hdesigngroup

Addendum

Addendum Number:	ADD-03
Addendum Date:	02.09.23
Project Number:	19-040
Project Name:	Wentzville Public Works
Owner:	City of Wentzville, MO

STATE OF MISSOURI
BRENT M. STEVENS
NUMBER
MO A-2000151419
ARCHITECT

Brent Stevens

Digitally signed by Brent Stevens
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Date: 2023.02.09 10:58:49-06'00'

Documents:

1. WPW Bidding RFI Responses 02-09-23
   a. Refer to attached requests for information received from bidding contractors through 02-06-23 and corresponding responses

2. Exhibit D – Scope of Work
   a. Revised item 84

3. Exhibit E – Supplemental Contract Terms
   a. Revised section 1.04-A-1

Specifications:

1. 011000 – Summary
   a. Revised section 1.4-B to indicate Appliances to be OFOI
   b. Removed item 2 in section 1.5-A
2. 071326 – Self-Adhering Sheet Waterproofing
   a. Added specification section
3. 072726 – Fluid-Applied Membrane Air Barrier
   a. Revised section 2.2-A-1 to add approved supplier per substitution request
4. 075423 – Thermoplastic-Polyolefin (TPO) Roofing
   a. Revised section 1.9-A-1 to indicate correct warranty requirements
   b. Revised section 2.4-A-3 to indicate correct insulation thickness requirements
5. 082550 – Fiberglass Reinforced Polyester Doors & Frames
   a. Revised section 2.1-B to add approved supplier per substitution request
6. 085653 – Security Windows
   a. Revised section 2.1-A to add approved suppliers per substitution requests
7. 087100 – Door Hardware
   a. Revised section 2-14-B to add approved supplier per substitution request
8. 133419 – Metal Building Systems
   a. Modified deflection criteria in section 2.2
9. 230923 – Direct Digital Control for HVAC
   a. Added Automated Logic and Siemens as acceptable bid alternates
   b. Revised requirements for bid alternates (section 2.1B) require
10. 233113 – Metal Ducts
    a. Added double wall ducts were added as acceptable for exposed round duct
11. 237413 – Outdoor Packaged Heating & Cooling Units
    a. Revised requirements for bid alternates (section 2.1A)

THIS ADDENDUM AMENDS THE DRAWINGS AND SPECIFICATIONS OF THE ABOVE-REFERENCED PROJECT AND IS HEREBY INCORPORATED INTO THE CONTRACT DOCUMENTS AS A PART THEREOF.

Drawings:

1. G000 – Cover Sheet
    a. Added sheets S506 & TY100 to Drawing Index
2. C-101 – Clearing & Demolition Plan
    a. Revised Notation for Tree Clearing to clarify all trees over 8” in diameter
3. C-600 – Storm Sewer Profiles
    a. Added notation pertaining to the use of RCP per City specifications for specific pipe runs
4. AS203 – Architectural Site Details
    a. Revised fence post maximum spacing distance dimension
5. S000 – General Notes
    a. Modified deferred submittals field of notes.
    b. Modified concrete exposure classifications and removed unnecessary types.
    c. Added clarifying note to foundations notes field giving thicknesses and reinforcements for slabs other than typical 4” thickness.
    d. Removed extraneous steel lintel note field and corrected typical floor deck angle size in miscellaneous steel notes.
    e. Modified deck attachment pattern in steel deck notes.
    f. Updated uplift pressures and steel bearing plate sizes in steel joists notes.
6. S001 – Special Inspections & B.F.D.
    a. Modified pre-engineered metal building deflection criteria.
    b. Added crane rail design criteria.
    c. Removed deep foundations special inspection table.
    d. Coordinated wind pressures for 120 mph wind speed change.
7. S002 – Schedules
    a. Removed duplicate pad footing schedule.
    b. Modified bottom of steel column elevation @ L-23.
    c. Added pedestals to schedule at interior PEMB column locations.
8. S003 – Typical Details
    a. Added dowel connection to G/S003.
9. S005 – Typical Details
    a. Added note to G/S005 specifying moment connection for tube beams.
10. S101 – Foundation Plan – Overall
    a. Showed step footings at truck dock and PEMB column pedestals.
11. S101A – Foundation Plan – Area A
    a. Corrected vapor barrier thickness and USGS elevation in general plan notes.
    b. Removed extraneous pier cap note from general plan notes.
    c. Lowered pad footing at column L-23 by 8”.
    d. Added note referencing frost stoop detail at exterior doors.
    e. Added re-entrant bars to plans.
    f. Added footing step to truck dock wall and elevation callouts.

g. Corrected slab edge dimensions, plan north.
h. Added control joint plan note.

12. S101B – Foundation Plan – Area B
    a. Added note referencing frost stoop detail at exterior doors.
    b. Added re-entrant bars to plans.
    c. Added control joint plan note.
    d. Added pedestals beneath PEMB columns to plans.

13. S101C – Foundation Plan – Area C
    a. Added note referencing frost stoop detail at exterior doors.
    b. Added re-entrant bars to plans.
    c. Added control joint plan note.
    d. Coordinated in ground-lift saw cut with equipment drawings.
    e. Adjusted footing dimension off CMU walls, typical around PEMB.
    f. Added pedestals beneath PEMB columns to plans.
    g. Added detail B/S101C showing steel column buried in CMU wall foundation.

14. S102 – Foundation Plan – Wash Building
    a. Added stem wall and footing to plan at drain.
    b. Added typical dowel connection between slabs at B/S102.
    c. Adjusted dimensions on plans from edges of footings and edges of CMU. Coordinated with details D and E/S102.

15. S103 – Foundation Plan – Salt Storage
    a. Added slab dimensions to plan.

16. S201 – Foundation Details
    a. Added typical foundation insulation to detail A/S201.
    b. Added typical dowel connection between slabs at E and Q/S102.
    c. Coordinated footing edge dimension across multiple details.
    d. Coordinated dowel leg dimension across multiple details.

17. S202 – Foundation Details
    a. Added M/S202 showing shared foundation pad between PEMB column and structural steel column.

18. S401A – Roof Framing Plan – Area A
    a. Modified steel beam elevation along grid K.
    b. Added closure angle callouts to plan.
    c. Added low tube to grid 18 and modified pertinent detail.
    d. Adjusted bar joist dimensions between grids 15 and 16 to avoid wall conflict.
    e. Added walls above refuge lid slabs @ similar details B, D, and E/S401A.

19. S401B – Roof Framing Plan – Area B
    a. Modified steel beam size along grid 9.
    b. Added miscellaneous steel to framing plan, such as closure angles and RTU H-frame.
    c. Trimmed tube beam along grid C from full length between columns to a stub beam moment welded to column C-7.2.
    d. Corrected multiple section cuts on plan.

20. S401C – Roof Framing Plan – Area C
    a. Added PEMB column @ S-4 and modified wind beam condition.
    b. Added closure angle callouts to mezzanine plan.
    c. Modified top of wall elevations in mezzanine plan.

21. S402 – Roof Framing Plan
    a. Added angle braces and plan notes to D/S402.

22. S501 – Framing Details
    a. Added crane beam lateral reactions for PEMB designer to details A and F/S501.
    b. Added grid and “per plan” dimension to F/S501.

23. S502 – Framing Details
    a. Added clip connection and specified gap between PEMB and structural wall to multiple details.
    b. Modified wind beam condition and provided reaction in B/S502.
    c. Corrected F/S502 to reflect beam bearing condition at CMU.

24. S503 – Framing Details
    a. Removed steel kickers at multiple details.
    b. Added roof slope callouts to multiple details.
    c. Adjusted weld at B/S503.
    d. Added SIM. Condition to H/S503.

25. S504 – Framing Details
    a. Added low tube and stiffener plate to C/S504.

26. S505 – Framing Details
    a. Added wind reaction to tube connection at top of CMU wall to E/S505.
    b. Corrected detail callout in F/S505.

27. S506 – Framing Details
    a. Modified G/S506 & D/S506 handrail attachment details

28. A101 – Overall Floor Plan
    a. Mirrored R/R 121 layout and door location
    b. Moved opening between R/R 121 and shower room location

29. A101A – Floor Plan - Area A
    a. Mirrored R/R 121 layout and door location
    b. Moved opening between R/R 121 and shower room location

30. A202 – Roof Plan – Wash Building
    a. Revised roof slope label to match slope indicated on exterior elevations

31. A601 – Wall Sections + Details
    a. Added blocking to top of wall framing in detail 11A to separate from parapet cap framing to allow for WRB system to continue over top of framing enclosure
    b. Added additional leaders to detail 11A keynote 07.27.C to indicate that WRB system to wrap continuously around framing enclosure
    c. Added keynote 07.30.B to detail 11K
    d. Added keynote 09.93.C to detail 11K
    e. Revised keynote 04.22.D, 07.27.C, 07.62.A & 07.62.F narrative

32. A603 – Wall Sections + Details
    a. Added blocking to top of wall framing in detail 8A to separate from parapet cap framing to allow for WRB system to continue over top of framing enclosure
    b. Added additional leaders to detail 8A keynote 07.27.C to indicate that WRB system to wrap continuously around framing enclosure
    c. Revised keynote 04.22.D, 07.27.C, 07.62.A & 07.62.F narrative

33. A604 – Wall Sections + Details
    a. Removed horizontal steel tube below roof decking in details 11D & 11J to match structural details
    b. Added blocking above glazing in detail 11D to continue wall and allow for WRB system to continue to roof decking
    c. Added insulation in roof deck cavity above wall assembly in details 11D & 11J
    d. Added blocking above beam in detail 11J to continue wall and allow for WRB system to continue to roof decking
    e. Removed sealant between base of EIFS system and flashing in detail 7J
    f. Added keynote 07.21.T narrative
    g. Revised keynote 07.27.C & 07.62.A narrative

34. A605 – Wall Sections + Details
    a. Added additional leaders to detail 8A keynote 07.27.C to indicate that WRB system to wrap continuously around framing enclosure
    b. Removed flashing above door head in detail 7H as specified door hardware rain drip will divert water from opening
    c. Shifted window away from exterior face of block and removed flashing above window head in detail 7G as glazing unit to have integral flashing
    d. Shifted window away from exterior face of block and indicate sill flashing sloping away from opening in detail 5G
    e. Revised enlarged detail reference tag in detail 1H to reference correct detail
    f. Moved underslab vapor barrier location under below-grade insulation for details 1D & 1G (typical)
    g. Revised detail at base of siding in detail 1D
    h. Revised keynote 04.22.D, 07.27.C, 07.62.A & 07.62.F narrative

35. A606 – Wall Sections + Details
    a. Added blocking above glazing in details 5D & 11A to continue wall and allow for WRB system to continue to roof decking
    b. Added insulation in roof deck cavity above wall assembly in detail 5D

c. Added blocking to top of wall framing in detail 6Q to separate from parapet cap framing to allow for WRB system to continue over top of framing enclosure
d. Added additional leaders to detail 6Q keynote 07.27.C to indicate that WRB system to wrap continuously around framing enclosure
e. Added keynote 07.21.T narrative
f. Revised keynote 07.27.C, 07.62.A & 07.62.F narrative

36. A702 – Enlarged Restrooms Plans + Details
    a. Mirrored R/R 121 layout and door location in plan 5A
    b. Moved opening between R/R 121 and shower room location in plan 5A
    c. Mirrored R/R 121 layout in elevation 10K

37. A721 – Millwork Elevations
    a. Removed General Millwork Notes 5, 11, 12 as they are unrelated to project
    b. Revised General Millwork Notes 13 & 14
    c. Added General Millwork Notes 15 & 16

38. A901 – Finish Schedule + Specifications
    a. Removed VWC-1 specifications as it is not required in project

39. E100 – Electrical Site Plan
    a. Revised – downlight type to be hard lid ceiling

40. E101A – Lighting Level 1 RCP – Area A
    a. Revised – shower area downlights
41. E201A – Power Level 1 Plan – Area A
    a. Added – laundry general power receptacle
    b. Revised – washer and dryer connections

42. E201C – Power Level 1 Plan – Area C
    a. Added – fused disconnect for three post lift connection
    b. Revised – plan note E13 to reflect lift installation instructions

43. E400 – Lighting Schedules
    a. Added – type D3 shower rated downlight

44. P101B – Plumbing Level 1 Plan – Area B
    a. Removed – IMB not needed for refrigerator
    b. Added – Plan keynotes on sheets

45. P101C – Plumbing Level 1 Plan – Area C
    a. Revised – Rerouted CWV piping away from lift station.
    b. Updated – Added 2”S and cleanout and attached to CWV piping.
    c. Added – keynote for lift station

46. P300 – Plumbing Sanitary Riser
    a. Updated – Updated riser sections to reflect new changes for addendum

47. P301 – Plumbing Sanitary Riser
    a. Updated – Riser updated to reflect R/R 121 fixture change

b. Updated – missing fixture riser tags

48. P401 – Plumbing Enlarged Plans
    a. Revised – Water piping and waste/vent piping for water closet and lavatory relocations
    b. Revised – Location of washing machine box for washer

49. M101A – Mechanical HVAC Level 1 Plan – Area A
    a. Revised – Location of VAV 1-11 for better access to the equipment.
    b. Revised – Location of VAV 1-06 for access to the equipment through corridor ceiling instead of an access panel in the gyp board restroom ceiling
    c. Revised – Exhaust ductwork layout in 125 Women Locker and 121 RR
    d. Revised – Dryer vent duct routing and associated note M19

50. M600 – Mechanical Schedules
    a. Revised – Notes for LV-1 on Louver schedule

51. M601 – Mechanical Schedules
    a. Revised – Notes for VAV Terminal schedule

52. TY000 – Security Legend and Notes
    a. Added C&C Group contact info
    b. Revised incorrect device notes

53. TY100 – Security Site Plan
    a. Added entire sheet

54. TY101A – Security Level 1 Plan – Area A
    a. Revised camera locations

55. TY101B – Security Level 1 Plan – Area B
    a. Revised camera locations

56. TY101C – Security Level 1 Plan – Area C
    a. Revised camera locations

57. TY102 – Security Level 1 Plan – Wash and Salt Storage Buildings
    a. Added camera location

58. TN100 – Technology Site Plan
    a. Added underground conduit for fiber
    b. Added keynotes

59. TN201A – Technology Level 1 RCP – Area A
    a. Revised camera locations

60. TN201B – Technology Level 1 RCP – Area B
    a. Revised camera locations

61. TN201C – Technology Level 1 RCP – Area C

a. Revised camera locations

62. TN202 – Technology Level 1 RCP – Wash & Salt Storage Buildings
    a. Added camera location

63. TN800 – Technology Details
    a. Revised riser diagram

Attachments:

Documents
WPW Bidding RFI Responses 02-09-23, Exhibit D- Scope of Work, Exhibit E- Supplemental Contract Terms

Specification Sections
011000, 071326, 072726, 075423, 082550, 085653, 087100, 133419, 230923, 233113, 237413

Drawings
G000, C-101, C-600, AS203, S000, S001, S002, S003, S005, S101, S101A, S101B, S101C, S102, S103, S201, S202, S401A, S401B, S401C, S402, S501, S502, S503, S504, S505, S506, A101, A101A, A202, A601, A603, A604, A605, A606, A702, A721, A901, E100, E101A, E201A, E201C, E400, M101A, M600, M601, P101B, P101C, P300, P301, P401, TN100, TN201A, TN201B, TN201C, TN202, TN800, TY000, TY100, TY101A, TY101B, TY101C, TY102,

Exhibit D
Scope of Work for General Contractor for the New Wentzville Public Works Facility
Updated 1/25/23 for Addendum 2
Updated 2/9/23 for Addendum 3

The Construction Manager (CM) referred to below is Navigate Building Solutions, LLC. The Owner referred to below is the City of Wentzville. The Contractor referred to below is the General Contractor. This bid package includes, but is not limited to, the following:

1. Scope shall include all work outlined by the project documents (plans and specifications) issued by H-Design Group dated January 12, 2023.

2. This contractor shall include in the base bid price an unknown site conditions allowance of $200,000. Allowance shall include all overhead, profit, and fees as is allowed for Change Orders in contract Exhibit F, Modification/Explanation of Change Order Fee. Unit prices provided on the Supplemental Bid Information Form shall be used where applicable to work paid from the Allowance. Any savings to this allowance shall be reconciled via a deduct Change Order which shall include the associated overhead, profit, and fees. This allowance may only be used at the sole discretion of the CM and Owner. This allowance may not be used to address the effects of weather conditions. Allowance amount is pre-entered into the eBidding system line item.

3. Contractor is aware of the potential for Liquidated Damages. Contractor shall be responsible to maintain scheduled items for the Contractor's work as included in the Master Project Schedule below. Contractor shall reference the City-Contractor Agreement included in the bid documents. Contractor agrees to pay the Owner, or to deduct from the Contract Sum, not as a penalty, but as liquidated damages, the amounts listed in the contract drafts provided.

4. Upon execution of this contract, this contractor must submit to the CM a detailed critical path baseline construction schedule outlining each construction activity and phase. This schedule must fall within the Master Project Schedule outlined below and be submitted no later than twenty-one (21) days following execution of the contract. Contractors are required to provide updated work schedules at a minimum on a monthly basis with each pay application. Contractor's detailed activity schedule/critical path schedule shall adhere to the Master Project Schedule and shall provide for expeditious and practicable execution of the Work. Should the Contractor fall behind schedule by more than 5 workdays due to the fault of this Contractor, the Contractor shall provide a recovery schedule to the CM within 5 days of request by the CM.

Master Project Schedule Milestone Dates (It is the responsibility of the contractor to check the e-bidding system for up to date information for Items a – g):

a.	Issue Request for Bids	January 12, 2023
b.	Pre-Bid Meeting and Site Visit	January 19, 2023
c.	Last Bidder Questions & Requests for Substitutions Due	February 6, 2023
d.	Last Bid Addenda Issued	February 9, 2023
e.	Bids Due	February 16, 2023 at 2:00 PM
f.	Supplemental Bid Information Due	February 17, 2023 at 2:00 PM
g.	Final Board Approval	March 8, 2023
h.	Anticipated Notice to Proceed / Mobilization	March 27, 2023

(18 days after BOA approval)

i.	Groundbreaking	Date TBD by Owner
j.	Critical Submittals Submitted for Review	
	(Retaining Wall, Footings/Foundations, HVAC	
	Equipment, Electric Gear, & Generator	30 days after NTP
	PEMB	45 days after NTP
k.	All Remaining Submittals Submitted for Review	120 days after NTP
l.	Topping Out Ceremony	Date TBD (Coordinated with Owner)
	● Main Public Works Building 'Dry-In':	Based on Bidder's Schedule
	● Watertight roof	
	● Exterior wall air barrier in place	
	● All windows / storefront / curtainwall installed, or openings filled with temporary watertight construction	
m.	Internal Contractor Internal Pre-Punch	6 wks. prior to Sub. Comp.
n.	Substantial Completion / Punchlist Populated (Day ___*) Schedule Note: All Life Safety Inspections & Occupancy Inspections to be completed on or before Substantial Completion date.	*Based on Bidder's
o.	Final Completion / Completion of Punchlist	30 calendar days after Subst. Completion

5. The contractual project duration shall be proposed by bidders in the e-bidding system Bid Form. The proposed duration will be used as key criteria along with other information submitted via the eBidding system to select and award a General Contractor. The project duration will be incorporated into the Contract between the Owner and the General Contractor.

6. Contractor accepts all risks associated with adverse weather. No time extensions will be granted related to claims of adverse weather. No claims for extra costs will be granted related to adverse weather and/or taking action to deal with adverse weather and/or the effects of adverse weather. All provisions in the City-Contractor Agreement otherwise respecting weather are superseded by this provision, and are of no force and effect.

7. Any claims for delay to critical path activities shall be submitted to the Construction Manager within 24 hours of occurrence, identifying the event and the impacted critical path activity. The Construction Manager will review to determine if the claim will be considered a valid delay. Each day claimed shall be tracked on a log for review at the bi-weekly Owner meetings.

8. Contractor is required to provide detailed work schedule (short term schedule) on a weekly basis. Contractor's detailed work schedule shall adhere to the Master Project Schedule and the accepted contractual project duration. Contractor shall meet the requirements of the Master Project Schedule.

9. Provide all supervision, labor, tools, equipment, and materials to complete the work.

10. Perform all unloading, loading, distribution and hoisting of materials for this scope of work.

11. Furnish, install, maintain, and remove temporary on-site trailers and storage containers as required to perform the work. Trailer shall include a conference room with table and chairs for Owner and Architect meetings, and other meetings as needed.

12. Perform all work in accordance with OSHA standards (including OSHA 10-hour requirement). This Contractor is responsible for OSHA required safety railings (installation, maintenance, and removal) including appropriate OSHA approved system for roof edge protection for all trades.

13. Provide ladders for all contractors to access the upper floor until the stairs are in place and available for use.

14. The Owner will provide the MO DNR Land Disturbance permit. The Contractor will comply with all requirements of the MO DNR Land Disturbance permit.

15. The Contractor will apply for and obtain the City of Wentzville Building permit. The City of Wentzville will waive the building permit review and building permit fees. The Contractor is still responsible for scheduling and obtaining all City of Wentzville building inspections and final approvals, temporary and final occupancy permits.

16. The City of Wentzville will waive the Engineering review fees and construction permit fees only. The Contractor is responsible to include all other required City of Wentzville engineering and utilities inspection costs, tap fees, connection fees, etc.

17. The cost of the Wentzville Fire Department Site Plan Review and New Construction permit will be applied for and paid for by the City of Wentzville. All other permits required by the Wentzville Fire District will be applied for and paid for by the Contractor (subcontractors), i.e.: Fire Main Underground, Fire Sprinkler Systems, Fire Alarm Systems, etc. Coordinate with Fire District for inspection of fire lines and fire hydrants. Site fire line into the building shall be flushed prior to interior drywall construction.

18. This Contractor (or its subcontractors) are responsible for all other permits, if required and fees required by state, county, local, regional, and federal authorities, and agencies associated with this scope of work, i.e.: mechanical, electrical, plumbing permits, pre-engineered building, and canopies, retaining wall, etc. and all permit requirements and inspection requirements associated with such items of work.

19. This Contractor is also required to obtain a Business License from the City of Wentzville if required.

20. The City of Wentzville will cut down all large hardwood trees (greater than 8”) as this work must be completed by March 31, 2023. Contractor will be responsible for removing the fallen trees, stumps, and all remaining smaller trees and vegetation.

21. Coordinate all work with the Construction Manager’s representative.

22. Bi-weekly meetings at the jobsite will be held with the Owner Representative. The work of this contractor must be performed in accordance with the decisions and schedules formulated at these meetings so as not to delay the work. The Contractor’s Project Manager and Foreman/Superintendent must be present at these meetings. This contractor shall keep minutes of these meetings and forward them to the CM for review within 4 working days after the meeting.

23. Weekly meetings at the jobsite MUST be held with this contractor and its subcontractor’s Foreman/Project Managers to coordinate installation of all systems. The Owner, Architect and the CM shall be invited to all of these meetings and will attend at their discretion. This contractor shall keep minutes of these meetings and forward them to the CM for review weekly.

24. General Contractor and its HVAC, Plumbing, Fire Protection, Electrical, and Equipment subcontractors will be expected to coordinate above-ceiling work prior to installation, including the creation of drawing overlays to identify and address interferences prior to installation as needed.

25. This Contractor shall provide all surveying and layout required to complete the work.

26. Review all drawings and specifications and accept responsibility for requirements, general notes, notes, specifications, and details as they relate to this scope of work.

27. General Contractor will install, maintain, and remove all SWPPP scope of work. Contractor will provide all SWPPP reports per MDNR standards. Provide SWPPP reports to the CM on a weekly basis and immediately following each rain event.

28. This Contractor is responsible for locating all public and private utilities.

29. Provide street cleaning to remove dirt, mud, and debris generated by the project site as needed to maintain a clean surface at existing drives, parking lots and public roads.

30. Take note of nearest water source and the schedule for water line installation; if no water is available on site, provide alternate means for tire wash down of trucks prior to leaving the site.

31. Provide barricades, signage, flagging and flagman for traffic control and public safety during the execution of the work. Coordination of all road closures (full or partial) with CM and city officials.

32. Protect adjacent properties and utilities as required during the execution of this work. Provide shoring or underpinning as required for safe excavations to meet OSHA requirements and to protect adjacent streets, sidewalks, utilities, and existing structure(s). If this requires engineered shoring systems, this Contractor will provide as needed for this scope of work.

33. This Contractor to cleanup all rubbish and debris from site and building on a daily basis. This includes off-site disposal of all rubbish and debris along with excess spoils, unsuitable materials, excess materials such as concrete, sand and masonry materials. Trucks or dumpsters to haul off material by this Contractor.

34. This Contractor shall furnish all dumpsters for the entire project and shall include cost to haul offsite and legally dispose of all construction rubbish and debris.

35. This contractor to broom clean all floors at least once a week to ensure housekeeping stays up to par.

36. This Contractor shall provide a heavy construction cleaning prior to punch list creation so all surfaces can be observed by the design team. Clean exterior and interior surfaces exposed to view; remove temporary labels, stains, putty, soil, paint and foreign substances from all surfaces, including glass and painted surfaces; polish transparent and glossy surfaces; clean equipment and fixtures to a sanitary condition; replace air filters in mechanical equipment; clean roofs, gutters, and downspouts; remove obstructions and flush debris from drainage systems; clean site; sweep paved areas and rake clean other surfaces; remove trash and surplus materials from the site; clean and polish all floors; clean and polish all hardware; and repair all Work damaged during cleaning.

37. Provide final cleaning of all buildings and site prior to occupancy.

38. Contractor will provide temporary construction toilets for the project for all Contractors, visitors, etc.

39. Contractor will provide ice, cups and distribute drinking water as needed for workers performing this scope of work.

40. This Contractor and all subcontractors will be responsible to review all specifications and drawings.

41. Contractor must not burn in the concrete at the carpet tile, vinyl, or other resilient flooring locations. Contractor to ensure floors are kept dry and clean so that the concrete can dry in order to accept adhesive for flooring products. Include moisture mitigation as required by the specifications.

42. The Owner, Architect, and CM will be very stringent on the quality of exposed concrete floors during punch list. It is ultimately in this Contractor's scope of work to protect all finish products through education, signage, and temporary protection. Proper concrete protection from staining must be observed and will be enforced. Steel must not be placed on slab to avoid staining. Diaper hydraulic powered equipment to avoid oil and gasoline staining. Pipe cutting machines shall not be used on the concrete slabs where the exposed concrete finishes are scheduled. Any rubber-tired traffic shall be kept at a minimum and shall be protected with drop cloths.

43. Plan concrete floor pours such that a single pour covers any continuous area of sealed concrete floors.

44. No lignite to be allowed in any interior or exterior flatwork concrete.

45. Contractor to furnish first aid and safety supplies as needed for this scope of work.

46. Contractor is solely responsible for site/project safety for this scope of work.

47. Contractor to maintain Site Specific Safety Plan which shall be completed and kept in their job trailer at all times.

48. Contractor to grout fill frames per architectural details and notes.

49. Provide code compliant seismic support and bracing as required by the contract documents.

50. Provide fire stop systems as required for the installation of this scope of work.

51. Provide stenciling of rated walls according to the AHJ requirements.

52. Include cost to furnish and install toilet accessories as indicated.

53. Include wall blocking as needed for ALL specialty items (toilet accessories, signage, wall mounted furniture, TV's, etc. regardless of OFCI, OFOI, or CFCI status.

54. Contractor to provide and maintain weather protection for material and work as required by the project schedule. Contractor to also provide any cold or hot weather measures for weather sensitive materials like concrete, masonry, roofing materials, air/vapor barrier, etc. This shall include but is not limited to tenting and heating for masonry installation. Delays will not be awarded for construction activities impacted by hot/cold temperatures. If wet site conditions are hindering the progress onsite and access for trades, this Contractor shall provide temporary rock access to those areas to maintain the project schedule.

55. Include water pumping and dewatering necessary to proceed with work being performed under this bid package. Refer to Geotechnical Report for anticipated groundwater.

56. This Contractor is responsible for securing the building once it is reasonably possible to do with temporary or permanent measures at the close of every day. Any temporary openings in walls are to be secured at the end of the work day.

57. This Contractor to supply, install, maintain, move, and remove temporary site fence with gates. Contractor shall submit their own proposed Site Logistics Plan for review. The Owner, CM, Contractor, and Architect will meet to review and discuss site logistics and finalize an agreed upon plan of action for construction parking, office/storage containers, temporary toilets, temporary site fence, etc.

58. Provide and remove temporary rock parking for visitors to the site, temporary construction parking, staging, and laydown areas. Location of all staging/trailer placement/access to be coordinated and approved by the Construction Manager.

59. General Contractor shall place rock around the building perimeter to create an all-weather access path for crane access and exterior wall construction as needed to maintain schedule.

60. Contractor is responsible for any coordination of staging or relocation for materials for this scope of work after initial unloading.

61. Soil testing, concrete testing and the Special Inspections listed on structural plans shall be performed by Owner's consultant and paid for by Owner. Contractor will assist and coordinate/schedule with the agency to perform onsite testing work as needed/required by the documents. If the agency must re-test or re-inspect for failed tests/inspections or if the Contractor fails to notify the testing agency of a cancelled test/inspection, this Contractor shall compensate the Owner for such tests.

62. The Owner will utilize the Faith Group as the third party Commissioning agent for the mechanical and electrical systems and exterior envelope. General Contractor to assist with coordinating and scheduling such inspections, start-ups, testing, and final owner demonstration, training sessions, etc. .

63. No smoking shall be allowed inside the building once interior construction begins.

64. Full-time onsite superintendent is required when any Work is taking place. Contractors shall consider the size and complexity of this project when determining the balance of the project's project management staff. Contractor shall assign staff as needed to maintain project progress and oversight. Contractor shall assign project manager/engineer/superintendent to the project with relative similar industry and project-type experience, availability, and workload capacity.

65. The contractor shall use Procore Project Management software program for coordination of project RFIs, submittals, change orders, etc. Contractor shall be the administrator and maintain all records in the program, and shall grant access to the Owner, CM, and design team members. Include the cost associated with the use of such program. Alternate Submittal Exchange may be requested, and must be a cloud-based system that can be accessed by multiple users including the contractor, design team, construction manager, and owner for collaboration of document exchange for the project.

66. This Contractor shall produce a submittal log at the beginning of the project that is populated with all of the required submittals for this scope of work and assign due dates for submission to the Architect and due dates for return from the Architect. This log must be submitted to the CM and Architect for review on a Bi-weekly basis.

67. The Project Milestone Dates identify when all submittals shall be submitted for review. This milestone does not relieve the Contractor of completing select submittals sooner, as needed to meet the overall project schedule for installation of the work.

68. This Contractor shall maintain an RFI log for this scope of work. This log must be submitted to the CM and Architect for review on a Bi-weekly basis. Log to include:

    a. RFI number
    b. Topic of RFI
    c. Date submitted
    d. Date requested response by
    e. Date returned
    f. Status- Open or Closed

69. This Contractor must prepare and make available upon request, a procurement log for this scope of work for all long lead materials and equipment. Procurement log must include date of order, date of confirmation of order, expected delivery date, actual delivery date, and comments noting any changes to dates and reasons for change.

70. This Contractor shall organize and arrange for pre-installation meetings for this scope of work for all major scopes of work with the subcontractors and manufacturers prior to commencement of those activities and invite the Owner, Architect, and CM to all pre-installation meetings (must give at least 2 weeks' notice of meetings). This contractor shall keep minutes of those meetings and forward to the CM and Architect for review.

71. This Contractor will be responsible for submitting daily logs containing the number of workers, equipment, work accomplished, daily weather, deliveries, visitors to the site, any inspections passed or failed, problems encountered, and other relevant data as may be required. These reports must be emailed to the CM daily, within 24 hours of work performance, utilizing an Apple iPad app called Construction Superintendent.

72. Provide photographs of all below slab, in slab, and in-wall rough in prior to cover-up. Organize photos electronically and label with location on corresponding floor plan. Submit 'rough in photograph' package at the end of the project. CM may ask for progress photos during project as needed for reference or coordination.

73. This Contractor shall arrange, schedule, organize and video tape as it pertains to this scope of work all equipment start-ups and Owner Training sessions per contract documents. These training sessions shall be recorded professionally by a videographer, including lapel mics for person providing the training, etc. A DVD including copies of each training session (organized as individual Chapters) shall be provided as part of the closeout documents. All Owner Demonstration and Training sessions will be scheduled to occur between Substantial Completion and Final Completion.

74. This Contractor must populate a closeout log and submit to the CM and Architect for review to verify that all required items have been included. Once approved, this log will be used to track required closeout items prior to final payment. This contractor is highly encouraged to submit O&M requirements as soon as possible in advance of final acceptance to help eliminate delay in payment.

75. This Contractor is responsible for any temporary heating/cooling, humidifying/dehumidifying as needed to maintain the project schedule and as needed prior to starting the permanent HVAC equipment. Use of the new HVAC system will not be allowed during construction. Contractor is also responsible for any extended warranties needed to provide the Owner with the required contractual warranty durations.

76. This Contractor shall be responsible for the cost of temporary utilities usage for all trades during the course of construction including but not limited to gas, electric, sewer, water. Contractor is responsible for any backflow preventer costs/water usage costs for hydrant use. Upon Substantial Completion, CM will work with Contractor and Owner to transfer all utilities into the Owner's name.

77. Contractor shall coordinate, furnish, and install temporary transformer according to Ameren requirements.

78. Prepare subgrade/pad for the Ameren transformer per Ameren UE Specifications. Ameren will furnish, deliver, and install the transformer pad and transformer.

79. Provide fuel for generator testing. At turnover of emergency generator, this Contractor is to completely fill generator fuel tank.

80. Clean all HVAC equipment and replace all filters with new filters at the time of building turnover to the Owner.

81. All ductwork ends are to be sealed before arriving at site and seals at end of runs to be maintained.

82. This Contractor will compile for the Owner a 'record set' of all documents and drawings, as it pertains to this scope of work, for the project at Substantial Completion. This shall be 'red-lined' copies of all project changes throughout the course of the project to identify all systems as they were actually installed on the project for the Owner's records. These must be electronically recorded and submitted to the Owner in pdf format.

83. As-built Surveys will be required by this Contractor at the Completion of the Project, including for Site Utilities, rain gardens, detention basins, etc. to submit to Utility company/department or City/County for final approval. A portion of retainage will be held until all surveyed as-builts have been submitted and accepted by the utility company and authorities having jurisdiction. As-built surveys must be prepared by a Land Surveyor or Engineer registered in the State of Missouri. Contractor shall also provide as-built drawings in accordance with Chapter 11 of the Wentzville Engineering Design Criteria and Division 11 of the Wentzville Standard Specifications.

84. Contractor is required to hold their alternate pricing that was included in the bid form for 60 days after the bid date, unless noted otherwise in the alternate description. Contractor will notify CM when decisions need to be made regarding the acceptance of bid alternates in order to maintain deliveries, installation, and the master project schedule.

85. The Master Project Milestone Dates include all work proposed in the Bid Alternates. No time extensions will be granted for accepted Alternates.

86. Unit prices provided on the Bid Form and incorporated into the contract shall apply to the condition described in the unit price, regardless of which subcontractor performs the work or when the work is being performed.

87. Construction work shall only be allowed during hours permitted by the City of Wentzville. If Contractor opts to work outside of those hours, they must contact the CM/City/Owner to obtain permission.

88. During the warranty period of the project, this Contractor shall document, maintain, and update a Warranty Log of all warranty items, weekly, to be shared with the Client and CM. Contractor shall acknowledge the Owner's warranty call within 4 hours and keep the Owner apprised of the resolution status. Any roof or building envelope leaks or elevator issues or any issue that interferes with regular building operations shall be considered as urgent / emergencies. Contractor to provide a 24-hour on-call service for such urgent or emergency items.

89. Builder's Risk to be carried by the General Contractor. Deductibles to be paid by General Contractor.

90. Contractor is required to maintain access to the work as needed to maintain schedule.

91. No change orders will be issued for material cost increases or impacts of tariffs that occur during the project.

92. The Owner will provide and maintain two time-lapse cameras to record progress of construction. General Contractor to provide two sturdy 20-foot tall mounting posts in location to be coordinated with the Owner. General Contractor to mount cameras on pole. Provide access to the pole for periodic maintenance once a month for the duration of the project. Remove poles at the completion of the project. Turn over cameras to the Owner.

93. This Contractor shall provide an opportunity for a ground-breaking ceremony. General Contractor to provide a twelve-inch high mound of lose dirt, three feet wide and forty feet long, to be removed after ceremony.

94. This Contractor shall provide an opportunity for a topping out ceremony. General Contractor to coordinate with Owner to provide location, parking, accessible steel beam and hoisting for ceremony.

95. If this contractor chooses to backfill foundation walls prior to that time which is approved/allowed by the structural engineer, this Contractor is responsible for designing, installing, rental (and eventual removal) of all temporary shoring of foundation walls prior to backfill.

96. Provide housekeeping pads.

97. Provide site bollards complete with footing, anchoring, concrete fill, painting, and plastic covers.

98. Signage – Contractor to furnish and install the equipment signage called for on the Equipment plans and specifications. Also, the parking lot handi-cap signs. All other signage will be provided by the owner. Contractor is responsible for coordinating building construction with the signage requirements including required blocking and any required electrical rough-in.

99. Remove remaining fallen trees and stumps and complete all required site demolition work. Strip all vegetation, roots, soft, organic, frozen, and unsuitable soils in the construction areas and either haul off or stockpile for later use in non-bearing areas.

100. Strip topsoil, stockpile, and stabilize until ready for use. Spread topsoil to the depth required by civil and landscape drawings and landscape specifications.

101. All areas must be left at the end of each day so that there is no standing water. Grade temporary swales to drain site, if necessary, to achieve this requirement.

102. After stripping of site and completion of initial cuts to required subgrades (-1' below paving section in the parking/drive areas and -3' below slab on grade section in the building areas), and prior to fill operations, proof roll the structure and parking areas.

     Replace of areas that rut or deflect (greater than 1") with properly compacted fill. Scarify and compact the subgrade soils to a depth of at least 6" below the surface in accordance with the geotechnical report recommendations. If remediation of the existing soils is required after completing the site stripping and initial cuts, this work will be completed on a unit price basis, and is should not be included in the base bid.

103. After subgrade preparation, complete site grading and compacted fill placement to three feet below the building and one foot below parking area required subgrades Contractor to determine the final fill material quantities and types. If onsite materials are utilized, Contractor is responsible for any additional work (moisture conditioning) to achieve required compaction and this work should be included in the Base Bid.

104. Include in the base bid imported, 1" minus gradation crushed limestone fill to a depth of 3' below building slab subgrades and 1' below parking and drive areas pavement subgrades. Include also 2' below the bearing level of footings/column pads. Lien concrete can also be utilized for remediation under the footings.

105. Include recompacting of the bottom of footing excavations, as directed by the materials testing agency, if the footing excavation has disturbed the compacted subgrade materials.

106. Proof roll subgrade again, prior to placing base rock for the final paving.

107. Provide properly compacted fill in all utility trenches within the building and parking areas.

108. Utilize equipment as recommended in the geotechnical report as weather and site conditions require.

109. If more or less remediation is required beyond what is included as outlined above, the change in work will be addressed by Unit Prices included on the Bid Form. In such case, unit quantities must be tracked by the Contractor and confirmed by the Materials Testing agency.

110. Lime stabilization of all pavement areas. Clarify. Moisture conditioning, if required, is to be included in the Base Bid. See Item 103.

111. No change orders will be awarded for additional forming or additional concrete in over excavated footings.

112. Pressure test and chlorinate site water lines. Provide test reports to Owner verifying acceptable pressures and chlorination. Coordinate with utility company / fire district and obtain approval from those parties as required.

113. Verify that all plumbing fixtures are mounted at ADA height required by AHJ.

114. Include all caulking and sealants for all systems and materials furnished and installed on the bid documents.

115. Provide access panels needed for all work installed under this contract.

116. Provide a mockup per documents of the building envelope materials and construction techniques. The mockup should reflect the project document details and be installed exactly as indicated on

the drawings. The purpose of the mockup is to not only review and achieve an approval of the materials, but also to ensure the transition of the materials results in a good water tight condition. Contractor to follow the mockup guidelines outlined in the project documents. If the Contractor questions a detail provided, it should be submitted as an RFI and discussed with the project team prior to the construction of the mockup.

117. Contractor (or the responsible subcontractor providing the delegated design) must include Professional Liability and errors and omissions insurance for the design-build, or delegated design scopes of work that are required by specifications to designed by a professional engineer. The General Contractor or subcontractor providing the design must carry a minimum of Professional Liability of $2M per claim. Drawings and calculations shall be signed and sealed by a Professional Engineer registered in the State of Missouri. The following items are delegated design by this Contractor:

    a. Heavy duty, simulated stone look vinyl fencing and footings
    b. Site retaining wall
    c. Pre-engineered metal building
    d. Pre-engineered/prefabricated covered parking structures.
    e. Salt Building Fabric Structure
    f. Fire Suppression System (including hangers, seismic restraints, etc.)
    g. Fire Alarm System (including wiring diagrams, etc.)
    h. Plumbing trapeze hangers and the seismic restraints
    i. Mechanical hangers and supports and seismic restraints
    j. Electrical hanger and supports and seismic restraints
    k. Structural Steel Connections (See Spec Section 051200)
    l. Cold Formed Metal Framing (See Spec Section 054000)
    m. Guardrails for mezzanine and truck dock areas
    n. Aluminum-Framed Storefronts (See Spec Section 084113)
    o. Glazed Aluminum Curtain Walls (See Spec Section 084113)
    p. Glazing (Spec Section 08800)

118. Review with the Owner/Fire Marshall before ordering the Knox box. Verify/obtain final location of the Knox box prior to installation.

119. The CONTRACTOR shall provide one project sign. The sign will include the Owner's logo, design team logos, Construction Manager logo and the CONTRACTOR logo. They shall also include the project rendering, the project name and expected completion timeframe. No other project signs will be allowed on the project for advertisement unless approved in advance by the owner. The sign needs to a minimum of 4' by 8'. The sign will be installed at a location to be approved by the Owner.

120. All disturbed landscape areas must be replaced to their pre-construction condition at the end of the project unless noted otherwise on the Project Documents. This includes areas disturbed by this Contractor outside of the parcel boundary, on adjacent properties, and along the ROW.

121. Contractor will submit to the CM a detailed Schedule of Values for review and approval prior to the submission of the first pay application.

122. Contractor must reference and comply with all City Standards in construction of the new facilities.

123. The typical property owner/development or service agreement fees from Ameren Electric, Ameren Gas, and Brightspeed are the responsibility of the Owner. Contractor to coordinate with and provide all indicated infrastructure and installations indicated on the plans to support the public utility provided services and equipment.

124. Mechanical, electrical, and plumbing subcontractors will assist Owner's Representative with completing Ameren BizSavers Program Incentive documentation within 30 days of Substantial Completion, including backups for labor and material costs for mechanical equipment, light fixtures, lighting controls, and other electric equipment which qualifies for incentives. Subcontractors shall also provide all invoices from suppliers for these items as required by Ameren for backup.

125. BID ALTERNATES (PROVIDE Lump Sum ADD or DEDUCT Amount)

Provided for information only. Contractor to provide all Alternate Bids via e-Bidding system.

Alternate 1 – Eliminate covered parking at the Main Building to include the prefabricated canopy structure, related storm piping, and lighting.

Alternate 2 – Provide medium duty EMPC concrete paving (Note 26 - Detail 13/C700) in lieu of areas called out to be light duty asphalt paving (Note 27 – Detail 12/C700) and medium duty asphalt paving (Note 15 – Detail 14/C700) at the North Parking Lot.

Alternate 3 – Provide approved substitute manufacturer to Trane as requested in Specifications Sections 230923 (Direct-Digital Control for HVAC), 237413 (Indoor Indirect-Fired Heating & Ventilating Units, and 237413 (Outdoor Packaged Heating & Cooling Units).

Alternate 4 – Provide engineered quartz tops at wet areas (Rooms 108, 119, 120, 123, 213, 214, 301, and 411) in lieu of solid surface tops.

Alternate 5 – Provide plastic laminate tops at dry areas (Rooms 112, 117, 211, 216, 308, and 403) in lieu of solid surface tops in accordance with the Finish Drawings

126. **UNIT PRICES:** The unit rates below are to include all general conditions, overhead, and profit. Rates are to be applied either as add or deduct rates; the same rate will apply for either condition. There will be only one rate allowed per unit price regardless of when in the construction process the rate is being applied or what trade is performing it.

Provided for information only. Contractor to submit all Unit Prices on Exhibit C – Supplemental Bid Information Form.

Unit Price No. 1: Removal and haul-off of rippable rock. Per CY

Unit Price No. 2: Removal and haul-off of non-rippable rock. Per CY

Unit Price No. 3: Removal and haul-off of trench rock. Per CY

Unit Price No. 4: Removal and disposal of existing buried concrete man-made structures. Per CY

Unit Price No. 5: Removal, haul-off and disposal of unsuitable soils and placement of lean concrete for soil remediation. Per CY

Unit Price No. 6: Removal, haul-off and disposal of unsuitable soils and import & compaction of 1" granular material for soil remediation per recommendations in Geotechnical Report. Per CY

Unit Price No. 7: Removal, haul-off and disposal of unsuitable soils and import & compaction of suitable soils per recommendations in Geotechnical Report. Per CY

Unit Price No. 8: Lime treatment of on-site unsatisfactory soils, tilled into a depth directed by Geotechnical Engineer. Include tilling, spreading and recompaction of treated soil. Per CY

Unit Price No. 9: Moisture conditioning existing subgrade material by aerating soil with a disk and allowing to air dry. Include spreading and recompaction. Per CY

Unit Price No. 10: Load and haul-off of surplus soils. Per CY

Unit Price No. 11: Import, placement and compaction of suitable soil. Per CY

Unit Price No. 12: 1" clean rock placement and compaction Per CY

Unit Price No. 13: 1" minus rock placement and compaction Per CY

Unit Price No. 14: Eliminate seed/straw, furnish, and install additional sod. Per SF

Unit Price No. 15: Furnish and install enhanced flooring adhesive capable of withstanding up to 99% Relative Humidity of slabs (compatible with flooring products) on new concrete slabs. Per SF

Unit Price No. 16: Furnish and install additional heavy duty, simulated stone vinyl fence. Per LF

Unit Price No. 17: Eliminate chain link/fabric screen fence. Per LF

Exhibit E
SUPPLEMENTAL CONTRACT TERMS
Updated Addendum 3 2/9/23

PART 1 GENERAL

1.01 SUMMARY

A. The Contract Form is CITY-CONTRACTOR AGREEMENT #23-008, Terms & Conditions, General Conditions, and as amended by these Supplemental Contract Terms.

1.02 Construction Manager, Navigate Building Solutions

A. The Construction Manager for the Project shall be Navigate Building Solutions ("Navigate"). All communications between Contractor and Owner shall be through Navigate on behalf of Owner. Navigate has the authority to take all actions on behalf of the Owner permitted by the Contract Documents, with the sole exception of agreeing to any Modifications to the Contract. Only the Owner's representatives Devon Dezort, Susan Spiegel, or the Mayor have the authority on behalf of the Owner to agree to any Change Order and/or to otherwise agree to authorize any Modifications, with it being understood and agreed that any Modifications to the Contract must be executed by Devon Dezort, Susan Spiegel, or the Mayor on behalf of the Owner in order to be effective.

1.04. MODIFICATIONS TO CONTRACT FORM

A. CITY-CONTRACTOR AGREEMENT #23-008 is hereby modified as follows:

1. Add the following to Section RECITALS:

   C. Subject to adjustments of the Contract Time as provided in the Contract Documents, the Contractor shall achieve Substantial Completion of all work related to new construction and bid alternates (identified as being included in the Base Bid), and associated Site Work within the number of days identified in this Section.

   The following Bid Alternates are accepted as part of the Award Amount listed:
   Alternate No. TBD in the amount of $TBD
   Alternate No. TBD in the amount of $TBD

   The following alternates may be accepted by the Owner following execution of this Agreement. The Owner reserves the Right to accept the following alternates through the Change Order Process post execution of this Agreement for the amounts below. This Contractor must hold prices for these Alternates for a period of Sixty (60) days.
   Alternate No. TBD in the amount of $TBD
   Alternate No. TBD in the amount of $TBD

   Unit Prices shall be as submitted in Exhibit C – Supplemental Bid Information.

2. Add the following to Section RECITALS:
   D. The Date of Commencement for the Contractor's Work shall be the date fixed by the Owner's written Notice to Proceed.

3. Add the following to Section 3 Coordination of Contract Documents:

   In the event of discrepancies or conflicts among or between the Contract Documents or observable conditions exist, the Contractor shall request an interpretation in writing from the Owner and Architect before proceeding with the Work.

   If the Contractor fails to request such interpretation from the Architect and Owner, it is presumed that the more stringent, better quality or higher quality requirement is included in the Work. The Contractor shall be responsible for the cost and installation of such requirement at no additional cost to the Owner. Before ordering any materials or doing any Work, the Contractor shall verify measurements at the Project site and shall be responsible for correctness of such measurements. Any difference which may be found shall be submitted to the Architect for interpretation before proceeding with the Work as a condition precedent to any claim for an increase in the Contract Sum.

   If conflict among various provisions of the Contract Documents is found, and the quality or stringency of the conflicts are not in question, the terms shall be interpreted in the following order of priority:

   a. Modifications to the Contract
   b. The Contract
   c. Special Conditions
   d. General Conditions

   Specifications shall control over Drawings, and details in drawings shall control over large-scale drawings.

4. Add the following to Section 4 Payment:

   (a) Each Application for Payment shall be based on the most recent schedule of values submitted by the Contractor in accordance with the Contract Documents. The schedule of values shall allocate the entire Contract Sum among the various portions of the Work. The schedule of values shall be prepared in such form, and supported by such data to substantiate its accuracy, as the Architect may require. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment. If Contractor fails or refuses to complete the Work, or has unsettled claims with Owner, any payment to Contractor shall be subject to deduction for such amounts as the Architect shall determine as the cost for completing incomplete Work and the value of unsettled claims.

   The period covered by each Application for Payment shall be one calendar month ending on the last day of the month. The Contractor shall submit a draft Application for Payment electronically to the Architect and the Construction Manager not later than the 20th day of the invoicing month. Upon receipt of a recommendation for approval form the Architect and Construction Manager, the Contractor shall submit the official Application for Payment to the Architect not later than the first day of a month.

   (b) Applications for Payments shall be submitted in similar formats to the AIA Documents G702 and G703 and acceptable to the Owner in compliance with other requirements set forth herein. In the event of a dispute with regard to any item included in an Application for Payment, the Owner shall make payment for items not in dispute and shall have the right to withhold from payment the amount of such disputed item while the parties attempt to resolve the dispute in accordance with the dispute resolution provisions provided for in the Contract Documents.

(c) Applications for Payments shall include:

i. Certified payrolls
ii. Invoices for all materials, rental equipment, and Contractor's statements (if requested by the Owner)
iii. Copies of Contractor's daily log (if not already submitted)
iv. Compliance with prevailing wage laws as per annual wage order issued with this contract
v. If invoicing for stored materials that have not been delivered to the project site, the following must be provided: proof of stored materials including certificate of insurance for facility where materials are stored, photographs of such materials, materials are labeled with signs indicating materials are "Property of City of Wentzville, Missouri" and copies of invoices for materials from the vendors/supplier.

(d) With each Application for Payment, the Contractor warrants that title to all Work covered by the Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment, all Work for which payment certificates and payment have been made, to the best of Contractor's knowledge, information and belief, are free and clear of all liens, claims, security interests or encumbrances in favor of the Contractor, any Subcontractors, material suppliers, or other persons or entities making a claim by reason of having provided labor, materials and equipment related to the Work.

Certified Payroll Procedures:

The Contractor & each Subcontractor are required to submit one (1) Certified Payroll for each week that work is in progress & must be numbered sequentially. If work is temporarily suspended, the last payroll must be appropriately marked to note that it would be the last payroll until work is resumed. Submitter shall make sure that each payroll is numbered and dated, includes the name of the Project on it as well as the name of the Subcontractor. Provided that all payrolls are numbered sequentially, Contractor will not need to send "No Work" payrolls when no hours are logged for a pay period. Submitter shall label each of the "Final Payrolls" from each Contractor/Subcontractor as such.

The Contractor must submit one (1) certified originals of each weekly payroll within seven (7) days of the payment date of the payroll. The certification may be attached to the payroll or may be on the payroll itself. The Contractor will be considered responsible for submittal of payrolls and certifications for all their Subcontractors on the project. The certification must be properly signed originals. Electronic submittal of certified payrolls is not permitted. Failure to submit these payrolls within the 7-day period will result in delay in submittal of pay applications. All certified payrolls must be certified by an officer of the Contractor. Contractor cannot certify several pay periods with only one payroll certification. This is unacceptable to the Department of Labor. Each certification must also be dated and signed to be valid. Owner would prefer that the certification be signed in a color other than black. Owner can accept Xeroxed payrolls; however, the certifications must each be signed with an original, live signature, not copies.

The employee's full name must be used. Addresses must be listed on certified payrolls. Contractor may not include Social Security numbers of employees on certified payrolls but must assign the employee an identification number and place that identification number on the certified payroll. The identification number can be the last four digits of the employee's Social Security number. Employers (prime Contractors and Subcontractors) must maintain the current address and full SSN for each employee and must provide this information upon request to the contracting agency or other authorized representative responsible for labor standards compliance. All deductions must be clearly identified. Only approved deductions should be used in wage rate calculations as per the Code of Federal Regulations. The US Department of Labor Form LS-57 may be used, as this form complies with all code requirements. If any part of the payroll or payroll certification

is illegible or not completely filled out, they will be returned to Contractor for correction and re-submission.
The first time each apprentice appears on a certified payroll, their apprentice certification letter must accompany that certified payroll. Approval of such certified payroll, and the pay application submission, will be delayed if such letter is not included.

Retainage shall be invoiced and paid upon Final Completion of the Contractor's Work, less such amounts as are attributable to 150% of the value of incomplete work and unsettled claims.

(e) Substantial Completion. Substantial Completion is defined to mean and take into account the situation when the Work, or a specific portion of it, is sufficiently complete so that the Owner can occupy or utilize the Work for its intended use. The Contractor shall notify the Owner and the Architect when the Contractor believes that the Work is substantially complete. Upon inspection of the Work and determination among the Owner and Architect that certain items need to be completed or corrected, Contractor shall be given notice to proceed with completion of such items. Contractor shall complete such items within seven (7) calendar days of receiving the notice. Upon Contractor's completion and correction of the remaining items, and upon satisfactory follow-up inspection of the Work by the Owner and Architect, a Certificate of Substantial Completion shall be issued by Architect. To the extent set out in the Certificate of Substantial Completion, the remaining responsibilities of the Owner and the Contractor shall be determined for the matters so included, as well as the time for completion.

(f) The Owner, upon acceptance of the Certificate of Substantial Completion, shall make payment of the amount of the retainage applicable to the Work completed and covered by said Certificate, subject to such adjustments as may be authorized. After Substantial Completion, any payments made to Contractor shall not be subject to any retainage being withheld.

(g) Final Completion and Payment. Upon completion of the Work, the Contractor shall provide to the Owner and Architect written notice that the Work is ready for final inspection and acceptance, along with Contractor's final Application for Payment. The Work shall then be inspected by the Owner and Architect, and when the Work is found to be acceptable and complete, the Architect shall issue a final Certificate for Payment stating that the Work has been completed in accordance with the Contract Documents.

(h) In order for the final payment and any remaining retainage to become due, Contractor shall submit to the Owner: (i) an affidavit that payrolls, bills for materials and equipment and any other indebtedness connected with the Work which could become the responsibility of the Owner, have been paid or otherwise satisfied; (ii) a certificate showing that any insurance required by the Contract Documents and related documentation to remain in force after final payment, is currently in effect and will be canceled only upon 30 days prior written notice to the Owner; (iii) an affidavit that all wages have been paid, and other requirements have been satisfied, of the Missouri Prevailing Wage Law; (iv) consent of surety to final payment, as applicable; (v) final and unconditional lien waivers signed by Contractor and all Subcontractors; (vi) copies of all as built documents, warranties and equipment manuals as required by the Contract Documents or by the Owner; and (vii) certificate of compliance with all other applicable laws and regulations, and requirements of the Owner. Upon satisfaction of the requirements and procedures and the providing of all affidavits, certificates, lien waivers and other documentation required by the Contract Documents has been completed, the Owner shall make final payment, which shall be the unpaid balance of the Contract Sum, to the Contractor. Acceptance of final payment by the Contractor and by all

Subcontractors shall constitute waiver by those parties of all claims except any previously made in writing.

(i) The Owner's making of final payment shall constitute a waiver of all claims by the Owner, except those arising from liens, claims, security interests or encumbrances arising out of the Contract Documents and remaining unsettled; failure of the Work to comply with the requirements of the Contract Documents; and the terms of guarantees and/or warranties as may be required by the Contract Documents.

5. Add the following to Section 7 Time of Completion:

Contractor shall complete the Work in accordance with the intermediate substantial completion dates for the following milestones which are identified in Exhibit D Scope of Work:

a. Submission of the critical and all remaining project submittals
b. Main Building 'Dry-In'

The Contractor has contemplated all adverse weather within the project schedule and the Contract Time. Except for "Unusually Severe Weather, defined as a weather condition more severe than one would reasonably anticipate at the Site based on historical conditions over the past five (5) years as established by the National Weather Service, Contractor accepts all risks associated with adverse weather. No time extensions will be granted related to claims of adverse weather, except for Unusually Severe Weather. No claims for extra costs will be granted related to adverse weather and/or taking action to deal with adverse weather and/or the effects of adverse weather, except for Unusually Severe Weather.

The Contractor must conform to the most recently approved Construction Schedule. The Contractor must complete the indicated work or achieve the required percentage of completion, as applicable, with any interim completion dates established in the most recently approved Construction Schedule.

The Contractor must maintain at the Site, available to the Owner and the Architect for their reference during the progress of the Work, a copy of the approved Construction Schedule and any approved revisions thereto. The Contractor must keep current records of and mark on a copy of the approved Construction Schedule the actual commencement date, progress, and completion date of each scheduled activity indicated on the Construction Schedule.

Recovery Clause: If at any time during the course of the work, the Owner reasonably determines that the Contractor has fallen behind the critical path of the schedule, the Owner may upon written notice to the Contractor, require the Contractor to recover schedule by any means appropriate (including but not limited to the provision of extra shifts and/or overtime and/or adjustments to the schedule). Within five days of Contractor's receipt of such written notice, the Contractor shall provide the Owner with a written recovery plan and shall commence recovery efforts. So long as the Contractor has fallen behind schedule for reasons attributable to the Contractor (and not to force majeure events), all costs associated with the recovery of schedule shall be borne by Contractor. If, however, the Contractor is not at fault for the delay in the work (due to force majeure events or other causes that would otherwise entitle the Contractor to an extension of the Contract Time) then the Contractor shall be paid for the costs of recovering schedule pursuant to the provisions of the Contract Documents applicable to changes in the work.

The Contractor represents that its bid includes all costs, overhead and profit which may be incurred throughout the Contract Time and the period between Substantial and Final Completion. Accordingly, the Contractor may not make any claim for delay damages based in whole or in part on the premise that the Contractor would have completed the Work prior to the expiration of the Contract Time but for any claimed delay.

The Owner reserves the right to issue a written directive to accelerate the Work that may be subject to an appropriate adjustment, if any, in the Contract Sum. Contractor must substantiate any costs associated with such Owner directive.

6. Add the following to Section 19 Prevailing Wage:
   The Contractor will forfeit a penalty to the Owner of $100 per day (or portion of a day) for each worker that is paid less than the prevailing wage for any work done under the Contract by the Contractor or by any Subcontractor. (Section 290.250, RSMo). For detailed information on rules and occupational titles, see 8 CSR 30-3.010 through 3.060.

7. Add the following to Section 14 Contractor's Liability Insurance:
   Work may not proceed until proof of all required insurance has been provided to the Owner. All insurance policies shall include an ISO Additional Insured Endorsement (CG 20 10 and CG 20 37 2004 editions or equivalent) listing the Owner and the Owner's Construction Manager as additional insureds on a primary basis with Owner and/or Owner's Construction Manager's insurance to be in excess and not contributory. Contractor's general liability and automobile insurance policies shall contain a waiver of subrogation in favor of Owner and its officers, directors and employees, and an ISO Notice of Cancellation/Modification Endorsement providing thirty (30) days written notice to be given by the insurance company to the Owner prior to modification or cancellation of such insurance. Such notices shall be sent via email to the Owner's Construction Manager and the Owner directly.

   By execution and performance of this Contract, the Owner does not intend to, nor shall it be deemed to have waived or relinquished any immunity or defense on behalf of the Owner, and the Owner's board of aldermen, officers, directors, servants, employees, agents, successors or assigns.

8. Add the following to Terms and Conditions section **Indemnification; No Personal Liability; Immunity Retention**:
   After the word "agents" add ", Construction Manager"

9. Add the following to Section 16 Liquidated Damages:
   If the Contractor shall neglect, refuse, or fail to submit the critical project submittals and/or all remaining project submittals within the calendar days after Notice to Proceed (as defined in Exhibit D, Item 4 and including any proper extension granted by the Owner), Contractor shall pay the Owner the stipulated sum of Five Hundred Dollars ($500) for each day beyond the submittal milestone.

   If the Contractor shall neglect , refuse, or fail to complete Final Completion /Completion of Punchlist within (30) calendar days after Substantial Completion, or Final Acceptance within (90) calendar days after Substantial Completion, Contractor shall pay the Owner the stipulated sum of Five Hundred Dollars ($500) for each day beyond the allocated calendar days to achieve these dates.

10. Replace Section 26 Force Majeure as follows:
    Neither the Owner nor the Contractor shall be responsible for delays or failures to timely perform if such delay arises out of causes beyond either party's control. If either party shall be delayed from punctually performing any obligation or satisfying any condition under this Agreement as a result of a Force Majeure Event, then the time to perform such obligation or satisfy such condition shall be extended by the period of delay caused by such Force Majeure Event. "Force Majeure Event" means unforeseeable causes beyond Contractor's or Owner's control and without their fault or negligence, including, but not limited to, governmental action or inaction, war, acts of God or of the public enemy, riots, fires, floods, earthquakes, pandemics, epidemics, quarantines, strikes, lockouts, freight embargoes, or Unusually Severe Weather.

B. MODIFICATIONS TO the "TERMS AND CONDITIONS" issued as part of the IFB#23-008 Sample Agreement:

1. The drawings, specifications, and other instruments of service are owned by the Owner. The Contractor, Subcontractors, Sub- subcontractors, and suppliers shall not own or claim a copyright in the Instruments of Service. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with the Project is not to be construed as publication in derogation of the Owner's reserved rights.

2. E-mail may be used for routine correspondence but is not sufficient to constitute official notice.

3. Review of Contract Documents and Field Conditions by Contractor

   Execution of the Contract by the Contractor is a representation that the Contractor has visited the Site, become generally familiar with local conditions under which the Work is to be performed, and correlated personal observations with requirements of the Contract Documents and has notified the Architect of and obtained clarification of any discrepancies which have become apparent during bidding or proposal period.

   Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work and shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information in such form as the Architect may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.

4. In lieu of correcting defective Work, the Owner may in its discretion decide to accept such defective Work and backcharge the Contractor a reasonable amount equivalent to what it would have cost to replace the defective Work.

5. Architect's and Construction Manager's Compensation for Services to Remedy Defective Work - When the Architect's and Construction Manager's additional services are required because of defective work, neglect, failure, deficiencies, or default by the Contractor, the Contractor shall be responsible to the Owner for the cost of such additional services.

6. If the Contractor performs any Work involving an apparent error, inconsistency, ambiguity, construction impracticality, omission or code violation in the Contract Documents of which the Contractor is aware, or which could reasonably have been discovered by the review required by Section B.3 above, without prompt written notice to the Owner and the Architect and request for correction, clarification or additional information, as appropriate, the Contractor does so at its own risk and expense and all claims relating thereafter are specifically waived.

7. Contractor waives all claims for consequential damages against the Owner and Construction Manager arising out of this Agreement and/or the performance of the Owner's obligations thereunder.

8. Change Proposals: The Contractor must submit change proposals covering a contemplated Change Order within ten (10) days after the request of the Owner, Architect or Construction Manager or within ten (10) days of the event giving rise to the Contractor's claim for a change in the Contract Sum or Contract Time. No increase in the Contract Sum or extension of the Contract Time will be allowed the Contractor for the cost or time involved in making change proposals. Change proposals will define or confirm in detail the Work that is proposed to be added, deleted, or changed and must include any adjustment which the Contractor believes to be necessary in the Contract Sum or the Contract Time. Any proposed adjustment must include detailed documentation, including but not limited to: cost, properly itemized and supported by sufficient substantiating data to permit evaluation including cost of labor, materials, supplies and equipment, rental cost of machinery and equipment, and additional bond cost. Change proposals will be binding upon the Contractor and may be accepted or rejected by the Owner in its discretion. The Owner may, at its option, instruct the Contractor to proceed with the Work involved in the Change Proposal without accepting the Change Proposal in its entirety. See Exhibit F, entitled Change Order Calculations which shall govern and apply to Change Orders. A Change Order is not effective until the Owner and Architect issue and sign the Change Order.

   If the Owner determines that a change proposal is appropriate, the Architect will prepare and submit a request for a Change Order or Contract Amendment providing for an appropriate adjustment in the Contract Sum or Contract Time, or both, for further action by the Owner. No such change is effective until the Owner and Architect sign the Change Order.

9. The Contractor has no right to stop Work as a consequence of non-payment. In the event of any disagreement between the Contractor and Owner involving the Contractor's entitlement to payment, the Contractor's only remedy is to file a Claim. The Contractor must diligently proceed with the Work pending resolution of the Claim. If, however, an Application for Payment has been approved for payment by the Owner, and the Owner fails to make payment within sixty (60) days of the approval for payment by the Owner, the Contractor may upon ten (10) days written notice to the Owner, stop work if payment is not made by the Owner within ten (10) days following the notice.

10. Claims:

    A Claim is a demand or assertion by one of the parties seeking, as a matter of right, payment of money, a change in the Contract Time, or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. The responsibility to substantiate Claims shall rest with the party making the Claim. This does not require the Owner to file a Claim in order to impose liquidated damages in accordance with the Contract Documents.

    Notice of circumstances that could give rise to a Claim must be given to the other party as soon as possible, to enable that party to take action as appropriate to lessen the impact of the potential Claim. The party recognizing a potential claim shall also explore all options and generate suggestions for how to avoid or overcome the impact of the circumstances. If damage cannot be avoided, Claims by either the Owner or Contractor must be initiated by written notice by mail or electronically to the other party. Claims by either party must be initiated within ten (10) days after occurrence of the event giving rise to such Claim or within ten (10) days after the claimant first recognizes the condition giving rise to the Claim, whichever is later.

    Pending final resolution of a Claim, except as otherwise agreed in writing or as provided in Section 9 above, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents.

11. Delays:

The sole remedy for delays other than Owner caused delays will be non-compensable time extensions for completion of the Work.

The Contractor must provide written notice of any actual or prospective delay promptly, and in no event later than seven (7) days after the occurrence of the event giving risk to such delay. The notice must be given to the Owner and Architect within the specified time. In the case of a Continuing delay, the Contractor must provide an initial notice and a further notice at each progress meeting throughout the duration of the delay. The notice must contain all of the specific information specified below. The Contractor's failure to provide the written notice containing the information specified below within ten (10) days prescribed above will be conclusively deemed a waiver or any claim for delay arising from such occurrence.

The Contractor's notice must identify those portions of the Construction Schedule affected by the delay and must include an estimate of the cost and probable effect of the delay, if any, on the progress of the Work. Supporting documentation must include, but is not limited to:

a. a written detailed statement of the reasons and causes for the delay;
b. inclusive dates of the delay;
c. specific trades and portions of the Work affected by the delay;
d. status of Work affected before commencement of the delay;
e. effect of the delay on available Float;
f. a critical path method (CPM) analysis demonstrating that the delay has affected an activity then on the critical path at the time of the occurrence of the delay as shown on the most recently approved Construction Schedule; and
g. if the Contractor claims that the delay is an excusable delay or compensable delay, evidence that the delay was due to a Force Majeure Event, as defined in the Agreement; and in the case of a compensable delay, was caused solely and exclusively by the acts or omissions of the Owner (excepting actions taken by the Owner to protect the public health or safety or to conform to law) or anyone for whose acts the Owner is responsible, and which are unreasonable under the circumstances involved and not reasonably within the contemplation of the parties.

12. Dispute Resolution:

The Owner and the Contractor agree that for Claims, disputes and other controversies arising out of, or related to this Agreement, they will attempt to informally resolve such matters in good faith, and include the Architect, as appropriate, in the informal resolution process. In the event a satisfactory resolution cannot be achieved despite the good faith efforts of the parties within a reasonable time, the parties may, but shall not be required, to engage in a formal mediation process, with the mediating agency and the mediating procedures to be mutually agreed upon.

If the described informal resolution process is not successful, and the Owner and the Contractor do not agree to proceed with formal mediation, then either or both of them may pursue litigation as the binding resolution process, consistent with the Governing/Choice of Law and Jurisdiction provision set forth above.

WPW Bidding RFI Responses 02-09-23

1. Gate operator specified in section 323111 will work with the 32'W sliding gate but will not be able to power the 50'W slide gate. Consider reducing gate size or provide specifications for a different operator for the 50'W gate.
    - Specified Basis of Design Liftmaster CSL24UL commercial slide gate operator literature notes “rated for gates up to 50 ft. and 1,500 lbs.”

2. The insulation Specs and details seem to be unclear. Under Metal Ducts it calls to just insulate first 15 ft. of RTU-1 SA Duct and to Insulate All of RA Duct with Liner. Under HVAC Insulation, it just states Supply ducts from RTU-1 and RA duct to be insulated just 10 ft from unit. No mention of VAV’s, just First 15 ft. of duct downstream of Equipment outlets under Metal Duct spec section for RTU-1.

    Please clarify the insulation type and thickness for the following duct:
    - Metal ducts spec covers where duct liner is required. HVAC Insulation spec covers where duct wrap is required. Refer to 230700 3.10 for duct wrap thicknesses and densities. Refer to 233113 2.2 for duct liner thicknesses and densities.

    MAU-1: Uninsulated?
    - Correct, MAU supply ductwork is not required to be insulated per 230700 3.9 D 1. Outdoor air ductwork between exterior louver and MAU inlet shall be wrapped according to 230700 3.9 C.

    RTU-1:
    Concealed Rectangular SA Duct:
    Wrapped per 230700.
    Exposed Rectangular SA Duct:
    Duct liner per 233113.
    Concealed Round SA Duct:
    Wrapped per 230700.
    Exposed Round SA Duct:
    Duct liner per 233113.

    VAV’s:
    Concealed Rectangular SA Duct:
    Wrapped per 230700.
    Exposed Rectangular SA Duct:
    Duct liner per 233113.
    Concealed Round SA Duct:
    Wrapped per 230700.

    If exposed Round Spiral is to be lined, will Double Wall Round Spiral be acceptable?
    - Yes, double wall is acceptable. Specification will be updated in Addendum 3 for double wall requirements.

3. The drawing (pg C-200) shows cantilever gates at the northwest and northeast entrances. The plan is noted for 20’ wide gates, but drive lines are much wider. Please advise if the intent is truly a 20’ wide gate or if you would like us to extend to the length of the drive lanes.
    - Keynote 21 on sheet C-200 notes the 20’ minimum width that is required by the City of Wentzville Fire Protection District. Please reference sheets AS101 and AS203 for specific gate length requirements.

4. In section 144500 sub 2.2 the part number ARO22N001 is for a 4 post lift that has a max wheelbase of 230". On the following page under dimensions/capacities it states that the max wheelbase should be 194", which would be a different part number. Could you clarify please?
    - The Wheelbase number listed (194") was incorrect, it should be 230". The part number is correct.

5. The BOD (Clearspan) for section 133600 is not going to be bidding this project. Can you please advise on another approved/preferred manufactures/supplier?
    - Clearspan is listed as basis of design but specifications also note "or equal" so any company that provides a similar structure that meets the specifications requirements will be considered. Britespan Building Systems Inc. and GNB Global Inc. are similar suppliers to Clearspan amongst several others out there.

6. If Exhibit C is a Wentzville provided document, how is Div.26, 27, and 28 not "packaged/ bundled?" There is only 1 Line for pricing. Can we get this document amended to reflect independent prices for each Division in Exhibit C?
    - Bidder is misunderstanding. Exhibit C - Supplemental Bid Information is not a bid form. It is simply a request for breakdown of the General Contractor's costs by specific Divisions of work 24 hours AFTER the bids have been received. The City is asking the General Contractor bidders to group Div 26, 27, 28 costs from their bids into a sub total similar to Div 1-10, Sitework specs, etc. This Exhibit is NOT identifying bid packages of work.

7. Section 111140 is annotated on the OF/CI Schedule, but the specs are not in the document.
    - Requested specification section 111140 is now provided via Addendum 03 package issued 02-09-23 and uploaded to the E-bidding system.

8. Please verify wind speed of 115mph as shown on drawings S001. Risk category III buildings should have wind speed of 120 mph.
    - The original listed wind speed of 115 mph was based off the design parameters for architects and engineers per the city of Wentzville's website. We agreed that this was not correct per risk category III, thus the listed wind speed was updated to 120 mph via Addendum 02 package issued 01-24-23 and uploaded to the E-bidding system.

9. Please verify which buildings should be designed as unheated (Ct = 1.2) as shown on S001, and which, if any, should be designed as heated.
    - Mechanical documents indicate all buildings are heated. For heated areas, the thermal factor may be reduced to 1.0.

10. There is a very large (10,000cy plus) discrepancy between my earthwork take off and the design engineers. Please advise.
    - Confirmation of the subgrade depths and rock quantities under the proposed building and pavement are required per the bid instructions. The depth of rock under the building is 3' of 1" minus and 1' of 1" minus under the specified asphalt/concrete pavement. This rock is in addition to the rock base referenced on the details.

11. Regarding the GC bid proposal, want to request that the bid proposal valid duration be changed from ninety (90) calendar days to thirty (30) calendar days. This would be more in line with the anticipated Final Board Approval milestone date of March 8, 2023.
    - The bid proposal valid duration and alternate pricing hold duration is revised from ninety (90) to sixty (60) calendar days.
    - E-Bidding Attribute 11- Revised to read "The bidder acknowledges their bid is valid for 60 days from bid opening date.
    - Exhibit D – Scope of Work, Item 84 revised and included in Addendum 3.
    - Exhibit E – Supplemental Contract Terms revised and included in Addendum 3.

12. Drawing P101C- shows 4” CWV going right through lift cassette? Lift cut-out area must be clear of all underground utilities.
    - This 4” CWV has been rerouted around the lift cassette via Addendum 03 package issued 02-09-23 and uploaded to the E-bidding system.

13. Is electrician making all the lift power connections?
    - Contractor to confirm with lift installer to verify what will be provided and if they make final connections. Per General Shop Equipment Note #5, on sheet E201B, the contractor shall provide all necessary items to make final connections to shop equipment. Coordinate any potential deviation from design documents with lift installation contractor and contract administrator.

    Pulling cord provided through chase pipes?
    - Design documents indicate a complete electrical installation, any potential deviation from this should be coordinated with the contract administrator.

    Landing wires at lift connections in the cassette?
    - Yes, see previous responses.

    Landing lift wires in the MCP?
    - Yes, see previous responses.

14. S-101C-A concrete cut-out will be left in the floor pad for future install of the in-ground lift. Is it (or can it be) required to install speed dowel sleeves for rebar around lift?
    - Structural foundation plans & details now indicate that the dowel sleeves are required at the joint between slab pours via Addendum 03 package issued 02-09-23 and uploaded to the E-bidding system.

    What is the concrete floor slope in the service shops?
    - No slope indicated or required.

    Lift manufacturer prefers NO slope in lift bays.
    - Correct, no slope indicated or required.

    Once the In-ground lift is installed and backfilled it will require an 18” thick final concrete pour all around the lift. Installer will have lift ready for concrete but does not do finish concrete work. Is this additional pour spec’d out for the concrete floor contractor? If not, it will need to be added. Requires a separate trip from original floor pour.
    - Lift cassettes should be installed prior to floor pour and the entire floor can be poured at once. Lift does not require a cut out.

15. Section 14 25 00 – Vehic. Spec calls out automatic draining of the lift cassettes in case water gets inside. We see no provision in the drawings for any type of plumbing from the lift cassettes to the shop sewer. Is there provision for the plumbing for lift auto drain of water? le Lifts, part 2-products, 2.1 identifier 5631 (3 post HD in-ground lift).
    - 2” connections were added to connect lift to 4” CWV via Addendum 03 package issued 02-09-23 and uploaded to the E-bidding system.

16. Regarding 144500 section 2.2 sub C.3.b The approach ramps on this lift are connected to the lift itself and not anchored to the floor. There is no option to get approach ramps that are “permanently anchored to the facility floor”. The ramps raise with the lift and tilt down to create a natural wheel stop so vehicles do not roll backwards off the lift. This also creates a clear floor for operation and work around the lift. Please confirm this is acceptable.
    - Approach ramps connected to the lift are acceptable.

17. Q101C shows vehicle exhaust on I-beam at the FRONT of the service bay. Q101B shows vehicle exhaust reels at REAR of service bays. Shouldn't the exhaust reels on Q101C be at the REAR of the service bay like they are shown on Q101B?
    - The light duty vehicles have exhaust that exits in the rear of the vehicle, so the exhaust reels are shown at the rear of the bays on sheet Q101B. The majority of the heavy-duty vehicles have exhaust that exits behind the cab, or mid vehicle, so the exhaust reels are mounted towards the front of the vehicle on sheet Q101C.

18. Design Specifications for PEMB states that a L/360 deflection limit is required for the girts. The masonry wall appears to be structurally independent (see detail K?S201). Why is the higher deflection limit needed?
    - The higher deflection limit is not required for this project since there appears to be no brittle finish supported from the PEMB at this time. The specs and basis for design criteria on S001 are now updated via Addendum 03 package issued 02-09-23 and uploaded to the E-bidding system to reflect the required PEMB deflection criteria for the expansion joint between buildings.

19. Design Specifications for PEMB states that a H/400 deflection limit is required for lateral drift. The masonry wall appears to be structurally independent (see detail K?S201). Why is the higher deflection limit needed?
    - Per response above, specifications and basis for design has been updated via Addendum 03 package issued 02-09-23 and uploaded to the E-bidding system.

20. On S401C a 4" wind beam is specified. What is it for? At what elevation is it required? and is it limited to only the west elevation?
    - These are the wind beams by the PEMB manufacturer over the garage door openings. The 4” offset called out on the plan refers only to the typical offset from the gridline, the size and location of the beam is per the metal building designer and the elevation needs to be coordinated with the architect.

21. S101C shows no interior column @ Q-7 and R-7, which are the only two interior frame lines shown this way. Was this intentional? If so, it will make those two frame lines heavier than the rest. You could just delete one interior column and go with two spans @ 44'-3" and 66'-4" for the entire building.
    - All interior columns were coordinated prior. They are desired where shown for equipment mounting, and desired to be omitted where not shown for clearances.

22. Is there a specific reason for the canopy bay spacings on Area B & A? Smaller spans will be more design and builder friendly.
    - Spacing was determined by parking stall coordination. Spacing can be modified as necessary as long as overall coverage footprint remains the same and column locations fall between parking stalls.

23. Do you expect the same roof panel to be supplied for the PEMB canopy and the conventional canopy (22-24/D-L)?
    - Building supported canopies and column supported canopies are two different product types and are to follow specification 105300 Prefabricated Canopy System parameters.

24. The canopy roof for the Wash Buildings is not priceable with 18'-0" and 12'-0" roof cantilevers on the endwalls. Can we change the bay spacings to make this work per our standards?
    - Yes, bay spacing can be modified as necessary as long as overall coverage footprint remains the same and column locations fall between parking stalls.

25. I cannot find any design parameters for the canopies. Do we design them using the PEMB specifications (which will make them more expensive than necessary)?
    - Canopies to follow specification 105300 Prefabricated Canopy System parameters.

26. Standing seam roofs that are uninsulated and open to the outside are prone to rattling. Is this acceptable?
    - Canopies to follow specification 105300 Prefabricated Canopy System parameters which includes gaskets to avoid rattling.

27. Due to the many unique scopes of work that are part of this project, would like to request that the Questions Deadline be pushed to Monday, February 13, 2023 by 11:59 PM (CT), and that the Close Date & Time be extended to Thursday, February 23, 2023 by 2:00 PM (CT).
    - The deadline for questions and for the bid response remains the same. No extension will be permitted.

28. Can they provide specs on the crane? I see the location but they don't give a crane capacity or anything like that. One of the details shows a crane beam that looks like it's a top running crane but there really isn't enough info to know.
    - All information regarding the crane can be found in specification section 412200.

29. What are the parameters for the deduct alternate #1 regarding the lighting? Not on the electrical drawings.
    - This deduct alternate would eliminate the nine (9) SC1 fixtures indicated on sheet E100 under the Main Building Parking Canopy for parking along the rear of the building.

30. Where is the VWC shown, I cannot find it?
    - VWC is not required for this project and product specifications have been removed via Addendum 03 package issued 02-09-23 and uploaded to the E-bidding system.

31. All of the concrete floor sealing; is it for a polish concrete or a stain concrete or just a regular clear sealer?
    - Concrete floor sealer to be water based clear sealer per specification 099123 Painting and Coating parameters.

32. They call for all masonry to be sealed, does that include the stone block?
    - Yes, Calcium Silicate Masonry Units to be sealed per specification 099123 Painting and Coating block sealing parameters.

33. The TPO roofing specifications call for a (15) year manufacturer's warranty, what wind speed warranty are they requiring?
    - A minimum 20-year manufacturer warranty and 55 MPH wind speed warranty is required. Specification 075423 TPO Roofing has been modified accordingly via Addendum 03 package issued 02-09-23 and uploaded to the E-bidding system

34. The specs calls for 1/4" taper insulation min. R-30 on roof plan B, A201B. This will give you R-Value 30 and an average R-Value 51.02. Starting point will be 5.1" and high point will be 12.1". Can they do an average R-30? Area roof plan A and partial roof area B get's flat stock insulation with min. R-30.
    - An average R Value of R-30 is acceptable and typical in a tapered insulation roof assembly. Specification 075423 TPO Roofing has been modified accordingly via Addendum 03 package issued 02-09-23 and uploaded to the E-bidding system

35. Doors 126A and 125: Are these opening required to be FEMA rated?
    - Openings are not required to be FEMA rated.

36. If so, I will need FEMA hardware required at # 126A; correct?
    - Openings are not required to be FEMA rated.

37. Are all interior CMU frames to wrap the walls?
    - Yes, interior HM frames required to wrap walls as graphically indicated in construction documents.

38. The 8" fire loop doesn't specify type of pipe. Can we use C900 or does it have to be a fusion welded pipe?
    - Water piping to be fusion welded pipe per the City of Wentzville specification requirements.

39. Can you please confirm if the GC is to supply and or install the appliances/equipment shown on the interior elevations (refrigerators, copiers, etc)?
    - The appliances (refrigerators, microwaves, dishwasher, ice maker, washer, and dryer are revised to be Owner Furnished Owner Installed (OFOI). The printers and copiers are to be OFOI. Contractor to coordinate all cabinet and casework shop drawings and fabrication with the owner furnished equipment and provide MEP rough in as indicated in the construction documents.

40. Is there going to be a separate spec section for the metal roof at the wash bay, or should they follow the same section that was released in addendum 2 for the PEMB (074113)?
    - Wash bay metal roof to be the same as the PEMB roof specified in 074113.

41. Section 074113 per paragraph 1.6.A. indicates for the roof panels to be equal to the Butler MR-24. This is a trapezoidal style of panel that is 24" in width. Paragraph 1.6.B. lists the approved equals including Berridge Metal Roofing, Dimensional Metals Inc., Englert Inc., PAC-CLAD Peterson Aluminum, MBCI, and Varco Pruden. Only two of the listed equal manufacturers MBCI and Varco Pruden produce a trapezoidal type panel although both of them also supply an architectural panel as well as Butler Buildings that is 16" in width. Since this scope of work includes a PEMB and conventional buildings with standing seam metal roofing is it acceptable to use an architectural panel in lieu of the trapezoidal style to ensure all standing seam metal roof systems are similar?
    - An architectural panel is acceptable and follows the specification guidelines to provide a similar product, outside of the basis of design, from the list of approved manufacturers.

42. Detail 8M/A607 per keynote <u>07.21.AM</u> indicates to provide 2 layers of 2" rigid insulation at the wash building. It also states to see specifications. Section 072100 includes only descriptions for kraft faced insulation, glass fiber blanket insulation, cavity wall insulation, and metal building insulation. Please provide the type of insulation and required R-Value at the SSMR on the wash building.
    - Rigid insulation to follow same parameters listed in specification 075423 TPO Roofing which notes the following:

        A. Polyisocyanurate Board Insulation: ASTM C1289, Type II, Class 1, Grade 2, felt or glass-fiber mat facer on both major surfaces.
            1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
                a. Atlas Roofing Corporation - Polyiso.
                b. Carlisle SynTec Incorporated.
                c. Firestone Building Products.
                d. GAF.
                e. Hunter Panels.
                f. Johns Manville; a Berkshire Hathaway company

43. Please confirm the roof slope on the wash bay building, the roof plan and elevation have conflicting slopes.
    - Wash building roof slope to be 2” / 1’-0” and this discrepancy is corrected via Addendum 03 package issued 02-09-23 and uploaded to the E-bidding system.

SECTION 011000 - SUMMARY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Project information.
2. Work covered by Contract Documents.
3. Work under Owner's separate contracts.
4. Owner-furnished/Contractor-installed (OFCI) products.
5. Contractor's use of site and premises.
6. Coordination with occupants.
7. Work restrictions.
8. Specification and Drawing conventions.

B. Related Requirements:

1. Section 015000 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

1.2 PROJECT INFORMATION

A. Project Identification: City of Wentzville MO Public Works Facility.

1. Project Location: 1295 Interstate Drive, Wentzville, MO 63385.

B. Owner: City of Wentzville.

C. Architect: hdesigngroup LLC, 5039 S National Avenue, Springfield, MO 65810.

1. Architect's Representative: Bryon Oster- Project Manager.

1.3 WORK COVERED BY CONTRACT DOCUMENTS

A. The Work of the Project is defined by the Contract Documents and project manual.

B. Type of Contract:

1. Project will be constructed under a single prime contract.

1.4 WORK UNDER SEPARATE CONTRACTS

A. General: Cooperate fully with separate contractors so work on those contracts may be carried out smoothly, without interfering with or delaying Work under this Contract or other contracts. Coordinate the Work of this Contract with work performed under separate contracts.

B. Concurrent Work: Owner will award separate contract(s) for the following construction operations at Project site. Those operations will be conducted simultaneously with work under this Contract.
   1. Telephone Equipment (rough-in, cabling, wall devices, cover plates, termination & certification to be CFCI)
   2. Data Servers (racks, PDU, UPS, rough-in, cabling, wall devices, cover plates, termination & certification to be CFCI)
   3. Network Switches
   4. Furniture & Systems Furniture
   5. Signage (except parking lot and equipment signage indicated in documents to be CFCI)
   6. Appliances

1.5 OWNER-FURNISHED/CONTRACTOR-INSTALLED (OFCI) PRODUCTS

A. OFCI Items:

   1. TVs & Mounts
   2. Removed
   3. Wireless Access Points (WAPs)
   4. Data Switches

B. Owner's Responsibilities: Owner will furnish products indicated and perform the following, as applicable:

   1. Provide to Contractor Owner-reviewed Product Data, Shop Drawings, and Samples.
   2. Provide for delivery of Owner-furnished products to Project site.
   3. Upon delivery, inspect, with Contractor present, delivered items.
      a. If Owner-furnished products are damaged, defective, or missing, arrange for replacement.
   4. Obtain manufacturer's inspections, service, and warranties.
   5. Inform Contractor of earliest available delivery date for Owner-furnished products.

C. Contractor's Responsibilities: The Work includes the following, as applicable:

   1. Designate delivery dates of Owner-furnished products in Contractor's construction schedule, utilizing Owner-furnished earliest available delivery dates.

2. Review Owner-reviewed Product Data, Shop Drawings, and Samples, noting discrepancies and other issues in providing for Owner-furnished products in the Work.
3. Receive, unload, handle, store, protect, and install Owner-furnished products.
4. Make building services connections for Owner-furnished products.
5. Protect Owner-furnished products from damage during storage, handling, and installation and prior to Substantial Completion.
6. Repair or replace Owner-furnished products damaged following receipt.

1.6 CONTRACTOR'S USE OF SITE AND PREMISES

A. Unrestricted Use of Site: Contractor shall have full use of Project site for construction operations during construction period. Contractor's use of Project site is limited only by Owner's right to perform work or to retain other contractors on portions of Project.

1.7 WORK RESTRICTIONS

A. Comply with restrictions on construction operations.

1. Comply with limitations on use of public streets, work on public streets, rights of way, and other requirements of authorities having jurisdiction.

B. Smoking and Controlled Substance Restrictions: Use of tobacco products , alcoholic beverages, and other controlled substances within the Project site on Owner's property is not permitted.

1.8 SPECIFICATION AND DRAWING CONVENTIONS

A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
2. Text Color: Text used in the Specifications, including units of measure, manufacturer and product names, and other text may appear in multiple colors or underlined as part of a hyperlink; no emphasis is implied by text with these characteristics.
3. Hypertext: Text used in the Specifications may contain hyperlinks. Hyperlinks may allow for access to linked information that is not residing in the Specifications. Unless otherwise indicated, linked information is not part of the Contract Documents.
4. Specification requirements are to be performed by Contractor unless specifically stated otherwise.

B. Division 00 Contracting Requirements: General provisions of the Contract, including General and Supplementary Conditions, apply to all Sections of the Specifications.

C. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 011000

SECTION 071326 - SELF-ADHERING SHEET WATERPROOFING

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. Modified bituminous sheet waterproofing.
2. Insulation drainage panels.
3. Accessory materials required for a complete, waterproof installation.

B. Related Requirements:

1. Section 03 30 00 "Cast-in-Place Concrete."
2. Section 07 21 00 “Thermal Insulation” for foundation wall insulation.
3. Section 07 62 00 "Sheet Metal Flashing and Trim."
4. Section 07 92 00 Joint Sealants."

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review waterproofing requirements including surface preparation, substrate condition and pretreatment, minimum curing period, forecasted weather conditions, special details and sheet flashings, installation procedures, testing and inspection procedures, and protection and repairs.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, and tested physical and performance properties of waterproofing.
2. Include manufacturer's written instructions for evaluating, preparing, and treating substrate.

B. Shop Drawings: Show locations and extent of waterproofing and details of substrate joints and cracks, expansion joints, sheet flashings, penetrations, inside and outside corners, tie-ins with adjoining waterproofing, and other termination conditions.

C. Samples: For each exposed product and for each color and texture specified, including the following products:

1. 8-by-8-inch (200-by-200-mm) square of waterproofing and flashing sheet.
2. 4-by-4-inch (100-by-100-mm) square of insulation drainage panel.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Field quality-control reports.

C. Sample Warranties: For special warranties.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Waterproofing systems shall be manufactured by a company with a minimum of 10 years' experience in the production of self-adhering sheet membrane waterproofing.

B. Installer Qualifications: An entity that has at least 5 years' experience in work of the type required by this section and that employs installers and supervisors who are trained and approved by waterproofing manufacturer.

1.7 DELIVERY, STORAGE AND HANDLING

A. Delivery: Deliver materials and products in labeled packages.

B. Storage:

1. Store and handle in strict compliance with manufacturer's instructions, recommendations, and material safety data sheets.
2. Protect from damage from sunlight, weather, excessive temperatures and construction operations.
3. Do not double-stack pallets of membrane on the job site. Provide cover on top and all sides, allowing for adequate ventilation.
4. Protect primer, mastic and adhesive from moisture and potential sources of ignition.

C. Remove damaged material from the site and dispose of in accordance with applicable regulations.

D. Sequence deliveries to avoid delays but minimize on-site storage.

1.8 PROJECT CONDITIONS

A. Environmental Limitations: Apply waterproofing within the range of ambient and substrate temperatures recommended in writing by waterproofing manufacturer. Do not apply waterproofing to a damp or wet substrate.

B. Proceed with installation only when substrate construction and preparation work is complete and in condition to receive sheet membrane waterproofing.

C. Verify that concrete and masonry have cured a minimum of 7 days, or period recommended by the waterproofing membrane manufacturer.

D. Perform moisture tests as necessary to ensure that the concrete moisture content is at an acceptable level per the manufacturer's written instructions to allow installation of the product of this section.

1. The start of installation shall be an indication that the concrete moisture content is at the level required by the manufacturer.

1.9 WARRANTY

A. Manufacturer's Warranty: Manufacturer agrees to furnish replacement waterproofing material for waterproofing that does not comply with requirements or that fails to remain watertight within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

PART 2 – PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Provide a complete waterproofing system designed to prevent the penetration and/or lateral migration of water into concrete walls and through concrete slabs on grade.

2.2 MANUFACTURERS

A. Source Limitations for Waterproofing System: Obtain waterproofing materials from single source from single manufacturer.

2.3 MODIFIED BITUMINOUS SHEET WATERPROOFING

A. Modified Bituminous Sheet: Minimum 60-mil (1.5-mm) nominal thickness, self-adhering sheet consisting of 56 mils (1.4 mm) of rubberized asphalt laminated on one side to a 4-mil- (0.10-mm-) thick, polyethylene-film reinforcement, and with release liner on adhesive side; formulated for application with primer or surface conditioner that complies with VOC limits of authorities having jurisdiction.

1. Provide membrane suitable for application at 25 degrees F.
2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Carlisle Coatings & Waterproofing Inc.; CCW MiraDRI 861.
b. CETCO, a Minerals Technologies company; Envirosheet LT.
c. GCP Applied Technologies Inc. (formerly Grace Construction Products); Bituthene 3000/Low Temperature Membrane.
d. Henry Company; Blueskin WP200.
e. Pecora Corporation; Duramem 700-SM.
f. W. R. Meadows, Inc.; Mel-Rol.

3. Physical Properties:

   a. Tensile Strength, Membrane: 250 psi (1.7 MPa) minimum; ASTM D 412, Die C, modified.
   b. Ultimate Elongation: 300 percent minimum; ASTM D 412, Die C, modified.
   c. Low-Temperature Flexibility: Pass at minus 20 deg F (minus 29 deg C); ASTM D 1970/D 1970M.
   d. Crack Cycling: Unaffected after 100 cycles of 1/8-inch (3-mm) movement; ASTM C 836/C 836M.
   e. Puncture Resistance: 40 lbf (180 N) minimum; ASTM E 154/E 154M.
   f. Water Absorption: 0.2 percent weight-gain maximum after 48-hour immersion at 70 deg F (21 deg C); ASTM D 570.
   g. Water Vapor Permeance: 0.05 perm (2.9 ng/Pa x s x sq. m) maximum; ASTM E 96/E 96M, Water Method.

4. Sheet Strips: Self-adhering, rubberized-asphalt strips of same material and thickness as sheet waterproofing.

B. Mastic, Adhesives, and Detail Tape: Liquid mastic and adhesives, and adhesive tapes recommended by waterproofing manufacturer.

2.4 INSULATION DRAINAGE PANELS

A. Provide one of the following drainage panel systems.

B. Geotextile-Faced Wall Insulation Drainage Panels: Extruded-polystyrene board insulation according to ASTM C578, Type VI, 40-psi (276-kPa) minimum compressive strength; fabricated with tongue-and-groove edges and with one side having grooved drainage channels faced with nonwoven-geotextile filter fabric.

1. Products: Subject to compliance with requirements, provide one of the following:

   a. T. Clear Corporation, a subsidiary of Fin Pan Inc; Thermadry 1250.
   b. Owens Corning, Foamular Insul-Drain.

2. Widths: 24” minimum.
3. Thickness: 1 ½” minimum, or as indicated on the Drawings.
4. Physical Properties:

   a. R-Value: 4.4/inch, 40° F – sf/Btu (ASTM C518).

5. Locations: Install over waterproofing membrane against foundation walls.

C. Geotextile-Faced Wall Drainage Panels: Heavy duty high density polyethylene geonet drainage core with ridges fused to a layer of non-woven filter fabric.

1. Products: Subject to compliance with requirements, provide the following or approved equal:

   a. J-Drain 300: JDR Enterprises, Inc.

2. Widths: 48” minimum.

3. Thickness: 1/4” minimum, or as indicated on the Drawings.
4. Physical Properties:

    a. Compressive strength; 40,000 psf

5. Locations: Install over waterproofing membrane against foundation walls.

2.5 AUXILIARY MATERIALS

A. Furnish auxiliary materials recommended by waterproofing manufacturer for intended use and compatible with sheet waterproofing.

    1. Furnish liquid-type auxiliary materials that comply with VOC limits of authorities having jurisdiction.

B. Primer: Liquid primer recommended for substrate by sheet-waterproofing material manufacturer.

C. Surface Conditioner: Liquid, waterborne surface conditioner recommended for substrate by sheet-waterproofing material manufacturer.

D. Liquid Membrane: Elastomeric, two-component liquid, cold fluid applied, of trowel grade or low viscosity.

E. Substrate Patching Membrane: Low-viscosity, two-component, modified asphalt coating.

F. Metal Termination Bars: Aluminum bars, approximately 1 by 1/8 inch (25 by 3 mm), predrilled at 9-inch (229-mm) centers.

G. Counter Flashing: As specified under Section 07 62 00 “Sheet Metal Flashing and Trim”.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of waterproofing.

    1. Verify that concrete has cured and aged for minimum time period recommended in writing by waterproofing manufacturer.
    2. Verify that substrate is visibly dry and within the moisture limits recommended in writing by manufacturer. Test for capillary moisture by plastic sheet method according to ASTM D 4263.

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

3.2 PREPARATION OF SUBSTRATES

A. Protect adjacent surfaces not designated to receive waterproofing.

B. Refer to manufacturer's literature for requirements for preparation of substrates. Surfaces shall be structurally sound and free of voids, spalled areas, loose aggregate and sharp protrusions. Remove contaminants such as grease, oil, and wax from exposed surfaces. Remove dust, dirt, loose stone and debris. Use repair materials and methods, which are acceptable to manufacturer of sheet membrane waterproofing.

C. Cast-In-Place Substrates:

1. Do not proceed with installation until concrete has properly cured and dried, minimum 7 days for normal structural concrete and minimum 14 days for lightweight structural concrete.
2. Fill form tie rod holes with concrete and finish flush with surrounding surface.
3. Repair bugholes over 1/2" in length and 1/4" deep and finish flush with surrounding surface.
4. Remove scaling to sound, unaffected concrete and repair exposed area.
5. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings from concrete.
6. Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets, holes, and other voids.

    a. Grind irregular construction joints to suitable flush surface.

7. Prepare, fill, prime, and treat joints and cracks in substrates. Remove dust and dirt from joints and cracks according to ASTM D 4258.

    a. Install sheet strips of width according to manufacturer's written instructions and center over treated construction and contraction joints and cracks exceeding a width of 1/16 inch (1.6 mm).

8. Corners: Prepare, prime, and treat inside and outside corners according to ASTM D 6135.

    a. Install membrane strips centered over vertical inside corners. Install 3/4-inch (19-mm) fillets of liquid membrane on horizontal inside corners and as follows:

        1) At footing-to-wall intersections, extend liquid membrane in each direction from corner or install membrane strip centered over corner.

9. Prepare, treat, and seal vertical and horizontal surfaces at terminations and penetrations through waterproofing and at drains and protrusions according to ASTM D 6135.

D. Related Materials: Treat joints and install flashings as recommended by waterproofing manufacturer.

3.3 MODIFIED BITUMINOUS SHEET-WATERPROOFING APPLICATION

A. Refer to manufacturer's literature for recommendations on installation, including but not limited to, the following:

1. Apply primer at the rate recommended by manufacturer.
2. Recoat areas not waterproofed if contaminated by dust or water. Recoat areas not waterproofed the same day primer is applied.

3. Mask and protect adjoining exposed finish surfaces to protect those surfaces from excessive application of primer.
4. Delay application of membrane until primer is completely dry. Dry time will vary with weather conditions.
5. Seal daily terminations with troweled bead of mastic.
6. Apply insulation drainage board and related materials in accordance with manufacturer's recommendations.

B. Remove release paper layer. Roll out on substrate with a mechanical roller to encourage full contact bond.

C. At footings; install a 3/4" cove of liquid mastic at intersection of wall and footing and extend mastic 6" in each direction from corner. Extend waterproofing membrane over cove and footing and lap a minimum of 3" down toe of footing. Seal permanently waterproof.

D. At inside and outside corners: Install a 12" wide strip of membrane centered on the corner. Press membrane tightly into the corner to assure full contact. Extend full coverage of waterproofing membrane over the treated corner.

E. Overlap edges and ends a minimum of 2-1/2" and seal water tight with a roller.

F. Terminate membrane as shown on the drawings, and per the manufacturers' instruction to suit the project conditions.

G. Install counterflashing in reglet or joint and apply continuous sealant bead.

H. Inspect membrane thoroughly before covering with insulation drainage board and patch any tears or slits with membrane and mastic.

3.4 INSULATION PANEL INSTALLATION

A. Insulation: Refer to Section 07 21 00 "Thermal Insulation" for insulation without drainage channel installation.

3.5 INSULATION DRAINAGE-PANEL INSTALLATION

A. Install insulation drainage panels over waterproofed surfaces. Cut and fit to within 3/4 inch (19 mm) of projections and penetrations.

B. Ensure that drainage channels are aligned and free of obstructions.

C. On vertical surfaces, set insulation drainage panels in adhesive or tape applied according to manufacturer's written instructions.

D. On horizontal surfaces, loosely lay insulation drainage panels according to manufacturer's written instructions. Stagger end joints and tightly abut insulation units.

