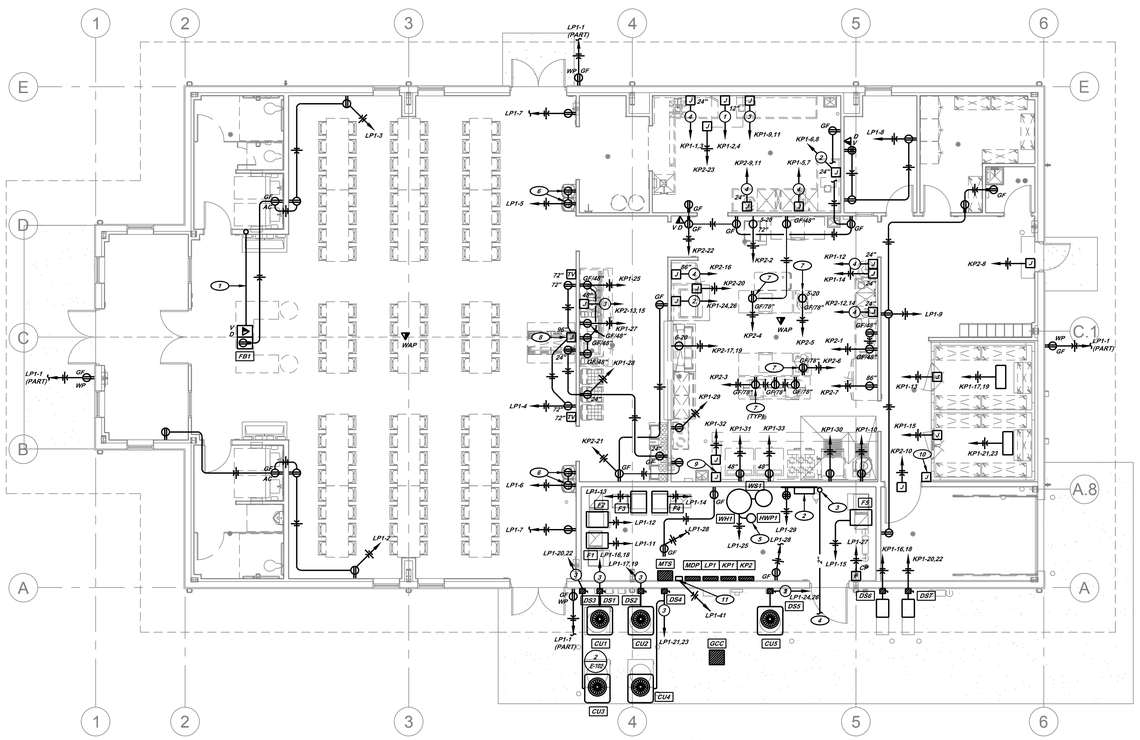
FLOOR BOX SCHEDULE

MARK	BASIS OF DESIGN		MATERIAL	COVER	SERVICE TYPE	MAX. KNOCKOUT OR HUB SIZE	APPROVED MANUFACTURERS	NOTES
	MANUFACTURER	SERIES / MODEL #						
FB1	HUBBELL	BA4233	CAST IRON	SA3825/SA3826	CONCRETE FLOOR	1"	LEVITON, WIREMOLD	1,2

NOTES:
1. PRIOR TO ANY INSTALLATION, EXACT FLOOR BOX LOCATIONS SHALL BE CONFIRMED WITH ARCHITECT/OWNER. LOCATIONS SHOWN ON POWER PLANS ARE APPROXIMATE. WHERE APPLICABLE, COORDINATE LOCATIONS WITH FINAL FURNITURE LAYOUT.
2. PROVIDE BOX WITH SEPARATE LOW VOLTAGE COMPARTMENT. COORDINATE LOW VOLTAGE WIRING REQUIREMENTS WITH OWNER.

SPECIAL NOTES:

1. COORDINATE NEMA CONFIGURATION AND AMPERAGE OF ALL RECEPTACLES AND ASSOCIATED CIRCUIT BREAKERS SERVING KITCHEN EQUIPMENT WITH OWNERS FINAL EQUIPMENT SELECTION.
2. PROVIDE FINAL ELECTRICAL CONNECTIONS TO ALL KITCHEN EQUIPMENT. VERIFY REQUIREMENTS WITH KITCHEN EQUIPMENT SUPPLIER. PROVIDE CORD AND PLUG OR DISCONNECT FOR ALL KITCHEN EQUIPMENT NOT SUPPLIED WITH INTEGRAL DISCONNECTING MEANS.



1 POWER PLAN

1/8" = 1'-0"

PLAN NORTH

KEYNOTES:

1. ROUTE 0.75" CONDUIT BELOW SLAB FOR DATA CABLING TO FLOOR BOX.
2. LOW-VOLTAGE PATCH PANEL AND ENCLOSURE INSTALLED ON PHONE BOARD.
3. 2" COMMUNICATIONS CONDUIT STUBBED UP TO PHONE BOARD.
4. REFER TO CIVIL PLANS FOR CONTINUATION.
5. WIRE PUMP THROUGH AQUASTAT AND TIMER KIT. COORDINATE REQUIREMENTS WITH PLUMBING CONTRACTOR.
6. INSTALL RECEPTACLES CONCEALED BEHIND DRINKING FOUNTAIN ENCLOSURE PER MANUFACTURER'S INSTRUCTIONS.
7. PROVIDE PENDANT CORD WITH RECEPTACLE SUSPENDED FROM CEILING.
8. PROVIDE POWER FOR OWNER FURNISHED/CONTRACTOR INSTALLED WALL CLOCK. INSTALL AT 8'-0" AFF.
9. ROUGH-IN FOR REMOTE LCD PANEL PROVIDED WITH EXHAUST HOOD CONTROL PANEL. REFER TO KITCHEN PLANS FOR ADDITIONAL INFORMATION.
10. ROUGH-IN FOR REMOTE PULL STATION FOR EXHAUST HOOD. REFER TO KITCHEN DRAWINGS FOR ADDITIONAL INFORMATION.
11. ASTRONOMICAL, DIGITAL, 24/7 TIME CLOCK. PROVIDE A TIME CLOCK WITH 4 CONTACTS RATED FOR 20A AT 120V. WIRE PHOTOCELL IN SERIES WITH TIME CLOCK.
12. MANUAL TRANSFER SWITCH (MTS) FOR CONNECTION OF A PORTABLE GENSET.
13. PROVIDE REMOTE EXTERIOR TAPBOX FOR CONNECTION OF A PORTABLE GENSET WITH CAM LOCK TYPE CONNECTIONS FOR THE PORTABLE GENERATOR CABLES, PER NEC SECTION 700.

CONDUIT & CONDUCTOR SCHEDULE:

1. (2) #3 AND (1) #8 GROUND IN 1" CONDUIT
2. (2) #2 AND (1) #8 GROUND IN 1" CONDUIT
3. (2) #8 AND (1) #10 GROUND IN 0.75" CONDUIT
4. (2) #10 AND (1) #10 GROUND IN 0.5" CONDUIT

ELECTRICAL SYMBOLS:

- SIMPLEX RECEPTACLE; 2P, 3W, 15A OR 20A, 125V
- 14-30 SIMPLEX RECEPTACLE; NEMA CONFIGURATION AS INDICATED
- DUPLEX RECEPTACLE; 2P, 3W, 15A OR 20A, 125V
- 42" DUPLEX RECEPTACLE; MOUNTED @ 42" ABOVE FINISHED FLOOR
- AC DUPLEX RECEPTACLE; MOUNTED 6" ABOVE COUNTERTOP BACKSPLASH
- C DUPLEX RECEPTACLE; INSTALLED FLUSH WITH CEILING
- GF DUPLEX RECEPTACLE W/ GROUND FAULT INTERRUPTER
- WP DUPLEX RECPTACLE; WEATHERPROOF
- DOUBLE DUPLEX RECEPTACLE WITH COMMON FACEPLATE
- RECEPTACLE MOUNTED IN FLUSH FLOOR BOX. REFER TO SPECIFICATIONS
- D V COMBINATION VOICE & DATA TELECOMMUNICATIONS OUTLET: ROUGH-IN JUNCTION BOX OR PLASTER RING, (1) CAT6 VOICE CABLE & (1) CAT6 DATA CABLE ROUTED TO PATCH PANEL, COVER PLATE & JACK
- WAP DATA TELECOMMUNICATIONS OUTLET INSTALLED FLUSH WITH CEILING: ROUGH-IN JUNCTION BOX OR PLASTER RING, (1) CAT6 DATA CABLE ROUTED TO PATCH PANEL, COVER PLATE & JACK
- TV CABLE TV OUTLET: ROUGH-IN JUNCTION BOX OR PLASTER RING ONLY. CABLE, COVER PLATE & JACKS PROVIDED BY OTHERS.
- J JUNCTION BOX
- LIGHTING & POWER PANELBOARD
- CONDUIT CONCEALED IN CEILING OR WALL
- CONDUIT BELOW GRADE
- HOME RUN: TICK MARKS INDICATE NUMBER OF WIRES, ARROWS INDICATE NUMBER OF CIRCUITS
- GROUND WIRE
- 7 FEEDER PER SCHEDULE
- DISCONNECT SWITCH

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WAPPAPELLO, MO 63966

PROJECT #
SITE #
ASSET #

REVISION: 2 ADD NO. 02
DATE: SEPT. 03, 2026
REVISION:
DATE:
REVISION:
DATE:
ISSUE DATE: JULY 10, 2026

CAD DWG FILE:
DRAWN BY: SBI
CHECKED BY: RJD
DESIGNED BY: JEB

SHEET TITLE:
POWER PLAN

SHEET NUMBER:
E-102

OF 40 SHEETS

PROJECT NAME: New Soldier Dining Facility - Wappapello MO (T233-01)
AUTOCAD FILE LOCATION \ NAME: X:\22\22277\2227701\Drawings\06-2227701_E-102.dwg
LAST CORRECTION BY ◆ DATE ◆ TIME: Kmcvey Thursday, September 3, 2026 1:34:13 PM
PLOTTED BY ◆ DATE ◆ TIME: Kelson Mcvey Thursday, September 3, 2026 1:34:53 PM

PANEL KP1

MAIN BUS AMPS:	225 A	**AIC:**	65,000 A		MAIN LUGS ONLY
MAIN BREAKER:	N/A	**SECTIONS:**	1 - 42 SPACE		EQUIPMENT GROUND BUS
VOLTAGE:	240/120 V	**MOUNTING:**	SURFACE		
PHASES/WIRES:	1 PH / 3 W	**ENCLOSURE TYPE:**	NEMA 1		

CIRCUIT DESCRIPTION	POLES	AMPS	CKT NO	CKT NO	AMPS	POLES	CIRCUIT DESCRIPTION
ITEM 26 - DISPOSAL	2	30	1	2	80	2	ITEM 30 - DISHWASHER
			3	4			
ITEM 36 - SINK HEATER	2	30	5	6	90	2	ITEM 37 - BOOSTER HEATER
			7	8			
ITEM 41 - BOOSTER HEATER	2	40	9	10	20GFI	1	ITEM 45 - KETTLE, GAS
			11	12	30	1	ITEM 55A - POTATO PEELER
ITEM 68A - WALK-IN FRIDGE LTG AND HTR	1	20	13	14	20	1	ITEM 55B - DISPOSER
ITEM 68A - WALK-IN FRIDGE LTG AND HTR	1	20	15	16	20	2	ITEM 68C - WALK-IN FRIDGE CU
ITEM 68B - WALK-IN FRIDGE EVAP.	2	20	17	18			
			19	20	20	2	ITEM 68C - WALK-IN FRIDGE CU
ITEM 68B - WALK-IN FRIDGE EVAP.	2	20	21	22			
			23	24	90	2	ITEM 20 - GRIDDLE
ITEM 3 - REC - BEVERAGE COUNTER	1	20	25	26			
ITEM 5 - JUICE DISPENSER	1	20GFI	27	28	20	1	ITEM 8 - REC - COLD FOOD COUNTERS
ITEM 16 - COLD FOOD COUNTER	1	20GFI	29	30	20GFI	1	ITEM 46 - TILT SKILLET
ITEM 49 - CONVECTION OVEN	1	20GFI	31	32	20ST	1	ITEM 50A - EXHAUST HOOD LTS AND CTRLS
ITEM 49 - CONVECTION OVEN	1	20GFI	33	34		1	SHUNT TRIP SPACE
SPARE	1	20	35	36	20	1	SPARE
SPARE	1	20	37	38	20	1	SPARE
SPARE	1	20	39	40	20	1	SPARE
SPARE	1	20	41	42	20	1	SPARE