3.6 FIELD QUALITY CONTROL

A. Manufacturer Inspection: Provide field inspection services by manufacturer's trained and authorized representative during installation.

1. Notify manufacturer's representative at least two weeks before start of work.
2. Schedule minimum of 3 field inspections by manufacturer's representative, with first scheduled before application of product.
3. Manufacturer’s representative shall provide a written report of each inspection, including:

    a. Date of inspection.
    b. Description of weather and surface conditions.
    c. Description of work location and extent of work being performed.
    d. Description of tie-in conditions with previous work or abutting materials.
    e. Observations on work in progress and instructions made to contractor.
    f. Notification of work not meeting specification requirements or conformance with manufacturer’s installation requirements.
    g. Description of corrective actions made by contractor.

3.7 PROTECTION, REPAIR, AND CLEANING

A. Do not permit foot or vehicular traffic on unprotected membrane.

B. Protect membrane from damage by adhering board insulation over membrane surface. Install board insulation the same day the membrane is applied. Scribe and cut boards around projections and interruptions.

C. Protect waterproofing from damage and wear during remainder of construction period.

D. Use care during backfill operation to avoid damage to waterproofing.

A. Protect installed insulation drainage panels from damage due to UV light, harmful weather exposures, physical abuse, and other causes. Provide temporary coverings where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

E. Correct deficiencies in or remove waterproofing that does not comply with requirements; repair substrates, reapply waterproofing, and repair sheet flashings.

F. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended in writing by manufacturer of affected construction.

END OF SECTION 07 13 26

SECTION 072726 - FLUID-APPLIED MEMBRANE AIR BARRIERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Vapor-permeable, fluid-applied air barriers.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site .

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For air-barrier assemblies.

1. Include details for substrate joints and cracks, counterflashing strips, penetrations, inside and outside corners, terminations, and tie-ins with adjoining construction.

1.4 INFORMATIONAL SUBMITTALS

A. Product certificates.

B. Product test reports.

C. Field quality-control reports.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

B. Mockups: Build mockups to set quality standards for materials and execution.

1. Build integrated mockups of exterior wall assembly , 150 sq. ft. , incorporating backup wall construction, external cladding, window, storefront, door frame and sill, insulation, ties and other penetrations, and flashing to demonstrate surface preparation, crack and joint treatment, application of air barriers, and sealing of gaps, terminations, and penetrations of air-barrier assembly.
   a. Coordinate construction of mockups to permit inspection and testing of air barrier before external insulation and cladding are installed.
   b. Include junction with roofing membrane , building corner condition, and foundation wall intersection.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Air-Barrier Performance: Air-barrier assembly and seals with adjacent construction shall be capable of performing as a continuous air barrier and as a liquid-water drainage plane flashed to discharge to the exterior incidental condensation or water penetration. Air-barrier assemblies shall be capable of accommodating substrate movement and of sealing substrate expansion and control joints, construction material changes, penetrations, and transitions at perimeter conditions without deterioration and air leakage exceeding specified limits.

B. Air-Barrier Assembly Air Leakage: Maximum 0.04 cfm/sq. ft. of surface area at 1.57 lbf/sq. ft. , when tested according to ASTM E 2357.

2.2 LOW-BUILD AIR BARRIERS, VAPOR PERMEABLE

A. Low-Build, Vapor-Permeable Air Barrier: Synthetic polymer material with an installed dry film thickness, according to manufacturer's written instructions, of 15 mils over smooth, void-free substrates.

1. Basis-of-Design Product: Subject to compliance with requirements, provide PROSOCO, Inc; R- Guard Spray Wrap MVP or comparable product by one of the following:
   a. Sto Corp.
   b. The Dow Chemical Company.

c. W.R. Meadows, Inc.
d. PROSOCO, Inc.
e. Carlisle Coating & Waterproofing- Barritech VP

2. Physical and Performance Properties:
   a. Air Permeance: Maximum 0.004 cfm/sq. ft. of surface area at 1.57-lbf/sq. ft. pressure difference; ASTM E 2178.
   b. Vapor Permeance: Minimum 25 perms ; ASTM E 96/E 96M, Desiccant Method, Procedure A.
   c. Ultimate Elongation: Minimum 250 percent; ASTM D 412, Die C.
   d. Adhesion to Substrate: Minimum 16 lbf/sq. in. when tested according to ASTM D 4541.
   e. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.
   f. UV Resistance: Can be exposed to sunlight for 180 days according to manufacturer's written instructions.
   g. Total Solids: 63 to 68- percent by volume according to ASTM D2369
   h. ICC-ES AC 212 acceptance criteria for Water-Resistive Coating used as Water-Resistive Barriers over existing sheathing.
   i. ABAA: Air Barrier Association of America acceptance criteria for Liquid Applied Membranes.
   j. Comply with national, state and local jurisdictions AIM VOC regulations and maintain less than 30 grams per liter.

2.3 WATER- BASED PRIMER FOR RAW GYPSUM BOARD EDGES

A. Primer to seal the cut edges of gypsum wall boards where they are exposed in rough openings for windows and doors. The sealed edge makes a compatible surface for easy application of liquid applied fiber reinforced coat and seam treatment for through-wall components.

1. Basis-of-Design Products: Subject to compliance with requirements, provide PROSOCO, Inc; R- Guard PorousPrep or comparable product approved by the Architect.
2. Physical and Performance Properties:
   a. Breathable liquid primer
   b. Total Solids: 16-precent by volume according to ASTM D2369
   c. Comply with national, state and local jurisdictions AIM VOC regulations an maintain less than 100 grams per liter.

2.4 LIQUID-APPLIED FLASHING AND DETAILING MEMBRANE

A. Gun- grade, spread, and tool or roller apply waterproofing, adhesive and detailing compound that combines the best of silicone and polyurethane properties. The single component, Silyl-Terminated-Polymer (STP) produces a highly durable, seamless, elastomeric should treat joints, seams, cracks and provide the flashing membrane in rough openings of structural walls and to counter-flash waterproofing and air barrier components.

1. Basis-of-Design Products: Subject to compliance with requirements, provide PROSOCO, Inc; R- Guard FastFlash or comparable product approved by the Architect.
2. Physical and Performance Properties:
   a. Tensile Strength: 150 psi when tested in accordance with ASTM D412
   b. Ultimate Elongation: Minimum 350 percent; ASTM D412, Die C
   c. Vapor Permeance: Minimum 21 perms; ASTM E96/E96M, Desiccant Method, Procedure A.
   d. Total Solids: 99-percent by volume according to ASTM D2369
   e. ICC-ES AC 212 acceptance criteria for Water-Resistive Coatings used as Water-Resistive Barriers over exterior sheathing.
   f. ABAA: Air Barrier Association of America acceptance criteria for Liquid Applied Membranes
   g. Comply with national, state, and local jurisdictions AIM VOC regulations and maintain less than 30 grams per liter.

2.5 LIQUID-APPLIED FILL COAT AND SEAM FILLER

A. High modulus, gun-grade, crack and joint filler, adhesive, and detailing compound that combines the best silicone and polyurethane properties. The singe- component, Silyl-Terminated-Polymer (STP) prepares open joints, seams and cracks before installing primary water and air barrier system to prevent the movement of water and air through building envelopes.

1. Basis-of-Design Products: Subject to compliance with requirements, provided PROSOCO, Inc; R- Guard Joints and Seam Filler or a comparable product approved by the Architect.
2. Physical and Performance Properties:
   a. Tensile Strength: 70 psi when tested in accordance with ASTM D412
   b. Ultimate Elongation: Minimum 180 percent; ASTM D412, Die C.
   c. Peel Strength: Minimum 25 pli when tested in accordance with ASTM D1718.
   d. Total Solids: 99-percent by volume according to ASTM D2369.
   e. Comply with national, state and local jurisdictions AIM VOC regulations and maintain less than 30 grams per liter.

2.6 INTERIOR SEALANT FOR WINDOWS AND DOORS

A. High performance, gun-grade waterproofing sealant that combines the best of silicone and polyurethane properties. Single component, Silyl-Terminated-Polymer (STP) is durable and stops the movement of moist air through cracks surrounding windows and doors.

1. Basis-of-Design Product: Subject to compliance with requirements, provide PROSOCO, Inc; R-Guard AirDam or comparable product approved by Architect.
2. Physical and Performance Properties:
   a. Ultimate Elongation: Minimum 1000 percent; ASTM D412, Die C
   b. Peel Strength: Minimum 25 pli when tested in accordance with ASTM D1781
   c. Total Solids: 98-percent by volume according to ASTM D2369.
   d. ICC-ES AC 212 acceptance criteria for Water-Resistive Coatings used for Water-Resistive Barriers over exterior sheathing.

e. Sealant Validation from Sealant Waterproofing and Restoration Institute (SWRI)
f. Comply with national, state, local and jurisdictions AIM VOC regulations and maintain less than 30 grams per liter.

3. Backer Rod: In deep joints, control sealant depth by installing closed cell backer rod. Diameter of the soft backer rod should be 25-percent greater than the joint width. Do not puncture backer rod.

2.7 PREFORMAED SILICONE SEALANT EXTRUSION

A. Manufacturer's standard system consisting of pre-cured low modulus elastomeric extrusion that provides a continuous transition and bridges windows, door frames, storefront, expansion joints, and roof to air barrier materials. Provide continuous Performed Silicone Sealant Extrusion System that is flexible, durable, designed for high dynamic and thermal movement which is resistant to ultraviolet exposure and weathering.

1. Basis-of-Design Product: Subject to compliance with requirements, provide PROSOCO, in; R-Guard SureSpan EX or comparable product approved by the Architect.
2. Physical and Performance Prosperities
   a. Tensile Strength 700 psi when tested in accordance with ASTM D412
   b. Ultimate Elongation: Minimum 400 percent; ASTM D412, Die C
   c. Joint Movement Capacity: Minimum 200 percent elongation and minimum 75 percent compression per ASTM C1518 and ASTM C1523.
   d. Tear Strength: Minimum 200 lb./in. when tested in accordance with ASTM D624
   e. Tear Propagation: Pass testing requirements of ASTM C1518 (ASTM C1523). Movement class shall exceed 200 percent Elongation and Tear Class of PT (Knotty Tear).
   f. Shore Hardness A; 50 to 65 when tested in accordance with ASTM E2240.
   g. UV Resistance: No degradation of material when exposed to UV.

2.8 ACCESSORY MATERIALS

A. Requirement: Provide primers, transition strips, termination strips, joint reinforcing fabric and strips, joint sealants, counterflashing strips, flashing sheets and metal termination bars, termination mastic, substrate patching materials, adhesives, tapes, foam sealants, lap sealants, and other accessory materials that are recommended in writing by air-barrier manufacturer to produce a complete air-barrier assembly and that are compatible with primary air-barrier material and adjacent construction to which they may seal.

PART 3 - EXECUTION

3.1 SURFACE PREPARATION

A. Clean, prepare, treat, fill, and seal substrate and joints and cracks in substrate according to manufacturer's written instructions and details. Provide clean, dust-free, and dry substrate for air-barrier application.

B. Mask off adjoining surfaces not covered by air barrier to prevent spillage and overspray affecting other construction.

C. Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets, holes, and other voids in concrete with substrate-patching material.

D. Remove excess mortar from masonry ties, shelf angles, and other obstructions.

E. At changes in substrate plane, apply sealant or termination mastic beads at sharp corners and edges to form a smooth transition from one plane to another.

F. Bridge isolation joints expansion joints and discontinuous wall-to-wall, deck-to-wall, and deck-to-deck joints with air-barrier accessory material that accommodates joint movement according to manufacturer's written instructions and details.

3.2 INSTALLATION

A. Install materials according to air-barrier manufacturer's written instructions and details to form a seal with adjacent construction and ensure continuity of air and water barrier.

1. Coordinate the installation of air barrier with installation of roofing membrane and base flashing to ensure continuity of air barrier with roofing membrane.
2. Install transition strip on roofing membrane or base flashing so that a minimum of 3 inches of coverage is achieved over each substrate.
3. Unless manufacturer recommends in writing against priming, apply primer to substrates at required rate and allow it to dry.
4. Apply primer to substrates at required rate and allow it to dry. Limit priming to areas that will be covered by air-barrier material on same day. Reprime areas exposed for more than 24 hours.

B. Connect and seal exterior wall air-barrier material continuously to roofing-membrane air barrier, concrete below-grade structures, floor-to-floor construction, exterior glazing and window systems,

glazed curtain-wall systems, storefront systems, exterior louvers, exterior door framing, and other construction used in exterior wall openings, using accessory materials.

C. Wall Openings: Prime concealed, perimeter frame surfaces of windows, curtain walls, storefronts, and doors. Apply transition strip so that a minimum of 3 inches of coverage is achieved over each substrate. Maintain 3 inches of full contact over firm bearing to perimeter frames, with not less than 1 inch of full contact.

D. Repair punctures, voids, and deficient lapped seams in strips and transition strips. Slit and flatten fishmouths and blisters. Patch with transition strips extending 6 inches beyond repaired areas in strip direction.

E. Low-Build Air Barriers: Apply continuous unbroken air-barrier material to substrates according to the following thickness. Apply an increased thickness of air-barrier material in full contact around protrusions such as masonry ties.

1. Vapor-Permeable, Low-Build Air Barrier: Total dry film thickness as recommended in writing by manufacturer to comply with performance requirements , applied in one or more equal coats. Apply additional material as needed to achieve void- and pinhole-free surface, but do not exceed thickness on which required vapor permeability is based.

F. Do not cover air barrier until it has been tested and inspected by testing agency.

G. Correct deficiencies in or remove air barrier that does not comply with requirements; repair substrates and reapply air-barrier components.

3.3 FIELD QUALITY CONTROL

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

B. Tests: As determined by testing agency from among the following tests:

1. Air-barrier dry film thickness.
2. Air-Leakage-Location Testing: Air-barrier assemblies will be tested for evidence of air leakage according to ASTM E 1186, chamber pressurization or depressurization with smoke tracers .
3. Air-Leakage-Volume Testing: Air-barrier assemblies will be tested for air-leakage rate according to ASTM E 783 or ASTM E 2357.
4. Adhesion Testing: Air-barrier assemblies will be tested for required adhesion to substrate according to ASTM D 4541 for each 600 sq. ft. of installed air barrier or part thereof.

C. Air barriers will be considered defective if they do not pass tests and inspections.

1. Apply additional air-barrier material, according to manufacturer's written instructions, where inspection results indicate insufficient thickness.
2. Remove and replace deficient air-barrier components for retesting as specified above.

D. Repair damage to air barriers caused by testing; follow manufacturer's written instructions.

E. Prepare test and inspection reports.

3.4 CLEANING AND PROTECTION

A. Protect air-barrier system from damage during application and remainder of construction period, according to manufacturer's written instructions.

B. Remove masking materials after installation.

END OF SECTION 072726

SECTION 075423 - THERMOPLASTIC-POLYOLEFIN (TPO) ROOFING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Adhered thermoplastic polyolefin (TPO) roofing system.
2. Roof insulation.
3. Cover board.
4. Walkways.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site .

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. For insulation and roof system component fasteners, include copy of FM Approvals' RoofNav listing.

B. Shop Drawings: Include roof plans, sections, details, and attachments to other work, including the following:

1. Layout and thickness of insulation.
2. Base flashings and membrane termination details.
3. Flashing details at penetrations.
4. Tapered insulation layout, thickness, and slopes.
5. Tie-in with adjoining air barrier.

C. Samples: For the following products:

1. Roof membrane and flashings, of color required.
2. Walkway pads or rolls, of color required.

D. Wind Uplift Resistance Submittal: For roofing system, indicating compliance with wind uplift performance requirements.

1.4 INFORMATIONAL SUBMITTALS

A. Manufacturer Certificates:

1. Performance Requirement Certificate: Signed by roof membrane manufacturer, certifying that roofing system complies with requirements specified in "Performance Requirements" Article.
   a. Submit evidence of compliance with performance requirements.
2. Special Warranty Certificate: Signed by roof membrane manufacturer, certifying that all materials supplied under this Section are acceptable for special warranty.

B. Product Test Reports: For roof membrane and insulation, for tests performed by a qualified testing agency, indicating compliance with specified requirements.

C. Research reports.

D. Field Test Reports:

1. Concrete internal relative humidity test reports.
2. Fastener-pullout test results and manufacturer's revised requirements for fastener patterns.

E. Field quality-control reports.

F. Sample warranties.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance data.

B. Certified statement from existing roof membrane manufacturer stating that existing roof warranty has not been affected by Work performed under this Section.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver roofing materials in original container with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture , and directions for storage.

B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer.

1.8 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when current and forecasted weather conditions permit roofing system to be installed in accordance with manufacturer's written instructions and guarantee requirements.

1.9 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within specified warranty period.

1. Warranty Period: minimum 20 years from date of Substantial Completion along with a minimum 55 MPH Wind Speed Warranty.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. General: Installed roofing membrane and base flashing systems shall remain watertight, to resist specified wind uplift pressures, thermally induced movement, and exposure to weather without failure.

B. Accelerated Weathering: Roof membrane shall withstand 2000 hours of exposure when tested according to ASTM G152, ASTM G154, or ASTM G155.

C. Impact Resistance: Roof membrane shall resist impact damage when tested according to ASTM D3746, ASTM D4272, or the "Resistance to Foot Traffic Test" in FM Approvals 4470.

D. SPRI's Directory of Roof Assemblies Listing: Roof membrane, base flashings, and component materials shall comply with requirements in FM Approvals 4450 or FM Approvals 4470 as part of

a roofing system, and shall be listed in SPRI's Directory of Roof Assemblies for roof assembly identical for that specified for this Project.

1. Wind Uplift Load Capacity: 120 psf .

E. ENERGY STAR Listing: Roofing system shall be listed on the DOE's ENERGY STAR "Roof Products Qualified Product List" for low -slope roof products.

F. Energy Performance: Roofing system shall have an initial solar reflectance of not less than 0.70 and an emissivity of not less than [0.75] when tested according to CRRC-1.

2.2 THERMOPLASTIC POLYOLEFIN (TPO) ROOFING

A. TPO Sheet: ASTM D6878/D6878M, internally fabric- or scrim-reinforced, fabric-backed TPO sheet.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Carlisle SynTec Incorporated.
   b. Firestone Building Products.
   c. GAF.
   d. GenFlex Roofing Systems.
   e. Johns Manville; a Berkshire Hathaway company.
   f. Mule-Hide Products Co., Inc.
   g. Versico Roofing Systems.
2. Thickness: 60 mils , nominal.
3. Exposed Face Color: Grey.

2.3 AUXILIARY ROOFING MATERIALS

A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with other roofing components.

1. Adhesive and Sealants: Comply with VOC limits of authorities having jurisdiction.

B. Sheet Flashing: Manufacturer's standard unreinforced TPO sheet flashing, 55 mils thick, minimum, of same color as TPO sheet.

C. Prefabricated Pipe Flashings: As recommended by roof membrane manufacturer.

D. Bonding Adhesive: Manufacturer's standard.

E. Slip Sheet: Manufacturer's standard, of thickness required for application.

F. Metal Termination Bars: Manufacturer's standard, predrilled stainless steel or aluminum bars, approximately 1 by 1/8 inch thick; with anchors.

G. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening roofing components to substrate, and acceptable to roofing system manufacturer.

H. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, lap sealants, termination reglets, and other accessories.

2.4 ROOF INSULATION

A. Polyisocyanurate Board Insulation: ASTM C1289, Type II, Class 1, Grade 2 , felt or glass-fiber mat facer on both major surfaces.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Atlas Roofing Corporation - Polyiso.
   b. Carlisle SynTec Incorporated.
   c. Firestone Building Products.
   d. GAF.
   e. Hunter Panels.
   f. Johns Manville; a Berkshire Hathaway company.
2. Size: 48 by 48 inches.
3. Thickness:
   a. Flat Stock Insulation Roof Assembly: As required to provide an assembly with a minimum R-30 Thermal Resistance Value or greater for entire roof assembly.
   b. Tapered Insulation Roof Assembly: As required to provide an assembly with an average R-30 Thermal Resistance Value or greater for entire roof assembly.

B. Tapered Insulation: Provide factory-tapered insulation boards.

1. Material: Match roof insulation.
2. Minimum Thickness: 1/4 inch.
3. Slope:
   a. Roof Field: 1/4 inch per foot unless otherwise indicated on Drawings.
   b. Saddles and Crickets: 1/2 inch per foot unless otherwise indicated on Drawings.

2.5 INSULATION ACCESSORIES

A. Fasteners: Factory-coated steel fasteners with metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening roof insulation and cover boards to substrate, and acceptable to roofing system manufacturer.

B. Insulation Adhesive: Insulation manufacturer's recommended adhesive formulated to attach roof insulation to substrate or to another insulation layer as follows:

1. Modified asphaltic, asbestos-free, cold-applied adhesive.
2. Bead-applied, low-rise, one-component or multicomponent urethane adhesive.
3. Full-spread, spray-applied, low-rise, two-component urethane adhesive.

C. Cover Board: ASTM C1177/C1177M, glass-mat, water-resistant gypsum board or ASTM C1278/C1278M fiber-reinforced gypsum board.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Georgia-Pacific Gypsum LLC.
   b. National Gypsum Company.
   c. USG Corporation.
2. Thickness: 5/8 inch.
3. Surface Finish: Factory primed .

D. Protection Mat: Woven or nonwoven polypropylene, polyolefin, or polyester fabric; water permeable and resistant to UV degradation; type and weight as recommended by roofing system manufacturer for application.

2.6 WALKWAYS

A. Flexible Walkways: Factory-formed, nonporous, heavy-duty, slip-resisting, surface-textured walkway pads or rolls, approximately 3/16 inch thick and acceptable to roofing system manufacturer.

1. Size: Approximately 36 by 60 inches.
2. Color: Contrasting with roof membrane.
3. Provide continuous path from roof access location to major equipment panels and as indicated on the drawings.
4. Provide per manufacturer written installation instructions.

PART 3 - EXECUTION

3.1 EXAMINATION

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

1. Verify that minimum concrete drying period recommended by roofing system manufacturer has passed.

2. Verify that concrete substrate is visibly dry and free of moisture, and that minimum concrete internal relative humidity is not more than 75 percent, or as recommended by roofing system manufacturer, when tested according to ASTM F2170.
   a. Test Frequency: One test probe per each 1000 sq. ft. , or portion thereof, of roof deck, with not less than three tests probes.
   b. Submit test reports within 24 hours after performing tests.
3. Verify that concrete-curing compounds that will impair adhesion of roofing components to roof deck have been removed.
4. Verify that joints in precast concrete roof decks have been grouted flush with top of concrete.

3.2 PREPARATION

A. Perform fastener-pullout tests according to roof system manufacturer's written instructions.

1. Submit test result within 24 hours after performing tests.
   a. Include manufacturer's requirements for any revision to previously submitted fastener patterns required to achieve specified wind uplift requirements.

3.3 INSTALLATION OF ROOFING, GENERAL

A. Install roofing system according to roofing system manufacturer's written instructions, SPRI's Directory of Roof Assemblies listed roof assembly requirements, and FM Global Property Loss Prevention Data Sheet 1-29.

B. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at end of workday or when rain is forecast. Remove and discard temporary seals before beginning Work on adjoining roofing.

C. Install roof membrane and auxiliary materials to tie in to existing roofing to maintain weathertightness of transition and to not void warranty for existing roofing system.

D. Coordinate installation and transition of roofing system component serving as an air barrier with air barrier specified under Section 072726 "Fluid-Applied Membrane Air Barriers."

3.4 INSTALLATION OF INSULATION

A. Coordinate installing roofing system components so insulation is not exposed to precipitation or left exposed at end of workday.

B. Comply with roofing system and roof insulation manufacturer's written instructions for installing roof insulation.

C. Installation Over Metal Decking:

1. Install base layer of insulation with joints staggered not less than 24 inches in adjacent rows .
   a. Locate end joints over crests of decking.
   b. Where installing composite and noncomposite insulation in two or more layers, install noncomposite board insulation for bottom layer and intermediate layers, if applicable, and install composite board insulation for top layer.
   c. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
   d. Make joints between adjacent insulation boards not more than 1/4 inch in width.
   e. At internal roof drains, slope insulation to create a square drain sump with each side equal to the diameter of the drain bowl plus 24 inches.
      1) Trim insulation so that water flow is unrestricted.
   f. Fill gaps exceeding 1/4 inch with insulation.
   g. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.
   h. Loosely lay base layer of insulation units over substrate.
   i. Mechanically attach base layer of insulation and substrate board using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to metal decks.
      1) Fasten insulation according to requirements in SPRI's Directory of Roof Assemblies for specified Wind Uplift Load Capacity.
      2) Fasten insulation to resist specified uplift pressure at corners, perimeter, and field of roof.
2. Install upper layers of insulation and tapered insulation with joints of each layer offset not less than 12 inches from previous layer of insulation.
   a. Staggered end joints within each layer not less than 24 inches in adjacent rows.
   b. Install with long joints continuous and with end joints staggered not less than 12 inches in adjacent rows.
   c. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
   d. Make joints between adjacent insulation boards not more than 1/4 inch in width.
   e. At internal roof drains, slope insulation to create a square drain sump with each side equal to the diameter of the drain bowl plus 24 inches.
      1) Trim insulation so that water flow is unrestricted.
   f. Fill gaps exceeding 1/4 inch with insulation.
   g. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.
   h. Loosely lay each layer of insulation units over substrate.
   i. Adhere each layer of insulation to substrate using adhesive according to SPRI's Directory of Roof Assemblies listed roof assembly requirements for specified Wind Uplift Load Capacity and FM Global Property Loss Prevention Data Sheet 1-29, as follows:
      1) Set each layer of insulation in a solid mopping of hot roofing asphalt, applied within plus or minus 25 deg F of equiviscous temperature.
      2) Set each layer of insulation in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place.
      3) Set each layer of insulation in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.

3.5 INSTALLATION OF COVER BOARDS

A. Install cover boards over insulation with long joints in continuous straight lines with end joints staggered between rows. Offset joints of insulation below a minimum of 6 inches in each direction.

1. Trim cover board neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
2. At internal roof drains, conform to slope of drain sump.
   a. Trim cover board so that water flow is unrestricted.
3. Cut and fit cover board tight to nailers, projections, and penetrations.
4. Loosely lay cover board over substrate.
5. Adhere cover board to substrate using adhesive according to FM Approvals' RoofNav listed roof assembly requirements for specified Windstorm Resistance Classification SPRI's Directory of Roof Assemblies listed roof assembly requirements for specified Wind Uplift Load Capacity and FM Global Property Loss Prevention Data Sheet 1-29, as follows:
   a. Set cover board in a solid mopping of hot roofing asphalt, applied within plus or minus 25 deg F of equiviscous temperature.
   b. Set cover board in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place.
   c. Set cover board in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.

B. Install slip sheet over cover board and beneath roof membrane.

3.6 INSTALLATION OF ADHERED ROOF MEMBRANE

A. Adhere roof membrane over area to receive roofing according to roofing system manufacturer's written instructions.

B. Unroll roof membrane and allow to relax before installing.

C. Start installation of roofing in presence of roofing system manufacturer's technical personnel and Owner's testing and inspection agency.

D. Accurately align roof membrane, and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.

E. Bonding Adhesive: Apply to substrate and underside of roof membrane at rate required by manufacturer, and allow to partially dry before installing roof membrane. Do not apply to splice area of roof membrane.

F. Hot Roofing Asphalt: Apply a solid mopping of hot roofing asphalt to substrate at temperature and rate required by manufacturer, and install fabric-backed roof membrane. Do not apply to splice area of roof membrane.

G. Fabric-Backed Roof Membrane Adhesive: Apply to substrate at rate required by manufacturer, and install fabric-backed roof membrane.

H. In addition to adhering, mechanically fasten roof membrane securely at terminations, penetrations, and perimeter of roofing.

I. Apply roof membrane with side laps shingled with slope of roof deck where possible.

J. Seams: Clean seam areas, overlap roof membrane, and hot-air weld side and end laps of roof membrane and sheet flashings, to ensure a watertight seam installation.

1. Test lap edges with probe to verify seam weld continuity. Apply lap sealant to seal cut edges of roof membrane and sheet flashings.
2. Verify field strength of seams a minimum of twice daily, and repair seam sample areas.
3. Repair tears, voids, and lapped seams in roof membrane that do not comply with requirements.

K. Spread sealant bed over deck-drain flange at roof drains, and securely seal roof membrane in place with clamping ring.

3.7 INSTALLATION OF BASE FLASHING

A. Install sheet flashings and preformed flashing accessories, and adhere to substrates according to roofing system manufacturer's written instructions.

B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate, and allow to partially dry. Do not apply to seam area of flashing.

C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.

D. Clean seam areas, overlap, and firmly roll sheet flashings into the adhesive. Hot-air weld side and end laps to ensure a watertight seam installation.

E. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

3.8 INSTALLATION OF WALKWAYS

A. Flexible Walkways:

1. Install flexible walkways at the following locations:
   a. Retain one or more subparagraphs below. Revise to suit Project.
   b. Perimeter of each rooftop unit.
   c. Between each rooftop unit location, creating a continuous path connecting rooftop unit locations.
   d. Between each roof hatch and each rooftop unit location or path connecting rooftop unit locations.
   e. Top and bottom of each roof access ladder.
   f. Between each roof access ladder and each rooftop unit location or path connecting rooftop unit locations.
   g. Locations indicated on Drawings.
   h. As required by roof membrane manufacturer's warranty requirements.
2. Provide 6-inch clearance between adjoining pads.
3. Heat weld to substrate or adhere walkway products to substrate with compatible adhesive according to roofing system manufacturer's written instructions.

B. Roof-Paver Walkways: Install walkway roof pavers according to manufacturer's written instructions.

1. Install roof paver walkways at the following locations:
   a. Perimeter of each rooftop unit.
   b. Between each rooftop unit location, creating a continuous path connecting rooftop unit locations.
   c. Between each roof hatch and each rooftop unit location or path connecting rooftop unit locations.
   d. Top and bottom of each roof access ladder.
   e. Between each roof access ladder and each rooftop unit location or path connecting rooftop unit locations.
   f. Locations indicated on Drawings.
   g. As required by roof membrane manufacturer's warranty requirements.
2. Provide 3 inches of space between adjacent roof pavers.

3.9 PROTECTING AND CLEANING

A. Protect roofing system from damage and wear during remainder of construction period. When remaining construction does not affect or endanger roofing system, inspect roofing system for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.

B. Correct deficiencies in or remove roofing system that does not comply with requirements, repair substrates, and repair or reinstall roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

SECTION 082550 – FIBERGLASS REINFORCED POLYESTER DOORS AND FRAMES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Fiberglass reinforced polyester (FRP) flush doors with FRP frame

1.2 RELATED SECTION

A. Section 087100 - Door Hardware.

1.3 REFERENCES

A. AAMA 1503-98 - Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections.

B. ANSI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors and Hardware Reinforcings.

C. ASTM B 117 - Operating Salt Spray (Fog) Apparatus.

D. ASTM B 209 - Aluminum and Aluminum-Alloy Sheet and Plate.

E. ASTM B 221 - Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.

F. ASTM D 256 - Determining the Pendulum Impact Resistance of Notched Specimens of Plastics.

G. ASTM D 543 - Evaluating the Resistance of Plastics to Chemical Reagents.

H. ASTM D 570 - Water Absorption of Plastics.

I. ASTM D 638 - Tensile Properties of Plastics.

J. ASTM D 790 - Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.

K. ASTM D 1308 - Effect of Household Chemicals on Clear and Pigmented Organic Finishes.

L. ASTM D 1621 - Compressive Properties of Rigid Cellular Plastics.

M. ASTM D 1623 - Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics.

N. ASTM D 2126 - Response of Rigid Cellular Plastics to Thermal and Humid Aging.

O. ASTM D 2583 - Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor.

P. ASTM E 84 - Surface Burning Characteristics of Building Materials.

Q. ASTM E 90 - Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions.

R. ASTM E 283 - Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.

S. ASTM E 330 - Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.

T. ASTM E 331 - Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.

U. ASTM F 476 - Security of Swinging Door Assemblies.

V. SFBC PA 201 - Impact Test Procedures.

W. SFBC PA 203 - Criteria for Testing Products Subject to Cyclic Wind Pressure Loading.

X. SFBC 3603.2 (b)(5) - Forced Entry Resistance Test.

1.4 PERFORMANCE REQUIREMENTS NON-RATED DOOR

A. General: Provide door assemblies that have been designed and fabricated to comply with specified performance requirements, as demonstrated by testing manufacturer's corresponding standard systems.

B. Air Infiltration: For a single door 3’-0” x 7’-0”, test specimen shall be tested in accordance with ASTM E 283 at pressure differential of 6.24 psf. Door shall not exceed 0.90 cfm per linear foot of perimeter crack.

C. Water Resistance: For a single door 3’-0” x 7’-0”, test specimen shall be tested in accordance with ASTM E 331 at pressure differential of 7.50 psf. Door shall not have water leakage.

D. Swinging Door Cycle Test, Doors and Frames, ANSI A250.4: Minimum of 20,000,000 cycles.

E. Swinging Security Door Assembly, Doors and Frames, ASTM F 476: Grade 40.

F. Salt Spray, Exterior Doors and Frames, ASTM B 117: Minimum of 500 hours.

G. Sound Transmission, Exterior Doors, STC, ASTM E 90: Minimum of 25.

H. Thermal Transmission, Exterior Doors, U-Value, AAMA 1503-98: Maximum of 0.29 BTU/hr x sf x degrees F. Minimum of 55 CRF value.

I. Surface Burning Characteristics, FRP Doors and Panels, ASTM E 84:
   1. Flame Spread: Maximum of 200, Class C.
   2. Smoke Developed: Maximum of 450, Class C.

J. Surface Burning Characteristics, Class A Option On Interior Faces of FRP Exterior Panels and Both Faces of FRP Interior Panels, ASTM E 84:
   1. Flame Spread: Maximum of 25.
   2. Smoke Developed: Maximum of 450.

K. Impact Strength, FRP Doors and Panels, Nominal Value, ASTM D 256: 15.0 foot-pounds per inch of notch.

L. Tensile Strength, FRP Doors and Panels, Nominal Value, ASTM D 638: 14,000 psi.

M. Flexural Strength, FRP Doors and Panels, Nominal Value, ASTM D 790: 21,000 psi.

N. Water Absorption, FRP Doors and Panels, Nominal Value, ASTM D 570: 0.20 percent after 24 hours.

O. Indentation Hardness, FRP Doors and Panels, Nominal Value, ASTM D 2583: 55.

P. Abrasion Resistance, Face Sheet, Taber Abrasion Test, 25 Cycles at 1,000 Gram Weight with CS-17 Wheel: Maximum of 0.029 average weight loss percentage.

Q. Stain Resistance, ASTM D 1308: Face sheet unaffected after exposure to red cabbage, tea, and tomato acid. Stain removed easily with mild abrasive or FRP cleaner when exposed to Sharpie ink pen and white spray paint.

R. Chemical Resistance, ASTM D 543. Excellent rating.
   1. Acetic acid, 5 percent solution.
   2. Chlorine bleach, 10 percent solution.
   3. Sodium hypochlorite, 4 to 6 percent solution.
   4. Citric acid, 10 percent solution.
   5. Sodium carbonate, 20 percent solution.
   6. Turpentine.

S. Compressive Strength, Foam Core, Nominal Value, ASTM D 1621: 84.2 psi.

T. Compressive Modulus, Foam Core, Nominal Value, ASTM D 1621: 448 psi.

U. Tensile Adhesion, Foam Core, Nominal Value, ASTM D 1623: 48 psi.

V. Thermal and Humid Aging, Nominal Value, 158 Degrees F and 100 Percent Humidity for 14 Days, ASTM D 2126: Minus 4.89 percent volume change.

1.5 SUBMITTALS

A. Comply with Section 013300 - Submittal Procedures.

B. Product Data: Submit manufacturer's product data, including description of materials, components, fabrication, finishes, and installation.

C. Shop Drawings: Submit manufacturer's shop drawings, including elevations, sections, and details, indicating dimensions, tolerances, materials, fabrication, doors, panels, framing, hardware schedule, and finish.

D. Samples:
   1. Door: Submit manufacturer's sample of door showing face sheets, core, framing, and finish.
   2. Color: Submit manufacturer's samples of standard colors of doors and frames.

E. Test Reports: Submit certified test reports from qualified independent testing agency indicating doors comply with specified performance requirements.

F. Manufacturer's Project References: Submit list of successfully completed projects including project name and location, name of architect, and type and quantity of doors manufactured.

G. Maintenance Manual: Submit manufacturer's maintenance and cleaning instructions for doors, including maintenance and operating instructions for hardware.

H. Warranty: Submit manufacturer's standard warranty.

1.6 QUALITY ASSURANCE

A. Manufacturer's Qualifications:
1. Continuously engaged in manufacturing of doors of similar type to that specified, with a minimum of 25 years successful experience.
2. Door and frame components from same manufacturer.
3. Evidence of a compliant documented quality management system.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying opening door mark and manufacturer.

B. Storage: Store materials in clean, dry area indoors in accordance with manufacturer's instructions.

C. Handling: Protect materials and finish from damage during handling and installation.

1.8 WARRANTY

A. Warrant doors, frames, and factory applied hardware against failure in materials and workmanship, including excessive deflection, faulty operation, defects in hardware installation, and deterioration of finish or construction in excess of normal weathering.
1. Warranty Period: Ten years starting on date of shipment.

B. Warrant door corner failure, face sheet delamination or bubbling, and core deterioration
1. Warranty Period: Lifetime

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Special-Lite, Inc., PO Box 6, Decatur, Michigan 49045. Toll Free (800) 821-6531. Phone (269) 423-7068. Fax (800) 423-7610. Web Site www.special-lite.com.

B. Approved Manufactures
1. Kawneer
2. Vistawall
3. FRP Architectural Doors Inc. (FD25 Series)

2.2 FRP FLUSH DOORS

A. Model: SL-17 Flush Doors with SpecLite3 fiberglass reinforced polyester (FRP) face sheets.

B. Door Opening Size: As indicated on the Drawings and Door Schedule.

C. Construction:
1. Door Thickness: 1-3/4 inches.
2. Stiles and Rails: Aluminum Alloy 6063-T5, minimum of 2-5/16-inch depth.
3. Corners: Mitered.
4. Provide joinery of 3/8-inch diameter full-width tie rods through extruded splines top and bottom as standard tubular shaped stiles and rails reinforced to accept hardware as specified.
5. Securing Internal Door Extrusions: 3/16-inch angle blocks and locking hex nuts for joinery. Welds, glue, or other methods are not acceptable.
6. Furnish extruded stiles and rails with integral reglets to accept face sheets. Lock face sheets into place to permit flush appearance.
7. Rail caps or other face sheet capture methods are not acceptable.
8. Extrude top and bottom rail legs for interlocking continuous weather bar.
9. Meeting Stiles: Pile brush weatherseals. Extrude meeting stile to include integral pocket to accept pile brush weatherseals.
10. Bottom of door to have adjustible door bottom SL-301.

D. Face Sheet:
1. Material: SpecLite3 FRP, 0.120-inch thickness, finish color throughout. Abuse-resistant engineered surface.
2. Texture: Pebble.
3. Color: As selected by Architect from manufacturer's standard 14 colors. Approved manufacturers bidding must have colors in range as specified product.

E. Core:
1. Material: Poured-in-place polyurethane foam.
2. Density: Minimum of 5 pounds per cubic foot.
3. R-Value: Minimum of 9.

F. Cutouts:
1. Manufacture doors with cutouts for required vision lites, louvers, and panels.
2. Factory install vision lites, louvers, and panels.

2.3 DOOR FRAMES

A. Exterior & interior Material: 1/4 inch thick solid pultruded FRP profiles having no corrosive components or reinforcement.
1. Width: 2 inch faces.
2. Depth: 5-3/4 inch standard
3. Style: One piece chemically welded at factory
4. Door Stop: 1/2 inch x 2-1/4 inch.
5. Corner Construction: Mitered with 4 inch x 4 inch x 3/8 inch pultruded FRP angle reinforcement with interlocking "L" shaped pultruded FRP brackets.
6. Reinforcing: 5/16 inch pultruded FPR chemically welded at all hinge, strike & closer locations.
7. Anchors: Furnished with 6 total wall anchors

8. Fasteners: Type 304 CRSS (18-8 series corrosion resistant stainless steel.
9. Finish: selected from manufacturers standard 14 colors.

2.4 FINISH OF DOORS

A. Face sheet colors to be selected from manufacturers standard 14 colors.

2.5 FABRICATION

A. Sizes and Profiles: Required sizes for door and frame units, and profile requirements shall be as indicated on the Drawings.

B. Coordination of Fabrication: Field measure before fabrication and show recorded measurements on shop drawings.

C. Assembly:
1. Complete cutting, fitting, forming, drilling, and grinding of metal before assembly.
2. Remove burrs from cut edges.

D. Welding: Welding of doors or frames is not acceptable.

E. Fit:
1. Maintain continuity of line and accurate relation of planes and angles.
2. Secure attachments and support at mechanical joints with hairline fit at contacting members.

2.6 HARDWARE

A. Premachine doors in accordance with templates from specified hardware manufacturers and hardware schedule.
1. Hardware per section 087100.

2.7 VISION LITES

A. Factory Glazing: 1 inch tempered glass for exterior doors.

B. Lites in Exterior Doors: Allow for thermal expansion.

C. Rectangular Lites:
1. Size: As indicated on the Drawings.
2. Factory glazed with screw-applied aluminum stops anodized to match perimeter door rails.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas to receive doors. Notify Architect of conditions that would adversely affect installation or subsequent use. Do not proceed with installation until unsatisfactory conditions are corrected.

3.2 PREPARATION

A. Ensure openings to receive frames are plumb, level, square, and in tolerance.

3.3 INSTALLATION

A. Install doors in accordance with manufacturer's instructions.

B. Install doors plumb, level, square, true to line, and without warp or rack.

C. Anchor frames securely in place.

D. Separate aluminum from other metal surfaces with bituminous coatings or other means approved by Architect.

E. Set thresholds in bed of mastic and backseal.

F. Install exterior doors to be weathertight in closed position.

G. Repair minor damages to finish in accordance with manufacturer's instructions and as approved by Architect.

H. Remove and replace damaged components that cannot be successfully repaired as determined by Architect.

3.4 FIELD QUALITY CONTROL

A. Manufacturer's Field Services: Manufacturer's representative shall provide technical assistance and guidance for installation of doors.

3.5 ADJUSTING

A. Adjust doors, hinges, and locksets for smooth operation without binding.

3.6 CLEANING

A. Clean doors promptly after installation in accordance with manufacturer's instructions.

B. Do not use harsh cleaning materials or methods that would damage finish.

3.7 PROTECTION

A. Protect installed doors to ensure that, except for normal weathering, doors will be without damage or deterioration at time of substantial completion.

END OF SECTION 082550

SECTION 085653 – SECUIRTY WINDOWS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Interior Bullet-Resistant Aluminum Transaction Windows

1.2 ACTION SUBMITTALS

A. Refer to Section 013300 Submittal Procedures

B. Product Data: For each type of window

C. Shop Drawings: Include plans, elevations, sections, details, anchorage to other work.

D. Samples: For each exposed finish.

1.3 INFORMATION SUBMITTALS

A. Product Test Reports: Indicating compliance with requirements

B. Warranty: Sample of finish warranty

1.4 CLOSEOUT SUBMITTALS

A. Refer to Section 017700 Closeout Submittals

B. Cleaning Instructions

1.5 DELIVERY, STORAGE AND HANDLING

A. Refer to Section 016000 Product Requirements

B. Protect windows in accordance with AAMA CW-10 "Care and Handling of Architectural Aluminum from Shop to Site" until Substantial Completion.

1.6 WARRANTY

A. Finish Warranty: Manufacturer’s warranty against deterioration of factory finishes for the period of 5 years from the date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURED UNIT

A. Basis of Design: Armortex Maximum Security Bullet Resistant Transaction Ticket Window by Covenant Security Equipment; Phone 800.880.8306; website www.covenantsecurityequipment.com

1. Subject to compliance with requirements, manufacturers of products of equivalent design may be acceptable if approved in accordance with Section 012500 Substitution Procedures.
2. Approved alternative manufacturers include:
   a. Chicago Bullet Proof Systems, Inc. (assembly components as defined in substitution request form)
   b. Quikserv Corp. Security Windows (assembly components as defined in criteria below)

B. Description

1. Factory fabricated window frame.
2. Deal Tray: Recessed stainless steel with bullet-trap
3. Dimensions: 36 inches by 48 inches

2.2 PERFORMANCE CRITERIA

A. Ballistic Resistant: Level 2 in accordance with UL 752 – Testing for Ballistic Resistance for the complete assembly including framing, glazing, deal tray and base.

2.3 FABRICATION

A. Miter or cope corners the full depth of framing; assemble and dress smooth.

1. Fabricate framing from manufacturer's standard extruded aluminum in thicknesses required for security windows to comply with indicated ballistic resistance requirement.

B. Tolerances: All joints and connections shall be tight, providing hairline joints and true alignment of adjacent members

C. Factory glaze security windows

1. Glazing Stops: Finish stops to match security window framing

2.4 ALUMINUM FINISH

A. Factory-applied finish:

1. Clear Anodic Finish: Architectural Class I, clear coating AA-M10C22A41 Mechanical Finish Chemical Finish: etched, medium matte; 0.70 mils minimum complying with AAMA 611 "Voluntary Specification for Anodized Architectural Aluminum"

2.5 GLAZING

A. Level 2: 1 inch Bullet-Resistant

2.6 ACCESSORIES

A. Fasteners: Manufacturer recommended security fasteners. Utilize fastener that require two types of tools to operate fasteners.

B. Sealants: As indicated in Section 079200 Joint Sealants.

C. Cast Stainless Steel Speaker: Model ANVS6

PART 3 - EXECUTION

3.1 PREPARATION

A. Verify field dimensions of opening prior to fabrication of transaction window.

B. Coordinate structural requirements to ensure proper attachment and support.

3.2 INSTALLATION

A. Install transaction windows in accordance with manufacturer's recommendations and approved shop drawings.

B. Where dissimilar metals will be in contact, protect against galvanic action by painting contact surfaces with primer or by apply sealant or tape recommended in writing by window manufacturer. When aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

C. Provide required support and securely fasten and set windows plumb, square, and level without twist or bow.

3.3 CLEANING

A. Clean security window surfaces after installation, avoiding damage to finishes. Remove excess glazing and sealant compound and dirt.

3.4 PROTECTION

A. Protect transaction windows damage during construction operations. If damage occurs, remove and replace as required to provide windows in their original, undamaged condition

SECTION 087100 - DOOR HARDWARE

PART 1 - GENERAL

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.

2. SUMMARY

a. This Section includes commercial door hardware for the following:

1) Swinging doors.
2) Other doors to the extent indicated.

b. Door hardware includes, but is not necessarily limited to, the following:

1) Mechanical door hardware.
2) Electromechanical door hardware.
3) Automatic operators.
4) Cylinders specified for doors in other sections.

c. Related Sections:

1) Division 08 Section “Hollow Metal Doors and Frames”.
2) Division 08 Section “Flush Wood Doors”.
3) Division 08 Section “Aluminum-Framed Entrances and Storefronts”.
4) Division 08 Section “Automatic Door Operators”.

d. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.

1) ANSI A117.1 - Accessible and Usable Buildings and Facilities.
2) ICC/IBC - International Building Code.
3) NFPA 70 - National Electrical Code.
4) NFPA 80 - Fire Doors and Windows.
5) NFPA 101 - Life Safety Code.
6) NFPA 105 - Installation of Smoke Door Assemblies.
7) UL/ULC and CSA C22.2 - Standards for Automatic Door Operators Used on Fire and Smoke Barrier Doors and Systems of Doors.
8) State Building Codes, Local Amendments.

e. Standards: All hardware specified herein shall comply with the following industry standards as applicable. Any undated reference to a standard shall be interpreted as referring to the latest edition of that standard:

1) ANSI/BHMA Certified Product Standards - A156 Series.
2) UL10C - Positive Pressure Fire Tests of Door Assemblies.
3) ANSI/UL 294 - Access Control System Units.
4) UL 305 - Panic Hardware.
5) ANSI/UL 437- Key Locks.

3. SUBMITTALS

a. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.

b. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.

1) Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."

2) Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.

3) Content: Include the following information:

a) Type, style, function, size, label, hand, and finish of each door hardware item.
b) Manufacturer of each item.
c) Fastenings and other pertinent information.
d) Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
e) Explanation of abbreviations, symbols, and codes contained in schedule.
f) Mounting locations for door hardware.
g) Door and frame sizes and materials.
h) Warranty information for each product.

4) Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.

c. Shop Drawings: Details of electrified access control hardware indicating the following:

1) Wiring Diagrams: Upon receipt of approved schedules, submit detailed system wiring diagrams for power, signaling, monitoring, communication, and control of the access control system electrified hardware. Differentiate between manufacturer-installed and field-installed wiring. Include the following:

a) Elevation diagram of each unique access controlled opening showing location and interconnection of major system components with respect to their placement in the respective door openings.
b) Complete (risers, point-to-point) access control system block wiring diagrams.
c) Wiring instructions for each electronic component scheduled herein.

2) Electrical Coordination: Coordinate with related sections the voltages and wiring details required at electrically controlled and operated hardware openings.

d. Keying Schedule: After a keying meeting with the owner has taken place prepare a separate keying schedule detailing final instructions. Submit the keying schedule in electronic format. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner must approve submitted keying schedule prior to the ordering of permanent cylinders/cores.

e. Informational Submittals:

1) Product Test Reports: Indicating compliance with cycle testing requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified independent testing agency.

f. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Procedures.

4. QUALITY ASSURANCE

a. Manufacturers Qualifications: Engage qualified manufacturers with a minimum 5 years of documented experience in producing hardware and equipment similar to that indicated for this Project and that have a proven record of successful in-service performance.

b. Certified Products: Where specified, products must maintain a current listing in the Builders Hardware Manufacturers Association (BHMA) Certified Products Directory (CPD).

c. Installer Qualifications: A minimum 3 years documented experience installing both standard and electrified door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

d. Door Hardware Supplier Qualifications: Experienced commercial door hardware distributors with a minimum 5 years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project. Supplier recognized as a factory direct distributor by the manufacturers of the primary materials with a warehousing facility in Project's vicinity. Supplier to have on staff a certified Architectural Hardware Consultant (AHC) available during the course of the Work to consult with Contractor, Architect, and Owner concerning both standard and electromechanical door hardware and keying.

e. Automatic Operator Supplier Qualifications: Power operator products and accessories are required to be supplied and installed through the Norton Preferred Installer (NPI) program. Suppliers are to be factory trained, certified, and a direct purchaser of the specified power

operators and be responsible for the installation and maintenance of the units and accessories indicated for the Project.

f. Source Limitations: Obtain each type and variety of door hardware specified in this section from a single source unless otherwise indicated.

1) Electrified modifications or enhancements made to a source manufacturer's product line by a secondary or third party source will not be accepted.

2) Provide electromechanical door hardware from the same manufacturer as mechanical door hardware, unless otherwise indicated.

g. Each unit to bear third party permanent label demonstrating compliance with the referenced standards.

h. Keying Conference: Conduct conference to comply with requirements in Division 01 Section "Project Meetings." Keying conference to incorporate the following criteria into the final keying schedule document:

1) Function of building, purpose of each area and degree of security required.
2) Plans for existing and future key system expansion.
3) Requirements for key control storage and software.
4) Installation of permanent keys, cylinder cores and software.
5) Address and requirements for delivery of keys.

i. Pre-Submittal Conference: Conduct coordination conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier(s), Installer(s), and Contractor(s) to review proper methods and the procedures for receiving, handling, and installing door hardware.

1) Prior to installation of door hardware, conduct a project specific training meeting to instruct the installing contractors' personnel on the proper installation and adjustment of their respective products. Product training to be attended by installers of door hardware (including electromechanical hardware) for aluminum, hollow metal and wood doors. Training will include the use of installation manuals, hardware schedules, templates and physical product samples as required.
2) Inspect and discuss electrical roughing-in, power supply connections, and other preparatory work performed by other trades.
3) Review sequence of operation narratives for each unique access controlled opening.
4) Review and finalize construction schedule and verify availability of materials.
5) Review the required inspecting, testing, commissioning, and demonstration procedures

j. At completion of installation, provide written documentation that components were applied to manufacturer's instructions and recommendations and according to approved schedule.

5. DELIVERY, STORAGE, AND HANDLING

a. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.

b. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.

c. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

6. COORDINATION

a. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing standard and electrified hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.

b. Door Hardware and Electrical Connections: Coordinate the layout and installation of scheduled electrified door hardware and related access control equipment with required connections to source power junction boxes, low voltage power supplies, detection and monitoring hardware, and fire and detection alarm systems.

c. Door and Frame Preparation: Doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

7. WARRANTY

a. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

b. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:

1) Structural failures including excessive deflection, cracking, or breakage.
2) Faulty operation of the hardware.
3) Deterioration of metals, metal finishes, and other materials beyond normal weathering.
4) Electrical component defects and failures within the systems operation.

c. Warranty Period: Unless otherwise indicated, warranty shall be one year from date of Substantial Completion.

8. MAINTENANCE SERVICE

a. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

PART 2 - PRODUCTS

1. SCHEDULED DOOR HARDWARE

a. General: Provide door hardware for each door to comply with requirements in Door Hardware Sets and each referenced section that products are to be supplied under.

b. Designations: Requirements for quantity, item, size, finish or color, grade, function, and other distinctive qualities of each type of door hardware are indicated in the Door Hardware Sets at the end of Part 3. Products are identified by using door hardware designations, as follows:

1) Named Manufacturer's Products: Product designation and manufacturer are listed for each door hardware type required for the purpose of establishing requirements. Manufacturers' names are abbreviated in the Door Hardware Schedule.

c. Substitutions: Requests for substitution and product approval for inclusive mechanical and electromechanical door hardware in compliance with the specifications must be submitted in writing and in accordance with the procedures and time frames outlined in Division 01, Substitution Procedures. Approval of requests is at the discretion of the architect, owner, and their designated consultants.

2. HANGING DEVICES

a. Hinges: ANSI/BHMA A156.1 butt hinges with number of hinge knuckles and other options as specified in the Door Hardware Sets.

1) Quantity: Provide the following hinge quantity:

a) Two Hinges: For doors with heights up to 60 inches.
b) Three Hinges: For doors with heights 61 to 90 inches.
c) Four Hinges: For doors with heights 91 to 120 inches.
d) For doors with heights more than 120 inches, provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches.

2) Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:

a) Widths up to 3’0”: 4-1/2” standard or heavy weight as specified.
b) Sizes from 3’1” to 4’0”: 5” standard or heavy weight as specified.

3) Hinge Weight and Base Material: Unless otherwise indicated, provide the following:

a) Exterior Doors: Heavy weight, non-ferrous, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate standard weight.
b) Interior Doors: Standard weight, steel, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate heavy weight.

4) Hinge Options: Comply with the following:

a) Non-removable Pins: With the exception of electric through wire hinges, provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for the all out-swinging lockable doors.

5) Manufacturers:

a) Ives (IV) - 5BB Series, 5 knuckle.
b) McKinney (MK) - TA/T4A Series, 5 knuckle.

b. Continuous Geared Hinges: ANSI/BHMA A156.26 Grade 1-600 continuous geared hinge. with minimum 0.120-inch thick extruded 6063-T6 aluminum alloy hinge leaves and a minimum overall width of 4 inches. Hinges are non-handed, reversible and fabricated to template screw locations. Factory trim hinges to suit door height and prepare for electrical cut-outs.

1) Manufacturers:

a) Pemko (PE).
b) Select Hinges (SL).

3. POWER TRANSFER DEVICES

a. Electrified Quick Connect Transfer Hinges: Provide electrified transfer hinges with Molex™ standardized plug connectors and sufficient number of concealed wires (up to 12) to accommodate the electrified functions specified in the Door Hardware Sets with a 1-year warranty. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Wire nut connections are not acceptable.

1) Manufacturers:

a) Ives (IV) - Connect.
b) McKinney (MK) - QC (# wires) Option.

b. Concealed Quick Connect Electric Power Transfers: Provide concealed wiring pathway housing mortised into the door and frame for low voltage electrified door hardware. Furnish with Molex™ standardized plug connectors and sufficient number of concealed wires (up to 12) to accommodate the electrified functions specified in the Door Hardware Sets. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Wire nut connections are not acceptable.

1) Manufacturers:

a) Pemko (PE) - EL-CEPT Series.
b) Securitron (SU) - EL-CEPT Series.

c. Electric Door Wire Harnesses: Provide electric/data transfer wiring harnesses with standardized plug connectors to accommodate up to twelve (12) wires. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Provide sufficient number and type of concealed wires to accommodate electric function of specified

hardware. Provide a connector for through-door electronic locking devices and from hinge to junction box above the opening. Wire nut connections are not acceptable. Determine the length required for each electrified hardware component for the door type, size and construction, minimum of two per electrified opening.

1) Provide one each of the following tools as part of the base bid contract:

   a) McKinney (MK) - Electrical Connecting Kit: QC-R001.
   b) McKinney (MK) - Connector Hand Tool: QC-R003.

2) Manufacturers:

   a) McKinney (MK) - QC-C Series.

4. DOOR OPERATING TRIM

a. Flush Bolts and Surface Bolts: Provide products conforming to ANSI/BHMA A156.3 and A156.16, Grade 1.

   1) Flush bolts to be furnished with top rod of sufficient length to allow bolt retraction device location approximately six feet from the floor.
   2) Furnish dust proof strikes for bottom bolts.
   3) Surface bolts to be minimum 8” in length and U.L. listed for labeled fire doors and U.L. listed for windstorm components where applicable.
   4) Provide related accessories (mounting brackets, strikes, coordinators, etc.) as required for appropriate installation and operation.

   5) Manufacturers:

      a) Burns Manufacturing (BU).
      b) Door Controls International (DC).
      c) Rockwood (RO).

b. Door Push Plates and Pulls: ANSI/BHMA A156.6 door pushes and pull units of type and design specified in the Hardware Sets. Coordinate and provide proper width and height as required where conflicting hardware dictates.

   1) Push/Pull Plates: Minimum .050 inch thick, size as indicated in hardware sets, with beveled edges, secured with exposed screws unless otherwise indicated.
   2) Door Pull and Push Bar Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door unless otherwise indicated.
   3) Offset Pull Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door and offset of 90 degrees unless otherwise indicated.
   4) Fasteners: Provide manufacturer's designated fastener type as indicated in Hardware Sets.

   5) Manufacturers:

a) Burns Manufacturing (BU).
b) Hiawatha, Inc. (HI).
c) Rockwood (RO).

5. CYLINDERS AND KEYING

a. General: Cylinder manufacturer to have minimum (10) years experience designing secured master key systems and have on record a published security keying system policy.

b. Cylinder Types: Original manufacturer cylinders able to supply the following cylinder formats and types:

1) Threaded mortise cylinders with rings and cams to suit hardware application.
2) Rim cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
3) Bored or cylindrical lock cylinders with tailpieces as required to suit locks.
4) Tubular deadlocks and other auxiliary locks.
5) Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes.
6) Keyway: Manufacturer’s Standard.

c. Large Format Interchangeable Cores: Provide removable cores (LFIC) as specified, core insert, removable by use of a special key, and for use with only the core manufacturer's cylinder and door hardware.

d. Patented Cylinders: ANSI/BHMA A156.5, Grade 1 Certified Products Directory (CPD) listed cylinders employing a utility patented and restricted keyway requiring the use of a patented key. Cylinders are to be protected from unauthorized manufacture and distribution by manufacturer’s United States patents. Cylinders are to be factory keyed with owner having the ability for on-site original key cutting.

1) Patented key systems shall not be established with products that have an expired patent. Expired systems shall only be specified and supplied to support existing systems.

2) Manufacturers:

a) Corbin Russwin (RU) - Access 3 AP.
b) Sargent (SA) - Degree DG1.

e. Keying System: Each type of lock and cylinders to be factory keyed.

1) Supplier shall conduct a "Keying Conference" to define and document keying system instructions and requirements.
2) Furnish factory cut, nickel-silver large bow permanently inscribed with a visual key control number as directed by Owner.
3) New System: Key locks to a new key system as directed by the Owner.

f. Key Quantity: Provide the following minimum number of keys:

1) Change Keys per Cylinder: Two (2)
2) Master Keys (per Master Key Level/Group): Five (5).
3) Construction Keys (where required): Ten (10).
4) Construction Control Keys (where required): Two (2).
5) Permanent Control Keys (where required): Two (2).

g. Construction Keying: Provide construction master keyed cylinders.

h. Construction Keying: Provide temporary keyed construction cores.

i. Key Registration List (Bitting List):

1) Provide keying transcript list to Owner's representative in the proper format for importing into key control software.
2) Provide transcript list in writing or electronic file as directed by the Owner.

6. KEY CONTROL

a. Key Control Cabinet: Provide a key control system including envelopes, labels, and tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers, permanent markers, and standard metal cabinet. Key control cabinet shall have expansion capacity of 150% of the number of locks required for the project.

1) Manufacturers:

a) Lund Equipment (LU).
b) MMF Industries (MM).
c) Telkee (TK).

p. Electronic Key Management System: Provide an electronic key control system with Stand-alone Plug and Play features including advanced RFID technology. Touchscreen interface with PIN access for keys individually locked in place. Minimum 1,000 system users and 21 iFobs for locking receptors. System shall have a minimum 250,000 audit events screen displayed or ability to be exported via USB port.

1) Manufacturers:

a) Medeco (MC).
b) Traka (TA).

7. MECHANICAL LOCKS AND LATCHING DEVICES

a. Multi-Point Locksets, FEMA: ANSI/BHMA A156.37, Certified Products Directory (CPD) listed three-point locking system device engineered for in-swinging and out-swinging door applications on windstorm safe shelter rooms. Extra heavy duty steel component construction securing the door to the frame at top, bottom and center latch positions. All three latching points are automatically activated when the device is locked. Multi-Point Deadlocking System shall be used only with doors, frames and associated hardware that have been engineered, tested and approved for a complete opening assembly system.

1) Severe Storm Shelter Components: Multi-point locking system devices engineered for in-swinging and out-swinging door applications on tornado or hurricane resistant safe shelter rooms. The multi-point latching integrated device is approved for usage as part of a complete ICC 500 (2014) and FEMA P-361 (2015) door, frame and hardware assembly.

2) ANSI-BHMA listed to A156.37 Grade 1 for multi-point locks:

   a) Lever torque to retract all bolts less than 28 in.lb.
   b) Cycle tested to 1,000,000 cycles.

3) NFPA 80 and NFPA 101 life safety requirements.

4) UL10B or UL10C, 3-hour fire rated openings.

5) Latchbolt Construction:

   a) Center Bolt to be one piece, ¾" throw anti-friction stainless steel latch and one piece, 1" throw, hardened stainless steel deadbolt; 2-3/4" standard backset.
   b) Top and Bottom Bolts to be ¾" x ¾" stainless steel square latchbolt with ¾" projection.

6) Independent top and bottom bolt projection shall be field adjustable:

   a) From the center mortise pocket.
   b) Ability to make field adjustments while the door is in the hung position without the removal of the door.
   c) Top and Bottom Bolts and the Center Mortise Case shall be factory installed into the door assembly.

7) Bottom strike shall be offset and reversible to accommodate alignment issues due to rough opening tolerances.

8) Devices must be able to accommodate sectional rose and lever trim to match the design style and architectural finishes of the balance of the lockset and latches as specified.

9) Devices must be available with electronic access control options for higher or everyday use and traceability.

10) Devices must be available with rod-dogging indicator options:

    a) Operated by single-point latching for non-emergency or normal use of the space.
    b) Ability to hold rods in a retracted state.
    c) Day-to-day operations with mortise lock only.
    d) Indicator to show status.

11) Manufacturers:

    a) Corbin Russwin Hardware (RU) - FE6600 Series.
    b) Sargent Manufacturing (SA) - FM7300 Series.

b. Cylindrical Locksets, Grade 1 (Heavy Duty): ANSI/BHMA A156.2, Series 4000, Operational Grade 1 Certified Products Directory (CPD) listed.

1) Locks shall meet or exceed the requirements of ANSI/BHMA A156.2 Series 4000, Grade 1 with all standard trims, as follows:

   a) Cycle Test: ANSI/BHMA A156.2 Grade 1 requirements with no lever sag.
   b) Abusive Locked Lever Torque: Exceed 3,100 in-lb with no entry; lock to maintain egress functionality in compliance with BHMA certification requirements.
   c) Offset Lever Pull: Exceed 1,600 lbs with no entry (8 times ANSI/BHMA A156.2 requirements).
   d) Latch Retraction with Preload: Exceed 100 lb preload while maintaining ANSI/BHMA requirements for operation in warped doors (2 times ANSI/BHMA A156.2 requirements).

2) Heavy duty cylindrical locks shall have a seven-year warranty.

3) Vertical Impact: Exceed 100 vertical impacts (20 times ANSI/BHMA A156.2 requirements).

4) Furnish with solid cast levers, standard 2 3/4” backset, and 1/2" (3/4" at rated paired openings) throw brass or stainless steel latchbolt.

5) Locks are to be non-handed and fully field reversible.

6) Manufacturers:

   a) Corbin Russwin Hardware (RU) - CLX3300 Series.
   b) Sargent Manufacturing (SA) - 10X Line.

8. ELECTROMECHANICAL LOCKING DEVICES

a. Electromechanical Cylindrical Locksets, Grade 1 (Heavy Duty): Subject to same compliance standards and requirements as mechanical cylindrical locksets, electrified locksets to be of type and design as specified below.

   1) Electrified Lock Options: Where indicated in the Hardware Sets, provide electrified options including: outside door lock/unlock trim control and request-to-exit signaling. Unless otherwise indicated, provide electrified locksets standard as fail secure.

   2) Manufacturers:

      a) Corbin Russwin Hardware (RU) - CL33900 Series.
      b) Sargent Manufacturing (SA) - 10G70/71 Series.

b. Electromechanical Multi-Point Locks: Vertical rod locking devices designed for openings requiring multiple latching points within one locking mechanism. Rods are retracted by dual mounted outside lever trim controls available in a variety of ANSI/BHMA operational functions. Option for single top latching only eliminates the need for bottom strikes. Electromechanical options include solenoid activated trim, electric latch retraction, and inside and outside lever monitoring.

1) Manufacturers:

a) Corbin Russwin Hardware (RU) MP9800 Series.
b) Sargent Manufacturing (SA) - 7000 Series.

9. STAND ALONE ACCESS CONTROL LOCKING DEVICES

a. Stand Alone Electronic Keypad Locksets: Internal, battery-powered, self-contained ANSI Grade 1 mortise or cylindrical lock consisting of electronically motor driven locking mechanism and integrated keypad without requirements for separate electronic programming devices. Locks to accept standard, interchangeable (removable) core, security and high security override cylinders. Provide keypad locks with a minimum 100 user codes furnished standard with 6 "AA" batteries and non-volatile memory.

1) Energy Efficient Design: Provide lock bodies which have a holding current draw of 15mA maximum, and can operate on either 12 or 24 volts. Locks are to be field configurable for fail safe or fail secure operation.

2) Manufacturers:

a) Sargent Manufacturing (SA) - KP Series.

10. AUXILIARY LOCKS

a. Mortise Deadlocks, Small Case: ANSI/BHMA A156.36, Grade 1, small case mortise type deadlocks constructed of heavy gauge wrought corrosion resistant steel. Steel or stainless steel bolts with a 1" throw and hardened steel roller pins. Deadlocks to be products of the same source manufacturer and keyway as other specified locksets.

1) Manufacturers:

a) Corbin Russwin Hardware (RU) - DL4000 Series.
b) Sargent Manufacturing (SA) - 4870 Series.

b. Narrow Case Deadlocks and Deadlatches: ANSI/BHMA 156.13 Series 1000 Grade 1 narrow case deadlocks and deadlatches for swinging or sliding door applications. All functions shall be manufactured in a single sized case formed from 12 gauge minimum, corrosion resistant steel (option for fully stainless steel case and components). Provide minimum 2 7/8" throw laminated stainless steel bolt. Bottom rail deadlocks to have 3/8” diameter bolts.

1) Manufacturers:

a) Adams Rite Manufacturing (AD) - MS1850S / MS1950 Series.

11. LOCK AND LATCH STRIKES

a. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:

1) Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
2) Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
3) Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.
4) Double-lipped strikes: For locks at double acting doors. Furnish with retractable stop for rescue hardware applications.

b. Standards: Comply with the following:

1) Strikes for Mortise Locks and Latches: BHMA A156.13.
2) Strikes for Bored Locks and Latches: BHMA A156.2.
3) Strikes for Auxiliary Deadlocks: BHMA A156.36.
4) Dustproof Strikes: BHMA A156.16.

12. CONVENTIONAL EXIT DEVICES

a. General Requirements: All exit devices specified herein shall meet or exceed the following criteria:

1) Exit devices shall have a five-year warranty.

2) At doors not requiring a fire rating, provide devices complying with NFPA 101 and listed and labeled for "Panic Hardware" according to UL305. Provide proper fasteners as required by manufacturer including sex nuts and bolts at openings specified in the Hardware Sets.

3) Where exit devices are required on fire rated doors, provide devices complying with NFPA 80 and with UL labeling indicating "Fire Exit Hardware". Provide devices with the proper fasteners for installation as tested and listed by UL. Consult manufacturer’s catalog and template book for specific requirements.

4) Except on fire rated doors, provide exit devices with hex key dogging device to hold the pushbar and latch in a retracted position. Provide optional keyed cylinder dogging on devices where specified in Hardware Sets.

5) Devices must fit flat against the door face with no gap that permits unauthorized dogging of the push bar. The addition of filler strips is required in any case where the door light extends behind the device as in a full glass configuration.

6) Flush End Caps: Provide flush end caps made of architectural metal in the same finish as the devices as in the Hardware Sets. Plastic end caps will not be acceptable.

7) Lever Operating Trim: Where exit devices require lever trim, furnish manufacturer's heavy duty escutcheon trim with threaded studs for thru-bolts.

a) Lock Trim Design: As indicated in Hardware Sets, provide finishes and designs to match that of the specified locksets.
b) Where function of exit device requires a cylinder, provide a cylinder (Rim or Mortise) as specified in Hardware Sets.

8) Vertical Rod Exit Devices: Where surface or concealed vertical rod exit devices are used at interior openings, provide as less bottom rod (LBR) unless otherwise indicated. Provide dust proof strikes where thermal pins are required to project into the floor.

9) Narrow Stile Applications: At doors constructed with narrow stiles, or as specified in Hardware Sets, provide devices designed for maximum 2” wide stiles.

10) Dummy Push Bar: Nonfunctioning push bar matching functional push bar.

11) Rail Sizing: Provide exit device rails factory sized for proper door width application.

12) Through Bolt Installation: For exit devices and trim as indicated in Door Hardware Sets.

13) Hurricane and Tornado Resistance Compliance: Conventional exit devices are to be U.L. listed for windstorm assemblies where applicable. Provide the appropriate hurricane or tornado resistant products that have been independent third party tested, certified, and labeled to meet state and local windstorm building codes applicable to project.

b. Conventional Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 Certified Products Directory (CPD) listed panic and fire exit hardware devices furnished in the functions specified in the Hardware Sets. Exit device latch to be stainless steel, pullman type, with deadlock feature.

1) Manufacturers:

a) Corbin Russwin Hardware (RU) - ED4000 / ED5000 Series.
b) Sargent Manufacturing (SA) - 80 Series.

13. ELECTROMECHANICAL EXIT DEVICES

a. Electromechanical Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 Certified Products Directory (CPD) listed panic and fire exit hardware devices subject to same compliance standards and requirements as mechanical exit devices. Electrified exit devices to be of type and design as specified below and in the hardware sets.

1) Where conventional power supplies are not sufficient, include any specific controllers required to provide the proper inrush current.

2) Motorized Electric Latch Retraction: Devices with an electric latch retraction feature must use motors which have a maximum current draw of 600mA. Solenoid driven latch retraction is not acceptable.

3) Manufacturers:

a) Corbin Russwin Hardware (RU) - ED5000 Series.

b) Sargent Manufacturing (SA) - 80 Series.

14. DOOR CLOSERS

a. All door closers specified herein shall meet or exceed the following criteria:

1) General: Door closers to be from one manufacturer, matching in design and style, with the same type door preparations and templates regardless of application or spring size. Closers to be non-handed with full sized covers.

2) Standards: Closers to comply with UL-10C for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.

3) Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Where closers are indicated for doors required to be accessible to the Americans with Disabilities Act, provide units complying with ANSI ICC/A117.1.

4) Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.

5) Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics.

6) Closer Accessories: Provide door closer accessories including custom templates, special mounting brackets, spacers and drop plates as required for proper installation. Provide through-bolt and security type fasteners as specified in the hardware sets.

b. Door Closers, Surface Mounted (Heavy Duty): ANSI/BHMA A156.4, Grade 1 Certified Products Directory (CPD) listed surface mounted, heavy duty door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one piece cast iron or aluminum alloy body construction, with adjustable backcheck and separate non-critical valves for closing sweep and latch speed control. Provide non-handed units standard.

1) Heavy duty surface mounted door closers shall have a 25-year warranty.

2) Manufacturers:

a) Corbin Russwin Hardware (RU) - DC6000 Series.
b) Norton Rixson (NO) - 7500 Series.
c) Sargent Manufacturing (SA) - 351 Series.
d) BEST Access Solutions – HD8000 Series.

15. ELECTROHYDRAULIC DOOR OPERATORS

a. General: Provide low energy operators of size recommended by manufacturer for door size, weight, and movement; for condition of exposure; and for compliance with UL 325. Coordinate operator mechanisms with door operation, hinges, and activation devices.

1) Fire-Rated Doors: Provide door operators for fire-rated door assemblies that comply with NFPA 80 for fire-rated door components and are listed and labeled by a qualified testing agency.

b. Standard: Conforming to ANSI/BHMA A156.19.

c. Performance Requirements:

1) Opening Force if Power Fails: Not more than 15 lbf required to release a latch if provided, not more than 30 lbf required to manually set door in motion, and not more than 15 lbf required to fully open door.
2) Entrapment Protection: Not more than 15 lbf required to prevent stopped door from closing or opening.

d. Configuration: Surface mounted or in-ground as required. Door operators to control single swinging and pair of swinging doors.

e. Operation: Power opening and spring closing operation capable of meeting ANSI A117.1 accessibility guideline. Provide time delay for door to remain open before initiating closing cycle as required by ANSI/BHMA A156.19. When not in automatic mode, door operator to function as manual door closer with fully adjustable opening and closing forces, with or without electrical power.

f. Features: Operator units to have full feature adjustments for door opening and closing force and speed, backcheck, motor assist acceleration from 0 to 30 seconds, time delay, vestibule interface delay, obstruction recycle, and hold open time from 0 up to 30 seconds.

g. Provide outputs and relays on board the operator to allow for coordination of exit device latch retraction, electric strikes, magnetic locks, card readers, safety and motion sensors and specified auxiliary contacts.

h. Brackets and Reinforcements: Manufacturer's standard, fabricated from aluminum with nonferrous shims for aligning system components.

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

1) Norton Rixson (NO) - 6000 Series.

16. ARCHITECTURAL TRIM

a. Door Protective Trim

1) General: Door protective trim units to be of type and design as specified below or in the Hardware Sets.

2) Size: Fabricate protection plates (kick, armor, or mop) not more than 2" less than door width (LDW) on stop side of single doors and 1” LDW on stop side of pairs of doors, and not more than 1" less than door width on pull side. Coordinate and provide proper width and height as required where conflicting hardware dictates. Height to be as specified in the Hardware Sets.

3) Where plates are applied to fire rated doors with the top of the plate more than 16” above the bottom of the door, provide plates complying with NFPA 80. Consult manufacturer’s catalog and template book for specific requirements for size and applications.

4) Protection Plates: ANSI/BHMA A156.6 protection plates (kick, armor, or mop), fabricated from the following:

a) Stainless Steel: 300 grade, 050-inch thick.

5) Options and fasteners: Provide manufacturer's designated fastener type as specified in the Hardware Sets. Provide countersunk screw holes.

6) Manufacturers:

a) Burns Manufacturing (BU).
b) Hiawatha, Inc. (HI).
c) Rockwood (RO).

17. DOOR STOPS AND HOLDERS

a. General: Door stops and holders to be of type and design as specified below or in the Hardware Sets.

b. Door Stops and Bumpers: ANSI/BHMA A156.16, Grade 1 door stops and wall bumpers. Provide wall bumpers, either convex or concave types with anchorage as indicated, unless floor or other types of door stops are specified in Hardware Sets. Do not mount floor stops where they will impede traffic. Where floor or wall bumpers are not appropriate, provide overhead type stops and holders.

1) Manufacturers:

a) Burns Manufacturing (BU).
b) Hiawatha, Inc. (HI).
c) Rockwood (RO).

c. Overhead Door Stops and Holders: ANSI/BHMA A156.8, Grade 1 Certified Products Directory (CPD) listed overhead stops and holders to be surface or concealed types as indicated in Hardware Sets. Track, slide, arm and jamb bracket to be constructed of extruded bronze and shock absorber spring of heavy tempered steel. Provide non-handed design with mounting brackets as required for proper operation and function.

1) Manufacturers:

a) Norton Rixson (RF).
b) Rockwood (RO).
c) Sargent Manufacturing (SA).

18. ARCHITECTURAL SEALS

a. General: Thresholds, weatherstripping, and gasket seals to be of type and design as specified below or in the Hardware Sets. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated. At exterior applications provide non-corrosive fasteners and elsewhere where indicated.

b. Smoke Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke control ratings indicated, based on testing according to UL 1784.

1) Provide smoke labeled perimeter gasketing at all smoke labeled openings.

c. Fire Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL-10C.

1) Provide intumescent seals as indicated to meet UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and NPFA 252, Standard Methods of Fire Tests of Door Assemblies.

d. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated.

e. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.

f. Manufacturers:

1) Pemko (PE).
2) Reese Enterprises, Inc. (RE).

19. ELECTRONIC ACCESSORIES

a. Door Position Switches: Door position magnetic reed contact switches specifically designed for use in commercial door applications. On recessed models the contact and magnetic housing snap-lock into a 1" diameter hole. Surface mounted models include wide gap distance design complete with armored flex cabling. Provide SPDT, N/O switches with optional Rare Earth Magnet installation on steel doors with flush top channels.

1) Manufacturers:

a) Sargent Manufacturing (SA) - 3280 Series.
b) Securitron (SU) - DPS Series.

b. Wiegand Test Unit: Test unit verifies proper Wiegand output integrated card reader lock installation in the field by testing for proper wiring, card reader data integrity, and lock functionality including lock/unlock, door position, and request-to-exit status. 12 or 24VDC voltage adjustable operating as Fail Safe or Fail Secure.

1) Manufacturers:

a) Corbin Russwin Hardware (RU) - WT2 Wiegand Test Unit.
b) Sargent Manufacturing (SA) - WT2 Wiegand Test Unit.

c. Switching Power Supplies: Provide power supplies with either single or dual voltage configurations at 12 or 24VDC. Power supplies shall have battery backup function with an integrated battery charging circuit and shall provide capability for power distribution, direct lock control and Fire Alarm Interface (FAI) through add on modules. Power supplies shall be expandable up to 16 individually protected outputs. Output modules shall provide individually protected, continuous outputs and/or individually protected, relay controlled outputs.

1) Manufacturers:

a) Securitron (SU) - AQD Series.

20. FABRICATION

a. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to manufacturers recognized installation standards for application intended.

21. FINISHES

a. Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.

b. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware

c. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

PART 3 - EXECUTION

1. EXAMINATION

a. Examine scheduled openings, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.

b. Notify architect of any discrepancies or conflicts between the door schedule, door types, drawings and scheduled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.

2. PREPARATION

a. Hollow Metal Doors and Frames: Comply with ANSI/DHI A115 series.

b. Wood Doors: Comply with ANSI/DHI A115-W series.

3. INSTALLATION

a. Install each item of mechanical and electromechanical hardware and access control equipment to comply with manufacturer's written instructions and according to specifications.

1) Installers are to be trained and certified by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; locking devices; closing devices; and seals.

b. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:

1) Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
2) DHI TDH-007-20: Installation Guide for Doors and Hardware.
3) Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."
4) Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.

c. Power Operator products and accessories are required to be installed through current members of the manufacturer's "Power Operator Preferred Installer" program.

d. Retrofitting: Install door hardware to comply with manufacturer's published templates and written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.

e. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."

f. Storage: Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.

4. ADJUSTING

a. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

5. CLEANING AND PROTECTION

a. Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.

b. Clean adjacent surfaces soiled by door hardware installation.

c. Clean operating items as necessary to restore proper finish. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of owner occupancy.

6. DEMONSTRATION

a. Instruct Owner's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door hardware.

7. DOOR HARDWARE SETS

a. The hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.

1) Quantities listed are for each pair of doors, or for each single door.

2) The supplier is responsible for handing and sizing all products.

3) Where multiple options for a piece of hardware are given in a single line item, the supplier shall provide the appropriate application for the opening.

b. Manufacturer’s Abbreviations:

1. MK - McKinney
2. PE - Pemko
3. RO - Rockwood
4. SA - SARGENT
5. RF - Rixson
6. NO - Norton
7. OT - Other
8. MC - Medeco
9. SU - Securitron
10. LU - Lund Equipment Co

Hardware Sets

Set: 1.0

Doors: 100A

2	Continuous Hinge	CFM_SLF-HD1 PT x Length Required		PE	087100
1	Narrow CVR Exit Device w/ Pull (NL, RX, ELR, CD)	16 43 55 56 DG164 AD8410 106 x 862 (Cyl. Dogging)	US32D	SA	087100
1	Narrow CVR Exit Device w/Pull (EO, RX, ELR, CD)	16 43 55 56 AD8410 862 (Cyl. Dogging)	US32D	SA	087100
3	LFIC Core	Large Format Interchangeable Core - Keyed as directed by Owner	US15	SA	087100
2	Automatic Operator	6000 Series (Drop Plate as Required)	689	NO	087100
1	Threshold	273x224AFGT MSES25SS x Length Required		PE	087100
1	Gasketing	Provided By Door/Frame Supplier		OT	
2	Sweep	3452CNB x Length Required		PE	087100
2	Harness Adaptor	52-2946		SA	
1	Card Reader	By Security Supplier			
2	ElectroLynx Harness (Door)	QC-C**** x Length Required		MK	087100
2	ElectroLynx Harness (Frame)	QC-C3000P		MK	087100
2	Touchless Actuator Switch	700		NO	087100
2	Position Switch	DPS - M / W-BK (SPDT)		SU	087100
1	Power Supply	AQD (Size and Options as required)		SU	087100
2	Electric Power Transfer	EL-CEPT	630	SU	087100
1	Wiring Diagram	Elevation and Point to Point as Specified		OT	

Notes: Perimeter and meeting stile gasket by door / frame manufacturer.

Operation:
During Normal Hours of Operation:
• Exit Device Latches are electronically held (Dogged) to allow Push Pull Operation.
• When there is motion in close proximity to the actuator switch on either side of the opening the auto operators will open both doors of the pair for assisted entry or egress.
• Manual entry or egress is always available by pushing exit device push bar or pulling door open.
• The exit devices are fail secure and will latch in the absence of power.
• Door position switches at each leaf will signal the doors OPEN/CLOSED status to the access control panel.

After Normal Hours of operation:
• Doors are normally closed and latched.
• Active leaf Exit Device has Nightlatch Function (Key will retract the exit device latch, door is latched when the key is removed).
• When an authorized card read is detected on the secured side of the door the access control system will momentarily retract the exit device latch at the active leaf and activates the touchless auto operator actuator switch on the secured side of the opening.

• Motion in close proximity to the touchless actuator switch on the secure side (after the authorized card read) will activate the auto operator to open both doors of the pair.
• Egress can be achieve at any time by Motion in close proximity to the touchless actuator switch on the unsecured side of the opening to retract the exit device latches on both doors and activating the auto operators to open the doors.
• Manual egress is always available by pressing either exit device push bar of the pair.
• The exit devices are fail secure and will latch in the absence of power. Request to Exit Switches integrated in the exit device push bars will signal an authorized egress to the access control system.
• Door position switches at each leaf will signal the doors OPEN/CLOSED status to the access control panel.

Set: 2.0

Doors: 130A, 400A

1	Continuous Hinge	CFM_SLF-HD1 PT x Length Required		PE	087100
1	Narrow Rim Exit Device w/Pull (NL, RX, ELR, CD)	DG164 16 43 55 56 AD8504 862 (Cyl. Dogging)	US32D	SA	087100
2	LFIC Core	Large Format Interchangeable Core - Keyed as directed by Owner	US15	SA	087100
1	Surface Closer	351 CPS (HD Cush STP Arm)	EN	SA	087100
1	Drop Plate	351D (as required)	EN	SA	087100
1	Blade Stop Spacer Kit	581-1 or 2 (as required)	EN	SA	087100
1	Threshold	273x224AFGT MSES25SS x Length Required		PE	087100
1	Rain Guard	346C x Width of Frame Head		PE	087100
1	Gasketing	Provided By Door/Frame Supplier		OT	
1	Sweep	3452CNB x Length Required		PE	087100
1	Harness Adaptor	52-2946		SA	
1	Card Reader	By Security Supplier			
1	ElectroLynx Harness (Door)	QC-C**** x Length Required		MK	087100
1	ElectroLynx Harness (Frame)	QC-C3000P		MK	087100
1	Position Switch	DPS - M / W-BK (SPDT)		SU	087100
1	Power Supply	AQD (Size and Options as required)		SU	087100
1	Electric Power Transfer	EL-CEPT	630	SU	087100
1	Wiring Diagram	Elevation and Point to Point as Specified		OT	

Notes: Weatherstrip by Aluminum Door Manufacturer.

System Operational Narrative:
• Door normally closed and secure.
• Exit Device has Nightlatch Function (Key will retract the exit device latch, door is latched when the key is removed).
• Access by valid credential presentation retracting the exit latch for a pre-determined time limit and then relocking.
• Egress always free for immediate exit. Request-to-Exit sensor allows exit without alarm condition.

• Door position switch provides open/closed monitoring to both access control system and intrusion alarm service.
• Latch remains projected/locked (fail secure) in event of power loss.

Set: 3.0

Doors: 317B

4	Hinge, Full Mortise, Hvy Wt	T4A3386 (NRP and size as required)	US32D	MK	087100
2	Hinge, Full Mortised, Hvy Wt (PWR TRNS)	T4A3386-QCx (# of Wires and Size as Required)	US32D	MK	087100
1	Removable Mullion	L980S / L980A (As Required) x Length Required	PC	SA	087100
1	Rim Exit Device (EL TRIM Fail-Sec., RX, CD)	DG164 16 43 55 8876-24v ETMD (Cyl. Dogging)	US32D	SA	087100
1	Rim Exit Device (EO, RX, CD)	16 43 55 8810 EO (Cyl. Dogging)	US32D	SA	087100
4	LFIC Core	Large Format Interchangeable Core - Keyed as directed by Owner	US15	SA	087100
1	Removable Mullion Cylinder w/Kit	DG164 980C1	US26D	SA	087100
2	Surface Closer	351 CPS (HD Cush STP Arm)	EN	SA	087100
2	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100
1	Threshold	273x224AFGT MSES25SS x Length Required		PE	087100
1	Gasketing	303AS (Head & Jambs)		PE	087100
1	Mullion Gasketing	5110BL x Mullion Height		PE	087100
1	Rain Guard	346C x Width of Frame Head		PE	087100
2	Sweep	3452CNB x Length Required		PE	087100
2	Astragal	29324CNB x Door Height		PE	087100
2	Harness Adaptor	52-2946		SA	
1	Card Reader	By Security Supplier			
2	ElectroLynx Harness (Door)	QC-C**** x Length Required		MK	087100
2	ElectroLynx Harness (Frame)	QC-C3000P		MK	087100
2	Position Switch	DPS - M / W-BK (SPDT)		SU	087100
1	Power Supply	AQD (Size and Options as required)		SU	087100
1	Wiring Diagram	Elevation and Point to Point as Specified		OT	

Notes: System Operational Narrative:
• Doors normally closed and secure.
• Active leaf Exit Device has Nightlatch Function (Key will retract the exit device latch, door is latched when the key is removed).
• Access by valid credential presentation releasing the exit trim lever at the active leaf for a pre-determined time limit and then relocking.
• Egress always free for immediate exit. Request-to-Exit sensors allows exit without alarm condition.
• Door position switches provide open/closed monitoring to both access control system and intrusion alarm service.
• Exit Trim Lever remains locked (fail secure) in event of power loss.

Set: 4.0

Doors: 413B

2	Hinge, Full Mortise, Hvy Wt	T4A3386 (NRP and size as required)	US32D	MK	087100
1	Hinge, Full Mortised, Hvy Wt (PWR TRNS)	T4A3386-QCx (# of Wires and Size as Required)	US32D	MK	087100
1	Rim Exit Device (EL TRIM Fail-Sec., RX, CD)	DG164 16 43 55 8876-24v ETMD (Cyl. Dogging)	US32D	SA	087100
2	LFIC Core	Large Format Interchangeable Core - Keyed as directed by Owner	US15	SA	087100
1	Surface Closer (TRI-PACK)	351 UO (RA or PA Arm as Required)	EN	SA	087100
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100
1	Wall Stop	403 (or) 441CU (As Required)	US26D	RO	087100
1	Threshold	273x224AFGT MSES25SS x Length Required		PE	087100
1	Gasketing	303AS (Head & Jambs)		PE	087100
1	Rain Guard	346C x Width of Frame Head		PE	087100
1	Sweep	3452CNB x Length Required		PE	087100
1	Harness Adaptor	52-2946		SA	
1	Card Reader	By Security Supplier			
1	ElectroLynx Harness (Door)	QC-C**** x Length Required		MK	087100
1	ElectroLynx Harness (Frame)	QC-C3000P		MK	087100
1	Position Switch	DPS - M / W-BK (SPDT)		SU	087100
1	Power Supply	AQD (Size and Options as required)		SU	087100
1	Wiring Diagram	Elevation and Point to Point as Specified		OT	

Notes: System Operational Narrative:
• Door normally closed and secure.
• Exit Device has Nightlatch Function (Key will retract the exit device latch, door is latched when the key is removed).
• Access by valid credential presentation releasing the exit trim lever for a pre-determined time limit and then relocking.
• Egress always free for immediate exit. Request-to-Exit sensor allows exit without alarm condition.
• Door position switch provides open/closed monitoring to both access control system and intrusion alarm service.
• Exit Trim Lever remains locked (fail secure) in event of power loss.

Set: 5.0

Doors: 311A, 318B, 418, 420B, 421B, 423B, 425B, 427B, 428B, 437D

2	Hinge, Full Mortise, Hvy Wt	T4A3386 (NRP and size as required)	US32D	MK	087100
1	Hinge, Full Mortised, Hvy Wt (PWR TRNS)	T4A3386-QCx (# of Wires and Size as Required)	US32D	MK	087100

1	Rim Exit Device (EL TRIM Fail-Sec., RX, CD)	DG164 16 43 55 8876-24v ETMD (Cyl. Dogging)	US32D	SA	087100
2	LFIC Core	Large Format Interchangeable Core - Keyed as directed by Owner	US15	SA	087100
1	Surface Closer	351 CPS (HD Cush STP Arm)	EN	SA	087100
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100
1	Threshold	273x224AFGT MSES25SS x Length Required		PE	087100
1	Gasketing	303AS (Head & Jambs)		PE	087100
1	Rain Guard	346C x Width of Frame Head		PE	087100
1	Sweep	3452CNB x Length Required		PE	087100
1	Harness Adaptor	52-2946		SA	
1	Card Reader	By Security Supplier			
1	ElectroLynx Harness (Door)	QC-C**** x Length Required		MK	087100
1	ElectroLynx Harness (Frame)	QC-C3000P		MK	087100
1	Position Switch	DPS - M / W-BK (SPDT)		SU	087100
1	Power Supply	AQD (Size and Options as required)		SU	087100
1	Wiring Diagram	Elevation and Point to Point as Specified		OT	

Notes: System Operational Narrative:
• Door normally closed and secure.
• Exit Device has Nightlatch Function (Key will retract the exit device latch, door is latched when the key is removed).
• Access by valid credential presentation releasing the exit trim lever for a pre-determined time limit and then relocking.
• Egress always free for immediate exit. Request-to-Exit sensor allows exit without alarm condition.
• Door position switch provides open/closed monitoring to both access control system and intrusion alarm service.
• Exit Trim Lever remains locked (fail secure) in event of power loss.

Set: 6.0

Doors: 126B

3	Hinge, Hvy Wt (Storm Pro)	SP3386 (NRP and Size as Required)	US32D	MK	087100
1	Hinge, Hvy Wt (Storm Pro, PWR TRNS)	SP3386 QCx (# of Wires and Size as Required)	US32D	MK	087100
1	Mortised Exit Device (STRM, EL TRIM Fail Sec., RX, CD)	DG164 16 43 55 WS 8976-24v ETMD (Cyl. Dogging)	US32D	SA	087100
2	LFIC Core	Large Format Interchangeable Core - Keyed as directed by Owner	US15	SA	087100
1	Surface Closer	351 CPS (HD Cush STP Arm)	EN	SA	087100
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100
1	Threshold	273x224AFGT MSES25SS x Length Required		PE	087100
1	Gasketing	303AS (Head & Jambs)		PE	087100

1	Rain Guard	346C x Width of Frame Head	PE	087100
1	Sweep	3452CNB x Length Required	PE	087100
1	Harness Adaptor	52-2946	SA	
1	Card Reader	By Security Supplier		
1	ElectroLynx Harness (Door)	QC-C**** x Length Required	MK	087100
1	ElectroLynx Harness (Frame)	QC-C3000P	MK	087100
1	Position Switch	DPS - M / W-BK (SPDT)	SU	087100
1	Power Supply	AQD (Size and Options as required)	SU	087100
1	Wiring Diagram	Elevation and Point to Point as Specified	OT	

Notes: System Operational Narrative:
• Door normally closed and secure.
• Exit Device has Nightlatch Function (Key will retract the exit device latch, door is latched when the key is removed).
• Access by valid credential presentation releasing the exit trim lever for a pre-determined time limit and then relocking.
• Egress always free for immediate exit. Request-to-Exit sensor allows exit without alarm condition.
• Door position switch provides open/closed monitoring to both access control system and intrusion alarm service.
• Exit Trim Lever remains locked (fail secure) in event of power loss.

Set: 7.0

Doors: 211, 217B

2	Hinge, Full Mortise, Hvy Wt	T4A3386 (NRP and size as required)	US32D	MK	087100
1	Hinge, Full Mortised, Hvy Wt (PWR TRNS)	T4A3386-QCx (# of Wires and Size as Required)	US32D	MK	087100
1	EL Cyl. Lock (Fail Sec., RX)	DG164 RX 28 10G71-24V LJ	US26D	SA	087100
1	LFIC Core	Large Format Interchangeable Core - Keyed as directed by Owner	US15	SA	087100
1	Surface Closer	351 CPS (HD Cush STP Arm)	EN	SA	087100
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100
1	Threshold	273x224AFGT MSES25SS x Length Required		PE	087100
1	Gasketing	303AS (Head & Jambs)		PE	087100
1	Rain Guard	346C x Width of Frame Head		PE	087100
1	Sweep	3452CNB x Length Required		PE	087100
1	Card Reader	By Security Supplier			
1	ElectroLynx Harness (Door)	QC-C**** x Length Required		MK	087100
1	ElectroLynx Harness (Frame)	QC-C3000P		MK	087100
1	Position Switch	DPS - M / W-BK (SPDT)		SU	087100
1	Power Supply	AQD (Size and Options as required)		SU	087100
1	Wiring Diagram	Elevation and Point to Point as Specified		OT	

Notes: System Operational Narrative:
• Door normally closed and secure.
• Electrified Lockset has Storeroom Function (Key will retract latch to open door, door is locked when the key is removed).
• Access by valid credential presentation releasing the lockset lever for a pre-determined time limit and then relocking.
• Egress always free for immediate exit. Request-to-Exit sensor allows exit without alarm condition.
• Door position switch provides open/closed monitoring to both access control system and intrusion alarm service.
• Lockset Lever remains locked (fail secure) in event of power loss.

Set: 8.0

Doors: 124

3	Hinge, Hvy Wt (Storm Pro)	SP3386 (NRP and Size as Required)	US32D	MK	087100
1	Hinge, Hvy Wt (Storm Pro, PWR TRNS)	SP3386 QCx (# of Wires and Size as Required)	US32D	MK	087100
1	Electrified Multi-Point Mortised Lock (STRM, RX, Fail Sec.)	DG164 NAC-FM73281 LNMD	US32D	SA	087100
1	LFIC Core	Large Format Interchangeable Core - Keyed as directed by Owner	US15	SA	087100
1	Surface Closer	351 CPS (HD Cush STP Arm)	EN	SA	087100
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100
1	Threshold	273x224AFGT MSES25SS x Length Required		PE	087100
1	Gasketing	303AS (Head & Jambs)		PE	087100
1	Rain Guard	346C x Width of Frame Head		PE	087100
1	Sweep	3452CNB x Length Required		PE	087100
1	Card Reader	By Security Supplier			
1	ElectroLynx Harness (Door)	QC-C**** x Length Required		MK	087100
1	ElectroLynx Harness (Frame)	QC-C3000P		MK	087100
1	Position Switch	DPS - M / W-BK (SPDT)		SU	087100
1	Power Supply	AQD (Size and Options as required)		SU	087100
1	Wiring Diagram	Elevation and Point to Point as Specified		OT	

Notes: System Operational Narrative:
• Door normally closed and secure.
• Multi-Point Lock has Storeroom Function (Key will retract the latch to open door, door is locked when the key is removed).
• Access by valid credential presentation releasing the lockset lever for a pre-determined time limit and then relocking.
• Egress always free for immediate exit. Request-to-Exit sensor allows exit without alarm condition.
• Door position switch provides open/closed monitoring to both access control system and intrusion alarm service.
• Lockset Lever remains locked (fail secure) in event of power loss.

Set: 9.0

Doors: 601A

1	Continuous Hinge	CFM_SLF-HD1 x Length Required		PE	087100
1	Keypad Cylindrical Lock	DG164 28 KP10G77 LJ	US26D	SA	087100
1	LFIC Core	Large Format Interchangeable Core - Keyed as directed by Owner	US15	SA	087100
1	Surface Closer	351 CPS (HD Cush STP Arm)	EN	SA	087100
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100
1	Threshold	175A MSES25SS x Length Required		PE	087100
1	Gasketing	303AS (Head & Jambs)		PE	087100
1	Rain Guard	346C x Width of Frame Head		PE	087100
1	Sweep	3452CNB x Length Required		PE	087100

Notes: System Operational Narrative:
• Door normally closed and secure.
• Keyoad Lockset has Storeroom Function (Key will retract latch to open door, door is locked when the key is removed).
• Access by entering a valid digital code releasing the lockset lever to allow entry and then relocking.
• Egress always free for immediate exit.
• Lockset Lever remains locked (fail secure) in event of power loss. (Lockset is Battery Powered).

Set: 10.0

Doors: 431, 603, 702

6	Hinge, Full Mortise, Hvy Wt	T4A3386 (NRP and size as required)	US32D	MK	087100
1	Self Latching Flush Bolt Set	2845 / 2945 (as required)	US26D	RO	087100
1	Dust Proof Strike	570	US26D	RO	087100
1	Storeroom/Closet Lock	DG164 10XG04 LMD	US26D	SA	087100
1	LFIC Core	Large Format Interchangeable Core - Keyed as directed by Owner	US15	SA	087100
2	Surface Closer	351 CPS (HD Cush STP Arm)	EN	SA	087100
2	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100
1	Threshold	175A MSES25SS x Length Required		PE	087100
1	Gasketing	303AS (Head & Jambs)		PE	087100
1	Rain Guard	346C x Width of Frame Head		PE	087100
2	Sweep	3452CNB x Length Required		PE	087100
2	Astragal	29324CNB x Door Height		PE	087100
2	Position Switch	DPS - M / W-BK (SPDT)		SU	087100

Notes: System Operational Narrative:
• Door normally closed and secure.
• Door position switch provides open/closed monitoring to both access control system and intrusion alarm service.

Set: 11.0

Doors: 439A

3	Hinge, Full Mortise, Hvy Wt	T4A3386 (NRP and size as required)	US32D	MK	087100
1	Storeroom/Closet Lock	DG164 10XG04 LMD	US26D	SA	087100
1	LFIC Core	Large Format Interchangeable Core - Keyed as directed by Owner	US15	SA	087100
1	Surface Closer (TRI-PACK)	351 UO (RA or PA Arm as Required)	EN	SA	087100
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100
1	Wall Stop	403 (or) 441CU (As Required)	US26D	RO	087100
1	Threshold	175A MSES25SS x Length Required		PE	087100
1	Gasketing	303AS (Head & Jambs)		PE	087100
1	Rain Guard	346C x Width of Frame Head		PE	087100
1	Sweep	3452CNB x Length Required		PE	087100
1	Position Switch	DPS - M / W-BK (SPDT)		SU	087100

Notes: System Operational Narrative:
• Door normally closed and secure.
• Door position switch provides open/closed monitoring to both access control system and intrusion alarm service.

Set: 12.0

Doors: 604

3	Hinge, Full Mortise, Hvy Wt	T4A3386 (NRP and size as required)	US32D	MK	087100
1	Entry/Office Lock	DG164 10XG05 LMD	US26D	SA	087100
1	LFIC Core	Large Format Interchangeable Core - Keyed as directed by Owner	US15	SA	087100
1	Surface Closer (TRI-PACK)	351 UO (RA or PA Arm as Required)	EN	SA	087100
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100
1	Wall Stop	403 (or) 441CU (As Required)	US26D	RO	087100
1	Threshold	175A MSES25SS x Length Required		PE	087100
1	Gasketing	303AS (Head & Jambs)		PE	087100
1	Rain Guard	346C x Width of Frame Head		PE	087100
1	Sweep	3452CNB x Length Required		PE	087100

Set: 13.0

Doors: 100B

2	Continuous Hinge	CFM_SLF-HD1 x Length Required		PE	087100
2	Narrow CVR Exit Device (ELR, PASS)	43 56 AD8415 ETMD	US32D	SA	087100
2	Automatic Operator	6000 Series (Drop Plate as Required)	689	NO	087100

1	Gasketing	Provided By Door/Frame Supplier		OT	
2	Touchless Actuator Switch	700		NO	087100

Notes: Perimeter and meeting stile gasket by door / frame manufacturer.