GFI - GROUND FAULT BREAKER

ST - SHUNT TRIP

PANEL KP2

MAIN BUS AMPS:	150 A	**AIC:**	65,000 A		MAIN LUGS ONLY
MAIN BREAKER:	N/A	**SECTIONS:**	1 - 42 SPACE		EQUIPMENT GROUND BUS
VOLTAGE:	240/120 V	**MOUNTING:**	SURFACE		
PHASES/WIRES:	1 PH / 3 W	**ENCLOSURE TYPE:**	NEMA 1		

CIRCUIT DESCRIPTION	POLES	AMPS	CKT NO	CKT NO	AMPS	POLES	CIRCUIT DESCRIPTION
ITEM 53 - REC - PREP TABLE	1	20	1	2	20GFI	1	ITEM 57 - ICE MACHINE
ITEM 59 - REC - WORK TABLE	1	20	3	4	20	1	ITEM 62 - REC - WORK TABLE
ITEM 63 - MIXER	1	20	5	6	20	1	ITEM 66 - MEAT SLICER
ITEM 67 - REACH-IN FREEZER	1	20GFI	7	8	15	1	ITEM 74 - AIR CURTAIN
ITEM 34 - DISPOSAL	2	30	9	10	15	1	ITEM 74 - AIR CURTAIN
			11	12	30	2	ITEM 54 - DISPOSAL
ITEM 6 - COFFEE URN	2	35	13	14			
			15	16	25	1	ITEM 19 - HEATED CABINET
ITEM 17 - HOT FOOD COUNTER	2	20	17	18	20	1	SPARE
			19	20	20	1	EXHAUST HOOD LTG AND CTRLS
REC - KITCHEN	1	20	21	22	20	1	REC - KITCHEN
EXHAUST HOOD LTG AND CTRLS	1	20	23	24	30	1	KEF1
KEF2	1	30	25	26	20	1	KEF3
KEF4	1	15	27	28	20	1	SPARE
SPARE	1	20	29	30	20	1	SPARE
SPARE	1	20	31	32	20	1	SPARE
SPARE	1	20	33	34	20	1	SPARE
SPARE	1	20	35	36		1	PREPARED SPACE
PREPARED SPACE	1		37	38		1	PREPARED SPACE
PREPARED SPACE	1		39	40		1	PREPARED SPACE
PREPARED SPACE	1		41	42		1	PREPARED SPACE

GFI - GROUND FAULT BREAKER

PANEL MDP

MAIN BUS AMPS:	800 A	**AIC:**	65,000 A		
MAIN BREAKER:	800 A	**SECTIONS:**	1 - 6 SPACE		EQUIPMENT GROUND BUS
VOLTAGE:	240/120 V	**MOUNTING:**	SURFACE		
PHASES/WIRES:	1 PH / 3 W	**ENCLOSURE TYPE:**	NEMA 1		SERVICE ENTRANCE

CIRCUIT DESCRIPTION	POLES	AMPS	CKT NO	CKT NO	AMPS	POLES	CIRCUIT DESCRIPTION
PANEL 'KP1'	3	225	1	2	150	3	PANEL 'KP2'
PANEL 'LP1'	3	400	3	4		3	PREPARED SPACE
PREPARED SPACE	3		5	6		3	PREPARED SPACE