Operation:
• Doors are normally closed. Passage Function - No Locking.
• When there is motion in close proximity to the actuator switch on either side of the opening the exit device latches will retract and the auto operators will open both doors of the pair for assisted entry or egress.
• The exit devices are fail secure and will latch in the absence of power.

Set: 14.0

Doors: 130B, 400B

1	Continuous Hinge	CFM_SLF-HD1 x Length Required		PE	087100
1	Narrow Rim Exit Device (PASS)	43 8515 ETMD	US32D	SA	087100
1	Surface Closer	351 CPS (HD Cush STP Arm)	EN	SA	087100
1	Drop Plate	351D (as required)	EN	SA	087100
1	Blade Stop Spacer Kit	581-1 or 2 (as required)	EN	SA	087100
1	Gasketing	Provided By Door/Frame Supplier		OT	

Notes: Perimeter Weatherstrip and astragals by the Aluminum Door Manufacturer.

Set: 15.0

Doors: 102

1	Continuous Hinge	CFM_SLF-HD1 x Length Required		PE	087100
1	Passage Latch	10XU15 LMD	US26D	SA	087100
1	Surface Closer (TRI-PACK)	351 UO (RA or PA Arm as Required)	EN	SA	087100
1	Wall Stop	403 (or) 441CU (As Required)	US26D	RO	087100
1	Gasketing	Provided By Door/Frame Supplier		OT	

Set: 16.0

Doors: 105

2	Hinge, Full Mortise, Hvy Wt	T4A3786 (NRP and size as required)	US26D	MK	087100
1	Hinge, Full Mortise, Hvy Wt (PWR TRNS)	T4A3786 QCx (# of Wires and Size as Required)	US26D	MK	087100
1	Rim Exit Device (EL TRIM Fail-Sec., RX, CD)	DG164 16 43 55 8876-24v ETMD (Cyl. Dogging)	US32D	SA	087100
2	LFIC Core	Large Format Interchangeable Core - Keyed as directed by Owner	US15	SA	087100
1	Surface Closer (TRI-PACK)	351 UO (RA or PA Arm as Required)	EN	SA	087100
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100

1	Wall Stop	403 (or) 441CU (As Required)	US26D	RO	087100
1	Silencer	608		RO	087100
1	Harness Adaptor	52-2946		SA	
1	Card Reader	By Security Supplier			
1	ElectroLynx Harness (Door)	QC-C**** x Length Required		MK	087100
1	ElectroLynx Harness (Frame)	QC-C3000P		MK	087100
1	Position Switch	DPS - M / W-BK (SPDT)		SU	087100
1	Power Supply	AQD (Size and Options as required)		SU	087100
1	Wiring Diagram	Elevation and Point to Point as Specified		OT	

Notes: System Operational Narrative:
• Door normally closed and secure.
• Exit Device has Nightlatch Function (Key will retract the exit device latch, door is latched when the key is removed).
• Access by valid credential presentation releasing the exit trim lever for a pre-determined time limit and then relocking.
• Egress always free for immediate exit. Request-to-Exit sensor allows exit without alarm condition.
• Door position switch provides open/closed monitoring to both access control system and intrusion alarm service.
• Exit Trim Lever remains locked (fail secure) in event of power loss.

Set: 17.0

Doors: 131A

3	Hinge, Full Mortise, Hvy Wt	T4A3786 (NRP and size as required)	US26D	MK	087100
1	Rim Exit Device (EO, Less Dogging)	LD 43 8810 EO	US32D	SA	087100
1	Surface Closer	351 CPS (HD Cush STP Arm)	EN	SA	087100
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100
3	Silencer	608		RO	087100

Notes: Exit Only, No Pull Side hardware or Access

Set: 18.0

Doors: 311B

3	Hinge, Full Mortise, Hvy Wt	T4A3786 (NRP and size as required)	US26D	MK	087100
1	Rim Exit Device (PASS)	43 8815 ETMD	US32D	SA	087100
1	Surf Overhead Stop	10-X36 (Size as Required)	630	RF	087100
1	Surface Closer (TRI-PACK)	351 UO (RA or PA Arm as Required)	EN	SA	087100
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100
3	Silencer	608		RO	087100

Set: 19.0

Doors: 434

5	Hinge, Full Mortise, Hvy Wt	T4A3786 (NRP and size as required)	US26D	MK	087100
1	Hinge, Full Mortise, Hvy Wt (PWR TRNS)	T4A3786 QCx (# of Wires and Size as Required)	US26D	MK	087100
1	Self Latching Flush Bolt Set	2845 / 2945 (as required)	US26D	RO	087100
1	Dust Proof Strike	570	US26D	RO	087100
1	EL Cyl. Lock (Fail Sec., RX)	DG164 RX 28 10G71-24V LJ	US26D	SA	087100
1	LFIC Core	Large Format Interchangeable Core - Keyed as directed by Owner	US15	SA	087100
2	Surface Closer	351 CPS (HD Cush STP Arm)	EN	SA	087100
2	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100
2	Silencer	608		RO	087100
1	Card Reader	By Security Supplier			
1	ElectroLynx Harness (Door)	QC-C**** x Length Required		MK	087100
1	ElectroLynx Harness (Frame)	QC-C3000P		MK	087100
2	Position Switch	DPS - M / W-BK (SPDT)		SU	087100
1	Power Supply	AQD (Size and Options as required)		SU	087100
1	Wiring Diagram	Elevation and Point to Point as Specified		OT	

Notes: System Operational Narrative:
• Door normally closed and secure.
• Electrified Lockset has Storeroom Function (Key will retract latch to open door, door is locked when the key is removed).
• Access by valid credential presentation releasing the lockset lever for a pre-determined time limit and then relocking.
• Egress always free for immediate exit. Request-to-Exit sensor allows exit without alarm condition.
• Door position switch provides open/closed monitoring to both access control system and intrusion alarm service.
• Lockset Lever remains locked (fail secure) in event of power loss.

Set: 20.0

Doors: 106, 116, 132

2	Hinge, Full Mortise, Hvy Wt	T4A3786 (NRP and size as required)	US26D	MK	087100
1	Hinge, Full Mortise, Hvy Wt (PWR TRNS)	T4A3786 QCx (# of Wires and Size as Required)	US26D	MK	087100
1	EL Cyl. Lock (Fail Sec., RX)	DG164 RX 28 10G71-24V LJ	US26D	SA	087100
1	LFIC Core	Large Format Interchangeable Core - Keyed as directed by Owner	US15	SA	087100
1	Surface Closer (TRI-PACK)	351 UO (RA or PA Arm as Required)	EN	SA	087100
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100
1	Wall Stop	403 (or) 441CU (As Required)	US26D	RO	087100
1	Silencer	608		RO	087100
1	Card Reader	By Security Supplier			
1	ElectroLynx Harness (Door)	QC-C**** x Length Required		MK	087100

1	ElectroLynx Harness (Frame)	QC-C3000P	MK	087100
1	Position Switch	DPS - M / W-BK (SPDT)	SU	087100
1	Power Supply	AQD (Size and Options as required)	SU	087100
1	Wiring Diagram	Elevation and Point to Point as Specified	OT	

Notes: System Operational Narrative:
• Door normally closed and secure.
• Electrified Lockset has Storeroom Function (Key will retract latch to open door, door is locked when the key is removed).
• Access by valid credential presentation releasing the lockset lever for a pre-determined time limit and then relocking.
• Egress always free for immediate exit. Request-to-Exit sensor allows exit without alarm condition.
• Door position switch provides open/closed monitoring to both access control system and intrusion alarm service.
• Lockset Lever remains locked (fail secure) in event of power loss.

Set: 21.0

Doors: 119B

2	Hinge, Full Mortise, Hvy Wt	T4A3786 (NRP and size as required)	US26D	MK	087100
1	Hinge, Full Mortise, Hvy Wt (PWR TRNS)	T4A3786 QCx (# of Wires and Size as Required)	US26D	MK	087100
1	EL Cyl. Lock (Fail Sec., RX)	DG164 RX 28 10G71-24V LJ	US26D	SA	087100
1	LFIC Core	Large Format Interchangeable Core - Keyed as directed by Owner	US15	SA	087100
1	Surf Overhead Stop	10-X36 (Size as Required)	630	RF	087100
1	Surface Closer (TRI-PACK)	351 UO (RA or PA Arm as Required)	EN	SA	087100
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100
1	Silencer	608		RO	087100
1	Card Reader	By Security Supplier			
1	ElectroLynx Harness (Door)	QC-C**** x Length Required		MK	087100
1	ElectroLynx Harness (Frame)	QC-C3000P		MK	087100
1	Position Switch	DPS - M / W-BK (SPDT)		SU	087100
1	Power Supply	AQD (Size and Options as required)		SU	087100
1	Wiring Diagram	Elevation and Point to Point as Specified		OT	

Notes: System Operational Narrative:
• Door normally closed and secure.
• Electrified Lockset has Storeroom Function (Key will retract latch to open door, door is locked when the key is removed).
• Access by valid credential presentation releasing the lockset lever for a pre-determined time limit and then relocking.
• Egress always free for immediate exit. Request-to-Exit sensor allows exit without alarm condition.
• Door position switch provides open/closed monitoring to both access control system and intrusion

alarm service.
• Lockset Lever remains locked (fail secure) in event of power loss.

Set: 22.0

Doors: 118

6	Hinge, Full Mortise	TA2714 (NRP and size as required)	US26D	MK	087100
1	Self Latching Flush Bolt Set	2845 / 2945 (as required)	US26D	RO	087100
1	Dust Proof Strike	570	US26D	RO	087100
1	Storeroom/Closet Lock	DG164 10XG04 LMD	US26D	SA	087100
1	LFIC Core	Large Format Interchangeable Core - Keyed as directed by Owner	US15	SA	087100
2	Surf Overhead Stop	10-X36 (Size as Required)	630	RF	087100
2	Silencer	608		RO	087100

Set: 23.0

Doors: 111

3	Hinge, Full Mortise	TA2714 (NRP and size as required)	US26D	MK	087100
1	Storeroom/Closet Lock	DG164 10XG04 LMD	US26D	SA	087100
1	LFIC Core	Large Format Interchangeable Core - Keyed as directed by Owner	US15	SA	087100
1	Surf Overhead Stop	10-X36 (Size as Required)	630	RF	087100
3	Silencer	608		RO	087100

Set: 24.0

Doors: 104, 128, 133, 210, 405

3	Hinge, Full Mortise	TA2714 (NRP and size as required)	US26D	MK	087100
1	Storeroom/Closet Lock	DG164 10XG04 LMD	US26D	SA	087100
1	LFIC Core	Large Format Interchangeable Core - Keyed as directed by Owner	US15	SA	087100
1	Surface Closer (TRI-PACK)	351 UO (RA or PA Arm as Required)	EN	SA	087100
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100
1	Wall Stop	403 (or) 441CU (As Required)	US26D	RO	087100
3	Silencer	608		RO	087100

Set: 25.0

Doors: 212, 435

3	Hinge, Full Mortise	TA2714 (NRP and size as required)	US26D	MK	087100
1	Storeroom/Closet Lock	DG164 10XG04 LMD	US26D	SA	087100

1	LFIC Core	Large Format Interchangeable Core - Keyed as directed by Owner	US15	SA	087100
1	Surface Closer	351 CPS (HD Cush STP Arm)	EN	SA	087100
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100
3	Silencer	608		RO	087100

Set: 26.0

Doors: 109A, 109B, 110, 113, 114, 119A, 201, 202, 204, 205, 206, 302, 303, 304, 305, 315, 406, 407, 408

3	Hinge, Full Mortise	TA2714 (NRP and size as required)	US26D	MK	087100
1	Entry/Office Lock	DG164 10XG05 LMD	US26D	SA	087100
1	LFIC Core	Large Format Interchangeable Core - Keyed as directed by Owner	US15	SA	087100
1	Wall Stop	403 (or) 441CU (As Required)	US26D	RO	087100
1	Silencer	608		RO	087100

Set: 27.0

Doors: 115A

3	Hinge, Full Mortise	TA2714 (NRP and size as required)	US26D	MK	087100
1	Entry/Office Lock	DG164 10XG05 LMD	US26D	SA	087100
1	LFIC Core	Large Format Interchangeable Core - Keyed as directed by Owner	US15	SA	087100
1	Surface Closer (TRI-PACK)	351 UO (RA or PA Arm as Required)	EN	SA	087100
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100
1	Wall Stop	403 (or) 441CU (As Required)	US26D	RO	087100
1	Silencer	608		RO	087100

Set: 28.0

Doors: 123

3	Hinge, Full Mortise	TA2714 (NRP and size as required)	US26D	MK	087100
1	Privacy Lock	10XU65 LMD	US26D	SA	087100
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100
1	Wall Stop	403 (or) 441CU (As Required)	US26D	RO	087100
1	Silencer	608		RO	087100
1	Coat Hook	RM801	US26D	RO	087100

Set: 29.0

Doors: 103, 107, 121, 215, 312, 313, 401, 432, 433

3	Hinge, Full Mortise	TA2714 (NRP and size as required)	US26D	MK	087100
1	Privacy Lock	10XU65 LMD	US26D	SA	087100
1	Surface Closer (TRI-PACK)	351 UO (RA or PA Arm as Required)	EN	SA	087100
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100
1	Wall Stop	403 (or) 441CU (As Required)	US26D	RO	087100
3	Silencer	608		RO	087100
1	Coat Hook	RM801	US26D	RO	087100

Set: 30.0

Doors: 126A

8	Hinge, Full Mortise, Hvy Wt	T4A3786 (NRP and size as required)	US26D	MK	087100
1	Self Latching Flush Bolt Set	2845 / 2945 (as required)	US26D	RO	087100
1	Dust Proof Strike	570	US26D	RO	087100
1	Multi-Point Mortised Lock (Dormitory w/DB)	DG164 FM7325 LNMD	US32D	SA	087100
2	Surface Closer (TRI-PACK)	351 UO (RA or PA Arm as Required)	EN	SA	087100
2	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100
2	Door Stop & Holder	490	US26D	RO	087100
2	Silencer	608		RO	087100

Set: 31.0

Doors: 424

6	Hinge, Full Mortise	TA2714 (NRP and size as required)	US26D	MK	087100
1	Self Latching Flush Bolt Set	2845 / 2945 (as required)	US26D	RO	087100
1	Dust Proof Strike	570	US26D	RO	087100
1	Passage Latch	10XU15 LMD	US26D	SA	087100
2	Surface Closer	351 CPS (HD Cush STP Arm)	EN	SA	087100
2	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100
2	Silencer	608		RO	087100

Set: 31.1

Doors: 439B

6	Hinge, Full Mortise	TA2714 (NRP and size as required)	US26D	MK	087100
1	Self Latching Flush Bolt Set	2845 / 2945 (as required)	US26D	RO	087100
1	Dust Proof Strike	570	US26D	RO	087100
1	Passage Latch	10XU15 LMD	US26D	SA	087100
2	Surface Closer	351 CPS (HD Cush STP Arm)	EN	SA	087100
2	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100

1	Gasketing	S88BL (Head & Jambs)		PE	087100
1	Astragal	S772BL x Door Height		PE	087100

Set: 32.0

Doors: 122, 438

3	Hinge, Full Mortise	TA2714 (NRP and size as required)	US26D	MK	087100
1	Passage Latch	10XU15 LMD	US26D	SA	087100
1	Wall Stop	403 (or) 441CU (As Required)	US26D	RO	087100
3	Silencer	608		RO	087100

Set: 33.0

Doors: 134, 436

3	Hinge, Full Mortise	TA2714 (NRP and size as required)	US26D	MK	087100
1	Passage Latch	10XU15 LMD	US26D	SA	087100
1	Surf Overhead Stop	10-X36 (Size as Required)	630	RF	087100
3	Silencer	608		RO	087100

Set: 34.0

Doors: 115B, 120, 127, 300, 317A, 318A, 404, 437C

3	Hinge, Full Mortise	TA2714 (NRP and size as required)	US26D	MK	087100
1	Passage Latch	10XU15 LMD	US26D	SA	087100
1	Surface Closer (TRI-PACK)	351 UO (RA or PA Arm as Required)	EN	SA	087100
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100
1	Wall Stop	403 (or) 441CU (As Required)	US26D	RO	087100
3	Silencer	608		RO	087100

Set: 34.1

Doors: 131B

3	Hinge, Full Mortise, Hvy Wt	T4A3786 (NRP and size as required)	US26D	MK	087100
1	Passage Latch	10XU15 LMD	US26D	SA	087100
1	Surface Closer (TRI-PACK)	351 UO (RA or PA Arm as Required)	EN	SA	087100
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100
1	Wall Stop	403 (or) 441CU (As Required)	US26D	RO	087100
3	Silencer	608		RO	087100

Set: 35.0

Doors: 125

4	Hinge, Hvy Wt (Storm Pro)	SP3786 (NRP and Size as Required)	US26D	MK	087100

1	Multi-Point Mortised Lock (Dormitory w/DB)	DG164 FM7325 LNMD	US32D	SA	087100
1	Surface Closer (TRI-PACK)	351 UO (RA or PA Arm as Required)	EN	SA	087100
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100
1	Wall Stop	403 (or) 441CU (As Required)	US26D	RO	087100
3	Silencer	608		RO	087100

Set: 36.0

Doors: 317C, 437A, 437F

3	Hinge, Full Mortise	TA2714 (NRP and size as required)	US26D	MK	087100
1	Passage Latch	10XU15 LMD	US26D	SA	087100
1	Surface Closer	351 CPS (HD Cush STP Arm)	EN	SA	087100
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100
3	Silencer	608		RO	087100

Set: 37.0

Doors: 217A

3	Hinge, Full Mortise	TA2714 (NRP and size as required)	US26D	MK	087100
1	Passage Latch	10XU15 LMD	US26D	SA	087100
1	Surface Closer	351 CPS (HD Cush STP Arm)	EN	SA	087100
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100
1	Wall Stop	403 (or) 441CU (As Required)	US26D	RO	087100
1	Gasketing	S88BL (Head & Jambs)		PE	087100
1	Sweep	3452CNB x Length Required		PE	087100

Set: 38.0

Doors: 318D

3	Hinge, Full Mortise	TA2714 (NRP and size as required)	US26D	MK	087100
1	Exit Deadlock	4879	US32D	SA	087100
1	Push Plate	70C-RKW	US32D	RO	087100
1	Surface Closer	351 CPS (HD Cush STP Arm)	EN	SA	087100
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100
1	Silencer	608		RO	087100

Notes: No Pull Side Hardware or Access

Set: 39.0

Doors: 217C, 318C, 437B, 437E, 602, 701

1	LFIC Core	Large Format Interchangeable Core - Keyed as directed by Owner	US15	SA	087100
1	LFIC Cylinder Housing	type as required	US32D	SA	087100
1		All Hardware Provided By Door Supplier			

Notes: Manual Operation

Set: 40.0

Doors: 413A, 414, 415, 416, 417, 419, 420A, 421A, 422, 423A, 425A, 426, 427A, 428A, 601B, 601C

1	LFIC Core	Large Format Interchangeable Core - Keyed as directed by Owner	US15	SA	087100
1	LFIC Cylinder Housing	type as required	US32D	SA	087100
1		All Hardware Provided By Door Supplier			

Notes: Motorized Operation

Set: 41.0

Doors: MISC

1	Software	KW-SS1		SA	087100
1	Repair Kit	QC-R001		MK	087100
1	Crimp Tool	QC-R003		MK	087100
1	Test Unit	WT2		SA	087100
1	Key Management System	EA-100117		MC	087100
1	Key Cabinet	1200 Series x Mounting Brackets & Capacity As Required		LU	

END OF SECTION 087100

SECTION 133419 - METAL BUILDING SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Structural-steel framing.
2. Thermal roof insulation.
3. Accessories.

1.2 SUBMITTALS

A. Product Data: For each type of metal building system component.

B. Shop Drawings: For metal building system components. Include plans, elevations, sections, details, and attachments to other work.

C. Samples: For each type of exposed finish required.

D. Delegated-Design Submittal: For metal building systems indicated to comply with performance requirements and design criteria, including analysis data and calculations signed and sealed by the qualified professional engineer responsible for their preparation. Details and plans outline basic connection types between metal building components and structural steel components. Beam to Beam and Beam to Column connections shall be sized by metal building professional engineer as standard AISC, Type 2, Bearing connections capable of supporting reactions developed by maximum uniform load capacity on a simple span for beam and beam span given.

E. Welding certificates.

F. Metal Building System Certificates: For each type of metal building system, from manufacturer.
1. Letter of Design Certification: Signed and sealed by a qualified professional engineer. Include the following:
a. Name and location of Project.
b. Order number.
c. Name of manufacturer.
d. Name of Contractor.
e. Building dimensions including width, length, height, and roof slope.
f. Indicate compliance with AISC standards for hot-rolled steel and AISI standards for cold-rolled steel, including edition dates of each standard.
g. Governing building code and year of edition.
h. 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).
i. Load Combinations: Indicate that loads were applied acting simultaneously with concentrated loads, according to governing building code.
j. Building-Use Category: Indicate category of building use and its effect on load importance factors.

G. Material test reports.

H. Source quality-control reports.

I. Field quality-control reports.

J. Maintenance data.

K. Warranties: Sample of special warranties.

1.3 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer.
   1. Engineering Responsibility: Preparation of Shop Drawings and comprehensive engineering analysis by a qualified professional engineer.

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."

D. Structural Steel: Comply with AISC 360, "Specification for Structural Steel Buildings," for design requirements and allowable stresses.

E. 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.

F. Preinstallation Conference: Conduct conference at Project site.

1.4 WARRANTY
   1. Manufacturer’s standard one year warranty on materials and workmanship.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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. A&S Building Systems, Inc.; Division of NCI Building Systems, L.P.
   2. Alliance Steel
   3. American Buildings Company; A Nucor Company
   4. Butler Manufacturing Company; a BlueScope Steel company.
   5. CBC Steel Buildings; A Nucor Company
   6. Ceco Building Systems; Division of NCI Building Systems, L.P.
   7. Garco Building Systems; Division of NCI Building Systems, L.P..
   8. Mesco Building Solutions; Division of NCI Building Systems, L.P.
   9. Metallic Building Company; Division of NCI Building Systems, L.P.
   10. Metco Metal Supply.
   11. Mid-West Steel Building Company; Division of NCI Building Systems, L.P.
   12. Nucor Building Systems A Nucor Company.
   13. Olympia Steel Building Systems.
   14. Pinnacle Structures, Inc.
   15. Star Building Systems; an NCI company.
   16. United Structures of America
   17. VP Buildings; a BlueScope Steel Company

18. Vulcan Steel Structures, Inc.

2.2 METAL BUILDING SYSTEM PERFORMANCE

A. Delegated Design: Design metal building system, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

B. Structural Performance: Metal building systems shall be designed according to procedures in MBMA's "Metal Building Systems Manual."
   1. Design Loads: As indicated on Drawings.
   2. Deflection Limits: Design metal building system assemblies to withstand design loads with deflections no greater than the following:
      a. Purlins: Vertical deflection of 1/150 of the span (L, S, or W). Vertical deflection of 1/120 of the span (D+L).
      b. Rafters: Vertical deflection of 1/180 of the span (L, S, or W). Vertical deflection of 1/120 of the span (D+L).
      c. Girts: Horizontal deflection of 1/90 of the span.
      d. Metal Roof Panels: Vertical deflection of 1/180 of the distance between purlins (L, S, or W). Vertical deflection of 1/150 of the distance between purlins (D+L).
      e. Metal Wall Panels: Horizontal deflection of 1/120 of the span.
      f. Design secondary-framing system to accommodate deflection of primary framing and construction tolerances, and to maintain clearances at openings.
   3. Drift Limits: Engineer building structure to withstand design loads with lateral drift limits no greater than the following:
      a. Wall Panels: Maximum of 1/120 of the distance between wall girts.
      b. Wall girts: Maximum of 1/150 of the bay length.
      c. Columns: Maximum 1/180 of the column height.
      d. Main frames: maximum 1/180 of the eave height.
      e. Any element for which CMU or other brittle system is supported: 1/400 of span.
   4. Metal panel assemblies shall withstand the effects of gravity loads and loads and stresses within limits and under conditions indicated according to ASTM E 1592.

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

D. Thermal Movements: Allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base engineering calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
   1. Temperature Change (Range): 120 deg F, material surfaces.

2.3 STRUCTURAL-STEEL FRAMING

A. Primary Framing: Manufacturer’s Rigid Frame (RF Series) solid web framing consisting of tapered or uniform depth rafters rigidly connected to tapered or uniform depth columns. System to be designed to withstand required loads and specified requirements. Primary framing includes transverse and lean-to frames; rafter, rake, and canopy beams; sidewall, intermediate, end-wall, and corner columns; connections; and wind bracing.
   1. General: Provide frames with attachment plates, bearing plates, and splice members. Factory drill for field-bolted assembly.

B. End-Wall Framing: Manufacturer's standard primary end-wall framing fabricated for field-bolted assembly.

C. 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.

D. Bolts: Provide plain-finish bolts for structural-framing components that are primed or finish painted. Provide zinc-plated or hot-dip galvanized bolts for structural-framing components that are galvanized.

E. Wind Bracing: Portal, torsional, diagonal bracing or diaphragm in accordance with manufacturer's standard design practices; utilizing rods, angles, and other members, with minimum yield strengths as required for design but in most cases, 50 ksi.

F. Primary Frame Flange Bracing: Attached from purlins or girts to the primary framing, minimum yield strength as required for design but in most cases 60 ksi.

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

2.4 MISCELLANEOUS FRAMING

A. Base Angles: 2 inch by 3 inch by 0.059 inch (50 mm by 75 mm by 1.5 mm) galvanized steel angles, with minimum yield strength of 55 ksi (380 MPa), anchored to the floor slab or grade beam with power driven fasteners or equivalent at a maximum spacing of 4 feet (1220 mm) on center and not more than 6 inches (150 mm) from the end of any angle member. Anchors are not provided by the metal building manufacturer.

B. Door Headers and Jambs: Zee- or Cee-shaped; depth as required; with minimum yield strength of 60 ksi (410 MPa).

2.5 INSULATION

A. See section 072100 for insulation.

2.6 METAL ROOF PANELS

A. See section 074113 for metal roof panels.

2.7 METAL WALL PANELS

A. See section 074213 for metal wall panels.

2.8 METAL LINER PANELS

A. See section 074215 for metal liner panels.

2.9 ACCESSORIES this section may deleted if covered in section 076200

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. Flashing and Trim: Formed from 0.022-inch nominal-thickness, metallic-coated steel sheet or aluminum-zinc alloy-coated steel sheet prepainted with coil coating; finished to match adjacent metal panels.

C. Gutters: 24 gage verify to match accessories in metal panel spec., metallic-coated steel sheet or aluminum-zinc alloy-coated steel sheet 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.

D. Downspouts: 24 gage verify to match accessories in metal panel spec, zinc-coated (galvanized) steel sheet or aluminum-zinc alloy-coated steel sheet 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.
   .
2. Continuous or Sectional-Ridge Type: Factory-engineered and -fabricated, continuous unit; 24 gage, metallic-coated steel sheet or aluminum-zinc alloy-coated steel sheet prepainted with coil coating; finished to match metal roof panels. Fabricated in minimum 10-foot- long sections. Provide throat size and total length indicated, complete with side baffles, ventilator assembly, end caps, splice plates, and reinforcing diaphragms.
   a. Bird Screening: Galvanized steel or aluminum

E. Interior metal liner panels: select one less expensive 26 ga Butlerib® II panels exposed fasteners as furnished by Butler Manufacturing Company and installed in accordance with the manufacturer's instructions. more expensive Equal to Pac-Clad 11” wide 24 gage flush panels with concealed fastening. Panel height to be 8’-0” and attached to metal building system girts. Finish to be Kynar 500 and selected from standard colors.

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

2.10 SOURCE QUALITY CONTROL

A. Testing Agency: Contractor will engage a qualified testing agency to evaluate field welds and bolt connections as required per International Building Code.

B. Special Inspector: Contractor will engage a qualified special inspector to perform the following tests and inspections and to submit reports. Special inspector will verify that manufacturer maintains detailed fabrication and quality-control procedures and will review the completeness and adequacy of those procedures to perform the Work.

1. Special inspections will not be required if fabrication is performed by manufacturer registered and approved by authorities having jurisdiction to perform such Work without special inspection.
   a. After fabrication, submit copy of certificate of compliance to authorities having jurisdiction, certifying that Work was performed according to Contract requirements.

C. Testing: Test and inspect field connections for metal buildings according to the following:
   1. Bolted Connections: Shop-bolted connections shall be tested and inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
   2. Field Welded Connections: In addition to visual inspection, connections shall be tested and inspected according to AWS D1.1/D1.1M and the following inspection procedures, at inspector's option:
      a. Liquid Penetrant Inspection: ASTM E 165.
      b. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
      c. Ultrasonic Inspection: ASTM E 164.
      d. Radiographic Inspection: ASTM E 94.

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

E. Prepare test and inspection reports.

2.11 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 shall 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 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.

D. Secondary Framing: Shop fabricate framing components to size and section by roll-forming or break-forming. Cut, form, punch, drill, and weld secondary framing for bolted field connections to primary framing.

PART 3 - EXECUTION

3.1 ERECTION OF STRUCTURAL FRAMING

A. Erect metal building system according to manufacturer's written erection instructions and erection 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. Base and Bearing Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials and roughen surfaces prior to setting plates. Clean bottom surface of plates.
   1. Set plates for structural members on wedges, shims, or setting nuts as required.

2. Tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of plate before packing with grout.
3. Promptly pack grout solidly between bearing surfaces and plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for shrinkage-resistant grouts.

E. 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.
2. Make allowances for difference between temperature at time of erection and mean temperature when structure will be completed and in service.

F. 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 ASTM A 325 or A 490 Bolts" for bolt type and joint type specified.
   a. Joint Type: Snug tightened or pretensioned.

G. 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. Locate canopy framing as indicated.
4. Provide supplemental framing at entire perimeter of openings, including doors, windows, louvers, ventilators, and other penetrations of roof and walls.

H. Steel Joists: Install joists and accessories plumb, square, and true to line; securely fasten to supporting construction according to SJI's "Standard Specifications and Load Tables for Steel Joists and Joist Girders," joist manufacturer's written instructions, and requirements in this Section.
1. Before installation, splice joists delivered to Project site in more than one piece.
2. Space, adjust, and align joists accurately in location before permanently fastening.
3. Install temporary bracing and erection bridging, connections, and anchors to ensure that joists are stabilized during construction.
4. Bolt joists to supporting steel framework using carbon-steel bolts unless high-strength structural bolts are required by the manufacturer.
5. Comply with RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for high-strength structural bolt installation and tightening requirements.
6. Install and connect bridging concurrently with joist erection, before construction loads are applied. Anchor ends of bridging lines at top and bottom chords if terminating at walls or beams.

I. 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.

J. 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.

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

3.2 ACCESSORY INSTALLATION some of this section may deleted if covered in section 076200

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 as indicated. 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.
   2. Tie downspouts to underground drainage system indicated.

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

END OF SECTION 133419

SECTION 230923 - DIRECT-DIGITAL CONTROL FOR HVAC

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. System Description.

B. Operator Interface.

C. Controllers.

D. Electrical Control Power Wiring and Low Voltage Wiring.

E. Local Area Network.

F. System Software.

G. Controller Software.

1.2 REFERENCE STANDARDS

A. ANSI/CEA 709.1.D - Control Network Protocol Specification; 2014.

B. ASHRAE Std 135 - BACnet - A Data Communication Protocol for Building Automation and Control Networks; most current edition.

C. IEEE C37.90.1 – IEEE Standard for Surge Withstand Capability (SWC) Tests for Relays and Relay Systems Associated with Electric Power Apparatus, most current edition.

D. IEEE C62.41.2 – IEEE Recommended Practice on Characterization of Surges in Low-Voltage (1000 V and less) AC Power Circuits, most current edition.

E. ISO 7498 – Information Processing Systems – Open System Interconnection – Basis Reference Model, International Standards Organization, most current edition.

F. NEMA – National Electrical Manufacturers Association.

G. NFPA 70 - National Electrical Code; National Fire Protection Association; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Conduct a preinstallation meeting one week prior to the start of the work of this section; require attendance by all affected installers.

1.4 DEFINITIONS

A. ASC: Application Specific Controller. Examples include controllers for specific applications (e.g., FCU, VAV box, etc.) that can be configured through any network services software.

A. ATU: Air Terminal Unit (e.g., VAV boxes, fan-powered boxes, fan coil units).

B. BAS: Building Automation System.

C. BTL: BACnet Testing Laboratories. Third party independent testing and listing program for devices which have been tested according to ASHRAE Standard 135.

D. Control Wiring: Includes conduit, wire and wiring devices to install complete control systems including motor control circuits, interlocks, thermostats, EP and IP switches and like devices. Includes all wiring from Intelligent Devices and Controllers to all sensors and points defined in the input/output summary shown on the drawings or specified herein and required to execute the sequence of operations

E. DDC: Direct Digital Control.

F. EMT: Electrical Metallic Tubing

G. High voltage: 50 volts or higher.

H. IP: Internet Protocol.

I. LAN: Local Area Network.

J. VLAN: Virtual Local Area Network.

K. Low voltage: Below 50 volts.

L. OSI: Open System Interconnection

M. PC: Personal Computer.

N. PICS: Protocol Implementation Conformance Statement.

O. Point: Point is a generic term used to describe a single item of information in a BAS. Points may be further described as input, output, digital, binary, discrete, analog, modulating, internal, external, virtual or global. Each unique point used by digital controllers, or in a BAS, is typically identified by an address.

1.5 CONTRACTOR RESPONSIBILITIES

A. Reference sections the following sections for additional contractor responsibilities and coordination:

1. Division 23 Section “Electrical Coordination for Mechanical Equipment.”
2. Division 23 Section “Instrumentation and Control Devices for HVAC.”

B. Reference Part 3 for additional electrical contractor responsibilities for BAS controls.

1.6 SUBMITTALS

A. Refer to Division 01 and Division 23 Section “General Mechanical Requirements” for submittal procedures.

B. General:

1. The drawings and specifications are not intended to show all details. The BAS contractor shall secure satisfactory information before submitting the proposal and include in the proposal a sum sufficient to cover all items of labor and material required for the complete installation for the devices and system described.
2. Inform Engineer in writing of any deviation in the exhibits submitted from the requirements of the drawings, specifications, and sequences of operations.

C. Product Data:

1. Submit manufacturer technical data for each system component and software module required for a complete installation.
1. Indicate dimensions, weights, and enclosure construction for all BAS distributed controllers.
2. Submit technical data on all new software supplied including description of functions performed by software and location within the system where software shall reside. Include all software licensing agreements.
3. Submit the PICS for each BACnet device used in the BAS.

D. Power and Communication Wiring Transient Protection:

1. Submit catalog data sheets providing evidence that all BAS products offered by the manufacturer are tested and comply with IEEE C62.41.2.
2. Testing shall include power and communication trunk wiring.
3. Compliance with IEEE C62.41.2 shall imply conformance with IEEE C37.90.1based on the stated position of ANSI and IEEE.

E. Shop Drawings:

1. Submit a trunk cable schematic showing locations of all programmable control units, controllers, and workstations, with associated network wiring.
   a. Indicate equipment served by each controller on the diagram.
   b. Indicate switches, power requirements to each controller, and daisy chained controllers.
2. Submit detailed schematic control drawings for each controlled device and equipment.
   c. Reference all control components to manufacturer make and model number.
   d. Include all control and power wiring with termination point (controller and terminal number).
   e. Include clearly indicated and written sequences of operation referenced to specific control components (e.g., "shall modulate valve V-3").
   f. Include default position (e.g., N.O., N.C., etc.) for all components where applicable.
   g. Clearly differentiate between existing components and new components.
   a. Include detailed wiring diagrams showing methods of connections to VFDs, motor starters, energy meters, and all other devices, and all other field wiring necessary for system installation.
   b. The use of ”typicals” will be allowed where appropriate.
2. Submit detailed drawings for each individual BAS distributed controller.
   a. Include controller identification.
   b. Include components included in the controller.
   c. Include numbering of terminals and communications ports.

d. List connected data points, including connected control unit and input device.
e. Include type of cable connected to each terminal port.
f. Identify specific field devices wired to each terminal including identification of each field device and application.
g. Clearly differentiate between existing controllers and new controllers.
h. Indicate source (electrical panel ID) of 120V power to each panel to which 120V power is connected.
i. Indicate method of connecting controller to equipment supplied by others and to existing communications networks.

3. Submit floor plans that indicate the following:
   a. Location of all new BAS distributed controllers and control panels.
   b. Routing of all new building level network communications wiring not located in mechanical and electrical rooms.
   c. Routing of wiring to controllers, sensors, and control points not located in mechanical and electrical rooms.
   d. Location of building system connection to Owner's campus wide data network.
4. Submit methods and materials used to integrate into existing networks.
5. All control drawings and schematics shall be generated using AutoCAD software or equivalent. All project drawings shall be supplied to the Owner in a format as desired by the Owner upon project completion.
3. Submit system identification nomenclature.
   a. Nomenclature shall be consistent throughout the network and consistent with any existing networks that are integrated. If not defined, nomenclature shall be similar to the point names shown on the drawings.
6. Indicate system graphics indicating monitored systems, data (connected and calculated) and operator notations.
   a. Submit example graphic visualizations and screenshots for the BAS. At a minimum, submit examples for major HVAC equipment components, including chillers, boilers, air handling units, fan coil units, heat pumps, fans, etc.
   b. Font size and type shall be manufacturer standard.
   c. Provide graphics demonstration package in a format as desired by the Owner.
7. Indicate description and sequence of operation of operating, user, and application software.

F. Manufacturer's Instructions: Indicate manufacturer's installation instructions for all manufactured components.

G. Manufacturer's qualification statement.

H. Installer's qualification statement.

I. Project Record Documents: Record actual locations of control components, including control units, thermostats, and sensors.

1. Revise shop drawings to reflect actual installation and operating sequences.
2. Include submittals data in final "Record Documents" form.
3. All additions or changes to the BAS during the course of construction shall be reflected upon the drawings and submitted to the Engineer before project close-out.

J. Testing and Commissioning Reports and Checklists: Submit completed versions of all reports and checklists, along with all trend logs, used to meet the requirements of Part 3, Startup and Demonstration.

K. Operation and Maintenance Data:

1. Include maintenance data and recommended spare parts list for digital control equipment and control components.
2. Include trouble-shooting maintenance guides.
3. Include interconnection wiring diagrams showing complete field installed systems with identified and numbered system components and devices.
4. Include keyboard illustrations and step-by-step procedures indexed for each operator function.
5. Include inspection period, cleaning methods, cleaning materials recommended, and calibration tolerances.
6. Include a maintenance manual which contains the information listed above, product data, shop drawings, final software code for sequences of operation and maintenance data in accordance with requirements of Division 01.
7. Include logbook for documentation of software updates and patches applied BAS for the time period included in the software licensing agreement.
8. Provide names, addresses, and telephone numbers of installing contractors and service representatives for equipment and control systems.

L. Warranty: Submit manufacturer's warranty and ensure forms have been filled out in Owner's name and registered with manufacturer.

M. Maintenance Materials:

1. Refer to Division 01 for additional provisions.

1.7 QUALITY ASSURANCE

A. Perform work in accordance with NFPA 70.

B. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc., as suitable for the purpose specified and indicated.

C. BACnet devices used in the BAS shall be BTL listed according to its device profile.

D. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

E. Installer Qualifications: Company specializing in performing the work of the type specified and with minimum documented experience as follows:

1. All personnel of the BAS Contractor shall have a minimum of three years of experience within their appropriate trades.
2. All subcontractors utilized by the BAS Contractor shall have a minimum of five years experience within their appropriate trades.

F. Additional BAS Contractor Requirements:

1. Personnel, Coverage and Response Capabilities: The BAS Contractor shall have a fully staffed office with service technicians and systems engineers within a 50 mile radius of the project location.
2. Emergency Service: The BAS Contractor shall have an established 24 hour emergency service organization. A dedicated telephone number shall be provided to the Owner for requesting emergency service. A maximum of four hour, electronic service technician on sight, response time shall be guaranteed by the BAS Contractor.

3. Parts Stocking: The BAS Contractor shall have an independently verifiable inventory of electronic service parts. This electronic service parts inventory must have a worth of at least $100,000 per year over the last five years.

1.8 WARRANTY

A. Refer to Division 01 for additional project warranty requirements.

B. Labor and materials for the BAS specified shall be warranted free from defects in workmanship and material for a period of 1 year after Substantial Completion and system acceptance.

C. BAS failures during the warranty period shall be adjusted, repaired, or replaced at no additional cost or reduction in service to the Owner.

D. All work shall have a single warranty date, even when the Owner has received beneficial use due to an early system start-up. If the work specified is split into multiple contracts or a multi-phase contract, then each contract or phase shall have a separate warranty start data and period.

E. Provide updates to operator workstation software, project-specific software, graphic software, database software, and firmware that resolve Contractor-identified software deficiencies at no charge during warranty period. If available, Owner can purchase in-warranty service agreement to receive upgrades for functional enhancements associated with above-mentioned items. Do not install updates or upgrades without Owner's written authorization.

F. Contractor shall maintain and provide a standard 12 month warranty for any existing equipment, wiring, and controllers that are selected to be reused for the project. Installation labor and materials shall be warranted. Demonstrate operable condition of reused devices at time of system commissioning.

G. Provide five year manufacturer's warranty for field programmable micro-processor based units.

H. Special warranty on instrumentation:

1. All instrumentation shall be covered by manufacturer's transferable one-year "No Fault" warranty. If manufacturer warranty is not available, the BAS installer shall provide the same.

1.9 PROTECTION OF SOFTWARE RIGHTS

A. Prior to delivery of software, the Owner and the party providing the software will enter into a software license agreement with provisions for the following:

1. Limiting use of software to equipment provided under these specifications.
2. Limiting copying.
3. Preserving confidentiality.
4. Prohibiting transfer to a third party.

B. Software provider shall provide software updates and patches to the BAS as part of the software licensing agreement as the updates and patches are released. If any security vulnerabilities are discovered by the provider, the provider shall notify the client within five business days.

C. Ownership of Proprietary Material: Project-specific software and documentation shall become Owner's property upon project completion. This includes, but is not limited to the following:

1. Graphics.
2. Record drawings.
3. Database.
4. Application programming code.
5. Documentation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Corporate Edition Products: The following manufacturers and product lines shall be manufacturer's most current vintage and of open protocol design. Corporate editions shall be based on manufacturer developed software.

B. Qualified Bidders: System shall be the product line as listed and as manufactured by:

Manufacturer	Product Line
BASE BID:	
1. Trane	Tracer SC
BID ALTERNATES:	

2. Owner approved equal. Alternative bids will be considered via Substitution request. Substitution requests shall follow the requirements of Division 1 for timing, format and other requirements to be considered. The bidding contractor proposing the alternate shall include both the base bid cost and the alternate cost in their bid. Alternate cost shall include all costs required to achieve design intent with the alternate product, including but not limited to, controls integration to existing system, additional devices and wiring, additional owner training, etc.
   a. Automated Logic, WebCtrl.
   b. Siemens, Apogee – Desigo CC.

C. The above list of manufacturers applies to operator workstation software, controller software, the custom application programming language, building controllers, custom application controllers, and application specific controllers. All other products specified under Division 23 Section "Instrumentation and Control Devices for HVAC" need not be manufactured by the above manufacturers.

2.2 SYSTEM DESCRIPTION

A. General:

1. The BAS shall consist of all necessary hardware and software to perform the control sequences of operation as called for in the Specifications and Drawings. Contractor shall install and commission all necessary devices to ensure a reliable and stable network.
2. System design is bases on a distributed system of fully intelligent, stand-alone controllers, operating in a multi-tasking, multi-user environment on token passing network, with central and remote hardware, software, and interconnecting wire and conduit.
3. Include computer software and hardware, operator input/output devices, control units, local area networks (LAN), sensors, control devices, actuators.
4. The BAS shall be capable of integrating multiple devices, sensors, and functions from multiple control vendors into a common front end, including equipment supervision and control, alarm management, energy management, and trend data collection.

5. The BAS shall be modular in nature, and shall permit expansion of both capacity and functionality through the addition of sensors, actuators, ASC's, and operator devices.
6. The failure of any single component or network connection shall not interrupt the execution of control strategies at other operational devices.

B. Local Area Network:

1. The BAS shall be set up as a physically separate network within the building.

C. Network Architecture: The BAS network architecture shall be based upon the OSI basic reference model in accordance with ISO 7498.

1. Application/Network Layer:
   a. BACnet protocol complying with ASHRAE Standard 135.
2. Physical/Data Link Layer:
   a. Hard-wired type:
      1) Ethernet according to ISO 8802-2 protocol.
      2) EIA-485 Twisted Cable Pair according to Master Slave/Token-Passing (MS/TP) protocol.
3. Communication between operator workstation(s) and building controller(s):
   a. Ethernet.
4. Communication between building controller(s) and application specific and custom application controllers:
   a. MS/TP.
   b. PTP.

D. Web Services Enabled Network:

1. The network shall be capable of being accessed remotely over the internet via a virtual link according to Internet Protocol.
2. System software shall be based on a client/server architecture, designed around the open standards of web technology. The BAS server shall be accessed using a web browser over the BAS network, Owner's LAN, and remotely over the Internet (through the Owner's LAN).
3. No special software other than a web browser shall be required to access graphics, point displays, and trends, configure trends, configure points and controllers, or to edit programming. Connection shall be browser agnostic.
4. Software applications shall be designed and optimized for hand-held device interface (e.g., tablets, smart phones, etc.). Interface shall grant visibility and control access, at a minimum, to the following data: Summary, Alarm, Setpoints, Status, Schedule, and Trending.

E. Network Integration:

1. The BAS network shall be integrated with other automation networks controlled by the Owner. Coordinate with the Owner's information technology (IT) department for networks that shall be integrated.
2. Provide gateways or other integration devices across networks with different communication protocol to provide a single network visibility and interoperability at the operator workstation. Coordinate communication protocol with each automation system specified.
3. Interoperable networks shall be capable of sharing all point and point information across networks to a single BAS front end.
4. Interoperable networks shall be capable of automatically downloading application program changes.

5. For integrated networks that cannot automatically download application program changes, provide a link to the Controller Manual Download Schedule, as defined in the submittals section of Part 1 on the BAS front end summary page
6. Integrate the following networks:
   a. Lighting control systems.
   b. Vehicle emission controller.

F. Network Interoperability:

1. Provide communication between control units over local area network (LAN).
2. Communication services over the LAN shall result in operator interface and value passing that is transparent to the network architecture as follows:
   a. Connection of an operator interface device to any one controller on the network shall allow the operator to interface with all other controllers as if that interface were directly connected to the other controllers. Data, status information, reports, system software, custom programs, etc., for all controllers shall be available for viewing and editing from any one controller on the network.
   b. All database values (e.g., objects, software variables, custom program variables) of any one controller shall be readable by any other controller on the network. This value passing shall be automatically performed by a controller when a reference to an object name not located in that controller is entered into the controller's database. An operator/installer shall not be required to set up any communication services to perform network value passing.

2.3 OPERATOR INTERFACE

A. General:

1. The Operator Interface shall provide overall BAS supervision and system software interface. Communications from the workstation shall be executed directly to and between the integration level building controllers and field level controllers.
2. The operator interface shall be capable of command entry, information and alarm management, database management, access of all system data, and be independent of hardware technology.

B. Hardware:

1. Desktop:
   a. Computer(s) and display(s) to be provided by BAS controls manufacturer.
   b. PC shall be general purpose and commercially available, with sufficient memory and processing capability to meet the requirements of the BAS.
      1) Quantity: 1.
      1) Minimum RAM: 4.0 gigabytes.
      2) Minimum Processing Speed: Intel i3 Dual Core Microprocessor or better running at no less than 3.0 gigahertz.
      3) Minimum Hard Drive Memory: 500 gigabytes.
      2) Drives: 32X CD Rom/8X DVD drive.
      4) Ports:
         a) Minimum of 2 USB 2.0 or faster ports on front of tower.
         b) Minimum of 2 free USB 2.0 or faster ports on rear of tower.
   b. Monitor: Minimum 17 inch VGA or higher resolution, color graphic LCD or LED monitor with a compatible VGA or higher resolution card.
   c. Location(s): As directed by the Owner.
   d. Network Connection:

1) Suitable for network technology provided.
2) Ethernet interface card with minimum Speed: 10/100/1000.
3) Wireless interface card, dual band.

e. Standard 101 key keyboard.
f. Standard mouse with track wheel.

2. Hand Held Operator Terminal for Mobile Devices:
   a. Device shall be provided by BAS controls manufacturer.
   c. Quantity: 1.
   b. Operating System: Android or iOS.
   c. Performance: Device shall meet the minimum performance requirements to run applications developed for hand held devices by the BAS controls manufacturer.
   d. Accessories:
      1) Provide dongle adapter with one end suitable for connecting into hand-held device and the other end with an Ethernet cable port.
      2) Provide dongle adapter with one end suitable for connecting into hand-held device and the other end suitable for building controller or application specific controller service communication port.
   e. Provide secure remote system access via PDA, iPad, or Smart Phone with browser agnostic connectivity, including controller point monitor and control access to the following data:
      1) Alarm.
      2) Summary.
      3) Setpoints.
      4) Status.
      5) Schedule.
      6) Trend.
   f. Provide the capability to view in text list based format.
3. Database Save/Restore/Back-Up:
   a. Back-up copies of all Building Controller and ASC data as well as mass storage for trend logs shall be stored in the mass storage device designated by the Owner.

2.4 CONTROLLERS

A. Building Controllers

1. General:
   a. Input Power Requirements: 24Vac.
   b. Manage global strategies by one or more, independent, standalone, microprocessor based controllers.
   c. Provide sufficient memory to support controller's operating system, database, and programming requirements.
   d. Share data between networked controllers.
   e. Controller operating system manages input and output communication signals allowing distributed controllers to share real and virtual object information and allow for central monitoring and alarms.
   f. Utilize real-time clock for scheduling.
   g. Continuously check processor status and memory circuits for abnormal operation.
   h. Monitor and assume predetermined failure mode and generate alarm notification upon detection of abnormal operation.
   i. Communication with other network devices to be based on assigned protocol.
   j. Monitor the status of all overrides, and include this information in logs and summaries to inform the operator that automatic control has been inhibited.
2. Communication:

a. Perform routing when connected to a network of custom application and application specific controllers.
b. Provide service communication port for connection to a portable operator's terminal or hand held device with compatible protocol.
1) Port shall be USB type.

3. Anticipated Environmental Ambient Conditions:
a. Outdoors and/or in Wet Ambient Conditions:
1) Mount within NEMA 4X waterproof enclosures.
2) Rated for operation at 40 to 150 degrees F and 95 percent RH, non-condensing.
b. Conditioned Space:
1) Mount within NEMA 1 dustproof enclosures.
2) Rated for operation at 32 to 120 degrees F.

4. Provisions for Serviceability:
a. Diagnostic LEDs for power, communication, and processor.
b. Make all wiring connections to field removable, modular terminal strips, or to a termination card connected by a ribbon cable.

5. Memory: In the event of a power loss, maintain all BIOS and programming information for a minimum of 72 hours.

6. Power and Noise Immunity:
a. Maintain operation at 90 to 110 percent of nominal voltage rating.
b. Perform orderly shutdown below 80 percent of nominal voltage.
c. Upon restoration of normal power, the controller shall automatically resume full operation without manual intervention.
d. Operation shall be protected against electrical noise of 5 to 120 Hz and from keyed radios up to 5 W. at 3 feet.

7. Surge and Transient Protection:
a. Isolation shall be provided at all network terminations, as well as all field point terminations, to suppress induced voltage transients consistent with IEEE Standard C62.41.2.
b. Isolation levels shall be sufficiently high as to allow all signal wiring to be run in the same conduit as high voltage wiring where acceptable by electrical code.

B. Custom Application Controllers

1. General:
a. Input Power Requirements: 24Vac.
b. Provide sufficient memory to support controller's operating system, database, and programming requirements.
c. Share data between networked, microprocessor based controllers.
d. Controller operating system manages input and output communication signals allowing distributed controllers to share real and virtual object information and allowing for central monitoring and alarms.
e. Utilize real-time clock for scheduling.
f. Continuously check processor status and memory circuits for abnormal operation.
g. Monitor and assume predetermined failure mode and generate alarm notification upon detection of abnormal operation.
h. Communication with other network devices to be based on assigned protocol.
i. Monitor the status of all overrides, and include this information in logs and summaries to inform the operator that automatic control has been inhibited.

2. Communication:
a. Provide service communication port for connection to a portable operator's terminal or hand held device with compatible protocol.

3. Anticipated Environmental Ambient Conditions:
a. Outdoors and/or in Wet Ambient Conditions:

1) Mount within NEMA 4X waterproof enclosures.
2) Rated for operation at 40 to 150 degrees F and 95 percent RH, non-condensing.

b. Conditioned Space:
1) Mount within NEMA 1 dustproof enclosures.
2) Rated for operation at 32 to 120 degrees F.

4. Provisions for Serviceability:
a. Diagnostic LEDs for power, communication, and processor.
b. Make all wiring connections to field removable, modular terminal strips, or to a termination card connected by a ribbon cable.

5. Memory: In the event of a power loss, maintain all BIOS and programming information for a minimum of 72 hours.

6. Power and Noise Immunity:
a. Maintain operation at 90 to 110 percent of nominal voltage rating.
b. Perform orderly shutdown below 80 percent of nominal voltage.
c. Upon restoration of normal power, the Digital Panel shall automatically resume full operation without manual intervention.
d. Operation protected against electrical noise of 5 to 120 Hz and from keyed radios up to 5 W. at 3 feet.

7. Surge and Transient Protection:
a. Isolation shall be provided at all network terminations, as well as all field point terminations, to suppress induced voltage transients consistent with IEEE Standard C62.41.2.
b. Isolation levels shall be sufficiently high as to allow all signal wiring to be run in the same conduit as high voltage wiring where acceptable by electrical code.

C. Application Specific Controllers

1. General:
a. Input Power Requirements: 24Vac.
b. Not fully user programmable, microprocessor based controllers dedicated to control specific equipment.
c. Customized for operation within the confines of equipment served.
d. Provide sufficient memory to support controller's operating system, database, and programming requirements.
e. Communication with other network devices to be based on assigned protocol.
1) Each ASC shall be capable of stand-alone operation and shall continue to provide control functions without being connected to the network.
f. Monitor and assume predetermined failure mode and generate alarm notification upon detection of abnormal operation.

2. Communication:
a. Provide service communication port for connection to a portable operator's terminal or hand held device with compatible protocol.

3. Anticipated Environmental Ambient Conditions:
a. Outdoors and/or in Wet Ambient Conditions:
1) Mount within NEMA 4X waterproof enclosures.
2) Rated for operation at 40 to 150 degrees F.

b. Conditioned Space:
1) Mount within NEMA 1 dustproof enclosures.
2) Rated for operation at 32 to 120 degrees F and 95 percent RH, non-condensing.

4. Provisions for Serviceability:
a. Diagnostic LEDs for power, communication, and processor.
b. Make all wiring connections to field removable, modular terminal strips, or to a termination card connected by a ribbon cable.

5. Memory. In the event of a power loss, maintain all BIOS and programming information for a minimum of 72 hours.
6. Power and Noise Immunity:
   a. Maintain operation at 90 to 110 percent of nominal voltage rating.
   b. Perform orderly shutdown below 80 percent of nominal voltage.
   c. Upon restoration of normal power, the controller shall automatically resume full operation without manual intervention.
   d. Operation shall be protected against electrical noise of 5 to 120 Hz and from keyed radios up to 5 W. at 3 feet.
7. Surge and Transient Protection:
   a. Isolation shall be provided at all network terminations, as well as all field point terminations, to suppress induced voltage transients consistent with IEEE Standard C62.41.2.
   b. Isolation levels shall be sufficiently high as to allow all signal wiring to be run in the same conduit as high voltage wiring where acceptable by electrical code.

D. Input/Output Interface

1. Hardwired inputs and outputs shall tie into the BAS through building, custom application, or application specific controllers.
2. All Input/Output Points:
   a. Protect controller from damage resulting from any point short-circuiting or grounding and from voltage up to 24 volts of any duration.
   b. Provide universal type for building and custom application controllers where input or output is software designated as either binary or analog type with appropriate properties.
   c. Universal-type inputs or outputs configurable between binary and analog are acceptable.
3. Binary Inputs:
   a. Allow monitoring of On/Off signals from remote devices.
   b. Provide wetting current of 12 mA minimum, compatible with commonly available control devices and protected against the effects of contact bounce and noise.
   c. Sense dry contact closure with power provided only by the controller.
4. Pulse Accumulation Input Objects: Conform to all requirements of binary input objects and accept up to 10 pulses per second.
5. Analog Inputs:
   a. Allow for monitoring of low voltage 0 to 10 Vdc, 4 to 20 mA current, or resistance signals (thermistor, RTD).
   b. Compatible with and field configurable to commonly available sensing devices.
6. Binary Outputs:
   a. Used for On/Off operation or a pulsed low-voltage signal for pulse width modulation control.
   b. Outputs provided with three position (On/Off/Auto) override switches.
   c. Status lights for building and custom application controllers to be selectable for normally open or normally closed operation.
7. Analog Outputs:
   a. Monitoring signal provides a 0 to 10 Vdc or a 4 to 20 mA output signal for end device control.
   b. Provide status lights and two position (AUTO/MANUAL) switch for building and custom application controllers with manually adjustable potentiometer for manual override on building and custom application controllers.
   c. Drift to not exceed 0.4 percent of range per year.
8. Tri State Outputs:
   a. Coordinate two binary outputs to control three point, floating type, electronic actuators without feedback.
   b. Limit the use of three point, floating devices to the following zone and terminal unit control applications:
      1) VAV terminal units.

2) Duct mounted heating coils.
3) Zone dampers.
4) Radiant devices.

c. Control algorithms shall run the zone actuator to one end of its stroke once every 24 hours for verification of operator tracking.

2.5 ELECTRICAL CONTROL POWER AND LOW VOLTAGE WIRING

A. Power Wiring: Copper wiring, plenum cable, and raceways shall be as specified in the applicable section of Division 26.

B. Power and Communication Wiring Transient Protection:

1. Comply with IEEE C62.41.2.
2. Communications trunk wiring shall be protected with a transient surge protection device providing the minimal protection required.
3. Communication circuitry, input/output circuitry, and communication unit shall provide protection against a 1000 volt, 3 amp transient signal, directly applied to the communication or input/output terminations.
   a. For systems not complying with this requirement, provide equivalent protection external to the automatic temperature control system controller. Protection shall be provided for the individual communications and input/output terminations for each automatic temperature control system controller.
   b. Submittal documentation shall clearly define how this requirement will be met and how the external protection will not affect the performance of the controllers.

C. Power Supplies:

1. Provide UL listed control transformers with Class 2 current limiting type or over-current protection in both primary and secondary circuits for Class 2 service as required by the NEC.
2. Limit connected loads to 80 percent of rated capacity.
3. Match DC power supply to current output and voltage requirements.
4. Supplies shall be full wave rectifier type with output ripple of 5.0 mV maximum peak to peak.
5. Regulation to be 1 percent combined line and load with 100 microsecond response time for 50 percent load changes.
6. Provide over-voltage and over-current protection to withstand a 150 percent current overload for 3 seconds minimum without trip-out or failure.
7. Operational Ambient Conditions: 32 to 120 degrees F.
8. EM/RF meets FCC Class B and VDE 0871 for Class B and MIL-STD 810 for shock and vibration.
9. Line voltage units UL recognized and CSA approved.

D. Power Line Filtering:

1. Provide external or internal transient voltage and surge suppression component for all workstations and controllers.
2. Minimum surge protection attributes:
   a. Dielectric strength of 1000 volts minimum.
   b. Response time of 10 nanoseconds or less.
   c. Transverse mode noise attenuation of 65 dB or greater.
   d. Common mode noise attenuation of 150 dB or greater at 40 to 100 Hz.

E. Input/Output Control Wiring

1. Control wiring shall be sized to accommodate the voltage drop associated with the distance between the control device and the controller. Minimum size shall be as specified herein.
2. In all communication conduits, provide one spare twisted pair to be installed, tagged and labeled at each end.
3. Control wiring not installed in conduit shall be UL rated for plenum installation.
4. Ethernet control wiring shall be fiber optic or single pair of solid 24 gauge twisted, shielded copper cable.
5. RTD wiring shall be three-wire or four-wire twisted, shielded, minimum number 22 gauge.
6. Other analog inputs shall be a minimum of number 22 gauge, twisted, shielded.
7. Binary control function wiring shall be a minimum of number 18 gauge.
8. Analog output control functions shall be a minimum of number 22 gauge, twisted, shielded.
9. Binary input wiring shall be a minimum of number 22 gauge, twisted, shielded.
10. Thermistors shall be equipped with the manufacturer's calibrated lead wiring.
11. 120V control wiring shall be #14 THHN in 3/4 inch conduit. Provide 20% fill extra wire in each conduit.

F. Splices: Splices in shielded cables shall consist of terminations and the use of shielded cable couplers that maintain the integrity of the shielding.

G. Conduit and Fittings

1. Conduit for Control Wiring, Control Cable and Transmission Cable: EMT with compression fittings, cold rolled steel, zinc coated or zinc-coated rigid steel with threaded connections.
2. Outlet Boxes (Dry Location): Sheradized or galvanized drawn steel suited to each application, in general, four inches square or octagon with suitable raised cover.
3. Outlet Boxes (Exposed to Weather): Threaded hub cast aluminum or iron boxes with gasket device plate.
4. Pull and Junction Boxes: Size according to number, size, and position of entering raceway as required by National Electrical Codes. Enclosure type shall be suited to location.

H. Relays

1. Relays other than those associated with digital output cards shall be general purpose, enclosed plug-in type with 8-pin octal plug and protected by a heat and shock resistant duct cover. Number of contacts and operational function shall be as required.
2. Solid State Relays (SSR):
   a. Input/output isolation: Greater than 10 E^9 ohms with a breakdown voltage of 1500V root mean square or greater at 60 Hz.
   b. Contact Life: 10 x 10 E^6 operations or greater.
   c. Ambient Temperature Range: Minus 20 to +140 degrees F.
   d. Input impedance: Not be less than 500 ohms.
   e. Relays shall be rated for the application. Operating and release time shall be for 100 milliseconds or less. Transient suppression shall be provided as an integral part of the relay.
3. Contactors:
   a. Type: Single coil, electrically operated, mechanically held, double-break, silver-to-silver type protected by arcing contacts.
   b. Positive locking shall be obtained without the use of hooks, latches, or semi permanent magnets.
   c. The number of contacts and rating shall be selected for the application. Operating and release times shall be 100 milliseconds or less. Contactors shall be equipped with coil transient suppression devices.

2.6 SYSTEM SOFTWARE

A. General:

1. Provide all necessary system software to form a complete operating system for all operator interface devices.
2. System software shall integrate with all controller software and allow management of software applications at the operator workstation.
3. System software display language: English.

B. Device Profile: BACnet devices shall Conform to the following device profiles as specified in ASHRAE/ANSI 135 BACnet Annex L:

1. Operator workstation: BACnet Advanced Workstation (B-AWS).
2. Building Controller: BACnet Building Controller (B-C).
3. Advanced Application Controller: BACnet Advanced Application Controller (B-AAC).
4. Application Specific Controller: BACnet Application Specific Controller (B-ASC).

C. Software Programming:

1. Provide programming for the system and adhere to the sequences of operation provided. Provide actions for all possible situations. All other system programming necessary for the operation of the system shall be provided by the Contractor. Imbed into the control program sufficient comment statements to clearly describe each section of the program. The comment statements shall reflect the language used in the sequences of operation. Provide text-based, graphic-based, and parameter-based programming where appropriate.

D. Operating System:

1. Concurrent, multi-tasking capability.
2. Common Software Applications Supported:
   a. Microsoft Windows and Microsoft Office Suite.
   b. Open platform compatible database: Microsoft Access, Oracle Database, IBM Analytics, or other SQL database software. Proprietary databases shall not be acceptable.
3. Acceptable Operating Systems: Most recent version of operating system.

E. System Graphics:

1. Color type, saved in an industry-standard format such as BMP, JPEG, PNG, or GIF.
2. Allow simultaneous display for comparison and monitoring of system status.
3. Web based graphics shall require no plug-in (such as HTML and JavaScript) or shall only require widely available no-cost plug-ins (such as Active-X, Java Virtual Machine, and Adobe Flash).
4. Animate displayed objects by shifting image files of objects based on object status.
5. Functionality: Provide method for operator with password to perform the following:
   a. Move between, change size, and change location of graphic displays.
   b. Modify on-line.
   c. View a summary of the most important data for each controlled zone or piece of equipment.
   d. View a summary of the most important global data for the project, including but not limited to date, day of week, time, outdoor dry bulb temperature, and humidity.
   e. Use point-and-click navigation between graphic screens.
   f. Edit setpoints and other specified parameters.
   g. Indicate areas or equipment in an alarm condition using color or other visual indicator.
   h. Add, delete, or change dynamic objects consisting of:

1) Analog and binary values.
2) Dynamic text.
3) Static text.
4) Animation files.

i. Display graphic file, text, and dynamic object data together on a single graphic. Display all measured and commanded data, setpoints, calculated values, and input and output control points with appropriate engineering units associated with each system schematic.

j. Dynamic Data Displays: Dynamic temperature values, humidity values, flow values, and status indication shall be shown in their actual respective locations, and shall automatically update to represent current conditions without operator intervention.

k. Dynamic Data Displays shall be capable of including point data from multiple ASC's.

6. Include at least one graphic for each of the following:
   a. Each piece of equipment.
   b. Occupied zone.
   c. Hydronic system (chilled water, condenser water, hot water, steam, heat pump, etc.)
   d. Floor plan displays of the building. Indicate summary conditions for each floor.
   e. Indicate thermal comfort on floor plan using dynamic colors to represent zone temperature relative to zone setpoint.
7. Graphic Tree Structure:
   a. Structure graphic system tree to allow access to individual graphic screens from a macro to a micro level.
   b. Allow each level of graphic direct access to the graphic screen above and below the graphic screen in the system tree.
   c. Allow direct access to the main summary graphic screen/map from any individual graphic screen.
8. Sequence of Operation Graphics:
   a. Display the complete Sequence of Operation or include a link to a separate text file that contains the sequence of operation, as submitted by the Contractor and approved by the Engineer with each system schematic view. The Sequence of Operation text shall be in a separate frame above, below, or to the side of the graphic as appropriate for the graphic size and content.
9. Custom Graphics Generation Package:
   a. Allow operator to create, delete, modify, and save custom graphic files and displays. File format of graphics shall be compatible with BAS software.
   b. Web-based Graphics: HTML graphics to support web browser compatible formats.
   c. The BAS Contractor shall provide libraries of pre-engineered screens and symbols depicting standard components with which custom graphics may be built. Standard components include but are not limited to
      1) Air handling unit components (e.g., fans, cooling coils, filters, dampers, etc.).
      2) Complete mechanical systems (e.g., constant volume-terminal reheat, VAV, etc.).
      3) Hydronic system components (e.g., chillers, boilers, pumps, piping, valves, etc.).
      4) Electrical symbols.
   d. The graphic development package shall use a mouse or similar pointing device in conjunction with a drawing program to allow the user to perform the following
      1) Define symbols.
      2) Position and size symbols.
      3) Define background screens.
      4) Define connecting lines and curves.
      5) Locate, orient and size descriptive text.
      6) Define and display colors for all elements.
      7) Establish correlation between symbols or text and associated system points or other displays.
      8) Capture or convert graphics from AutoCAD.

e. Graphical displays shall be capable of representing a group of objects. Groups shall be capable of representing any logical grouping of system points or calculated data based upon building function, mechanical system, building layout, or any other logical grouping of points which aids the operator in the analysis of the building.

10. Standard HVAC Graphics Library: Furnish a complete library of standard HVAC equipment graphics and standard symbols for ancillary equipment in a file format compatible with the graphics generation package program. Graphics shall include, but not be limited to, the following:
    a. HVAC Equipment:
        1) Air Handlers.
        2) Terminal HVAC Units.
        3) Fan Coil Units.
        4) Heat Exchangers.
    b. Ancillary Equipment:
        1) Fans.
        2) Pumps.
        3) Coils.
        4) Valves.
        5) Piping.
        6) Dampers.
        7) Ductwork.

F. Workstation System Applications:

1. General Application Functions:
    a. All applications shall be capable of being executed automatically without the need for operator intervention, and shall be flexible enough to allow user customization.
    b. Allow BAS configuration and future changes or additions by operators with password protection.
    c. Execute configured processes defined by the user to automatically perform calculations and control routines.
    d. Process Inputs and Variables: It shall be possible to use any of the following in a configured process:
        1) Any system-measured point data or status
        2) Any calculated data
        3) Any results from other processes
        4) Boolean logic operators (and, or)
    e. Process Triggers: Configured processes may be triggered based on any combination of the following:
        1) Time of day
        2) Calendar Date
        3) Other processes
        4) Events (e.g., point alarms)
    f. Data Access: A single process shall be able to incorporate measured or calculated data from any and all other ASC's. In addition, a single process shall be able to issue commands to points in any and all other ASC's on the local network.
2. Network Configuration:
    a. Allow for configuration of the BAS network.
    b. Provide alarm when a break in communication between devices is detected.
    c. Enable the operator to add, delete, or modify the following:
        1) Building controllers and ASC’s.
        2) Points of any type, point parameters, and tuning constants.
    d. Provide automatic reconfiguration if any station is added or lost.
3. Save and Restore:

a. Automatic System Database Save and Restore Functions:
   1) Store current database copy of each Building Controller on hard disk or server.
   2) Backup database on a user adjustable frequency basis. Default frequency shall be monthly.
   3) Automatically update upon change in any system panel.
   4) In the event of database loss in any system panel, the first workstation to detect the loss automatically restores the database for that panel unless disabled by the operator.
b. Manual System Database Save and Restore Functions by Operator with Password Clearance:
   1) Save database from any system panel.
   2) Clear a panel database.
   3) Initiate a download of a specified database to any system panel.

4. On-line Help:
   a. Include context-sensitive system to assist operator in operation and editing.
   b. Include topics available for all applications.
   c. Include relevant screen data provided for particular screen display.
   d. Include additional help via hypertext.
5. Security:
   a. Require user name and password for Operator log-on to view, edit, add, or delete data.
   b. Include selectable system security for each operator. Support a minimum of five levels of access:
      1) Level 1 = Read-only data access and display.
      2) Level 2 = Level 1 + scheduling.
      3) Level 3 = Level 2 + operator overrides and commands.
      4) Level 4 = Level 3 + database generation and modification.
      5) Level 5 = Level 4 + Audit trail management.
      6) Operators shall be able to perform only those commands available for their respective passwords. Menu selections displayed at any operator device shall be limited to only the items defined as accessible for the user.
      7) Support a minimum of 4 passwords at each Building Controller.
   c. Allow system supervisor to set passwords and security levels for all other operators.
   d. Allow operator passwords to restrict functions accessible to viewing and/or changing system applications, editor, and object.
   e. Include automatic, operator log-off results from keyboard or mouse inactivity during user-adjustable, time period.
   f. Store all system security data in encrypted format.
   g. Log all user actions and store data for audit with permission access by system administrator only.
      1) Include the modified system.
      2) Include the value modified.
      3) Include the time of modification.
6. System Diagnostics:
   a. Operations Automatically Monitored:
      1) Workstations.
      2) Printers.
      3) Network connections.
      4) Building management panels.
      5) Controllers.
   b. Device failure is annunciated to the operator.
7. Alarm Management:
   a. Allow alarm prioritizing to minimize nuisance reporting and to speed operator response to critical alarms.
      1) Provide a minimum of three, user definable priority levels.
      2) Enable users to manually inhibit alarm reporting for each point.

3) Enable users to manually inhibit nuisance alarm reporting for maintenance or repair work that is scheduled to be performed.
4) Enable user to define conditions under which point changes need to be acknowledged by an operator, and/or logged for analysis at a later date.
5) Allow alarm prioritization to lock out or circumvent other alarms that may be generated as a result of primary alarm.

b. Prohibit interference with the ability of the system software to report alarms by either operator activity at the local I/O device, or communications with other system controllers on the network.
c. Allow all system objects that are configurable to "alarm in" and "alarm out" of normal state.
d. Configurable Objects:
1) Alarm limits.
2) Alarm limit differentials.
3) States.
4) Reactions for each object.
5) Alarm delay.

e. Alarm Messages:
1) Descriptor: English language. Acronyms or mnemonics for objects in alarm are not acceptable.
2) Recognizable Features:
a) Source.
b) Location.
c) Nature.
d) Time and Date.
e) Alarm message box to more fully describe the alarm condition or direct operator response.
f) Each Alarm messages shall be assignable to any point in the BAS. Alarm messages shall be assignable to multiple points.
a) Notification of an alarm override.

f. Configurable Alarm Reactions by Workstation and Time of Day:
1) Logging.
2) Printing.
3) Starting programs.
4) Displaying messages.
5) Phone text message.
6) Email.
7) Providing audible annunciation.
8) Displaying specific system graphics.

8. Custom Trend Logs:
a. Maintain trend information for minimum 365 days.
b. Definable for any data object in the system including interval, start time, and stop time.
1) Resolution: Interval periods shall be adjustable down to one minute.
2) Multiple Interval Period: Each trended point shall have the ability to be trended at a different trend interval.

c. Trend Data:
1) Sampled and stored on the building controller panel.
2) Auto-Delete Period: Software shall be capable of automatically deleting stored trend data after a user-adjustable period of time. Each trended point shall have the ability to have a different auto-delete interval period.
3) Archivable on hard disk or server.
4) Retrievable for use in reports, spreadsheets and standard database programs.
5) Protected and encrypted format to prevent manipulation or editing of historical data and event logs.

d. Trend Graph Display:

1) Group Trend Time Series Plots:
   a) Provide user-selectable Y-axis points.
   b) Provide user editable titles, point names, and Y-axis titles.
   c) Individual trended points shall be able to be grouped into groups of up to four points per plot with up to four plots per page.
2) X-Y Trend Plots:
   a) User selectable X and Y trend inputs.
   b) User editable titles, point names, and X and Y-axis titles.
   c) User selectable time period options:
      i) 1-day 24-hour period.
      ii) 1-week 7-day period.
      iii) 1-month period with appropriate days for the month selected.
      iv) 1-year period.
      v) User shall be able to select the beginning and ending period for each X-Y chart, within the time domain of the database being used.
      vi) User selectable display up to 6 plots per screen in 2 columns.
3) Automatic Scaling: System shall automatically scale the axis on which trends are displayed when multiple points with different trend interval periods are selected for graphical display.
4) Dynamic Update: Trends shall be able to dynamically update at operator-defined intervals.
5) Zoom: Software shall allow zoom-in function for detailed examination of trends.

e. Numeric Value Display: Software shall display value of any sample on a trend when picked.

9. Alarm and Event Log:
   a. View all system alarms and change of states from any system location.
   b. List events chronologically.
   c. List alarm priority.
   c. Allow operator with proper security to acknowledge and clear alarms. Log operator and time when alarm is acknowledged.
   d. Archive alarms not cleared by operator to the workstation.
10. Object, Property Status, and Control:
   a. Provide a method to view, edit if applicable, the status of any object and property in the system.
   b. Status Available by the Following Methods:
      1) Menu.
      2) Graphics.
      3) Custom Programs.
11. Clock Synchronization:
   a. The real-time clocks in all building control panels and workstations shall be able to automatically synchronize daily from any operator-designated device in the system.
   b. The system shall automatically adjust for daylight savings and standard time, if applicable.
12. Reports and Logs:
   a. Reporting Package:
      1) Allow operator to select, modify, or create reports.
      2) Definable as to data content, format, interval, and date.
      3) Under no conditions shall the operator need to specify the address of hardware controller to obtain system information.
      4) Provide ability to obtain real-time logs of all objects available by type or status such as alarm, lockout, normal, etc.
      5) Stored on hard disk and readily accessible by standard software applications, including spreadsheets and word processing.
      6) Allow printing on operator command or specific time(s).
   b. Standard Report Format Options:
      1) Objects with current values.

2) Global modification values.
3) Current alarms not locked out.
4) Disabled and overridden objects, points and variables.
5) Objects in manual or automatic alarm lockout.
6) Objects in alarm lockout currently in alarm.
7) Objects currently in override status.
8) Objects in Schedules
   a) Daily.
   b) Weekly.
   c) Holiday.
9) Logs:
   a) Alarm History.
   b) System messages.
   c) System events.
   d) Trends.

c. Custom Report Format Options:
   1) Daily.
   2) Weekly.
   3) Monthly.
   4) Annual.
   5) Time and date stamped.
   6) Title.
   7) Facility name.
   8) Point Groups.
      a) User-selectable.
      b) Group may be comprised of specific points, group of equipment objects, group of groups, or for the entire facility without restriction due to the hardware configuration of the BAS.

13. Global Modify:
    a. Allow global modification of all editable data. Similar data shall be grouped into logical objects based on building function, mechanical system, building layout, or any other logical grouping of points.
    b. Allow each common type of equipment to be excluded or included within the global editing process.
    c. Display status information on all similar points in one global report.
    d. Allow modification of the following:
       1) Individual data point edited.
       2) List of all points within the category.
       3) Global change field.
       4) Copy feature to assist in downloading the new changes.
       5) Verification that all changes were completed.
    e. Include a change-all feature to change all selections.
    f. Prevent acceptance of changes until an accept icon is acknowledged.

G. Workstation Applications Editors:

1. Provide editing software for each system application at the PC workstation.
2. Edited applications shall be automatically downloaded and executed at the controller panel.
3. Programming Description: Definition of operator device characteristics, ASC's, individual points, applications and control sequences shall be performed through fill-in-the-blank templates.
4. System Definition/Control Sequence Documentation: All portions of system definition shall be self-documenting to provide hard copy printouts of all configuration and application data.

5. System definition and modification procedures shall not interfere with normal system operation and control.
6. Provide consistent text-based displays of all system point and system applications.
7. Point identification, engineering units, status indication, and application naming conventions shall be the same at all operator devices.
8. Full screen editor for each application shall allow operator to view and change:
    a. Configuration.
    b. Name.
    c. Control parameters.
    d. Set-points.
    e. Schedules.
9. Scheduling:
    d. Allow scheduling down to the zone or room level.
    a. Monthly calendar indicates schedules, holidays, and exceptions.
    b. Allows several related objects to be grouped, scheduled, and copied to other objects or dates.
    c. Start and stop times adjustable from master schedule.
    e. Schedule expiration.
    d. Temporary overrides of systems with user adjustable time-out.
    f. Provide minimum three tiers of priorities for scheduling.
        1) Priority 1: Event, temporary, or override.
        2) Priority 2: Calendar.
        3) Priority 3: Default.
    g. Higher priority schedules shall overlay with lower priority schedules without interrupting or deleting them. Upon expiration of a higher priority schedule, schedule shall revert to next lower priority.
    h. Expired priority 1 and priority 2 schedules shall be automatically deleted after execution.
10. Custom Application Programming:
    a. Create, modify, debug, edit, compile, and download custom application programming during operation and without disruption of all other system applications.
    b. Programming Features:
        1) English oriented programming language, allowing for free form programming.
        2) Alternative language graphically based using appropriate function blocks suitable for all required functions and amenable to customizing or compounding.
        3) Insert, add, modify, and delete custom programming code that incorporates word processing features such as cut/paste and find/replace.
        4) Allows the development of independently, executing, program modules designed to enable and disable other modules.
        5) Debugging/simulation capability that displays intermediate values and/or results including syntax/execution error messages.
        6) Support for conditional statements (IF/THEN/ELSE/ELSE-F) using compound Boolean (AND, OR, and NOT) and/or relations (EQUAL, LESS THAN, GREATER THAN, NOT EQUAL) comparisons.
        7) Support for floating-point arithmetic utilizing plus, minus, divide, times, square root operators; including absolute value; minimum/maximum value from a list of values for mathematical functions.
        8) Language consisting of resettable, predefined, variables representing time of day, day of the week, month of the year, date; and elapsed time in seconds, minutes, hours, and days where the variable values can be used in IF/THEN comparisons, calculations, programming statement logic, etc.
        9) Language having predefined variables representing status and results of the system software enables, disables, and changes the set points of the controller software.

2.7 CONTROLLER SOFTWARE

A. All applications reside and operate in the system controllers and editing of all applications occurs at the operator workstation.

B. System Security:

1. User access secured via user passwords and user names.
2. Passwords restrict user to the objects, applications, and system functions as assigned by the system manager.
3. User Log On/Log Off attempts are recorded.
4. Automatic Log Off occurs following the last keystroke after a user defined delay time.

C. Object or Object Group Scheduling:

1. Weekly Schedules Based on Separate, Daily Schedules:
   a. Include start, stop, optimal stop, and night economizer.
   b. 10 events maximum per schedule.
   c. Start/stop times adjustable for each group object.
2. Exception Schedules:
   a. Based on any day of the year.
   b. Defined up to one year in advance.
   c. Automatically discarded and replaced with standard schedule for that day of the week upon execution.
3. Holiday or Special Schedules:
   a. Capability to define up to 99 schedules.
   b. Repeated annually.
   c. Length of each period is operator defined.

D. System Coordination: Provide a standard application for equipment coordination. The application shall provide the operator with a method of grouping together equipment based on function and location. Groups shall be capable of being used for scheduling and other applications.

E. Alarms:

1. Binary object is set to alarm based on the operator specified state.
2. Analog object to have high/low alarm limits.
3. All alarming is capable of being automatically or manually disabled.
4. Alarm Reporting:
   a. Operator determines action to be taken for alarm event.
   b. Alarms to be routed to appropriate workstation.
5. Reporting Action Options:
   a. Start Programs.
   b. Print.
   c. Logged.
   d. Custom messaging.
   e. Graphical displays.
   f. Dial out to workstation receivers via system protocol.

F. Maintenance Management: System monitors equipment status and generates maintenance messages based upon user-designated run-time limits.

G. Sequencing: Application software based upon specified sequences of operation on the control drawings.

H. PID Control Characteristics:

1. Provide proportional-integral algorithms.
2. Direct or reverse action.
3. Anti-windup.
4. Calculated, time-varying, analog value, positions an output or stages a series of outputs.
5. User selectable controlled variable, set-point, and PI gains.

I. Staggered Start Application:

1. Prevents all controlled equipment from simultaneously restarting after power outage.
2. Order of equipment startup is user selectable.

J. Anti-Short Cycling:

1. All binary output objects protected from short-cycling.
2. Allows minimum on-time and off-time to be selected.
3. Allows the number of times each piece of equipment may be cycled within any one-hour period.

K. On-Off Control with Differential:

1. Algorithm allows binary output to be cycled based on a controlled variable and set-point.
2. Algorithm to be direct-acting or reverse-acting incorporating an adjustable differential.

L. Trending: Building controllers shall allow collection and delivery of (time, value) pairs.

M. Totalization:

1. Run-Time Totalization:
   a. Totalize run-times for all binary input objects.
   b. Provides operator with capability to assign high run-time alarm.
   c. Generates unique, user-specified messages when the limit is reached.
   d. Resolution: Adjustable down to one minute.
2. Pulse Totalization:
   a. Totalize consumption for user-selected analog and binary pulse input-type objects.
   b. Configurable for a daily, weekly, or monthly basis.
   c. Provide calculation and storage accumulations of up to 9,999,999 units (e.g. KWH, gallons, KBTU, tons, etc.).
   d. Resolution: Adjustable down to one minute.
   e. Warning Limit: User definable. Generate unique, user-specified messages when the limit is reached.
   f. The information available from the Pulse Totalization shall include, but not be limited to, the following:
      1) Peak Demand, with date and time stamp
      2) 24-hour Demand Log
      3) Accumulated KWH for day
      4) Sunday through Saturday KWH usage
      5) Sunday through Saturday Demand kW
      6) Demand kW annual history for past 12 periods
      7) KWH annual history for past 12 periods

3. Event Totalization:
   a. Count user-selected events, such as the number of times a pump or fan system is cycled on and off.
   b. Provide storage accumulations of up to 9,999,999 events before reset.
   c. Warning Limit: User definable. Generate unique, user-specified messages when the limit is reached.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that systems are ready to receive work.

C. Beginning of installation means installer accepts existing conditions.

D. Verify that conditioned power supply is available to the control units and to the operator work station. Verify that field end devices and wiring are installed prior to installation proceeding.

E. Verify the integrity of control wiring, raceways, control panels, sensors, and control devices prior to reusing for the new work.

F. Verify wiring insulation is defect free and test wiring for continuity and ground faults.

3.2 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Coordination:

1. The BAS Contractor shall execute his work in such a manner as to cause the minimum interference to the operation of the building.
2. Cooperate with other contractors performing work on this project as necessary to achieve a complete and coordinated installation. Each Contractor shall consult the Drawings and Specifications for all trades to determine the nature and extent of others work.
3. Where the BAS shall share a common network backbone via a VLAN, provide temporary network access for BAS construction, startup, and commissioning. Coordinate transition of network operation to Owner's IT group.
4. Coordinate with the Owner to display additional virtual points on individual schematic graphic screens that are not directly associated with that system. Examples may include outdoor air temperature or global alarm conditions.

C. Web Services Enabled Network:

1. Provide an IP network data drop for connection of BAS into Owner's IP network. Coordinate final location of IP network data drop with the Owners' IT staff.
2. If the Owner has no preference or not indicated on the drawings, locate data drop within the main BAS control panel.
3. Coordinate with the Owner's IT department to implement proper security measures, including secure access to the network data drop and firewalls at all virtual access points to the internet to protect access to the BAS.

D. General Workmanship:

1. Install equipment, piping, and wiring/raceway parallel to building lines wherever possible.
2. Install all equipment in readily accessible locations.
3. Verify integrity of all wiring to ensure continuity and freedom from shorts and grounds.
   All installations shall comply with industry specifications and standards for performance, reliability, and compatibility and be executed in strict adherence to local codes and standard practices.
4. Control wiring routed in wall cavities shall be installed in conduit.
5. Install control units and other hardware in position on permanent walls where not subject to excessive vibration.
6. Install software in control units and in operator work station. Implement all features of programs to specified requirements and appropriate to sequence of operation.

E. Controllers:

1. Install controllers in a locked control panel. Provide common keying for all controller covers.
2. Provide a separate controller for each piece of controlled equipment, such as an AHU, FCU, VAV box, etc. A controller may control more than one piece of equipment provided that all points associated with the equipment are assigned to the same BAS controller. Global points used for control loop reset are exempt from this requirement.
3. Select building controllers and custom application controllers to provide the required I/O point capacity required to monitor all of the hardware points listed on the control drawings.
4. Application specific controllers may be used where factory programming is capable of executing all control functions specified in the sequences of operation. Contractor shall add supplemental controllers, devices, and programming as required to execute the specified control function if the ASC cannot.

F. Wiring:

1. All control and interlock wiring shall comply with national and local electrical codes.
5. Wire all safety devices through both hand and auto positions of motor starting device to ensure 100 percent safety shut-off.
2. Provide interlock wiring between devices as indicated on the control drawings.
3. Provide electrical wiring for relays (including power feed) for temperature and pressure indication.
4. All NEC Class 1 (line voltage) wiring shall be UL listed in approved raceway according to NEC and Division 26 requirements.
5. All low-voltage wiring shall meet NEC Class 2 requirements. Low-voltage power circuits shall be sub-fused when required to meet Class 2 current limit.
6. Conceal all low voltage wiring in finished rooms.
7. Conceal all low voltage wiring in unfinished rooms below the elevation of the lights. Low voltage wiring above the elevation of the lights may be exposed.
8. Routing of low voltage wiring above working heights in equipment rooms and above accessible ceilings is acceptable subject to following criteria:
   a. Wiring shall be plenum rated.
   b. Do not lay wiring on ceiling tiles.
6. Where NEC Class 2 (current-limited) wires are in concealed and accessible locations, including ceiling return air plenums, approved cables not in raceway may be used provided that cables are UL listed for the intended applications.
7. All wiring in mechanical, electrical, service rooms, or where subject to mechanical damage, shall be installed in raceway at levels below 10 feet.
8. Do not install Class 2 wiring in raceway containing Class 1 wiring. Boxes and panels containing high voltage wiring and equipment may not be used for low-voltage wiring except for the purpose of interfacing the two wires (e.g., relays and transformers).

9. Where Class 2 wiring is run exposed, wiring shall be run parallel along a surface or perpendicular to it and neatly tied at 10 foot intervals.
10. Where plenum cables are used without raceway, they shall be supported from or anchored to structural members. Cables shall not be supported by or anchored to ductwork, electrical raceways, piping, or ceiling suspension systems.
11. All wire-to-device and wire-to-wire connections shall be made at a terminal block or terminal strip.
12. All wiring within enclosures shall be neatly bundled and anchored to permit access and prevent restriction to devices and terminals.
13. Maximum allowable voltage for control wiring shall be 120 V. If only higher voltages are available, coordinate with Division 26 to provide step-down transformers.
14. All wiring shall be installed as continuous lengths, with no splices permitted between termination points.
15. Install plenum wiring in sleeves where it passes through floors and walls. Maintain fire rating at all penetrations.
16. Size of raceway and size and type of wire shall be the responsibility of the Contractor, in keeping with the manufacturer's recommendations and NEC requirements, except as noted elsewhere.
17. Include one pull string in each raceway 1 inch and larger.
18. Use coded conductors throughout with conductors of different colors.
19. Control and status relays shall be located in designated enclosures only. These enclosures include packaged equipment control panel enclosures unless they also contain Class 1 starters.
20. Conceal all raceways, except within mechanical, electrical, or service rooms. Install raceway to maintain a minimum clearance of 6 inches from high-temperature equipment (e.g., steam pipes or flues).
21. Secure raceways with raceway clamps fastened to the structure and spaced according to code requirements. Raceways and pull boxes may not be hung on flexible duct strap or tie rods. Raceways may not be run on or attached to ductwork.
22. Install insulated bushing on all raceway ends and openings to enclosures. Seal top end of all vertical raceways.
23. Terminate all control and/or interlock wiring and maintain updated (as-built) wiring diagrams with terminations identified at the job site.
24. Terminate BAS sensor input wiring cable shield by taping back at the field device and connect shield to the grounded control panel chassis or sub-panel.
25. Terminate BAS comm bus cable shield between controllers per manufacturer recommendations.
26. Terminate management level/enterprise level network wiring cable shield by wrapping the drain wire around the foil shield and connecting the ground strip to the drain wire.
27. Flexible metal raceways and liquid-tight, flexible metal raceways shall not exceed 3 feet in length and shall be supported at each end. Flexible metal raceway less than 1/2 inch electrical trade size shall not be used. In areas exposed to moisture, including chiller and boiler rooms, liquid-tight, flexible metal raceways shall be used.
28. Raceway shall be rigidly installed, adequately supported, properly reamed at both ends, and left clean and free of obstructions. Raceway sections shall be joined with couplings (according to code). Terminations shall be made with fittings at boxes, and ends not terminating in boxes shall have bushings installed.

G. Communication Wiring:

1. Adhere to the items listed in the "Wiring" article in Part 3 of this specification in addition to the requirements listed below.
2. All cabling shall be installed in a neat and workmanlike manner. Follow manufacturer's installation recommendations for all communication wiring.
3. Do not install communication wiring in raceway and enclosures containing Class 1 or other Class 2 wiring.

4. Do not install power wiring, in excess of 30 Vac RMS, in conduit with communications wiring. In cases where signal wiring is run in conduit with communication wiring, use separate twisted shielded pairs with the shields grounded in accordance with the manufacturer's wiring practice.
5. Communication conduits shall not be installed closer than six feet from high power transformers or run parallel within six feet of electrical high power cables. Care shall be taken to route the cable as far from interference generating devices as possible.
6. Do not exceed maximum pulling, tension, and bend radius for cable installation, as specified by the cable manufacturer during installation.
7. Verify the integrity of the entire network following the cable installation. Use appropriate test measures for each particular cable.
8. When a cable enters or exits a building, install a lightning arrestor between the lines and ground. Install the lightning arrestor according to the manufacturer's instructions.
9. Ground (earth ground) all shields at one point only, to eliminate ground loops.
10. All runs of communications wiring shall be unspliced length when that length is commercially available.
11. Terminate shielded cable splices in accessible locations. Harness cables with cable ties.
12. Make all wire-to-device and wire-to-wire connections at a terminal block or terminal strip.
13. Label all communications wiring to indicate origination and destination data.
14. Ground coaxial cable in accordance with NEC regulations.
15. Install BACnet MS/TP communications wiring in accordance with ASHRAE/ANSI Standard 135
    a. The network shall use shielded, twisted-pair cable with characteristic impedance between 100 and 120 ohms. Distributed capacitance between conductors shall be less than 100 pF per meter (30 pF per foot.)
    b. The maximum length of an MS/TP segment shall be 4000 ft with AWG 22 or 24 cable. The use of greater distances and/or different wire gauges shall comply with the electrical specifications of EIA-485.
    c. The maximum number of nodes per segment shall be 50. Additional nodes may be accommodated by the use of repeaters.
    d. An MS/TP EIA-485 network shall have no T connections.

H. Identification of Hardware and Wiring:

1. Label all wiring and cabling, including that within factory-fabricated panels, at each end within 2 inch of termination with the BAS address or termination number.
2. Permanently label or code each point of field terminal strips to show the instrument or item served.
3. Identify control panels with minimum 1/2 inch letters on laminated plastic nameplates.
4. Identify all other control components with permanent labels. Label all plug-in components such that removal of the component does not remove the label.
5. Identify room sensors related to terminal box or valves with nameplates.
6. Maintain manufacturers' nameplates and UL or CSA labels visible and legible after equipment is installed.
7. Identifiers shall match record documents.

3.3 STARTUP AND DEMONSTRATION

A. Start and commission systems. Allow sufficient time for start-up and commissioning prior to placing the BAS in permanent operation.

B. Contractor shall provide an on-site controls technician or programmer familiar with the project BAS installation and system programming to assist the Commissioning Agent as directed during all phases of system functional testing.

C. Coordinate with Owner the setup of logins, passwords, and security level access for individuals requiring access to the BAS.

D. BAS shall be set up and checked by factory trained technicians skilled in the setting and adjustment of the BAS equipment used in this project. Technicians shall be experienced in the type of HVAC systems associated with this project.

E. Verify that all control wiring is properly connected and free of all shorts and ground faults. Verify that terminations are tight.

F. Test each control device to ensure that it is operating properly and is calibrated to the appropriate operating requirements. Run each control device through its range of operation and sequence. Verify all normal positions are correct. Adjust and tune PID control constants to achieve proper system operation.

1. As each control input and output is checked, a log shall be completed showing the date, technician's initials, and any corrective action taken or needed.
2. Demand limiting. The Contractor shall supply a trend data output showing the action of the demand limiting algorithm. The data shall document the action on a minute-by-minute basis over at least a 30-minute period. Included in the trend shall be building kW, demand limiting set point, and the status of sheddable equipment outputs.
3. Optimum start/stop. The Contractor shall supply a trend data output showing the capability of the algorithm. The change-of-value or change-of-state trends shall include the output status of all optimally started and stopped equipment, as well as temperature sensor inputs of affected areas.
4. Any tests that fail to demonstrate the operation of the BAS shall be repeated at a later date. The Contractor shall be responsible for any necessary repairs or revisions to the hardware or software to successfully complete all tests.

G. Test and verify control interfaces to other building systems integrated into the network.

H. Verify all alarms and interlocks.

1. Check each alarm separately by including an appropriate signal at a value that will trip the alarm.
2. Interlocks shall be tripped using field contacts to check the logic, as well as to ensure that the fail-safe condition for all actuators is in the proper direction.
3. Interlock actions shall be tested by simulating alarm conditions to check the initiating value of the variable and interlock action.
4. Verify fire/smoke and smoke damper functionality. Verify that they respond to the proper fire alarm system general, zone, and/or detector trips.

I. Document on system equipment schedules the final setting of controller PID constant settings, setpoints, manual reset values, maximum and minimum controller output, and ratio and bias settings in units and terminology specific to the controller. Store documentation with operator workstation.

J. Demonstrate complete and operating system to Owner.

1. Prior to acceptance, the BAS shall undergo a series of performance tests to verify operation and compliance with this specification. These tests shall occur after the Contractor has completed the installation, started up the system, and performed his/her own tests.
2. The tests described in this section are to be performed in addition to the tests that the Contractor performs as a necessary part of the installation, start-up, and debugging process.
3. The Contractor shall demonstrate actual field operation of each control and sensing point for all modes of operation including day, night, occupied, unoccupied, fire/smoke alarm, seasonal

changeover, and power failure modes. Any test equipment required to provide the proper operation shall be provided by and operated by the Contractor.
4. Demonstrate compliance with sequences of operation through all modes of operation.
5. Demonstrate complete operation of operator interface.

K. Acceptance:

1. All tests described in this specification shall have been performed to the satisfaction of the Owner prior to the acceptance of the BAS as meeting the requirements of completion. Any tests that cannot be performed due to circumstances beyond the control of the Contractor may be exempt from the completion requirements if stated as such in writing by the Contractor and submitted for approval by the Owner. Such tests shall then be performed as part of the warranty.
2. The BAS shall not be accepted until all forms and checklists completed as part of the demonstration are submitted and approved.

3.4 MAINTENANCE SERVICE

A. Provide service and maintenance of energy management and control systems for one year from Date of Substantial Completion.

3.5 TRAINING

A. General: At a time mutually agreed upon between the Owner, Construction Manager, Commissioning Agent, and Engineer, provide the services of a factory trained and authorized representative to train Owner's designated personnel for a minimum of sixteen hours on the operation and maintenance of the equipment provided under this section.

B. Organize the training into sessions or modules for different levels of operators. Owner designated personnel shall be trained based on the level of operator training described below.

C. Day-to-day Operator Training:

1. Overview of the system and/or equipment as it relates to the facility as a whole.
2. Proficiently operate the BAS.
3. Understand BAS architecture and configuration.
4. Understand BAS components.
5. Understand system operation, including BAS control and optimizing routines (algorithms).
6. Operate the workstation and peripherals.
7. Log on and off the system.
8. Access graphics, point reports, and logs.
9. Adjust and change system set points, time schedules, and holiday schedules.
10. Recognize malfunctions of the system by observation of the printed copy and graphical visual signals.
11. Understand BAS drawings and Operation and Maintenance manual.
12. Understand the job layout and location of control components.
13. Access data from BAS controllers and ASCs.
14. Operate portable operator’s terminals.
15. Operation and maintenance procedures and schedules related to startup and shutdown, troubleshooting, servicing, preventive maintenance and appropriate operator intervention.

D. Advanced Operator Training:

1. Make and change graphics on the workstation.
2. Create, delete, and modify alarms, including annunciation and routing of these.
3. Create, delete, and modify point trend logs and graph or print these both on an ad-hoc basis and at user-definable time intervals.
4. Create, delete, and modify reports.
5. Add, remove, and modify system's physical points.
6. Create, modify, and delete programming.
7. Add panels when required.
8. Add operator interface stations.
9. Create, delete, and modify system displays, both graphical and others.
10. Perform BAS field checkout procedures.
11. Perform BAS controller unit operation and maintenance procedures.
12. Perform workstation and peripheral operation and maintenance procedures.
13. Perform BAS diagnostic procedures.
14. Configure hardware including PC boards, switches, communication, and I/O points.
15. Maintain, calibrate, troubleshoot, diagnose, and repair hardware.
16. Adjust, calibrate, and replace system components.

E. Review data included in the operation and maintenance manuals. Refer to Division 1 Section "Operation and Maintenance Data."

F. Certification: Contractor shall submit to the Engineer a certification letter stating that the Owner's designated representative has been trained as specified herein. Letter shall include date, time, attendees and subject of training. The certification letter shall be signed by the Contractor and the Owner's representative indicating agreement that the training has been provided.

G. Schedule: Schedule training with Owner with at least 7 days' advance notice.

END OF SECTION 230923

SECTION 233113 - METAL DUCTS

PART 1 - GENERAL REQUIREMENTS

1.1 SUMMARY

A. This Section includes:

1. Rectangular, and round, metal ducts for heating, ventilating, and air conditioning systems in pressure classes from minus 2 inches to plus 10 inches water gauge.
2. Duct liner.

B. Related Sections:

1. Division 23 Section "Identification for HVAC Piping & Equipment," for labeling and identification of metal ducts.
2. Division 23 Section "Common Work Results for HVAC," for materials and methods for wall penetrations and equipment pads.

1.2 DEFINITIONS

A. Sealing Requirements Definitions: For the purposes of duct systems sealing requirements specified in this Section, the following definitions apply:

1. Seams: A seam is defined as joining of two longitudinally (in the direction of airflow) oriented edges of duct surface material occurring between two joints. All other duct surface connections made on the perimeter are deemed to be joints.
2. Joints: Joints include girth joints; branch and subbranch intersections; so-called duct collar tap-ins; fitting subsections; louver and air terminal connections to ducts; access door and access panel frames and jambs; duct, plenum, and casing abutments to building structures.

1.3 SYSTEM PERFORMANCE REQUIREMENTS

A. The duct system design, as indicated, has been used to select and size air moving and distribution equipment and other components of the air system. Changes or alterations to the layout or configuration of the duct system must be specifically approved in writing. Accompany requests for layout modifications with calculations showing that the proposed layout will provide the original design results without increasing the system total pressure.

1.4 SUBMITTALS

A. Product data including details of construction relative to materials, dimensions of individual components, profiles, and finishes for the following items:

1. Duct Liner.
2. Sealing Materials.
3. Fire-Stopping Materials.

B. Shop drawings from duct fabrication shop, drawn to a scale not smaller than 1/4 inch equals 1 foot, on drawing sheets same size as the Contract Drawings, detailing:

1. Fabrication, assembly, and installation details, including plans, elevations, sections, details of components, and attachments to other work.
2. Duct layout, indicating pressure classifications, duct gauge and sizes in plan view. For exhaust ducts systems, indicate the classification of the materials handled as defined in this Section.
3. Fittings.
4. Reinforcing details and spacing.
5. Seam and joint construction details.
6. Penetrations through fire-rated and other partitions.
7. Terminal heating and cooling unit, coil, humidifier and duct silencer installations.
8. Locations of fire and fire/smoke dampers and associated duct access doors.
9. Locations of cleanout and access doors in grease exhaust ducts.
10. Location of manual balancing dampers.
11. Duct smoke detector locations. Refer to electrical drawings for general locations and coordinate locations with the electrical contractor.
12. Hangers and supports, including methods for building attachment, vibration isolation, and duct attachment.

C. Coordination drawings for ductwork installation in accordance with Division 23 Section "General Mechanical Requirements." In addition to the requirements specified in "General Mechanical Requirements" show the following:

1. Coordination with ceiling suspension members.
2. Spatial coordination with other systems installed in the same space with the duct systems.
3. Coordination of ceiling- and wall-mounted access doors and panels required to provide access to dampers and other operating devices.
4. Coordination with ceiling-mounted lighting fixtures and air outlets and inlets.

D. Record drawings including duct systems routing, fittings details, reinforcing, support, and installed accessories and devices, in accordance with Division 23 Section "General Mechanical Requirements" and Division 1.

1.5 QUALITY ASSURANCE

A. NFPA Compliance: Comply with the following NFPA Standards:

1. NFPA 90A, "Standard for the Installation of Air Conditioning and Ventilating Systems," except as indicated otherwise.

2. NFPA 90B, “Standard for the Installation of Warm Air Heating and Air Conditioning Systems.

B. Sheet Metal and Air Conditioning Contractors’ National Association, Inc. (SMACNA): Provide ductwork systems in conformance with “HVAC Duct Construction Standards – Metal and Flexible,” latest edition.

C. Underwriter’s Laboratories (UL): Comply with the UL standards listed within this section. Provide mastic and tapes that are listed and labeled in accordance with UL 181A and marked according to type.

D. National Air Duct Cleaners Association, Inc. (NADCA): Clean ductwork systems in accordance with the standard Assessment, Cleaning and Restoration of HVAC Systems (ACR 2002).

1.6 PROTECTION AND REPLACEMENT

A. Protect ductwork during shipping and storage from dirt, debris and moisture damage. Provide plastic covers over ends of ductwork during shipping, storage and installation.

B. Replace duct liner that is damaged and cannot be repaired satisfactorily, including insulation with vapor barrier damage and insulation that has been exposed to moisture during shipping, storage, or installation. Drying the insulation is not acceptable. Dry surfaces prior to installing new duct liner.

PART 2 - PRODUCTS AND MATERIALS

2.1 SHEET METAL MATERIALS

A. Sheet Metal, General: Provide sheet metal in thickness indicated (minimum 26 gauge), packaged and marked as specified in ASTM A 700.

B. Galvanized Sheet Steel: Lock-forming quality, ASTM A 653, Coating Designation G 90. Provide mill phosphatized or galvanealed finish for surfaces of ducts exposed to view that is to be field painted. Provide bright galvanized finish for ductwork that is exposed to view and not field painted.

C. Aluminum Sheets: ASTM B 209, Alloy 3003, Temper H14, sheet form; with standard, one-side bright finish where ducts are exposed to view, and mill finish for concealed ducts.

D. Reinforcement Shapes and Plates: Unless otherwise indicated, provide galvanized steel reinforcing where installed on galvanized sheet metal ducts. For aluminum and stainless steel ducts provide reinforcing of compatible materials.

E. Tie Rods: Galvanized steel, 1/4-inch minimum diameter for 36-inch length or less; 3/8-inch minimum diameter for lengths longer than 36 inches.

2.2 DUCT LINER

A. General:

1. Comply with NFPA Standard 90A and North American Insulation Manufacturers Association (NAIMA) Standard AHC-101.
2. Liner shall have a flame spread rating of not more than 25 without evidence of continued progressive combustion and a smoke developed rating of no higher than 50, when tested in accordance with ASTM E84.
3. Duct sizes on mechanical plans indicate clear inside airflow dimensions. Sheet metal sizes for ductwork with duct liner shall be increased accordingly to account for liner thickness.

B. Fiberglass: ASTM C 1071, Type I or II, glass fibers firmly bonded together with a thermosetting resin with surface exposed to airstream coated to prevent erosion of glass fibers. Liner surface shall serve as a barrier against infiltration of dust and dirt, shall meet ASTM C 1338 for fungi resistance and shall be cleanable using duct cleaning methods and equipment outlined by NAIMA Duct Cleaning Guide. Duct liner shall be rated for air velocity of 6,000 fpm.

1. Rectangular fiberglass duct liner shall be Certainteed ToughGard T, JohnsManville Linacoustic RC, Knauf Atmosphere, Owens Corning QuietR or approved equal.
   a. Thickness and Density:
      1) 1-1/2 inch, 1-1/2 pounds.
2. Round fiberglass duct liner shall be Certainteed ToughGard UltraRound, JohnsManville Spiracoustic Plus, Owens Corning QuietZone Spiral, or approved equal.
   a. Thickness and Density:
      1) 1 inch, 4 pound.
3. Thermal Performance: Meet minimum "K-Factor" equal to 0.26 (Btu·in/h·sq ft·F) or better, at a mean temperature of 75°F and rated in installed condition in accordance with ASTM C518 and/or ASTM C177.
4. Noise Reduction Coefficient (NRC): Meet the following minimum NRC in accordance with ASTM C423 Type A Mounting:
   a. 1-1/2 Inch Thick: NRC 0.80.
5. Liner Adhesive: Comply with NFPA Standard 90A /UL 181 classified with flame spread/smoke development less than 25/50 and ASTM C 916. Adhesive shall be a minimum 50% solid content, water-based, non-oxidizing and have a service temperature of –20 to 200 F. Water-based adhesive shall be one of the following:
   a. Armacell LLC Armsflex 520 BLV low VOC.
   b. Design Polymerics DP 2502.
   c. Duro Dyne WIT.
   d. Foster 85-60.
   e. Childers CP-127.
   f. Johns Manville SuperSeal HV.
   g. Hardcast 951.
   h. United McGill Uni-Tack.
6. Mechanical Fasteners: Galvanized steel, suitable for adhesive attachment, mechanical attachment, or welding attachment to duct.

a. Fastener Pin Length: As required for thickness of insulation, and without projecting more than 1/8 inch into the airstream.
b. Adhesive For Attachment of Mechanical Fasteners: Comply with the "Fire Hazard Classification" of duct liner system.

2.3 SEALING MATERIALS

A. Joint and Seam Sealants, General:

1. The term sealant used here is not limited to materials of adhesive or mastic nature, but also includes tapes and combinations of open weave fabric strips and mastics.
2. Duct tape shall not be used as a sealant on any ducts.
3. Sealants shall be ASTM E84 or UL 723 listed with a flame spread index not more than 25 and a smoke-developed index not more than 50.

B. Joint and Seam Tape: 2 inches wide, glass-fiber-reinforced fabric.

C. Tape Sealing System: Woven-fiber tape impregnated with a gypsum mineral compound and a modified acrylic/silicone activator to react exothermically with the tape to form a hard, durable, airtight seal.

D. Solvent-Based Joint and Seam Sealant: One-part, non-sag, solvent-release-curing, polymerized butyl sealant complying with FS TT-S-001657, Type I; formulated with a minimum of 70 percent solids.

1. Manufacturers:
   a. Childers CP-140.
   b. Duro Dyne SGD.
   c. Fosters 32-14.
   d. Approved equal.

E. Water-Based Joint and Seam Sealant, Non-Fibrated: UL 181 listed. Sealant shall be rated to ±15 inches w.g. Sealant shall have a service temperature of –25 to 200 F and be freeze/thaw stable through 5 cycles.

1. Manufacturers:
   a. Childers CP-146.
   b. Design Polymerics DP 1010.
   c. Ductmate Proseal/Fiberseal.
   d. Duro Dyne Duroseal.
   e. Fosters 32-19
   f. United Duct Sealer (Water Based).
   g. Hardcast 601.

F. Flanged Joint Mastics: One-part, acid-curing, silicone elastomeric joint sealants, complying with ASTM C 920, Type S, Grade NS, Class 25, Use O.

G. Flanged Gasket Tapes: Butyl gasket shall be UL 181 classified. Gasket size shall be minimum 5/8 inch x 3/16 inch and have nominal 100 percent solid content. It shall be non-oxidizing, non-skinning and have a service temperature of –25 to 180 F.

1. Manufacturers:
   a. Design Polymerics DP 1040.
   b. Ductmate 440.
   c. Hardcast 1902.

2.4 HANGERS AND SUPPORTS

A. Building Attachments: Concrete inserts, powder actuated fasteners, or structural steel fasteners appropriate for building materials. Do not use powder actuated concrete fasteners for lightweight aggregate concrete or for slabs less than 4 inches thick.

B. Hangers: Galvanized sheet steel, or round, uncoated steel, threaded rod.

1. Hangers Installed In Corrosive Atmospheres: Electro-galvanized, all-thread rod or hot-dipped-galvanized rods with threads painted after installation.
2. Straps and Rod Sizes: Conform with SMACNA HVAC Duct Construction Standards, 2005 Edition, for sheet steel width and gauge and steel rod diameters.

C. Duct Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.

D. Trapeze and Riser Supports: Steel shapes conforming to ASTM A 36.

1. Where galvanized steel ducts are installed, provide hot-dipped-galvanized steel shapes and plates.
2. For stainless steel ducts, provide stainless steel support materials.
3. For aluminum ducts, provide aluminum support materials, except where materials are electrolytically separated from ductwork.

2.5 RECTANGULAR DUCT FABRICATION

A. General: Except as otherwise indicated, fabricate rectangular ducts with galvanized sheet steel, in accordance with SMACNA "HVAC Duct Construction Standards," 2005 Edition, Tables 2-1 through 2-28, including their associated details. Conform to the requirements in the referenced standard for metal thickness, reinforcing types and intervals, tie rod applications, and joint types and intervals.

1. Fabricate rectangular ductwork of minimum 26 gauge sheet metal.
2. Fabricate rectangular ducts in lengths appropriate to reinforcement and rigidity class required for pressure classification.
3. Provide materials that are free from visual imperfections such as pitting, seam marks, roller marks, stains, and discolorations.

B. Crossbreaking or Cross Beading: Crossbreak or bead duct sides that are 19 inches and larger and are 20 gauge or less, with more than 10 sq. ft. of unbraced panel area, as indicated in SMACNA "HVAC Duct Construction Standards," 2005 Edition, Figure 2-9, unless they are lined or are externally insulated.

C. Field Painted Ductwork: Provide mill phosphatized finish on exposed surfaces of rectangular ductwork and duct fittings to be field painted.

2.6 RECTANGULAR DUCT FITTINGS

A. Fabricate elbows, transitions, offsets, branch connections, and other duct construction in accordance with SMACNA "HVAC Metal Duct Construction Standard," 2005 Edition, Figures 4-1 through 4-8. Unless otherwise noted on drawings, provide prefabricated 45 degree, high efficiency, rectangular/round branch duct takeoff fittings with manual balancing damper, 3/8 inch square shaft, U-bolt, nylon bushings, locking quadrant, and 2 inch insulation build-out for branch duct connections and take-offs to individual diffusers, registers and grilles. 45 degree, high efficiency, rectangular/round branch duct takeoff fittings shall be Flexmaster STO with model BO3 damper or equal.

B. Provide radius elbows, turns, and offsets with a minimum centerline radius of 1-1/2 times the duct width. Where space does not permit full radius elbows, provide short radius elbows with a minimum of two continuous splitter vanes. Vanes shall be the entire length of the bend. The use of square throat, radius heel elbows is prohibited. Remove and replace all installed elbows of this type with an approved elbow at no additional cost to the owner.

C. Provide mitered elbows where space does not permit radius elbows, where shown on the drawings, or at the option of the contractor with the engineer's approval. The contractor shall obtain approval to substitute mitered elbows in lieu of radius elbows prior to fitting fabrication. Mitered elbows less than 45 degrees shall not require turning vanes. Mitered elbows 45-degrees and greater shall have single thickness turning vanes of same material and gauge as ductwork, rigidly fastened with guide strips in ductwork. Vanes for mitered elbows shall be provided in all supply and exhaust ductwork and in return and outside air ductwork that has an air velocity exceeding 1000 fpm. Do not install vanes in grease ductwork. Refer to Section "Ductwork Accessories" for turning vane construction and mounting.

2.7 SHOP APPLICATION OF LINER IN RECTANGULAR DUCTS

A. Adhere a single layer of indicated thickness of duct liner with 90 percent coverage of adhesive at liner contact surface area. Multiple layers of insulation to achieve indicated thickness is prohibited.

B. Apply a coat of adhesive to liner facing in direction of airflow not receiving metal nosing.

C. Butt transverse joints without gaps and coat joint with adhesive.

D. Fold and compress liner in corners of rectangular ducts or cut and fit to assure butted edge overlapping.

E. Longitudinal joints in rectangular ducts shall not occur except at corners of ducts, unless the size of the duct and standard liner product dimensions make longitudinal joints necessary.

1. Apply an adhesive coating on longitudinal seams in ducts exceeding 2,500 FPM air velocity.

F. Secure liner with mechanical fasteners 4 inches from corners and at intervals not exceeding 12 inches transversely around perimeter; at 3 inches from transverse joints and at intervals not exceeding 18 inches longitudinally.

G. Secure transversely oriented liner edges facing the airstream with metal nosings that are either channel or "Z" profile or are integrally formed from the duct wall at the following locations:

1. Fan discharge.
2. Intervals of lined duct preceding unlined duct.
3. Upstream edges of transverse joints in ducts where duct velocity is greater than 2,500 FPM.

H. Terminate liner with duct buildouts installed in ducts to attach dampers, turning vane assemblies, and other devices. Fabricated buildouts (metal hat sections) or other buildout means are optional; when used, secure buildouts to the duct wall with bolts, screws, rivets, or welds. Terminate liner at fire dampers at connection to fire damper sleeve through fire separation.

2.8 ROUND DUCT FABRICATION

A. General: Except where interrupted by fittings, provide round ducts in lengths not less than 12 feet.

1. Fabricate round ductwork of minimum 26 gauge sheet metal.

B. Round Ducts: Fabricate round supply ducts using seam types identified in SMACNA "HVAC Duct Construction Standards," 2005 Edition, Figure 3-2, RL-1, RL-4, or RL-5 except where diameters exceed 72 inches. Seam Types RL-2 or RL-3 may be used for ducts smaller than 72 inches in diameter if spot-welded on 1-inch intervals. Fabricate ducts having diameters greater than 72 inches with longitudinal butt-welded seams. Comply with SMACNA "HVAC Duct Construction Standards," 2005 Edition, Table 3-5 through 3-13 for galvanized steel gauges. For round duct with static pressure classification of 2 inches water gauge or lower, round supply ducts may be fabricated using snaplock seam types identified in SMACNA "HVAC Duct Construction Standards," 2005 Edition, Figure 3-2, RL-6A, RL-6B, RL-7 or RL-8.

C. Double-Wall (Insulated) Ducts: Fabricate double-wall insulated ducts with an outer shell, insulation, and an inner liner as specified below. Dimensions indicated on internally insulated ducts are nominal inside dimensions.

1. Outer Shell: Base outer shell gauge on actual outer shell dimensions. Provide outer shell lengths 2 inches longer than inner shell and insulation, and in gauges specified above for single-wall duct.
2. Insulation: Meet the performance criteria as specified in paragraph “Duct Liner” above. Provide insulation ends where internally insulated duct connects to single-wall duct or non-insulated components. The insulation end shall terminate the insulation and reduce the outer shell diameter to the inner liner diameter.

3. Solid Inner Liner: Construct round and flat oval inner liners with solid sheet metal of the gauges listed below. For flat oval ducts, the diameter indicated in the table below is the "basic round diameter."
4. Perforated Inner Liner: Construct round and flat oval inner liners with perforated sheet metal of the gauges listed below. Provide 3/32-inch-diameter perforations, with an overall open area of 23 percent.
   a. 3 to 8 inches: 28 gauge with standard spiral construction.
   b. 9 to 42 inches: 28 gauge with single-rib spiral construction.
   c. 44 to 60 inches: 26 gauge with single-rib spiral construction.
5. Maintain concentricity of liner to outer shell by mechanical means. Retain insulation from dislocation by mechanical means.

D. Field Painted Ductwork: All round ductwork and duct fittings to be field painted shall have galvanized metal primer applied in the shop after fabrication and prior to shipping.

2.9 ROUND SUPPLY AND EXHAUST FITTINGS FABRICATION

A. 90-Degree Tees and Laterals and Conical Tees: Fabricate to conform to SMACNA "HVAC Duct Construction Standards," 2005 Edition, Figures 3-5, 3-6 and 3-7 and with metal thickness specified for longitudinal seam straight duct.

B. Diverging-Flow Fittings: Fabricate with a reduced entrance to branch taps with no excess material projecting from the body onto branch tap entrance.

C. Elbows: Unless elbow construction type is indicated, provide elbows meeting the following requirements:

1. Fabricate in die-formed, gored, pleated, or mitered construction. Fabricate the bend radius of die-formed, gored, and pleated elbows 1.5 times the elbow diameter.
   a. Elbows in Round Duct: Provide full radius elbows.
   b. The use of square throat, radius heel elbows is prohibited. Remove and replace all installed elbows of this type with an approved elbow at no additional cost to the owner.
   c. Provide full radius elbows for ductwork installed in noise critical spaces or where shown on the drawings. Refer to Section “Basic Mechanical Materials and Methods” for noise critical spaces.
2. Round Elbows - 8 Inches and Smaller: Die-formed elbows for 45- and 90-degree elbows and pleated elbows for 30, 45, 60, and 90 degrees only. Fabricate nonstandard bend angle configurations or 1/2-inch-diameter (e.g. 3-1/2- and 4-1/2-inch) elbows with gored construction.
3. Round Elbows - 9 Through 14 Inches: Gored or pleated elbows for 30, 45, 60, and 90 degrees, except where space restrictions require a mitered elbow. Fabricate nonstandard bend angle configurations or 1/2-inch-diameter (e.g. 9-1/2- and 10-1/2-inch) elbows with gored construction.
4. Round Elbows - Larger Than 14 Inches and All Flat Oval Elbows: Gored elbows, except where space restrictions require a mitered elbow.
5. Die-Formed Elbows for Sizes Through 8 Inches and All Pressures: 20 gauge with 2-piece welded construction.
6. Round Gored Elbows Gauges: Same as for non-elbow fittings specified above.
7. Pleated Elbows Sizes Through 14 Inches and Pressures Through 10 Inches: 26 gauge.

D. Double-Wall (Insulated) Fittings: Fabricate double-wall insulated fittings with an outer shell, insulation, and an inner liner as specified below. Dimensions indicated on internally insulated ducts are nominal inside dimensions.

1. Outer Shell: Base outer shell gauge on actual outer shell dimensions. Provide outer shell lengths 2 inches longer than inner shell and insulation. Gauges for outer shell shall be same as for uninsulated fittings specified above.
2. Insulation: Unless otherwise indicated, provide 2-inch-thick, minimum R-value of 6.0, fiber-glass insulation with thermal conductivity performance of 0.26 Btu/sq.ft./°F/inch-thickness at 75°F mean temperature. Provide insulation ends where internally insulated duct connects to single-wall duct or non-insulated components. The insulation end shall terminate the insulation and reduce the outer shell diameter to the nominal single-wall size.
3. Solid Inner Liner: Construct round and flat oval inner liners with solid sheet metal of the gauges listed below. For flat oval ducts, the diameter indicated in the table below is the "basic round diameter."
4. Perforated Inner Liner: Construct round and flat oval inner liners with perforated sheet metal of the gauges listed below. Provide 3/32-inch-diameter perforations, with an overall open area of 23 percent. For flat oval ducts, the diameter indicated in the table below is the "basic round diameter."
   a. 3 to 34 inches: 24 gauge.
   b. 35 to 58 inches: 22 gauge.
5. Maintain concentricity of liner to outer shell by mechanical means. Retain insulation from dislocation by mechanical means.

2.10 FACTORY-MANUFACTURED DUCTWORK

A. Manufacturers:

1. Hercules Industries.
2. Lewis & Lambert.
3. Lindab Safe.
4. Linx Industries, Inc.
5. Semco.
6. Approved equal.

B. General: At the Contractor’s option, factory-manufactured ductwork can be provided instead of fabricated ductwork for round ductwork. The round duct system shall consist of fittings that are factory fitted with a sealing gasket and spiral duct which, when installed according to the manufacturer's instructions, will seal the duct joints without the use of duct sealer.

C. Duct Construction

1. Unless otherwise noted, all duct and fittings shall be constructed from galvanized steel in accordance with SMACNA's Duct Construction Standards for +10” water gauge pressure with thickness as shown in the following tables:

Single Wall Round Duct:

Diameter (Inches)	Galvanized Spiral Duct	Galvanized Fittings
3-14	28	24

15-24	26	24
26-42	24	22
42-60	22	20

Double Wall Round Duct:

Diameter (Inches)	Galvanized Spiral Duct		Galvanized Fittings	
	Inner	Outer	Inner	Outer
3-14	28	28	24	24
16-24	26	26	24	24
26-42	24	24	22	22
44-60	22	22	20	20

2. Duct shall be calibrated to manufacturer's published dimensional tolerance standard.
3. All duct 14" diameter and larger shall be corrugated for added strength and rigidity.
4. Spiral seam slippage shall be prevented by means of a flat seam and a mechanically formed indentation evenly spaced along the spiral seam.
5. Ducts shall be constructed using spiral lock seam sheet metal construction.
6. Ductwork to be installed in exposed locations shall have the surface prepared in the factory for field painting.

D. Fittings:

1. All fitting ends for round duct and transitions and divided flow fittings smaller than 50” diameter that convert oval duct to round duct shall come factory equipped with a double lipped, U-profile, EPDM rubber gasket. Gasket shall be manufactured to gauge and flexibility so as to insure that system will meet all of the performance criteria set forth in the manufacturer's literature. Gasket shall be classified by Underwriter's Laboratories to conform to ASTM E84-91a and NFPA 90A flame spread and smoke developed ratings of 25/50.
2. All fittings shall be calibrated to manufacturer's published dimensional tolerance standard and associated spiral duct.
3. All fitting ends from 5" to 60" diameter shall have rolled over edges for added strength and rigidity.
4. All elbows from 5" to 12" diameter shall be 2 piece die stamped and continuously stitch welded. All elbows 14" diameter and larger shall be standing seam gorelock construction and internally sealed.
5. The radius of all 90° and 45° elbows shall be 1.5 times the elbow diameter, unless otherwise noted on the contract documents to be 1.0. The radius of all 15°, 30° and 60° elbows shall be 1.0 times the elbow diameter.
6. All fittings that are of either spot welded or button punched construction shall be internally sealed. When contract documents require divided flow fittings, only full body fittings will be accepted. The use of duct taps is unacceptable except for retrofit installations.
7. Double wall duct and fittings shall consist of a perforated or solid inner liner, a 2 inch, 1.50 lb/ft3, minimum R-6.0 (unless otherwise specified) layer of fiberglass insulation and a solid outer pressure shell. Perforated inner liner shall have a retaining fabric wrapped between the perforated inner and the fiberglass insulation. This fabric shall provide fiberglass tear retention while maintaining the desired acoustical properties. For 2 inch thick insulation, the outer pressure shell diameter shall be 4 inches larger than the inner liner.
8. All double wall fittings for round duct shall be furnished with the Lindab Safe gasket on the outer shell. The inner shell on all double wall fittings shall extend a minimum of 1 inch past the outer shell.
9. Double wall to single wall transitions shall be provided where insulated duct connects to non-insulated, single wall duct. Transitions shall also act as insulation ends reducing the double wall outer shell diameter to the inner shell diameter.

10. All double wall duct and fittings shall be furnished with both an inner liner and an outer pressure shell coupling. The inner liners shall not be fastened tighter to allow for expansion and contraction.
11. All volume dampers shall be Lindab Safe type DRU, DSU or DTU or approved equal. Damper shall be fitting sized to slip into spiral duct. Damper shall have the following features:
    a. Locking quadrant with blade position indicator.
    b. 2" sheet metal insulation stand-off.
    c. Integral shaft/blade assembly.
    d. Shaft mounted, load bearing bushings.
    e. Gasketed shaft penetrations to minimize leakage.

2.11 SNAP-LOCK DUCT SYSTEM

A. General: At Contractor's option, snap-lock round ductwork can be provided instead of fabricated ductwork for round ductwork up to 14" in diameter in air systems with pressures between negative 1" and positive 2" w.c..

B. Duct Construction:

1. Material:
    a. Galvanized steel conforming to ASTM A653 and A924 with G-60 galvanized coating conforming to ASTM A653 and ASTM A90.
2. Duct shall be minimum 26 gauge. Duct shall be self-locking and incorporate a factory applied gasket in the longitudinal seam and the female end of the traverse joint to provide a system that meets SMACNA Seal Class A.
3. Fittings: Minimum 26 gauge. All high-efficiency take-offs, conicals, and collars shall have a factory applied gasket along all rivets, co-latches, and flanges. Dampered fittings shall have low leakage hardware with closed-end bearings.

C. Gaskets: Butyl and EPDM rubber that meets flame spread index of 25 and smoke spread index of 50 according to ASTM E84.

D. Manufacturers:

1. Ductmate GreenSeam.
2. Approved equal.

PART 3 - EXECUTION

3.1 DUCT MATERIAL APPLICATION

A. All ducts shall be galvanized steel. except as follows:

1. Locker Room & Shower Ductwork:

a. Aboveground: Minimum 22 gauge aluminum sheet material.
2. Dryer Vent Ducts: Rigid, smooth wall, aluminum duct, minimum 26 gauge.

3.2 DUCT LINER INSTALLATION

A. Fiberglass Duct Liner:

1. Attach fiberglass duct liner using fasteners that do not damage the liner when applied as recommended by the manufacturer, that do not cause leakage in the duct, and will indefinitely sustain a 50-pound tensile dead load test perpendicular to the duct wall.

B. Application: Provide duct liner on the following interior air ducts and where specified on the drawings.

1. Supply Ductwork (RTU-1):
   a. Exposed rectangular ductwork.
   b. Exposed round ductwork.
   c. First 15 feet of ductwork downstream of equipment outlets.
2. Return/Transfer Ductwork.
   a. All ductwork.

3.3 DUCT INSTALLATION, GENERAL

A. Install products in accordance with manufacturer's instructions.

B. Duct System Pressure Class: Construct and install each duct system except factory-manufactured ductwork for the specific duct pressure classification indicated. For factory-manufactured ductwork, refer to Paragraph "Factory-Manufactured Ductwork".

1. Supply Air Ducts: 3 inches water gauge.
2. Primary Supply Air Ducts (upstream of terminal boxes): 4 inches water gauge.
3. Secondary Supply Air Ducts (downstream of terminal boxes): 2 inches water gauge
4. Return and Outdoor Air Ducts: 2 inches water gauge, negative pressure.
5. Exhaust Air Ducts: 2 inches water gauge, negative pressure.

C. Install ducts with the fewest possible joints.

D. Seal duct joints with the appropriate sealing material.

E. Use fabricated fittings for all changes in directions, changes in size and shape, and connections.

F. Install couplings tight to duct wall surface with projections into duct at connections kept to a minimum.

G. Locate ducts, except as otherwise indicated, vertically and horizontally, parallel and perpendicular to building lines; avoid diagonal runs. Install duct systems in shortest route that does not obstruct useable space or block access for servicing building and its equipment.

H. Install ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building.

I. Cover ducts openings during construction with duct caps or three-mil plastic to protect inside of (installed and delivered) ductwork from exposure to dust, dirt, paint and moisture. Do not use duct tape on ducts that will be exposed or painted.

J. Provide clearance of 1 inch where furring is shown for enclosure or concealment of ducts, plus allowance for insulation thickness, if any.

K. Install insulated ducts with 1-inch clearance outside of insulation.

L. Conceal ducts from view in finished and occupied spaces by locating in mechanical shafts, hollow wall construction, or above suspended ceilings. Do not encase horizontal runs in solid partitions, except as specifically shown.

M. Coordinate layout with suspended ceiling and lighting layouts and similar finished work.

N. Exposed Ductwork: Exposed ductwork shall be free of defects, dents or blemished surfaces to provide a smooth, finished appearance. Any damaged material shall be replaced with new material. Ductwork that is to be field painted shall have surfaces wiped clean of lubricant, dirt, or fil prior to priming and painting. Apply primer and paint of type as recommended by paint manufacturer for duct material and finish.

O. Electrical Equipment Spaces: Route ductwork to avoid passing through transformer vaults and electrical equipment spaces and enclosures.

P. Non-Fire-Rated Partition Penetrations: Where ducts pass interior partitions and exterior walls, and are exposed to view, conceal space between construction opening and duct or duct insulation with sheet metal flanges of same gauge as duct. Overlap opening on 4 sides by at least 1-1/2 inches.

3.4 DRYER VENT DUCTS

A. Install dryer vent exhaust ducts in accordance with dryer manufacturer’s installation instructions.

B. Install dryer vent ducts without kinks. Install duct joints with overlap, with the male end extending in the direction of airflow. Make connections with metal clamps adjustable using phillips/hex head screws. Do not penetrate duct with sheet metal screws.

C. Connect individual dryer vents into main header using lateral, 45 degree tees to minimize pressure drop.

D. Install vertical risers with a means for cleanout.

E. Install a backdraft damper at termination of the dryer vent duct.

3.5 SEAM AND JOINT SEALING

A. General: Seal duct seams and joints as follows:

1. All transverse joints, longitudinal seams, and duct wall penetrations shall be sealed to meet SMACNA Seal Class A.
2. Seal class shall apply to all supply, return, outdoor air, and exhaust ductwork, regardless if the duct is positively or negatively pressurized.

B. Seal externally insulated ducts prior to insulation installation.

C. Ductwork installed exterior to the building shall have longitudinal and transverse joints welded or sealed airtight with weatherproof heavy liquid sealant applied according to manufacturer's instructions.

3.6 HANGING AND SUPPORTING

A. Install rigid round, rectangular, and flat oval metal duct with support systems indicated in Chapter 5 of the SMACNA "HVAC Duct Construction Standards", 2005 Edition.

B. Support horizontal ducts within 2 feet of each elbow and within 4 feet of each branch intersection.

C. Support vertical ducts at a maximum interval of 16 feet and at each floor.

D. Upper attachments to structures shall have an allowable load not exceeding 1/4 of the failure (proof test) load but are not limited to the specific methods indicated. Hangers and supports shall be fastened to building joists or beams. Do not attach hangers and supports to the above floor slab or roof with sheet metal screws.

E. Install concrete insert prior to placing concrete.

F. Install powder actuated concrete fasteners after concrete is placed and completely cured.

3.7 PENETRATIONS

A. Exterior Wall Penetrations: Seal duct penetrations through exterior wall constructions with sleeves, packing, and sealant. Refer to Division 23 Section “Basic Mechanical Materials and Methods” for additional information.

B. Elevated Floor Penetrations of Waterproof Membrane, Interior Penetrations of No-Fire Rated Walls and Concrete Slab on Grade Penetrations: Seal ducts that pass through waterproof floors, non-fire rated walls, partitions and ceilings or concrete slab on grade. Refer to Division 23 Section "Basic Mechanical Materials and Methods” for special sealers and materials.

3.8 CONNECTIONS

A. Equipment Connections: Connect equipment with flexible connectors in accordance with Division 23 Section "Air Duct Accessories."

B. Branch Connections: Comply with SMACNA "HVAC Duct Construction Standards," 2005 Edition, Figures 4-5 and 4-6.

C. Outlet and Inlet Connections: Comply with SMACNA "HVAC Duct Construction Standards," 2005 Edition, Figures 7-6 and 7-7. Where a 90-degree elbow is required at the connection to air devices, provide a rigid duct elbow or, at Contractor’s option, a flexible elbow assembly as specified in Division 23 Section "Air Duct Accessories."

D. Fan Connections: Comply with SMACNA "HVAC Duct Construction Standards," 2005 Edition, Figure 7-8.

3.9 FIELD QUALITY CONTROL

A. Remove temporary protection devices over ductwork prior to starting equipment and turning the system over to the owner.

B. If permanent HVAC equipment is used during the construction period, provide temporary filters at all openings in the ductwork and at inside equipment to protect the system from dust, dirt, paint, and moisture. Replace and maintain filters when needed, but not less than every month. On the day of substantial completion, clean the duct system and provide a new set of filters in the HVAC unit.

3.10 ADJUSTING AND CLEANING

A. Adjust volume control devices as required by the testing and balancing procedures to achieve required air flow. Refer to Division 23 Section "TESTING, ADJUSTING, AND BALANCING FOR HVAC" for requirements and procedures for adjusting and balancing air systems.

B. Vacuum duct systems prior to final acceptance to remove dust and debris.

3.11 CLEANING NEW SYSTEMS

A. Contractor shall clean the HVAC systems in accordance with NADCA.

B. Mark position of dampers and air-directional mechanical devices before cleaning, and perform cleaning before air balancing.

C. Use service openings, as required, for physical and mechanical entry and for inspection.

1. Create other openings to comply with duct standards.
2. Disconnect flexible ducts as needed for cleaning and inspection.
3. Remove and reinstall ceiling sections to gain access during the cleaning process.

D. Vent vacuuming system to the outside. Provide filtration and/or containment systems to keep debris removed from HVAC systems from contaminating other spaces. Locate exhaust down wind and away from air intakes and other points of entry into building.

E. Clean the following metal duct systems by removing surface contaminants and deposits:

1. Air outlets and inlets (registers, grilles, and diffusers).
2. Supply, return, and exhaust fans including fan housings, plenums (except ceiling supply and return plenums), scrolls, blades or vanes, shafts, baffles, dampers, and drive assemblies.
3. Air-handling unit internal surfaces and components including mixing box, coil section, air wash systems, spray eliminators, condensate drain pans, humidifiers and dehumidifiers, filters and filter sections, and condensate collectors and drains.
4. Coils and related components.
5. Return air ducts, dampers, and actuators except in ceiling plenums and mechanical equipment rooms.
6. Supply and outdoor air ducts, dampers, actuators, and turning vanes.

F. Mechanical Cleaning Methodology:

1. Clean metal duct systems using mechanical cleaning methods that extract contaminants from within duct systems and remove contaminants from building.
2. Use vacuum-collection devices that are operated continuously during cleaning. Connect vacuum device to downstream end of duct sections so areas being cleaned are under negative pressure.
3. Use mechanical agitation to dislodge debris adhered to interior duct surfaces without damaging integrity of metal ducts, duct liner, or duct accessories.
4. Clean fibrous-glass duct liner with HEPA vacuuming equipment while the system is under negative pressure; do not permit duct liner to get wet.
5. Clean coils and coil drain pans according to ACR 2002. Keep drain pan operational. Rinse coils with clean water to remove latent residues and cleaning materials; comb and straighten fins.

G. Disposal: Debris collected from the HVAC system shall be disposed of in accordance with applicable federal, state and local requirements.

H. Cleanliness Verification:

1. Visually inspect metal ducts for contaminants.
2. Where contaminants are discovered, re-clean and re-inspect ducts.

END OF SECTION 233113

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SECTION 237413 - OUTDOOR PACKAGED HEATING AND COOLING UNITS

PART 1 - GENERAL REQUIREMENTS

1.1 SUMMARY

A. Section includes package rooftop heating and cooling units.

B. Related Sections: The following Sections contain requirements that relate to this Section:

1. Division 22 Section “Natural Gas Systems” for natural gas equipment connection requirements.
2. Division 23 Sections for temperature controls and other mechanical equipment not specified in this Section, but required for a complete installation.
3. Division 26 Sections for electrical work including motor starters, disconnects, wires/cables, raceways, and other electrical equipment devices not specified in this Section, but required for a complete installation.

1.2 SUBMITTALS

A. Product Data: Submit manufacturer's technical product data, including rated capacities of selected model clearly indicated, dimensions, required clearances, weights, furnished specialties and accessories; and installation and start-up instructions. Provide short circuit current rating of units with factory mounted starter or variable frequency drive.

B. Shop Drawings:

1. Submit manufacturer's assembly-type shop drawings indicating dimensions, required clearances, and methods of assembly of components
2. Submit shop drawings detailing the mounting, securing, and flashing of the roof curb to the roof structure. Indicate coordinating requirements with roof membrane system.

C. Wiring Diagrams: Submit wiring diagrams detailing the manufacturer's electrical requirements for power supply wiring for rooftop heating and cooling units. Submit manufacturer's ladder-type wiring diagrams for interlock and control wiring. Clearly differentiate between portions of wiring that are factory-installed and portions to be field-installed.

D. Operation and Maintenance Data: Submit maintenance data and parts list for each rooftop unit, including "trouble-shooting" maintenance guide, servicing guide and preventative maintenance schedule and procedures. Include this data in maintenance manual; in accordance with requirements of Division 1.

1.3 QUALITY ASSURANCE

A. Codes and Standards:

1. Gas-fired furnace section construction shall be in accordance with AGA safety standards. Furnace section shall bear the AGA label.
2. AHRI Compliance:
   a. Testing and rating of rooftop units of 135,000 btu/hr capacity or over shall be in accordance with AHRI 360 "Standard for Commercial and Industrial Unitary Air-Conditioning Equipment".
   b. Capacity ratings for air-to-air energy recovery equipment shall comply with AHRI 1060, "Performance Rating of Air-to-Air Heat Exchangers for Energy Recovery Ventilation Equipment."
   c. Sound testing and rating of units shall be in accordance with AHRI 270 "Standard for Sound Rating of Outdoor Unitary Equipment". Units shall bear Certified Rating Seal.
3. Refrigerating system construction of rooftop units shall be in accordance with ASHRAE 15 "Safety Code for Mechanical Refrigeration".
4. Energy Efficiency Ratio (EER) of rooftop units shall be equal to or greater than prescribed by ASHRAE 90.1-2004 "Energy Standard For Buildings Except Low-Rise Residential Buildings".
5. Rooftop units shall be listed by UL and have UL label as a unit.
6. Rooftop units shall be designed, manufactured, and tested in accordance with UL requirements.

1.4 SPARE PARTS

A. General: Furnish to Owner, with receipt, the following spare parts for each rooftop heating and cooling unit.

1. One set of matched fan belts for each belt driven fan.
2. One set of spare filters of each type required for each unit. Obtain receipt from Owner that spare filters have been provided. In addition to the spare set of filters, install new filters at completion of installation work, and prior to testing, adjusting, and balancing work.

1.5 SPECIAL WARRANTY

A. Warranty on Compressor and Heat Exchanger: Provide written warranty, signed by manufacturer, agreeing to replace/repair, within warranty period, compressors and heat exchangers with inadequate and defective materials and workmanship, including leakage, breakage, improper assembly, or failure to perform as required; provided manufacturer's instructions for handling, installing, protecting, and maintaining units have been adhered to during warranty period. Replacement is limited to component replacement only, and does not include labor for removal and reinstallation.

1. Warranty Period: 5 years from date of substantial completion.

PART 2 - PRODUCTS AND MATERIALS

2.1 ROOFTOP UNITS 20 TONS AND LARGER

A. Qualified Manufacturers: Subject to compliance with requirements, provide rooftop units of one of the following:

BASE BID:

1. Trane (The) Co; Div of American Standard Inc.

BID ALTERNATES:

2. Owner approved equal. Alternative bids will be considered via Substitution request. Substitution requests shall follow the requirements of Division 1 for timing, format and other requirements to be considered. The bidding contractor proposing the alternate shall include both the base bid cost and the alternate cost in their bid. Alternate cost shall include all costs required to achieve design intent with the alternate product, including but not limited to, structural modifications, electrical revisions, additional acoustic treatment, ductwork modifications, additional screening, controls, etc.

B. General Description: Rooftop unit shall be factory-assembled and tested, designed for roof or slab installation and, consisting of compressors, condensers, evaporator coils, condenser and evaporator fans, refrigeration and temperature controls, filters, and dampers. Capacities and electrical characteristics shall be as scheduled on the Drawings.

C. Casing: Provide manufacturer's standard double wall insulated casing construction, having corrosion protection coating, and exterior finish. Casings shall have removable panels or access doors for inspection and access to internal parts, a minimum of 1" thick, 1.5 pound density thermal insulation with a thermal resistance of R-9, knockouts for electrical and piping connections, and an exterior condensate drain connection, and lifting lugs.

D. Roof Curbs: Provide manufacturer's standard construction, insulated and having corrosive protective coating, complete with factory- installed wood nailer and drain nipple. Construction shall be in accordance with NRCA Standards. Curb shall be sloped to match roof structure to enable the rooftop unit to be installed level. The unit shall be anchored to the roof curb with anchor straps.

1. Overall Roof Curb Height: Minimum 12 inches for roofs with no insulation, 15” for roofs with insulation or as scheduled on the drawings. Height is measured from the top of the roof insulation to the top of the curb.

E. Compressors: Provide serviceable, semi-hermetic, or fully hermetic compressors, complete with integral vibration isolators, and crankcase heaters which de-energize during compressor operation.

1. Units shall have the following capacity control measures to prevent excessive compressor short cycling and prevent evaporator coil from freezing:
   a. Digital scroll or inverter scroll compressor as the first stage.
2. Accessories: Thermal expansion valves, filter dryers, sight glasses, compressor service valves, liquid line service valves; minimum of 2 refrigerant circuits for units having 2 or more compressors; and fan-cycling control for low ambient control to 35 deg F (2 deg C).

F. Evaporator Fans: Provide forward-curved, centrifugal, belt-driven fans with adjustable sheaves; and permanently lubricated motor bearings.

G. Condenser Fans: Provide propeller-type, direct-driven fans with permanently lubricated bearings.

H. Motors: Refer to Section “Common Motor Requirements for HVAC Equipment” for requirements.

I. Coils:

1. General: Aluminum plate fin and seamless copper tube type. Fins shall have collars drawn, belled and firmly bonded to the tubes by means of mechanical expansion of the tubes. No soldering or tinning shall be used in the bonding process. Coils shall have a galvanized steel casing. Coils shall be mounted in the coil casing with same end connections accessible for service. Coils shall be removable from the unit through the roof or through the piping enclosure. Coil section shall be completely insulated.
2. Refrigerant cooling coils: Refrigerant coils shall have an equalizing type vertical distributor to ensure each coil circuit receives the same amount of refrigerant. Coils shall be proof (450 psig) and leak (300 psig) tested with air pressure under water, then cleaned, dehydrated, and sealed with a holding charge of refrigerant.

J. Condensate Drain Pan: Provide insulated stainless steel condensate drain pan sloped to drain connection.

K. Heat exchangers: Provide manufacturer's standard stainless steel construction for gas-fired heat exchangers and burners, designed for a minimum efficiency of 80 percent. Provide single gas connection. Burner shall be fully modulating with turndown as scheduled on the drawings.

1. Operating Controls: Provide the following controls for the gas-fired heat exchangers:
   a. Redundant gas valves;
   b. Intermittent pilot ignition;
   c. Electronic spark ignition system;
   d. High limit cutout;
   e. Forced draft proving switch;
   f. Flame roll-out switch.

A. Pre-Filter Section: Provide 2” thick fiberglass throwaway pleated filters in filter rack, with maximum face velocity of 400 fpm and minimum MERV rating per ASHRAE 52.2 of MERV 8.

L. Final Filter Section: Provide 4” thick fiberglass throwaway pleated filters in filter rack, with maximum face velocity of 400 FPM and MERV rating per ASHRAE 52.2 of MERV 13.

M. Safety Controls: Provide safety controls for:

1. Low pressure cutout, manual reset type;
2. High pressure cutout, manual reset type;
3. Compressor motor overload protection, manual reset type;
4. Anti-recycling timing device;

5. Adjustable low-ambient lockout;
6. Oil pressure switch.

N. Dampers:

1. General: Dampers and their operators shall comply with performance requirements specified in Division 23 Section “Instrumentation and Control Devices for HVAC.”
2. Outdoor Air Damper:
   a. Provide outside air damper constructed of extruded aluminum, hollow core, airfoil blades with rubber edge seals and aluminum end seals. Damper blades shall be gear driven.
   b. Refer to schedules on the drawings for capacity and control method of the outdoor air damper of each unit.

O. Economizer Control:

1. Provide economizer system complete with return and outside air dampers, outside air filter, fully modulating electric control system with dry bulb or enthalpy control as scheduled on the drawings, and adjustable mixed-air thermostat.
2. System shall have 100 percent outside air capability.
3. Provide automatic changeover through adjustable control device.

P. Relief Control:

1. Power Exhaust Fan: Direct drive, backward inclined. Motors shall be open drip-proof with internal motor protection and permanently lubricated ball bearings.
2. Damper: Include a relief damper with control type as scheduled on the drawings.

Q. Variable Air Volume Control: Provide variable frequency drive to modulate fan to meet specified sequence of operation. Refer to Division 23 section “Variable Frequency Drives”.

R. Unit Controls: Solid-state control board and components contain at least the following features:

1. Indoor fan on/off delay.
2. Default control to ensure proper operation after power interruption.
3. Service relay output.
4. Unit diagnostics and diagnostic code storage.
5. Field-adjustable control parameters.
6. Dehumidification control with humidity sensor.
7. Economizer control.
8. Gas valve delay between first- and second-stage firing.
9. Indoor-air quality control with carbon dioxide sensor.
10. Minimum run time.
11. Night setback mode.
12. Fan-proving switch to lock out unit if fan fails.
13. Dirty-filter switch.
14. Smoke alarm with smoke detector installed in ductwork as noted on the drawings.

S. DDC Interface: Install stand-alone control module providing link between unit controls and DDC system. Control module shall be compatible with temperature-control system specified in Division 23 section "Direct Digital Control for HVAC”. All system components and adjustable setpoints shall be accessible for viewing and adjusting at the existing front end.

T. Electrical: Provide a 125 VAC, 20 amp duplex convenience receptacle mounted to unit ready for field wiring through the curb with a cover UL listed for wet and damp locations when in use. Unit power connection shall be either through unit cabinet or within roof curb perimeter. Rooftop units shall be designed to meet the minimum short-circuit withstand rating specified on the drawings.

U. Refrigerant Type: Provide rooftop units designed to operate with R-410 refrigerant.

V. Accessories: Units shall include the following accessories:

1. Anti-recycling control to automatically prevent compressor restart for 5-minutes after shutdown.
2. Provide guards to protect the condenser coil from hail or other damage.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions under which rooftop units are to be installed. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer.

3.2 INSTALLATION OF ROOFTOP HEATING AND COOLING UNITS

A. General: Install rooftop units in accordance with manufacturer's installation instructions. Install units plumb and level, firmly anchored in locations indicated, and maintain manufacturer's recommended clearances.

B. Support:

1. Support rooftop units on roof curb. Attach curb to roof structure. Anchor unit to roof curb using anchor straps.

C. Electrical Wiring: Install electrical devices furnished by manufacturer but not specified to be factory-mounted. Furnish copy of manufacturer's wiring diagram submittal to electrical installer.

1. Verify that electrical wiring installation is in accordance with manufacturer's submittal and installation requirements of Division-26 sections. Do not proceed with equipment start-up until wiring installation is acceptable to equipment Installer.

D. Ductwork: Refer to Division-23 section "Metal Ducts". Connect supply and return ducts to unit with flexible duct connections. Provide transitions to exactly match unit duct connection size.

E. Piping: Piping installation requirements are specified in other Division 23 sections. The Drawings indicate the general arrangement of piping, valves, fittings, and specialties. The following are specific connection requirements:

1. Condensate Drain Piping: Route condensate drain to nearest roof drain or to location shown on the drawings. Provide trap, minimum of 1" deeper than fan pressure in inches of water, at drain pan connection and install cleanouts at changes in direction (refer to manufacturer's recommendations for any additional requirements). Size condensate drain piping in accordance with local code and the following:

Piping Length	Size
Less than 10 feet	Same size as unit connection
More than 10 feet	One pipe size larger than unit connection

F. Connect gas piping to gas-fired heat exchanger according to requirements of Division 22 section "Natural Gas Systems." Provide union with sufficient clearance for burner removal and service.

3.3 ADJUSTING, CLEANING, AND PROTECTING

A. Adjust fan for required airflow in accordance with Section "Testing, Adjusting and Balancing for HVAC." Tighten belts as required for proper operation.

B. Adjust damper linkages for proper damper operation.

C. Clean the entire unit including cabinet interiors just prior to substantial completion to remove foreign material and construction dirt and dust. Vacuum clean fan wheel, fan cabinet, intake plenum cabinet, heat exchange surfaces, cooling/heating coil sections, filter sections, access sections, etc.

3.4 STARTUP

A. Final Checks Before Start-Up: Perform the following operations and checks before start-up:

1. Remove shipping, blocking, and bracing.
2. Verify unit is secure on mountings and supporting devices and that connections for piping, ductwork, and electrical are complete. Verify proper thermal overload protection is installed in motors, starters, and disconnects.
3. Perform cleaning and adjusting specified in this Section.
4. Disconnect fan drive from motor and verify proper motor rotation direction and verify fan wheel free rotation and smooth bearings operations. Reconnect fan drive system, align belts, and install belt guards.
5. Lubricate bearings, pulleys, belts, and other moving parts with factory-recommended lubricants.
6. Set outside-air and return-air mixing dampers to minimum outside-air setting.
7. Comb coil fins for parallel orientation.
8. Install clean filters. Do not operate air handling unit without pre-filters installed.
9. Verify manual and automatic volume control, and fire and smoke dampers in connected ductwork systems are in the full-open position.

10. Disable automatic temperature control operators.

B. Start-Up Services: Provide the services of a factory-authorized service representative to start-up rooftop units in accordance with manufacturer's written start-up instructions. Do not operate units without filters installed. Test controls and demonstrate compliance with requirements. Replace damaged or malfunctioning controls and equipment. Notify Construction Manager, Commissioning Agent, and Engineer of start-up schedule and dates in advance.

1. Energize motor, verify proper operation of motor, drive system, and fan wheel. Adjust fan to indicated RPM.
   a. Replace fan and motor pulleys as required to achieve design conditions.
   b. Measure and record motor electrical values for voltage and amperage.
   c. Shut unit down and reconnect automatic temperature control operators.
   d. Refer to Division 23 Section "Testing, Adjusting, and Balancing for HVAC" for procedures for system testing, adjusting, and balancing.

3.5 TRAINING

A. General: At a time mutually agreed upon between the Construction Manager, Commissioning Agent, and Engineer, provide the services of a factory trained and authorized representative to train Construction Manager, Commissioning Agent, and Engineer for a minimum of four hours on the operation and maintenance of the equipment provided under this section.

B. Content: Training shall include but not be limited to:

1. Overview of the system and/or equipment as it relates to the facility as a whole.
2. Operation and maintenance procedures and schedules related to startup and shutdown, troubleshooting, servicing, preventive maintenance and appropriate operator intervention.
3. Review data included in the operation and maintenance manuals. Refer to Division 1 Section "Operating and Maintenance Data."

C. Certification: Contractor shall submit to the Engineer a certification letter stating that the Owner’s designated representative has been trained as specified herein. Letter shall include date, time, attendees and subject of training. The certification letter shall be signed by the Contractor and the Owner’s representative indicating agreement that the training has been provided.

D. Schedule: Schedule training with Owner with at least 7 days' advance notice.

END OF SECTION 237413

CITY OF WENTZVILLE, MO PUBLIC WORKS FACILITY

1295 INTERSTATE DRIVE
WENTZVILLE, MO 63385

*ARTIST'S DEPICTION/RENDERING OF PROJECT FOR GRAPHICAL PURPOSES ONLY - DO NOT CONSTRUCT FROM THIS DEPICTION

CONSTRUCTION DOCUMENT SET: 12.15.22

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NO.	DESCRIPTION	DATE
3	ADD 03	02.09.23

PROJECT NO.: 19-040 DRAWN BY: HDG
DATE: 12.15.22 REVIEWED BY: BMS

PROFESSIONAL SEAL

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GENERAL CONDITIONS

DRAWINGS AND GENERAL PROVISIONS OF THE CONTRACT INCLUDING CITY OF WENTZVILLE CITY-CONTRACTOR AGREEMENT, GENERAL CONDITIONS AND SUPPLEMENTAL CONTRACT TERMS APPLY TO ALL AREAS OF THESE CONSTRUCTION DOCUMENTS.

ALL APPLICABLE INDUSTRY STANDARDS, ASTM CLASSIFICATIONS, MANUFACTURER'S SPECIFICATIONS, INSTITUTE CRITERIA, CODE REQUIREMENTS, AND CURRENT PUBLISHED MANUFACTURER OR INSTITUTE INSTALLATION INSTRUCTIONS AND SPECIFICATIONS SHALL BE APPLICABLE TO MATERIALS SPECIFIED IN THE FOLLOWING HEADINGS.

THE GENERAL CONTRACTOR AND SUBCONTRACTORS SHALL BE RESPONSIBLE FOR CHECKING CONTRACT DOCUMENTS, FIELD CONDITIONS AND DIMENSIONS FOR ACCURACY AND COORDINATION OF THEIR WORK AND TRADE WORK BEFORE PROCEEDING WITH CONSTRUCTION. IF THERE ARE ANY DISCREPANCIES OR OMISSIONS WHICH WOULD INTERFERE WITH SATISFACTORY COMPLETION OF THE WORK, THE GENERAL CONTRACTOR SHALL OBTAIN A CLARIFICATION FROM THE ARCHITECT BEFORE PROCEEDING WITH THE WORK IN QUESTION.

THE GENERAL CONTRACTOR AND SUBCONTRACTORS SHALL VISIT THE SITE, THOROUGHLY REVIEW THE DRAWINGS AND SPECIFICATIONS, SO AS TO BE SURE ALL ANCILLARY COSTS HAVE BEEN COVERED IN THE BID. THE OWNER WILL NOT ENTERTAIN REQUESTS FOR EXTRA COMPENSATION FOR WORK THAT SHOULD HAVE REASONABLY BEEN ANTICIPATED OR OBSERVED.

THE GENERAL CONTRACTOR IS RESPONSIBLE FOR THE MEANS, METHODS, AND TECHNIQUES, OF CONSTRUCTION, SAFETY PRECAUTIONS IN CONNECTION WITH THE WORK, AND FOR THE ACTS AND OMISSIONS OF THE SUBCONTRACTORS.

THE GENERAL CONTRACTOR AND SUBCONTRACTORS SHALL NOT SCALE THE DRAWINGS TO DETERMINE ANY DIMENSION. USE ONLY THE DIMENSIONS AS SHOWN ON THE DRAWINGS. SHOULD THERE BE A CRITICAL DIMENSION OMITTED OR AN UNCERTAINTY WITH THE DIMENSIONS SHOWN, VERIFY WITH THE ARCHITECT BEFORE PROCEEDING.

DRAWINGS ARE NOT SET UP SPECIFICALLY ACCORDING TO THE TRADE AND EACH CONTRACTOR AND SUB-CONTRACTOR OR TRADE IS REQUIRED TO REVIEW THE DRAWINGS AS A WHOLE AND PROVIDE ANY MISCELLANEOUS ITEMS, MATERIALS, WORK, ETC. REQUIRED TO COMPLETE THE WORK AS SHOWN ON ALL DOCUMENTS. ALL TRADES SHALL ADHERE TO THIS REQUIREMENT. STRUCTURAL, MECHANICAL, ELECTRICAL AND PLUMBING REQUIREMENTS AND RELATED WORK ARE INDICATED THROUGHOUT THE SET OF DRAWINGS AND SHOULD BE REVIEWED WITH THE SPECIFIC MECHANICAL, ELECTRICAL, PLUMBING AND STRUCTURAL DRAWINGS FOR OVERALL SCOPE OF WORK.

THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR ALL PERMITS, INSPECTIONS AND APPROVALS REQUIRED FOR CONSTRUCTION BY ALL APPLICABLE LOCAL, STATE, AND FEDERAL CODES. BUILDING AND PERMIT REVIEW FEES WILL BE PAID BY THE CITY. THE CONTRACTOR SHALL COORDINATE ALL WORK WITH THE OWNER. EACH SUBCONTRACTOR SHALL BE RESPONSIBLE FOR PERMITS ETC. AS RELATED TO THEIR SPECIFIC PORTION OF THE WORK.

GENERAL CONTRACTOR TO COORDINATE ALL EXTERIOR BUILDING WORK WITH FAITH GROUP. THE OWNER'S THIRD-PARTY COMMISSIONING AGENT.

THE GENERAL CONTRACTOR AND SUBCONTRACTORS SHALL PURCHASE AND MAINTAIN CERTIFICATIONS OF INSURANCE WITH RESPECT TO WORKMEN'S COMPENSATION, PUBLIC LIABILITY AND PROPERTY DAMAGE FOR THE LIMITS AS REQUIRED BY LAW. OR OWNER, THE CONTRACTOR SHALL BE RESPONSIBLE FOR INITIATING, MAINTAINING AND SUPERVISING ALL SAFETY PRECAUTIONS IN CONNECTION WITH THE WORK.

EACH SUBCONTRACTOR SHALL FURNISH ALL LABOR, MATERIALS (UNLESS NOTED OTHERWISE) EQUIPMENT, TOOLS, UTILITIES, INSURANCE, TRANSPORTATION AND SERVICES NECESSARY FOR PROPERLY COMPLETING CONSTRUCTION OF THEIR PORTION OF THE SUBCONTRACT FOR THIS PROJECT AS INDICATED IN THESE DOCUMENTS, WHETHER TEMPORARY OR PERMANENT.

ALL SUBCONTRACTORS MUST COMPLY WITH RULES AND REGULATIONS OF AGENCIES HAVING JURISDICTION AND SHALL CONFORM TO ALL CITY, STATE, AND FEDERAL CONSTRUCTION SAFETY AND SANITARY LAWS, CODES, STATUTES AND ORDINANCES.

ALL INSTALLED PLUMBING, MECHANICAL AND ELECTRICAL EQUIPMENT SHALL OPERATE QUIETLY AND FREE FROM EXCESS VIBRATION.

ALL ROOF PENETRATIONS, EQUIPMENT SUPPORTS, PITCH PANS, FLASHING, CURBING AND ROOFING REPAIRS SHALL BE ENGINEERED AND INSTALLED IN ACCORDANCE WITH STANDARD PROJECT ROOFING DETAILS. FACTORY MUTUAL INSURANCE ASSOCIATION'S SPECIFICATIONS, AND GUIDELINES PUBLISHED BY THE NATIONAL ROOFING CONTRACTORS ASSOCIATION.

THE GENERAL CONTRACTOR SHALL NOTIFY SUBCONTRACTORS WHEN TELEPHONE SERVICE IS REQUIRED AT JOB SITE FOR WIRE OF PHONE EQUIPMENT.

SHOULD A DISCREPANCY BETWEEN CONTRACT DOCUMENTS AND SPECIFICATIONS OCCUR, CONTRACTOR SHOULD IMMEDIATELY NOTIFY ARCHITECT FOR RESOLUTION BEFORE PROCEEDING WITH WORK.

ALL MATERIALS SHALL BE NEW, UNUSED AND OF THE HIGHEST QUALITY IN EVERY RESPECT, UNLESS OTHERWISE NOTED OR TO BE USED FOR FORMS AND/OR TEMPORARY STRUCTURES.

ALL SURFACES SHALL BE PROPERLY PREPARED BEFORE THE APPLICATION OF FINISH MATERIALS.

TO BEGIN THE APPLICATION OF A FINISH MATERIAL MEANS THAT THE SUBCONTRACTOR ACCEPTS THE SURFACE AND SUBSEQUENT RESPONSIBILITY FOR THE APPEARANCE OF THE FINAL FINISH.

ALL MATERIALS, FINISHES AND EQUIPMENT REQUIRED FOR THE COMPLETION OF THIS PROJECT SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS, AS WELL AS GUIDELINES SET FORTH IN THESE DOCUMENTS.

IT SHALL BE THE SUBCONTRACTORS RESPONSIBILITY TO OBTAIN AND SUBMIT TO THE GENERAL CONTRACTOR TO FORWARD TO THE ARCHITECT FOR REVIEW ANY SHOP DRAWINGS, MATERIAL SAMPLES AND MANUFACTURER'S PRINTED MATERIAL NECESSARY FOR AN ACCURATE COMPARISON TO BE MADE ON ANY ITEM SUBMITTED FOR INSTALLATION AND/OR SUBSTITUTION. ALL FINAL SELECTIONS SHALL BE MADE BY THE ARCHITECT.

MILLWORK CONSTRUCTION SHALL CONFORM WITH AWI STANDARDS FOR PREMIUM MILLWORK. DRAWINGS SHALL INDICATE MILLWORK DESIGN INTENT ONLY. FABRICATOR IS RESPONSIBLE FOR FOR PROPER SOLUTION AND SHALL SUBMIT SHOP DRAWINGS FOR DESIGN REVIEW.

ALL MATERIALS, EQUIPMENT. AND LABOR SHALL CARRY A MINIMUM OF ONE (1) YEAR WRITTEN WARRANTY GUARANTEE AGAINST DEFECT STARTING FROM THE DATE OF APPROVAL FOR FINAL PAYMENT.

THE SUBCONTRACTORS SHALL BE RESPONSIBLE FOR SUPPLYING THE ARCHITECT AND THE OWNER WITH ALL MAINTENANCE AND OPERATION MANUALS, WARRANTIES, AND GUARANTEES ON ALL EQUIPMENT AND MATERIALS.

THE CONSTRUCTION SITE SHALL AT ALL TIMES BE KEPT FREE FROM ACCUMULATED WASTE MATERIALS. THE SITE SHALL BE MAINTAINED IN A MANNER TO PROVIDE A SAFE ENVIRONMENT FOR WORKERS AND THE PUBLIC. CONDUCT CLEANING AND DISPOSAL OPERATIONS TO COMPLY WITH ALL LOCAL ORDINANCES AND ANTI POLLUTION LAWS.

ALL WORK BY ALL TRADES SHALL CONFORM TO AND BE COMPLETED IN ACCORDANCE WITH ALL APPLICABLE CODES, ORDINANCES, STANDARDS OR RESTRICTIONS WHETHER INDICATED ON DRAWINGS OR NOT. THE MORE STRINGENT TO GOVERN DISCREPANCIES BETWEEN CONTRACT DOCUMENTS AND CODES SHALL BE BROUGHT TO THE ARCHITECTS ATTENTION PROMPTLY AND RESOLUTION OBTAINED BEFORE PROCEEDING.

UPON COMPLETION OF THE WORK, REMOVE ALL WASTE MATERIALS, EQUIPMENT, DEBRIS AND CLEAN ALL SIGHT-EXPOSED SURFACES. TOUCH-UP PAINTING OF MARRED SURFACES AND REPAIR OF ALL DAMAGES LEAVING THE PROJECT READY FOR OCCUPANCY. TRASH SHALL BE REMOVED FROM PROJECT SITE AT SUBCONTRACTOR'S EXPENSE. IF THE SUBCONTRACTOR FAILS TO HAVE THE SITE READY FOR OCCUPANCY. THE GENERAL CONTRACTOR MAY HIRE AN OUTSIDE AGENCY FOR THIS SERVICE AND THE COST MAY BE CHARGED TO THE CONTRACTOR.

UPON COMPLETION OF THE PROJECT, A "PUNCH LIST" WILL BE COMPILED BY THE ARCHITECT. WHICH WILL CONSIST OF ITEMS IN NEED OF CORRECTION AND UNSATISFACTORY AND/OR INCOMPLETE WORK. FINAL PAYMENT WILL BE CONTINGENT UPON THE CORRECTION AND SUBSEQUENT APPROVAL OF THESE ITEMS.

THE GENERAL CONTRACTOR SHALL OBTAIN CERTIFICATE FOR OCCUPANCY FROM THE APPROPRIATE REGULATORY AGENCY BUILDING DEPARTMENT. ONE (1) COPY OF THE CERTIFICATE WILL BE SUBMITTED TO THE ARCHITECT WITH FINAL APPLICATION FOR PAYMENT.

ALL CHANGES, OMISSIONS OR ADDITIONS TO THE SCOPE OF WORK DESCRIBED IN THESE CONTRACT DRAWINGS AND SPECIFICATIONS MUST BE APPROVED IN WRITING BY THE CITY OF WENTZVILLE.

UNLESS NOTED OTHERWISE, ALL WORK SHALL INCLUDE NECESSARY APPURTENANCES AND ACCESSORIES TO PROVIDE COMPLETE OPERATING ASSEMBLIES, WHETHER OR NOT SHOWN OR DETAILED.

PERFORMANCE SPECS

THE FOLLOWING ITEMS ARE NOT SPECIFICALLY DESIGNED WITHIN THIS SET OF CONSTRUCTION DOCUMENTS. THE PERFORMANCE REQUIREMENTS LISTED SHALL BE INCORPORATED INTO THE PROJECT AND REVIEWED BY THE ARCHITECT FOR CONFORMANCE.

SPRINKLER SYSTEM: 903
AN NFPA AUTOMATIC SPRINKLER SYSTEM SHALL BE PROVIDED AND INSTALLED IN ACCORDANCE WITH SECTION 903 OF INTERNATIONAL BUILDING CODE (IBC). SPRINKLER CONTRACTOR TO PROVIDE HYDRAULIC DESIGN CALCULATIONS, PREPARED BY AN ENGINEER REGISTERED IN THE STATE HAVING JURISDICTION, TO THE ARCHITECT AND AUTHORITIES HAVING JURISDICTION OVER THE WORK FOR APPROVAL, PRIOR TO COMMENCING INSTALLATION.

REFERENCE SPECIFICATIONS FOR THE FOLLOWING ITEMS NOT SPECIFICALLY DESIGNED WITHIN THIS SET OF CONSTRUCTION DOCUMENTS:

- FIRE ALARM
- PRE-ENGINEERED METAL BUILDING
- PRE-FABRICATED CANOPIES
- SALT BUILDING FABRIC STRUCTURE

SPECIAL NOTICE

IN THE EVENT THE CLIENT CONSENTS TO, ALLOWS, AUTHORIZES OR APPROVES CHANGES TO ANY PLANS, SPECIFICATIONS, OR OTHER CONSTRUCTION DOCUMENTS AND THESE CHANGES ARE NOT APPROVED IN WRITING BY THE ARCHITECT OF RECORD, THE CLIENT AGREES THAT THE ARCHITECT AND THE RESULT THEREOF ARE NOT THE RESPONSIBILITY OF THE DESIGN PROFESSIONAL THEREFORE, THE CLIENT AGREES TO RELEASE THE DESIGN PROFESSIONAL FROM ANY LIABILITY ARISING FROM THE CONSTRUCTION, USE OR RESULT OF SUCH CHANGES. IN ADDITION, THE CLIENT AGREES TO THE FULLEST EXTENT PERMITTED BY LAW, TO INDEMNIFY AND HOLD THE DESIGN PROFESSIONAL HARMLESS FROM ANY DAMAGE, LIABILITY, OR COST (INCLUDING REASONABLE ATTORNEY'S FEES AND COSTS OF DEFENSE) ARISING FROM SUCH CHANGES.

LOCATION MAP

N

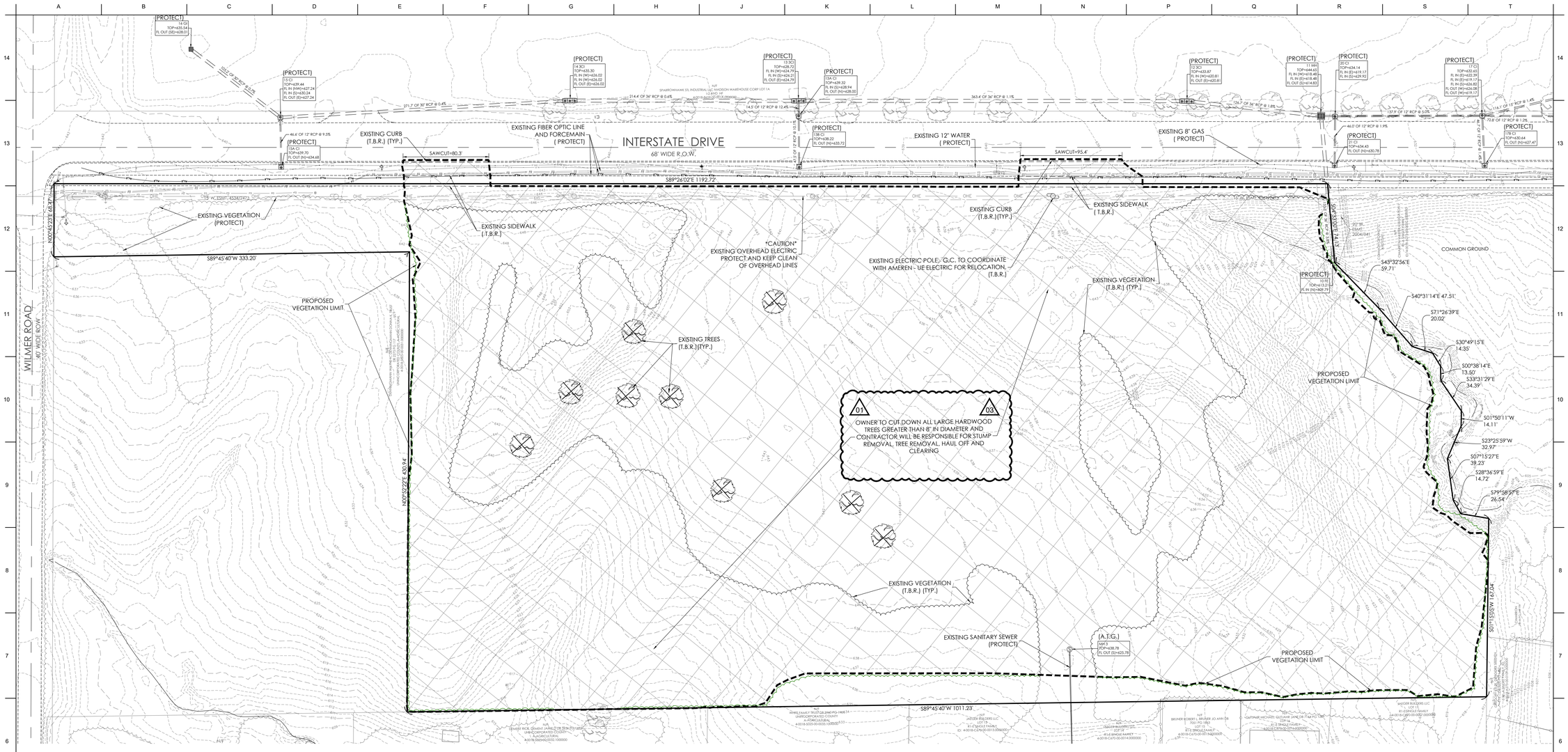
PROJECT TITLE

CITY OF WENTZVILLE, MO PUBLIC WORKS FACILITY

PROJECT ADDRESS:
1295 INTERSTATE DRIVE
WENTZVILLE, MO 63385

COVER SHEET

SHEET
G000



AREA OF ALL EXISTING IMPROVEMENTS TO BE REMOVED UNLESS NOTED OTHERWISE

DENOTES EXISTING TREE TO BE REMOVED

NOTE:

A. ALL EXISTING IMPROVEMENTS, OLD FOUNDATIONS, RUBBLE, DEBRIS, ALL VEGETATION AND TRASH WITHIN THE DISTURBED AREA OF THE SITE SHALL BE REMOVED UNLESS NOTED OTHERWISE.

B. EXISTING INLETS ARE TO BE INSPECTED BY THE CITY OF WENTZVILLE TO DETERMINE IF REPLACEMENT IS NEEDED. EXISTING TOP OF STRUCTURES AND ALL FLOWLINES OF STRUCTURES ARE TO BE REPLICATED PER PLANS IF REPLACEMENT IS REQUIRED. CONTRACTOR TO INCLUDE REMOVAL AND REPLACEMENT OF STRUCTURES IN BID.

C. ALL TREES WITHIN THE DISTURBANCE LIMITS SHALL BE REMOVED PRIOR TO APRIL 1ST, 2023.

DEMOLITION PLAN NOTES

1. DO NOT SCALE DRAWINGS, USE DIMENSIONS AS SHOWN.
2. CONTRACTOR TO NOTIFY THE ENGINEER IF DISCREPANCIES ARE FOUND IN THE FIELD COMPARED TO THE DESIGN PLANS.
3. REFERENCE POINTS, SUCH AS SURVEY MONUMENTS, BENCH MARKS, STAKES, ETC., SHALL BE PRESERVED, BUT IF DISTURBED OR DESTROYED, SHALL BE REPLACED AS DIRECTED, AT THE EXPENSE OF THE GENERAL CONTRACTOR.
4. NO WORK SHALL BE DONE WHICH WILL AFFECT EXISTING UTILITIES PRIOR TO HAVING ASCERTAINED THAT THE UTILITIES HAVE BEEN PROPERLY CAPPED, PLUGGED, OR OTHERWISE ABANDONED IN A MANNER ACCEPTABLE TO THE AFFECTED UTILITY COMPANY. THE APPROPRIATE AGENCY SHALL BE NOTIFIED PRIOR TO THE COMMENCEMENT OF ANY WORK WHICH WILL AFFECT ANY EXISTING UTILITY. REMOVALS OR RELOCATIONS BY UTILITY COMPANIES ARE TO BE INITIATED AND COORDINATED BY THE CONTRACTOR.
5. CONDUCT OPERATIONS TO PREVENT INJURY TO ADJACENT BUILDINGS, STRUCTURES, OTHER FACILITIES AND PERSONS. SIGNS, LIGHTS, AND BARRICADES SHALL BE INSTALLED AT ALL LOCATIONS AS NECESSARY TO GUARD AGAINST ACCIDENT. PROMPTLY REPAIR DAMAGES CAUSED TO FACILITIES BY OPERATIONS, AS DIRECTED BY THE ENGINEER AND AT NO ADDITIONAL COST TO THE OWNER.
6. ALL PAVEMENT TO BE REMOVED SHALL BE SAWCUT IN A STRAIGHT LINE AT THE CONTACT POINT WITH THE PAVEMENT TO REMAIN UNLESS NOTED OTHERWISE.
7. ALL SANITARY AND STORM SEWER WORK SHALL BE PER THE CITY OF WENTZVILLE SPECIFICATIONS.
8. ALL UNDERGROUND UTILITIES SHALL BE LOCATED PRIOR TO THE START OF ANY WORK.
9. DESTROY EXISTING SERVICE CONNECTIONS FOR WATER, GAS, ELECTRIC, CABLE TV AND TELEPHONE TO ALL EXISTING BUILDINGS TO BE REMOVED PER THE REQUIREMENTS OF THE AFFECTED UTILITY COMPANY. ALL FEES AND PERMITS ASSOCIATED WITH UTILITY CAPS OR REMOVAL SHALL BE PAID BY THE CONTRACTOR.
10. ALL EXISTING FOUNDATIONS, FLOOR SLABS AND RUBBLE SHALL BE COMPLETELY REMOVED FROM THE SITE.
11. ALL ITEMS SHOWN TO BE REMOVED SHALL BE COMPLETELY REMOVED INCLUDING POLE BASES, FOUNDATIONS, SIGN BASES, POWER POLE STUBS ETC.
12. THE GENERAL CONTRACTOR SHALL MAINTAIN THE SURROUNDING AREA DURING CONSTRUCTION. ANY DUST OR DEBRIS FROM JOB SITE SHALL BE COLLECTED OR MITIGATED FOR ADJACENT PROPERTY OWNERS OR RESIDENCES.
13. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SUBMITTING AN AMEREN UE MAIN REQUEST APPLICATION FOR TEMPORARY AND PERMANENT ELECTRICAL SERVICE FOR THE PROJECT.
14. THE GENERAL CONTRACTOR SHALL PROVIDE A TRAFFIC CONTROL PLAN TO CITY OF WENTZVILLE FOR APPROVAL PRIOR TO ANY WORK WITHIN THE ROAD WAY.
15. THE GENERAL CONTRACTOR SHALL PROVIDE EDGE TREATMENT IN ACCORDANCE TO CITY OF WENTZVILLE SPECIFICATIONS FOR ALL AREAS OF EDGE DROP-OFF WITHIN RIGHT OF WAY.

THE DEMOLITION CONTRACTOR SHALL FURNISH ALL MATERIAL AND PERFORM ALL WORK INCLUDING PROPER SUPERVISION NECESSARY TO COMPLETE ALL WORK DESCRIBED BELOW. ANYTHING THAT IS NOT EXPRESSLY SET FORTH BELOW BUT IS IMPLIED AND IS REQUIRED TO CARRY OUT THE WORK INTENDED SHALL BE PERFORMED THE SAME MANNER AS THOUGH SPECIFICALLY MENTIONED. ALL WORK SHALL BE PERFORMED IN A GOOD AND WORKMANLIKE MANNER IN ACCORDANCE WITH GOOD CONSTRUCTION PRACTICES. IN GENERAL, DEMOLITION CONTRACTOR SHALL DEMOLISH AND LEGALLY DISPOSE OF ALL STRUCTURES IN ENTIRETY ON THE PROPERTY, INCLUDING ALL BUILDINGS, FOUNDATIONS, FOOTINGS, EXISTING SITE IMPROVEMENTS, UTILITIES AND UTILITY CONNECTIONS UNLESS NOTED OTHERWISE. THIS WORK SHALL BE DONE IN STRICT ACCORDANCE WITH ALL APPLICABLE LAWS, CODES AND ORDINANCES, AND OSHA REGULATIONS INCLUDING OBTAINING ANY AND ALL NECESSARY APPROVALS AND PERMITS. THE CONTRACTOR SHALL ALSO BE RESPONSIBLE FOR SENDING OUT ALL REQUIRED PUBLIC AND PRIVATE NOTIFICATIONS. THE WORK TO BE PERFORMED BY DEMOLITION CONTRACTOR SHALL INCLUDE, WITHOUT LIMITATION, THE FOLLOWING:

- REMOVAL OF HOLLOW ITEMS OR ITEMS WHICH COULD COLLAPSE, INCLUDING WITHOUT LIMITATION BASEMENTS, CISTERNS, UNDERGROUND TANKS AND SEPTIC SYSTEMS. BACKFILLING AND COMPACTING TO THE LINES AND GRADES INDICATED.
- DEMOLITION OF BELOW-GRADE FOUNDATIONS, WALLS AND SITE IMPROVEMENT AS INDICATED TO AVOID CONFLICT WITH NEW CONSTRUCTION OR SITE WORK. BACKFILLING AND COMPACTING OF THE RESULTING EXCAVATION SHALL BE IN ACCORDANCE WITH REQUIREMENTS OF PURCHASER'S ENGINEER AND/OR LATEST GEOTECHNICAL REPORT.
- CLEARING SITE OF ALL DEMOLITION DEBRIS, TRASH AND MISCELLANEOUS MATERIAL TO BE LEGALLY DISPOSED OF OFFSITE.
- SAFETY BARRICADES TO BE PROVIDED AND MAINTAINED DURING DEMOLITION WORK UNTIL START OF EARTHWORK.
- POLLUTION CONTROL DURING BUILDING DEMOLITION, INCLUDING DUST AND NOISE CONTROL.
- REMOVAL AND LAWFUL DISPOSAL OF HAZARDOUS MATERIALS.
- REMOVAL AND LAWFUL DISPOSAL OF LEAD PAINT.
- UPON COMPLETION OF DEMOLITION AND CLEARING, THE SITE SHALL BE LEFT IN A NEAT, CLEAN AND SAFE CONDITION INCLUDING POSITIVE DRAINAGE.
- TEMPORARY CHAIN LINK PERIMETER FENCE SHALL BE PROVIDED AROUND THE PROJECT LIMITS. FENCE SHALL NOT BE LOCATED WITHIN RIGHT-OF-WAY UNLESS APPROVED BY THE GOVERNING AUTHORITY.
- ALL EXISTING IMPROVEMENTS, OLD FOUNDATIONS, RUBBLE, DEBRIS, ALL VEGETATION AND TRASH WITHIN THE DISTURBED AREA OF THE SITE SHALL BE REMOVED UNLESS NOTED OTHERWISE.

1" = 40'

40 20 0 40 80

SCALE IN FEET

"It's the NICE thing" CALL BEFORE YOU DIG! 1-800-DIG-RITE

UNDERGROUND UTILITIES AND OSHA SAFETY NOTE:

Underground utilities and structures have been plotted from available information and therefore, their location must be considered approximate only. It is the responsibility of the individual contractors to notify the utility companies before actual construction. All O.S.H.A rules and regulations established for the type of construction required by these plans shall be strictly followed (ie. trenching, blasting, etc.)

WENTZVILLE PROJECT #: ENG-2022-033A

hdesigngroup
architecture + design

5039 S National Avenue | Springfield, MO 65810 | 417.887.6595

OWNER

CITY OF WENTZVILLE
1001 SCHROEDER CREEK BLVD.
WENTZVILLE, MO 63385
636.327.5101

PROJECT TEAM

CIVIL ENGINEER
PREMIER DESIGN GROUP
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MEP ENGINEER
HENDERSON ENGINEERS, INC.
8345 LENEXA DR., #300
LENEXA, KS 66214
913.742.5000

REVISIONS

NO.	DESCRIPTION	DATE
1	ADD 01	1/11/2023
2	ADD 02	1/25/2023
3	ADD 03	2/9/2023

PROJECT NO.: 19-040 DRAWN BY: J.R. & A.J.
DATE: 12.15.22 REVIEWED BY: M.F.

PROFESSIONAL SEAL

STATE OF MISSOURI
STEVEN D. MARION
NUMBER
PE2006036195
PROFESSIONAL ENGINEER

ENGINEERS AUTHENTICATION

The responsibility for authenticate and seal applies only to the plans authenticated by the seal, signature, and date hereunder attached. Responsibility is disclaimed for all other engineering plans involved in this project and specifically excludes revisions after the plans are authenticated.

STEVEN D. MARION P.E.
PROFESSIONAL ENGINEER
PE 2006036195

PROJECT TITLE

CITY OF WENTZVILLE, MO PUBLIC WORKS FACILITY

PROJECT ADDRESS:

1295 INTERSTATE DRIVE
WENTZVILLE, MO 63385

CLEARING AND DEMOLITION PLAN

SHEET

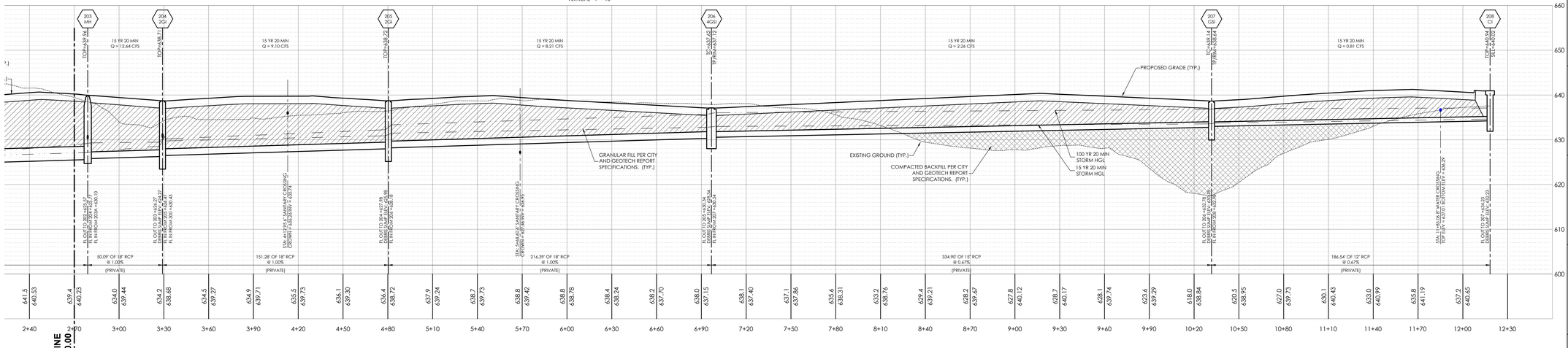
C-101

NOT RELEASED FOR CONSTRUCTION

\\hdsatl-sp\saatl\CIVIL 3D PROJECTS\2020\20090\CD_CITY OF WENTZVILLE PUBLIC WORKS_WENTZVILLE MO\ENGINEERING\CONSTRUCTION DRAWINGS\SHEETS\C-101 CLEARING AND DEMOLITION PLAN.dwg

208 CI - 202 GSI STORM SEWER PROFILE

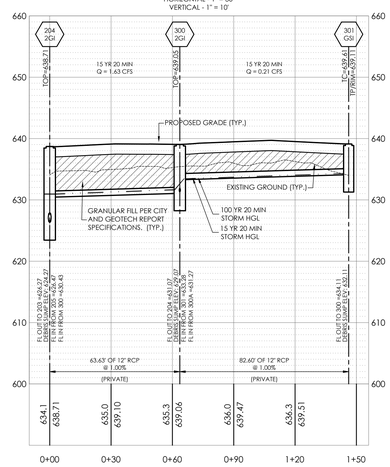
HORIZONTAL - 1" = 30'
VERTICAL - 1" = 10'



MATCH LINE STA. 2+70.00

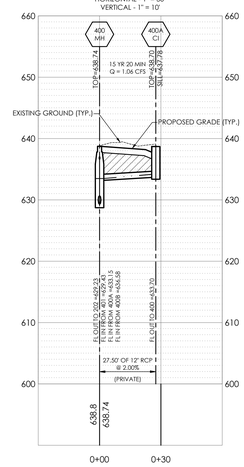
301 GSI - 204 2GI STORM SEWER PROFILE

HORIZONTAL - 1" = 30'
VERTICAL - 1" = 10'



400A CI - 400 MH STORM SEWER PROFILE

HORIZONTAL - 1" = 30'
VERTICAL - 1" = 10'



401A CI - 401 MH STORM SEWER PROFILE

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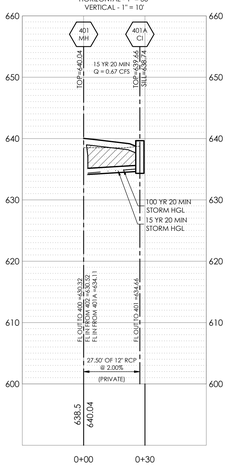
VERTICAL - 1" = 10'



402A CI - 402 MH STORM SEWER PROFILE

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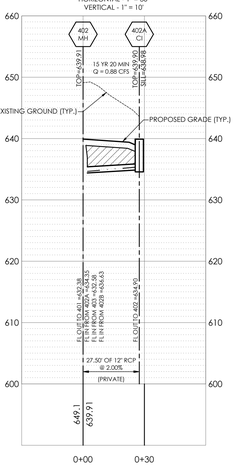
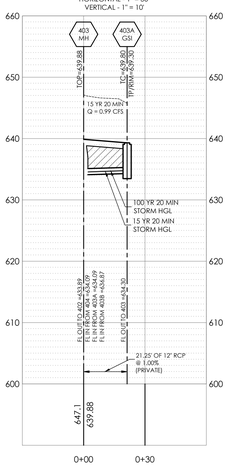
VERTICAL - 1" = 10'



403A GSI - 403 MH STORM SEWER PROFILE

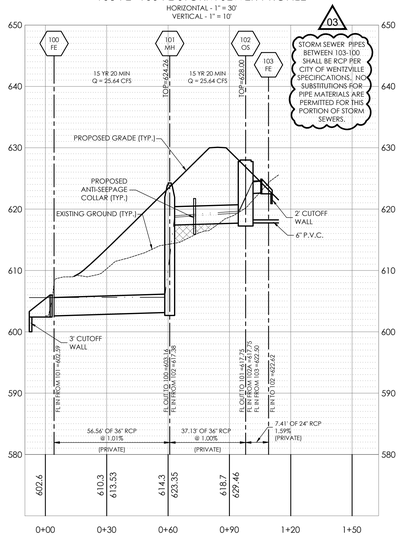
HORIZONTAL - 1" = 30'
VERTICAL - 1" = 10'



MATCH LINE STA. 2+70.00

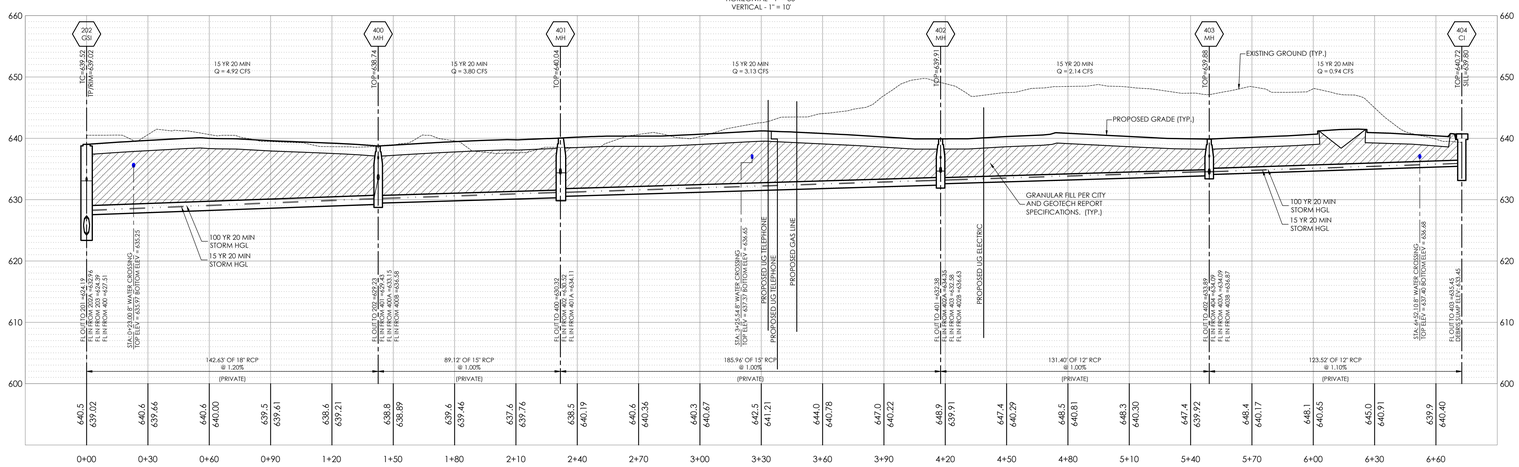
103 FE- 100 FE STORM SEWER PROFILE

HORIZONTAL - 1" = 30'
VERTICAL - 1" = 10'



404 CI - 202 GSI STORM SEWER PROFILE

HORIZONTAL - 1" = 30'
VERTICAL - 1" = 10'



STORM SEWER PIPES WITH A DESIGN GRADE LESS THAN 1.0% WILL REQUIRE VERIFICATION OF THE PIPE GRADE FOR EACH REACH PRIOR TO ANY SURFACE RESTORATION OR INSTALLATION OF ANY SURFACE IMPROVEMENTS

WENTZVILLE PROJECT #: ENG-2022-033A

"Little MO" says CALL BEFORE YOU DIG! 1-800-DIG-RITE

UNDERGROUND UTILITIES AND OSHA SAFETY NOTE:

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\\Vault-p\vault\CIVIL 3D PROJECTS\2020\200040_CITY OF WENTZVILLE PUBLIC WORKS_WENTZVILLE MO\ENGINEERING\CONSTRUCTION DRAWINGS\SHEETS\STORM SEWER PROFILES.dwg

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architecture + design
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PROJECT TEAM

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417.890.8002

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8345 LENEXA DR., #300
LENEXA, KS 66214
913.742.5000

REVISIONS

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PROJECT NO.: 19-040 DRAWN BY: J.R. & A.J.
DATE: 12.15.22 REVIEWED BY: M.F.

PROFESSIONAL SEAL

STATE OF MISSOURI
STEVEN D. MARRON
NUMBER
PE2006007195
PROFESSIONAL ENGINEER

ENGINEERS AUTHENTICATION
The responsibility for professional engineering liability on this project is limited under RSMo 327 to the professional engineer and firm named and date hereunder attached. Responsibility is disclaimed for all other engineering plans involved in this project and specifically excludes revisions after this date unless reauthenticated.
STEVEN D. MARRON P.E.
PROFESSIONAL ENGINEER
PE 2006007195

PROJECT TITLE

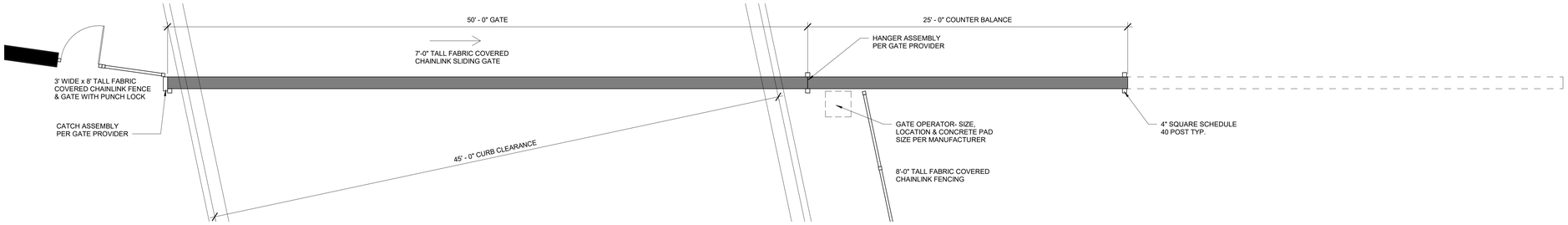
CITY OF WENTZVILLE, MO PUBLIC WORKS FACILITY

PROJECT ADDRESS:
1295 INTERSTATE DRIVE
WENTZVILLE, MO 63385

STORM SEWER PROFILES

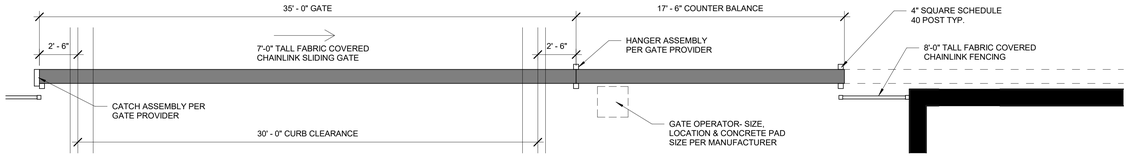
SHEET
C-600

NOT RELEASED FOR CONSTRUCTION



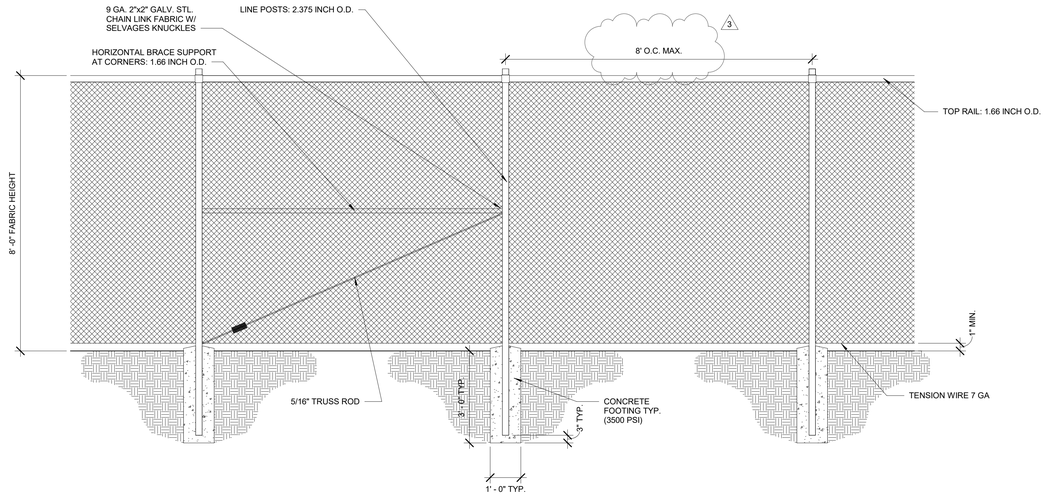
12A AS203 EAST GATE PLAN

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



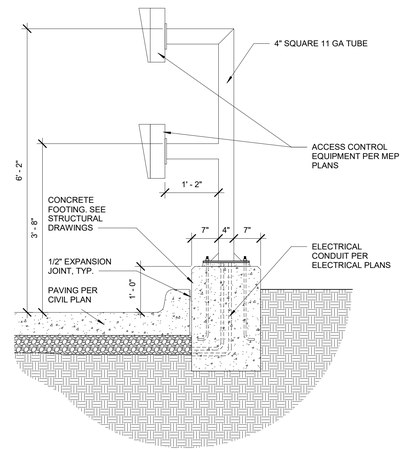
10A AS203 WEST GATE

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



6A AS203 CHAINLINK FENCE DETAIL

scale: 1/2" = 1'-0"



6L AS203 GATE ACCESS POST

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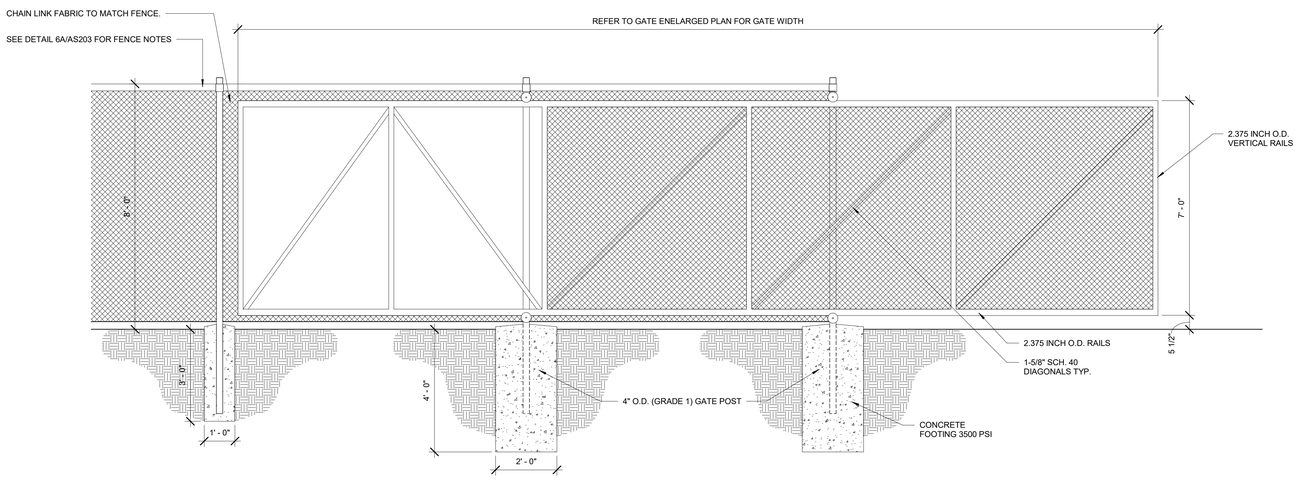
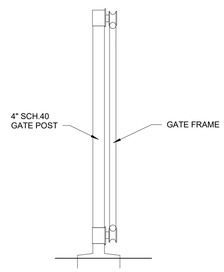


1A AS203 CHAINLINK GATE DETAIL

scale: 1/2" = 1'-0"



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3	ADD 03	02.09.23

PROJECT NO.: 19-040 DRAWN BY: HDG
DATE: 12.15.22 REVIEWED BY: BMS

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PROJECT TITLE

CITY OF WENTZVILLE, MO PUBLIC WORKS FACILITY

PROJECT ADDRESS:
1295 INTERSTATE DRIVE
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ARCHITECTURAL SITE DETAILS

SHEET
AS203

SPECIAL CONDITIONS, REQUIREMENTS AND NOTES TO OWNER, DEVELOPER AND CONTRACTOR:

1. CONTRACTOR, BUILDER AND SUBCONTRACTORS INVOLVED IN ANY FORM OF CONSTRUCTION USING THESE CONTRACT DOCUMENTS SHALL BE INFORMED OF THE FOLLOWING RESPONSIBILITIES, PERFORMANCE CRITERIA, LIMITATIONS AND RISKS ASSOCIATED WITH CONSTRUCTION. IF THE OWNER, DEVELOPER OR CONTRACTOR IS NOT ABLE TO ACCEPT THE RESPONSIBILITIES OR PERFORMANCE CRITERIA AND LIMITATIONS, NOTIFY THE ENGINEER OF RECORD OR ARCHITECT PRIOR TO START OF CONSTRUCTION. IT SHALL BE EXPRESSLY UNDERSTOOD THAT THE ENGINEER IS NOT RESPONSIBLE OR LIABLE FOR THE LACK OF PERFORMANCE OF MATERIALS, SYSTEMS OR DESIGNS NOT BEING LIMITED TO ITEMS OUTLINED BELOW. CONTRACTORS AND SUBCONTRACTORS SHALL THOROUGHLY REVIEW ALL CONDITIONS AND RESPONSIBILITIES STATED IN THESE NOTES, PLANS, SECTIONS / DETAILS, AND SHALL NOTIFY THE ENGINEER AND OWNER IN WRITING PRIOR TO CONSTRUCTION OF ANY CONDITIONS OR RESPONSIBILITIES WHICH ARE NOT ACCEPTABLE OR NOT UNDERSTOOD.

2. THE CONTRACTOR SHALL USE ALL STANDARD MEANS TO ENSURE PROPER PROTECTION AND CURING OF ALL CEMENTITIOUS MATERIALS TO REDUCE CRACKING OR SURFACE SPALLING. PLAIN CONCRETE, REINFORCED CONCRETE, OR CONCRETE MASONRY DEVELOP CRACKS. THE CRACKS ARE DUE TO INHERENT SHRINKAGE, CREEP AND RESTRAINING EFFECTS. CRACKS ARE NORMALLY COSMETIC AND THE STANDARD MAINTAINS SERVICEABILITY AND STRENGTH REQUIREMENTS. JOINTS MAY BE INDICATED TO CONTROL CRACKING, BUT ARE NOT MEANT TO ELIMINATE ALL CRACKING, AS THIS IS NOT PRACTICAL. EXTREME CRACKING MAY BE CAUSED BY POOR MATERIALS OR PLACEMENT. CONTACT THE ENGINEER OF RECORD FOR POSSIBLE REPAIR REQUIREMENTS.