PANEL LP1

MAIN BUS AMPS:	400 A	**AIC:**	65,000 A		MAIN LUGS ONLY
MAIN BREAKER:	N/A	**SECTIONS:**	1 - 54 SPACE		EQUIPMENT GROUND BUS
VOLTAGE:	240/120 V	**MOUNTING:**	SURFACE		
PHASES/WIRES:	1 PH / 3 W	**ENCLOSURE TYPE:**	NEMA 1		

CIRCUIT DESCRIPTION	POLES	AMPS	CKT NO	CKT NO	AMPS	POLES	CIRCUIT DESCRIPTION
REC - EXTERIOR	1	20	1	2	20	1	REC - CONVENIENCE
REC - CONVENIENCE	1	20	3	4	20	1	REC - TV WALL
EWC	1	20GFI	5	6	20GFI	1	EWC
REC - CONVENIENCE	1	20	7	8	20	1	REC - OFFICE
REC - CONVENIENCE	1	20	9	10	20	1	REC - ROOF RECEPTACLES
FURNACE - F1	1	15	11	12	15	1	FURNACE - F2
FURNACE - F3	1	15	13	14	15	1	FURNACE - F4
FURNACE - F5	1	15	15	16	60	2	CU1
CU2	2	60	17	18			
			19	20	60	2	CU3
CU4	2	60	21	22			
			23	24	60	2	CU5
WH1, WS1, AND HWP1	1	20	25	26			
FIRE ALARM CONTROL PANEL (FACP)	1	20LCK	27	28	20	1	REC - CONVENIENCE
IT RECEPTACLE	1	20	29	30	60	2	MAU2
MAU1	2	20	31	32			
			33	34	20	1	LTG - PUBLIC AREAS
LTG - EXTERIOR WALL PACKS	1	20	35	36	20	1	LTG - BOH AND KITCHEN SPACES
SPARE	1	20	37	38	20	1	SPARE
SPARE	1	20	39	40	20	1	SPARE
TIMECLOCK	1	20	41	42	20	1	SPARE
SPARE	1	20	43	44	20	1	SPARE
SPARE	1	20	45	46	20	1	SPARE
PREPARED SPACE	1		47	48		1	PREPARED SPACE
PREPARED SPACE	1		49	50		1	PREPARED SPACE
PREPARED SPACE	1		51	52		1	PREPARED SPACE
PREPARED SPACE	1		53	54		1	PREPARED SPACE

GFI - GROUND FAULT BREAKER
LCK - LOCKABLE TAB
ST - SHUNT TRIP

smith & boucher engineers
25618 west 103rd St olathe, ks 66061
phone 913.345.2127 fax 913.345.0617
project number 2227701

STATE OF MISSOURI
MIKE KEHOE,
GOVERNOR

STATE OF MISSOURI
RYAN JEROD DIEDIKER
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7/10/26

PROFESSIONAL SEAL

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OFFICE OF ADMINISTRATION
DIVISION OF FACILITIES
MANAGEMENT,
DESIGN AND CONSTRUCTION

DEPARTMENT OF
PUBLIC SAFETY
MISSOURI ARMY
NATIONAL GUARD

CONSTRUCT NEW
SOLDIER DINING FACILITY

WAPPAPELLO
TRAINING SITE
461 COUNTY ROAD 517
WAPPAPELLO, MO 63966

PROJECT #
SITE #
ASSET #

REVISION: 2 ADD NO. 02
DATE: SEPT. 03, 2026
REVISION:
DATE:
REVISION:
DATE:

ISSUE DATE: JULY 10, 2026

CAD DWG FILE:
DRAWN BY: SBI
CHECKED BY: RJD
DESIGNED BY: JEB

SHEET TITLE:
ELECTRICAL
SCHEDULES
AND DETAILS

SHEET NUMBER:
E-104

OF 40 SHEETS

PROJECT NAME: New Soldier Dining Facility - Wappapello MO (T2233-01)
AUTOCAD FILE LOCATION \ NAME: X:\22\22277\2227701\Drawings\06-2227701_E-104.dwg
LAST CORRECTION BY◆DATE◆TIME: Kmcvey Thursday, September 3, 2026 11:29:34 AM
PLOTTED BY◆DATE◆TIME: Kelson Mcvey Thursday, September 3, 2026 11:30:53 AM