3. FOUNDATION SETTLEMENT MAY CAUSE DISTORTION AND DISTRESS TO THE SUPPORTED STRUCTURE AS WELL AS ADJACENT UTILITIES, SLABS, FOUNDATIONS, ETC. THE GEOTECHNICAL REPORT MAY INDICATE A LEVEL OF DISPLACEMENT. ATTENTION TO PROPER SOIL PREPARATION AND GRADING, AS WELL AS PROPER DRAINAGE AWAY FROM STRUCTURE IS ESSENTIAL IN REDUCING EXPECTED SETTLEMENT. ALL REQUIREMENTS WITHIN THE GEOTECHNICAL REPORT ARE TO BE FOLLOWED. INFORM THE ENGINEER OF RECORD OF ANY CONFLICTS BETWEEN THE REPORT AND THE DRAWINGS.

4. VARIOUS IN DIMENSIONS MAY OCCUR AS A RESULT OF THERMAL INFLUENCES, NATURAL DEFLECTIONS AND/OR CAMBERS OF MEMBERS. AS A RESULT, QUANTITIES MAY VARY AND ARCHITECTURAL FINISHES MAY BE AT RISK OF COSMETIC VARIATION OR DAMAGE.

5. THE ENGINEER OF RECORD SHALL NOT BE RESPONSIBLE FOR VARIATIONS TO PLANS BETWEEN BID PROCESS AND FINALIZED APPROVED DOCUMENTS RELEASED FOR CONSTRUCTION UNLESS SUCH VARIATIONS ARE ISSUED BY THE ENGINEER. ADDITIONS AND ALTERATIONS MAY BE MADE BY THE ENGINEER BETWEEN RELEASE OF BID DOCUMENTS AND FINALIZED CONSTRUCTION DOCUMENTS.

6. THESE DRAWINGS HAVE BEEN PREPARED USING STANDARDS OF PROFESSIONAL CARE AND COMPLETENESS NORMALLY EXERCISED UNDER SIMILAR CIRCUMSTANCES BY REPUTABLE STRUCTURAL ENGINEERS IN THIS OR SIMILAR LOCALITIES. THEY NECESSARILY ASSUME THAT THE WORK DEPICTED WILL BE PERFORMED BY AN EXPERIENCED CONTRACTOR, SUBCONTRACTOR AND/OR WORKPERSONS WHO HAVE A WORKING KNOWLEDGE OF THE APPLICABLE CODE STANDARDS AND REQUIREMENTS AND OF INDUSTRY ACCEPTED STANDARD GOOD PRACTICE. AS NOT EVERY CONDITION OR EMERGENCY CAN BE ANTICIPATED, IT SHOWN ON THESE DRAWINGS. IT IS UNDERSTOOD THAT THE CONTRACTOR WILL USE INDUSTRY ACCEPTED STANDARD GOOD PRACTICE FOR ALL WORK WHETHER EXPLICITLY SHOWN OR NOT.

7. CALCULATION AND DESIGN OF MISCELLANEOUS NON-STRUCTURAL ITEMS, SUCH AS RAILINGS, NON-STRUCTURAL WALLS AND PREFABRICATED STRUCTURAL ITEMS, SUCH AS CANOPIES, ARE NOT INCLUDED AND ARE TO BE PROVIDED BY OTHERS UNLESS SPECIFICALLY NOTED ON THESE DRAWINGS.

8. THESE DRAWINGS REPRESENT THE FINISHED STRUCTURE. THEY DO NOT INDICATE THE MEANS AND METHODS OF CONSTRUCTION. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES AND PROCEDURES. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DESIGN AND PROVIDE ADEQUATE, SHORING, BRACING, FORMWORK, ETC. AS REQUIRED FOR THE PROTECTION OF LIFE AND PROPERTY DURING CONSTRUCTION.

9. CONSTRUCTION MATERIALS SHALL BE UNIFORMLY SPREAD OUT SUCH THAT DESIGN LIVE LOAD PER SQUARE FOOT AS STATED HEREIN IS NOT EXCEEDED. VISITS TO THE SITE BY THE STRUCTURAL ENGINEER SHALL NOT INCLUDE INSPECTION OF THE ABOVE ITEMS.

10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL EXCAVATION PROCEDURES INCLUDING SHORING AND PROTECTION OF ADJACENT PROPERTY, STRUCTURES, STREETS AND UTILITIES IN ACCORDANCE WITH THE LOCAL BUILDING DEPARTMENT AND SHALL COMPLY WITH ALL APPLICABLE BUILDING CODES, REGULATIONS AND SAFETY REQUIREMENTS.

11. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFICATION OF ALL DIMENSIONS, CONDITIONS AND ELEVATIONS WITH OTHER DISCIPLINES DRAWINGS BEFORE PLACING THE CONCRETE OF CONSTRUCTION. THE CONTRACTOR SHALL INFORM THE ARCHITECT AND ENGINEER OF RECORD IN WRITING OF ANY DISCREPANCIES OR OMISSIONS NOTED ON THE DRAWINGS. ANY SUCH DISCREPANCY, OMISSION OR VARIATION NOT REPORTED BEFORE THE START OF CONSTRUCTION SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.

12. WHERE REFERENCE IS MADE TO VARIOUS TEST STANDARDS FOR MATERIALS, SUCH STANDARDS SHALL BE THE LATEST EDITION AND/OR ADDENDA.

13. OPTIONS ARE FOR CONTRACTOR'S CONVENIENCE. IF AN OPTION IS USED, THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL NECESSARY CHANGES AND SHALL COORDINATE ALL DETAILS.

14. TYPICAL GENERAL STRUCTURAL NOTES AND DETAILS SHALL APPLY, THOUGH NOT NECESSARILY AT A SPECIFIC LOCATION ON PLANS. WHERE NO DETAILS ARE SHOWN, CONSTRUCTION SHALL CONFORM TO SIMILAR WORK ON THE PROJECT. DETAILS MAY ONLY SHOW ONE SIDE OF CONNECTION OR MAY OMIT INFORMATION FOR CLARITY. WHERE DISCREPANCIES OCCUR IN THESE DRAWINGS, SPECIFIC NOTES AND DETAILS ON DRAWINGS SHALL TAKE PRECEDENCE OVER GENERAL STRUCTURAL NOTES AND TYPICAL DETAILS.

15. ALL OPENINGS ARE NOT SHOWN ON THESE DRAWINGS. ESTABLISH AND VERIFY ALL OPENINGS AND INSERTS FOR ARCHITECTURAL, MECHANICAL, PLUMBING AND ELECTRICAL WITH APPROPRIATE TRADES, DRAWINGS AND SUBCONTRACTORS PRIOR TO CONSTRUCTION. OPENINGS MAY REQUIRE ADDITIONAL REINFORCING OR SUPPORTS AS SHOWN ON TYPICAL DETAILS. IF TYPICAL DETAILS FOR ALL CONDITIONS ARE NOT INCLUDED HEREIN, IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO REQUEST IN WRITING ADDITIONAL INFORMATION.

16. ALL INSPECTIONS REQUIRED BY THE BUILDING CODES, LOCAL BUILDING OFFICIALS, OR BY THESE PLANS SHALL BE PROVIDED BY AN INDEPENDENT INSPECTION COMPANY OR THE BUILDING DEPARTMENT. SPECIAL INSPECTION REQUIREMENTS STATED HEREIN ARE PARTIAL. COMPLETE INSPECTION REQUIREMENTS SHALL BE AS DIRECTED BY THE LOCAL BUILDING DEPARTMENT. SITE VISITS BY THE ENGINEER DO NOT CONSTITUTE A SPECIAL INSPECTION, UNLESS SPECIFICALLY CONTRACTED FOR.

17. SHOP DRAWINGS SHALL BE SUBMITTED FOR ALL STRUCTURAL ITEMS. SHOP DRAWINGS ARE REVIEWED ONLY FOR GENERAL COMPLIANCE WITH THE STRUCTURAL DRAWINGS. REVIEW DOES NOT INDICATE THAT THE SHOP DRAWINGS ARE CORRECT OR COMPLETE. RESPONSIBILITY FOR CORRECTNESS SHALL REST WITH THE CONTRACTOR. ANY CHANGES, SUBSTITUTIONS, OR DEVIATIONS FROM CONTRACT DRAWINGS SHALL BE CLOUDED. ANY OF THE AFOREMENTIONED SHALL NOT BE CONSIDERED APPROVED AFTER ENGINEER'S REVIEW UNLESS SPECIFICALLY NOTED ACCORDINGLY. THE SHOP DRAWINGS DO NOT SUPERSEDE OR REPLACE THE ORIGINAL CONTRACT DRAWINGS. ANY ENGINEERING PROVIDED BY OTHERS AND SUBMITTED FOR REVIEW SHALL BEAR THE SEAL OF AN APPROPRIATELY REGISTERED ENGINEER. THE ENGINEER OF RECORD SHALL NOT BE RESPONSIBLE FOR THE ADEQUACY OF ENGINEERING DESIGNS PERFORMED BY OTHERS. ALLOW A MINIMUM OF 10 WORKING DAYS FOR THE ENGINEER'S REVIEW. ONE COPY OF EACH SUBMITTAL WILL BE RETAINED FOR THE ENGINEER'S RECORDS.

DEFERRED SUBMITTALS:

1. IN ACCORDANCE WITH THE IBC SECTION 106.3.4.2, SPECIALTY ITEMS, PRE-ENGINEERED COMPONENTS, AND DESIGN/ BUILD ELEMENTS MAY BE SUBMITTED FOR APPROVAL BY THE ENGINEER OF RECORD AND THE BUILDING OFFICIAL BY DEFERRED SUBMITTAL. SUCH ITEMS ARE DEFINED AS THOSE SPECIFIED IN CONSTRUCTION DOCUMENTS BUT WHICH REQUIRE DESIGN BY THE MANUFACTURER, SUPPLIER, OR INSTALLER.

2. SUBMITTALS ARE REQUIRED FOR THE FOLLOWING:

A. LIGHT GAUGE METAL FRAMING
B. STEEL JOISTS & METAL DECK
C. CONTENED WORKS
D. CONCRETE MIX DESIGNS AND REBAR SHOP DRAWINGS
E. STEEL SHOP DRAWINGS
F. CANOPIES
G. HAND/GUARD RAILS
H. SIGNS

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3. SUBMITTALS SHALL INCLUDE:

A. CALCULATIONS PREPARED AND SEALED BY AN APPROPRIATELY REGISTERED ENGINEER (THE "SPECIALTY ENGINEER").

B. DIAGRAM PREPARED AND SEALED BY THE SPECIALTY ENGINEER, SHOWING LOAD MAGNITUDES AND LOCATIONS - SEPARATE FOR DEAD, LIVE, WIND AND/OR SEISMIC COMPONENTS - THAT ARE APPLIED TO THE PRIMARY STRUCTURE.

C. ERECTION OR DESIGN DRAWINGS BEARING THE SPECIALTY ENGINEER'S SEAL AND THE ARCHITECT'S STAMP INDICATING HIS REVIEW.

4. SUBMIT (1) REPRODUCIBLE COPY, ONE (1) WET SEALED COPY FOR THE STRUCTURAL ENGINEER OF RECORD'S FILE, AND ADDITIONAL COPIES AS ARE NECESSARY FOR THE BUILDING DEPARTMENT. SUBMITTALS CONTAINING EXCEPTIONS, CORRECTIONS, OR OTHER REVIEW COMMENTS ARE NOT ACCEPTABLE FOR SUBMITTAL TO THE BUILDING DEPARTMENT.

5. THE STRUCTURAL ENGINEER OF RECORD'S REVIEW IS STRICTLY LIMITED TO THE FOLLOWING:

A. THE DRAWINGS AND CALCULATIONS ARE PROPERLY SEALED.

B. THE LOAD CRITERIA IS CONSISTENT WITH THE CONTRACT DOCUMENTS AND INTERNATIONAL BUILDING CODE REQUIREMENTS.

C. THE CONNECTIONS TO THE PRIMARY STRUCTURE ARE CONSISTENT WITH THE PRIMARY DESIGN.

D. THE BASE STRUCTURE IS CAPABLE OF SUPPORTING THE IMPOSED LOADS.

6. IF THE LOADS IMPOSED ON THE STRUCTURE EXCEED THE LOAD ALLOWANCE PROVIDED THE STRUCTURAL ENGINEER OF RECORD WILL REJECT THE SUBMITTAL ONLY AT THE OWNER'S WRITTEN DIRECTION WILL MODIFICATIONS TO THE BASE STRUCTURE TO ACCOMMODATE THE SPECIALTY ITEM(S) BE MADE BY THE ENGINEER OF RECORD. DEFERRED SUBMITTAL ITEMS SHALL NOT BE INSTALLED UNTIL THEIR DESIGN AND THE ENGINEER OF RECORD AND THE BUILDING OFFICIAL HAVE APPROVED SUBMITTAL DOCUMENTS.

CONCRETE:

1. MINIMUM 28 DAY STRENGTH (f'c) SHALL BE AS FOLLOWS:

USE TYPE	STRENGTH	EXPOSURE CLASS		CONDITIONS
FOOTINGS AND PIERS	4000 PSI	F1	S0	W0 C0
INTERIOR SLAB ON GROUND	4000 PSI	F0	S0	W0 C0
EXTERIOR SLAB ON GROUND	5000 PSI	F3	S2	W0 C2
ELEVATED SLABS	4000 PSI	F0	S0	W0 C0
SALT STORAGE SLAB & WALLS	5000 PSI	F3	S2	W0 C2

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2. A MIX DESIGN SHALL BE SUBMITTED FOR REVIEW FOR EACH MIX TYPE AND SHALL INCLUDE RESULTS OF STENGTH TEST, ALL MATERIALS TO BE USED, SIEVE ANALYSIS OF AGGREGATE, AND DATA FOR ALL PRODUCTS.

3. AIR ENTRAINMENT AS FOLLOWS:
A. EXTERIOR CONCRETE SHALL BE PER ASTM C260, 3% +- 1%
B. INTERIOR CONCRETE SHALL BE LIMITED TO 3% IN ACCORDANCE WITH ACI 302.1R

4. FLY ASH MAY BE USED AT CONTRACTOR'S OPTION. IF USED IT SHALL BE LIMITED TO 20% AND MEET ASTM 6618, CLASS "F".

5. CONCRETE MIXES SHALL BE DESIGNED BY A CERTIFIED LABORATORY AND APPROVED BY THE ENGINEER ACCORDING TO ACI 301.

6. CONCRETE SHALL BE NORMAL WEIGHT CONCRETE OF 145 POUND PER CUBIC FOOT USING HARDROCK AGGREGATES U.N.O. AGGREGATES USED IN CONCRETE SHALL CONFORM TO ASTM C33, CONCRETE AGGREGATES.

7. THE CONCRETE SUPPLIER SHALL STATE THE SLUMP AND ADDITIVES USED IN THE MIX DESIGN.
A. MAXIMUM SLUMP FOR EXTERIOR SLABS SHALL BE 4" +/- 1".
B. MAXIMUM SLUMP FOR ALL OTHER CONCRETE SHALL BE 3" +/- 1".
C. WATER SHALL BE CLEAN AND POTABLE. IF ADDITIONAL FLOWABILITY IS REQUIRED FOR PLACEMENT OF ANY CONCRETE MIX, A WATER-REDUCING ADDITIVE CONFORMING TO ASTM C494, TYPE A OR F, SHALL BE USED. NO ADDITIONAL WATER MAY BE ADDED TO THE MIX. THE ONLY WATER WHICH MAY BE ADDED ONSITE IS MIXWATER THAT HAS BEEN LEFT OUT AT THE BATCH PLANT.
D. CONCRETE DELIVERY TICKET SHALL CLEARLY INDICATE THE AMOUNT OF MIX WATER WHICH HAS BEEN LEFT OUT. MAXIMUM SLUMP SHALL BE F FOR CONCRETE WITH VERIFIED SLUMP OF 2" TO 4" BEFORE ADDING HIGH-RANGE WATER-REDUCING ADMIXTURE OR PLASTICIZING ADMIXTURE. SEE DIVISION 3 SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.

8. PORTLAND CEMENT SHALL CONFORM TO ASTM C 150 **TYPE II** CEMENT. CALCIUM CHLORIDE IS NOT ALLOWED.

9. NO MORE THAN 90 MINUTES SHALL ELAPSE BETWEEN CONCRETE BATCHING AND CONCRETE PLACEMENT, UNLESS APPROVED BY THE ENGINEER OR AUTHORIZED TESTING AGENCY.

10. CONCRETE MIXING, PLACEMENT AND QUALITY SHALL BE PER IBC SECTION 1904, ASTM C 94, ASTM C 685, AND ACI 302. MECHANICALLY VIBRATE ALL CONCRETE WHEN PLACED. EXCEPT SLABS ON GROUND NEED ONLY BE VIBRATED OR THOROUGHLY RODDED AROUND EMBEDDED STRAPS OR HARDWARE, BOLTS FOR UPLIFT ANCHORS, CURBS AND EDGES OF SLAB STEPS AND UNDER FLOOR DUCTS OR SIMILAR ELEMENTS. REMOVE ALL DEBRIS FROM FORMS BEFORE PLACING CONCRETE.

11. CONCRETE SHALL NOT BE DROPPED THROUGH REINFORCING STEEL (AS IN WALLS AND COLUMNS) SO AS TO CAUSE SEGREGATION OF AGGREGATES. UNCONFINED FALL SHALL NO EXCEED 5 FEET. CARE SHALL BE TAKE IN PLACING SLABS ON GROUND SO AS TO CONCRETE DOES NOT DISTURB FILL MATERIAL.

12. ALL ITEMS THAT ARE CAST INTO CONCRETE SUCH AS REINFORCING, DOWELS, BOLTS, ANCHORS, SLEEVES, EMBEDS, INSERTS, ETC. SHALL BE SECURELY POSITIONED IN THE FORMS BEFORE PLACING THE CONCRETE. SUPPORT ALL REINFORCING WITH CHAIRS AS REQUIRED. FLOATING IN OF THESE ITEMS IS NOT PERMITTED. REINFORCING, DOWELS, EMBEDS, AND INSERTS SHALL BE CLEAN OF RUST, OILS, AND DIRT PRIOR TO CASTING.

13. CONCRETE SLAB ON GROUND CONTROL JOINTS SHALL BE AS SHOWN ON THE FOUNDATION PLAN OR TYPICAL DETAILS. WHERE CONTROL JOINTS ARE NOT SHOWN ON PLANS, ALL CONCRETE SLABS ON GROUND SHALL BE BOUND BY KEYED, DOWELED OR SAWCUT CONTROL JOINTS SUCH THAT THE ENCLOSED AREA DOES NOT EXCEED 144 SQUARE FEET. RATIO OF SQUARE DIMENSIONS SHALL NOT EXCEED 1.5:1. LOCATE CONTROL JOINTS OFF OF CORNERS OF DIAMOND ISOLATION LEAVE OUTS AND RE-ENTRANT CORNERS. KEYED OR DOWELED CONSTRUCTION JOINTS MAY ONLY OCCUR AT EXPOSED EDGES DURING POURING. ALL OTHER JOINTS MAY BE SAWCUT. SAWCUT JOINTS SHALL BE CUT IN SLABS ON GROUND AS SOON AS POSSIBLE WITHIN 24 HOURS AFTER SLAB FINISHING AS MAY BE SAFELY DONE WITHOUT DISLODGING AGGREGATE.

14. PIPES OTHER THAN ELECTRICAL CONDUITS SHALL NOT BE EMBEDDED IN STRUCTURAL CONCRETE EXCEPT WHERE SPECIFICALLY APPROVED BY THE ENGINEER. MAXIMUM PIPE SIZE SHALL BE 1/3 OF THE SLAB THICKNESS AND LOCATED AT MID-DEPTH. MINIMUM SPACING SHALL BE 3 TIMES THE OUTSIDE PIPE DIAMETER. PIPES SHALL NOT IMPAIR THE STRENGTH OF THE MEMBER.

15. PROTECT CONCRETE FROM DAMAGE OR REDUCED STRENGTH DUE TO HOT OR COLD WEATHER IN ACCORDANCE WITH ACI 305 AND 306 AND IBC SECTION 1905.
WHERE DOWELS, BOLTS OR INSERTS ARE CALLED TO BE ANCHORED TO CAST IN PLACE CONCRETE ELEMENTS USING EPOXY ADHESIVES, FOLLOW ALL MANUFACTURERS RECOMMENDATIONS. ALTERNATE ANCHORAGE SYSTEMS MAY BE USED WITH ENGINEERS PRIOR APPROVAL.

FOUNDATIONS:

1. GEOTECHNICAL REPORT: PROFESSIONAL SERVICE INDUSTRIES, INC., 11826 BORMAN DR. ST LOUIS, MO 63146

PROJECT NO.: 0040404-1 DATED: 11/08/2021

2. THE OWNER SHALL EMPLOY A GEOTECHNICAL ENGINEER TO PROVIDE SOIL TESTING AND REVIEW DURING CONSTRUCTION. THE GEOTECHNICAL ENGINEER SHALL REVIEW AND APPROVE THE FOUNDATION REQUIREMENTS OF THE CONTRACT DOCUMENTS. IF CONDITIONS VARY FROM THAT INDICATED HEREIN, THEN THE GEOTECHNICAL ENGINEER SHALL NOTIFY THE ARCHITECT AND ENGINEER PRIOR TO FOUNDATION CONSTRUCTION.

3. THE BACKFILL SHALL BE PLACED AND COMPACTED ON EACH SIDE OF FOUNDATION WALLS SUCH THAT NO UNBALANCED LATERAL LOADS ARE INDUCED ON THE WALL.

4. BACKFILL SHALL BE PLACED EVENLY AGAINST EACH SIDE OF SUBGRADE STRUCTURAL ELEMENTS TO PRODUCE APPROXIMATELY EQUAL AND OPPOSITE LATERAL PRESSURES.

5. UNDERCUT THE BUILDING AREA AND INSTALL A MINIMUM OF 24" OF SELECT, LOW VOLUME ENGINEERED FILL BELOW ALL FLOOR SLAB SUB-BASE PER THE GEOTECHNICAL REPORT.

WALLS:
1. RETAINING WALLS ARE DESIGNED FOR AN EQUIVALENT FLUID PRESSURE OF 58 PSF PER FOOT. THIS IS BASED UPON A LEAN CLAY BACKFILL. BACKFILL WALLS PRIOR TO PLACING THE ELEVATED FLOOR ABOVE.

SLAB ON GRADE:
1. TYPICAL CONCRETE SLAB ON GROUND SHALL BE 4" THICK WITH 6x6-W2.1xW2.1 WELDED WIRE FABRIC OVER A 15 MIL VAPOR RETARDER, UNLESS WHERE NOTED OTHERWISE ON PLANS. PROVIDE (1) #4 CONTINUOUS AT PERIMETER OF SLAB AND (2) #4x4'-0" BARS AT RE-ENTRANT CORNERS.

2. CONCRETE SLAB ON GROUND SHALL BE 8" THICK W/ #4 BARS @ 12" O.C. EACH WAY OVER 15 MIL VAPOR RETARDER AT FLEET WASH, AND SALT STORAGE BUILDINGS, TYPICAL UNLESS NOTED OTHERWISE ON PLANS.

3. SLAB ON GROUND SUPPORT: MINIMUM 4" LAYER OF GRANULAR BASE CONSISTING OF CRUSHED LIMESTONE OR SAND/GRAVEL MIX (MODOT TYPE 5 OR SIMILAR). PER GEOTECHNICAL REPORT.

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4. UNLESS NOTED OTHERWISE IN THE GEOTECHNICAL REPORT, CONCRETE SLABS ON GROUND SHALL BE SUPPORTED ON SELECT FILL MATERIAL AS NOTED ABOVE. FILL MATERIAL SHOULD BE MOISTENED, BUT NOT SATURATED JUST PRIOR TO PLACING CONCRETE. CARE SHALL BE TAKEN IN PLACING SLABS ON GRADE SO AS NOT TO DISTURB FILL MATERIAL OR REINFORCING. THE FILL MATERIAL SHALL BE COMPACTED TO NO LESS THAN 95% COMPACTION AT MOISTURE CONTENT RANGE OF 3% BELOW TO 3% ABOVE OPTIMUM MOISTURE CONTENT BEFORE PLACEMENT OF SLABS. REFER TO GEOTECHNICAL REPORT FOR ANY ADDITIONAL REQUIREMENTS.

SHALLOW SPREAD FOOTINGS:
1. FROST DEPTH IS 30" BELOW GRADE.

2. ALLOWABLE FOOTING BEARING CAPACITY IS AS FOLLOWS PER GEOTECH REPORT:
2a. PUBLIC WORKS BUILDING
ON "COMPETENT NATURALLY DEPOSITED SOILS OR COMPACTED-ENGINEERED FILL": 3820 PSF
2b. WASH STATION BUILDING
ON "COMPETENT NATURALLY DEPOSITED SOILS OR COMPACTED-ENGINEERED FILL": 4000 PSF
2c. SALT STORAGE BUILDING
ON "COMPETENT NATURALLY DEPOSITED SOILS OR COMPACTED-ENGINEERED FILL": 4370 PSF

**NO FOUNDATIONS MAY BE BEARED ON SITE FILL. ALL MUST BEAR ON "COMPETENT NATURALLY DEPOSITED SOILS OR COMPACTED-ENGINEERED FILL" PER THE GEOTECHNICAL REPORT. **

3. ALL FOOTINGS SHALL EXTEND TO DEPTH NOTED ABOVE UNLESS NOTED OTHERWISE ON PLANS OR DETAIL. GRADE IS DEFINED AS TOP OF SLAB FOR INTERIOR FOOTINGS, AND LOWEST ADJACENT COMPACTED SUBGRADE (PAD GRADE BEFORE LANDSCAPING) OR NATURAL GRADE WITHIN 5 FEET OF BUILDING FOR PERIMETER FOOTINGS. GRADE IS DEFINED AS TOP OF EXTERIOR PAVING OR CONCRETE WHERE EXTERIOR PAVING OR CONCRETE IS PERMANENTLY LOCATED DIRECTLY ADJACENT TO BUILDING AND EXTENDS AT LEAST 5 FEET FROM BUILDING.

4. FOOTING EXCAVATIONS SHALL BE CLEAN AND FREE FROM LOOSE DEBRIS, STANDING WATER, OR UNCOMPACTED MATERIAL AT TIME OF CONCRETE PLACEMENT.

5. EXCAVATION FOR FOOTINGS SHALL BE CUT TO ACCURATE SIZE AND DIMENSIONS AS SHOWN ON PLANS. ALL SOIL BELOW SLABS AND FOOTINGS SHALL BE PROPERLY COMPACTED AND SUBGRADE BROUGHT TO A REASONABLE TRUE AND LEVEL PLANE BEFORE PLACING CONCRETE.

6. SITE PREPARATION AND GRADING REQUIREMENTS OF THE GEOTECHNICAL REPORT AND ANY ADDENDA SHALL BE COMPLETED PRIOR TO CONSTRUCTION OF FOUNDATIONS. ANY TESTS, INSPECTIONS, FIELD OBSERVATIONS, OR APPROVAL FROM THE GEOTECHNICAL ENGINEER SHALL BE PERFORMED PRIOR TO PLACEMENT OF FOUNDATION REINFORCING STEEL OR CONCRETE. ALTERATIONS TO SITE PREPARATION OR GRADING SHALL BE REPORTED TO THE ENGINEER PRIOR TO FOUNDATION CONSTRUCTION.

HAND/GUARD RAILS:

1. HANDRAIL ASSEMBLIES AND GUARDS SHALL BE DESIGNED TO RESIST A LOAD OF 50 PLF APPLIED IN ANY DIRECTION AT THE TOP AND TO TRANSFER THIS LOAD THROUGH THE SUPPORTS TO THE STRUCTURE.

2. HANDRAIL ASSEMBLIES AND GUARDS SHALL BE ABLE TO RESIST A SINGLE CONCENTRATED LOAD OF 200 POUNDS APPLIED IN ANY DIRECTION AT ANY POINT ALONG THE TOP, AND HAVE ATTACHMENT DEVICES AND SUPPORTING STRUCTURE TO TRANSFER THIS LOADING TO APPROPRIATE STRUCTURAL ELEMENTS OF THE BUILDING. THIS LOAD NEED NOT BE ASSUMED TO ACT CONCURRENTLY WITH THE LOADS SPECIFIED IN THE PRECEDING PARAGRAPH.

3. INTERMEDIATE RAILS (ALL THOSE EXCEPT THE HANDRAIL), BALUSTERS AND PANEL FILLERS SHALL BE DESIGNED TO WITHSTAND A HORIZONTALLY APPLIED NORMAL LOAD OF 50 POUNDS ON AN AREA EQUAL TO 1 SQUARE FOOT, INCLUDING OPENINGS AND SPACE BETWEEN RAILS. REACTIONS DUE TO THIS LOADING ARE NOT REQUIRED TO BE SUPERIMPOSED WITH THOSE ABOVE.

4. WHERE HANDRAILS AND GUARDS ARE DESIGNED IN ACCORDANCE WITH THE PROVISIONS FOR ALLOWABLE STRESS DESIGN (WORKING STRESS DESIGN) EXCLUSIVELY FOR THE LOADS SPECIFIED ABOVE, THE ALLOWABLE STRESS FOR THE MEMBERS AND THEIR ATTACHMENTS ARE PERMITTED TO BE INCREASED BY ONE-THIRD.

5. PROVIDE BLOCKING IN WALLS AT ALL HANDRAIL LOCATIONS.

MASONRY (CONCRETE BLOCK):

1. COMPRESSIVE STRENGTH OF CONCRETE MASONRY CONSTRUCTION, (CMU) SHALL BE AS FOLLOWS (PSI).
MASONRY STRENGTH NOT SPECIFICALLY NOTED ON PLAN SHALL SHALL BE (F'm) 2000 PSI.

MASONRY STRENGTH (F'm DESIGN)	= 2,000 PSI
BLOCK STRENGTH	= 2,000 PSI
TYPE M MORTAR STRENGTH	= 2,500 PSI
TYPE S MORTAR STRENGTH	= 2,000 PSI
GROUT STRENGTH	= 3,000 PSI

2. CONCRETE BLOCK SHALL BE HOLLOW LOAD-BEARING CONCRETE MASONRY UNITS CONFORMING TO ASTM C90, GRADE N-II. ALL BLOCKS SHALL BE PLACED IN RUNNING BOND CONSTRUCTION (UNLESS OTHERWISE NOTED) WITH ALL VERTICALS CELLS IN ALIGNMENT.

3. MORTAR MIX SHALL CONFORM TO REQUIREMENTS OF IBC SECTION 2103.8, TYPE M OR S, TYPE M MORTAR SHALL BE USED WHERE MASONRY IS IN CONTACT WITH SOIL.

4. GROUT: USE SUFFICIENT WATER FOR GROUT TO FLOW INTO ALL UNITS OF THE MASONRY WITHOUT SEGREGATION.
ALL CELLS IN CONCRETE BLOCKS CONTAINING REINFORCING SHALL BE FILLED SOLID WITH GROUT. ALL MASONRY BELOW FINISHED FLOOR OR GRADE SHALL BE GROUTED.

5. MINIMUM WALL VERTICAL REINFORCING, UNLESS NOTED OTHERWISE ON PLANS OR DETAILS, SHALL BE #5 BAR VERTICAL FULL HEIGHT IN CENTER OF GROUTED CELL AT ALL WALL INTERSECTIONS, CORNERS, WALL ENDS, JAMBS AT WALL OPENINGS, EACH SIDE OF CONTROL JOINTS, AND AT INTERVALS NOT TO EXCEED 32 INCHES ON CENTER. TIE AT 8'-0" VERTICALLY, WITH SINGLE WIRE LOOP TIE OR EQUIVALENT. DOWEL ALL VERTICAL REINFORCING TO FOUNDATION WITH DOWELS TO MATCH AND LAP VERTICAL REINFORCING.

6. MINIMUM WALL HORIZONTAL REINFORCING, UNLESS NOTED OTHERWISE ON PLANS OR DETAILS, SHALL BE A SINGLE #5 BAR IN CENTER OF 8 INCH DEEP CONTINUOUS GROUTED BOND BEAM AT TOP OF PARAPET OR FREE STANDING WALL AND AT 8'-0" INTERVALS THROUGH CONTROL JOINTS. PROVIDE BENT BARS PER TYPICAL DETAILS TO MATCH AND LAP HORIZONTAL BOND BEAM REINFORCING AT CORNERS AND WALL INTERSECTIONS TO MAINTAIN BOND BEAM CONTINUITY. USE BOND BEAM UNITS AT HORIZONTAL REINFORCING. PROVIDE BOND BEAMS AT FLOOR LEVELS AND AT THE MIDSPAN OF EACH FLOOR. REFER TO DETAILS FOR ADDITIONAL INFORMATION.

7. MINIMUM LINTEL, WHERE NOT NOTED ON PLANS, SHALL HAVE A MINIMUM OF (2) #5 CONTINUOUS HORIZONTAL BARS IN BOTTOM OF BOND BEAM OR LINTEL BLOCK AND SHALL BE GROUTED SOLID TO A MINIMUM DEPTH OF 24 INCHES. ALL LINTEL REINFORCING AND GROUT SHALL EXTEND 2 FEET MINIMUM PAST JAMBS UNLESS NOTED OTHERWISE ON PLAN DETAILS.

8. LAP REINFORCING 60 BAR DIAMETERS FOR GRADE 60. STAGGER LAP SPLICES A MINIMUM OF ONE LAP LENGTH.

9. RETAINING WALLS, ETC. SHALL BE ADEQUATELY WATERPROOFED AND DRAINED AS SPECIFIED BY ENGINEERS. IF NOT SPECIFIED BY OTHERS UNLESS NOTED OTHERWISE, DRAINAGE THROUGH RETAINING WALLS SHALL BE PROVIDED BY MEANS OF 1-1/2" DIA. HOLE AT 4 FEET O.C. AT LOW GRADE LEVEL. PROVIDE 2" GRAVEL COVER WITH FABRIC COVER AT DRAIN HOLES.

10. MASONRY VENEER SHALL BE ATTACHED TO SUPPORTING WALL FRAMING WITH 3/16" DIA. WALLS TIES OR DOVETAIL-TYPE METAL TIES OF EQUIVALENT STIFFNESS EMBEDDED INTO HORIZONTAL MORTAR JOINTS. MAX. VERTICAL SPACING OF TIES SHALL BE 18" MAX. HORIZONTAL SPACING SHALL BE 24". TIES IN ALTERNATE COURSES SHALL BE STAGGERED. PROVIDE 9 GA. WIRE REINFORCING IN HORIZONTAL MORTAR JOINTS AT 16" O.C. ENGAGE 9 GA. WIRE WITH WALL ANCOR TIES. CONSTRUCTION JOINTS IN MASONRY VENEER WALLS SHALL BE LOCATED PER THE ARCHITECTURAL DRAWINGS.

11. HORIZONTAL JOINTS SHALL BE REINFORCED WITH 9-GAUGE TRUSS-TYPE JOINT REINFORCEMENT EQUAL TO "DUROWALL" @ 16" O.C.

12. UNLESS OTHERWISE NOTED ON ARCHITECTURAL ELEVATIONS PROVIDE CONTROL/E

BASIS FOR DESIGN:

1. BUILDING CODE: IBC 2015
   RISK CATEGORY = III
   REFER TO CHAPTER 35 FOR REFERENCED STANDARDS

2. DEAD LOADS
   - A. ROOF, PRE-ENG. METAL BUILDING — PER MFR. + 5 PSF COLLATERAL
   - B. ROOF, MAIN OFFICE BUILDING — 18 PSF
   - C. ROOF, WASH BUILDING — 16 PSF
   - D. ROOF, SALT STORAGE BUILDING — PER MFR. + 5 PSF COLLATERAL
   - E. MEZZANINE STORAGE — 36 PSF

3. LIVE LOADS
   - A. ROOFS, ALL (NO REDUCTION) — 20 PSF
   - B. MEZZANINE STORAGE — 250 PSF
   - C. WASH BLDG. PLATFORM — 60 PSF

4. SNOW LOAD
   - A. GROUND SNOW — P_g = 20 PSF
   - B. MINIMUM FLAT ROOF SNOW LOAD — P_m = 22 PSF
   - C. SLOPED ROOF SNOW LOAD — P_f = 16 PSF
   - D. EXPOSURE FACTOR — C_e = 1.0
   - E. IMPORTANCE FACTOR — I_s = 1.1
   - F. THERMAL FACTOR — C_t = 1.2
   - G. RAIN ON SNOW = 5 PSF (FLAT ROOF)

5. SEISMIC LOAD
   - A. IMPORTANCE FACTOR, Ie = 1.25
   - B. S_S = 0.293
   - C. S_1 = 0.132
   - D. SITE CLASS = C
   - E. SD_S = 0.234
   - F. SD_1 = 0.147
   - G. SEISMIC DESIGN CATEGORY = C
   - H. BASIC SEISMIC FORCE RESISTING SYSTEM
     - a. STEEL ORDINARY CONCENTRICALLY BRACED FRAMES
     - b. STEEL INTERMEDIATE MOMENT FRAMES
     - c. INTERMEDIATE REINFORCED MASONRY SHEAR WALLS
   - I. DESIGN BASE SHEAR
     - a. FLEET PEMB = BY OTHERS
     - b. PUBLIC WORKS BUILDING = 166.3 KIPS
     - c. WASH BUILDING = 43.6 KIPS
     - d. SALT STORAGE = BY OTHERS
   - J. RESPONSE MODIFICATION COEFFICIENT(S), R
     - a. STEEL ORDINARY CONCENTRICALLY BRACED FRAMES = 3.25
     - b. STEEL INTERMEDIATE MOMENT FRAMES = 4.5
     - c. INTERMEDIATE REINFORCED MASONRY SHEAR WALLS = 3.5
   - K. SEISMIC RESPONSE COEFFICIENT(S), Cs
     - a. STEEL ORDINARY CONCENTRICALLY BRACED FRAMES = 0.090
     - b. STEEL INTERMEDIATE MOMENT FRAMES = 0.065
     - c. INTERMEDIATE REINFORCED MASONRY SHEAR WALLS = 0.084
   - L. ANALYSIS PROCEDURE = EQUIVALENT LATERAL FORCE PROCEDURE

6. WIND LOAD
   - A. BASIC WIND SPEED (3-SECOND GUST)
     - a. ULTIMATE DESIGN WIND SPEED = 120 MPH
     - b. SERVICE DESIGN WIND SPEED = 93 MPH
   - B. RISK CATERGORY, I_w = 1.0
   - C. EXPOSURE = "C"
   - D. INTERNAL PRESSURE COEFFICIENT = ±0.18
   - E. WIND DESIGN PRESSURES (COMPONENTS & CLADDING) - REFER TO TABLES BELOW.
   - F. MEAN ROOF HEIGHTS:
     - a. 30'-6" @ FLEET PEMB
     - b. 15'-0" @ MAIN OFFICE BUILDING
     - c. 21'-6" @ WASH BUILDING

7. PRE-ENGINEERED METAL BUILDING STANDARD DEFLECTION CRITERIA
   VERTICAL
   - A. ROOF PANEL, L = DISTANCE BETWEEN PURLINS:
     - a. L/180 (L, S, OR W)
     - b. L/150 (D+L)
   - B. PURLINS, L = BAY LENGTH
     - a. L/150 (L, S, OR W)
     - b. L/120 (D+L)
   - C. EW RAFTERS, L = DISTANCE BETWEEN COLUMNS
     - a. L/180 (L, S, OR W)
     - b. L/120 (D+L)
   - D. MAIN FRAMES, L = FRAME WIDTH
     - a. L/180 (L, S, OR W)
     - b. L/120 (D+L)

   HORIZONTAL
   - A. WALL PANEL, L = DISTANCE BETWEEN GIRTS — L/120
   - B. GIRTS, L = BAY LENGTH — L/150
   - C. EW COLUMNS, H = COLUMN HEIGHT — H/180
   - D. MAIN FRAMES, H = EAVE HEIGHT — H/180
   - E. ANY ELEMENT SUPPORTING BRITTLE SYSTEM (I.E. CMU) — L/400

8. CRANE RAIL DESIGN CRITERIA
   - A. VERTICAL LOAD = 21.4 K
   - B. VERTICAL DEFLECTION = L/600
   - C. HORIZONTAL LOAD = 4.6 K
   - D. HORIZONTAL DEFLECTION = L/400

03

03

ROOF GROSS UPLIFT AT OFFICES (PSF)

AREA SUPPORT FT²	ZONE 1'	ZONE 1	ZONE 2	ZONE 3
10	16.0 / -28.7	16.0 / -50.0	16.0 / -65.8	16.0 / -89.8
20	16.0 / -28.7	16.0 / -46.6	16.0 / -61.6	16.0 / -81.3
50	16.0 / -28.7	16.0 / -40.8	16.0 / -56.0	16.0 / -70.0
100	16.0 / -28.7	16.0 / -39.0	16.0 / -51.8	16.0 / -61.6

WALL AND PARAPET PRESSURES AT OFFICES (PSF)

AREA SUPPORT FT²	WALLS		PARAPETS	
	ZONE 4	ZONE 5	ZONE 4	ZONE 5
10	31.3 / -34.0	31.4 / -42.0	72.3 / -42.3	96.3 / -50.7
20	29.9 / -31.8	29.9 / -39.2	68.1 / -40.0	87.8 / -47.8
50	28.1 / -30.7	28.1 / -35.5	84.9 / -60.9	99.0 / -64.9
100	26.6 / -29.3	26.6 / -32.6	79.8 / -58.9	89.6 / -62.3

ROOF GROSS UPLIFT AT FLEET BUILDING (PSF)

AREA SUPPORT FT²	ZONE 1'	ZONE 1	ZONE 2	ZONE 3
10	16.0 / -33.3	16.0 / -58.0	16.0 / -76.4	16.0 / -104.3
20	16.0 / -33.3	16.0 / -54.1	16.0 / -71.5	16.0 / -94.4
50	16.0 / -33.3	16.0 / -47.4	16.0 / -65.1	16.0 / -81.4
100	16.0 / -33.3	16.0 / -45.2	16.0 / -60.1	16.0 / -71.5

WALL AND PARAPET PRESSURES AT FLEET BUILDING (PSF)

AREA SUPPORT FT²	WALLS		PARAPETS	
	ZONE 4	ZONE 5	ZONE 4	ZONE 5
10	36.4 / -39.5	36.4 / -48.8	N/A	N/A
20	34.7 / -37.0	34.7 / -45.5	N/A	N/A
50	32.6 / -35.7	32.6 / -41.2	N/A	N/A
100	30.9 / -34.0	30.9 / -37.8	N/A	N/A

ROOF GROSS UPLIFT AT WASH BUILDING (PSF)

AREA SUPPORT FT²	ZONE 1'	ZONE 1	ZONE 2	ZONE 3
10	16.0 / -31.0	16.0 / -54.0	16.0 / -71.2	16.0 / -97.1
20	16.0 / -31.0	16.0 / -50.4	16.0 / -66.6	16.0 / -87.9
50	16.0 / -31.0	16.0 / -44.1	16.0 / -60.6	16.0 / -75.7
100	16.0 / -31.0	16.0 / -42.2	16.0 / -56.0	16.0 / -66.6

WALL AND PARAPET PRESSURES WASH BUILDING (PSF)

AREA SUPPORT FT²	WALLS		PARAPETS	
	ZONE 4	ZONE 5	ZONE 4	ZONE 5
10	33.9 / -36.8	33.9 / -45.4	N/A	N/A
20	32.3 / -34.4	32.3 / -42.4	N/A	N/A
50	30.4 / -33.2	30.4 / -38.3	N/A	N/A
100	28.8 / -31.7	28.8 / -35.2	N/A	N/A

ROOF GROSS UPLIFT AT SALT STORAGE BUILDING (PSF)

AREA SUPPORT FT²	ZONE 1'	ZONE 1	ZONE 2	ZONE 3
10	16.0 / -34.7	16.0 / -60.6	16.0 / -80.0	16.0 / -108.8
20	16.0 / -34.7	16.0 / -56.4	16.0 / -74.6	16.0 / -98.5
50	16.0 / -34.7	16.0 / -49.4	16.0 / -67.9	16.0 / -84.9
100	16.0 / -34.7	16.0 / -47.2	16.0 / -62.7	16.0 / -64.6

WALL AND PARAPET PRESSURES SALT STORAGE BUILDING (PSF)

AREA SUPPORT FT²	WALLS		PARAPETS	
	ZONE 4	ZONE 5	ZONE 4	ZONE 5
10	38.0 / -41.2	38.0 / -50.9	N/A	N/A
20	36.2 / -38.6	36.2 / -47.5	N/A	N/A
50	34.0 / -37.2	34.0 / -43.0	N/A	N/A
100	32.3 / -35.5	32.3 / -39.4	N/A	N/A

TYPICAL GROSS UPLIFT NOTES

1. ALL UPLIFT VALUES ARE EXPRESSED IN PSF.
2. NEGATIVE VALUE DENOTES PRESSURE AWAY FROM SURFACE.
3. POSITIVE VALUE DENOTES PRESSURE AWAY FROM SURFACE.
4. EFFECTIVE DEAD LOAD TO RESIST UPLIFT = 18 PSF U.N.O. FOR WOOD FRAMING.
5. EFFECTIVE DEAD LOAD TO RESIST UPLIFT = 24 PSF U.N.O. FOR STEEL FRAMING.

MASONRY CONSTRUCTION

TMS 402 AND TMS 602 LEVEL "B" QUALITY ASSURANCE

TYPE	CONTINUOUS SPECIAL INSPECTION	PERIODIC SPECIAL INSPECTION
1. MATERIAL TESTING:		
A. VERIFICATION OF SLUMP FLOW AND VISUAL STABILITY INDEX (VSI) AS DELIVERED TO THE PROJECT SITE IN ACCORDANCE WITH ARTICLE 1.5 B.1.b.3 FOR SELF-CONSOLIDATING GROUT.	-	X
B. VERIFICATION OF fm IN ACCORDANCE WITH ARTICLE 1.4 B PRIOR TO CONSTRUCTION, EXCEPT WHERE SPECIFICALLY EXEMPTED BY THE CODE.	-	X
2. VERIFY COMPLIANCE WITH THE APPROVED SUBMITTALS.	-	X
3. AS MASONRY CONSTRUCTION BEGINS, VERIFY THAT THE FOLLOWING ARE IN COMPLIANCE:		
A. PROPORTIONS OF SITE-PREPARED MORTAR.	-	X
B. CONSTRUCTION OF MORTAR JOINTS.	-	X
C. LOCATION OF REINFORCEMENT AND CONNECTORS.	-	X
4. PRIOR TO GROUTING, VERIFY THAT THE FOLLOWING ARE IN COMPLIANCE:		
A. GROUT SPACING.	-	X
B. GRADE, TYPE, AND SIZE OF REINFORCEMENT AND ANCHOR BOLTS, AND PRESTRESSING TENDONS AND ANCHORAGE.	-	X
C. PLACEMENT OF REINFORCEMENT AND CONNECTORS.	-	X
D. PROPORTIONS OF SITE-PREPARED GROUT.	-	X
E. CONSTRUCTION OF MORTAR JOINTS.	-	X
5. VERIFY DURING CONSTRUCTION:		
A. SIZE AND LOCATION OF STRUCTURAL ELEMENTS.	-	X
B. TYPE, SIZE, AND LOCATION OF ANCHORS, INCLUDING OTHER DETAILS OF ANCHORAGE OF MASONRY TO STRUCTURAL MEMBERS, FRAMES, OR OTHER CONSTRUCTION.	-	X
C. WELDING OF REINFORCEMENT.	X	-
D. PREPARATION, CONSTRUCTION, AND PROTECTION OF MASONRY DURING COLD WEATHER OR HOT WEATHER.	-	X
E. PLACEMENT OF GROUT.	X	-
6. OBSERVATION PREPARATION OF GROUT SPECIMENS, MORTAR SPECIMENS, AND/OR PRISMS.	-	X

STRUCTURAL STEEL

AISC 360

TYPE	CONTINUOUS SPECIAL INSPECTION	PERIODIC SPECIAL INSPECTION
1. MATERIAL VERIFICATION OF HIGH-STRENGTH BOLTS, NUTS, AND WASHERS:		
A. IDENTIFICATION MARKINGS TO CONFORM TO ASTM STANDARDS SPECIFIED IN THE APPROVED CONSTRUCTION DOCUMENTS.	-	X
B. MANUFACTURER'S CERTIFICATE OF COMPLIANCE REQUIRED.	-	X
2. INSPECT OF HIGH-STRENGTH BOLTING:		
A. BEARING-TYPE CONNECTIONS.	-	X
B. SLIP-CRITICAL CONNECTIONS.	X	-
3. MATERIAL VERIFICATION OF STRUCTURAL STEEL:		
A. IDENTIFICATION MARKINGS TO CONFORM TO ASTM STANDARDS SPECIFIED IN THE APPROVED CONSTRUCTION DOCUMENTS.	-	X
B. MANUFACTURER'S CERTIFIED MILL TEST REPORTS.	-	X
4. MATERIAL VERIFICATION OF WELD FILLER MATERIALS:		
A. IDENTIFICATION MARKINGS TO CONFORM TO AWS SPECIFICATION IN THE APPROVED CONSTRUCTION DOCUMENTS.	-	X
B. MANUFACTURER'S CERTIFIED OF COMPLIANCE REQUIRED.	-	X
5. INSPECTION OF STRUCTURAL STEEL WELDING:		
A. COMPLETE AND PARTIAL PENETRATION GROOVE WELDS.	X	-
B. MULTI-PASS FILLET WELDS.	X	-
C. SINGLE-PASS FILLET WELDS > 5/16".	X	-
D. SINGLE-PASS FILLET WELDS < 5/16".	-	X
6. INSPECTION OF STEEL FRAME JOINT DETAILS FOR COMPLIANCE WITH APPROVED CONSTRUCTION DOCUMENTS:		
A. DETAILS SUCH AS BRACING AND STIFFENING.	-	X
B. MEMBER LOCATIONS.	-	X
C. APPLICATION OF JOINT DETAILS AT EACH CONNECTION.	-	X

STATEMENT OF SPECIAL INSPECTIONS

1. SPECIAL INSPECTIONS ARE REQUIRED FOR THIS PRIMARY BUILDING FRAME / MAIN FORCE RESISTING SYSTEM PER THE LATEST EDITION OF THE IBC.
2. REFER TO THE IBC FOR ADDITIONAL INFORMATION RELATED TO THESE TABLES.
3. INSPECTIONS AND TESTING SHALL BE PROVIDED BY A QUALIFIED TESTING LABORATORY, RETAINED BY THE OWNER AND APPROVED BY THE ENGINEER OF RECORD.
4. REPORTS SHALL INDICATE THAT WORK INSPECTED OR TESTED WAS OR WAS NOT COMPLETED IN CONFORMANCE TO APPROVED CONSTRUCTION DOCUMENTS. DISCREPANCIES SHALL BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE CONTRACTOR FOR CORRECTION. IF THEY ARE NOT CORRECT, THE DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE BUILDING OFFICIAL AND THE ENGINEER OF RECORD PRIOR TO THE COMPLETION OF THAT PHASE OF THE WORK.
5. A LETTER OF SUBSTANTIAL COMPLETION SHALL BE SUBMITTED TO THE BUILDING DEPARTMENT BY THE SPECIAL INSPECTOR PRIOR TO THE FINAL INSPECTION.

SOILS

IBC TABLE 1705.6

TYPE	CONTINUOUS SPECIAL INSPECTION	PERIODIC SPECIAL INSPECTION
1. VERIFY MATERIALS BELOW SHALLOW FOUNDATIONS ARE ADEQUATE TO ACHIEVE 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 THICKNESS DURING PLACEMENT AND COMPACTION OF COMPACTED FILL.	X	-
5. PRIOR TO PLACEMENT OF COMPACTED FILL, INSPECT SUBGRADE AND VERIFY THAT SITE HAS BEEN PREPARED PROPERLY.	-	X

CONCRETE CONSTRUCTION

IBC TABLE 1705.3

TYPE	CONTINUOUS SPECIAL INSPECTION	PERIODIC SPECIAL INSPECTION
1. INSPECT REINFORCEMENT AND VERIFY PLACEMENT.	-	X
2. REINFORCING BAR WELDING:		
A. VERIFY WELDABILITY OF REINFORCING BARS OTHER THAN ASTM A706.	-	X
B. INSPECT SINGLE-PASS FILLET WELDS, MAXIMUM 5/16".	-	X
C. INSPECT ALL OTHER WELDS.	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	X	-
B. MECHANICAL ANCHORS AND ADHESIVE ANCHORS NOT DEFINED IN 4.A.	-	X
5. VERIFY USE OF REQUIRED DESIGN MIX.	-	X
6. PRIOR TO CONCRETE PLACEMENT, FABRICATE SPECIMENS FOR STRENGTH TESTS, PERFORM SLUMP AND AIR CONTENT TESTS, AND DETERMINE THE TEMPERATURE OF THE CONCRETE.	X	-
7. INSPECT CONCRETE PLACEMENT FOR PROPER APPLICATION TECHNIQUES.	X	-
8. VERIFY MAINTENANCE OF SPECIFIED CURING TEMPERATURE AND TECHNIQUES.	-	X
9. INSPECT FORMWORK FOR SHAPE, LOCATION AND DIMENSIONS OF THE CONCRETE MEMBER BEING FORMED.	-	X

STEEL CONSTRUCTION

IBC TABLE 1705.2

TYPE	CONTINUOUS SPECIAL INSPECTION	PERIODIC SPECIAL INSPECTION
1. MATERIAL VERIFICATION OF COLD-FORMED STEEL DECK:		
A. IDENTIFICATION MARKINGS TO CONFORM TO ASTM STANDARDS SPECIFIED IN THE APPROVED CONSTRUCTION DOCUMENTS.	-	X
B. MANUFACTURER'S CERTIFICATE TEST REPORTS.	-	X
2. INSPECT OF COLD-FORMED STEEL DECK WELDING:		
A. FLOOR DECK WELDS.	-	X
B. ROOF DECK WELDS.	-	X
3. INSPECTION OF REINFORCING STEEL WELDING:		
A. VERIFICATION OF WELD ABLITY OF REINFORCING STEEL OTHER THAN A706.	-	X
B. REINFORCING STEEL RESISTING FLEXURAL AND AXIAL FORCES IN REINFORCING STEEL RESISTING FLEXURAL AND AXIAL FORCES IN OF SPECIAL REINFORCED CONCRETE SHEAR WALLS AND SHEAR REINFORCEMENT.	X	-
C. SHEAR REINFORCEMENT.	X	-
D. OTHER REINFORCING STEEL.	-	X

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REVISIONS

NO.	DESCRIPTION	DATE
01	ADD 01	01/11/23
02	ADD 02	01/25/23
03	ADD 03	02/09/23

PROJECT NO.: 20-0067 DRAWN BY: MRH, TNB
DATE: 12.15.22 REVIEWED BY: BSW

PROFESSIONAL SEAL

ALAN METTEMEYER, PE
PROFESSIONAL TITLE: ENGINEER
MO# E-2000162147

STATE OF MISSOURI
ALAN R. METTEMEYER
NUMBER E-2000162147
PROFESSIONAL ENGINEER
2-9-23

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PROJECT TITLE

CITY OF WENTZVILLE, MO PUBLIC WORKS FACILITY

PROJECT ADDRESS:
1295 INTERSTATE DRIVE
WENTZVILLE, MO 63385

SPECIAL INSPECTIONS & B.F.D.

SHEET
S001

STRAIGHT DOWEL DEVELOPMENT LENGTHS (INCHES)
Fy = 60,000 PSI

BAR SIZE	TENSION												COMPRESSION		
	OTHER BARS						TOP BARS								
	3000 PSI CONCRETE	4000 PSI CONCRETE	5000 PSI CONCRETE	6000 PSI CONCRETE	7000 PSI CONCRETE	8000 PSI CONCRETE	3000 PSI CONCRETE	4000 PSI CONCRETE	5000 PSI CONCRETE	6000 PSI CONCRETE	7000 PSI CONCRETE	8000 PSI CONCRETE	3000 PSI CONCRETE	4000 PSI CONCRETE	5000 PSI-10,000 PSI CONCRETE
#3	17	15	13	12	12	12	22	19	17	16	14	14	9	8	8
#4	22	19	17	16	15	14	29	25	23	21	19	18	11	10	9
#5	28	24	22	20	18	17	36	31	28	26	24	22	14	12	12
#6	33	29	26	24	22	21	43	37	34	31	28	27	17	15	14
#7	48	42	38	34	32	30	63	54	49	45	41	39	20	17	16
#8	55	48	43	39	36	34	72	62	56	51	47	44	22	19	18
#9	62	54	48	44	41	38	81	70	63	57	53	50	25	22	21
#10	70	61	54	50	46	43	91	79	71	64	60	56	28	25	23
#11	78	67	60	55	51	48	101	87	78	71	66	62	31	27	26
#14	93	81	72	66	61	57	121	105	94	86	79	74	38	33	31
#18	124	108	96	88	81	76	161	140	125	114	106	99	50	43	41

NOTES:
1. TOP BARS ARE HORIZONTAL REINFORCEMENT PLACED SO THAT MORE THAN 12" OF FRESH CONCRETE IS CAST IN THE MEMBER BELOW THE REINFORCEMENT.

2. DEVELOPMENT LENGTHS IN TENSION ARE BASED ON THE FOLLOWING. NOTIFY ENGINEER IF ONE OF THE FOLLOWING CRITERIA IS NOT MET:
A. CLEAR SPACING OF BARS BEING DEVELOPED OR SPLICED IS NOT LESS THAN THE BAR DIAMETER, CLEAR COVER NOT LESS THAN THE BAR DIAMETER, AND STIRRUPS OR TIES THROUGHOUT THE DEVELOPMENT LENGTH NOT LESS THAN THE CODE MINIMUM, OR

B. CLEAR SPACING OF BARS BEING DEVELOPED OR SPLICED NOT LESS THAN 2 TIMES THE BAR DIAMETER AND CLEAR COVER NOT LESS THAN THE BAR DIAMETER.

LAP SPLICE LENGTHS (INCHES)
Fy = 60,000 PSI

BAR SIZE	TENSION (CLASS B SPLICE)												COMPRESSION
	OTHER BARS						TOP BARS						
	3000 PSI CONCRETE	4000 PSI CONCRETE	5000 PSI CONCRETE	6000 PSI CONCRETE	7000 PSI CONCRETE	8000 PSI CONCRETE	3000 PSI CONCRETE	4000 PSI CONCRETE	5000 PSI CONCRETE	6000 PSI CONCRETE	7000 PSI CONCRETE	8000 PSI CONCRETE	3000 PSI-10,000 PSI CONCRETE
#3	23	20	17	16	15	15	29	25	23	21	19	19	12
#4	29	25	23	21	20	19	38	33	30	28	25	24	15
#5	37	32	29	26	24	23	47	41	37	34	32	29	19
#6	43	38	34	32	29	28	56	49	45	41	37	36	23
#7	63	55	50	45	42	39	82	71	64	59	54	51	27
#8	72	63	56	51	47	45	94	81	73	67	62	58	30
#9	81	71	63	58	54	50	106	91	82	75	69	65	34
#10	91	80	71	65	60	56	119	103	93	84	78	73	39
#11	102	88	78	72	67	63	132	114	102	93	86	81	43
#14	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	51
#18	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	68

NOTES:
1. TOP BARS ARE HORIZONTAL REINFORCEMENT PLACED SO THAT MORE THAN 12" OF FRESH CONCRETE IS CAST IN THE MEMBER BELOW THE REINFORCEMENT.

2. DEVELOPMENT LENGTHS IN TENSION ARE BASED ON THE FOLLOWING.
NOTIFY ENGINEER IF ONE OF THE FOLLOWING CRITERIA IS NOT MET:
A. CLEAR SPACING OF BARS BEING DEVELOPED OR SPLICED IS NOT LESS THAN THE BAR DIAMETER, CLEAR COVER NOT LESS THAN THE BAR DIAMETER, AND STIRRUPS OR TIES THROUGHOUT THE DEVELOPMENT LENGTH NOT LESS THAN THE CODE MINIMUM, OR

B. CLEAR SPACING OF BARS BEING DEVELOPED OR SPLICED NOT LESS THAN 2 TIMES THE BAR DIAMETER AND CLEAR COVER NOT LESS THAN THE BAR DIAMETER.

HOOKED DOWEL DEVELOPMENT LENGTHS IN TENSION (INCHES)
Fy = 60,000 PSI

BAR SIZE	EMBEDMENT						EXTENSION		MINIMUM BEND DIAMETER (IN.)
	3000 PSI CONCRETE	4000 PSI CONCRETE	5000 PSI CONCRETE	6000 PSI CONCRETE	7000 PSI CONCRETE	8000 PSI CONCRETE	90° HOOK	180° HOOK	
#3	6	6	6	6	6	6	5	3	3
#4	8	7	6	6	6	6	6	3	4
#5	10	8	7	7	6	6	8	3	5
#6	12	10	9	8	8	7	9	3	6
#7	13	12	10	9	9	8	11	4	7
#8	15	13	12	11	10	9	12	4	8
#9	17	15	13	12	11	11	14	5	12
#10	19	17	15	14	13	12	16	6	13
#11	22	19	17	15	14	13	17	6	15

NOTES:
1. DEVELOPMENT LENGTH IS BASED ON 2 1/2" MINIMUM SIDE COVER AND 2" MINIMUM END COVER.

INTERIOR LIGHT GAGE WALL STUD SIZES

MAX WALL HEIGHT	STUD SIZE	SPACING	REQUIRED BLOCKING/BRIDGING
14'-8"	362S137-33	16"	MANUFACTURER'S STANDARD @ 4'-0" O.C.
15'-4"	362S162-33	16"	MANUFACTURER'S STANDARD @ 4'-0" O.C.
21'-8"	600S137-33	16"	MANUFACTURER'S STANDARD @ 4'-0" O.C.
22'-9"	600S162-33	16"	MANUFACTURER'S STANDARD @ 4'-0" O.C.

EXTERIOR LIGHT GAGE HEADER SCHEDULE

SPAN	REDHEADER TYPE	HEADER CLIP	JAMB STUD
6'-0" - 9'-0"	587HS300-54	14GA W/ 4/6 SCREW PATTERN	600S300-54
9'-0" - 15'-6"	587HS350-97	14GA W/ 4/6 SCREW PATTERN	600S300-97

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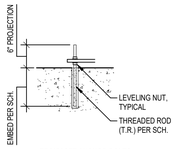
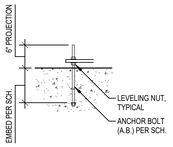
SYMBOL KEY

NOTE:
SEE PAD FOOTING SCHEDULE FOR SIZES AND REINFORCEMENT.



EPOXY SET ANCHOR BOLTS



CAST-IN-PLACE ANCHOR BOLTS

CONCRETE PEDESTAL SCHEDULE

PEDESTAL LOCATION	PEDESTAL SIZE (INCHES)	B/PEDESTAL	T/PEDESTAL	REBAR DOWELS	REBAR TIES
D-23	24" x 24"	EL=98'-0"	EL=99'-4"	(8) #6	#3 @ 9" O.C., TOP (3) IN TOP 5" OF PED.
D-23.5	24" x 24"	EL=98'-0"	EL=99'-4"	(8) #6	#3 @ 9" O.C., TOP (3) IN TOP 5" OF PED.
D-24	36" x 36"	EL=98'-0"	EL=99'-4"	(12) #6	#3 @ 9" O.C., TOP (3) IN TOP 5" OF PED.
E 1-23.5	24" x 24"	EL=94'-0"	EL=98'-0"	(8) #6	#3 @ 9" O.C., TOP (3) IN TOP 5" OF PED.
~~G-6~~	~~18" x 18"~~	~~EL=98'-8"~~	~~T/SLAB=100'-0"~~	~~(8) #6~~	~~#3 @ 9" O.C., TOP (3) IN TOP 5" OF PED.~~
G-7	18" x 18"	EL=98'-8"	T/SLAB=100'-0"	(8) #6	#3 @ 9" O.C., TOP (3) IN TOP 5" OF PED.
G-7.4	14" x 18"	EL=98'-8"	T/SLAB=100'-0"	(6) #6	#3 @ 9" O.C., TOP (3) IN TOP 5" OF PED.
K-5	18" x 18"	EL=98'-8"	T/SLAB=100'-0"	(8) #6	#3 @ 9" O.C., TOP (3) IN TOP 5" OF PED.
K-7	18" x 18"	EL=98'-8"	T/SLAB=100'-0"	(8) #6	#3 @ 9" O.C., TOP (3) IN TOP 5" OF PED.
M-5	18" x 18"	EL=98'-8"	T/SLAB=100'-0"	(8) #6	#3 @ 9" O.C., TOP (3) IN TOP 5" OF PED.
M-7	18" x 18"	EL=98'-8"	T/SLAB=100'-0"	(8) #6	#3 @ 9" O.C., TOP (3) IN TOP 5" OF PED.
N-5	18" x 18"	EL=98'-8"	T/SLAB=100'-0"	(8) #6	#3 @ 9" O.C., TOP (3) IN TOP 5" OF PED.
N-7	18" x 18"	EL=98'-8"	T/SLAB=100'-0"	(8) #6	#3 @ 9" O.C., TOP (3) IN TOP 5" OF PED.
Q-5	18" x 18"	EL=98'-8"	T/SLAB=100'-0"	(8) #6	#3 @ 9" O.C., TOP (3) IN TOP 5" OF PED.
R-5	18" x 18"	EL=98'-8"	T/SLAB=100'-0"	(8) #6	#3 @ 9" O.C., TOP (3) IN TOP 5" OF PED.
S-5	14" x 18"	EL=98'-8"	T/SLAB=100'-0"	(6) #6	#3 @ 9" O.C., TOP (3) IN TOP 5" OF PED.
S-7	18" x 18"	EL=98'-8"	T/SLAB=100'-0"	(8) #6	#3 @ 9" O.C., TOP (3) IN TOP 5" OF PED.
T-5	18" x 18"	EL=98'-8"	T/SLAB=100'-0"	(8) #6	#3 @ 9" O.C., TOP (3) IN TOP 5" OF PED.
T-7	18" x 18"	EL=98'-8"	T/SLAB=100'-0"	(8) #6	#3 @ 9" O.C., TOP (3) IN TOP 5" OF PED.
U-5	18" x 18"	EL=98'-8"	T/SLAB=100'-0"	(8) #6	#3 @ 9" O.C., TOP (3) IN TOP 5" OF PED.
U-7	18" x 18"	EL=98'-8"	T/SLAB=100'-0"	(8) #6	#3 @ 9" O.C., TOP (3) IN TOP 5" OF PED.
V-5	18" x 18"	EL=98'-8"	T/SLAB=100'-0"	(8) #6	#3 @ 9" O.C., TOP (3) IN TOP 5" OF PED.
V-7	18" x 18"	EL=98'-8"	T/SLAB=100'-0"	(8) #6	#3 @ 9" O.C., TOP (3) IN TOP 5" OF PED.
W-5	18" x 18"	EL=98'-8"	T/SLAB=100'-0"	(8) #6	#3 @ 9" O.C., TOP (3) IN TOP 5" OF PED.
W-7	18" x 18"	EL=98'-8"	T/SLAB=100'-0"	(8) #6	#3 @ 9" O.C., TOP (3) IN TOP 5" OF PED.

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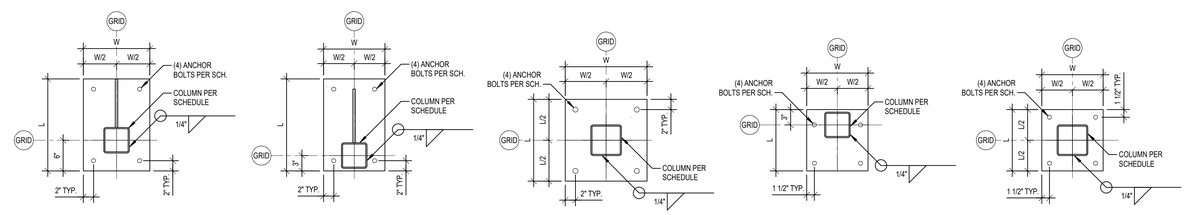
STEEL COLUMN SCHEDULE

COLUMN LOCATION	COLUMN SHAPE	BASE PLATE TYPE	PLATE THICKNESS	PLATE LENGTH	PLATE WIDTH	BOLT DIAM.	ANCHOR BOLT EMBED.	ANCHOR BOLT TYPE	SHEAR LUG DEPTH	SHEAR LUG WIDTH	SHEAR LUG THICKNESS	SHEAR LUG WELD	B/STEEL COLUMN + GROUT BED	T/STEEL COLUMN ±
A(6')-17.7	HSS5-1/2X5-1/2X3/8	B	1"	12"	12"	3/4"	8"	F1554-GR36 A.B.					EL=98'-8"	T/STL=113'-9"
A-17	HSS5-1/2X5-1/2X3/8	B	1"	12"	12"	3/4"	8"	F1554-GR36 A.B.					EL=98'-8"	T/STL=124'-4"
A-18	HSS5-1/2X5-1/2X3/8	B	1"	12"	12"	3/4"	8"	F1554-GR36 A.B.					EL=98'-8"	T/PARAPET = 120'-0"
B-13	HSS5-1/2X5-1/2X3/8	D	1"	16"	12"	1"	12"	F1554-GR36 A.B.					EL=98'-8"	T/STL=117'-4"
B-14	HSS5-1/2X5-1/2X3/8	E	1"	16"	12"	1"	12"	F1554-GR36 A.B.					EL=98'-8"	T/STL=117-7"
B-14.3	HSS5-1/2X5-1/2X3/8	E	1"	16"	12"	1"	12"	F1554-GR36 A.B.					EL=98'-8"	T/PARAPET = 120'-0"
B-15	HSS5-1/2X5-1/2X3/8	E	1"	16"	12"	1"	12"	F1554-GR36 A.B.					EL=98'-8"	T/PARAPET = 120'-0"
B-16	HSS5-1/2X5-1/2X3/8	B	3/4"	12"	12"	3/4"	8"	F1554-GR36 A.B.					EL=98'-8"	T/PARAPET = 120'-0"
C-1	HSS5X5X1/4	D	1"	16"	12"	1"	12"	F1554-GR36 A.B.					EL=98'-8"	EL=112'-0"
C-2	HSS5X5X1/4	B	1"	12"	12"	3/4"	8"	F1554-GR36 A.B.					EL=98'-8"	EL=112'-0"
C-3.1	HSS5X5X3/8	E	1"	16"	12"	1"	12"	F1554-GR36 A.B.					EL=98'-8"	EL=112'-0"
C-4	HSS4X4X1/4	B	3/4"	12"	12"	3/4"	8"	F1554-GR36 A.B.					EL=98'-8"	EL=112'-0"
C-4.6	HSS4X4X1/4	B	3/4"	12"	12"	3/4"	8"	F1554-GR36 A.B.					EL=98'-8"	EL=112'-0"
C-5.3	HSS4X4X1/4	D	1"	16"	12"	1"	12"	F1554-GR36 A.B.					EL=98'-8"	EL=112'-2 1/2"
C-6	HSS5-1/2X5-1/2X3/8	B	3/4"	12"	12"	3/4"	8"	F1554-GR36 A.B.					EL=98'-8"	T/PARAPET = 121'-0"
C-7.2	HSS8X6X1/2	B	3/4"	14"	12"	3/4"	8"	F1554-GR36 A.B.					EL=98'-8"	T/PARAPET = 121'-0"
C-7.4	HSS8X6X1/2	B	3/4"	14"	12"	3/4"	8"	F1554-GR36 A.B.					EL=98'-8"	T/PARAPET = 121'-0"
C-7.6	HSS8X6X1/2	B	3/4"	14"	12"	3/4"	8"	F1554-GR36 A.B.					EL=98'-8"	T/PARAPET = 121'-0"
C-8	HSS5-1/2X5-1/2X3/8	D	1"	16"	12"	1"	12"	F1554-GR36 A.B.					EL=98'-8"	T/PARAPET = 121'-0"
D-9	HSS5X5X1/4	D	1"	16"	12"	1"	12"	F1554-GR36 A.B.					EL=98'-8"	T/STL=116'-6 3/4"
D-9.7	HSS5X5X1/4	E	1"	16"	12"	1"	12"	F1554-GR36 A.B.					EL=98'-8"	T/STL=116'-6 3/4"
D-10	HSS5X5X1/4	E	1"	16"	12"	1"	12"	F1554-GR36 A.B.					EL=98'-8"	T/STL=116'-6 3/4"
D-11	HSS4X4X1/4	B	3/4"	12"	12"	3/4"	8"	F1554-GR36 A.B.					EL=98'-8"	T/STL=116'-6 3/4"
D-12	HSS4X4X1/4	B	3/4"	12"	12"	3/4"	8"	F1554-GR36 A.B.					EL=98'-8"	T/STL=116'-6 3/4"
D-13	HSS5X5X3/8	D	1"	16"	12"	1-1/4"	12"	F1554-GR55 A.B.					EL=98'-8"	T/STL=116'-6 3/4"
D-17	HSS5-1/2X5-1/2X3/8	E	1"	16"	12"	1"	12"	F1554-GR36 A.B.					EL=98'-8"	T/STL=124'-4"
D-18	HSS5-1/2X5-1/2X3/8	D	1"	16"	12"	1"	12"	F1554-GR36 A.B.					EL=98'-8"	T/STL=119'-8 3/4"
D-19	HSS4X4X1/4	B	3/4"	11"	11"	3/4"	8"	F1554-GR36 A.B.					EL=98'-8"	T/STL=116'-8 3/4"
D-20	HSS4X4X1/4	B	3/4"	11"	11"	3/4"	8"	F1554-GR36 A.B.					EL=98'-8"	T/STL=116'-8 3/4"
D-21	HSS5-1/2X5-1/2X1/4	E	1"	16"	12"	1"	12"	F1554-GR36 A.B.					EL=98'-8"	T/STL=116'-8 3/4"
D-22	HSS5-1/2X5-1/2X1/4	D	1"	16"	12"	1"	12"	F1554-GR36 A.B.					EL=98'-8"	T/PARAPET = 120'-0"
D-23	HSS6X6X3/8	A	1"	12"	12"	3/4"	8"	F1554-GR36 A.B.					EL=99'-4"	T/PARAPET = 120'-0"
D-23.5	HSS6X6X1/2	A	1"	12"	12"	3/4"	8"	F1554-GR36 A.B.					EL=99'-4"	T/PARAPET = 120'-0"
D-24	HSS6X6X1/2	C	1-1/2"	16"	16"	1-1/4"	12"	F1554-GR55 A.B.					EL=99'-4"	T/PARAPET = 120'-0"
D-6-5.3	HSS4X4X1/4	E	1"	16"	12"	1"	12"	F1554-GR36 A.B.					EL=98'-8"	EL=112'-0"
E-9	HSS5X5X1/4	E	1"	16"	12"	1"	12"	F1554-GR36 A.B.					EL=98'-8"	T/STL=115'-5"
E-13	HSS5X5X3/8	E	1"	16"	12"	1-1/4"	12"	F1554-GR55 A.B.					EL=98'-8"	T/STL=115'-5"
E-14	HSS5X5X3/8	A	3/4"	12"	12"	3/4"	8"	F1554-GR36 A.B.					EL=98'-8"	T/STL=115'-5"
E-15	HSS5X5X3/8	A	3/4"	12"	12"	3/4"	8"	F1554-GR36 A.B.					EL=98'-8"	T/STL=115'-5"
E-16	HSS5X5X1/4	A	3/4"	12"	12"	3/4"	8"	F1554-GR36 A.B.					EL=98'-8"	T/STL=115'-5"
E-17	HSS5-1/2X5-1/2X3/8	E	1"	16"	12"	1"	12"	F1554-GR36 A.B.					EL=98'-8"	T/STL=124'-4"
E-18	HSS5-1/2X5-1/2X3/8	E	1"	16"	12"	1"	12"	F1554-GR36 A.B.					EL=98'-8"	T/STL=119'-8 3/4"
E-19	HSS5X5X1/4	A	3/4"	12"	12"	3/4"	8"	F1554-GR36 A.B.					EL=98'-8"	T/PARAPET = 115'-0"
E-20	HSS5X5X1/4	A	3/4"	12"	12"	3/4"	8"	F1554-GR36 A.B.					EL=98'-8"	T/PARAPET = 115'-0"
E.1-23	HSS10X10X3/8	C	1"	18"	16"	1"	12"	F1554-GR36 A.B.					EL=98'-0"	T/STL=111'-6"
E.1-23.5	HSS10X10X3/8	C	1-1/2"	18"	16"	1-1/4"	12"	F1554-GR55 A.B.					EL=98'-0"	T/STL=111'-6"
E.1-24	HSS10X10X3/8	C	1-1/2"	18"	16"	1-1/4"	12"	F1554-GR55 A.B.					EL=98'-0"	T/STL=111'-6"
F-1	HSS5X5X1/4	D	1"	16"	12"	1"	12"	F1554-GR36 A.B.					EL=98'-8"	EL=112'-0"
F-2	HSS4X4X1/4	B	3/4"	12"	12"	3/4"	8"	F1554-GR36 A.B.					EL=98'-8"	EL=112'-0"
F-4	HSS4X4X1/4	B	3/4"	12"	12"	3/4"	8"	F1554-GR36 A.B.					EL=98'-8"	EL=112'-0"
F-6	HSS5X5X1/4	B	3/4"	12"	12"	3/4"	8"	F1554-GR36 A.B.					EL=98'-8"	EL=112'-0"
F-7.4	HSS4X4X1/4	B	3/4"	12"	10"	3/4"	8"	F1554-GR36 A.B.					EL=98'-8"	EL=112'-2 1/2"
H-10	HSS6X3X1/2	A	3/4"	12"	10"	3/4"	8"	F1554-GR36 A.B.					EL=98'-8"	EL=112'-2 1/2"
H-11	HSS3-1/2X3-1/2X3/8	A	3/4"	10"	10"	3/4"	8"	F1554-GR36 A.B.					EL=98'-8"	T/STL = 114'-8"
H-12	HSS3-1/2X3-1/2X3/8	A	3/4"	10"	10"	3/4"	8"	F1554-GR36 A.B.					EL=98'-8"	T/STL = 114'-8"
H-13	HSS4X4X1/4	A	3/4"	10"	10"	3/4"	8"	F1554-GR36 A.B.					EL=98'-8"	T/STL = 114'-8"
J-17	HSS5-1/2X5-1/2X3/8	A	3/4"	12"	12"	3/4"	8"	F1554-GR36 A.B.					EL=98'-8"	T/STL=124'-4"
J-18	HSS5-1/2X5-1/2X3/8	A	3/4"	12"	12"	3/4"	8"	F1554-GR36 A.B.					EL=98'-8"	T/PARAPET = 120'-0"
K.2-9	HSS3-1/2X3-1/2X1/4	A	3/4"	10"	10"	3/4"	8"	F1554-GR36 A.B.					EL=98'-8"	T/STL=114'-8"
L-23	HSS10X10X3/8	C	1"	18"	18"	1"	12"	F1554-GR36 A.B.					.03 EL=98'-0"	T/STL=111'-6"
Q.1-7.3	HSS4X4X1/2	A	3/4"	10"	10"	3/4"	8"	F1554-GR36 A.B.					EL=98'-8"	T/CMU = 110'-8"
Q.1-7.9	HSS4X4X1/2	A	3/4"	10"	10"	3/4"	8"	F1554-GR36 A.B.					EL=98'-8"	T/CMU = 110'-8"
R.9-7.3	HSS4X4X1/2	A	3/4"	10"	10"	3/4"	8"	F1554-GR36 A.B.					EL=98'-8"	T/CMU = 110'-8"
R.9-7.9	HSS4X4X1/2	A	3/4"	10"	10"	3/4"	8"	F1554-GR36 A.B.					EL=98'-8"	T/CMU = 110'-8"

NOTES:
1. ANCHOR BOLT TYPE - A.B. = CAST-IN-PLACE ANCHOR BOLT AND T.R. = EPOXY SET THREADED ROD.
2. EPOXY SET THREADED RODS SHALL BE SET IN HILTI HIT-HY 200 EPOXY, UNLESS NOTED OTHERWISE.



TYPE E | TYPE D | TYPE C | TYPE B | TYPE A

B / S002 BASE PLATE TYPES
Scale: 1" = 1'-0"

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PROJECT TEAM
CIVIL ENGINEER
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MAINTENANCE CONSULTANT
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417.890.8002

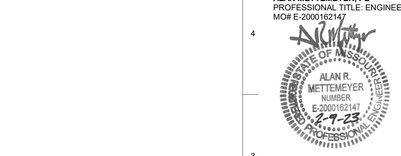
MEP ENGINEER
HENDERSON ENGINEERING, INC.
8345 LENEXA DR., #300
LENEXA, KS 66214
417.555.5555
.
.
.

REVISIONS

NO.	DESCRIPTION	DATE
01	ADD 01	01/11/23
02	ADD 02	01/25/23
03	ADD 03	02/09/23

PROJECT NO.: 20-0067 DRAWN BY: MRH, TNB
DATE: 12.15.22 REVIEWED BY: BSW

PROFESSIONAL SEAL
ALAN METTEMEYER, PE
PROFESSIONAL TITLE: ENGINEER
MO# E-2000162147



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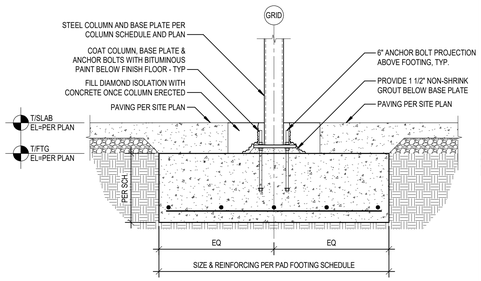
PROJECT TITLE
CITY OF WENTZVILLE, MO PUBLIC WORKS FACILITY

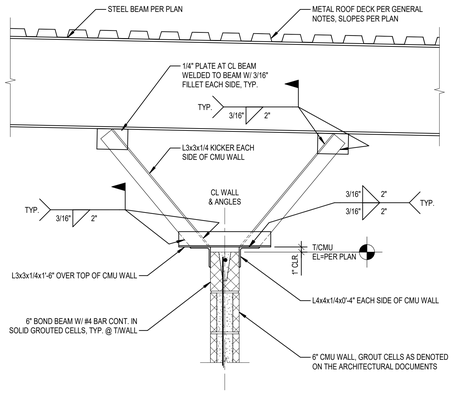
PROJECT ADDRESS:
1295 INTERSTATE DRIVE
WENTZVILLE, MO 63385

SCHEDULES

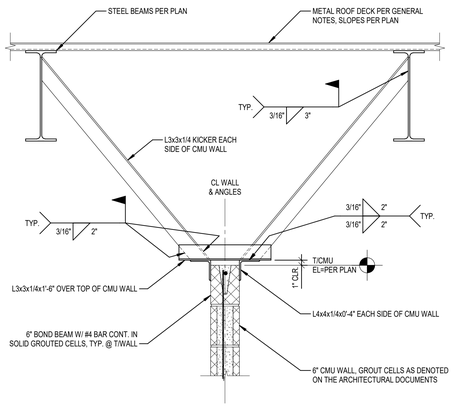
SHEET
S002



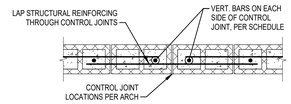
V S003 EXTERIOR STEEL COLUMN FOUNDATION, TYP.
Scale: 3/4" = 1'-0"



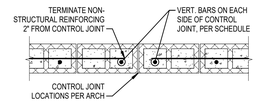
U S003 ROOF FRAMING DETAIL
Scale: 1" = 1'-0"



T S003 ROOF FRAMING DETAIL
Scale: 1" = 1'-0"

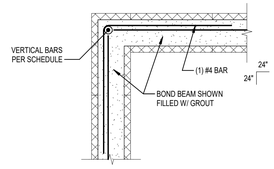


@ STRUCTURAL WALL

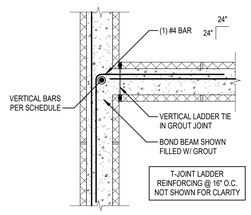


@ NON-STRUCTURAL WALL

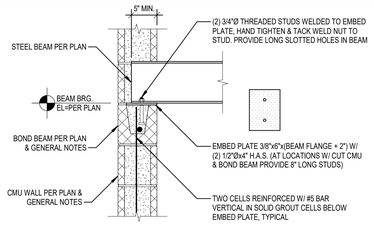
R S003 CMU WALL CONTROL JOINT, TYP. (PLAN VIEW)
Scale: 3/4" = 1'-0"



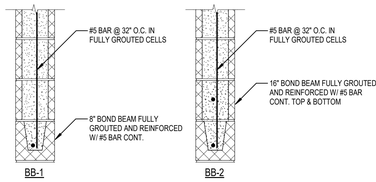
Q S003 CMU BOND BEAM CORNERS, TYP. (PLAN VIEW)
Scale: 1" = 1'-0"



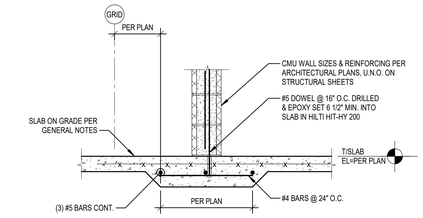
P S003 CMU WALL @ INTERSECTION, TYP. (PLAN VIEW)
Scale: 1" = 1'-0"



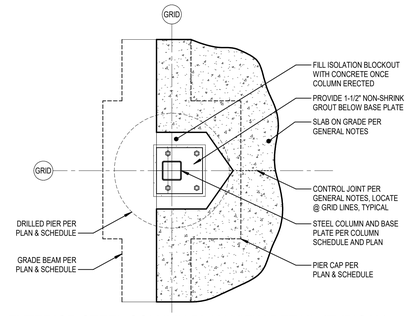
N S003 BEAM BEARING @ CMU WALL (TYPICAL)
Scale: 1" = 1'-0"



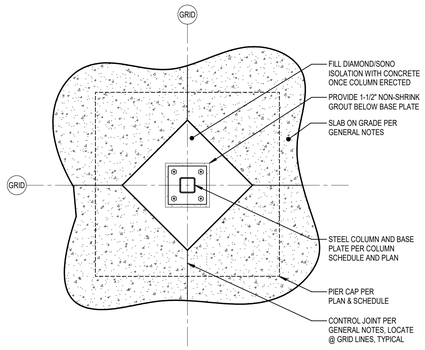
M S003 CMU WALL BOND BEAM TYPES (TYPICAL)
Scale: 1" = 1'-0"



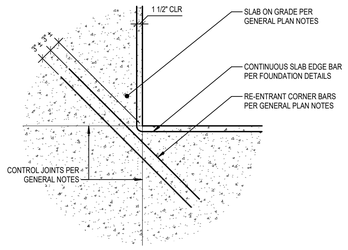
L S003 THICKENED SLAB @ INTERIOR CMU WALL, TYPICAL
Scale: 3/4" = 1'-0"



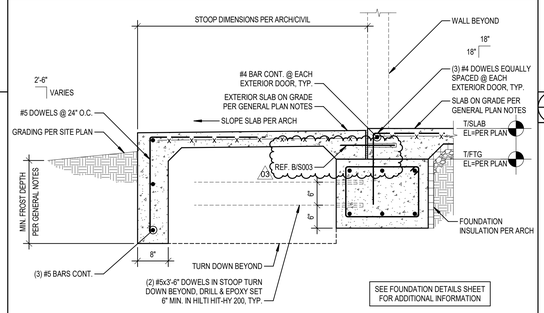
K S003 EXTERIOR STEEL COLUMN PLAN VIEW DETAIL (TYPICAL)
Scale: 3/4" = 1'-0"



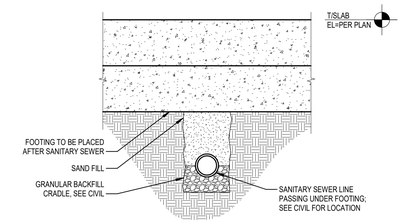
J S003 INTERIOR STEEL COLUMN PLAN VIEW DETAIL (TYPICAL)
Scale: 3/4" = 1'-0"



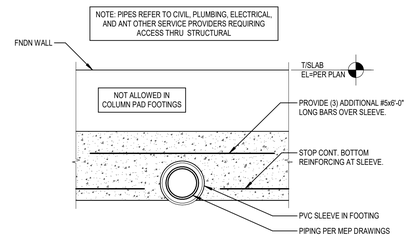
H S003 TYPICAL RE-ENTRANT CORNER BARS
Scale: 3/4" = 1'-0"



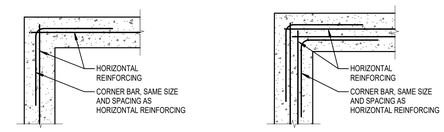
G S003 TYPICAL FROST STOOP @ EXTERIOR DOORS
Scale: 3/4" = 1'-0"



F S003 TYPICAL PIPE BELOW FOUNDATION
Scale: 3/4" = 1'-0"



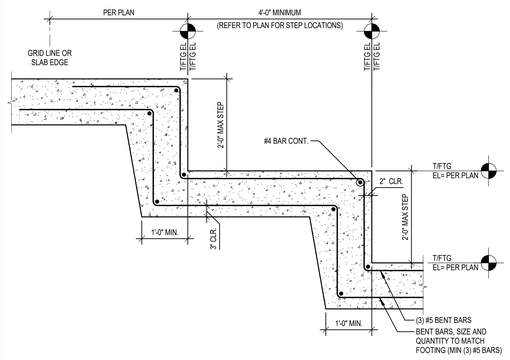
E S003 TYPICAL PIPE PENETRATION @ FOUNDATION
Scale: 3/4" = 1'-0"



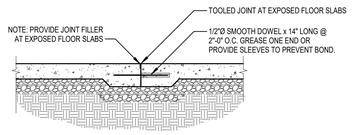
@ SINGLE LAYER REINFORCEMENT

@ DOUBLE LAYER REINFORCEMENT

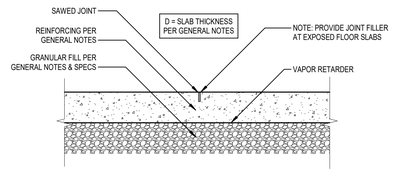
D S003 CORNER BARS (TYPICAL)
Scale: 3/4" = 1'-0"



C S003 TYPICAL STEPPED FOOTING
Scale: 3/4" = 1'-0"



B S003 CONSTRUCTION JOINT (TYPICAL)
Scale: 3/4" = 1'-0"



A S003 CONTROL JOINT (TYPICAL)
Scale: 1 1/2" = 1'-0"

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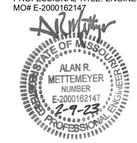
MEP ENGINEER
HENDERSON ENGINEERING, INC.
8345 LENEXA DR., #300
LENEXA, KS 66214
417.555.5555

REVISIONS

NO.	DESCRIPTION	DATE
01	ADD 01	01/11/23
02	ADD 02	01/25/23
03	ADD 03	02/09/23

PROJECT NO.: 20-0067 DRAWN BY: MRH, TNB
DATE: 12.15.22 REVIEWED BY: BSW

PROFESSIONAL SEAL
ALAN METTEMEYER, PE
PROFESSIONAL TITLE: ENGINEER
MO# E-2000162147



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PROJECT TITLE
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PROJECT ADDRESS:
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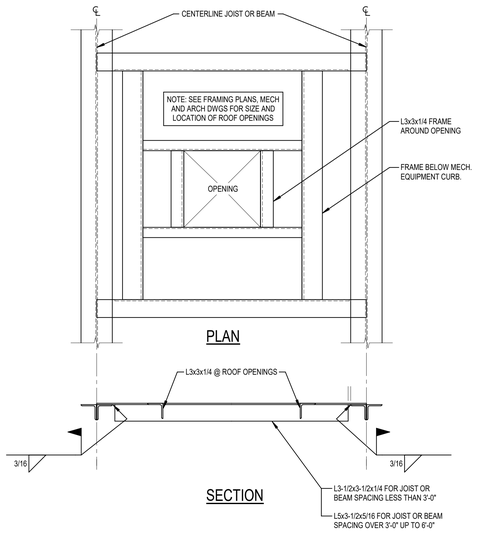
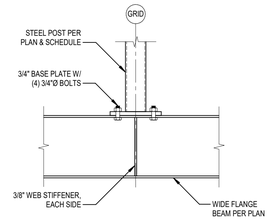
WENTZVILLE, MO 63385

TYPICAL DETAILS

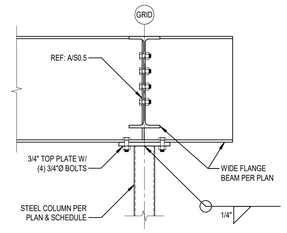
SHEET
S003



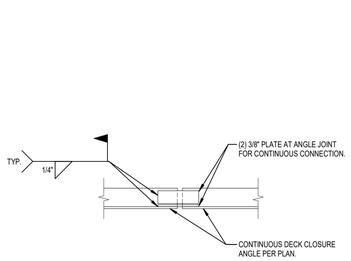
J S005 H-FRAME ROOF DETAIL, TYPICAL
Scale: 1" = 1'-0"



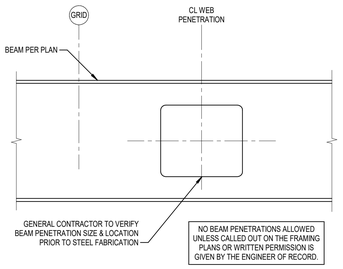
E S005 COLUMN OVER BEAM CONNECTION (TYPICAL)
Scale: 1" = 1'-0"



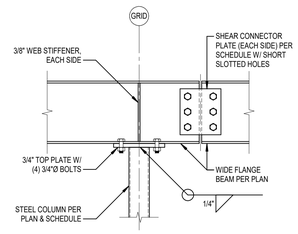
D S005 BEAM OVER COLUMN CONNECTION
Scale: 1" = 1'-0"



M S005 DECK CLOSURE ANGLE TYP.
Scale: 1" = 1'-0"



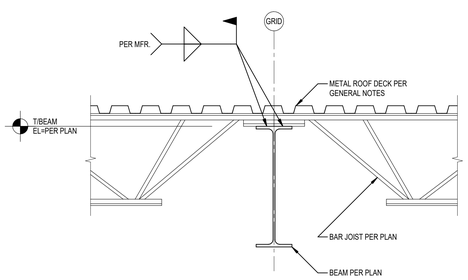
H S005 BEAM PENETRATION (TYPICAL)
Scale: 1" = 1'-0"



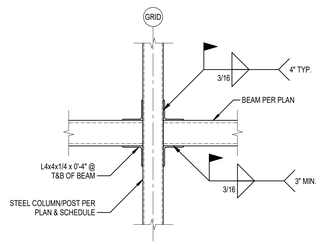
SHEAR PLATE SCHEDULE

BEAM SHAPE	SHEAR PL THICKNESS	NUMBER OF BOLTS (in)
W8	(2) 3/8"	2
W10	(2) 3/8"	2
W12	(2) 3/8"	3
W14	(2) 3/8"	3
W16	(2) 3/8"	4
W18	(2) 3/8"	4
W21	(2) 3/8"	5
W24	(2) 3/8"	6

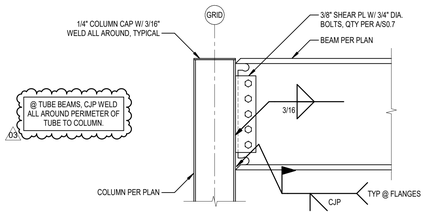
C S005 BEAM OVER COLUMN CONNECTION (TYPICAL)
Scale: 1" = 1'-0"



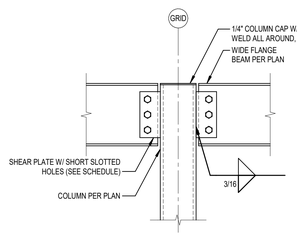
P S005 INTERIOR BAR JOIST BEARING DETAIL, TYPICAL
Scale: 1" = 1'-0"



L S005 HSS BEAM - COLUMN CONNECTION (TYPICAL)
Scale: 1" = 1'-0"



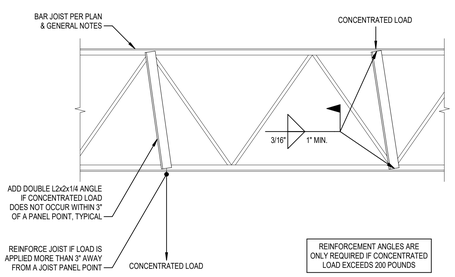
G S005 WELDED MOMENT CONNECTION @ W-COLUMN (TYPICAL)
Scale: 1" = 1'-0"



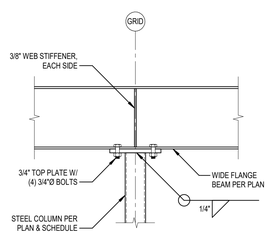
SHEAR PLATE SCHEDULE

BEAM SHAPE	SHEAR PL THICKNESS	NUMBER OF BOLTS (in)
W8	3/8"	2
W10	3/8"	2
W12	3/8"	3
W14	3/8"	3
W16	3/8"	4
W18	3/8"	4
W21	3/8"	5
W24	3/8"	6

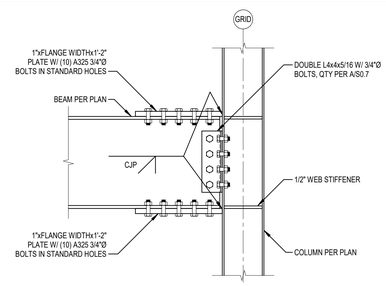
B S005 BEAM TO COLUMN SHEAR CONNECTION (TYPICAL)
Scale: 1" = 1'-0"



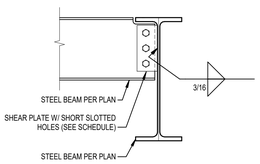
N S005 BAR JOIST CHORD REINFORCING, TYPICAL
Scale: 1" = 1'-0"



K S005 BEAM OVER COLUMN CONNECTION (TYPICAL)
Scale: 1" = 1'-0"



F S005 BOLTED MOMENT CONNECTION @ W-COLUMN (TYPICAL)
Scale: 1" = 1'-0"



SHEAR PLATE SCHEDULE

BEAM SHAPE	SHEAR PL THICKNESS	NUMBER OF BOLTS (in)
W8	3/8"	2
W10	3/8"	2
W12	3/8"	3
W14	3/8"	3
W16	3/8"	4
W18	3/8"	4
W21	3/8"	5
W24	3/8"	6

A S005 W-JOIST TO BEAM SHEAR CONNECTION (TYPICAL)
Scale: 1" = 1'-0"

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LENEXA, KS 66214
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REVISIONS

NO.	DESCRIPTION	DATE
01	ADD 01	01/11/23
03	ADD 03	02/09/23

PROJECT NO.: 20-0067 DRAWN BY: MRH, TNB
DATE: 12.15.22 REVIEWED BY: BSW

PROFESSIONAL SEAL
ALAN METTEMEYER, PE
PROFESSIONAL TITLE: ENGINEER
MO# E-2000162147

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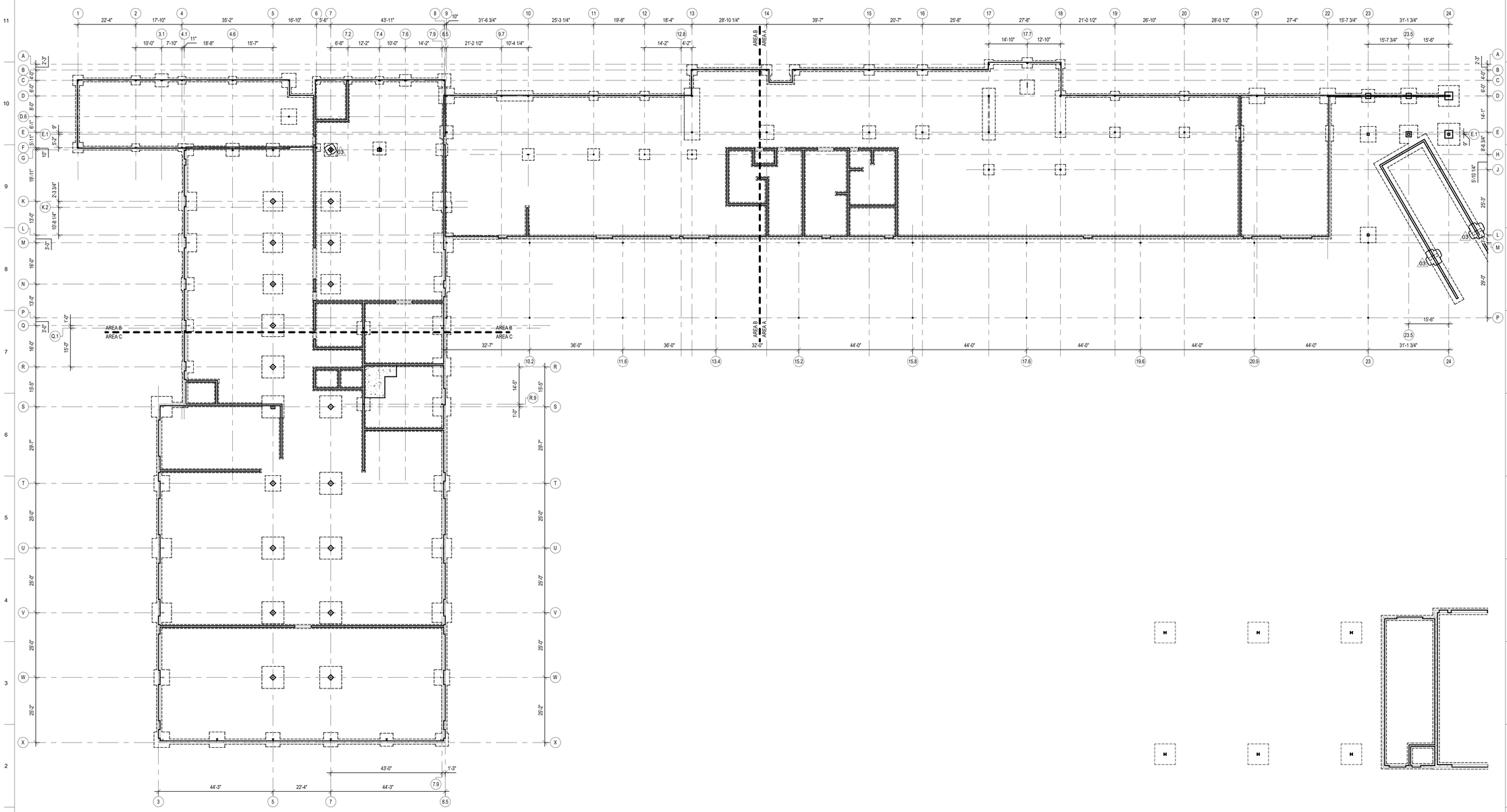
CITY OF WENTZVILLE, MO PUBLIC WORKS FACILITY
PROJECT ADDRESS:
1296 INTERSTATE DRIVE
WENTZVILLE, MO 63385

TYPICAL DETAILS

SHEET
S005

GENERAL PLAN NOTES

1. SEE SHEET S101A FOR GENERAL FOUNDATION NOTES.
2. SEE SHEET S002 FOR SCHEDULES.



A FOUNDATION PLAN - OVERALL
S101 Scale: 1/16" = 1'-0"

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PREMIER DESIGN GROUP
100 MIDLAND PARK DRIVE
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FOUNDATION PLAN - OVERALL

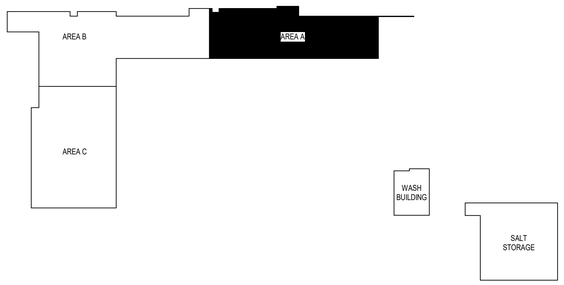
SHEET
S101

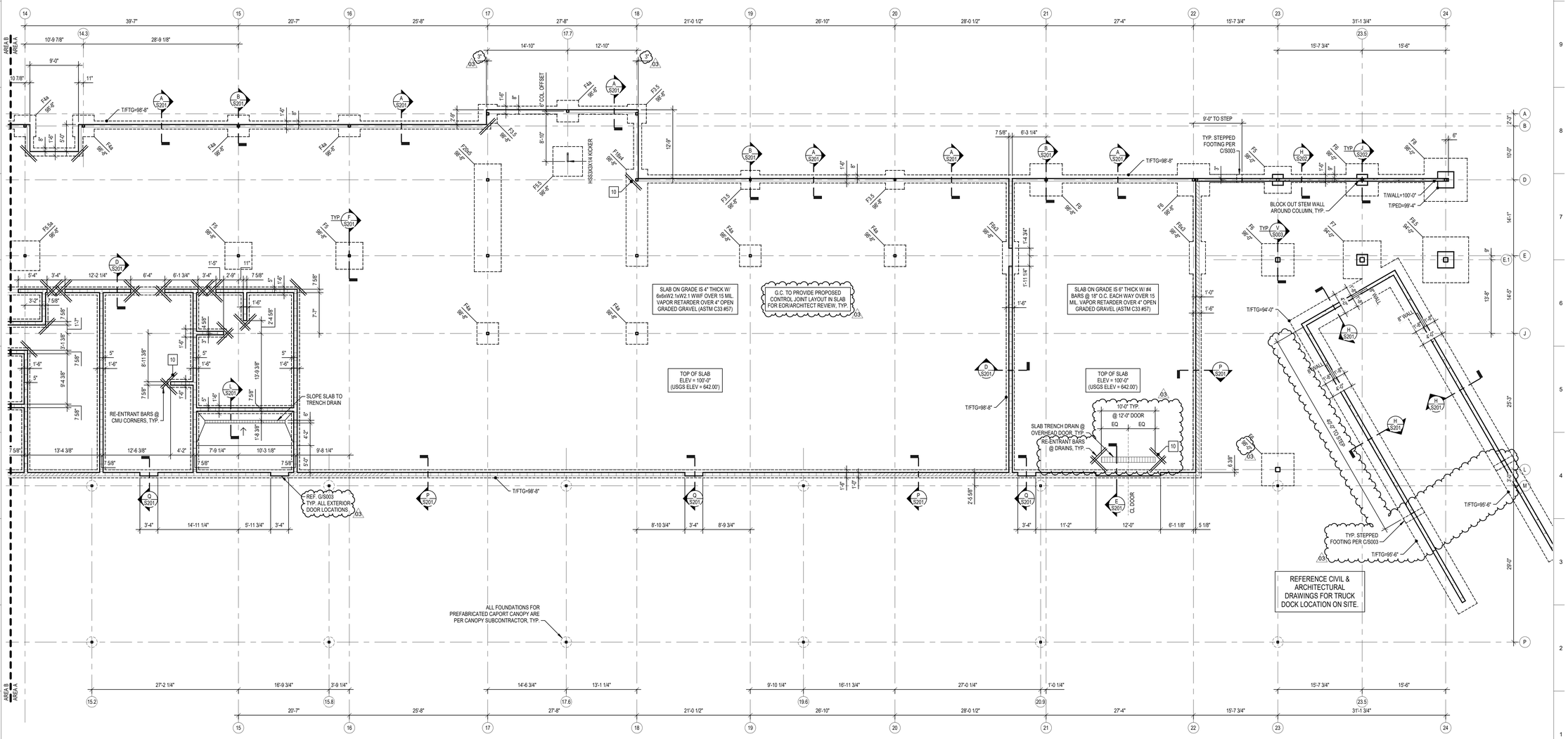
PAD FOOTING SCHEDULE

PAD FOOTING MARK	WIDTH	LENGTH	THICKNESS	REINFORCEMENT	REMARKS
F3	3'-0"	3'-0"	1'-4"	(4) #4 BARS EA. WAY, BOTTOM	
F3.5	3'-6"	3'-6"	1'-4"	(4) #5 BARS EA. WAY, BOTTOM	
F4.5a	4'-6"	4'-6"	1'-4"	(6) #5 BARS EA. WAY, TOP & BTM	
F4a	4'-0"	4'-0"	1'-4"	(5) #5 BARS EA. WAY, TOP & BTM	
F5	5'-0"	5'-0"	1'-4"	(6) #5 BARS EA. WAY, TOP & BTM	
F5.5	5'-6"	5'-6"	1'-4"	(5) #6 BARS EA. WAY, BOTTOM	
F5.5a	5'-6"	5'-6"	1'-4"	(7) #5 BARS EA. WAY, TOP & BTM	
F6	6'-0"	6'-0"	1'-4"	(7) #5 BARS EA. WAY, TOP & BTM	
F7	7'-0"	7'-0"	1'-4"	(7) #6 BARS EA. WAY, TOP & BTM	
F7.5	7'-6"	7'-6"	1'-4"	(7) #6 BARS EA. WAY, TOP & BTM	
F8	8'-0"	8'-0"	1'-4"	(9) #5 BARS EA. WAY, TOP & BTM	
F8.5	8'-6"	8'-6"	2'-0"	(9) #5 BARS EA. WAY, TOP & BTM	
F14x4	14'-0"	4'-0"	1'-4"	(5) #5 BARS LONG WAY, TOP & BTM (16) #5 BARS SHORT WAY, TOP & BTM	
F18x4	4'-0"	18'-0"	1'-4"	(6) #5 BARS LONG WAY, TOP & BTM (20) #5 BARS SHORT WAY, TOP & BTM	
F20x5	5'-0"	20'-0"	1'-4"	(6) #5 BARS LONG WAY, TOP & BTM (24) #5 BARS, LONG WAY, TOP & BTM	
F20x6	6'-0"	20'-0"	2'-0"	(8) #6 BARS LONG WAY, TOP & BTM (24) #6 BARS SHORT WAY, TOP & BTM	

GENERAL PLAN NOTES

1. TYPICAL CONCRETE SLAB ON GRADE, U.N.O., AT HEATED AREAS SHALL BE 4" THICK WITH 6x6 W2.1xW2.1 REINFORCEMENT OVER 15 MIL VISQUEEN VAPOR BARRIER. IF THE CONCRETE SLAB ON GRADE IS TO BE LEFT EXPOSED, PROVIDE CHAIRS TO SUPPORT THE WWF (NO VAPOR BARRIER).
2. SEE SHEET S000 FOR GENERAL NOTES. SEE SHEET S001 FOR SPECIAL INSPECTIONS AND BASIS FOR DESIGN CRITERIA. SEE SHEET S002 FOR SCHEDULES.
3. CJ - CONTROL OR CONSTRUCTION JOINT IN FLOOR SLAB, SEE A/S003 & B/S003 RESPECTIVELY.
4. SEE ARCHITECTURAL AND PLUMBING SHEETS FOR WATER-PROOFING AND STORM WATER DRAINAGE REQUIREMENTS.
5. SLOPE SLAB TO FLOOR DRAINS. REFER TO ARCH FOR LOCATIONS.
6. PRIOR TO CASTING INTERIOR THICKENED SLAB SOIL COMPACTION REPORT MUST BE APPROVED BY THE ENGINEER OF RECORD.
7. NOT ALL MECHANICAL OPENINGS AND/OR PENETRATIONS MAY BE INDICATED. REFER TO MECHANICAL DRAWINGS FOR ADDITIONAL INFORMATION.
8. THE BUILDING SHALL NOT BE LOCATED ON SITE OFF OF THE STRUCTURAL DOCUMENTS. REFER TO THE CIVIL SITE PLAN AND ARCHITECTURAL PLANS FOR BUILDING LOCATION INFORMATION.
9. PLAN REFERENCE ELEVATION OF 100'-0" = USGS ELEVATION OF 642.00'
10. PROVIDE (2) #4x4'-0" RE-ENTRANT CORNER BARS, TYPICAL.
11. AT ALL OVERHEAD DOORS, STEEL FRAMES, AND MAN DOORS, PROVIDE HORIZONTAL DOWELS BETWEEN INTERIOR AND EXTERIOR SLAB. DOWELS ARE TO BE #4 BARS @ 12" O.C. AT MID DEPTH OF SLAB.
12. CONCRETE COLUMN PEDESTALS ARE PER PLAN AND CONCRETE PEDESTAL SCHEDULE. CONCRETE PEDESTALS ARE CENTERED ON GRIDS OR ALIGNED WITH STEM WALL EDGES, U.N.O.





A S101A FOUNDATION PLAN - AREA A
Scale: 1/8" = 1'-0"

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636.327.5101

PROJECT TEAM

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PROFESSIONAL SEAL
ALAN METTEMEYER, PE
PROFESSIONAL TITLE: ENGINEER
MO# E-2000162147

STATE OF MISSOURI ALAN R. METTEMEYER NUMBER E-2000162147 2-9-23 PROFESSIONAL ENGINEER

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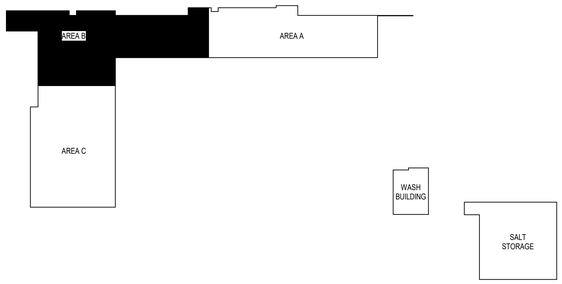
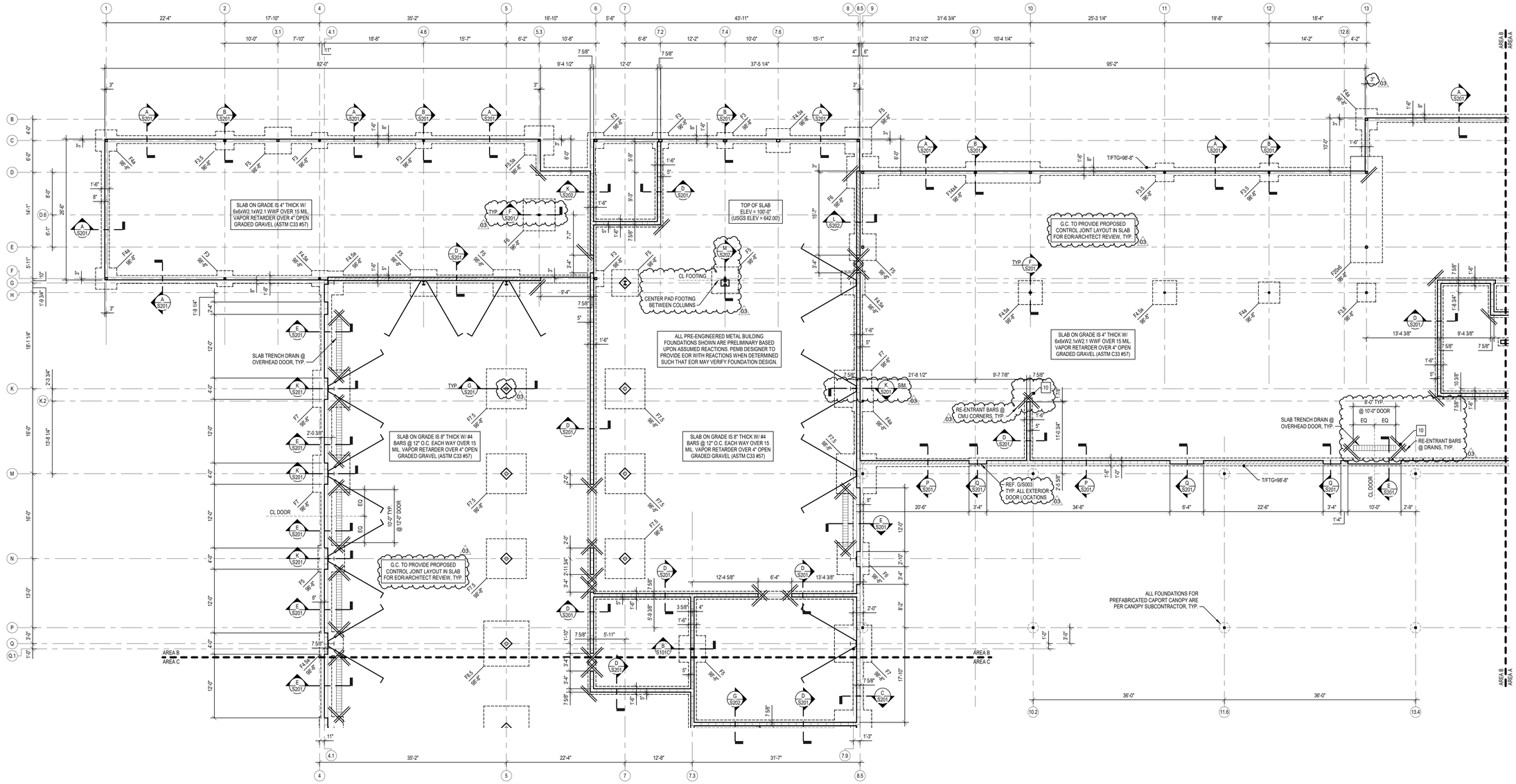
FOUNDATION PLAN - AREA A

SHEET
S101A

GENERAL PLAN NOTES

1. SEE SHEET S101A FOR GENERAL FOUNDATION NOTES.
2. SEE SHEET S002 FOR SCHEDULES.





A S101B FOUNDATION PLAN - AREA B
Scale: 1/8" = 1'-0"

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DATE: 12.15.22 REVIEWED BY: BSW

PROFESSIONAL SEAL
ALAN METTEMEYER, PE
PROFESSIONAL TITLE: ENGINEER
MO# E-2000162147

STATE OF MISSOURI
ALAN R. METTEMEYER
NUMBER E-2000162147
2-9-23
PROFESSIONAL ENGINEER

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PROJECT ADDRESS:
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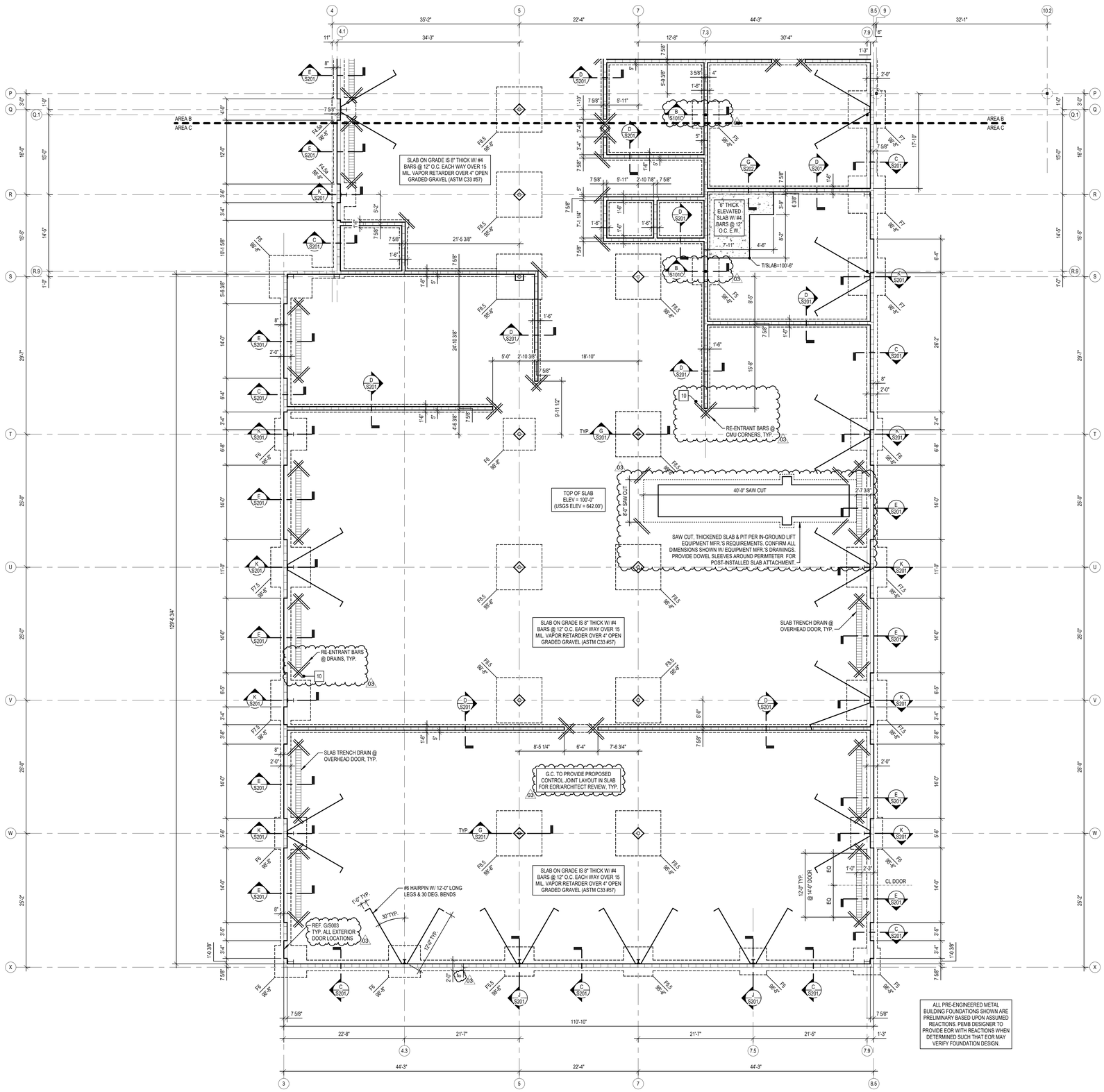
WENTZVILLE, MO 63385

FOUNDATION PLAN - AREA B

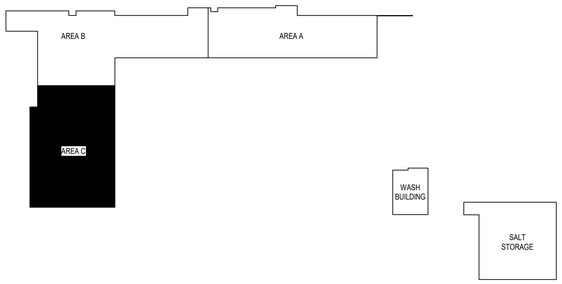
SHEET
S101B

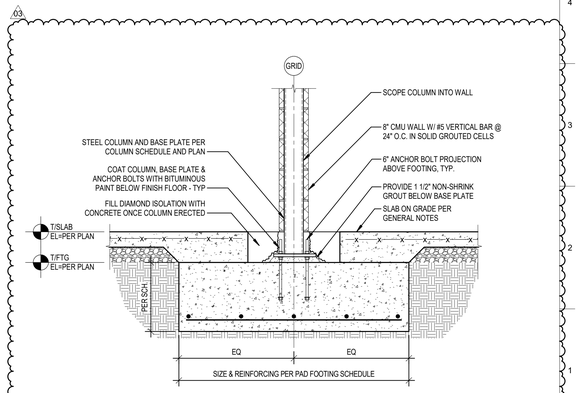


A S101C FOUNDATION PLAN - AREA C
Scale: 1/8" = 1'-0"

GENERAL PLAN NOTES

1. SEE SHEET S101A FOR GENERAL FOUNDATION NOTES.
2. SEE SHEET S002 FOR SCHEDULES.





B S101C INTERIOR STEEL COLUMN & WALL FNDN.
Scale: 3/4" = 1'-0"

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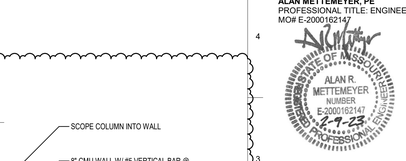
PROFESSIONAL TITLE: ENGINEER
MO# E-2000162147



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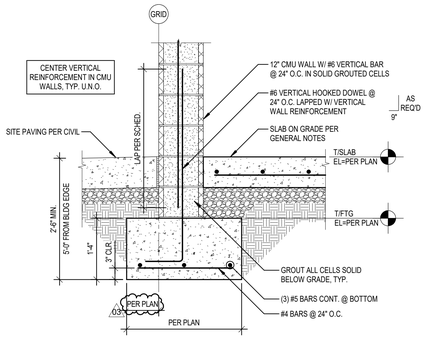
FOUNDATION PLAN - AREA C

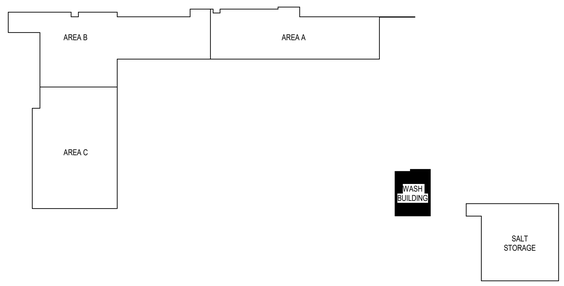
SHEET
S101C

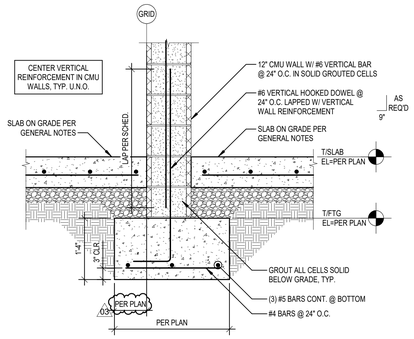


E S102 WASH BAY FOUNDATION DETAIL
Scale: 3/4" = 1'-0"

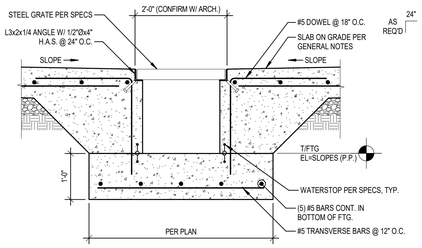
GENERAL PLAN NOTES

1. SEE SHEET S101A FOR GENERAL FOUNDATION NOTES.
2. SEE SHEET S002 FOR SCHEDULES.

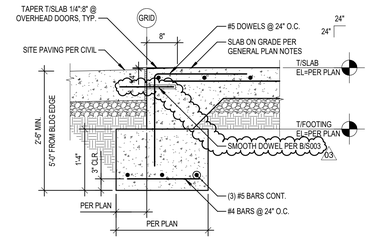




D S102 WASH BAY FOUNDATION DETAIL
Scale: 3/4" = 1'-0"



C S102 WASH BAY FOUNDATION DETAIL
Scale: 3/4" = 1'-0"



B S102 WASH BAY FOUNDATION DETAIL
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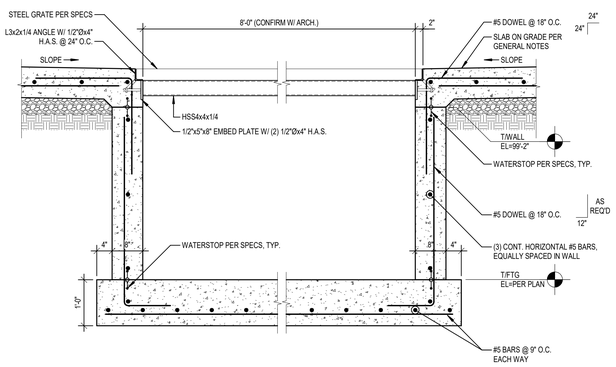
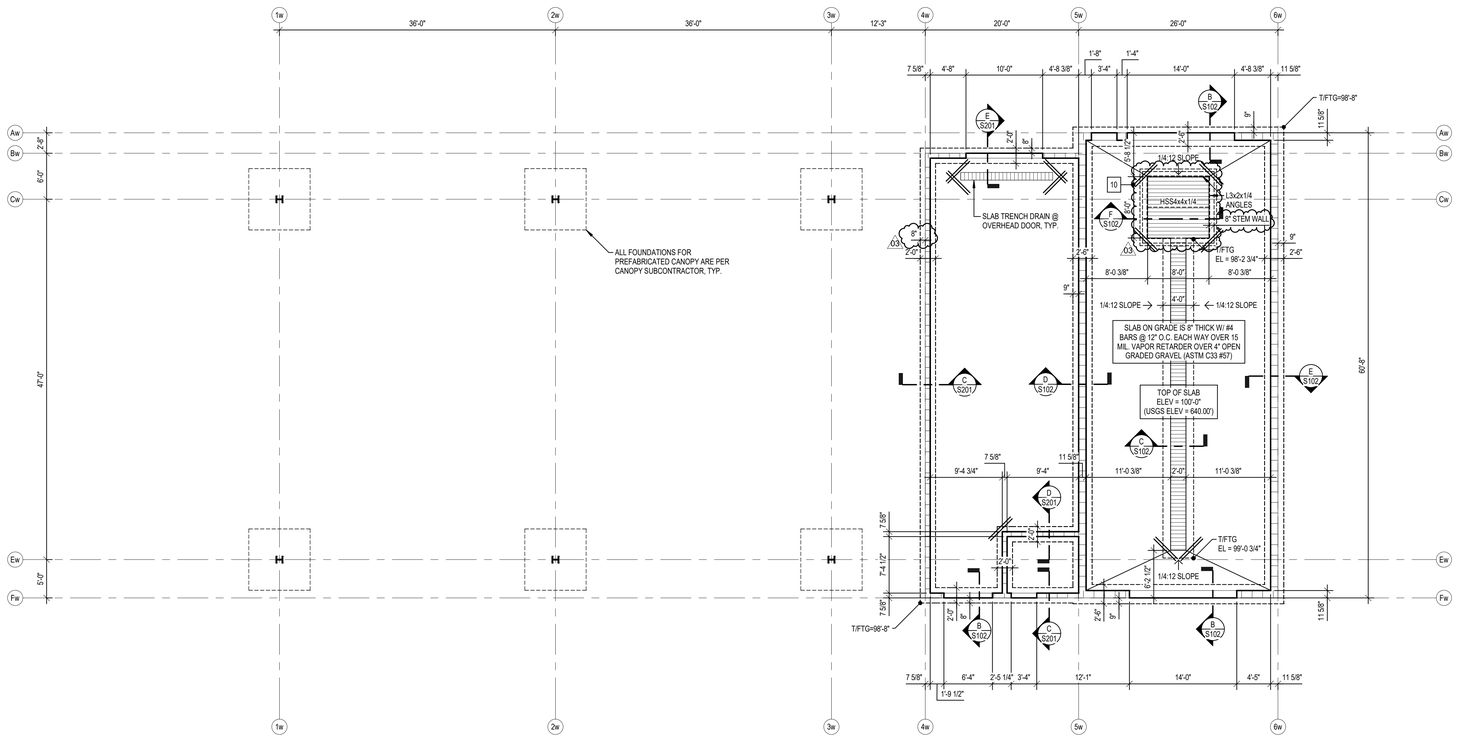


F S102 WASH BAY FOUNDATION DETAIL
Scale: 3/4" = 1'-0"



A S102 FOUNDATION PLAN - WASH BUILDING
Scale: 1/8" = 1'-0"

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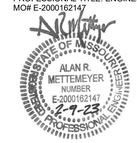

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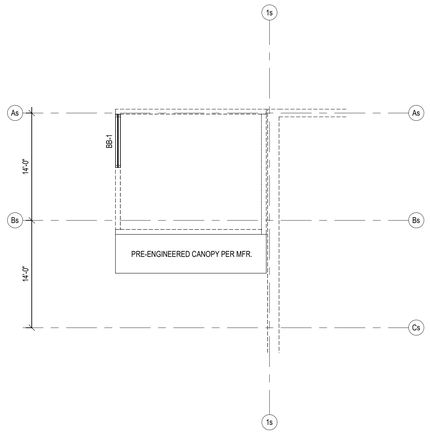
FOUNDATION PLAN - WASH BUILDING

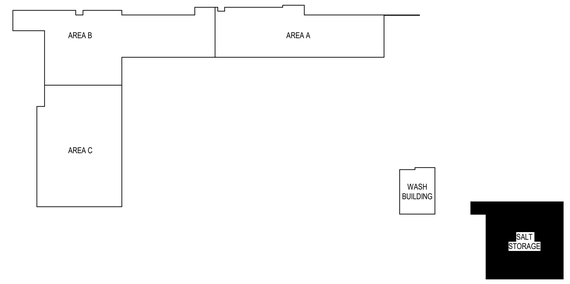
SHEET
S102



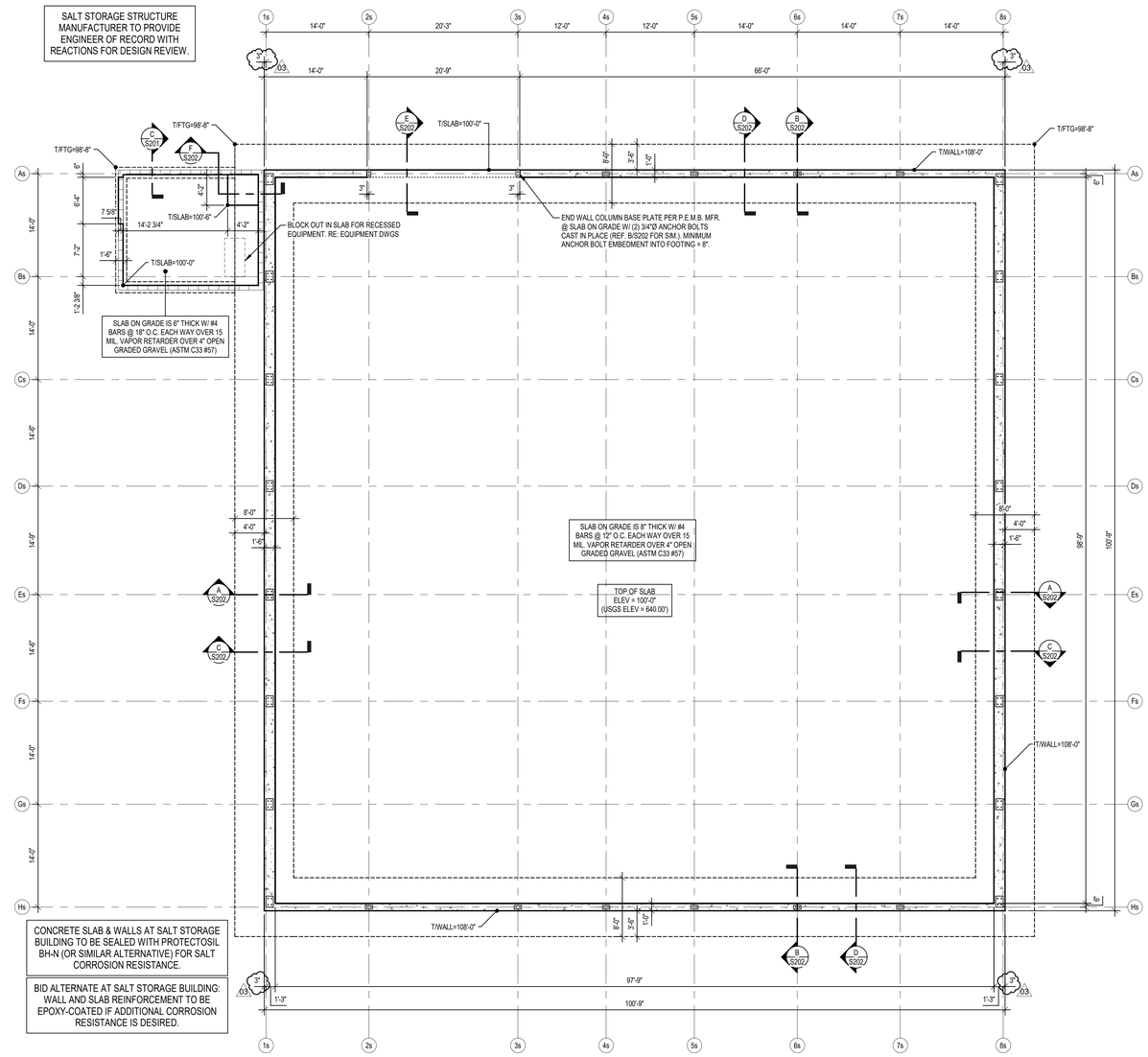
B S103 ROOF FRAMING PLAN - SALT STORAGE
Scale: 1/8" = 1'-0"

GENERAL PLAN NOTES

1. SEE SHEET S101A FOR GENERAL FOUNDATION NOTES.
2. SEE SHEET S002 FOR SCHEDULES.



SALT STORAGE STRUCTURE MANUFACTURER TO PROVIDE ENGINEER OF RECORD WITH REACTIONS FOR DESIGN REVIEW.



CONCRETE SLAB & WALLS AT SALT STORAGE BUILDING TO BE SEALED WITH PROTECTOSIL BH-N (OR SIMILAR ALTERNATIVE) FOR SALT CORROSION RESISTANCE.

BID ALTERNATE AT SALT STORAGE BUILDING: WALL AND SLAB REINFORCEMENT TO BE EPOXY-COATED IF ADDITIONAL CORROSION RESISTANCE IS DESIRED.

A S103 FOUNDATION PLAN - SALT STORAGE BUILDING
Scale: 1/8" = 1'-0"

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REVISIONS

NO.	DESCRIPTION	DATE
03	ADD 03	02/09/23

PROJECT NO.: 20-0067 DRAWN BY: MRH, TNB
DATE: 12.15.22 REVIEWED BY: BSW

PROFESSIONAL SEAL
ALAN METTEMEYER, PE
PROFESSIONAL TITLE: ENGINEER
MO# E-2000162147

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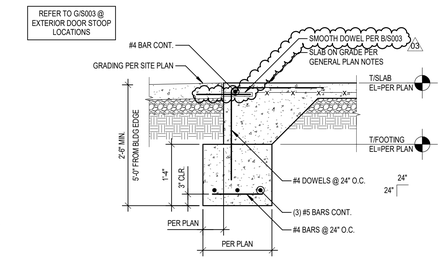
CITY OF WENTZVILLE, MO PUBLIC WORKS FACILITY

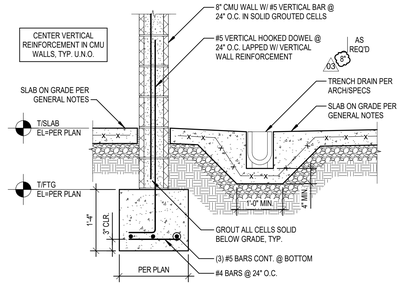
PROJECT ADDRESS:
1295 INTERSTATE DRIVE
WENTZVILLE, MO 63385

FOUNDATION PLAN - SALT STORAGE

SHEET
S103



Q S201 FOUNDATION DETAIL
Scale: 3/4" = 1'-0"



L S201 TRENCH DRAIN FOUNDATION DETAIL
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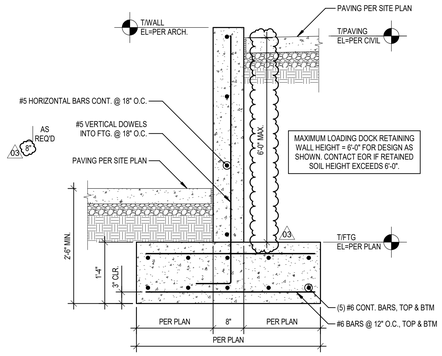
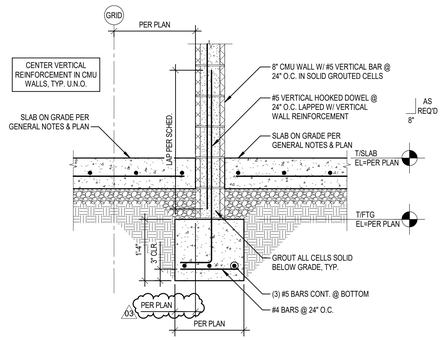
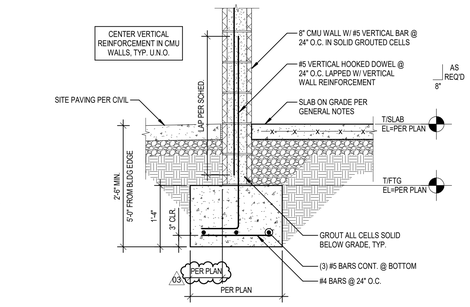


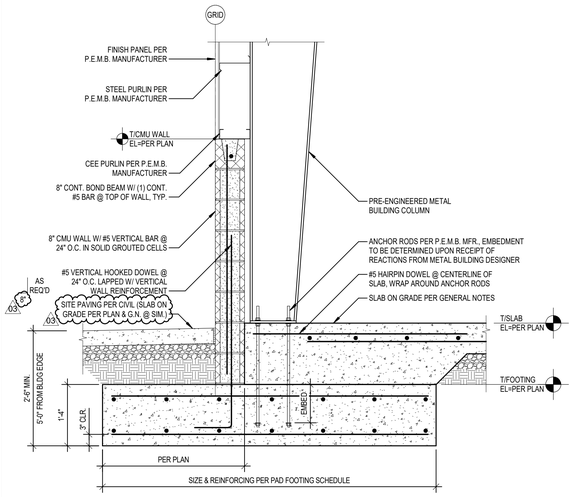
H S201 FOUNDATION DETAIL @ TRUCK DOCK
Scale: 3/4" = 1'-0"



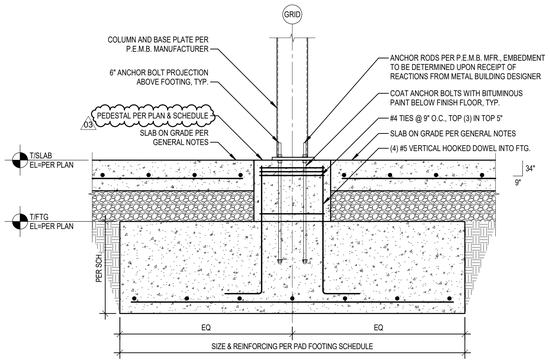
D S201 INTERIOR CMU WALL DETAIL, TYP.
Scale: 3/4" = 1'-0"



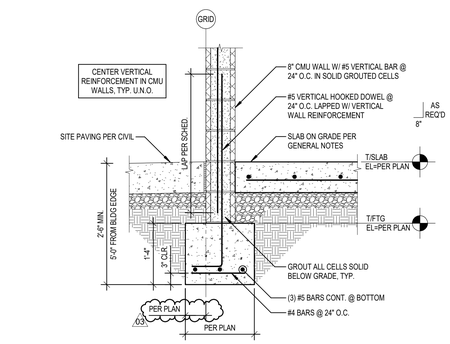
P S201 EXERIOR CMU WALL DETAIL
Scale: 3/4" = 1'-0"



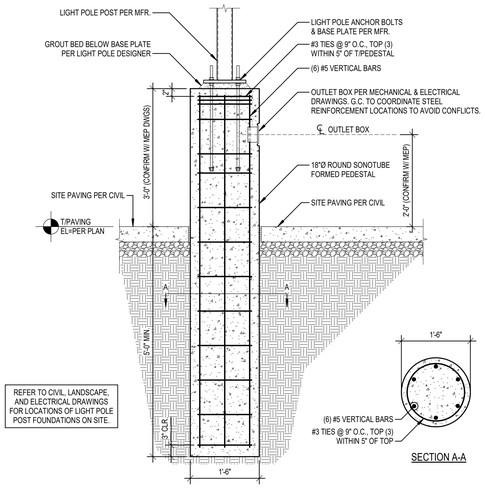
K S201 EXTERIOR PEMB COLUMN FOUNDATION DETAIL
Scale: 3/4" = 1'-0"



G S201 INTERIOR PEMB COLUMN FOUNDATION, TYP.
Scale: 3/4" = 1'-0"



C S201 EXERIOR CMU WALL DETAIL, TYP.
Scale: 3/4" = 1'-0"



N S201 SITE LIGHT POLE FNDN.
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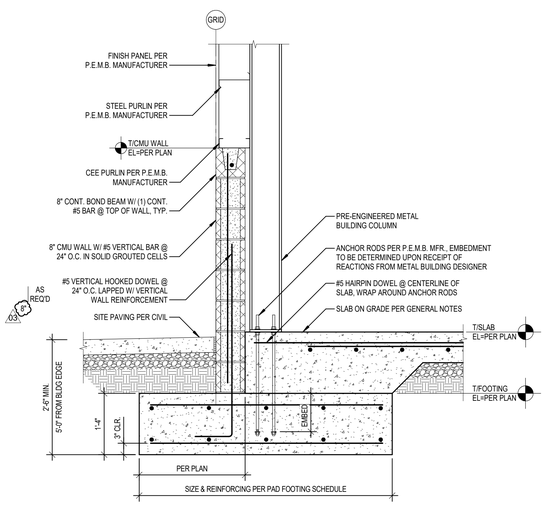
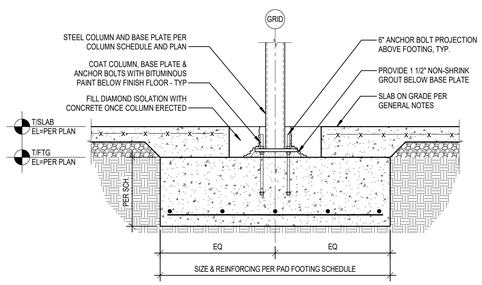


J S201 EXTERIOR PEMB COLUMN FOUNDATION DETAIL
Scale: 3/4" = 1'-0"



F S201 INTERIOR STEEL COLUMN FOUNDATION, TYP.
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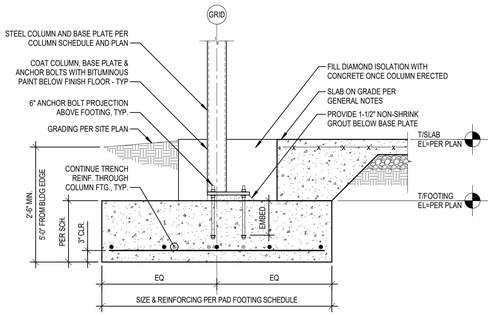

B S201 EXT/INT STEEL COLUMN FOUNDATION, TYP.
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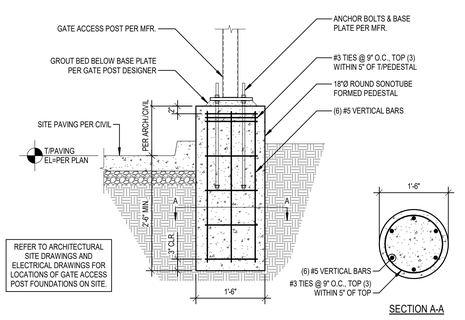

M S201 SITE GATE ACCESS POST FNDN.
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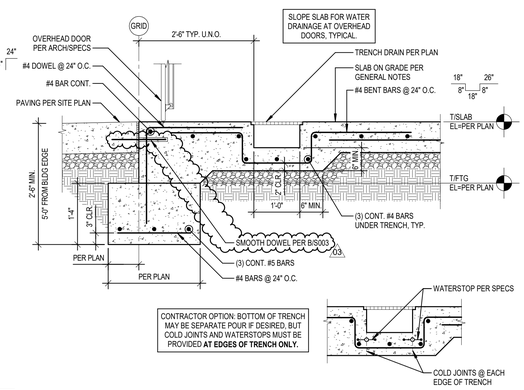
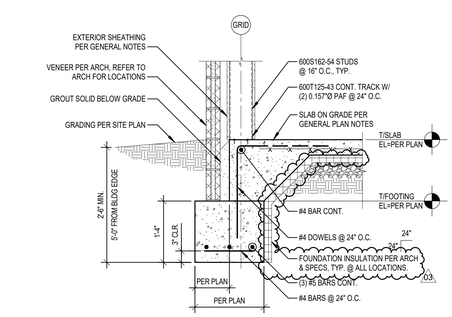


E S201 EXT. OPENING @ OVERHEAD DOOR
Scale: 3/4" = 1'-0"



A S201 FOUNDATION DETAIL
Scale: 3/4" = 1'-0"

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REVISIONS

NO.	DESCRIPTION	DATE
01	ADD 01	01/11/23
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PROFESSIONAL TITLE: ENGINEER
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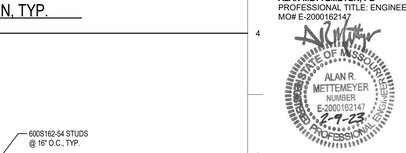

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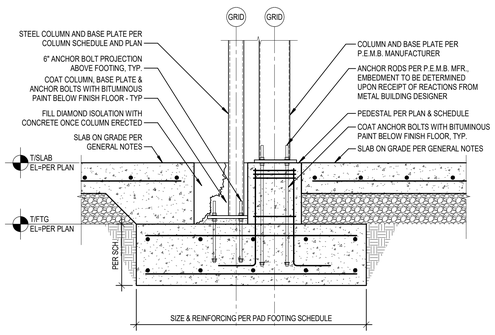
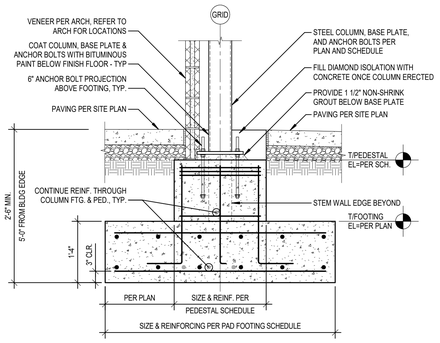
FOUNDATION DETAILS

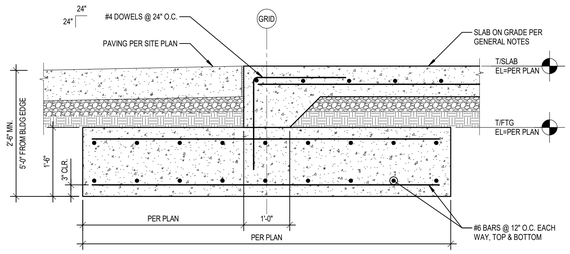
SHEET
S201



M S202 INTERIOR PEMB & STEEL COLUMN FOUNDATION
Scale: 3/4" = 1'-0"

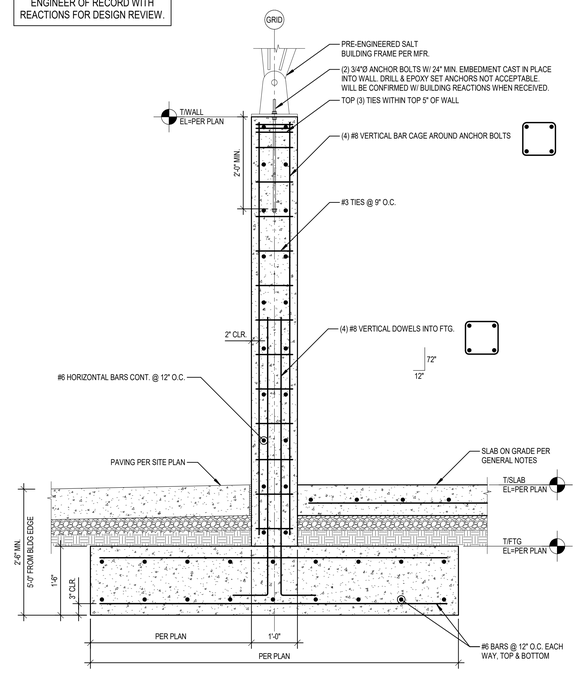


J S202 FOUNDATION DETAIL
Scale: 3/4" = 1'-0"

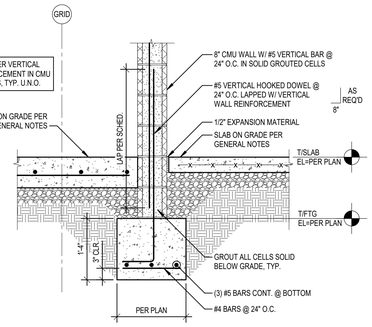


E S202 FOUNDATION DETAIL @ SALT STORAGE
Scale: 3/4" = 1'-0"

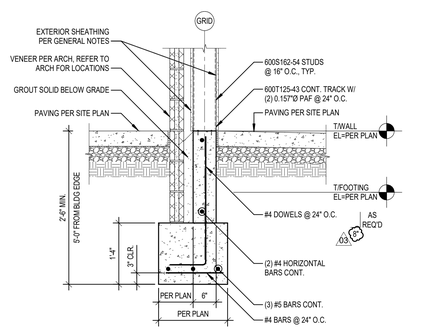
SALT STORAGE STRUCTURE MANUFACTURER TO PROVIDE ENGINEER OF RECORD WITH REACTIONS FOR DESIGN REVIEW.



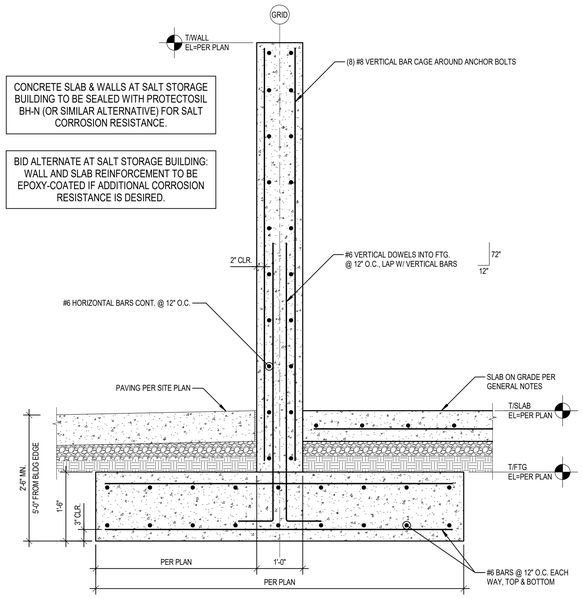
B S202 FOUNDATION DETAIL @ SALT STORAGE
Scale: 3/4" = 1'-0"



L S202 INTERIOR CMU WALL DETAIL
Scale: 3/4" = 1'-0"



H S202 FOUNDATION DETAIL
Scale: 3/4" = 1'-0"

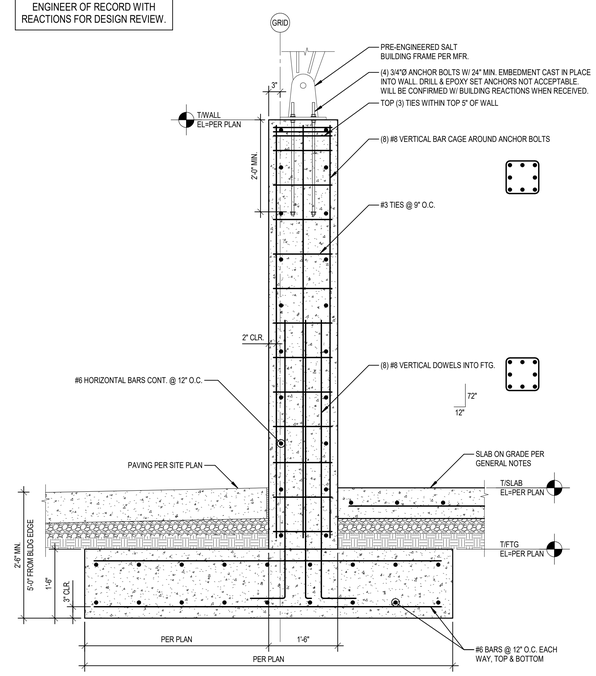


D S202 FOUNDATION DETAIL @ SALT STORAGE
Scale: 3/4" = 1'-0"

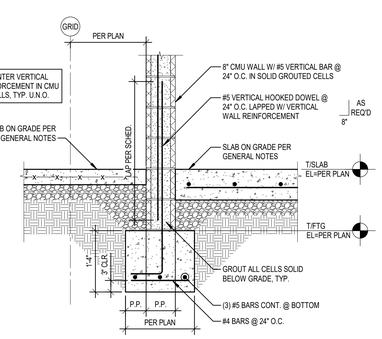
CONCRETE SLAB & WALLS AT SALT STORAGE BUILDING TO BE SEALED WITH PROTECTOSIL BH-N (OR SIMILAR ALTERNATIVE) FOR SALT CORROSION RESISTANCE.

BID ALTERNATE AT SALT STORAGE BUILDING: WALL AND SLAB REINFORCEMENT TO BE EPOXY-COATED IF ADDITIONAL CORROSION RESISTANCE IS DESIRED.

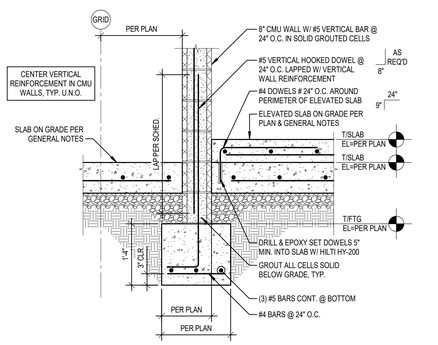
SALT STORAGE STRUCTURE MANUFACTURER TO PROVIDE ENGINEER OF RECORD WITH REACTIONS FOR DESIGN REVIEW.



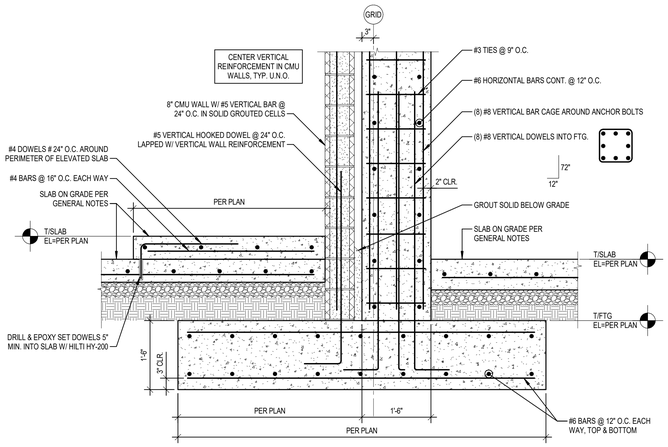
A S202 FOUNDATION DETAIL @ SALT STORAGE
Scale: 3/4" = 1'-0"



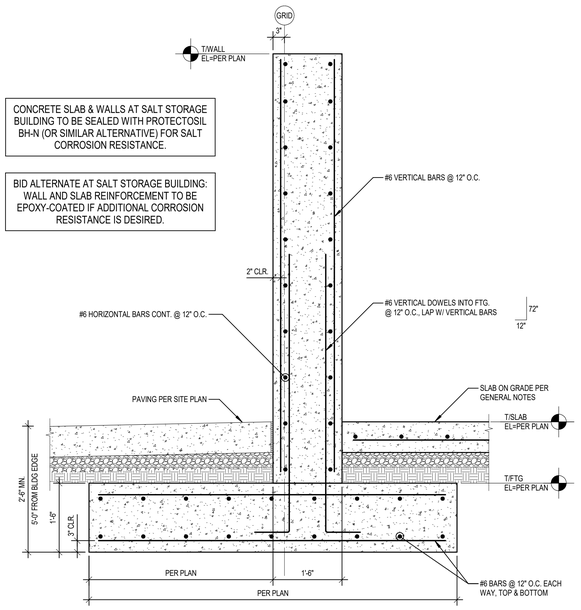
K S202 INTERIOR CMU WALL DETAIL
Scale: 3/4" = 1'-0"



G S202 INTERIOR CMU WALL DETAIL @ ELEVATED SLAB
Scale: 3/4" = 1'-0"



F S202 FOUNDATION DETAIL @ SALT STORAGE
Scale: 3/4" = 1'-0"



CONCRETE SLAB & WALLS AT SALT STORAGE BUILDING TO BE SEALED WITH PROTECTOSIL BH-N (OR SIMILAR ALTERNATIVE) FOR SALT CORROSION RESISTANCE.

BID ALTERNATE AT SALT STORAGE BUILDING: WALL AND SLAB REINFORCEMENT TO BE EPOXY-COATED IF ADDITIONAL CORROSION RESISTANCE IS DESIRED.

C S202 FOUNDATION DETAIL @ SALT STORAGE
Scale: 3/4" = 1'-0"

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REVISIONS

NO.	DESCRIPTION	DATE
02	ADD 02	01/25/23
03	ADD 03	02/09/23

PROJECT NO.: 20-0067 DRAWN BY: MRH, TNB
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PROFESSIONAL SEAL
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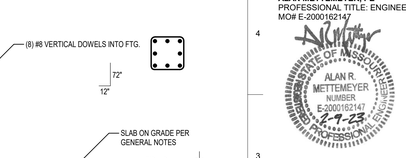
PROFESSIONAL TITLE: ENGINEER
MO# E-2000162147



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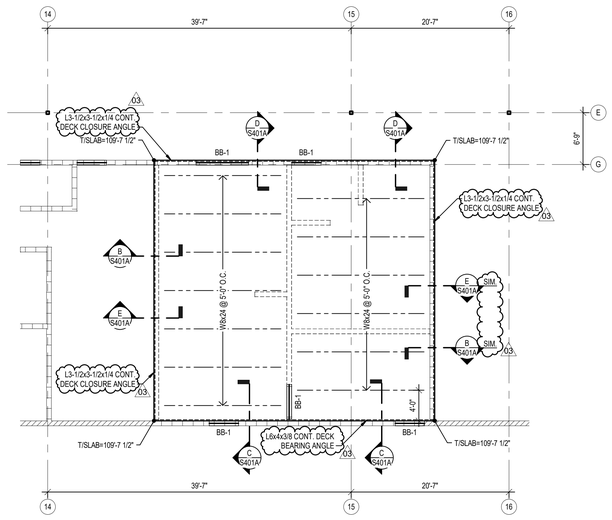
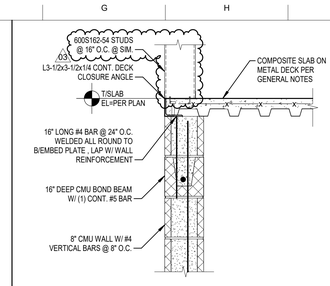
FOUNDATION DETAILS

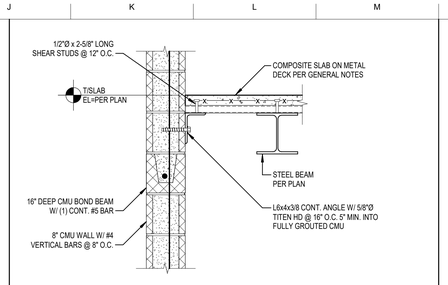
SHEET
S202



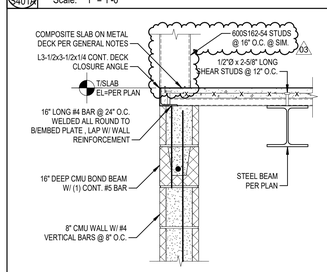
F S401A REFUGE AREA FRAMING PLAN
Scale: 1/8" = 1'-0"



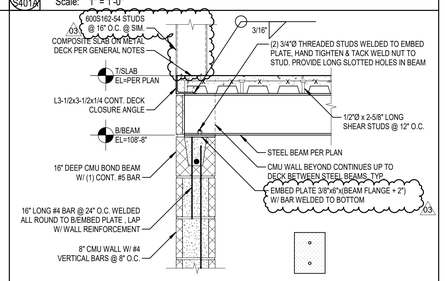
E S401A REFUGE LID FRAMING DETAIL
Scale: 1" = 1'-0"



C S401A REFUGE LID FRAMING DETAIL
Scale: 1" = 1'-0"



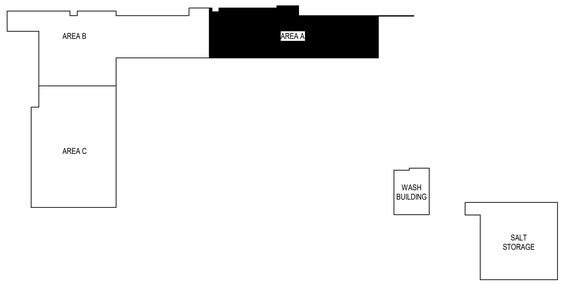
D S401A REFUGE LID FRAMING DETAIL
Scale: 1" = 1'-0"

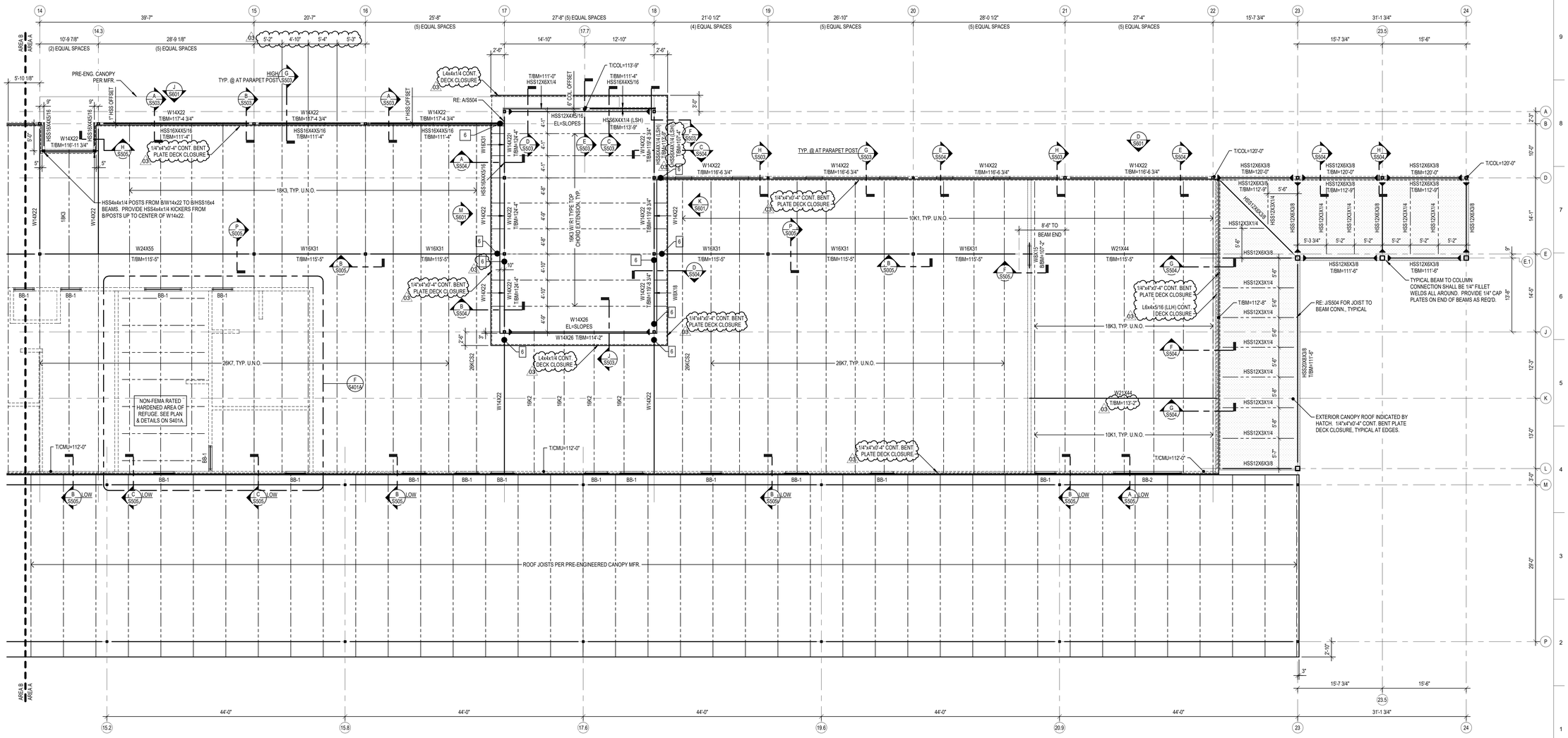


B S401A REFUGE LID FRAMING DETAIL
Scale: 1" = 1'-0"

GENERAL PLAN NOTES

1. SEE SHEET S000 FOR GENERAL STRUCTURAL NOTES.
2. SEE SHEET S001 FOR SPECIAL INSPECTIONS & BASIS FOR DESIGN.
3. SEE SHEET S002 FOR SCHEDULES.
4. SEE SHEETS S003, S004, & S005 FOR TYPICAL DETAILS.
5. ▶ = MOMENT CONNECTIONS PER PLAN, REFER TO TYPICAL DETAILS.
6. ● = SLIP CRITICAL STEEL CONNECTION FOR DRAG STRUT LOCATIONS PER PLAN.
7. NOT ALL MECHANICAL OPENINGS AND/OR PENETRATIONS MAY BE INDICATED. REFER TO MECHANICAL DRAWINGS FOR ADDITIONAL INFORMATION.
8. STEEL COLUMN ELEVATIONS PER STEEL COLUMN SCHEDULE.
9. STEEL POST ELEVATIONS PER STEEL POST SCHEDULE.





A S401A ROOF FRAMING PLAN - AREA A
Scale: 1/8" = 1'-0"

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STATE OF MISSOURI
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NUMBER E-2000162147
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ROOF FRAMING PLAN - AREA A

SHEET
S401A

GENERAL PLAN NOTES

1. SEE SHEET S000 FOR GENERAL STRUCTURAL NOTES.
2. SEE SHEET S001 FOR SPECIAL INSPECTIONS & BASIS FOR DESIGN.
3. SEE SHEET S002 FOR SCHEDULES.
4. SEE SHEETS S003, S004, & S005 FOR TYPICAL DETAILS.
5. ▶ = MOMENT CONNECTIONS PER PLAN, REFER TO DETAIL S/S003.
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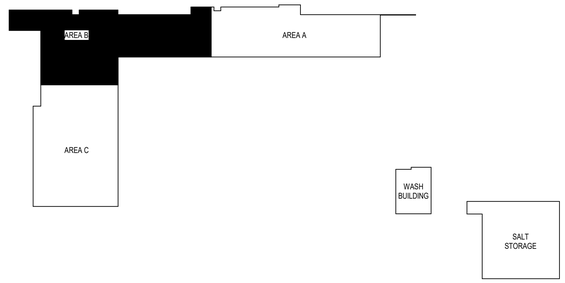
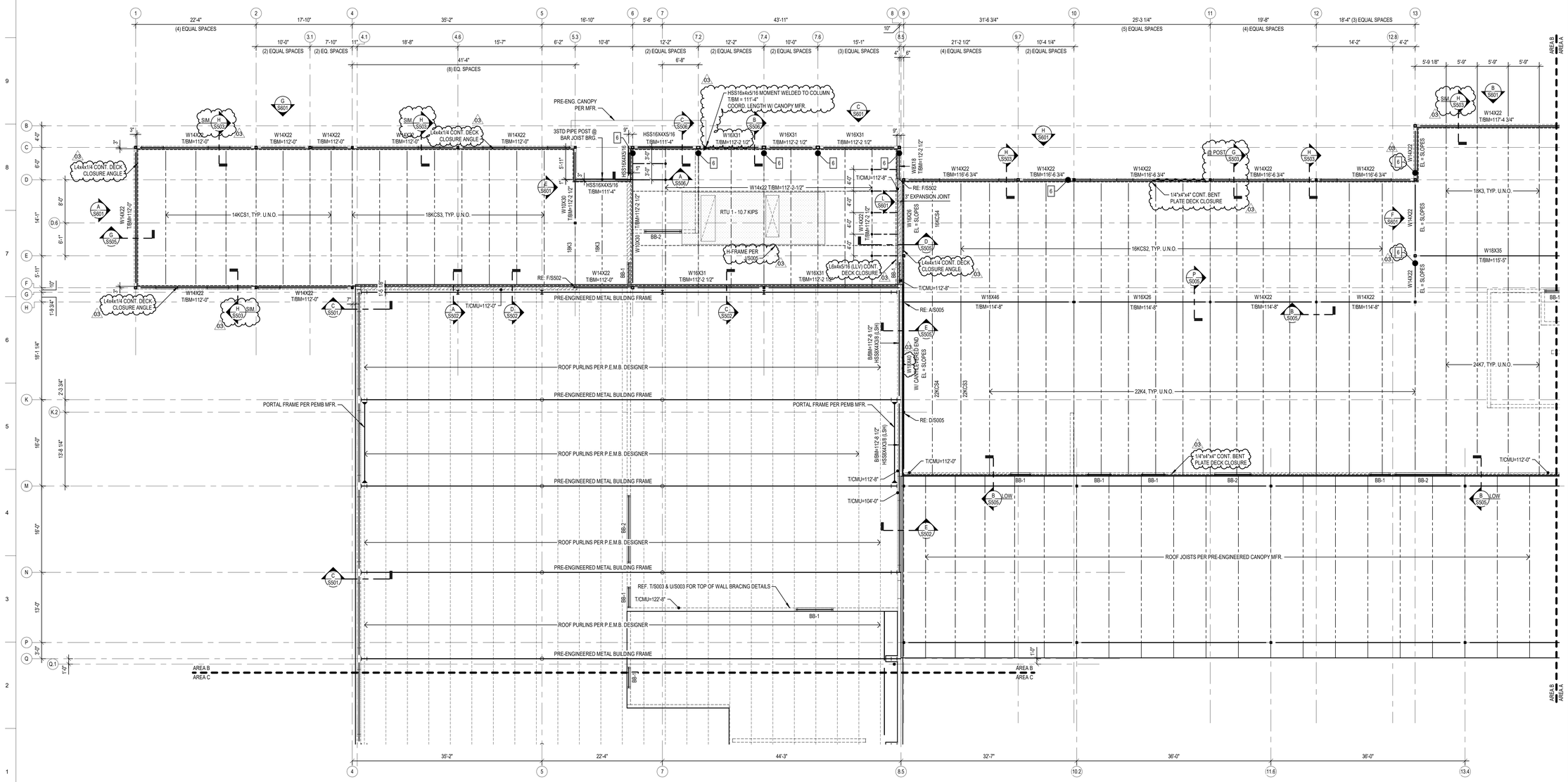
8. STEEL COLUMN ELEVATIONS PER STEEL COLUMN SCHEDULE.
9. STEEL POST ELEVATIONS PER STEEL POST SCHEDULE.





A S401B ROOF FRAMING PLAN - AREA B
Scale: 1/8" = 1'-0"

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HENDERSON ENGINEERING, INC.
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417.555.5555

REVISIONS

NO.	DESCRIPTION	DATE
01	ADD 01	01/11/23
02	ADD 02	01/25/23
03	ADD 03	02/09/23

PROJECT NO.: 20-0067 DRAWN BY: MRH, TNB
DATE: 12.15.22 REVIEWED BY: BSW

PROFESSIONAL SEAL
ALAN METTEMEYER, PE
PROFESSIONAL TITLE: ENGINEER
MO# E-2000162147

STATE OF MISSOURI
ALAN R. METTEMEYER
NUMBER E-2000162147
12-9-22
REGISTERED PROFESSIONAL ENGINEER

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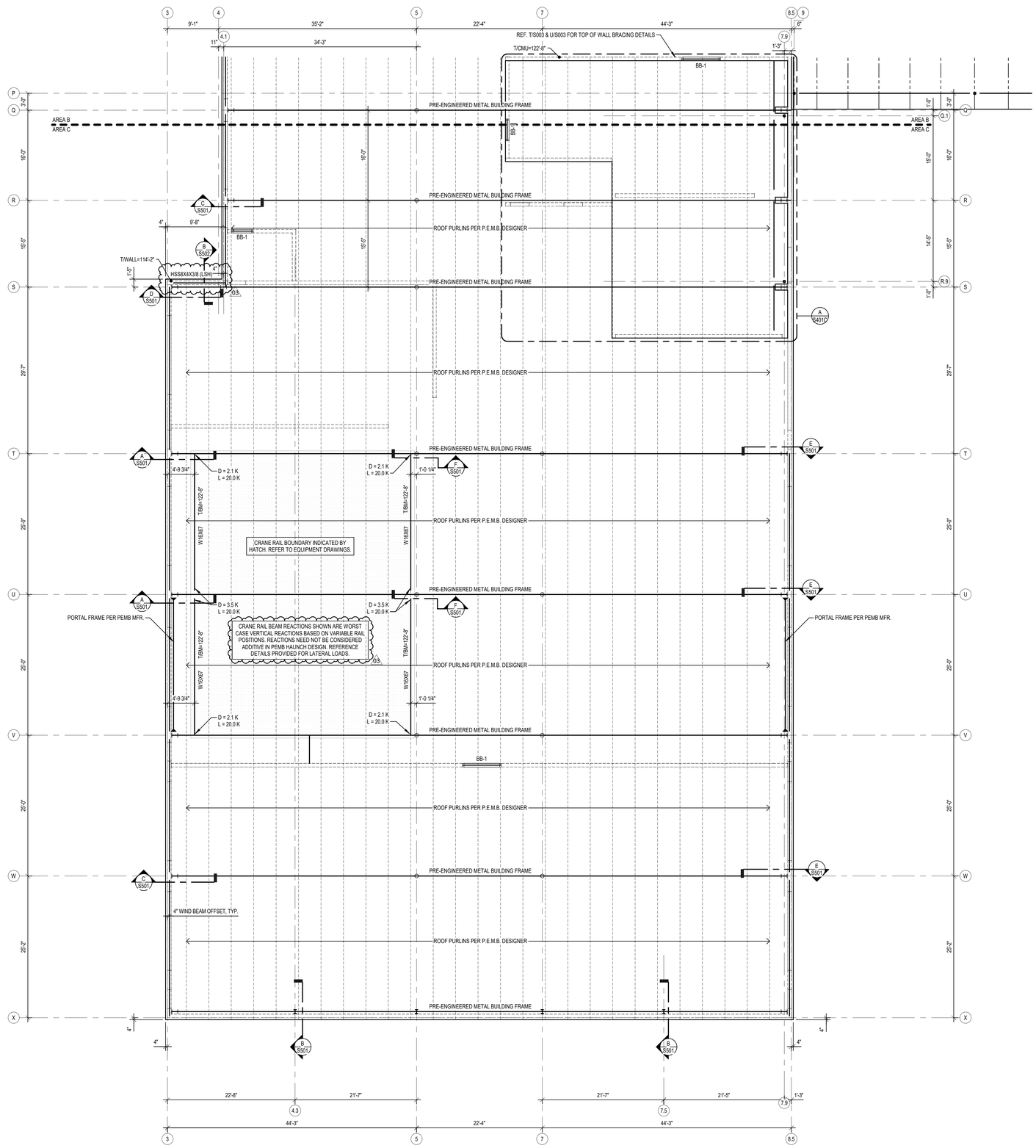
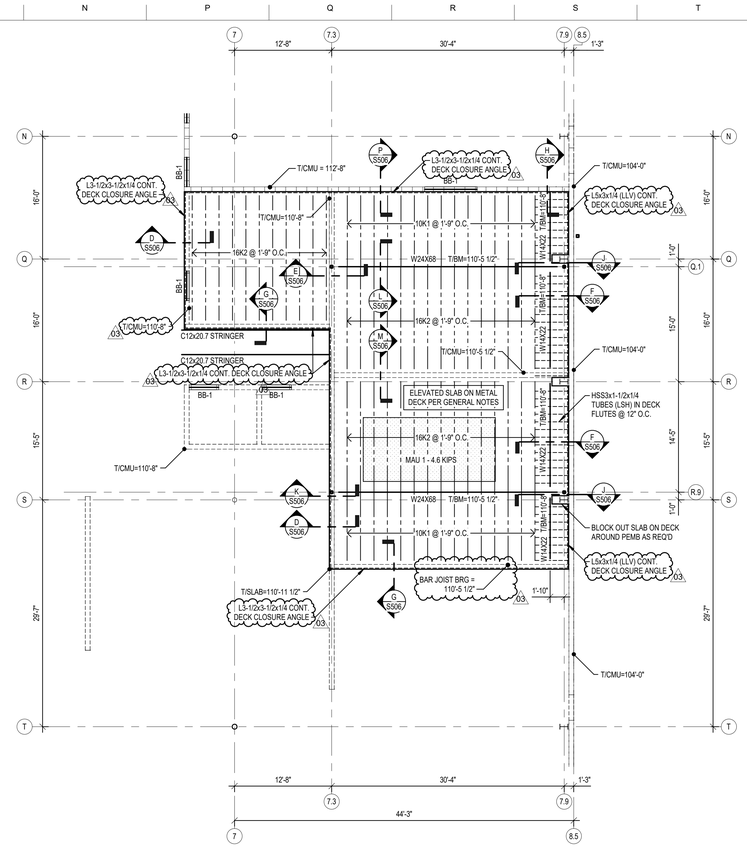
ROOF FRAMING PLAN - AREA B

SHEET
S401B



B S401C ROOF FRAMING PLAN - AREA C
Scale: 1/8" = 1'-0"



A S401C MEZZANINE FLOOR FRAMING PLAN
Scale: 1/8" = 1'-0"

GENERAL PLAN NOTES

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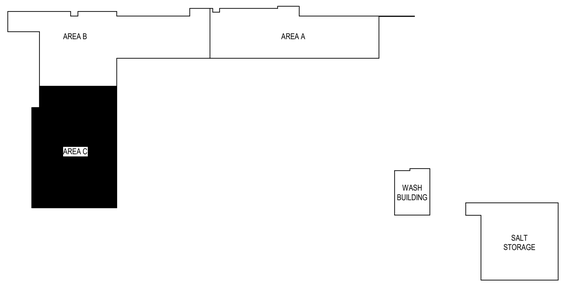

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PROFESSIONAL SEAL
ALAN METTEMEYER, PE
PROFESSIONAL TITLE: ENGINEER
MO# E-2000162147

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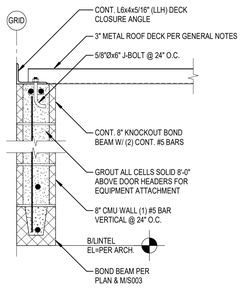
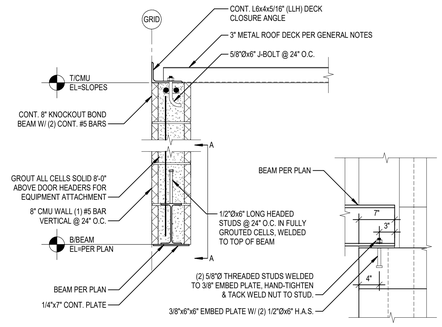
ROOF FRAMING PLAN - AREA C

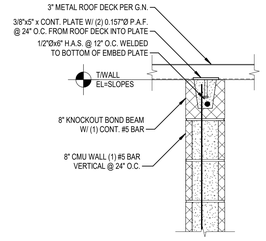
SHEET
S401C



K S402 WASH BAY FRAMING DETAIL
Scale: 1" = 1'-0"



F S402 WASH BAY FRAMING DETAIL
Scale: 1" = 1'-0"



J S402 WASH BAY FRAMING DETAIL
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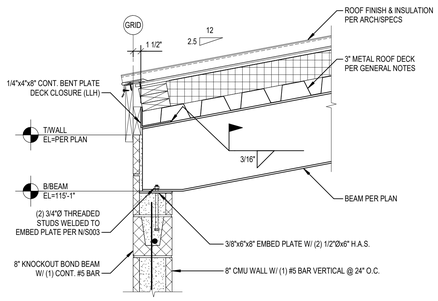

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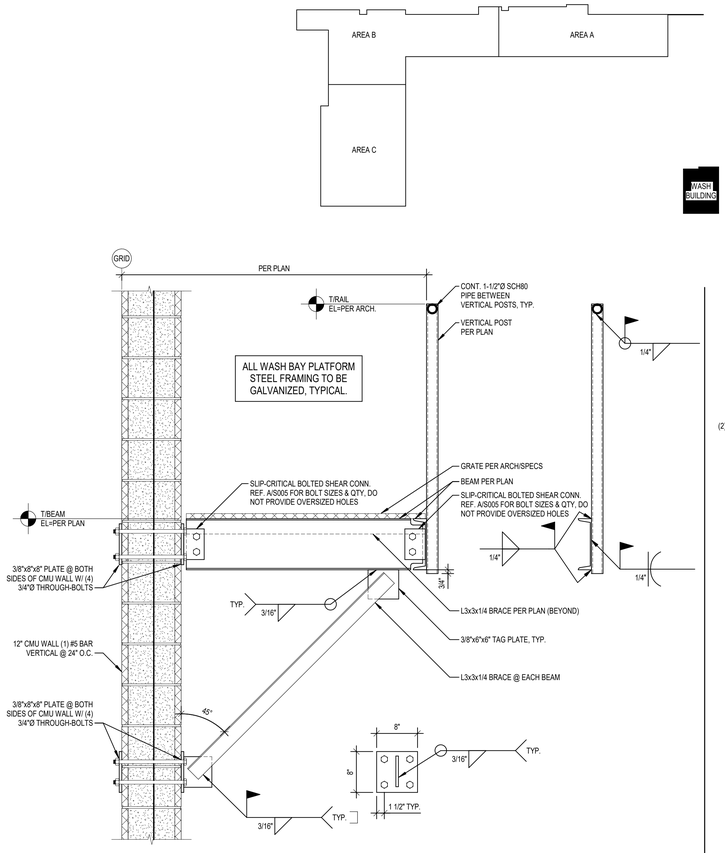
Scale: 1" = 1'-0"



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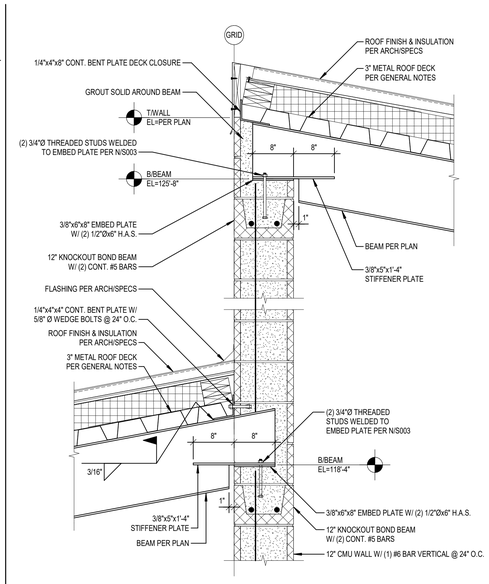

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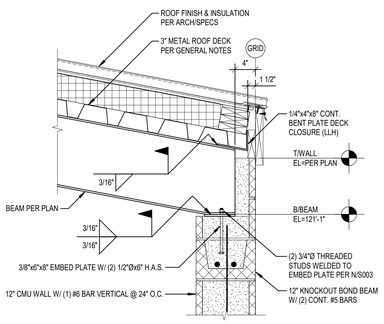
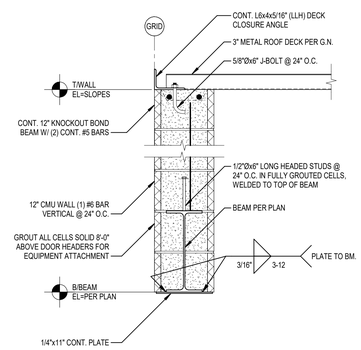
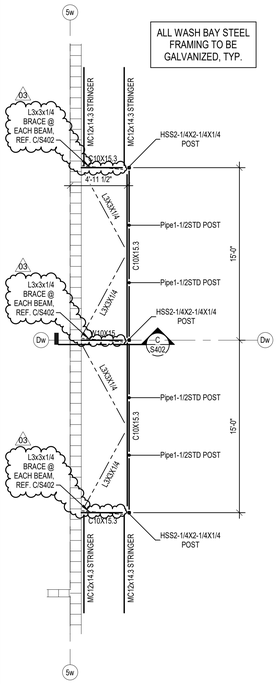
Scale: 1" = 1'-0"



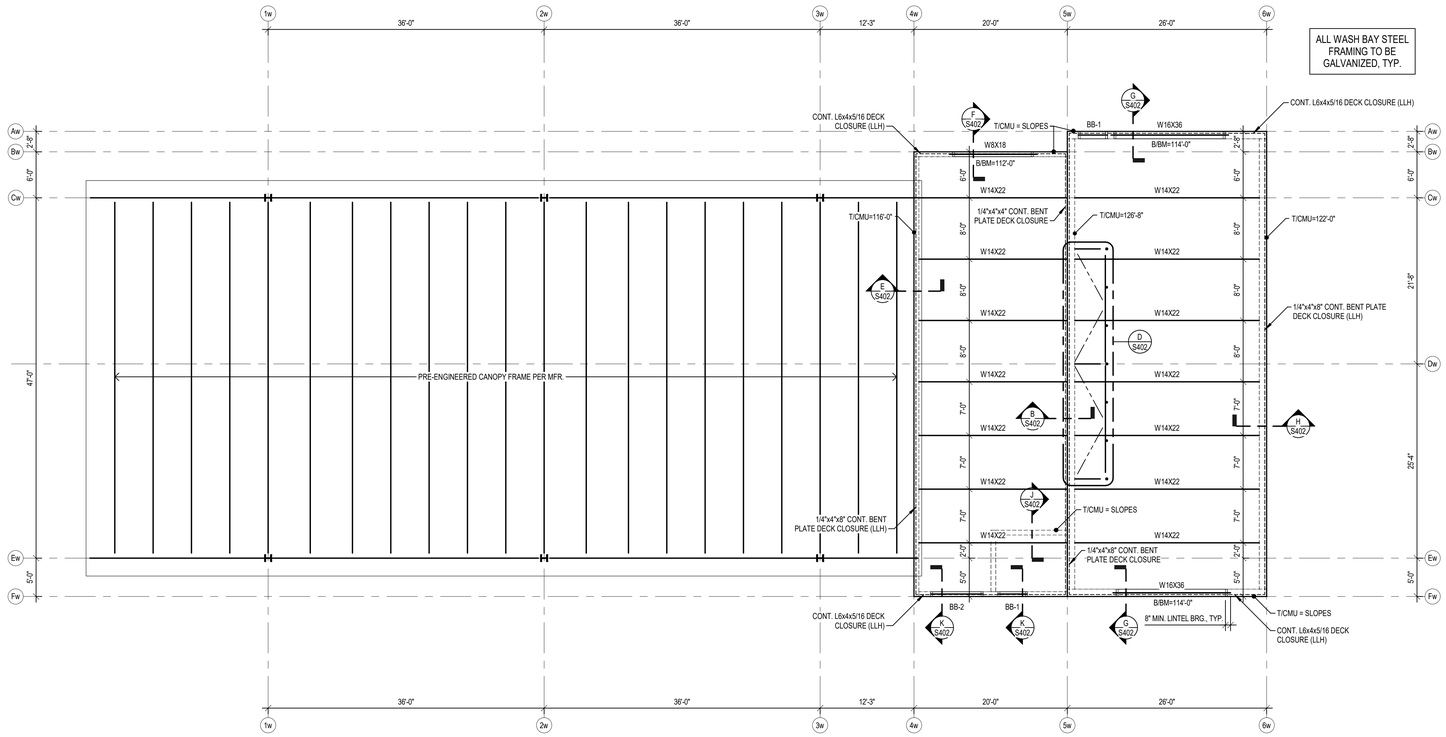
H S402 WASH BAY FRAMING DETAIL
Scale: 1" = 1'-0"



G S402 WASH BAY FRAMING DETAIL
Scale: 1" = 1'-0"



D S402 WASH BUILDING PLATFORM PLAN
Scale: 3/16" = 1'-0"



A S402 ROOF FRAMING PLAN - WASH BUILDING
Scale: 1/8" = 1'-0"

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REVISIONS

NO.	DESCRIPTION	DATE
03	ADD 03	02/09/23

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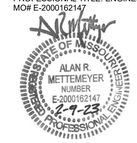

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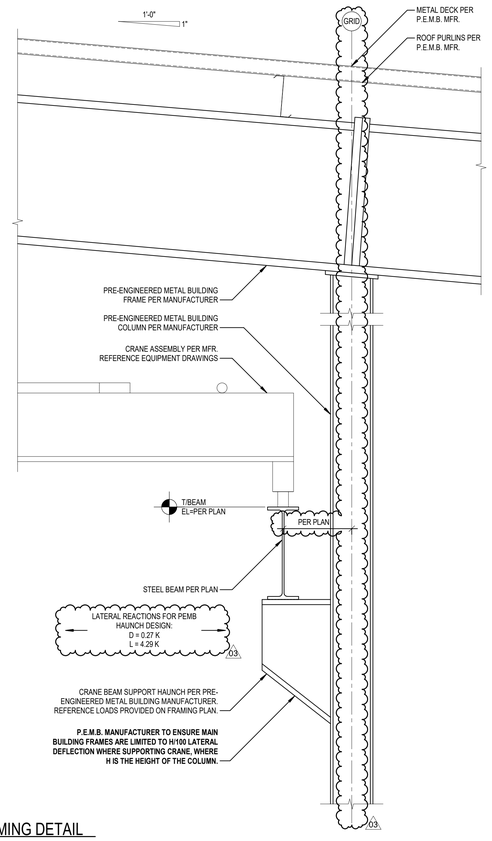
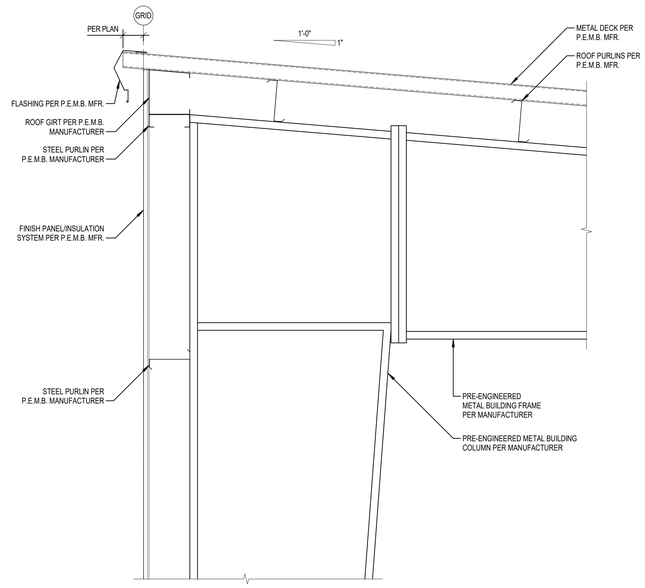
ROOF FRAMING PLAN - WASH BUILDING

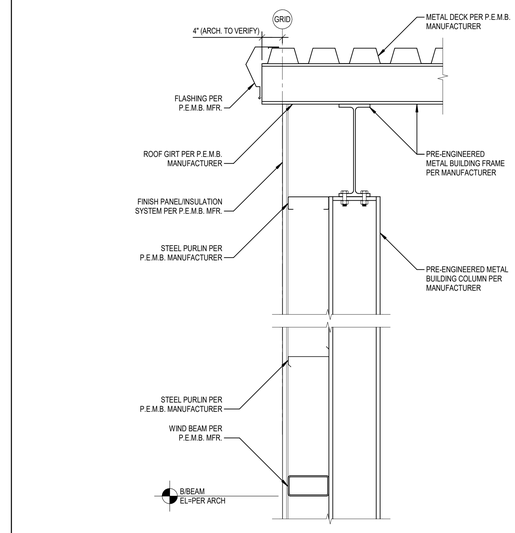
SHEET
S402



F S501 ROOF FRAMING DETAIL
Scale: 1" = 1'-0"



D S501 PEMB FRAMING DETAIL
Scale: 1" = 1'-0"



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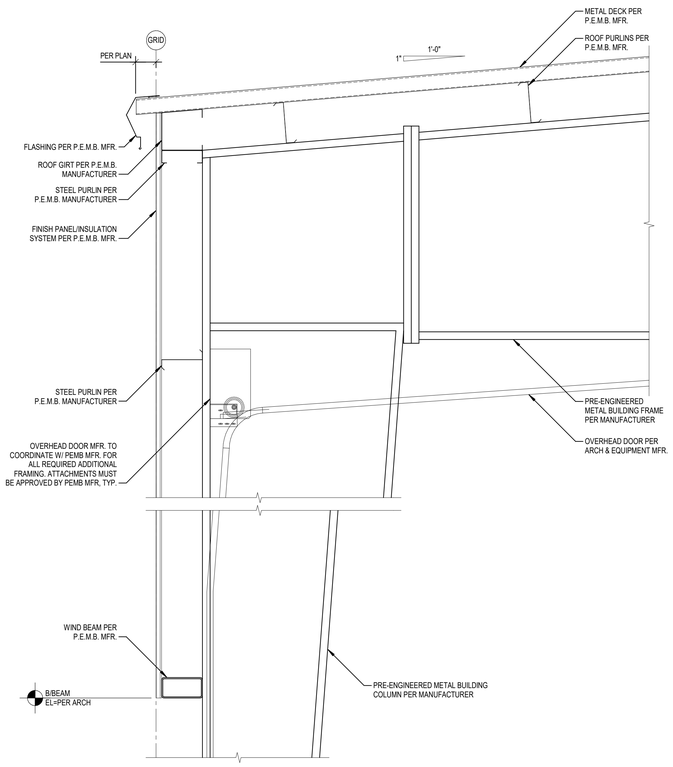

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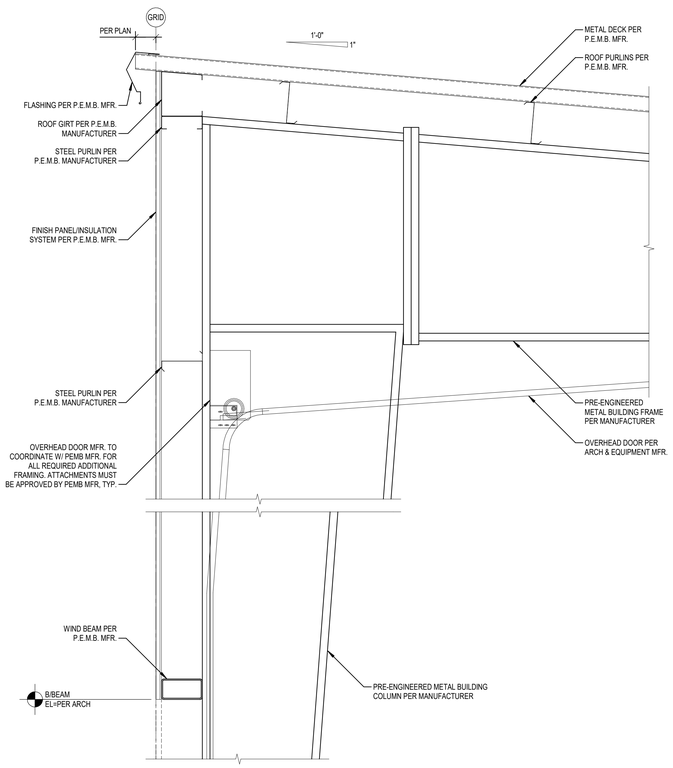

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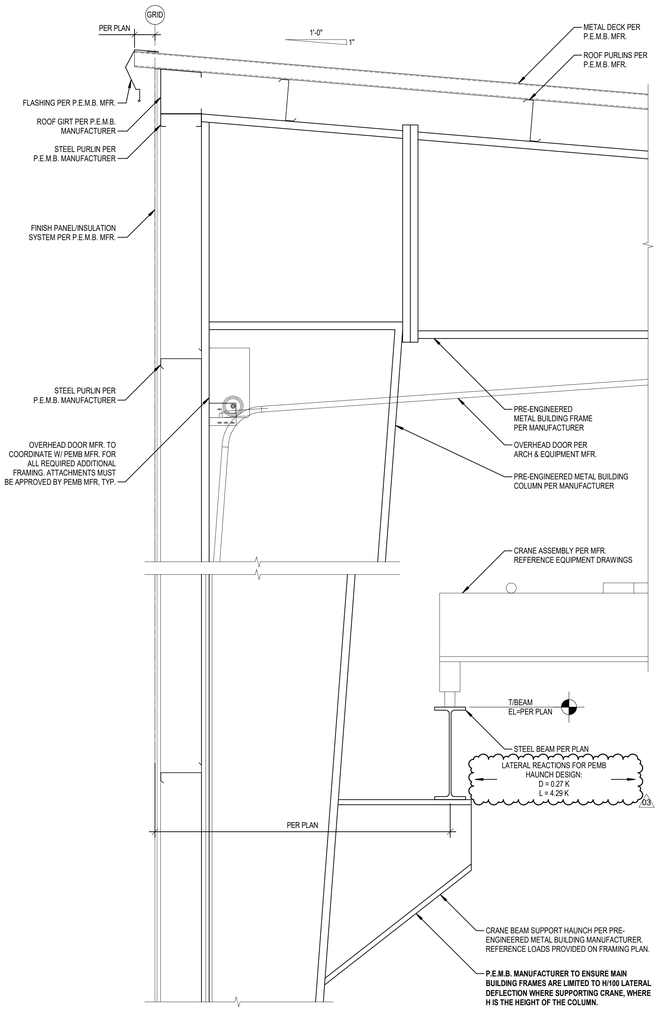

A S501 ROOF FRAMING DETAIL
Scale: 1" = 1'-0"

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REVISIONS

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PROJECT NO.: 20-0067 DRAWN BY: MRH, TNB
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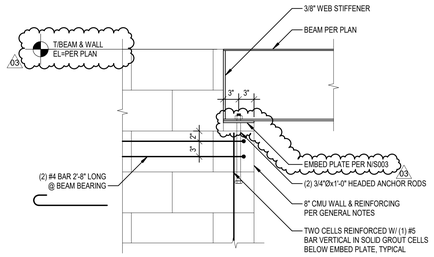
FRAMING DETAILS

SHEET
S501



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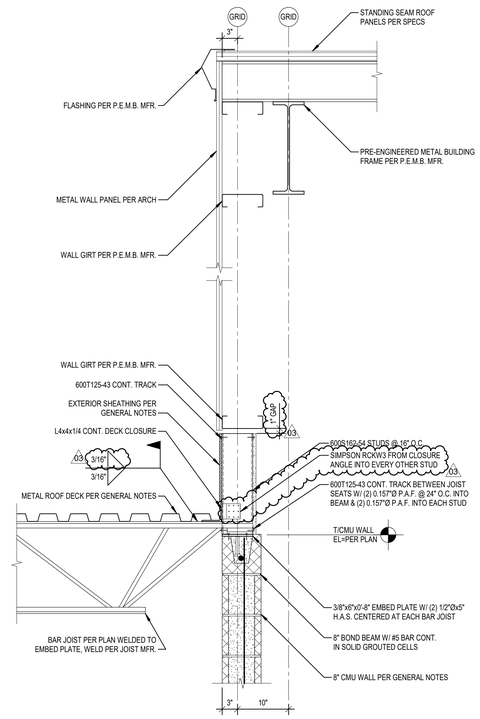

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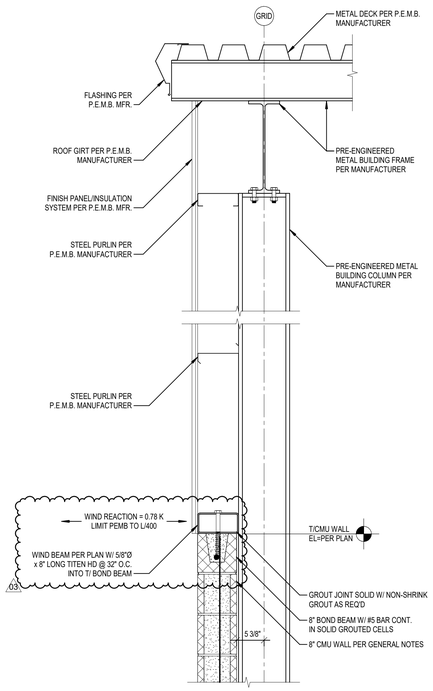

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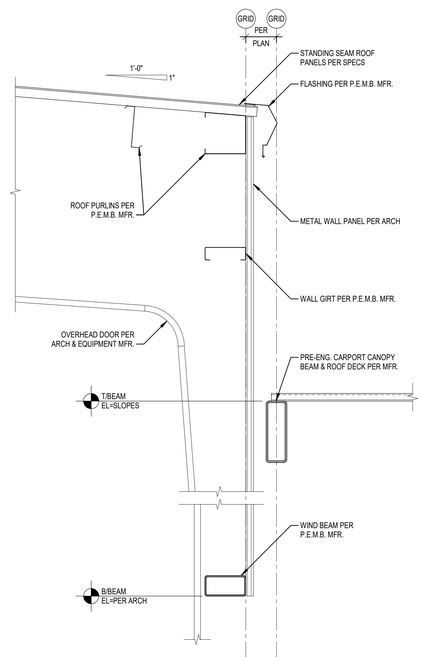

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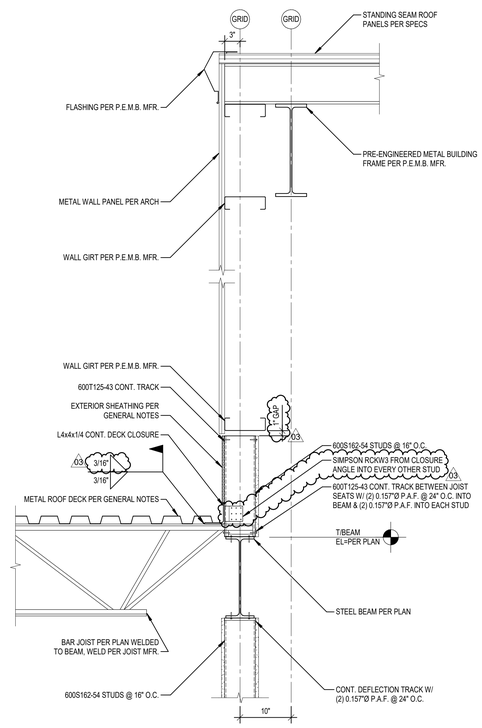

C S502 ROOF FRAMING DETAIL
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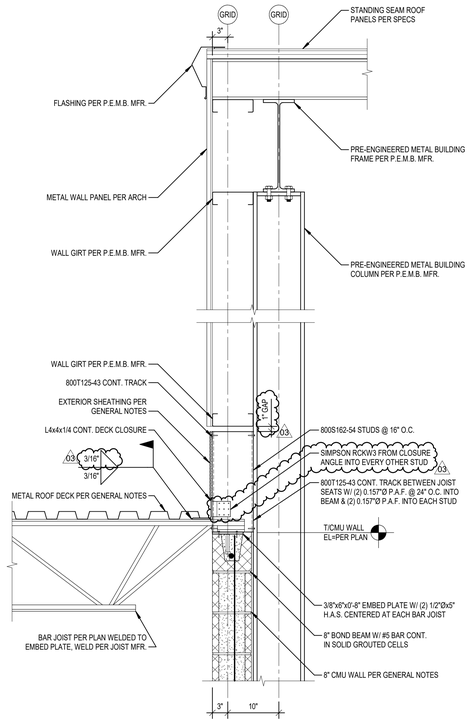

A S502 ROOF FRAMING DETAIL
Scale: 1" = 1'-0"

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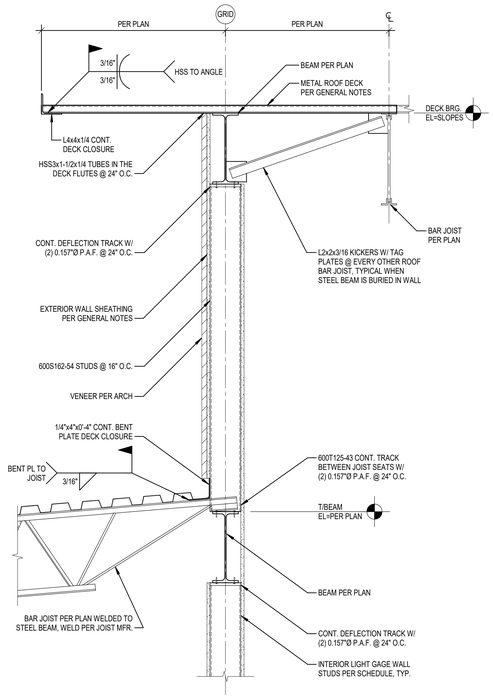
FRAMING DETAILS

SHEET
S502



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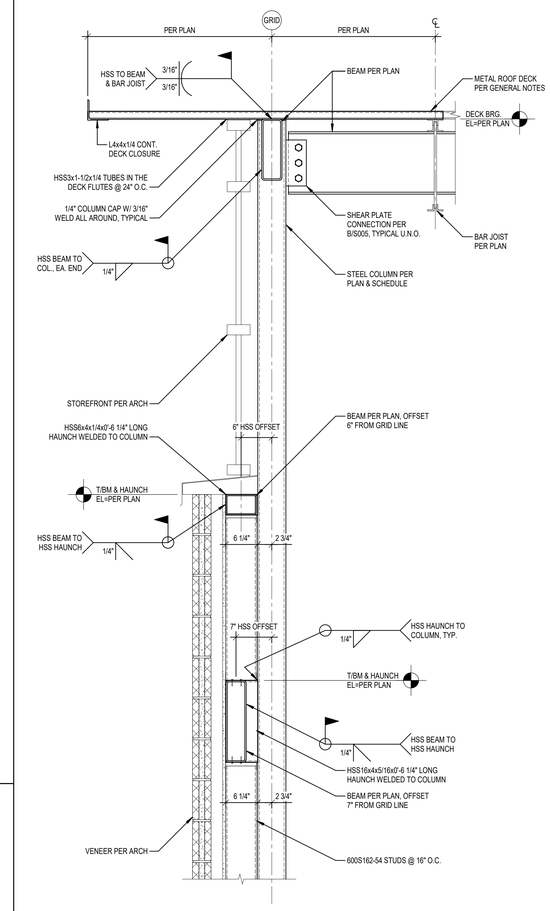

F S503 ROOF FRAMING DETAIL
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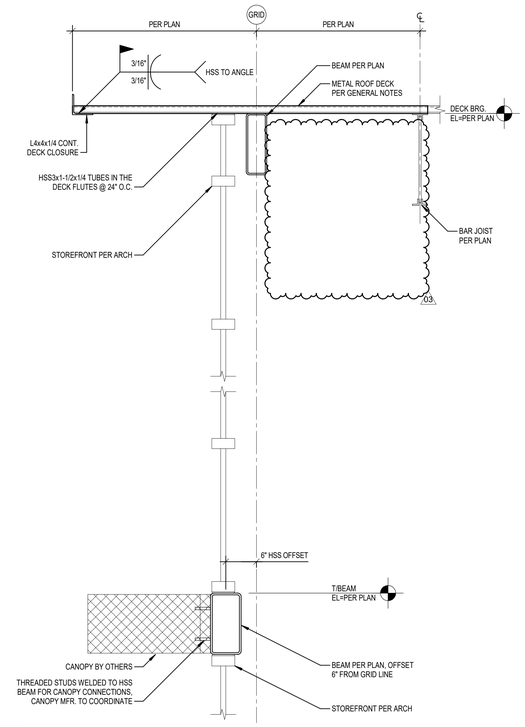

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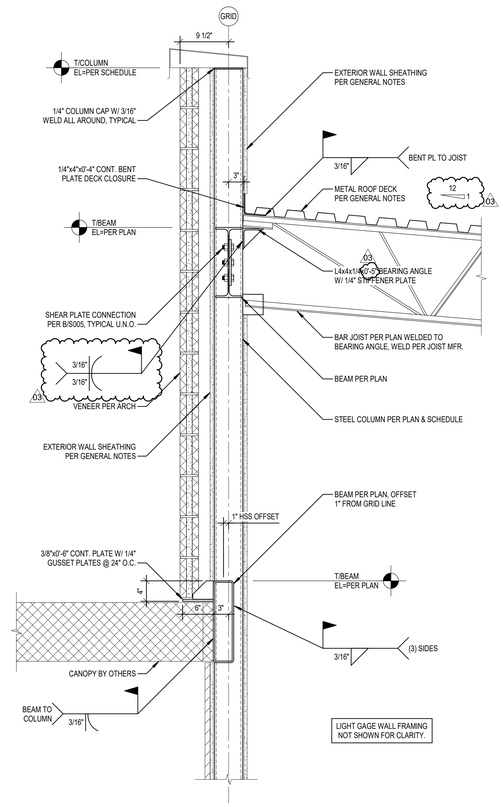

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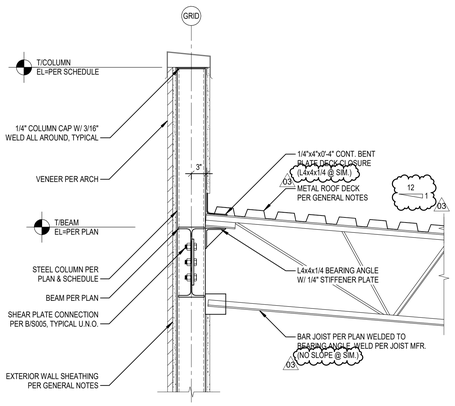

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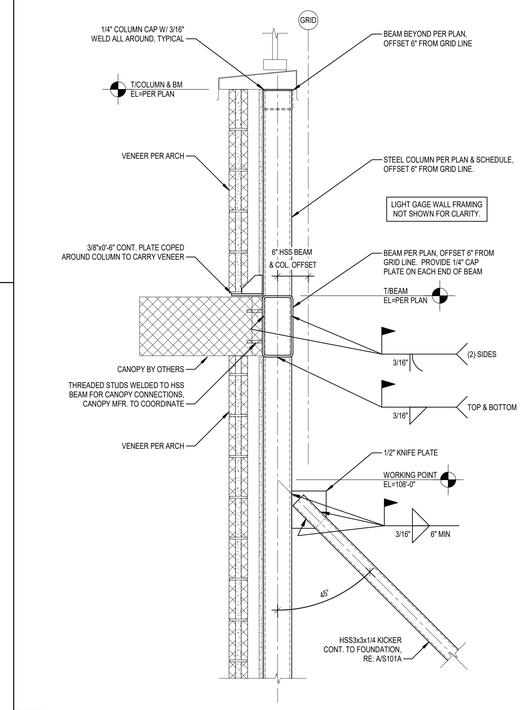

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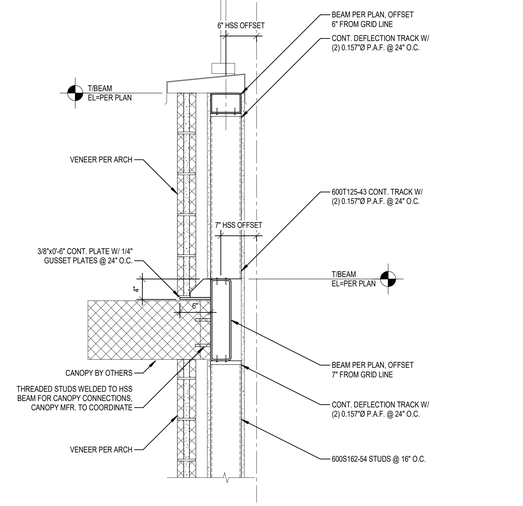

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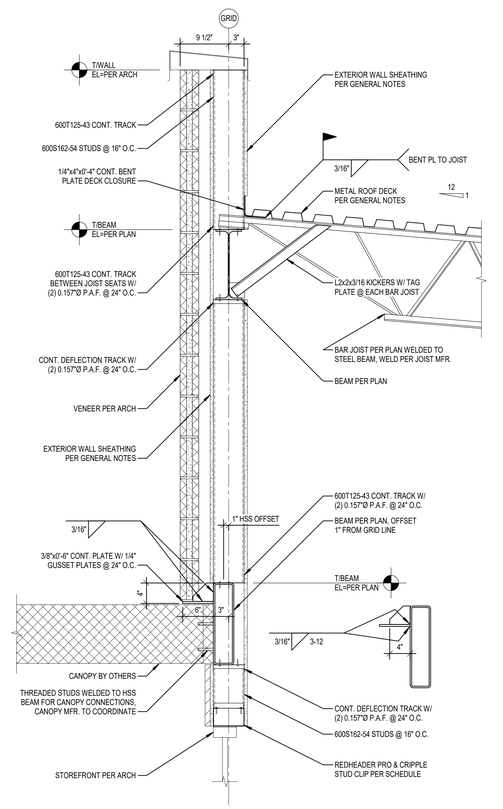

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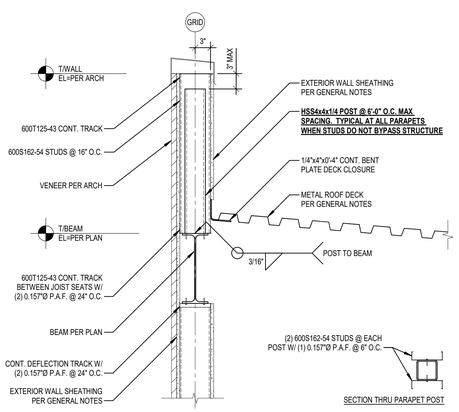

G S503 STEEL PARAPET POST AT EXTERIOR WALLS, TYPICAL
Scale: 1" = 1'-0"

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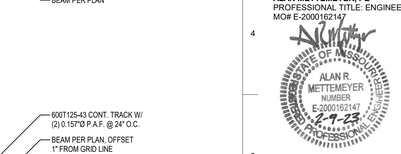
REVISIONS

NO.	DESCRIPTION	DATE
03	ADD 03	02/09/23

PROJECT NO.: 20-0067 DRAWN BY: MRH, TNB
DATE: 12.15.22 REVIEWED BY: BSW

PROFESSIONAL SEAL
ALAN METTEMEYER, PE
PROFESSIONAL TITLE: ENGINEER
MO# E-2000162147



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PROJECT ADDRESS:
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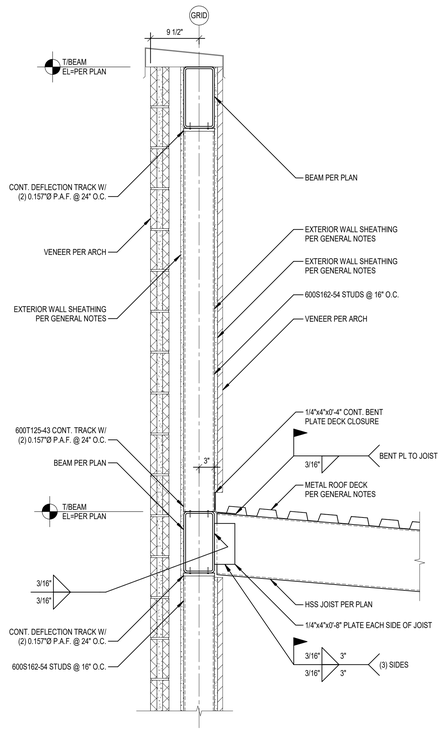
FRAMING DETAILS

SHEET
S503



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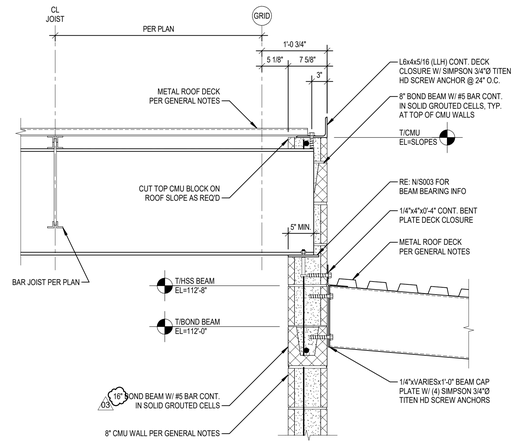
Scale: 1" = 1'-0"



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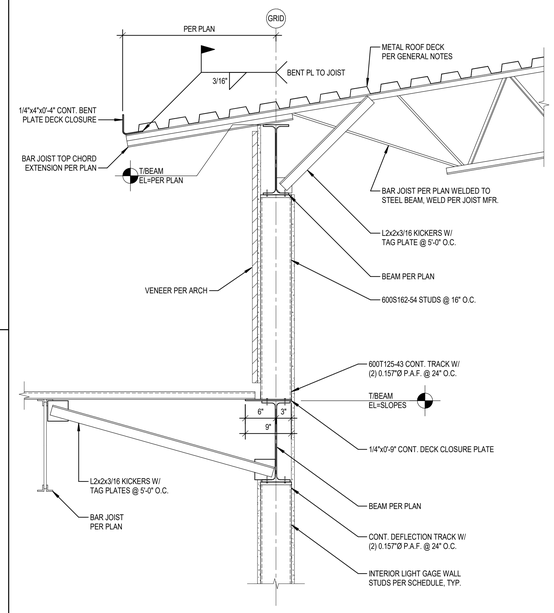

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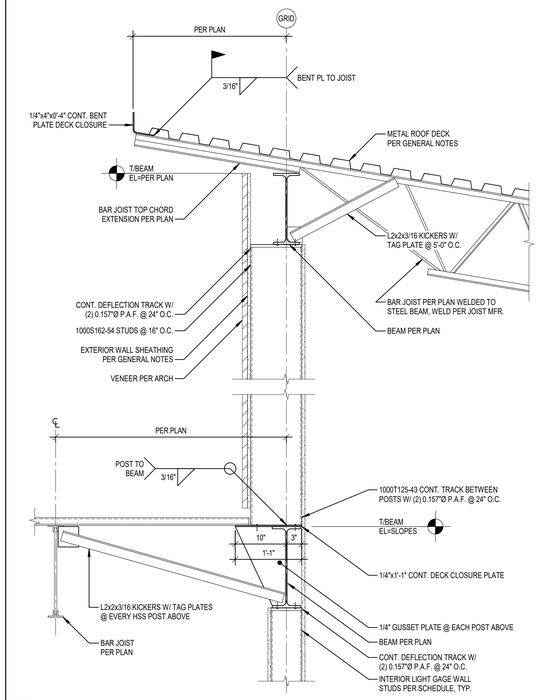

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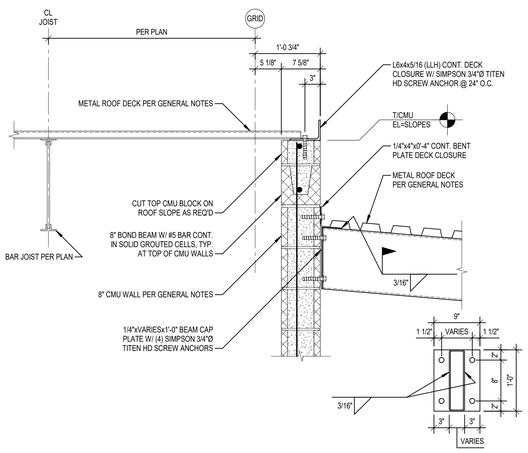

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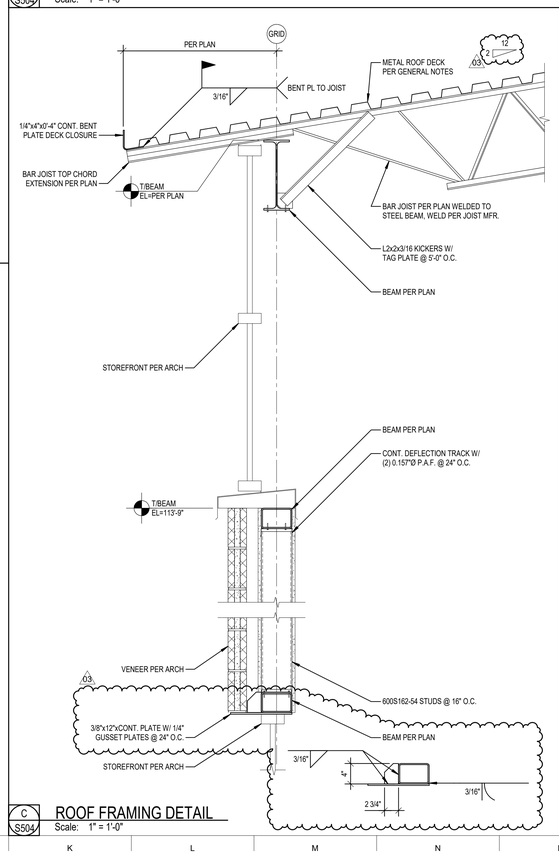

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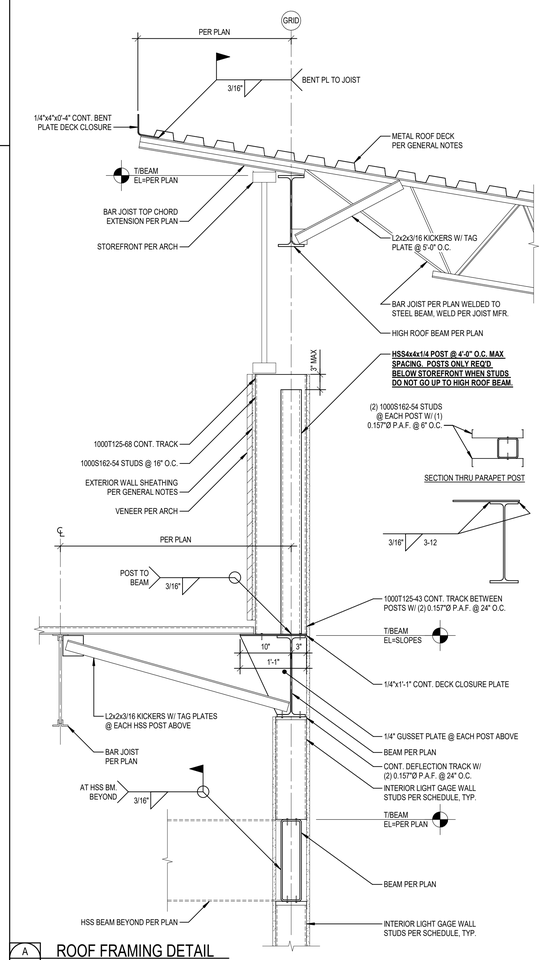
Scale: 1" = 1'-0"



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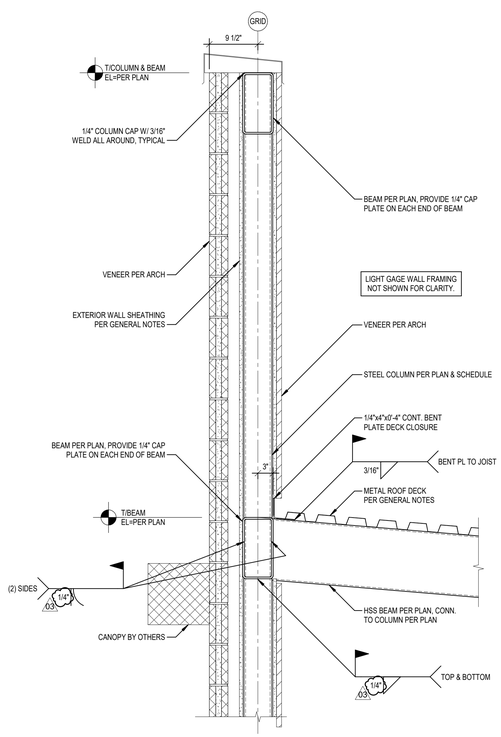
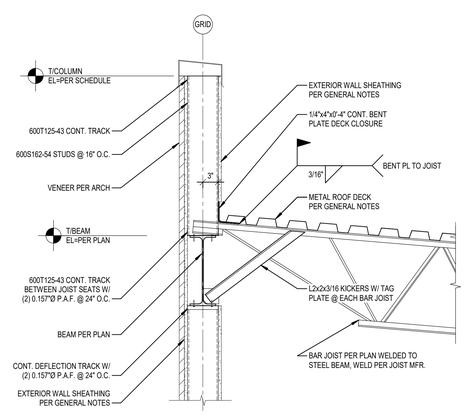


H / S504 ROOF FRAMING DETAIL
Scale: 1" = 1'-0"



E / S504 ROOF FRAMING DETAIL
Scale: 1" = 1'-0"

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REVISIONS

NO.	DESCRIPTION	DATE
03	ADD 03	02/09/23

PROJECT NO.: 20-0067 DRAWN BY: MRH, TNB
DATE: 12.15.22 REVIEWED BY: BSW

PROFESSIONAL SEAL
ALAN METTEMEYER, PE
PROFESSIONAL TITLE: ENGINEER
MO# E-2000162147

STATE OF MISSOURI
ALAN R. METTEMEYER
NUMBER E-2000162147
2-7-23
PROFESSIONAL ENGINEER

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PROJECT ADDRESS:
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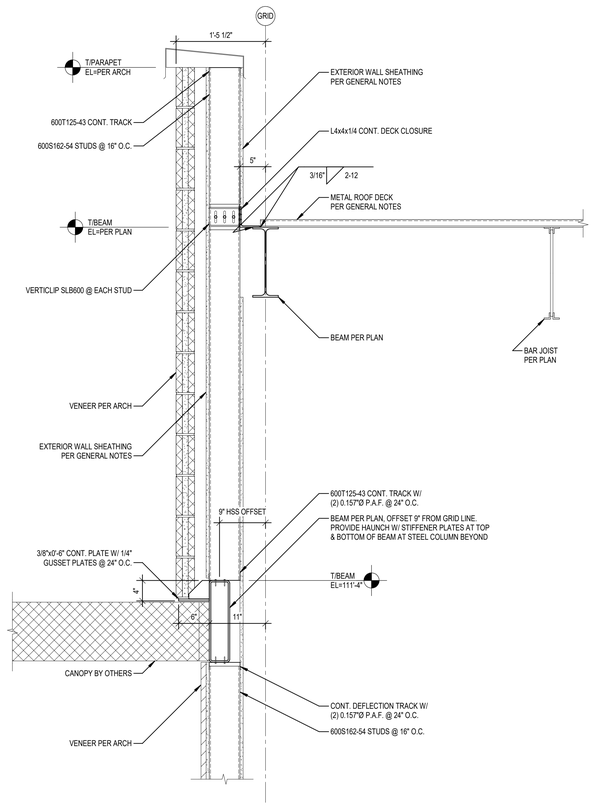
FRAMING DETAILS

SHEET
S504



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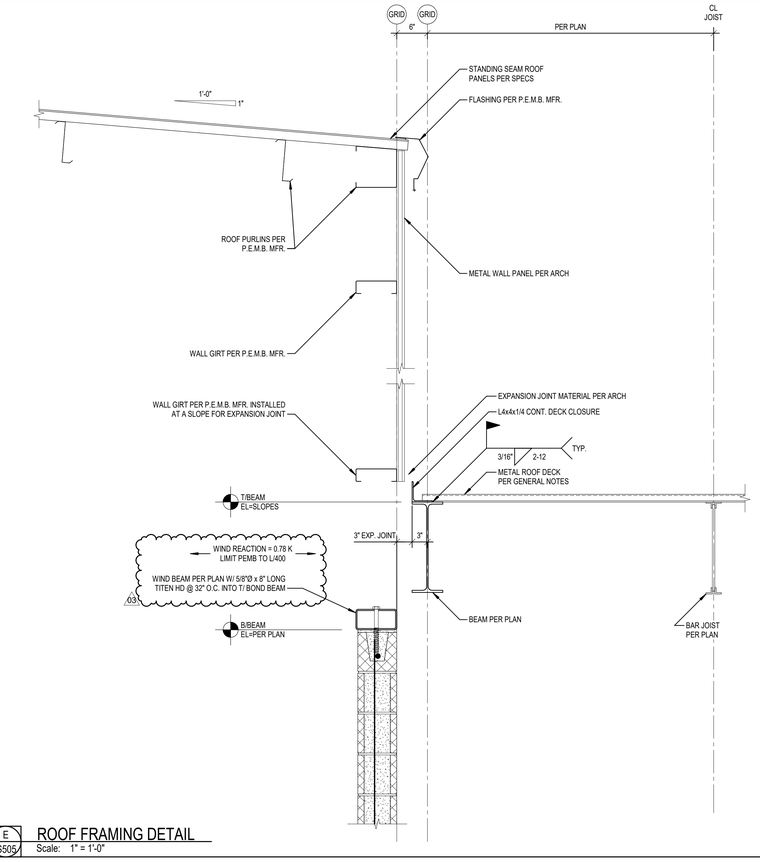

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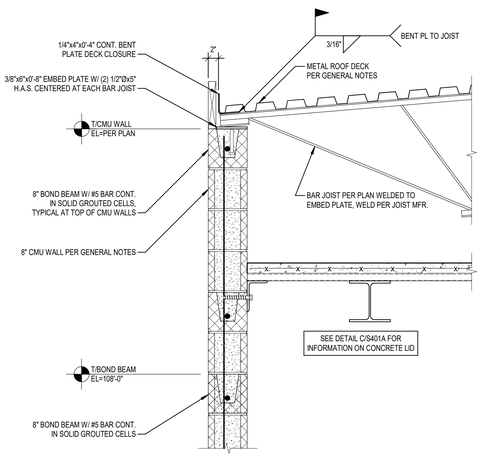

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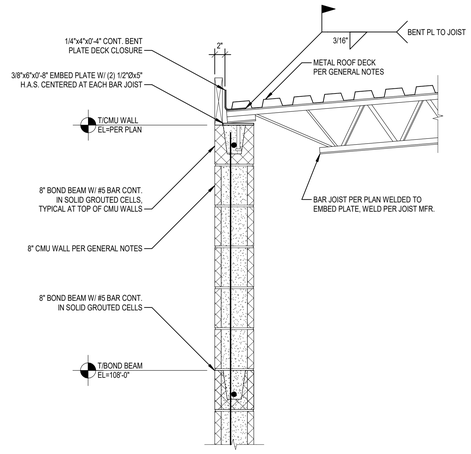

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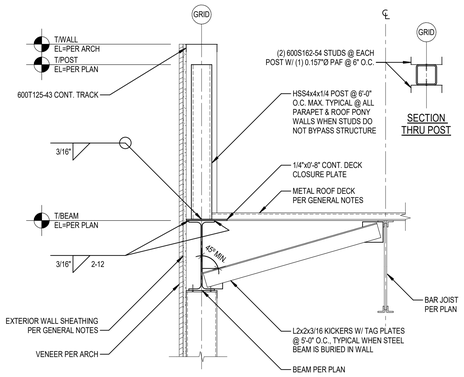

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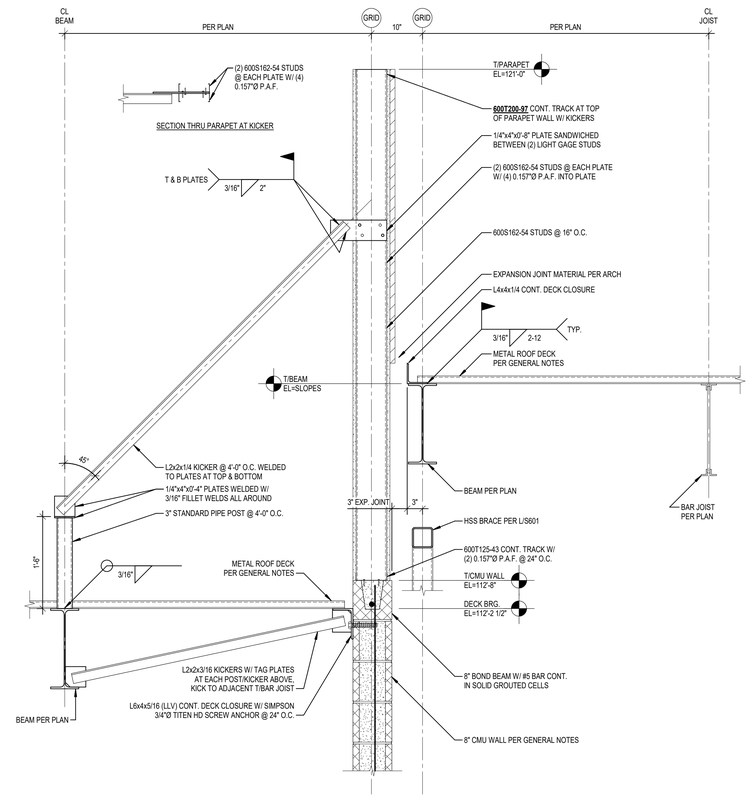

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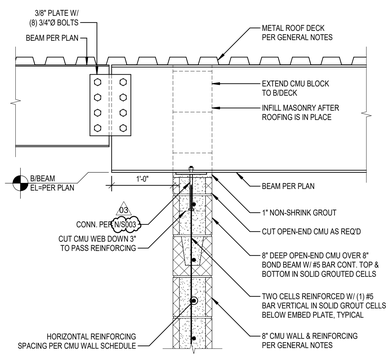

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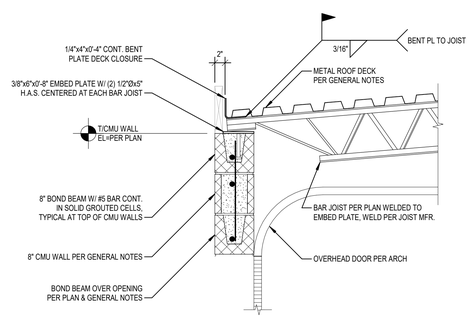

A S505 ROOF FRAMING DETAIL
Scale: 1" = 1'-0"

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REVISIONS

NO.	DESCRIPTION	DATE
02	ADD 02	01/25/23
03	ADD 03	02/09/23

PROJECT NO.: 20-0067 DRAWN BY: MRH, TNB
DATE: 12.15.22 REVIEWED BY: BSW

PROFESSIONAL SEAL
ALAN METTEMEYER, PE
PROFESSIONAL TITLE: ENGINEER
MO# E-2000162147

STATE OF MISSOURI
ALAN R. METTEMEYER
NUMBER E-2000162147
02-7-23
PROFESSIONAL ENGINEER

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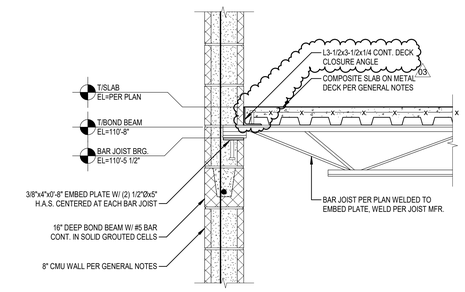
FRAMING DETAILS

SHEET
S505



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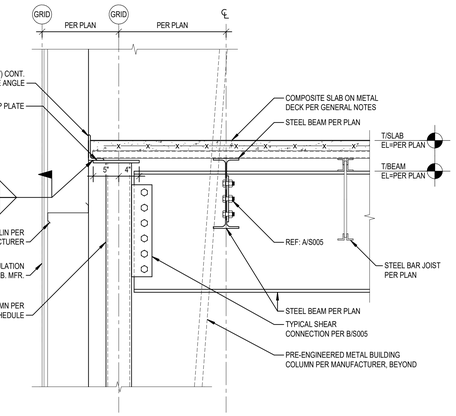
Scale: 1" = 1'-0"



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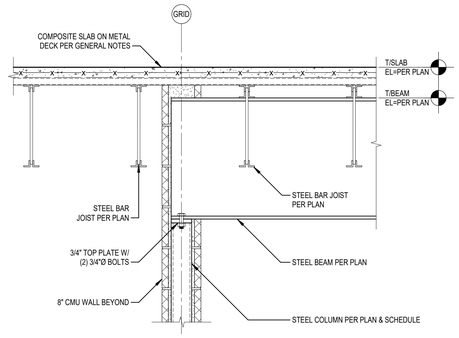

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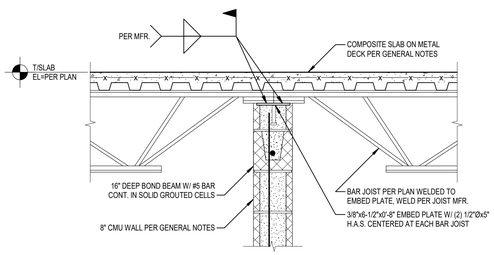

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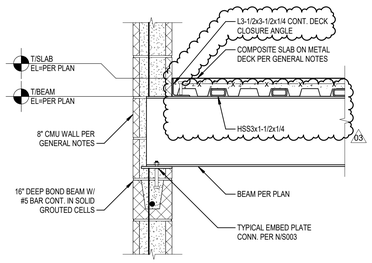

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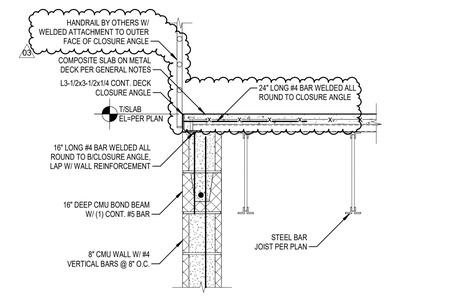

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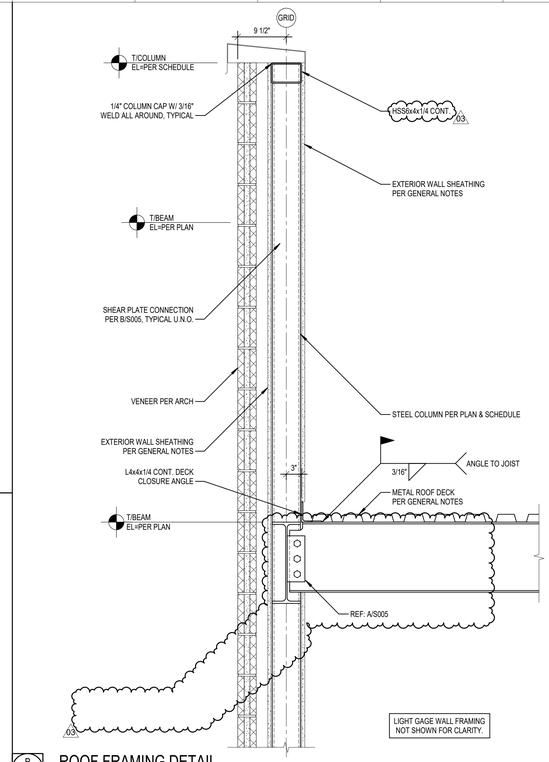

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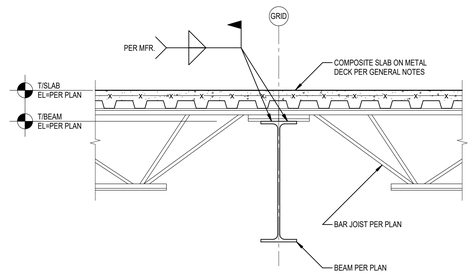

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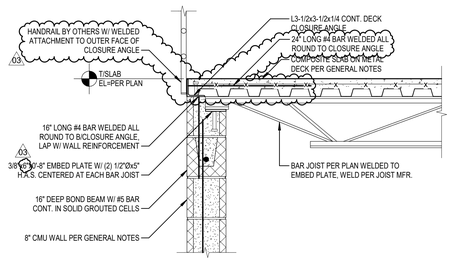

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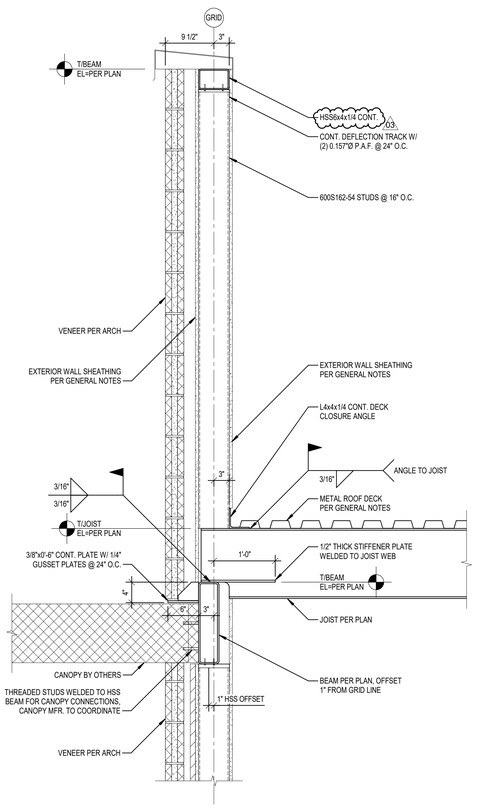

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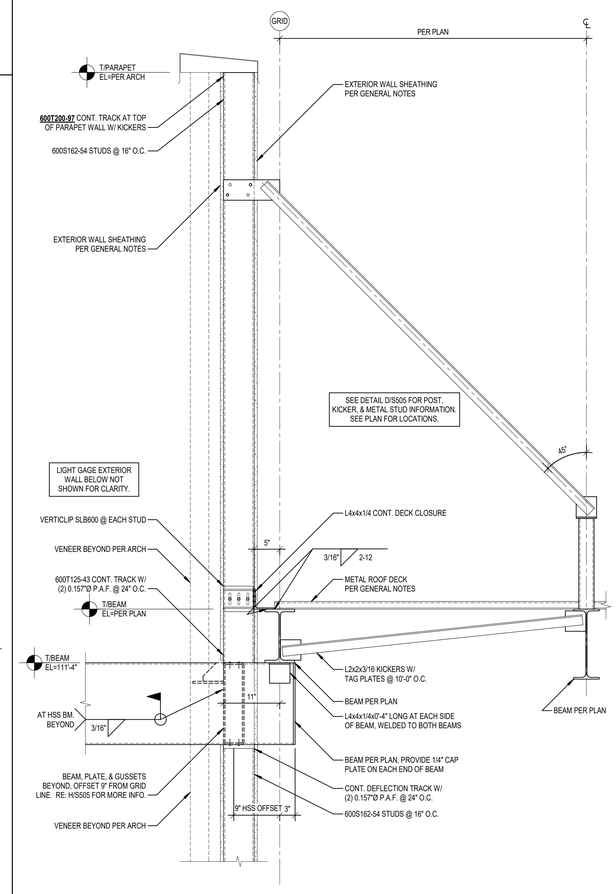

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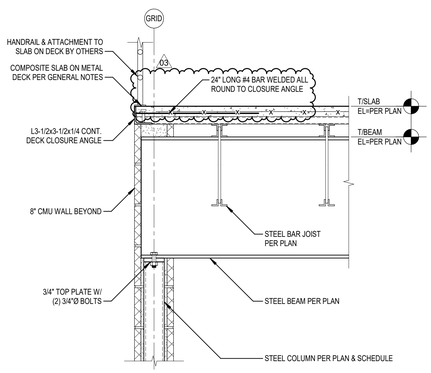

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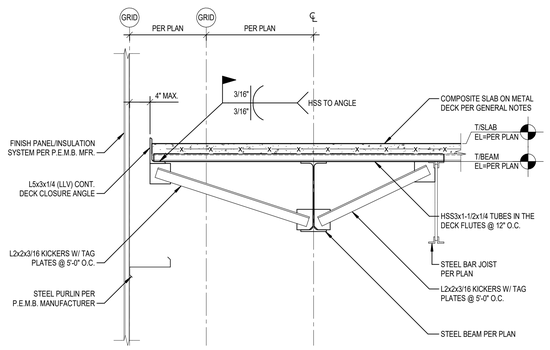

F S506 MEZZANINE FRAMING DETAIL
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REVISIONS

NO.	DESCRIPTION	DATE
01	ADD 01	01/11/23
02	ADD 02	01/25/23
03	ADD 03	02/09/23

PROJECT NO.: 20-0067 DRAWN BY: MRH, TNB
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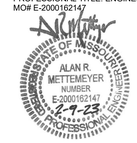
ALAN METTEMEYER, PE
PROFESSIONAL TITLE: ENGINEER
MO# E-2000162147



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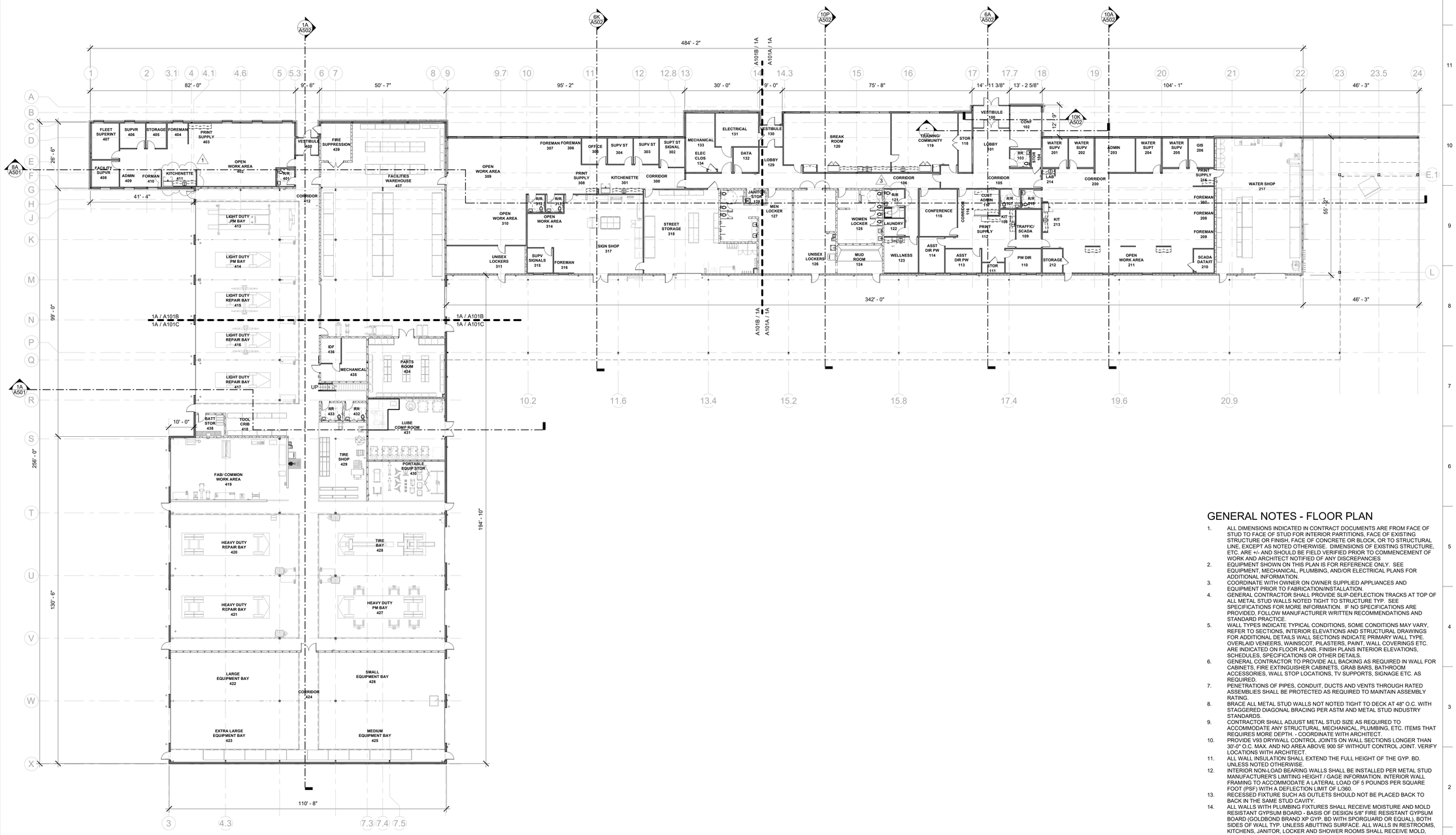
PROJECT TITLE
CITY OF WENTZVILLE, MO PUBLIC WORKS FACILITY

PROJECT ADDRESS:
1295 INTERSTATE DRIVE
WENTZVILLE, MO 63385

FRAMING DETAILS

SHEET
S506



1A A101 OVERALL FLOOR PLAN

scale: 1/16" = 1'-0"

N

GENERAL NOTES - FLOOR PLAN

1. ALL DIMENSIONS INDICATED IN CONTRACT DOCUMENTS ARE FROM FACE OF STUD TO FACE OF STUD FOR INTERIOR PARTITIONS, FACE OF EXISTING STRUCTURE OR FINISH, FACE OF CONCRETE OR BLOCK, OR TO STRUCTURAL LINE, EXCEPT AS NOTED OTHERWISE. DIMENSIONS OF EXISTING STRUCTURE, ETC. ARE +/- AND SHOULD BE FIELD VERIFIED PRIOR TO COMMENCEMENT OF WORK AND ARCHITECT NOTIFIED OF ANY DISCREPANCIES
2. EQUIPMENT SHOWN ON THIS PLAN IS FOR REFERENCE ONLY. SEE EQUIPMENT, MECHANICAL, PLUMBING, AND/OR ELECTRICAL PLANS FOR ADDITIONAL INFORMATION.
3. COORDINATE WITH OWNER ON OWNER SUPPLIED APPLIANCES AND EQUIPMENT PRIOR TO FABRICATION/INSTALLATION.
4. GENERAL CONTRACTOR SHALL PROVIDE SLIP-DEFLECTION TRACKS AT TOP OF ALL METAL STUD WALLS NOTED TIGHT TO STRUCTURE TYP. SEE SPECIFICATIONS FOR MORE INFORMATION. IF NO SPECIFICATIONS ARE PROVIDED, FOLLOW MANUFACTURER WRITTEN RECOMMENDATIONS AND STANDARD PRACTICE.
5. WALL TYPES INDICATE TYPICAL CONDITIONS, SOME CONDITIONS MAY VARY, REFER TO SECTIONS, INTERIOR ELEVATIONS AND STRUCTURAL DRAWINGS FOR ADDITIONAL DETAILS WALL SECTIONS INDICATE PRIMARY WALL TYPE. OVERLAID VENEERS, WAINSCOT, PILASTERS, PAINT, WALL COVERINGS ETC. ARE INDICATED ON FLOOR PLANS, FINISH PLANS INTERIOR ELEVATIONS, SCHEDULES, SPECIFICATIONS OR OTHER DETAILS.
6. GENERAL CONTRACTOR TO PROVIDE ALL BACKING AS REQUIRED IN WALL FOR CABINETS, FIRE EXTINGUISHER CABINETS, GRAB BARS, BATHROOM ACCESSORIES, WALL STOP LOCATIONS, TV SUPPORTS, SIGNAGE ETC. AS REQUIRED.
7. PENETRATIONS OF PIPES, CONDUIT, DUCTS AND VENTS THROUGH RATED ASSEMBLIES SHALL BE PROTECTED AS REQUIRED TO MAINTAIN ASSEMBLY RATING.
8. BRACE ALL METAL STUD WALLS NOT NOTED TIGHT TO DECK AT 48" O.C. WITH STAGGERED DIAGONAL BRACING PER ASTM AND METAL STUD INDUSTRY STANDARDS.
9. CONTRACTOR SHALL ADJUST METAL STUD SIZE AS REQUIRED TO ACCOMMODATE ANY STRUCTURAL, MECHANICAL, PLUMBING, ETC. ITEMS THAT REQUIRES MORE DEPTH. - COORDINATE WITH ARCHITECT.
10. PROVIDE V93 DRYWALL CONTROL JOINTS ON WALL SECTIONS LONGER THAN 30'-0" O.C. MAX. AND NO AREA ABOVE 900 SF WITHOUT CONTROL JOINT. VERIFY LOCATIONS WITH ARCHITECT.
11. ALL WALL INSULATION SHALL EXTEND THE FULL HEIGHT OF THE GYP. BD. UNLESS NOTED OTHERWISE.
12. INTERIOR NON-LOAD BEARING WALLS SHALL BE INSTALLED PER METAL STUD MANUFACTURER'S LIMITING HEIGHT / GAGE INFORMATION. INTERIOR WALL FRAMING TO ACCOMMODATE A LATERAL LOAD OF 5 POUNDS PER SQUARE FOOT (PSF) WITH A DEFLECTION LIMIT OF L/360.
13. RECESSED FIXTURE SUCH AS OUTLETS SHOULD NOT BE PLACED BACK TO BACK IN THE SAME STUD CAVITY.
14. ALL WALLS WITH PLUMBING FIXTURES SHALL RECEIVE MOISTURE AND MOLD RESISTANT GYPSUM BOARD - BASIS OF DESIGN 5/8" FIRE RESISTANT GYPSUM BOARD (GOLDBOND BRAND XP GYP. BD WITH SPORGUARD OR EQUAL). BOTH SIDES OF WALL TYP. UNLESS ABUTTING SURFACE. ALL WALLS IN RESTROOMS, KITCHENS, JANITOR, LOCKER AND SHOWER ROOMS SHALL RECEIVE MOLD, MILDEW AND MOISTURE RESISTANT GYPSUM BOARD, BASIS OF DESIGN 5/8" FIRE RESISTANT GYPSUM BOARD (GOLDBOND BRAND XXP GYP. BD WITH SPORGUARD OR EQUAL).

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REVISIONS

NO.	DESCRIPTION	DATE
1	ADD 01	01.11.23
3	ADD 03	02.09.23

PROJECT NO.: 19-040 DRAWN BY: HDG
DATE: 12.15.22 REVIEWED BY: BMS

PROFESSIONAL SEAL

BRENT M. STEVENS, AIA NCARB
PROFESSIONAL TITLE: ARCHITECT
MO# A-2000151419

STATE OF MISSOURI
BRENT M STEVENS
NUMBER
MO A-2000151419
ARCHITECT

Digitally signed by Brent Stevens
DN: C=US, E=bstevens@hdesigngroup.com, O=H Design Group, OU=Architect, CN=Brent Stevens
Date: 2023.02.09 10:55:18-06'00'

Brent Stevens

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PROJECT TITLE

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PROJECT ADDRESS:
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WENTZVILLE, MO 63385

OVERALL FLOOR PLAN

SHEET

A101

KEYNOTE LEGEND

A1	TRENCH DRAIN PER PLUMBING DRAWINGS.
A2	SLOPE CONCRETE SLAB TOWARD TRENCH DRAIN PER STRUCTURAL DRAWINGS.
A3	FIRE EXTINGUISHER AND CABINET PER SPECIFICATIONS.
A4	KNOX BOX PER CITY OF WENTZVILLE FIRE DEPARTMENT REQUIREMENTS.
A5	FULL HEIGHT WALL FRAMING, INSULATION AND DRYWALL WITH HAT CHANNELS BETWEEN WALL FRAMING AND DRYWALL ON OTHER SIDE OF R/R WALL FOR SOUND CONTROL.
A6	BUILDING ADDRESS WITH 6" x 1" STROKE NUMBERS PER CITY OF WENTZVILLE FIRE DEPARTMENT REQUIREMENTS.
A7	DASHED LINE INDICATES EDGE OF CANOPY ABOVE- SEE ROOF PLAN FOR MORE INFORMATION.
A8	TRENCH DRAIN PER STRUCTURAL DETAILS- TYPICAL INSIDE ALL OVERHEAD DOORS.
A9	LOCKERS PER SPECIFICATIONS.
A11	BOLLARD PER CIVIL DETAIL- TYPICAL ADJACENT TO EXTERIOR OPENING OF ALL OVERHEAD DOORS.
A12	TACTILE RESTROOM SIGN- SEE SHEET G001 FOR SIGN REQUIREMENTS.
A13	TACTILE EXIT SIGN- SEE SHEET G001 FOR SIGN REQUIREMENTS.
A14	TACTILE SIGN INDICATING MAXIMUM 65 OCCUPANTS- SEE SHEET G001 FOR SIGN REQUIREMENTS.
A15	TACTILE SIGN INDICATING MAXIMUM 40 OCCUPANTS- SEE SHEET G001 FOR SIGN REQUIREMENTS.

PARTITION TYPES

P4A
OUTSIDE FACE
-5/8" GYPSUM BOARD
-3 5/8" METAL STUDS @ 16" O.C.
FILL WITH SOUND BATT INSULATION
-5/8" GYPSUM BOARD
INSIDE FACE

P6A
OUTSIDE FACE
-5/8" GYPSUM BOARD
-6" METAL STUDS @ 16" O.C.
FILL WITH SOUND BATT INSULATION
-5/8" GYPSUM BOARD
INSIDE FACE

P8A
7 5/8" CMU BLOCK

P8B
7 5/8" CMU BLOCK - FOAM INSULATION FILL ALL EXTERIOR WALL BLOCK NOT REQUIRED TO BE FULLY GROUTED

ALL METAL STUD WALL FRAMING TO EXTEND TO DECK. PROVIDE SLIP TRACK AT TOP OF WALL PER STRUCTURAL DETAILS. SOUND BATT INSULATION TO GO FULL HEIGHT OF WALL. ONCE ABOVE CEILING PLANE, GYPSUM BOARD TO EXTEND 4" ABOVE CEILING ON ONE SIDE. OTHER SIDE OF GYPSUM BOARD TO EXTEND TO DECK, ONE SIDE ONLY. VERIFY WITH ARCHITECT WITH ANY QUESTION ON WALL HEIGHTS AND/ OR TYPES.

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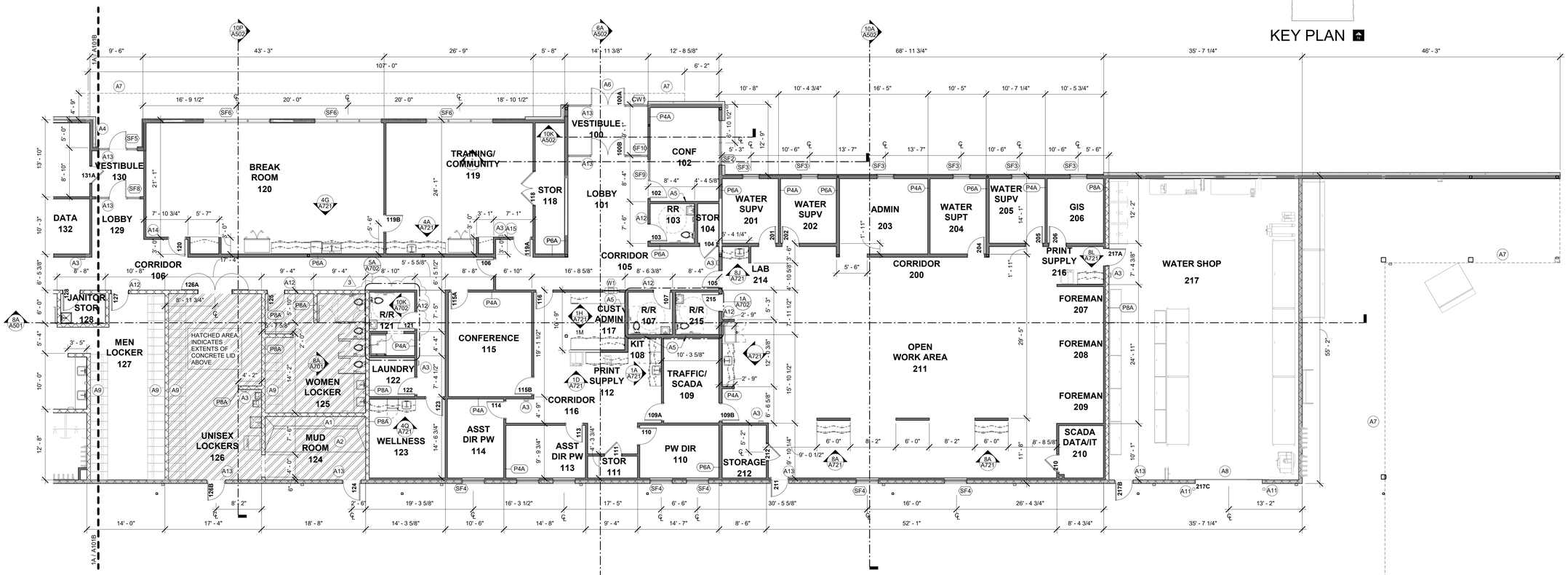
KEY PLAN



1A
A101A

FLOOR PLAN - AREA A

scale: 1/8" = 1'-0"

N

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REVISIONS

NO.	DESCRIPTION	DATE
3	ADD 03	02.09.23

PROJECT NO.: 19-040 DRAWN BY: HDG
DATE: 12.15.22 REVIEWED BY: BMS

PROFESSIONAL SEAL
BRENT M. STEVENS, AIA NCARB
PROFESSIONAL TITLE: ARCHITECT
MO# A-2000151419

STATE OF MISSOURI
BRENT M. STEVENS
NUMBER
MO A-2000151419
ARCHITECT

Digitally signed by Brent Stevens
DN: C=US, E=brent@hdesigngroup.com, O=H Design Group, OU=Architect, CN=Brent Stevens
Date: 2023.02.09 10:55:18-06'00'

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PROJECT TITLE
CITY OF WENTZVILLE, MO PUBLIC WORKS FACILITY

PROJECT ADDRESS:
1296 INTERSTATE DRIVE
WENTZVILLE, MO 63385

FLOOR PLAN - AREA A

SHEET
A101A

GENERAL NOTES - ROOF PLAN

1. ROOFING CONTRACTOR TO FLASH ALL CURBS, AND BOOTS PROVIDE BY MECHANICAL, ELECTRICAL AND PLUMBING CONTRACTOR IN ORDER TO MAINTAIN MANUFACTURER ROOF WARRANTY PER SPECIFICATIONS.
2. ALL SINGLE-PLY MEMBRANE ROOFING SLOPE TO BE AS INDICATED ON PLANS, AREAS THAT ARE NOT NOTED SHALL HAVE A MINIMUM SLOPE OF 1/4" PER 1'-0", TYP. SEE SPECIFICATIONS FOR ALL REQUIRED ROOFING COMPONENTS.
3. MECHANICAL EQUIPMENT AND VENTS SHOWN FOR REFERENCE ONLY. MECHANICAL CONTRACTOR TO PROVIDE ALL CURBS AND ROOF. ROOFING CONTRACTOR TO FLASH AND PROVIDE ALL ROOF FLASHING/TERMINATION ACCESSORIES FOR ALL PENETRATIONS.
4. PLUMBING CONTRACTOR AND ROOFING CONTRACTOR SHALL REVIEW LOCATIONS OF ROOF DRAINS AND COORDINATE AS NOT TO CONFLICT WITH STRUCTURAL STEEL ROOF FRAMING. ADJUST LOCATIONS AS REQUIRED AND RE-WORK INSULATION LAYOUT TO MAINTAIN REQUIRED SLOPES.
5. INSTALL TAPERED INSULATION ON THE UPHILL SIDE OF ALL ROOFTOP UNIT CURBS, ROOF HATCHES, AND OTHER ROOFTOP MOUNTED EQUIPMENT TO PROPERLY DRAIN WATER AROUND THE OBSTRUCTION, TYP.

ROOF PLAN LEGEND

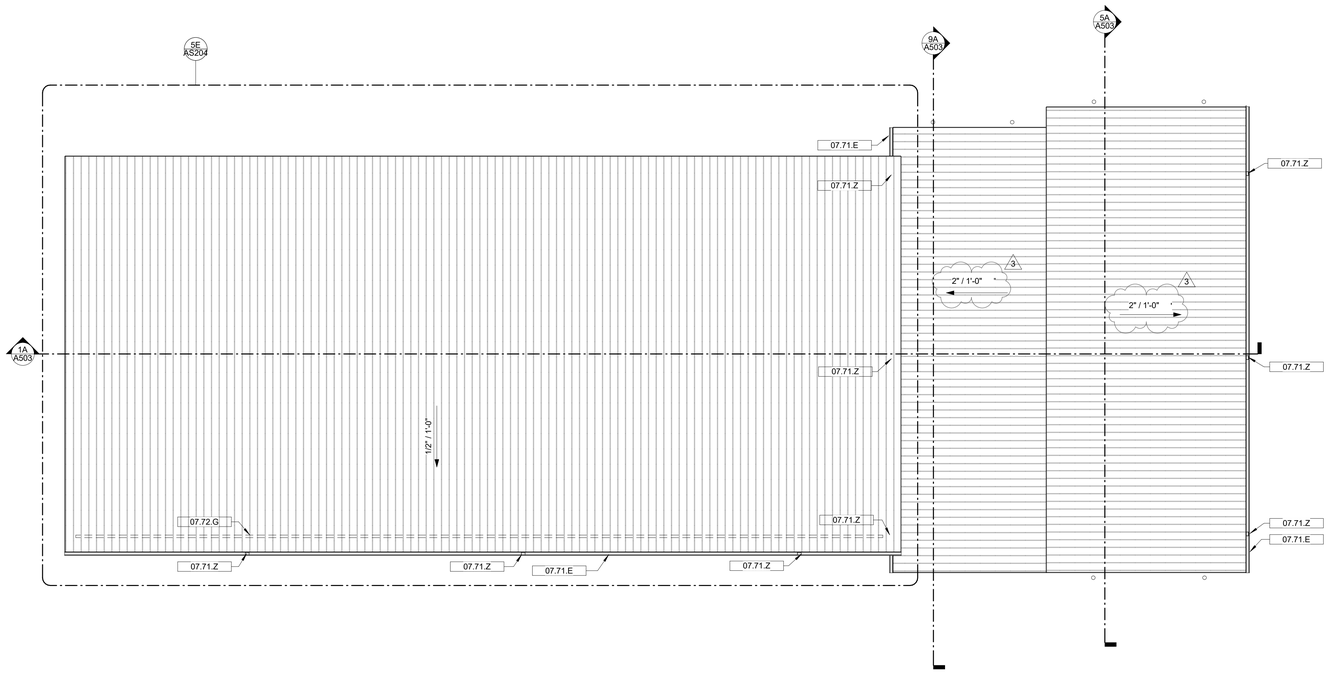
TPO MEMBRANE ROOFING
SEE SPECIFICATIONS FOR MORE INFORMATION

STANDING SEAM ROOFING
SEE SPECIFICATIONS FOR MORE INFORMATION

WALK PAD

KEYNOTE LEGEND

07.71.E	PREFORMED, PREFINISHED (MIN. 24 GAUGE) 5" HIGH X 6" DEEP RECTANGULAR METAL GUTTER. USE PREFINISHED GUTTER BRACKETS OF GAUGE THICKER THAN GUTTER AT 24" O.C. TYP. SEE ROOF PLAN FOR DOWNSPOUT LOCATIONS. SEE SPECIFICATIONS FOR MORE INFORMATION.
07.71.Z	PREFORMED, PREFINISHED (MIN. 24 GAUGE) 4" WIDE X 6" DEEP RECTANGULAR METAL DOWNSPOUT. SEE SPECIFICATIONS FOR MORE INFORMATION.
07.72.G	PREMANUFACTURED, PREFINISHED SNOW GUARD COMPONENTS WHICH CLIP TO STANDING SEAM ROOF PANELS AS REQUIRED.SPECIFICATIONS FOR MORE INFORMATION.



1A
A202

ROOF PLAN- WASH BUILDING

scale: 1/8" = 1'-0"

N

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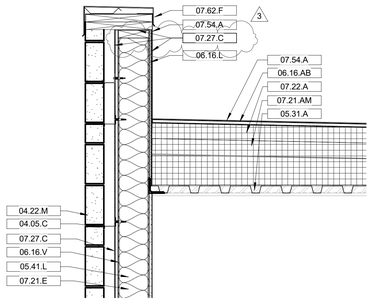
ROOF PLAN- WASH BUILDING

SHEET
A202



11A A601 DETAIL
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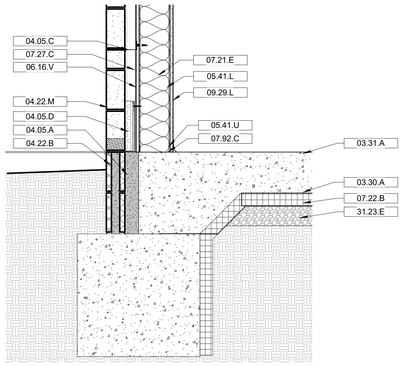

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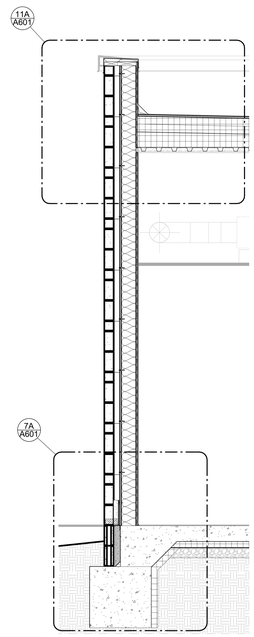

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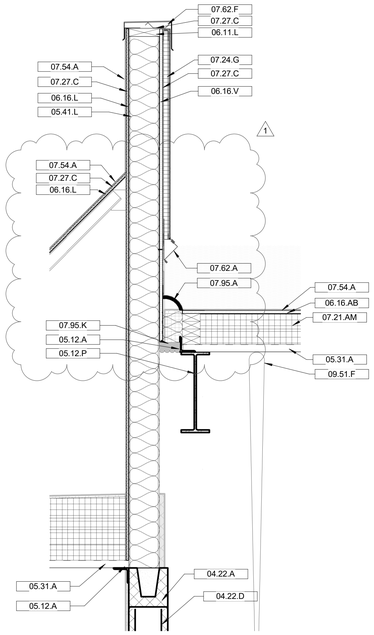

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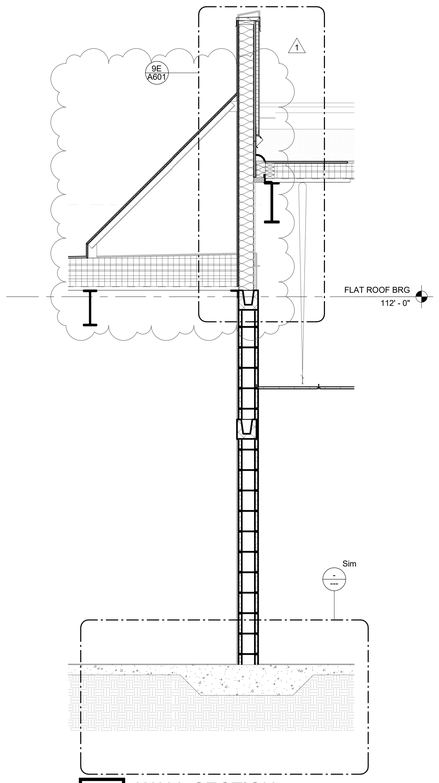

1D A601 WALL SECTION
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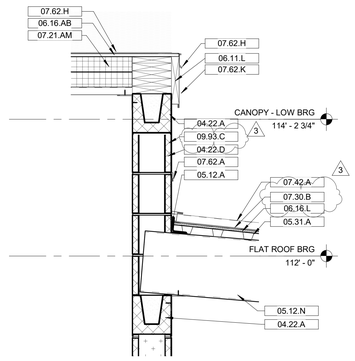

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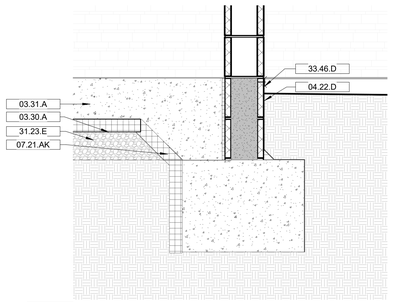

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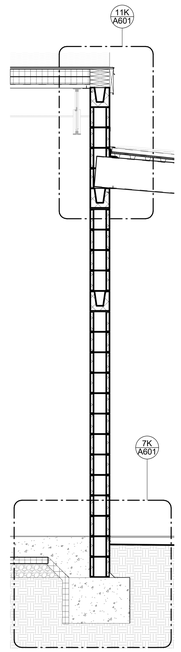

1P A601 WALL SECTION
scale: 1/2" = 1'-0"

KEYNOTE LEGEND

03.30.A	UNDERSLAB VAPOR RETARDER. SEE SPEC SECTION "033099 UNDERSLAB VAPOR RETARDER" FOR MORE INFORMATION.
03.31.A	THICKENED SLAB. SEE STRUCTURAL DRAWINGS FOR MORE INFORMATION.
04.05.A	FILL W/ NON-SHRINK GROUT.
04.05.C	MASONRY ANCHORS @ 18" O.C. VERTICALLY & HORIZONTALLY. SEE ARCHITECTURAL SPECIFICATIONS FOR MORE INFORMATION.
04.05.D	MORTAR NET, MORTAR DROPPING CONTROL, THRU-WALL FLASHING AND WEEPS. SEE ARCHITECTURAL SPECIFICATIONS FOR MORE INFORMATION.
04.22.A	CONCRETE UNIT MASONRY BOND BEAM. SEE STRUCTURAL DRAWINGS/SPECIFICATIONS FOR MORE INFORMATION.
3 04.22.B	CONCRETE UNIT MASONRY, 4"X8"X16", 2-CORE, WITH FULLY GROUTED CORES. SEE STRUCTURAL DRAWINGS/SPECIFICATIONS FOR MORE INFORMATION.
04.22.D	CONCRETE UNIT MASONRY, 8"X8"X16", 2-CORE, WITH INSULATED CORES. WATER REPELLANT ADMIX & SEALANT ON ALL EXTERIOR CMU BLOCK WALLS. SEE STRUCTURAL DRAWINGS & SPECIFICATIONS FOR MORE INFORMATION.
04.22.M	4" LIMESTONE BED STONE BLOCK. SEE SPECIFICATIONS FOR MORE INFORMATION.
05.12.A	STRUCTURAL STEEL ANGLE. SEE STRUCTURAL DRAWINGS FOR MORE INFORMATION.
05.12.N	STRUCTURAL STEEL TUBE STEEL SHAPE. SEE STRUCTURAL DRAWINGS FOR MORE INFORMATION.
05.12.P	STRUCTURAL STEEL BEAM. SEE STRUCTURAL FOR MORE INFORMATION.
05.31.A	COMPOSITE METAL DECK PER STRUCTURAL. SEE STRUCTURAL DRAWINGS FOR MORE INFORMATION.
05.41.L	6" METAL STUD FRAMING @ 16" O.C.,TYP. SEE STRUCTURAL DRAWINGS FOR GAUGE AND MORE INFORMATION.
05.41.U	6" CHANNEL STUD.
06.11.L	WOOD BLOCKING AS REQUIRED - USE TREATED WOOD BLOCKING IN EXTERIOR OR WET APPLICATIONS. SEE DETAIL SHEETS (ALL DISCIPLINES) FOR MORE INFORMATION.
06.16.AB	COVERBOARD. SEE SPECIFICATIONS FOR MORE INFORMATION.
06.16.L	FIRE RATED EXTERIOR GRADE PLYWOOD SHEATHING.
06.16.V	5/8" EXTERIOR GRADE GLASS MAT SHEATHING. SEE SPECIFICATIONS FOR MORE INFORMATION.
07.21.AK	2" RIGID INSULATION. SEE SPECIFICATIONS FOR MORE INFORMATION.
07.21.AM	2 LAYERS OF 2" RIGID INSULATION. SEE SPECIFICATIONS FOR MORE INFORMATION.
07.21.E	R-19 BATT INSULATION. SEE SPECIFICATIONS FOR MORE INFORMATION.
07.22.A	TAPERED RIGID INSULATION. SEE ROOF PLAN AND SPECIFICATIONS FOR MORE INFORMATION.
07.22.B	2" (MIN.) BELOW-GRADE BUILDING PERIMETER INSULATION. SEE SPECIFICATIONS FOR MORE INFORMATION. FULL HEIGHT OF STEM WALL/FOUNDATION + MIN. 24" INTO BUILDING.
3 07.24.G	EIFS APPLIED OVER INSULATION BOARD. SEE SPECIFICATIONS FOR MORE INFORMATION.
07.27.C	FLUID-APPLIED WEATHER RESISTIVE BARRIER (WRB) SYSTEM. SEE SPECIFICATIONS FOR MORE INFORMATION. SYSTEM JOINT/CORNER TAPE TO BE APPLIED AT ALL PANEL JOINTS, SILLS/JAMBS/HEADS OF ALL OPENINGS AND WRAP TO WARM SIDE OF OPENING, AT INSIDE/OUTSIDE CORNERS, PENETRATIONS, AND AT ALL MANUFACTURER REQUIRED LOCATIONS; SYSTEM TO WRAP OVER ANY PARAPET, AND SYSTEM TO PROVIDE A CONTINUOUS BUILDING ENVELOPE.
07.30.B	SELF-ADHERING SELF-HEALING SHEET WATERPROOF ROOF UNDERLAYMENT MEMBRANE SEE SPECIFICATIONS FOR MORE INFORMATION.
07.42.A	PREFORMED, PREFINISHED STANDING SEAM (SSS) ROOF PANELS. SEE SPECIFICATIONS FOR MORE INFORMATION.
07.54.A	SINGLE PLY FULLY-ADHERED TPO ROOF MEMBRANE SYSTEM. SEE SPECIFICATIONS FOR MORE INFORMATION. MEMBRANE
3	TO WRAP PARAPET WALLS AND OVER PARAPET CAP. PROVIDE SHEATHING ON WALLS THAT NEED A SUBSTRATE FOR ADHERENCE.
07.62.A	PREFORMED, SHEET METAL FLASHING. PROVIDE POSITIVE SLOPE AWAY FROM BUILDING. SEE SPECIFICATIONS AND DETAILS FOR MORE INFORMATION. ALL EXPOSED EDGES TO BE HEMMED.
07.62.F	PREFORMED, PREFINISHED METAL PARAPET COPING FLASHING + INTEGRAL DRIPS + CONTINUOUS CLEATS ON BOTH SIDES. SLOPE PAPARET TOP MIN 1/4" PER 12". SEE SPECIFICATIONS FOR MORE INFORMATION. PROVIDE MINIMUM 4" LAP
	JOINT W/ CONTINUOUS SEALANT. PROVIDE SLOTTED OR OVERSIZE HOLES IN CLEATS FOR EXPANSION/CONTRACTION. LEG LENGTHS AS SHOWN IN DETAILS OR AS SPECIFIED BY ARCHITECT. ALL EXPOSED EDGES TO BE HEMMED.
07.62.H	PREFORMED, PREFINISHED METAL EDGE OF ROOF DRIP EDGE FLASHING WITH MIN. 4" LEG ONTO ROOF, 1/2" DRIP, AND MIN. 2" VERTICAL LEG CLIPPED INTO CLEAT. GUTTERS ARE TO BE TUCKED BEHIND DRIP EDGE, AND ROOF MEMBRANES ARE TO
	COVER 4" LEG. ALL EXPOSED EDGES TO BE HEMMED. PROVIDE MINIMUM 4" LAP JOINT W/ CONTINUOUS SEALANT.
07.62.K	PREFORMED, PREFINISHED FASCIA CLOSURE FLASHING WITH INTEGRAL DRIP EDGE (MIN. 1/2") ALONG BOTTOM LEADING EDGE. TOP EDGE TO BE TUCKED BEHIND DRIP EDGE (AND GUTTER IF PRESENT). LOWER EDGE TO BE TUCKED BEHIND
	SUB-FASCIA (AND SOFFIT IF PRESENT) MIN. 1/2". SIZE OF FASCIA ENCLOSURE AS SHOWN IN DETAILS OR AS SPECIFIED BY ARCHITECT. ALL EXPOSED EDGES TO BE HEMMED. PROVIDE MINIMUM 4" LAP JOINT W/ CONTINUOUS SEALANT.
07.92.C	PERIMETER BASE OF WALL POLYURETHANE SEALANT. FULLY SPREAD SEALANT AT BASE OF WALL AND BELOW THE SILL
	PLATE @ PERIMETER WALLS, TYP. WHERE STOREFRONT OR WINDOW SYSTEMS ARE USED, PERIMETER SEALANT IS TO BE
1	BELOW SILL FLASHING.
07.95.A	EXPANSION JOINT COVER ASSEMBLY.
07.95.K	FIBROUS EXPANSION JOINT FILLER.
09.29.L	5/8" GYPSUM WALLBOARD (MOISTURE RESISTANT). SEE SPECIFICATIONS FOR MORE INFORMATION.
09.51.F	ACOUSTIC CEILING TILE SUSPENSION WIRE. SEE REFLECTED CEILING PLANS, DETAILS, AND SPECIFICATIONS FOR MORE
3	INFORMATION.
09.93.C	WATER REPELLANT ADMIX TO IMPROVE UNIT/WALL PREFORMCE AT ALL EXTERIOR CMU BLOCK WALLS. SEE SPEC
	SECTION 099123,"PAINTING AND COATING" FOR MORE INFORMATION.
31.23.E	COMPACTED GRAVEL SUB-BASE. SEE CIVIL, STRUCTURAL, AND ARCHITECTURAL DETAIL SHEETS AND SPECIFICATIONS
	FOR MORE INFORMATION.
33.46.D	SELF-ADHERING SHEET WATERPROOFING BELOW-GRADE FOUNDATION DRAINAGE SYSTEM - SEE SPECIFICATIONS FOR MORE INFORMATION. SYSTEM INCLUDES, AT MINIMUM, THE FOLLOWING: PERFORATED FABRIC DRAINAGE MAT OVER RAISED PANEL DRAINAGE PLANE OVER WATERPROOFING MEMBRANE OVER CONCRETE WALL PRIMER. EXTEND UP CONCRETE FOOTING/FOUNDATION AND COVER WITH TERMINATION BAR AND CONTINUOUS CAULK AT 6 INCHES BELOW GRADE.

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REVISIONS

NO.	DESCRIPTION	DATE
1	ADD 01	01.11.23
3	ADD 03	02.09.23

PROJECT NO.: 19-040 DRAWN BY: HDG
DATE: 12.15.22 REVIEWED BY: BMS

PROFESSIONAL SEAL
BRENT M. STEVENS, AIA NCARB
PROFESSIONAL TITLE: ARCHITECT
MO# A-2000151419

STATE OF MISSOURI
BRENT M. STEVENS
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ARCHITECT
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Date: 2023.02.09 10:55:19-06'00'

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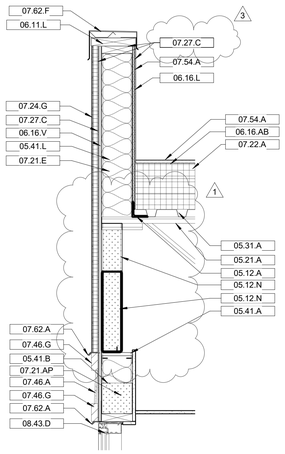
PROJECT TITLE
CITY OF WENTZVILLE, MO PUBLIC WORKS FACILITY

PROJECT ADDRESS:
1295 INTERSTATE DRIVE
WENTZVILLE, MO 63385

WALL SECTIONS + DETAILS

SHEET
A601



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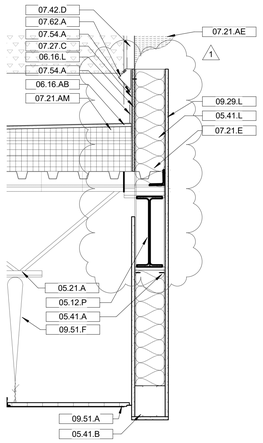

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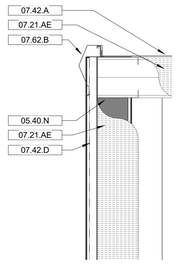

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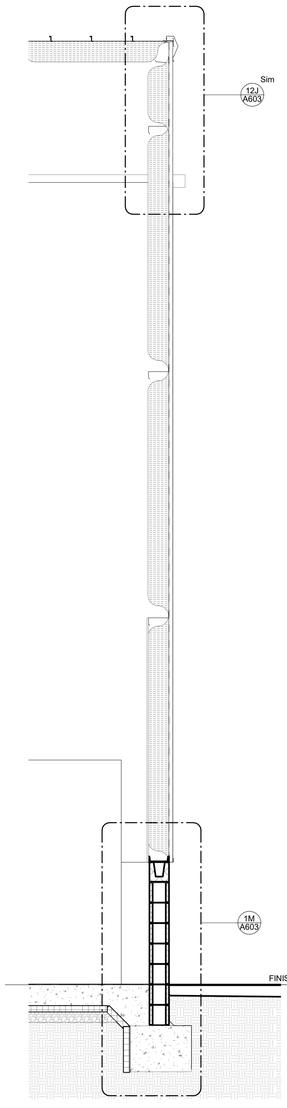

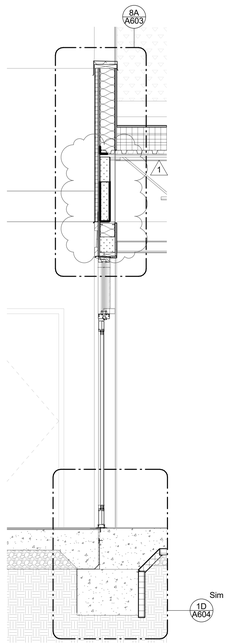

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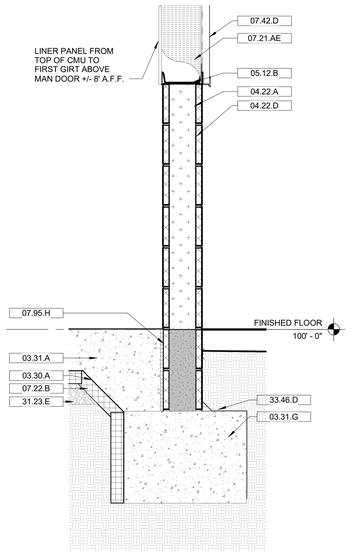
scale: 1/2" = 1'-0"

1E A603 WALL SECTION
scale: 1/2" = 1'-0"

1J A603 WALL SECTION
scale: 1/2" = 1'-0"



1M A603 DETAIL
scale: 1" = 1'-0"

KEYNOTE LEGEND

03.30.A	UNDERSLAB VAPOR RETARDER. SEE SPEC SECTION "033099 UNDERSLAB VAPOR RETARDER" FOR MORE INFORMATION.
03.31.A	THICKENED SLAB. SEE STRUCTURAL DRAWINGS FOR MORE INFORMATION.
03.31.G	CAST-IN-PLACE CONCRETE FOOTING PER STRUCTURAL. SEE STRUCTURAL DRAWINGS FOR MORE INFORMATION.
04.22.A	CONCRETE UNIT MASONRY,BOND BEAM. SEE STRUCTURAL DRAWINGS/SPECIFICATIONS FOR MORE INFORMATION.
04.22.D	CONCRETE UNIT MASONRY, 8"X8"X16", 2-CORE, WITH INSULATED CORES. WATER REPELLANT ADMIX & SEALANT ON ALL EXTERIOR CMU BLOCK WALLS. SEE STRUCTURAL DRAWINGS & SPECIFICATIONS FOR MORE INFORMATION.
05.12.A	STRUCTURAL STEEL ANGLE. SEE STRUCTURAL DRAWINGS FOR MORE INFORMATION.
05.12.B	STRUCTURAL STEEL C SHAPE. SEE STRUCTURAL DRAWINGS FOR MORE INFORMATION.
05.12.N	STRUCTURAL STEEL TUBE STEEL SHAPE. SEE STRUCTURAL DRAWINGS FOR MORE INFORMATION.
05.12.P	STRUCTURAL STEEL BEAM. SEE STRUCTURAL FOR MORE INFORMATION.
05.21.A	STRUCTURAL STEEL JOIST. SEE STRUCTURAL FOR MORE INFORMATION.
05.31.A	COMPOSITE METAL DECK PER STRUCTURAL. SEE STRUCTURAL DRAWINGS FOR MORE INFORMATION.
05.40.N	METAL BUILDING PURLIN BY PRE-ENGINEERED BUILDING MANUFACTURER
05.41.A	METAL STUD SLOTTED DEFLECTION/SLIP TRACK FRAMING. USE MANUFACTURER WRITTEN INSTALLATION METHODS.
05.41.B	METAL STUD BOX BEAM HEADER. SEE STRUCTURAL DRAWINGS AND SPECIFICATIONS FOR MORE INFORMATION. CONTRACTOR TO VERIFY STUD GAUGE TO PROVIDE ADEQUATE STRUCTURAL SUPPORT.
05.41.L	6" METAL STUD FRAMING @ 16" O.C.,TYP. SEE STRUCTURAL DRAWINGS FOR GAUGE AND MORE INFORMATION.
06.11.L	WOOD BLOCKING AS REQUIRED - USE TREATED WOOD BLOCKING IN EXTERIOR OR WET APPLICATIONS. SEE DETAIL SHEETS (ALL DISCIPLINES) FOR MORE INFORMATION.
06.16.AB	COVERBOARD. SEE SPECIFICATIONS FOR MORE INFORMATION.
06.16.L	FIRE RATED EXTERIOR GRADE PLYWOOD SHEATHING.
06.16.V	5/8" EXTERIOR GRADE GLASS MAT SHEATHING. SEE SPECIFICATIONS FOR MORE INFORMATION.
07.21.AE	R-25 (MIN.) VINYL-FACED PEMB INSULATION. SEE SPECIFICATIONS FOR MORE INFORMATION.
07.21.AM	2 LAYERS OF 2" RIGID INSULATION. SEE SPECIFICATIONS FOR MORE INFORMATION.
07.21.AP	CLOSED-CELL SPRAY-APPLIED FOAM INSULATION. FILL ENTIRE CAVITY OF INDICATED ELEMENT(S). SEE SPECIFICATIONS FOR MORE INFORMATION.
07.21.E	R-19 BATT INSULATION. SEE SPECIFICATIONS FOR MORE INFORMATION.
07.22.A	TAPERED RIGID INSULATION. SEE ROOF PLAN AND SPECIFICATIONS FOR MORE INFORMATION.
07.22.B	2" (MIN.) BELOW-GRADE BUILDING PERIMETER INSULATION. SEE SPECIFICATIONS FOR MORE INFORMATION. FULL HEIGHT OF STEM WALL/FOUNDATION + MIN. 24" INTO BUILDING.
07.24.G	EIFS APPLIED OVER INSULATION BOARD. SEE SPECIFICATIONS FOR MORE INFORMATION.
07.27.C	FLUID-APPLIED WEATHER RESISTIVE BARRIER (WRB) SYSTEM. SEE SPECIFICATIONS FOR MORE INFORMATION. SYSTEM JOINT/CORNER TAPE TO BE APPLIED AT ALL PANEL JOINTS, SILLS/JAMBS/HEADS OF ALL OPENINGS AND WRAP TO WARM SIDE OF OPENING, AT INSIDE/OUTSIDE CORNERS, PENETRATIONS, AND AT ALL MANUFACTURER REQUIRED LOCATIONS; SYSTEM TO WRAP OVER ANY PARAPET; AND SYSTEM TO PROVIDE A CONTINUOUS BUILDING ENVELOPE.
07.42.A	PREFORMED, PREFINISHED STANDING SEAM (SS) ROOF PANELS. SEE SPECIFICATIONS FOR MORE INFORMATION.
07.42.D	PREFORMED, PREFINISHED CORRUGATED, METAL WALL PANEL SYSTEM. SEE SPECIFICATIONS FOR MORE INFORMATION.
07.46.A	FIBER-REINFORCED CEMENT HORIZONTAL SIDING (PROFILE 1) WITH INTEGRAL COLOR. SEE SPECIFICATIONS FOR MORE INFORMATION. SEE ELEVATION SHEETS FOR LOCATION OF TRIM/JOINTS.
07.46.G	FIBER-REINFORCED CEMENT TRIM BOARD, 4" EXPOSED FACE. SEE SPECIFICATIONS FOR MORE INFORMATION.
07.54.A	SINGLE PLY FULLY-ADHERED TPO ROOF MEMBRANE SYSTEM. SEE SPECIFICATIONS FOR MORE INFORMATION. MEMBRANE TO WRAP PARAPET WALLS AND OVER PARAPET CAP. PROVIDE SHEATHING ON WALLS THAT NEED A SUBSTRATE FOR ADHERENCE.
07.62.A	PREFORMED, SHEET METAL FLASHING. PROVIDE POSITIVE SLOPE AWAY FROM BUILDING. SEE SPECIFICATIONS AND DETAILS FOR MORE INFORMATION. ALL EXPOSED EDGES TO BE HEMMED.
07.62.B	PREFORMED SHEET METAL FLASHING PER PEMB. SEE SPECIFICATIONS AND DETAILS FOR MORE INFORMATION. ALL EXPOSED EDGES TO BE HEMMED.
07.62.F	PREFORMED, PREFINISHED METAL PARAPET COPING FLASHING + INTEGRAL DRIPS + CONTINUOUS CLEATS ON BOTH SIDES. SLOPE PAPARET TOP MIN 1/4" PER 12". SEE SPECIFICATIONS FOR MORE INFORMATION. PROVIDE MINIMUM 4" LAP JOINT W/ CONTINUOUS SEALANT. PROVIDE SLOTTED OR OVERSIZE HOLES IN CLEATS FOR EXPANSION/CONTRACTION. LEG LENGTHS AS SHOWN IN DETAILS OR AS SPECIFIED BY ARCHITECT. ALL EXPOSED EDGES TO BE HEMMED.
07.95.H	1/2" EXPANSION JOINT.
08.43.D	ALUMINUM (PREFINISHED) STOREFRONT HEAD. SEE DETAILS, SPECIFICATIONS, AND A3 SERIES SHEETS FOR MORE INFORMATION.
09.29.L	5/8" GYPSUM WALLBOARD (MOISTURE RESISTANT). SEE SPECIFICATIONS FOR MORE INFORMATION.
09.51.A	ACOUSTIC CEILING TILE. SEE REFLECTED CEILING PLANS, DETAILS, AND SPECIFICATIONS FOR MORE INFORMATION.
09.51.F	ACOUSTIC CEILING TILE SUSPENSION WIRE. SEE REFLECTED CEILING PLANS, DETAILS, AND SPECIFICATIONS FOR MORE INFORMATION.
31.23.E	COMPACTED GRAVEL SUB-BASE. SEE CIVIL, STRUCTURAL, AND ARCHITECTURAL DETAIL SHEETS AND SPECIFICATIONS FOR MORE INFORMATION.
33.46.D	SELF-ADHERING SHEET WATERPROOFING BELOW-GRADE FOUNDATION DRAINAGE SYSTEM - SEE SPECIFICATIONS FOR MORE INFORMATION. SYSTEM INCLUDES, AT MINIMUM, THE FOLLOWING: PERFORATED FABRIC DRAINAGE MAT OVER RAISED PANEL DRAINAGE PLANE OVER WATERPROOFING MEMBRANE OVER CONCRETE WALL PRIMER. EXTEND UP CONCRETE FOOTING/FOUNDATION AND COVER WITH TERMINATION BAR AND CONTINUOUS CAULK AT 6 INCHES BELOW GRADE.

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REVISIONS

NO.	DESCRIPTION	DATE
1	ADD 01	01.11.23
3	ADD 03	02.09.23

PROJECT NO.: 19-040 DRAWN BY: HDG
DATE: 12.15.22 REVIEWED BY: BMS

PROFESSIONAL SEAL

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PROFESSIONAL TITLE: ARCHITECT
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Date: 2023.02.09 10:55:20-06'00'

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PROJECT TITLE

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PROJECT ADDRESS:
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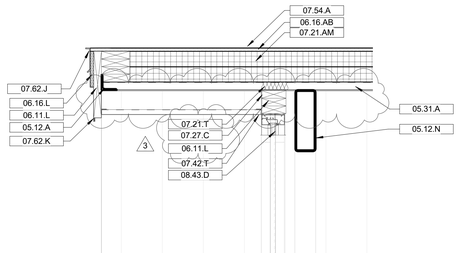
WALL SECTIONS + DETAILS

SHEET
A603



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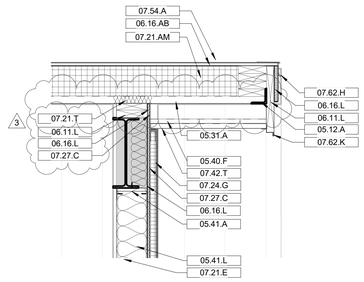

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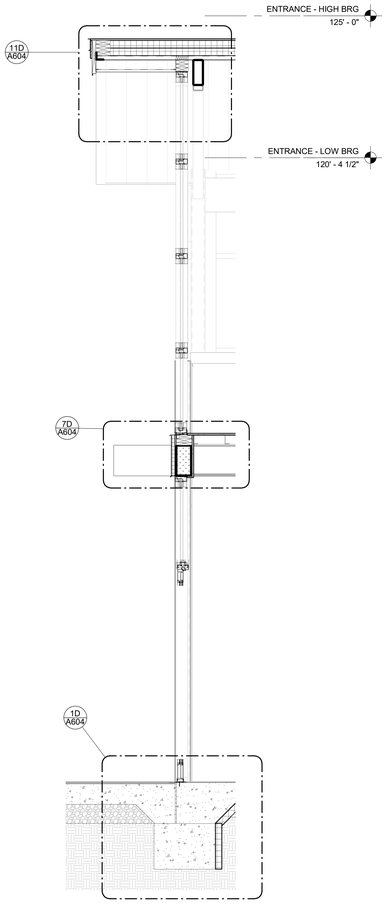

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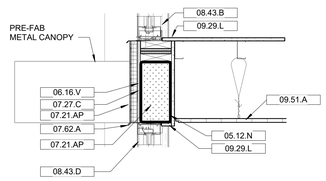

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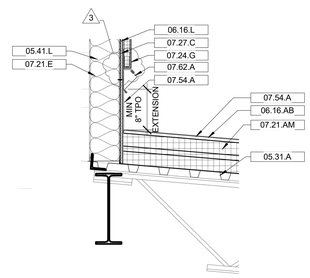

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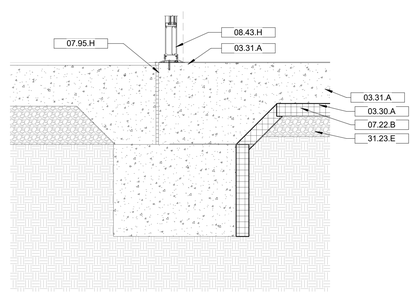

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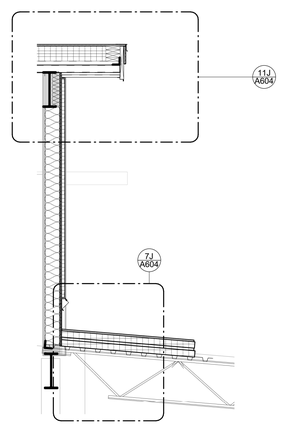

1J A604 WALL SECTION
scale: 1/2" = 1'-0"

KEYNOTE LEGEND

03.30.A	UNDERSLAB VAPOR RETARDER. SEE SPEC SECTION "033099 UNDERSLAB VAPOR RETARDER" FOR MORE INFORMATION.
03.31.A	THICKENED SLAB. SEE STRUCTURAL DRAWINGS FOR MORE INFORMATION.
05.12.A	STRUCTURAL STEEL ANGLE. SEE STRUCTURAL DRAWINGS FOR MORE INFORMATION.
05.12.N	STRUCTURAL STEEL TUBE STEEL SHAPE. SEE STRUCTURAL DRAWINGS FOR MORE INFORMATION.
05.31.A	COMPOSITE METAL DECK PER STRUCTURAL. SEE STRUCTURAL DRAWINGS FOR MORE INFORMATION.
05.40.F	7/8" HAT CHANNEL @ 16" O.C.
05.41.A	METAL STUD SLOTTED DEFLECTION/SLIP TRACK FRAMING. USE MANUFACTURER WRITTEN INSTALLATION METHODS.
05.41.L	6" METAL STUD FRAMING @ 16" O.C.,TYP. SEE STRUCTURAL DRAWINGS FOR GAUGE AND MORE INFORMATION.
06.11.L	WOOD BLOCKING AS REQUIRED - USE TREATED WOOD BLOCKING IN EXTERIOR OR WET APPLICATIONS. SEE DETAIL SHEETS (ALL DISCIPLINES) FOR MORE INFORMATION.
06.16.AB	COVERBOARD. SEE SPECIFICATIONS FOR MORE INFORMATION.
06.16.L	FIRE RATED EXTERIOR GRADE PLYWOOD SHEATHING.
06.16.V	5/8" EXTERIOR GRADE GLASS MAT SHEATHING. SEE SPECIFICATIONS FOR MORE INFORMATION.
07.21.AM	2 LAYERS OF 2" RIGID INSULATION. SEE SPECIFICATIONS FOR MORE INFORMATION.
07.21.AP	CLOSED-CELL SPRAY-APPLIED FOAM INSULATION. FILL ENTIRE CAVITY OF INDICATED ELEMENT(S). SEE SPECIFICATIONS FOR MORE INFORMATION.
07.21.E	R-19 BATT INSULATION. SEE SPECIFICATIONS FOR MORE INFORMATION.
07.21.T	UNFACED BATT INSULATION. PROVIDE THICKNESS TO CONTINUOUSLY FILL SEE GAP. SPECIFICATIONS FOR MORE INFORMATION.
07.22.B	2" (MIN.) BELOW-GRADE BUILDING PERIMETER INSULATION. SEE SPECIFICATIONS FOR MORE INFORMATION. FULL HEIGHT OF STEM WALL/FOUNDATION + MIN. 24" INTO BUILDING.
07.24.G	EIFS APPLIED OVER INSULATION BOARD. SEE SPECIFICATIONS FOR MORE INFORMATION.
07.27.C	FLUID-APPLIED WEATHER RESISTIVE BARRIER (WRB) SYSTEM. SEE SPECIFICATIONS FOR MORE INFORMATION. SYSTEM JOINT/CORNER TAPE TO BE APPLIED AT ALL PANEL JOINTS, SILL/JAMBS/HEADS OF ALL OPENINGS AND WRAP TO WARM SIDE OF OPENING, AT INSIDE/OUTSIDE CORNERS, PENETRATIONS, AND AT ALL MANUFACTURER REQUIRED LOCATIONS; SYSTEM TO WRAP OVER ANY PARAPET; AND SYSTEM TO PROVIDE A CONTINUOUS BUILDING ENVELOPE.
07.42.T	PREFORMED, PREFINISHED UNVENTED METAL SOFFIT PANELS. SEE SPECIFICATIONS FOR MORE INFORMATION.
07.54.A	SINGLE PLY FULLY-ADHERED TPO ROOF MEMBRANE SYSTEM. SEE SPECIFICATIONS FOR MORE INFORMATION. MEMBRANE TO WRAP PARAPET WALLS AND OVER PARAPET CAP. PROVIDE SHEATHING ON WALLS THAT NEED A SUBSTRATE FOR ADHERENCE.
07.62.A	PREFORMED, SHEET METAL FLASHING. PROVIDE POSITIVE SLOPE AWAY FROM BUILDING. SEE SPECIFICATIONS AND DETAILS FOR MORE INFORMATION. ALL EXPOSED EDGES TO BE HEMMED.
07.62.H	PREFORMED, PREFINISHED METAL EDGE OF ROOF DRIP EDGE FLASHING WITH MIN. 4" LEG ONTO ROOF, 1/2" DRIP; AND MIN. 2" VERTICAL LEG CLIPPED INTO CLEAT. GUTTERS ARE TO BE TUCKED BEHIND DRIP EDGE; AND ROOF MEMBRANES ARE TO COVER 4" LEG. ALL EXPOSED EDGES TO BE HEMMED. PROVIDE MINIMUM 4" LAP JOINT W/ CONTINUOUS SEALANT.
07.62.J	PREFORMED, PREFINISHED METAL EDGE OF ROOF RAKE FLASHING WITH MIN. 4" LEG ONTO ROOF; DRIP; AND VERTICAL LEG CLIPPED INTO CLEAT. ROOF MEMBRANES ARE TO COVER 4" LEG. ALL EXPOSED EDGES TO BE HEMMED. PROVIDE MINIMUM 4" LAP JOINT W/ CONTINUOUS SEALANT.
07.62.K	PREFORMED, PREFINISHED FASCIA CLOSURE FLASHING WITH INTEGRAL DRIP EDGE (MIN. 1/2") ALONG BOTTOM LEADING EDGE. TOP EDGE TO BE TUCKED BEHIND DRIP EDGE (AND GUTTER IF PRESENT). LOWER EDGE TO BE TUCKED BEHIND SUB-FASCIA (AND SOFFIT IF PRESENT) MIN. 1/2". SIZE OF FASCIA ENCLOSURE AS SHOWN IN DETAILS OR AS SPECIFIED BY ARCHITECT. ALL EXPOSED EDGES TO BE HEMMED. PROVIDE MINIMUM 4" LAP JOINT W/ CONTINUOUS SEALANT.
07.95.H	1/2" EXPANSION JOINT.
08.43.B	ALUMINUM (PREFINISHED) STOREFRONT SILL. SEE DETAILS, SPECIFICATIONS, AND A3 SERIES SHEETS FOR MORE INFORMATION.
08.43.D	ALUMINUM (PREFINISHED) STOREFRONT HEAD. SEE DETAILS, SPECIFICATIONS, AND A3 SERIES SHEETS FOR MORE INFORMATION.
08.43.H	ALUMINUM (PREFINISHED) STOREFRONT DOOR BOTTOM. SEE DETAILS, SPECIFICATIONS, AND A3 SERIES SHEETS FOR MORE INFORMATION.
09.29.L	5/8" GYPSUM WALLBOARD (MOISTURE RESISTANT). SEE SPECIFICATIONS FOR MORE INFORMATION.
09.51.A	ACOUSTIC CEILING TILE. SEE REFLECTED CEILING PLANS, DETAILS, AND SPECIFICATIONS FOR MORE INFORMATION.
31.23.E	COMPACTED GRAVEL SUB-BASE. SEE CIVIL, STRUCTURAL, AND ARCHITECTURAL DETAIL SHEETS AND SPECIFICATIONS FOR MORE INFORMATION.

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NO.	DESCRIPTION	DATE
3	ADD 03	02.09.23

PROJECT NO.:	19-040	DRAWN BY:	HDG
DATE:	12.15.22	REVIEWED BY:	BMS

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PROFESSIONAL TITLE: ARCHITECT
MO# A-2000151419

STATE OF MISSOURI
BRENT M. STEVENS
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Date: 2023.02.09 10:55:20-06'00'

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PROJECT TITLE

CITY OF WENTZVILLE, MO PUBLIC WORKS FACILITY

PROJECT ADDRESS:
1295 INTERSTATE DRIVE
WENTZVILLE, MO 63385

WALL SECTIONS + DETAILS

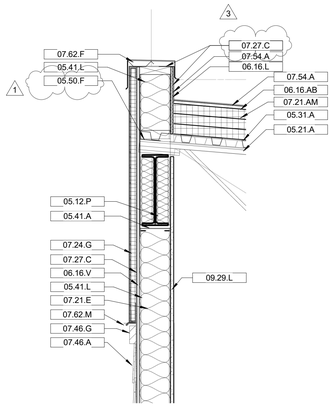
SHEET
A604

KEYNOTE LEGEND

03.30.A	UNDERSLAB VAPOR RETARDER. SEE SPEC SECTION "033099 UNDERSLAB VAPOR RETARDER" FOR MORE INFORMATION.
03.31.A	THICKENED SLAB. SEE STRUCTURAL DRAWINGS FOR MORE INFORMATION.
03.31.G	CAST-IN-PLACE CONCRETE FOOTING PER STRUCTURAL. SEE STRUCTURAL DRAWINGS FOR MORE INFORMATION.
04.22.A	CONCRETE UNIT MASONRY BOND BEAM. SEE STRUCTURAL DRAWINGS/SPECIFICATIONS FOR MORE INFORMATION.
04.22.D	CONCRETE UNIT MASONRY, 8"X8"X16", 2-CORE, WITH INSULATED CORES. WATER REPELLANT ADMIX & SEALANT ON ALL EXTERIOR CMU BLOCK WALLS. SEE STRUCTURAL DRAWINGS & SPECIFICATIONS FOR MORE INFORMATION.
04.22.N	CONCRETE UNIT MASONRY INVERTED BOND BEAM. SEE STRUCTURAL DRAWINGS/SPECIFICATIONS FOR MORE INFORMATION.
05.12.P	STRUCTURAL STEEL BEAM. SEE STRUCTURAL FOR MORE INFORMATION.
05.21.A	STRUCTURAL STEEL JOIST. SEE STRUCTURAL FOR MORE INFORMATION.
05.31.A	COMPOSITE METAL DECK PER STRUCTURAL. SEE STRUCTURAL DRAWINGS FOR MORE INFORMATION.
05.41.A	METAL STUD SLOTTED DEFLECTION/SLIP TRACK FRAMING. USE MANUFACTURER WRITTEN INSTALLATION METHODS.
05.41.H	3-5/8" METAL STUD FRAMING @ 16" O.C.,TYP. SEE STRUCTURAL DRAWINGS FOR GAUGE AND MORE INFORMATION.
05.41.L	6" METAL STUD FRAMING @ 16" O.C.,TYP. SEE STRUCTURAL DRAWINGS FOR GAUGE AND MORE INFORMATION.
05.41.S	3-5/8" CHANNEL STUD.
05.50.F	CONTINUOUS BENT PLATE DECK CLOSURE. SEE STRUCTURAL FOR MORE INFORMATION.
06.11.L	WOOD BLOCKING AS REQUIRED - USE TREATED WOOD BLOCKING IN EXTERIOR OR WET APPLICATIONS. SEE DETAIL SHEETS (ALL DISCIPLINES) FOR MORE INFORMATION.
06.16.AB	COVERBOARD. SEE SPECIFICATIONS FOR MORE INFORMATION.
06.16.L	FIRE RATED EXTERIOR GRADE PLYWOOD SHEATHING.
06.16.V	5/8" EXTERIOR GRADE GLASS MAT SHEATHING. SEE SPECIFICATIONS FOR MORE INFORMATION.
07.21.AM	2 LAYERS OF 2" RIGID INSULATION. SEE SPECIFICATIONS FOR MORE INFORMATION.
07.21.E	R-19 BATT INSULATION. SEE SPECIFICATIONS FOR MORE INFORMATION.
07.22.B	2" (MIN.) BELOW-GRADE BUILDING PERIMETER INSULATION. SEE SPECIFICATIONS FOR MORE INFORMATION. FULL HEIGHT OF STEM WALL/FOUNDATION + MIN. 24" INTO BUILDING.
07.24.G	EIFS APPLIED OVER INSULATION BOARD. SEE SPECIFICATIONS FOR MORE INFORMATION.

KEYNOTE LEGEND

07.27.C	FLUID-APPLIED WEATHER RESISTIVE BARRIER (WRB) SYSTEM. SEE SPECIFICATIONS FOR MORE INFORMATION. SYSTEM JOINT/CORNER TAPE TO BE APPLIED AT ALL PANEL JOINTS, SILLS/JAMBS/HEADS OF ALL OPENINGS AND WRAP TO WARM SIDE OF OPENING, AT INSIDE/OUTSIDE CORNERS, PENETRATIONS, AND AT ALL MANUFACTURER REQUIRED LOCATIONS; SYSTEM TO WRAP OVER ANY PARAPET; AND SYSTEM TO PROVIDE A CONTINUOUS BUILDING ENVELOPE.
07.46.A	FIBER-REINFORCED CEMENT HORIZONTAL SIDING (PROFILE 1) WITH INTEGRAL COLOR. SEE SPECIFICATIONS FOR MORE INFORMATION. SEE ELEVATION SHEETS FOR LOCATION OF TRIM/JOINTS.
07.46.G	FIBER-REINFORCED CEMENT TRIM BOARD, 4" EXPOSED FACE. SEE SPECIFICATIONS FOR MORE INFORMATION.
07.54.A	SINGLE PLY, FULLY-ADHERED TPO ROOF MEMBRANE SYSTEM. SEE SPECIFICATIONS FOR MORE INFORMATION. MEMBRANE TO WRAP PARAPET WALLS AND OVER PARAPET CAP. PROVIDE SHEATHING ON WALLS THAT NEED A SUBSTRATE FOR ADHERENCE.
07.62.A	PREFORMED, SHEET METAL FLASHING. PROVIDE POSITIVE SLOPE AWAY FROM BUILDING. SEE SPECIFICATIONS AND DETAILS FOR MORE INFORMATION. ALL EXPOSED EDGES TO BE HEMMED.
07.62.F	PREFORMED, PREFINISHED METAL PARAPET COPING FLASHING + INTEGRAL DRIPS + CONTINUOUS CLEATS ON BOTH SIDES. SLOPE PAPARET TOP MIN 1/4" PER 12". SEE SPECIFICATIONS FOR MORE INFORMATION. PROVIDE MINIMUM 4" LAP JOINT W/ CONTINUOUS SEALANT. PROVIDE SLOTTED OR OVERSIZE HOLES IN CLEATS FOR EXPANSION/CONTRACTION. LEG LENGTHS AS SHOWN IN DETAILS OR AS SPECIFIED BY ARCHITECT. ALL EXPOSED EDGES TO BE HEMMED.
07.62.H	PREFORMED, PREFINISHED METAL EDGE OF ROOF DRIP EDGE FLASHING WITH MIN. 4" LEG ONTO ROOF, 1/2" DRIP, AND MIN. 2" VERTICAL LEG CLIPPED INTO CLEAT. GUTTERS ARE TO BE TUCKED BEHIND DRIP EDGE; AND ROOF MEMBRANES ARE TO COVER 4" LEG. ALL EXPOSED EDGES TO BE HEMMED. PROVIDE MINIMUM 4" LAP JOINT W/ CONTINUOUS SEALANT.
07.62.K	PREFORMED, PREFINISHED FASCIA CLOSURE FLASHING WITH INTEGRAL DRIP EDGE (MIN. 1/2") ALONG BOTTOM LEADING EDGE. TOP EDGE TO BE TUCKED BEHIND DRIP EDGE (AND GUTTER IF PRESENT). LOWER EDGE TO BE TUCKED BEHIND SUB-FASCIA (AND SOFFIT IF PRESENT) MIN. 1/2". SIZE OF FASCIA ENCLOSURE AS SHOWN IN DETAILS OR AS SPECIFIED BY ARCHITECT. ALL EXPOSED EDGES TO BE HEMMED. PROVIDE MINIMUM 4" LAP JOINT W/ CONTINUOUS SEALANT.
07.62.M	PREFORMED, PREFINISHED BASE + COUNTER FLASHING FOR BASE OF WALL WITH INTEGRAL HEMMED DRIP EDGE. BASE FLASHING IS TO HAVE MIN. 4" LEG ON THE INSIDE FACE OF THE SHEATHING. COUNTER FLASHING IS TO HAVE MIN. 4" LEG, BE PLACED OVER SHEATHING, PROVIDE CLOSURE TO FINISH MATERIAL, AND BE HEMMED WITH BASE FLASHING. COVER TOP EDGE OF COUNTER FLASHING WITH WEATHER BARRIER SYSTEM FOR POSITIVE DRAINAGE.
07.71.F	PREFORMED, PREFINISHED (MIN. 24 GAUGE) 6" HIGH X 6" DEEP RECTANGULAR METAL GUTTER. USE PREFINISHED GUTTER BRACKETS OF GAUGE THICKER THAN GUTTER AT 24" O.C. TYP. SEE ROOF PLAN FOR DOWNSPOUT LOCATIONS. SEE SPECIFICATIONS FOR MORE INFORMATION.
07.92.C	PERIMETER BASE OF WALL POLYURETHANE SEALANT. FULLY SPREAD SEALANT AT BASE OF WALL AND BELOW THE SILL PLATE @ PERIMETER WALLS, TYP. WHERE STOREFRONT OR WINDOW SYSTEMS ARE USED. PERIMETER SEALANT IS TO BE BELOW SILL FLASHING.
07.92.D	CONTINUOUS SEALANT @ DISSIMILAR MATERIALS. FULL PERIMETER OF CONNECTION AS REQUIRED. FOLLOW MANUFACTURERS WRITTEN INSTRUCTIONS. SEE SPECIFICATIONS FOR MORE INFORMATION.
08.11.B	HOLLOW METAL DOOR HEAD. SEE DETAILS, SPECIFICATIONS, AND A3 SERIES SHEETS FOR MORE INFORMATION.
08.43.B	ALUMINUM (PREFINISHED) STOREFRONT SILL. SEE DETAILS, SPECIFICATIONS, AND A3 SERIES SHEETS FOR MORE INFORMATION.
08.43.D	ALUMINUM (PREFINISHED) STOREFRONT HEAD. SEE DETAILS, SPECIFICATIONS, AND A3 SERIES SHEETS FOR MORE INFORMATION.
09.29.L	5/8" GYPSUM WALLBOARD (MOISTURE RESISTANT). SEE SPECIFICATIONS FOR MORE INFORMATION.
31.23.E	COMPACTED GRAVEL SUB-BASE. SEE CIVIL, STRUCTURAL, AND ARCHITECTURAL DETAIL SHEETS AND SPECIFICATIONS FOR MORE INFORMATION.
33.46.D	SELF-ADHERING SHEET WATERPROOFING BELOW-GRADE FOUNDATION DRAINAGE SYSTEM - SEE SPECIFICATIONS FOR MORE INFORMATION. SYSTEM INCLUDES, AT MINIMUM, THE FOLLOWING: PERFORATED FABRIC DRAINAGE MAT OVER RAISED PANEL DRAINAGE PLANE OVER WATERPROOFING MEMBRANE OVER CONCRETE WALL PRIMER. EXTEND UP CONCRETE FOOTING/FOUNDATION AND COVER WITH TERMINATION BAR AND CONTINUOUS CAULK AT 6 INCHES BELOW GRADE.



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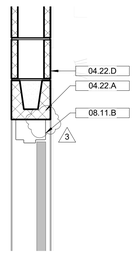

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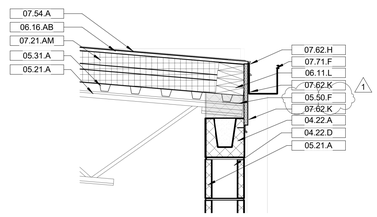

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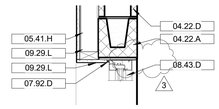

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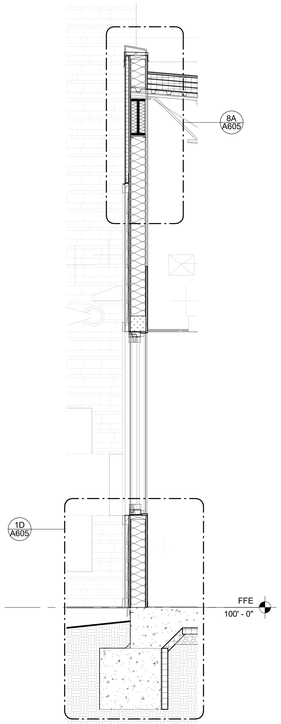

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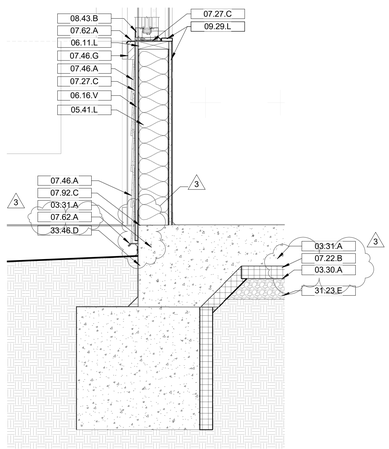

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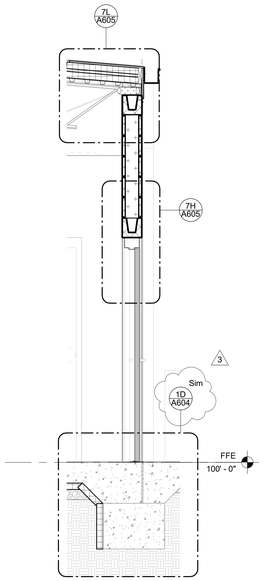

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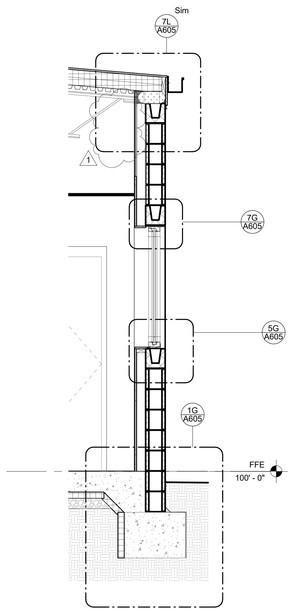

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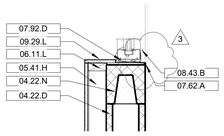

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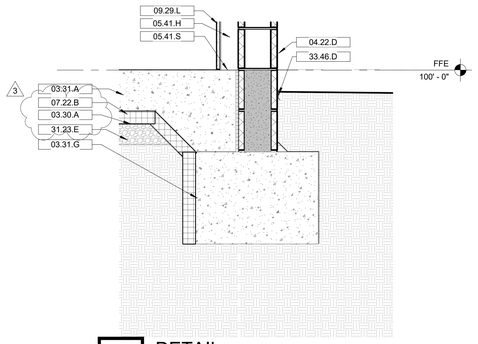

1G A605 DETAIL
scale: 1" = 1'-0"

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REVISIONS

NO.	DESCRIPTION	DATE
1	ADD 01	01.11.23
3	ADD 03	02.09.23

PROJECT NO.: 19-040 DRAWN BY: HDG
DATE: 12.15.22 REVIEWED BY: BMS

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PROFESSIONAL TITLE: ARCHITECT
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BRENT M. STEVENS
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MO A-2000151419
ARCHITECT

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PROJECT TITLE

CITY OF WENTZVILLE, MO PUBLIC WORKS FACILITY

PROJECT ADDRESS:
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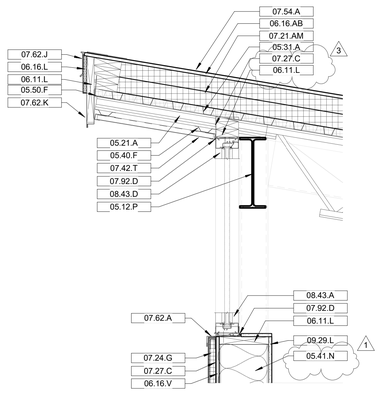
WALL SECTIONS + DETAILS

SHEET
A605



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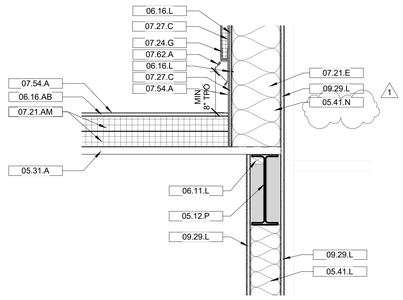

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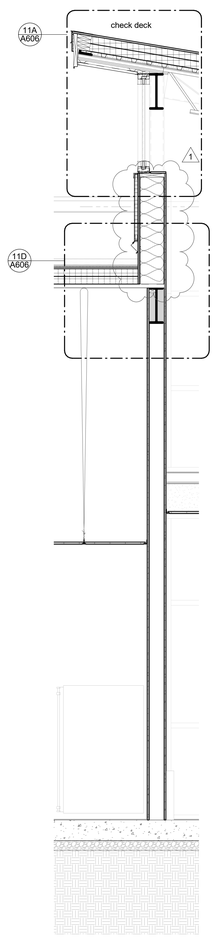

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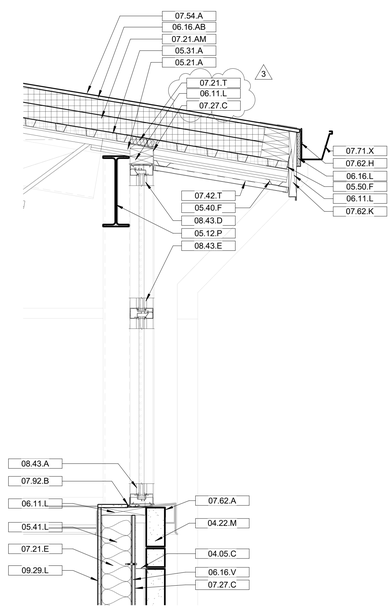

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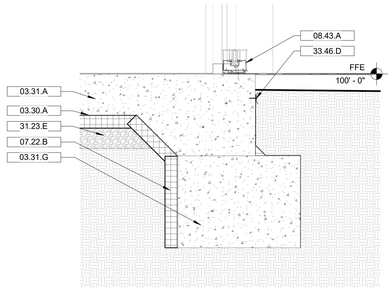

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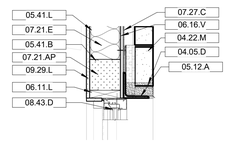

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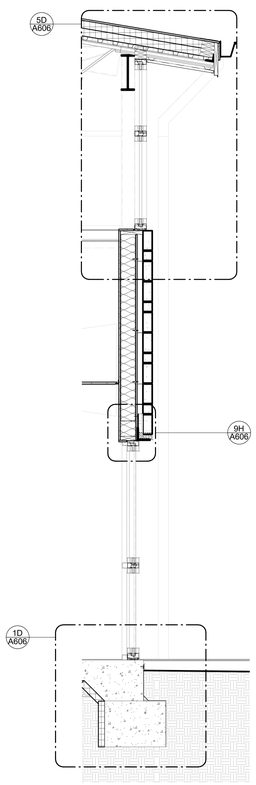

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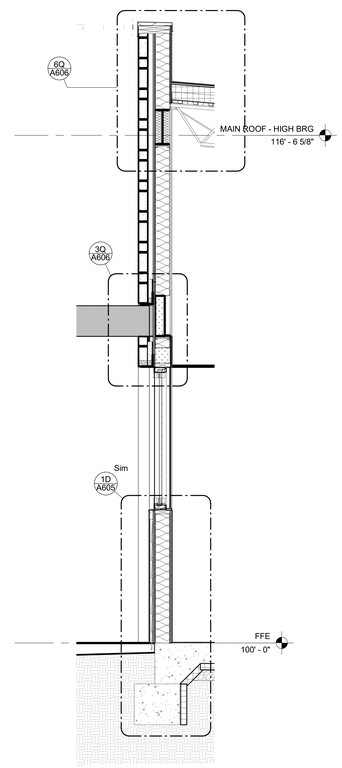


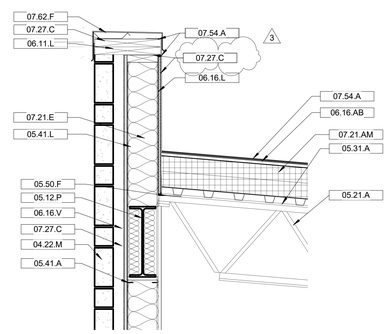
1L A606 WALL SECTION
scale: 1/2" = 1'-0"

KEYNOTE LEGEND

03.30.A	UNDERSLAB VAPOR RETARDER. SEE SPEC SECTION "033099 UNDERSLAB VAPOR RETARDER" FOR MORE INFORMATION.
03.31.A	THICKENED SLAB. SEE STRUCTURAL DRAWINGS FOR MORE INFORMATION.
03.31.G	CAST-IN-PLACE CONCRETE FOOTING PER STRUCTURAL. SEE STRUCTURAL DRAWINGS FOR MORE INFORMATION.
04.05.C	MASONRY ANCHORS @ 18" O.C. VERTICALLY & HORIZONTALLY. SEE ARCHITECTURAL SPECIFICATIONS FOR MORE INFORMATION.
04.05.D	MORTAR NET, MORTAR DROPPING CONTROL, THRU-WALL FLASHING AND WEEPS. SEE ARCHITECTURAL SPECIFICATIONS FOR MORE INFORMATION.
04.22.M	4" LIMESTONE BED STONE BLOCK. SEE SPECIFICATIONS FOR MORE INFORMATION.
05.12.A	STRUCTURAL STEEL ANGLE. SEE STRUCTURAL DRAWINGS FOR MORE INFORMATION.
05.12.N	STRUCTURAL STEEL TUBE STEEL SHAPE. SEE STRUCTURAL DRAWINGS FOR MORE INFORMATION.
05.12.P	STRUCTURAL STEEL BEAM. SEE STRUCTURAL FOR MORE INFORMATION.
05.21.A	STRUCTURAL STEEL JOIST. SEE STRUCTURAL FOR MORE INFORMATION.
05.31.A	COMPOSITE METAL DECK PER STRUCTURAL. SEE STRUCTURAL DRAWINGS FOR MORE INFORMATION.
05.40.F	7/8" HAT CHANNEL @ 16" O.C..
05.41.A	METAL STUD SLOTTED DEFLECTION/SLIP TRACK FRAMING. USE MANUFACTURER WRITTEN INSTALLATION METHODS.
05.41.B	METAL STUD BOX BEAM HEADER. SEE STRUCTURAL DRAWINGS AND SPECIFICATIONS FOR MORE INFORMATION. CONTRACTOR TO VERIFY STUD GAUGE TO PROVIDE ADEQUATE STRUCTURAL SUPPORT.
05.41.L	6" METAL STUD FRAMING @ 16" O.C.,TYP. SEE STRUCTURAL DRAWINGS FOR GAUGE AND MORE INFORMATION.
05.41.N	10" METAL STUD FRAMING @ 16" O.C.,TYP. SEE STRUCTURAL DRAWINGS FOR GAUGE AND MORE INFORMATION.
05.50.F	CONTINUOUS BENT PLATE DECK CLOSURE. SEE STRUCTURAL FOR MORE INFORMATION.
06.11.L	WOOD BLOCKING AS REQUIRED - USE TREATED WOOD BLOCKING IN EXTERIOR OR WET APPLICATIONS. SEE DETAIL SHEETS (ALL DISCIPLINES) FOR MORE INFORMATION.
06.16.AB	COVERBOARD. SEE SPECIFICATIONS FOR MORE INFORMATION.
06.16.L	FIRE RATED EXTERIOR GRADE PLYWOOD SHEATHING.
06.16.V	5/8" EXTERIOR GRADE GLASS MAT SHEATHING. SEE SPECIFICATIONS FOR MORE INFORMATION.
07.21.AM	2 LAYERS OF 2" RIGID INSULATION. SEE SPECIFICATIONS FOR MORE INFORMATION.
07.21.AP	CLOSED-CELL SPRAY-APPLIED FOAM INSULATION. FILL ENTIRE CAVITY OF INDICATED ELEMENT(S). SEE SPECIFICATIONS FOR MORE INFORMATION.
07.21.E	R-19 BATT INSULATION. SEE SPECIFICATIONS FOR MORE INFORMATION.
07.21.T	UNFACED BATT INSULATION. PROVIDE THICKNESS TO CONTINUOUSLY FILL SEE GAP. SPECIFICATIONS FOR MORE INFORMATION.
07.22.B	2" (MIN.) BELOW-GRADE BUILDING PERIMETER INSULATION. SEE SPECIFICATIONS FOR MORE INFORMATION. FULL HEIGHT OF STEM WALL/FOUNDATION + MIN. 24" INTO BUILDING.
07.24.G	EIFS APPLIED OVER INSULATION BOARD. SEE SPECIFICATIONS FOR MORE INFORMATION.

KEYNOTE LEGEND

07.27.C	FLUID-APPLIED WEATHER RESISTIVE BARRIER (WRB) SYSTEM. SEE SPECIFICATIONS FOR MORE INFORMATION. SYSTEM JOINT/CORNER TAPE TO BE APPLIED AT ALL PANEL JOINTS, SILLS/JAMBS/HEADS OF ALL OPENINGS AND WRAP TO WARM SIDE OF OPENING, AT INSIDE/OUTSIDE CORNERS, PENETRATIONS, AND AT ALL MANUFACTURER REQUIRED LOCATIONS; SYSTEM TO WRAP OVER ANY PARAPET; AND SYSTEM TO PROVIDE A CONTINUOUS BUILDING ENVELOPE.
07.42.T	PREFORMED, PREFINISHED UNVENTED METAL SOFFIT PANELS. SEE SPECIFICATIONS FOR MORE INFORMATION.
07.54.A	SINGLE PLY FULLY-ADHERED TPO ROOF MEMBRANE SYSTEM. SEE SPECIFICATIONS FOR MORE INFORMATION. MEMBRANE TO WRAP PARAPET WALLS AND OVER PARAPET CAP. PROVIDE SHEATHING ON WALLS THAT NEED A SUBSTRATE FOR ADHERENCE.
07.62.A	PREFORMED, SHEET METAL FLASHING. PROVIDE POSITIVE SLOPE AWAY FROM BUILDING. SEE SPECIFICATIONS AND DETAILS FOR MORE INFORMATION. ALL EXPOSED EDGES TO BE HEMMED.
07.62.F	PREFORMED, PREFINISHED METAL PARAPET COPING FLASHING + INTEGRAL DRIPS + CONTINUOUS CLEATS ON BOTH SIDES. SLOPE PARAPET TOP MIN 1/4" PER 12". SEE SPECIFICATIONS FOR MORE INFORMATION. PROVIDE MINIMUM 4" LAP JOINT W/ CONTINUOUS SEALANT. PROVIDE SLOTTED OR OVERSIZE HOLES IN CLEATS FOR EXPANSION/CONTRACTION. LEG LENGTHS AS SHOWN IN DETAILS OR AS SPECIFIED BY ARCHITECT. ALL EXPOSED EDGES TO BE HEMMED.
07.62.H	PREFORMED, PREFINISHED METAL EDGE OF ROOF DRIP EDGE FLASHING WITH MIN. 4" LEG ONTO ROOF; 1/2" DRIP; AND MIN. 2" VERTICAL LEG CLIPPED INTO CLEAT. GUTTERS ARE TO BE TUCKED BEHIND DRIP EDGE; AND ROOF MEMBRANES ARE TO COVER 4" LEG. ALL EXPOSED EDGES TO BE HEMMED. PROVIDE MINIMUM 4" LAP JOINT W/ CONTINUOUS SEALANT.
07.62.J	PREFORMED, PREFINISHED METAL EDGE OF ROOF RAKE FLASHING WITH MIN. 4" LEG ONTO ROOF; DRIP; AND VERTICAL LEG CLIPPED INTO CLEAT. ROOF MEMBRANES ARE TO COVER 4" LEG. ALL EXPOSED EDGES TO BE HEMMED. PROVIDE MINIMUM 4" LAP JOINT W/ CONTINUOUS SEALANT.
07.62.K	PREFORMED, PREFINISHED FASCIA CLOSURE FLASHING WITH INTEGRAL DRIP EDGE (MIN. 1/2") ALONG BOTTOM LEADING EDGE. TOP EDGE TO BE TUCKED BEHIND DRIP EDGE (AND GUTTER IF PRESENT). LOWER EDGE TO BE TUCKED BEHIND SUB-FASCIA (AND SOFFIT IF PRESENT) MIN. 1/2". SIZE OF FASCIA ENCLOSURE AS SHOWN IN DETAILS OR AS SPECIFIED BY ARCHITECT. ALL EXPOSED EDGES TO BE HEMMED. PROVIDE MINIMUM 4" LAP JOINT W/ CONTINUOUS SEALANT.
07.71.X	PREFORMED, PREFINISHED (MIN. 24 GAUGE) 4" WIDE X 4" DEEP RECTANGULAR METAL DOWNSPOUT. SEE SPECIFICATIONS FOR MORE INFORMATION.
07.92.B	CONTINUOUS BACKER ROD & SEALANT AROUND PERIMETER, BOTH SIDES OF WALL/OPENING, TYP.
07.92.D	CONTINUOUS SEALANT @ DISSIMILAR MATERIALS, FULL PERIMETER OF CONNECTION AS REQUIRED. FOLLOW MANUFACTURERS WRITTEN INSTRUCTIONS. SEE SPECIFICATIONS FOR MORE INFORMATION.
08.43.A	ALUMINUM (PREFINISHED) STOREFRONT FRAME ASSEMBLY. SEE DETAILS, SPECIFICATIONS, AND A3 SERIES SHEETS FOR MORE INFORMATION.
08.43.D	ALUMINUM (PREFINISHED) STOREFRONT HEAD. SEE DETAILS, SPECIFICATIONS, AND A3 SERIES SHEETS FOR MORE INFORMATION.
08.43.E	ALUMINUM (PREFINISHED) STOREFRONT MULLION TO MATCH SIZE/DESIGN OF FRAME. SEE DETAILS, SPECIFICATIONS, AND A3 SERIES SHEETS FOR MORE INFORMATION.
09.29.L	5/8" GYPSUM WALLBOARD (MOISTURE RESISTANT). SEE SPECIFICATIONS FOR MORE INFORMATION.
09.51.A	ACOUSTIC CEILING TILE. SEE REFLECTED CEILING PLANS, DETAILS, AND SPECIFICATIONS FOR MORE INFORMATION.
31.23.E	COMPACTED GRAVEL SUB-BASE. SEE CIVIL, STRUCTURAL, AND ARCHITECTURAL DETAIL SHEETS AND SPECIFICATIONS FOR MORE INFORMATION.
33.46.D	SELF-ADHERING SHEET WATERPROOFING BELOW-GRADE FOUNDATION DRAINAGE SYSTEM - SEE SPECIFICATIONS FOR MORE INFORMATION. SYSTEM INCLUDES, AT MINIMUM, THE FOLLOWING: PERFORATED FABRIC DRAINAGE MAT OVER RAISED PANEL DRAINAGE PLANE OVER WATERPROOFING MEMBRANE OVER CONCRETE WALL PRIMER. EXTEND UP CONCRETE FOOTING/FOUNDATION AND COVER WITH TERMINATION BAR AND CONTINUOUS CAULK AT 6 INCHES BELOW GRADE.



6Q A606 DETAIL
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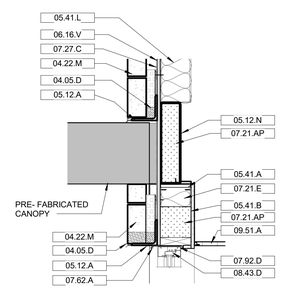

3Q A606 DETAIL
scale: 1" = 1'-0"

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REVISIONS

NO.	DESCRIPTION	DATE
1	ADD 01	01.11.23
3	ADD 03	02.09.23

PROJECT NO.:	19-040	DRAWN BY:	HDG
DATE:	12.15.22	REVIEWED BY:	BMS

PROFESSIONAL SEAL
BRENT M. STEVENS, AIA NCARB
PROFESSIONAL TITLE: ARCHITECT
MO# A-2000151419

STATE OF MISSOURI
BRENT M. STEVENS
NUMBER
MO A-2000151419
ARCHITECT

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Date: 2023.02.09 10:55:21-06'00'

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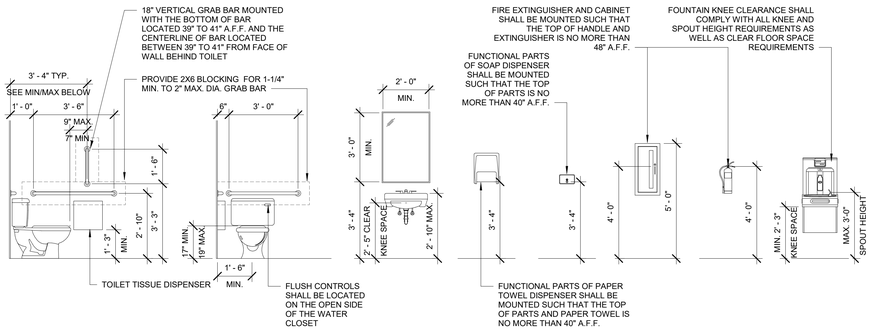
PROJECT TITLE
CITY OF WENTZVILLE, MO PUBLIC WORKS FACILITY

PROJECT ADDRESS:
1295 INTERSTATE DRIVE
WENTZVILLE, MO 63385

WALL SECTIONS + DETAILS

SHEET
A606



10A A702 TYPICAL MOUNTING HEIGHTS

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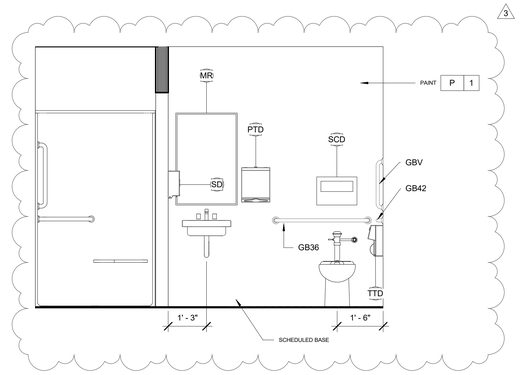
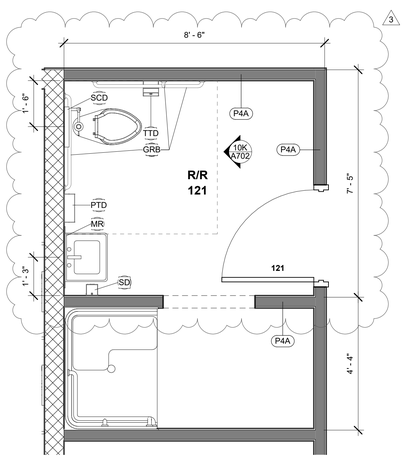


10K A702 RR 121

scale: 1/2" = 1'-0"

TOILET ACCESSORIES SCHEDULE

Type Mark	Description	Comments
GRB	GRAB BARS	CFCI- SEE SPECIFICATIONS
MR	MIRROR	CFCI- SEE SPECIFICATIONS
PTD	PAPER TOWEL DISPENSER	CFCI- SEE SPECIFICATIONS
SCD	SEAT COVER DISPENSER	CFCI- SEE SPECIFICATIONS
SD	SOAP DISPENSER	CFCI- SEE SPECIFICATIONS
SND	SANITARY NAPKIN DISPOSAL	CFCI- SEE SPECIFICATIONS
TTD	TOILET TISSUE DISPENSER	CFCI- SEE SPECIFICATIONS



5A A702 RR 121

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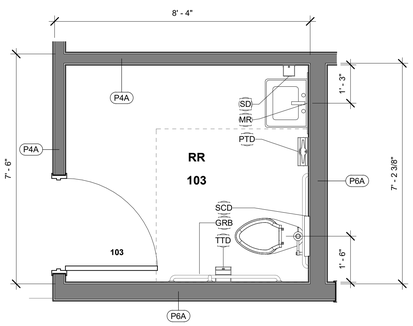

5D A702 ENLARGED RESTROOM PLAN

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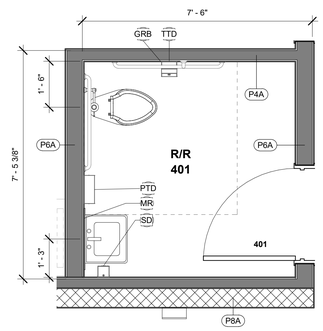

5H A702 RR 401

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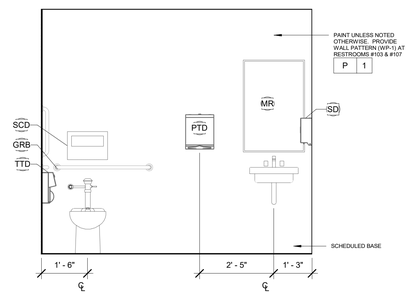

5M A702 RESTROOM ELEVATION

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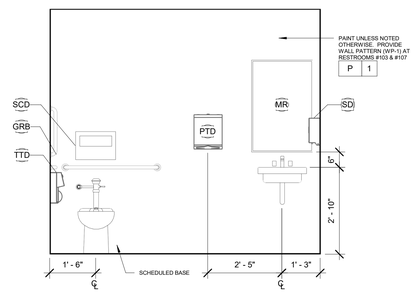

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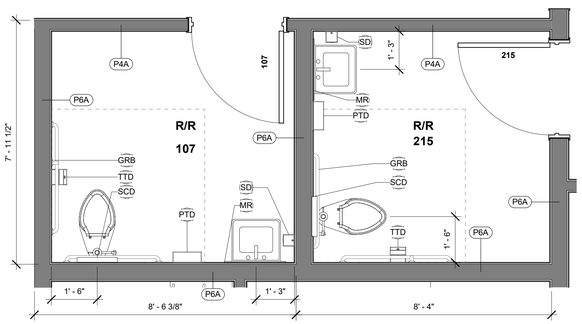

1A A702 RR 107/215

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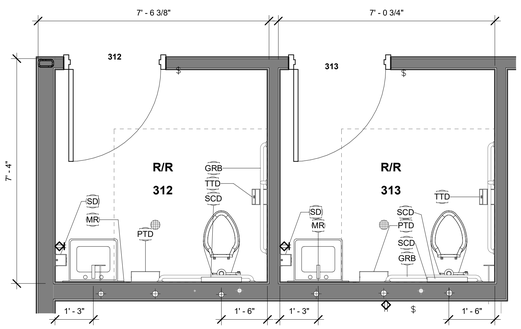

1G A702 RR 312/313

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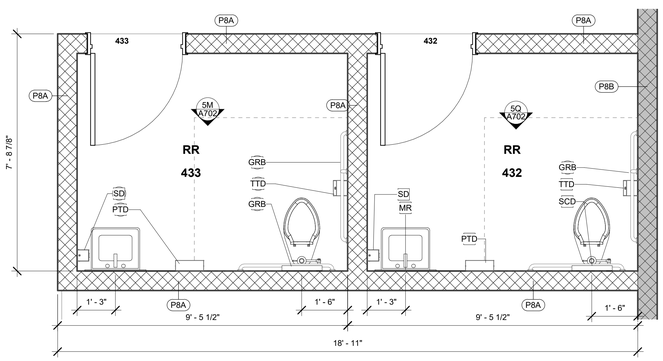

1M A702 ENLARGED RESTROOM PLAN

scale: 1/2" = 1'-0"

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REVISIONS

NO.	DESCRIPTION	DATE
3	ADD 03	02.09.23

PROJECT NO.: 19-040 DRAWN BY: HDG
DATE: 12.15.22 REVIEWED BY: BMS

PROFESSIONAL SEAL

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PROFESSIONAL TITLE: ARCHITECT
MO# A-2000151419

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Date: 2023.02.09 10:55:22-06'00'

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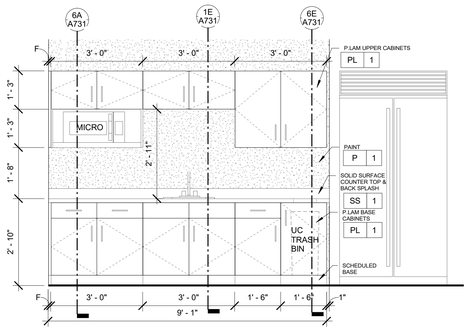
PROJECT TITLE

CITY OF WENTZVILLE, MO PUBLIC WORKS FACILITY

PROJECT ADDRESS:
1295 INTERSTATE DRIVE
WENTZVILLE, MO 63385

ENLARGED RESTROOM PLANS + DETAILS

SHEET
A702



12A A721 411 FLEET KITCHENETTE
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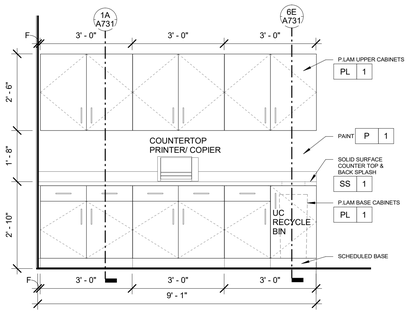

12F A721 403 FLEET PRINT
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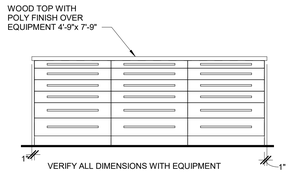

12H A721 OPEN WORK AREA 314
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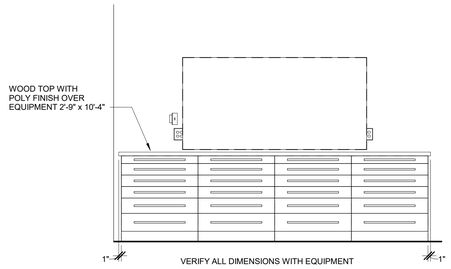
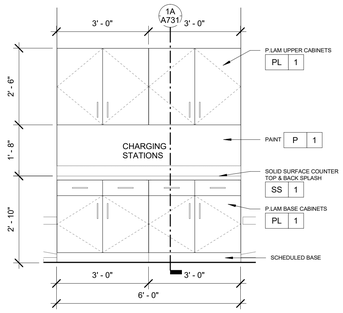


12L A721 PARTS ROOM 434 (TWO LOCATIONS)
scale: 1/2" = 1'-0"

GENERAL NOTES - MILLWORK

1. COORDINATE FINAL FINISHES AND CABINETRY DETAILS WITH ARCHITECT PRIOR TO FABRICATION. IF THERE IS A DISCREPANCY BETWEEN DETAILS, PLEASE NOTIFY ARCHITECT PRIOR TO FABRICATION
2. REFER TO INTERIOR FINISH SHEETS FOR ROOM FINISH SCHEDULE, MATERIALS LEGEND AND ADDITIONAL WALL AND FLOOR FINISH INFORMATION
3. CONSTRUCT WALLS WITH ROUGH OPENINGS AS NEEDED FOR SIZES OF MILLWORK INDICATED
4. INSTALL MATCHING WOOD SCRIBE AT ALL MILLWORK/WALL JOINTS
5. REMOVED
6. PRIOR TO FABRICATION OF CASEWORK, CONTRACTOR SHALL FIELD VERIFY ACTUAL FINISH WALL DIMENSIONS
7. PROVIDE FINISHED SURFACES ON MILLWORK & COUNTERTOPS WHERE EXPOSED TO VIEW
8. UTILIZE 2X WOOD BLOCKING AS REQUIRED FOR INSTALLATION OF MILLWORK WHERE INDICATED AND AS NEEDED FOR SECURE ANCHOR TO WALLS
9. CONTINUOUS CAULK AROUND ALL FIXTURES AT FLOORS, WALLS, ETC.
10. PROVIDE 1/4" GAP BETWEEN ALL DOORS, DRAWERS, LATERAL FILE, AND OTHER MOVEABLE PIECES OF MILLWORK
11. REMOVED
12. REMOVED
13. COUNTERTOPS TO BE SOLID SURFACE MATERIAL PER SPECS IN ALL AREAS.
14. ALL HARDWARE TO BE SATIN NICKEL.
15. BID ALTERNATE 4 REQUESTS TO PROVIDE ALTERNATE PRICING FOR ENGINEERED QUARTZ TOPS AT ALL WET AREAS (ROOMS 108, 119, 120, 123, 213, 214, 301 AND 411) IN LIEU OF SOLID SURFACE TOPS.
16. BID ALTERNATE 5 REQUESTS TO PROVIDE ALTERNATE PRICING FOR PLASTIC LAMINATE TOPS AT ALL DRY AREAS (ROOMS 112, 117, 211, 216, 308 AND 403) IN LIEU OF SOLID SURFACE TOPS.



8A A721 211 WATER WORK
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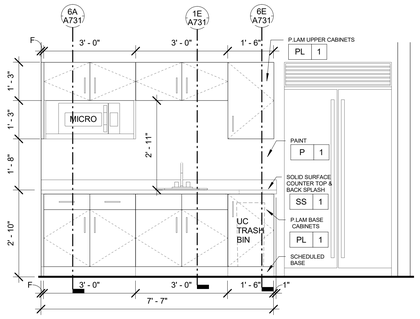

8D A721 213 WATER KITCHENETTE
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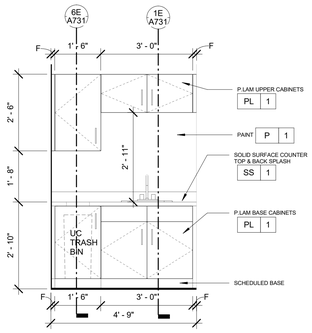

8J A721 213 WATER LAB
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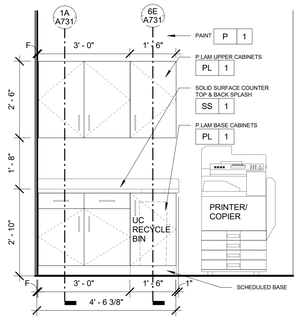

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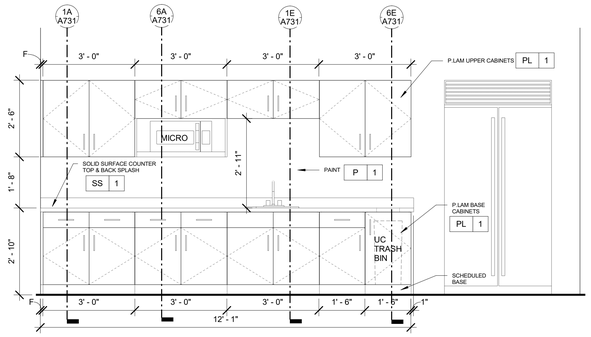

8P A721 301 STREETS KITCHENETTE
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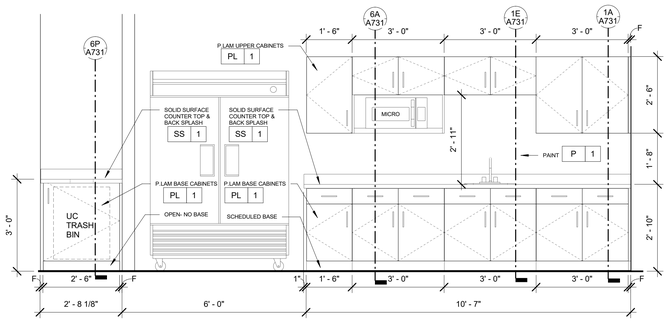

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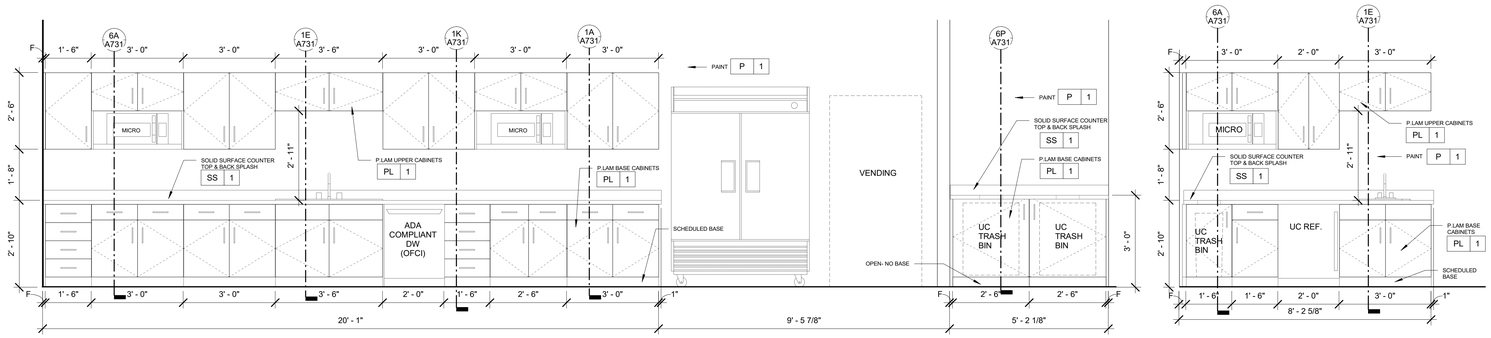

4G A721 120 BREAKROOM
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4Q A721 123 WELLNESS
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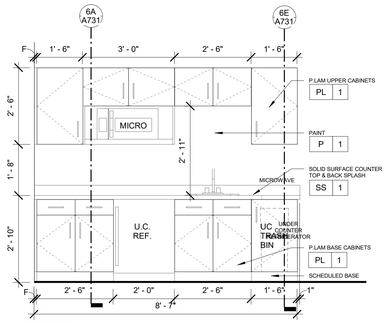

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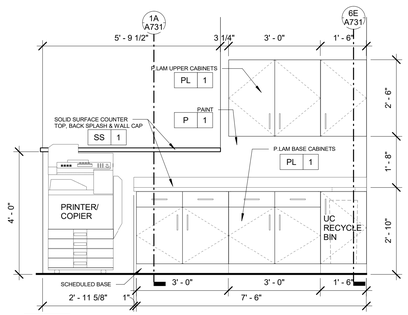

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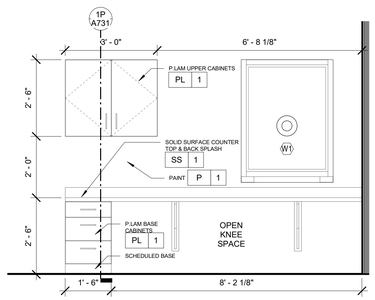

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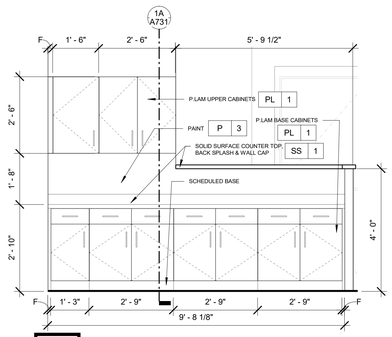

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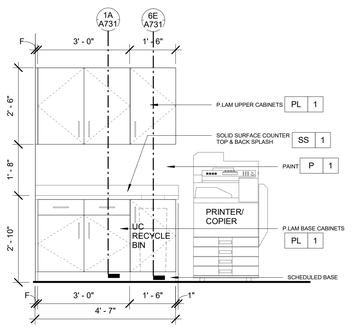

1Q A721 308 STREETS PRINTER
scale: 1/2" = 1'-0"

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LENEXA, KS 66214
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REVISIONS

NO.	DESCRIPTION	DATE
3	ADD 03	02.09.23

PROJECT NO.: 19-040 DRAWN BY: HDG
DATE: 12.15.22 REVIEWED BY: BMS

PROFESSIONAL SEAL
BRENT M. STEVENS, AIA NCARB
PROFESSIONAL TITLE: ARCHITECT
MO# A-2000151419

STATE OF MISSOURI
BRENT M. STEVENS
NUMBER
MO A-2000151419
ARCHITECT

Digitally signed by Brent Stevens
DN: C=US, E=bmm@hdesigngroup.com, O=H Design Group, OU=Architect, CN=Brent Stevens
Date: 2023.02.09 16:55:22-06'00'

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PROJECT TITLE
CITY OF WENTZVILLE, MO PUBLIC WORKS FACILITY

PROJECT ADDRESS:
1295 INTERSTATE DRIVE
WENTZVILLE, MO 63385

MILLWORK ELEVATIONS

SHEET
A721

ROOM FINISH SCHEDULE

Name	Number	Floor Finish	Ceiling Finish	Wall Finish	Base Finish	Remarks
VESTIBULE	100	WOC-1	ACT-1	P-2	B-1	#1 & #7
LOBBY	101	FP-2	P-1	P-2	B-1	#3, #5, #6, #8, #9, #10, #11, & #32
CONF	102	FP-3	ACT-1	P-2	B-1	#5, #8, & #11
RR	103	FP-4	P-1	P-2	CWB-1	#3, #9, #12, & #35
STOR	104	SC-1	P-1	P-2	B-1	#34
CORRIDOR	105	SC-1	ACT-1	P-2	B-1	#4, #6, #10, #13, #14, #15, #16, & #34
CORRIDOR	106	SC-1	ACT-1	P-2	B-1	#2, #6, #17, #18, #19. & # 34
R/R	107	FP-4	P-1	P-2	CWB-1	#4, #14, #20, & #35
KIT	108	C-1	ACT-1	P-2	B-1	#36
TRAFFIC/ SCADA	109	SC-1	ACT-1	P-2	B-1	#21 & #34
PW DIR	110	C-1	ACT-1	P-2	B-1	
STOR	111	C-1	P-1	P-2	B-1	
PRINT SUPPLY	112	C-1	ACT-1	P-2	B-1	
ASST DIR PW	113	C-1	ACT-1	P-2	B-1	
ASST DIR PW	114	C-1	ACT-1	P-2	B-1	
CONFERENCE	115	FP-3	ACT-1	P-2	B-1	#1, #6, #17, #22, & #23
CORRIDOR	116	C-1	ACT-1	P-2	B-1	
CUST ADMIN	117	C-1	ACT-1	P-2	B-1	#23
STOR	118	SC-1	ACT-1	P-2	B-1	#6, #24, & #34
TRAINING/ COMMUNITY	119	FP-1	ACT-1	P-2	B-1	#6, #13, #25, & #36
BREAK ROOM	120	FP-1	ACT-1	P-2	B-1	#6, #17, #26, & #36
R/R	121	SC-1	P-1	P-2	B-1	#34 & #35
R/R	121	SC-1	P-1	P-2	B-1	#34 & #35
LAUNDRY	122	SC-1	P-1	P-2	B-1	#34 & #35
WELLNESS	123	C-1	ACT-1	P-3	B-1	#2, #18, & #36
MUD ROOM	124	SC-1	ACT-1	P-2	B-1	#33 & #35
WOMEN LOCKER	125	SC-1	ACT-1	P-2	B-1	#34 & #35
UNISEX LOCKERS	126	SC-1	ACT-1	P-2	B-1	#34, #35, & SEE SPECIFIATIONS FOR MORE INFORMATION
MEN LOCKER	127	SC-1	ACT-1	P-2	B-1	#34 & #35
JANITOR STOR	128	SC-1	P-1	P-2	B-1	#32, #34, & #35
LOBBY	129	SC-1	ACT-1	P-2	B-1	#2, #25, #27, & #34
VESTIBULE	130	WOC-1	P-1	P-2	B-1	#2 #27, & #28
ELECTRICAL	131	SC-1	P-1	P-2	B-1	#2, #28, #32, & #33
DATA	132	SC-1	P-1	P-2	B-1	#32 & #33
MECHANICAL	133	SC-1	P-1	P-2	B-1	#32 & #33
CLOS	134	SC-1	P-1	P-2	B-1	#32 & #33
CORRIDOR	200	SC-1	ACT-1	P-2	B-1	#34 & SEE SPECIFICATIONS FOR MORE INFORMATION
WATER SUPV	201	SC-1	ACT-1	P-2	B-1	#34 & SEE SPECIFICATIONS FOR MORE INFORMATION
WATER SUPV	202	SC-1	ACT-1	P-2	B-1	#34 & SEE SPECIFICATIONS FOR MORE INFORMATION
ADMIN	203	SC-1	ACT-1	P-2	B-1	#34 & SEE SPECIFICATIONS FOR MORE INFORMATION
WATER SUPT	204	SC-1	ACT-1	P-2	B-1	#34 & SEE SPECIFICATIONS FOR MORE INFORMATION
WATER SUPV	205	SC-1	ACT-1	P-2	B-1	#34 & SEE SPECIFICATIONS FOR MORE INFORMATION
GIS	206	SC-1	ACT-1	P-2	B-1	#34 & SEE SPECIFICATIONS FOR MORE INFORMATION
FOREMAN	207	SC-1	ACT-1	P-2	B-1	#34
FOREMAN	208	SC-1	ACT-1	P-2	B-1	#34
FOREMAN	209	SC-1	ACT-1	P-2	B-1	#34
SCADA DATA/IT	210	SC-1	P-1	P-2	B-1	#32 & #34
OPEN WORK AREA	211	SC-1	ACT-1	P-2	B-1	#34 & SEE SPECIFICATIONS FOR MORE INFORMATION
STORAGE	212	SC-1	ACT-1	P-2	B-1	#34
KIT	213	SC-1	ACT-1	P-2	B-1	#34 & #36
LAB	214	SC-1	ACT-1	P-2	B-1	#34 & #36
R/R	215	SC-1	P-1	P-2	B-1	#34 & #35
PRINT SUPPLY	216	SC-1	ACT-1	P-2	B-1	#34
WATER SHOP	217	SC-1	P-1	P-2	B-1	#32, #33, #35, & SEE SPECIFICATIONS FOR MORE INFORMATION
CORRIDOR	300	SC-1	ACT-1	P-2	B-1	#29 & #34
KITCHENETTE	301	SC-1	ACT-1	P-2	B-1	#34 & #36
SUPT ST SIGNAL	302	SC-1	ACT-1	P-2	B-1	#34 & SEE SPECIFICATIONS FOR MORE INFORMATION
SUPV ST	303	SC-1	ACT-1	P-2	B-1	#34 & SEE SPECIFICATIONS FOR MORE INFORMATION
SUPV ST	304	SC-1	ACT-1	P-2	B-1	#34 & SEE SPECIFICATIONS FOR MORE INFORMATION
OFFICE	305	SC-1	ACT-1	P-2	B-1	#34 & SEE SPECIFICATIONS FOR MORE INFORMATION
FOREMAN	306	SC-1	ACT-1	P-2	B-1	#34
FOREMAN	307	SC-1	ACT-1	P-2	B-1	#34
PRINT SUPPLY	308	SC-1	ACT-1	P-2	B-1	#34
OPEN WORK AREA	309	SC-1	ACT-1	P-2	B-1	#34
OPEN WORK AREA	310	SC-1	ACT-1	P-2	B-1	#34
UNISEX LOCKERS	311	SC-1	ACT-1	P-2	B-1	#34 & #35
R/R	312	SC-1	P-1	P-2	B-1	#34 & #35
R/R	313	SC-1	P-1	P-2	B-1	#34 & #35
OPEN WORK AREA	314	SC-1	ACT-1	P-2	B-1	#34
SUPV SIGNALS	315	SC-1	ACT-1	P-2	B-1	#34
FOREMAN	316	SC-1	ACT-1	P-2	B-1	#34
SIGN SHOP	317	SC-1	P-1	P-2	B-1	#32, #34, &#35
STREET STORAGE	318	SC-1	P-1	P-2	B-1	#32, #33, #35, & SEE SPECIFICATIONS FOR MORE INFORMATION
VESTIBULE	400	WOC-1	P-1	P-2	B-1	#2 & #30
R/R	401	SC-1	P-1	P-2	B-1	#34 & #35
OPEN WORK AREA	402	SC-1	ACT-1	P-2	B-1	#31 & #34
PRINT SUPPLY	403	SC-1	ACT-1	P-2	B-1	#34
FOREMAN	404	SC-1	ACT-1	P-2	B-1	#31 & #34
STORAGE	405	SC-1	ACT-1	P-2	B-1	#34
SUPVR	406	SC-1	ACT-1	P-2	B-1	#34 & SEE SPECIFICATIONS FOR MORE INFORMATION
FLEET SUPERINT	407	SC-1	ACT-1	P-2	B-1	#34 & SEE SPECIFICATIONS FOR MORE INFORMATION
FACILITY SUPVR	408	SC-1	ACT-1	P-2	B-1	#34 & SEE SPECIFICATIONS FOR MORE INFORMATION
ADMIN	409	SC-1	ACT-1	P-2	B-1	#34
FORMAN	410	SC-1	ACT-1	P-2	B-1	#34
KITCHENETTE	411	SC-1	ACT-1	P-2	B-1	#34 & #36
CORRIDOR	412	SC-1	ACT-1/P-1	P-2	B-1	#2, #30, #32, #33, & #35
LIGHT DUTY PM BAY	413	SC-1	P-1	P-2	B-1	#32, #33, #35, & SEE SPECIFICATIONS FOR MORE INFORMATION
LIGHT DUTY PM BAY	414	SC-1	P-1	P-2	B-1	#32, #33, #35, & SEE SPECIFICATIONS FOR MORE INFORMATION
LIGHT DUTY REPAIR BAY	415	SC-1	P-1	P-2	B-1	#32, #33, #35, & SEE SPECIFICATIONS FOR MORE INFORMATION
LIGHT DUTY REPAIR BAY	416	SC-1	P-1	P-2	B-1	#32, #33, #35, & SEE SPECIFICATIONS FOR MORE INFORMATION
LIGHT DUTY REPAIR BAY	417	SC-1	P-1	P-2	B-1	#32, #33, #35, & SEE SPECIFICATIONS FOR MORE INFORMATION
TOOL CRIB	418	SC-1	P-1	P-2	B-1	#32, #33, #35, & SEE SPECIFICATIONS FOR MORE INFORMATION
FAB/ COMMON WORK AREA	419	SC-1	P-1	P-2	B-1	#32, #33, #35, & SEE SPECIFICATIONS FOR MORE INFORMATION
HEAVY DUTY REPAIR BAY	420	SC-1	P-1	P-2	B-1	#32, #33, #35, & SEE SPECIFICATIONS FOR MORE INFORMATION
HEAVY DUTY REPAIR BAY	421	SC-1	P-1	P-2	B-1	#32, #33, #35, & SEE SPECIFICATIONS FOR MORE INFORMATION
LARGE EQUIPMENT BAY	422	SC-1	P-1	P-2	B-1	#32, #33, #35, & SEE SPECIFICATIONS FOR MORE INFORMATION
EXTRA LARGE EQUIPMENT BAY	423	SC-1	P-1	P-2	B-1	#32, #33, #35, & SEE SPECIFICATIONS FOR MORE INFORMATION
CORRIDOR	424	SC-1	P-1	P-2	B-1	#32, #33, #35, & SEE SPECIFICATIONS FOR MORE INFORMATION
MEDIUM EQUIPMENT BAY	425	SC-1	P-1	P-2	B-1	#32, #33, #35, & SEE SPECIFICATIONS FOR MORE INFORMATION
SMALL EQUIPMENT BAY	426	SC-1	P-1	P-2	B-1	#32, #33, #35, & SEE SPECIFICATIONS FOR MORE INFORMATION
HEAVY DUTY PM BAY	427	SC-1	P-1	P-2	B-1	#32, #33, #35, & SEE SPECIFICATIONS FOR MORE INFORMATION
TIRE BAY	428	SC-1	P-1	P-2	B-1	#32, #33, #35, & SEE SPECIFICATIONS FOR MORE INFORMATION
TIRE SHOP	429	SC-1	P-1	P-2	B-1	#32, #33, #35, & SEE SPECIFICATIONS FOR MORE INFORMATION
PORTABLE EQUIP STOR	430	SC-1	P-1	P-2	B-1	#32, #33, #35, & SEE SPECIFICATIONS FOR MORE INFORMATION
LUBE COMP ROOM	431	SC-1	P-1	P-2	B-1	#32, #33, #35, & SEE SPECIFICATIONS FOR MORE INFORMATION
RR	432	SC-1	ACT-1	P-2	B-1	#33, #35, & SEE SPECIFICATIONS FOR MORE INFORMATION
RR	433	SC-1	ACT-1	P-2	B-1	#33, #35, & SEE SPECIFICATIONS FOR MORE INFORMATION
PARTS ROOM	434	SC-1	P-1	P-2	B-1	#32, #33, #35, & SEE SPECIFICATIONS FOR MORE INFORMATION
MECHANICAL	435	SC-1	P-1	P-2	B-1	#32 #33, & SEE SPECIFICATIONS FOR MORE INFORMATION
IDF	436	SC-1	P-1	P-2	B-1	#32 & #33
FACILITIES WAREHOUSE	437	SC-1	ACT-1	P-2	B-1	#33 & SEE SPECIFICATIONS FOR MORE INFORMATION
BATT STOR	438	SC-1	P-1	P-2	B-1	#33 & #35
FIRE SUPPRESSION	439	SC-1	P-1	P-2	B-1	#32 & #33

FINISH SPECIFICATIONS

PAINT:

P-1
MFR: SHERWIN WILLIAMS
COLOR: CEILING BRIGHT WHITE
NO: SW 7007
NOTES: GYPSUM BOARD CEILINGS
CONTACT: HANK MEINKING
hank.meinking@sherwinwilliams.com
314.281.1485

P-2
MFR: SHERWIN WILLIAMS
COLOR: GOSSAMER VEIL
NO: SW 9165
NOTES: GENERAL WALL PAINT
CONTACT: HANK MEINKING
hank.meinking@sherwinwilliams.com
314.281.1485

P-3
MFR: PPG PAINTS
COLOR: SAILOR'S COAT
NO: PPG1153-7
NOTES: ACCENT PAINT
CONTACT: DREW HARRIS
drewharris@ppg.com
618.381.5307

P-4
MFR: SHERWIN WILLIAMS
COLOR: IRON ORE
NO: SW 7069
NOTES: DOOR FRAME PAINT
CONTACT: HANK MEINKING
hankmeinking@sherwinwilliams.com
314.281.1485

VINYL WALL COVERING:

3

VWC-1
MFR: NOT USED
PATTERN: NOT USED
NO: NOT USED
COLOR: NOT USED
NOTES: NOT USED
CONTACT: N/A

CERAMIC TILE:

CWT-1
MFR: DALTILE
PATTERN: VITRUVIAN
COLOR: VV11, WHITE MATTE
SIZE: 4 x 12 x 5/16
NOTES: WET WALLS AT RESTROOMS 103 & 107
CONTACT: JOANNA WHITTAKER
joannawhittaker@daltile.com
314.629.0125

CWB-1
MFR: DALTILE
PATTERN: VITRUVIAN
COLOR: VV11, WHITE MATTE
SIZE: 4 x 12 x 5/16, BULLNOSE 12" SIDE
NOTES: WALL BASE AT RESTROOMS 103 & 107
CONTACT: JOANNA WHITTAKER
joannawhittaker@daltile.com
314.629.0125

PORCELAIN TILE:

PFT-1
MFR: TRENDS IN TILE
COLLECTION: BASIC ELEGANCE COLLECTION
PATTERN: FUSION
COLOR: SAND
SIZE: 12 x 24 x 5/16
INSTALLATION: ASHLAR W/ STAGGER ON 12" SIDE
NOTES: FLOOR TILE AT RESTROOMS 103 & 107
CONTACT: JAN BAY
jan@trendsintile.com
314.479.0290

RUBBER BASE:

B-1
MFR: JOHNSONITE/TARKETT
NO: DC/CB, TRADITIONAL DURACOVE RUBBER BASE
SIZE: 4" HEIGHT, 1/8" THICK
COLOR: 63 BURNT UMBER
CONTACT: AMY ELLIS
amy.ellis@tarkett.com
314.348.7677

SOLID SURFACE:

SS-1
MFR: FORMICA - EVERFORM
COLOR: 742, BLANCO TERRAZZO
SIZE: 30 x 144 x 1/2
NOTES: COUNTERTOPS & BACK SPLASH
CONTACT: ANN YOUNG
ann.young@amerhart.com
314.221.2434

ENGINEERED QUARTZ:

Q-1
MFR: DALTILE - ONE QUARTZ SURFACES
COLOR: NQ76 SIMPLY WHITE
SIZE: 135.87" x 78.74" x 3/4"
NOTES: ALTERNATE COUNTERTOP & BACK SPLASH MATERIAL AT WET LOCATIONS
CONTACT: JOANNA WHITTAKER
joannawhittaker@daltile.com
314.629.0125

PLASTIC LAMINATE:

PL-1
MFR: WILSONART
PATTERN: FAWN CYPRESS, 8208K
FINISH: 16, CASUAL RUSTIC FINISH
NOTES: AEON SCRATCH RESISTANCE BASE & UPPER CASEWORK
CONTACT: PATTY EGAN
pegan@compidistributors.com
314.809.5114

PL-2
MFR: WILSONART
PATTERN: CRISP LINEN, 4942
FINISH: 38, FINE VELVET FINISH
NOTES: ALTERNATE COUNTERTOP & BACK SPLASH MATERIAL AT DRY LOCATIONS
CONTACT: PATTY EGAN
pegan@compidistributors.com
314.809.5114

CARPET:

C-1
MFR: SHAW CONTRACT
COLLECTION: IN SYNC
PATTERN: CORRESPOND TILE, 5T353
COLOR: ALIKE, 52557
SIZE: 24 x 24
INSTALLATION: QUARTER TURNED
CONTACT: AFTEN ZURLIENE
aften.zurliene@shawcontract.com
314.440.2010

WALK-OFF CARPET:

WOC-1
MFR: SHAW CONTRACT
COLLECTION: STEPPIN OUT
PATTERN: WELCOME II TILE, 5T031
COLOR: BLACK CHOCOLATE, 31751
INSTALLATION: MONOLITHIC
CONTACT: AFTEN ZURLIENE
aften.zurliene@shawcontract.com
314.440.2010

LUXURY VINYL TILE:

LVT-1
MFR: SHAW CONTRACT
PATTERN: GRAIN DIRECT GLUE, 0502V
COLOR: ASHEN, 64155
SIZE: 7 x 48
INSTALLATION: FLOOR PATTERN 1 (FP-1)
CONTACT: AFTEN ZURLIENE
aften.zurliene@shawcontract.com
314.440.2010

LVT-2
MFR: SHAW CONTRACT
PATTERN: GRAIN DIRECT GLUE, 0502V
COLOR: ANTLER, 64761
SIZE: 7 x 48
INSTALLATION: FLOOR PATTERN 1 (FP-1)
HERRINGBONE AT LOBBY 101
ASHLAR W/ STAGGER ON SHORT SIDE
AT CONFERENCE ROOMS 102 & 115
CONTACT: AFTEN ZURLIENE
aften.zurliene@shawcontract.com
314.440.2010

LVT-3
MFR: SHAW CONTRACT
PATTERN: GRAIN DIRECT GLUE, 0502V
COLOR: RUSSET, 64760
SIZE: 7 x 48
INSTALLATION: FLOOR PATTERN 1 (FP-1)
CONTACT: AFTEN ZURLIENE
aften.zurliene@shawcontract.com
314.440.2010

SEALED CONCRETE:

SC-1
MFR: RE: ARCHITECTURAL SPECIFICATIONS
COLOR: CLEAR OR TINTED SEALER. FINAL COLOR TO BE SELECTED BY ARCHITECT DURING SUBMITTAL PHASE

ACOUSTICAL CEILING TILE:

ACT-1
NOTES: 2x2 TEGULAR, RE: SPECIFICATIONS

FINISH SCHEDULE REMARKS

1. FLOOR FINISH TRANSITION #1, CARPET TO LVT (3G/A9.01)
2. FLOOR FINISH TRANSITION #2, CARPET TO CONCRETE (1G/A901)
3. FLOOR FINISH TRANSITION #3, PORCELAIN TILE TO LVT (3L/A901)
4. FLOOR FINISH TRANSITION #4, PORCELAIN TILE TO CONCRETE (1L/A901)
5. FLOOR FINISH TRANSITION #5, LVT TO LVT (3P/A901)
6. FLOOR FINISH TRANSITION #6, LVT TO CONCRETE (1P/A901)
7. PROVIDE FLOOR TRANSITION #1 BETWEEN VESTIBULE #100 & LOBBY #101.
8. PROVIDE FLOOR TRANSITION #5 BETWEEN LOBBY #101 & CONFERENCE #102.
9. PROVIDE FLOOR TRANSITION #3 BETWEEN LOBBY #101 & RESTROOM #103.
10. PROVIDE FLOOR TRANSITION #6 BETWEEN LOBBY #101 & CORRIDOR #105. TRANSITION TO ALIGN W/ SOUTHWEST CORNER OF RESTROOM #103 & BE PERPENDICULAR TO WEST WALL OF LOBBY #101.
11. NORTH WALL TO BE PAINTED W/ ACCENT PAINT P-3.
12. WALL PATTERN WP-1 TO BE INSTALLED ON EAST (WET) WALL.
13. PROVIDE FLOOR TRANSITION #6 BETWEEN CORRIDOR #105 & TRAINING/COMMUNITY 119.
14. PROVIDE FLOOR TRANSITION #4 BETWEEN CORRIDOR #105 & RESTROOM #107.
15. PROVIDE FLOOR TRANSITION #2 BETWEEN CORRIDOR #105 & COORIDOR #116.
16. FOLLOWING WALLS AT CORRIDOR #105 TO BE PAINTED W/ ACCENT P-3:
    - EAST WALL CONTAINING DOOR #105
    - NORTH WALL CONTAINING DOOR #119A
    - WEST WALL CONTINAINING DOOR #106
17. PROVIDE FLOOR TRANSITION #6 BETWEEN CORRIDOR #106 & CONFERENCE ROOM #115 & BETWEEN CORRIDOR #106 & BREAK ROOM #120.
18. PROVIDE FLOOR TRANSITION #2 BETWEEN CORRIDOR #106 & WELLNESS #123.
19. FOLLOWING WALLS AT CORRIDOR #106 TO BE PAINTED W/ ACCENT P-3:
    - EAST WALL CONTAINING DOOR #106
    - SOUTH WALL CONTAINING DOOR #123
    - WEST WALL CONTAINING DOOR #300
    - NORTH WALL CONTAINING DOOR #120
20. WALL PATTERN WP-1 TO BE INSTALLED ON SOUTH (WET) WALL.
21. PROVIDE FLOOR TRANSITION #2 BETWEEN TRAFFIC/SCADA #109 & CORRIDOR #116.
22. PROVIDE FLOOR TRANSITION #1 BETWEEN CONFERENCE #115 & CORRIDOR #116.
23. SOUTH WALL TO BE PAINTED W/ ACCENT PAINT P-3.
24. PROVIDE FLOOR TRANSITION #6 BETWEEN STORAGE #118 & TRAINING / COMMUNITY #119.
25. EAST WALL TO BE PAINTED W/ ACCENT PAINT P-3.
26. WEST WALL TO BE PAINTED W/ ACCENT PAINT P-3.
27. PROVIDE FLOOR TRANSITION #2 BETWEEN LOBBY #129 & VESTIBULE #130.
28. PROVIDE FLOOR TRANSITION #2 BETWEEN VESTIBULE #130 & ELECTRICAL #131.
29. EAST WALL AT CORRIDOR #300 CONTAINING DOOR #300 TO BE PAINTED W/ ACCENT PAINT P-3.
30. PROVIDE FLOOR TRANSITION #2 BETWEEN VESTIBULE #400 & CORRIDOR #412.
31. SOUTH WALL AT OPEN WORK AREA #402 BETWEEN RESTROOM #401 & KITCHENETTE #411 TO BE PAINTED P-3.
32. CEILING OPEN TO STRUCTURE ABOVE. ALL EXPOSED SURFACES TO BE PAINTED P-1, DRY-FALL.
33. SC-1 APPLIED TO ROUGH FORM FINISH SLAB.
34. SC-1 APPLIED TO SMOOTH FORM FINISH SLAB.
35. ALL WALL PAINT TO BE EPOXY.
36. WALL PAINT AT WALL BEHIND CASEWORK TO BE EPOXY.

FINISH LEGEND

FLOOR PATTERN:

FP-1
FLOOR PATTERN CONSISTING OF EQUAL PARTS OF LUXURY VINYL TILES LVT-1, LVT-2, & LVT-3. ALL TILE TO BE INSTALLED IN A RANDOM COLOR PATTERN WITH TILES INSTALLED IN AN ASHLAR PATTERN W/ THE STAGGER ON THE 7" DIMENSION OF EACH PLANK. SEE 6P/A901 FOR ADDITIONAL INFORMATION.

FP-2
FLOOR PATTERN CONSISTING OF LUXURY VINYL TILE LVT-2 INSTALLED W/ HERRINGBONE PATTERN. 48" DIMENSION OF PLANK TO BE ORIENTED AT A 45 DEGREE ANGLE TO THE WEST WALL

FP-3
FLOOR PATTERN CONSISTING OF LUXURY VINYL TILE LVT-2 INSTALLED W/ ASHLAR PATTERN W/ STAGGER ON THE 7" DIMENSION OF EACH PLANK. 48" DIMENSION OF TILE TO BE INSTALLED PARALLEL TO LONG SIDE OF ROOM. SEE 6P/A901 FOR ADDITIONAL INFORMATION.

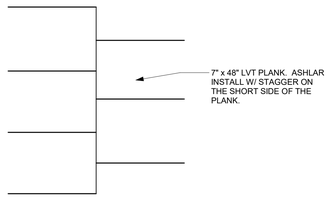
FP-4
FLOOR PATTERN CONSISTING OF PORCELAIN FLOOR TILE PFT-1 INSTALLED W/ ASHLAR PATTERN W/ STAGGER ON THE 12" DIMENSION OF EACH TILE. 24" DIMENSION OF TILE TO BE INSTALLED PARALLEL TO WALL BEHIND WATER CLOSET.

WALL PATTERN:

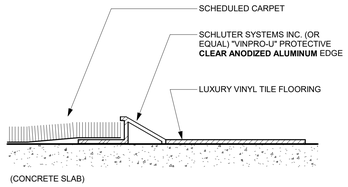
WP-1
WALL PATTERN CONSISTING OF CERAMIC WALL TILE CWT-1 BEING INSTALLED FROM FLOOR TO 5'-0" A.F.F. W/ ONE ROW OF CERAMIC WALL BASE CWB-1 INSTALLED AT TOP ROW OF TILE PROVIDING A BULLNOSE ALONG THE TOP EDGE OF THE TILE INSTALLATION. TILE TO BE INSTALLED RUNNING BOND PATTERN. REMAINING PORTION OF WALL ABOVE CERAMIC WALL TILE TO BE PAINTED P-1, EPOXY.

FINISH NOTES

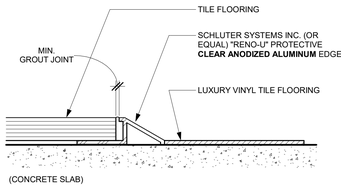
1. REFER TO INTERIOR ELEVATIONS AND INTERIOR SPECIFICATIONS FOR ADDITIONAL FINISHES NOT INDICATED ON FINISH SCHEDULE.
2. ALL WALLS WITHIN ROOMS SHALL BE FINISHED THE SAME UNLESS NOTED OTHERWISE.
3. ALL GYPSUM BOARD CEILINGS SHALL BE PAINTED P-1 WITH A FLAT FINISH, UNLESS NOTED OTHERWISE.
4. PAINT ALL EXPOSED DECK, STRUCTURE, DUCTWORK, CONDUIT, PIPING, ETC. USING DRYFALL PAINT IN COLOR INDICATED ON FINISH SCHEDULE.
5. FLOORING TRANSITIONS SHALL OCCUR AT THE CENTERLINE OF DOOR, UNLESS OTHERWISE NOTED ON FINISH SCHEDULE. REFER TO FLOORING TRANSITION DETAILS ON THIS SHEET.
6. PROVIDE AND CONTINUE SCHEDULED FLOORING FROM PARTITION TO PARTITION AND UNDER MILLWORK UNLESS NOTED OTHERWISE.



6P A901 ASHLAR SHORT STAGGER PATTERN
scale: 12" = 1'-0"



3G A901 FLOORING TRANSITION #1
scale: 12" = 1'-0"



3L A901 FLOORING TRANSITION #3
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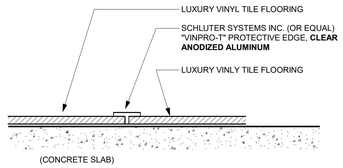

3P A901 FLOORING TRANSITION #5
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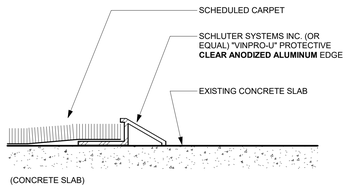
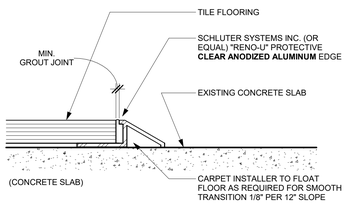


1G A901 FLOORING TRANSITION #2
scale: 12" = 1'-0"



1L A901 FLOORING TRANSITION #4
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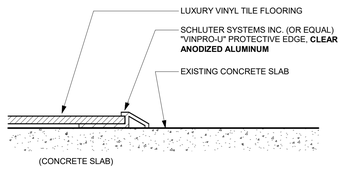

1P A901 FLOORING TRANSITION #6
scale: 12" = 1'-0"

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REVISIONS

NO.	DESCRIPTION	DATE
1	ADD 01	01.11.23
3	ADD 03	02.09.23

PROJECT NO.: 19-040 DRAWN BY: HDG
DATE: 12.15.22 REVIEWED BY: SW

PROFESSIONAL SEAL
TOBIAS HEDDINGHAUS, AIA, LEED AP BD+C
PROFESSIONAL TITLE: ARCHITECT
MO# A-2007011296

STATE OF MISSOURI
TOBIAS HEDDINGHAUS
NUMBER A-2007011296
ARCHITECT
02/07/2023

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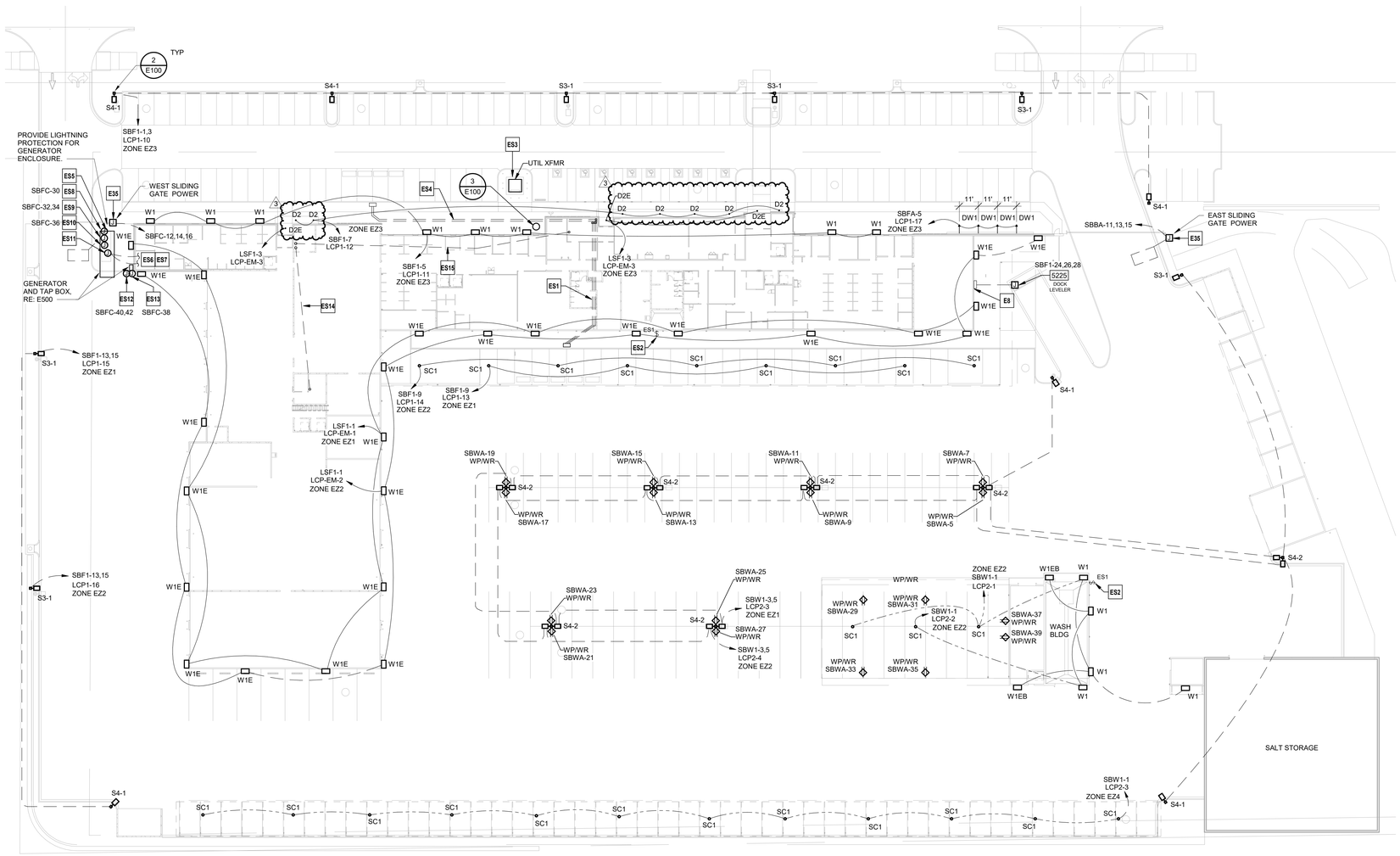
PROJECT TITLE
CITY OF WENTZVILLE, MO PUBLIC WORKS FACILITY
PROJECT ADDRESS:
1295 INTERSTATE DRIVE
WENTZVILLE, MO 63385

FINISH SCHEDULE + SPECIFICATIONS

SHEET
A901



1 ELECTRICAL SITE PLAN
1" = 30'-0"

N

SITE ELECTRICAL GENERAL NOTES:

1. REFER TO CIVIL DRAWINGS AND SPECIFICATIONS FOR ADDITIONAL INFORMATION. COORDINATE THE FINAL LOCATION OF ALL SITE LIGHTING POLES, SIGNAGE, UNDERGROUND UTILITIES, CONDUITS, CIRCUITRY, TRANSFORMERS AND OTHER EQUIPMENT WITH CIVIL DRAWINGS, LANDSCAPING DRAWINGS AND OWNER PRIOR TO INSTALLATION.

2. COORDINATE ALL SITE ELECTRICAL REQUIREMENTS WITH EQUIPMENT MANUFACTURER INFORMATION AND OTHER TRADES AND ADJUST ELECTRICAL PROVISIONS AS REQUIRED TO MEET REQUIREMENTS.

3. SITE ELECTRICAL CONDUITS SHALL BE **1"** MINIMUM, UNLESS NOTED OTHERWISE. WHERE PRACTICABLE, ALL SITE ELECTRICAL CONDUITS SHALL BE INSTALLED A MINIMUM OF **24"** BELOW GRADE, UNLESS NOTED OTHERWISE. COORDINATE FINAL CONDUIT ROUTING WITH EXISTING OBSTRUCTIONS AND OTHER TRADES AND ADJUST AS NECESSARY.

4. CAP AND MARK ALL UNDERGROUND CONDUITS PROVIDED FOR FUTURE USE AND INCLUDE PULL STRINGS. PROVIDE DIMENSIONED LOCATIONS OF TERMINATION POINTS ON AS-BUILT DRAWINGS AND SUBMIT TO OWNER.

5. MINIMUM WIRE SIZE FOR SITE ELECTRICAL CIRCUITS SHALL BE **#10** AWG CU, UNLESS NOTED OTHERWISE. ALL SITE ELECTRICAL BRANCH CIRCUIT WIRING SHALL BE SIZED SUCH THAT THE MAXIMUM BRANCH CIRCUIT VOLTAGE DROP IS LESS THAN **3** PERCENT.

6. PROVIDE SPLICE AND PULL BOXES FOR SITE LIGHTING AND SITE ELECTRICAL POWER TO LIMIT MAXIMUM CONDUIT RUN TO 300'. PLACE BOXES IN A PLANTER AREA CLEAR OF VEGETATION WHEREVER PRACTICABLE; (COORDINATE FINAL LOCATION WITH CIVIL, LANDSCAPE CONTRACTOR AND OWNER). BOXES SHALL BE SUITABLE FOR LOCATION AND PROPERLY SIZED FOR QUANTITY AND SIZE OF CONDUITS IN AND OUT AND SHALL BE MARKED "ELECTRICAL". NOT ALL OF THESE BOXES ARE SHOWN ON SITE ELECTRICAL DRAWINGS; CONTRACTOR SHALL PROVIDE LOCATION ON AS-BUILT DRAWINGS AND SUBMIT TO OWNER. SPLICE BOX SHALL BE APPROPRIATE FOR LOCATION AND SHALL BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS. SPLICE BOX SHALL HAVE A MINIMUM NOMINAL SIZE OF 12"X12"X12", SHALL BE AN OPEN BOTTOM NRTL LISTED UNDERGROUND ENCLOSURE, AND SHALL AT A MINIMUM BE TIER 15 TRAFFIC RATED.

7. THE SITE LIGHTING IS DESIGNED TO MEET THE FOLLOWING CRITERIA EXCEPT WHERE LIMITED BY SITE CONSTRAINTS AND LOCAL REQUIREMENTS:

   A. MINIMUM MAINTAINED HORIZONTAL ILLUMINATION LEVEL AT FINISHED GRADE OF **0.5** FC AT ALL PAVED PARKING AND WALKING SURFACES.

   B. MAXIMUM INITIAL LEVEL AT FINISHED GRADE OF 12.0 FC AT ALL PAVED PARKING AND WALKING SURFACES.

   C. MAXIMUM HORIZONTAL ILLUMINATION LEVEL OF **0.5** FC AT FINISHED GRADE AT ALL RESIDENTIAL PROPERTY LINES.

   D. THE TOTAL LIGHT LOSS FACTOR USED FOR THE CALCULATIONS SHALL BE **1.0** OF INITIAL LUMEN OUTPUT FOR LED SOURCES.

   E. MAXIMUM LUMINAIRE MOUNTING HEIGHT (INLCUDING POLE AND BASE) OF **25'** ABOVE FINISHED GRADE.

☐ ELECTRICAL PLAN NOTES:

E8 DOCK LEVELER CONTROL PANEL/STARTER. COORDINATE ELECTRICAL REQUIREMENTS AND DESIRED CONTROLLER LOCATION WITH OWNER PRIOR TO ROUGH-IN. CONNECT COMPLETE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.

E35 PROVIDE 2" CONDUIT AN PULL BOXES AS NECESSARY TO PROVIDE POWER FOR GATES AND KEY PAD PEDESTALS. PROVIDE UNDERGROUND VEHICLE DETECTOR LOOP FOR VEHICLE EXIT. COORDINATE POWER ROUGH-IN AND DETECTOR LOOP REQUIREMENTS WITH GATE MANUFACTURER. REFER TO TECHNOLOGY T-SHEETS FOR CONTROL CONDUIT.

ES1 PROVIDE (3) 1-1/2" CONDUIT WITH PULLSTRING FOR FUTURE EV CHARGERS. STUB CONDUITS THROUGH FLOOR BELOW PANEL SBAB AND TERMINATE AT EXTERIOR IN GRADE FLUSH PULLBOX.

ES2 EXTERIOR LIGHTING SWITCH TO CONTROL EXTERIOR LIGHTING ZONE EZ1 AND EZ2 FOR OVERRIDE FOR AFTER HOURS USAGE.

ES3 APPROXIMATE LOCATION OF NEW PAD-MOUNT UTILITY TRANSFORMER. COORDINATE LOCATION AND PAD SIZE WITH CIVIL PLANS AND ELECTRIC UTILITY.

ES4 PROVIDE (2) 1-1/2" CONDUIT WITH PULLSTRING FOR FUTURE EV CHARGERS. STUB CONDUITS THROUGH FLOOR BELOW PANEL SBAB AND TERMINATE AT EXTERIOR IN GRADE FLUSH PULLBOX.

ES5 PROVIDE ALL NECESSARY CIRCUITRY FOR GENERATOR, GENERATOR CRANKCASE/JACKET HEATER, BATTERY CHARGER, MONITORING AND CONTROLS FOR PROPER OPERATION. COORDINATE REQUIREMENTS WITH GENERATOR MANUFACTURER, OWNER AND OTHER TRADES. REFER TO THE ONE-LINE DIAGRAM AND SPECIFICATIONS FOR ADDITIONAL INFORMATION.

ES6 PROVIDE 3/4" CONDUIT WITH PULL-WIRE TO BMS CABINET FOR METER CONTROLS.

ES7 CONTRACTOR SHALL ROUTE (1) 1"C. WITH PULL-WIRES FROM GENERATOR'S CONTROL PANEL TO GENERATOR ANNUNCIATOR FOR CONTROLS.

ES8 CONNECTION TO GENERATOR BATTERY CHARGER.

ES9 CONNECTION TO GENERATOR CRANK HEATER.

ES10 CONNECTION TO CONTROL POWER.

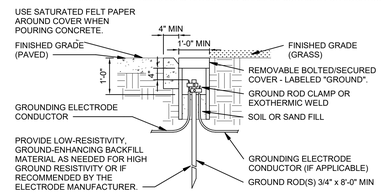
ES11 CONNECTION TO GENERATOR CONTROL WIRING.

ES12 CONNECTION TO ROLL UP GENERATOR CRANK HEATER.

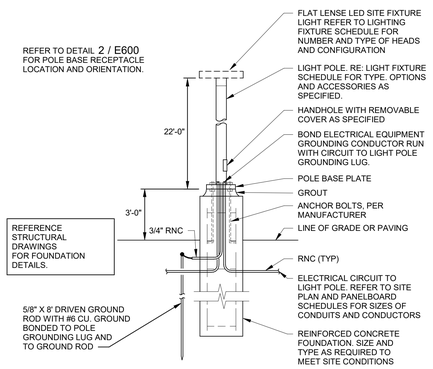
ES13 CONNECTION TO ROLL UP GENERATOR BATTERY CHARGER.

ES14 ROUTE FEEDER UNDERGROUND FROM PANELBOARD EMDP TO FIRE PUMP CONTROLLER. REFER TO ONE-LINE ON SHEET E500 FOR FEEDER SIZE.

ES15 ROUTE FEEDER UNDERGROUND FROM SWTICH BOARD SWBD-N TO FIRE PUMP CONTROLLER. REFER TO ONE-LINE ON SHEET E500 FOR FEEDER SIZE.



3 GROUNDING TEST WELL INSTALLATION
NTS



2 POLE BASE DETAIL
NTS

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REVISIONS

NO.	DESCRIPTION	DATE
2	ADD 02	01.25.23
3	ADD 03	02.09.23

PROJECT NO.: 19-040 DRAWN BY: NS
DATE: 12.15.22 REVIEWED BY: HEI

STATE OF MISSOURI
DOUGLAS M. EVERHART
NUMBER PE-2019007648
PROFESSIONAL ENGINEER

02/08/2023

DOUGLAS M. EVERHART
LICENSE # PE-2019007648

PROJECT TITLE
CITY OF WENTZVILLE, MO PUBLIC WORKS FACILITY

PROJECT ADDRESS:
1295 INTERSTATE DRIVE
WENTZVILLE, MO 63385

ELECTRICAL SITE PLAN

SHEET
E100

DOUGLAS M. EVERHART

LIGHTING GENERAL NOTES:

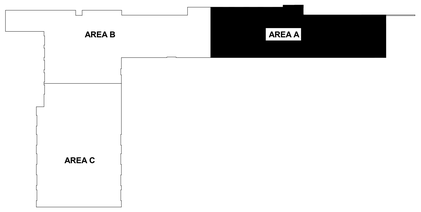
1. THE EMERGENCY LIGHTING SYSTEM HAS BEEN DESIGNED TO PROVIDE AN INITIAL FLOOR ILLUMINANCE LEVEL OF 1 FC AVERAGE, 0.1 FC MINIMUM AND NO MORE THAN A 40:1 MAX/MIN RATIO ALONG THE EMERGENCY EGRESS PATHS. WHERE APPLICABLE, ADJUST AIMING OF EMERGENCY LIGHTS AS REQUIRED TO PROVIDE PROPER ILLUMINATION AT FLOOR AVOIDING OBSTACLES AND SHADOWS AFTER STORE SET-UP IS COMPLETE.
2. WALL MOUNTED EXITS SIGNS SHALL BE MOUNTED 12" ABOVE DOOR FRAME AND CENTERED ABOVE DOOR OPENING, UNLESS NOTED OTHERWISE. CEILING/PENDANT MOUNTED EXIT SIGNS SHALL BE SUSPENDED TO 12'-0" AFF IN FINISHED AREAS OPEN TO STRUCTURE, AT BOTTOM OF BAR JOISTS IN BACKROOM AREAS AND ON FINISHED CEILING WHERE APPLICABLE, UNLESS NOTED OTHERWISE. EXIT SIGNS SHALL BE READILY VISIBLE FROM DIRECTION OF EGRESS TRAVEL. COORDINATE FINAL EXIT SIGN LOCATIONS WITH AHJ AND OWNER.
3. SUSPEND BACK OF HOUSE, RECEIVING AND STOCKROOM AREA LIGHT FIXTURES AS HIGH AS PRACTICABLE IN ORDER TO AVOID DAMAGE DURING STOCKING, UNLESS NOTED OTHERWISE. SUSPEND JUST BELOW REFRIGERATION PIPING, DUCTWORK AND SIMILAR OBSTRUCTIONS WHERE NECESSARY TO AVOID SHADOWS. COORDINATE REQUIREMENTS WITH OWNER AND OTHER DISCIPLINES PRIOR TO INSTALLATION.
4. PROVIDE LABEL AT EACH MANUAL LIGHT SWITCH INDICATING THE LIGHT FIXTURE(S) THAT THE SWITCH CONTROLS AND THE RESPECTIVE "PNLBD-CKT#" DESIGNATION. A SINGLE LIGHT SWITCH FOR A SMALL ROOM DOES NOT NEED TO INDICATE THE SPACE CONTROLLED SINCE IT IS INTUITIVELY OBVIOUS. COORDINATE LABEL REQUIREMENTS WITH THE OWNER PRIOR TO INSTALLATION. REFER TO THE SPECIFICATIONS FOR MORE INFORMATION.
5. ALL REMOTELY LOCATED LIGHT FIXTURE POWER SUPPLIES SHALL BE LOCATED IN AN ACCESSIBLE LOCATION WITH PROPER VENTILATION IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS. CONCEAL DEVICES AND RELATED WIRING FROM CUSTOMER/PUBLIC VIEW. PROVIDE ENCOSURE IF REQUIRED. COORDINATE LOCATION AND ENCLOSURE TYPE WITH ARCHITECT AND OWNER PRIOR TO INSTALLATION.
6. PER NEC 700.24, ALL DIRECTLY CONTROLLED LUMINAIRES USED FOR EMERGENCY ILLUMINATION AND ALL APPLICABLE CONTROLS SHALL HAVE UL 924 LISTING OR EQUIVALENT NRTL LISTING. IF EMERGENCY LUMINAIRE OR CONTROL MANUFACTURER DOES NOT HAVE APPROPRIATE LISTING THEN FIELD LISTING OF EQUIPMENT IS ACCEPTABLE (AT CONTRACTOR'S COST), IF APPROVED BY THE AHJ. ALTERNATIVELY, AS ALLOWED PER NEC 90.4, THE CONTRACTOR MAY OBTAIN SPECIAL PERMISSION FROM THE AHJ AND SUBMIT SAID PERMISSION IN WRITING TO THE ENGINEER FOR REVIEW. IF USING NON-LISTED EQUIPMENT FOR APPLICABLE EMERGENCY SYSTEMS, THE ALTERNATIVE METHOD MUST BE FIELD TESTED AND ACHIEVE EQUIVALENT OBJECTIVES TO CODE INTENT. IN ADDITION, ALTERNATE METHOD AND EQUIPMENT USED MUST BE DEEMED SAFE AND ACCEPTABLE TO BOTH THE AHJ AND THE ENGINEER.

LIGHTING SUPPLEMENTAL SPECIFICATIONS:

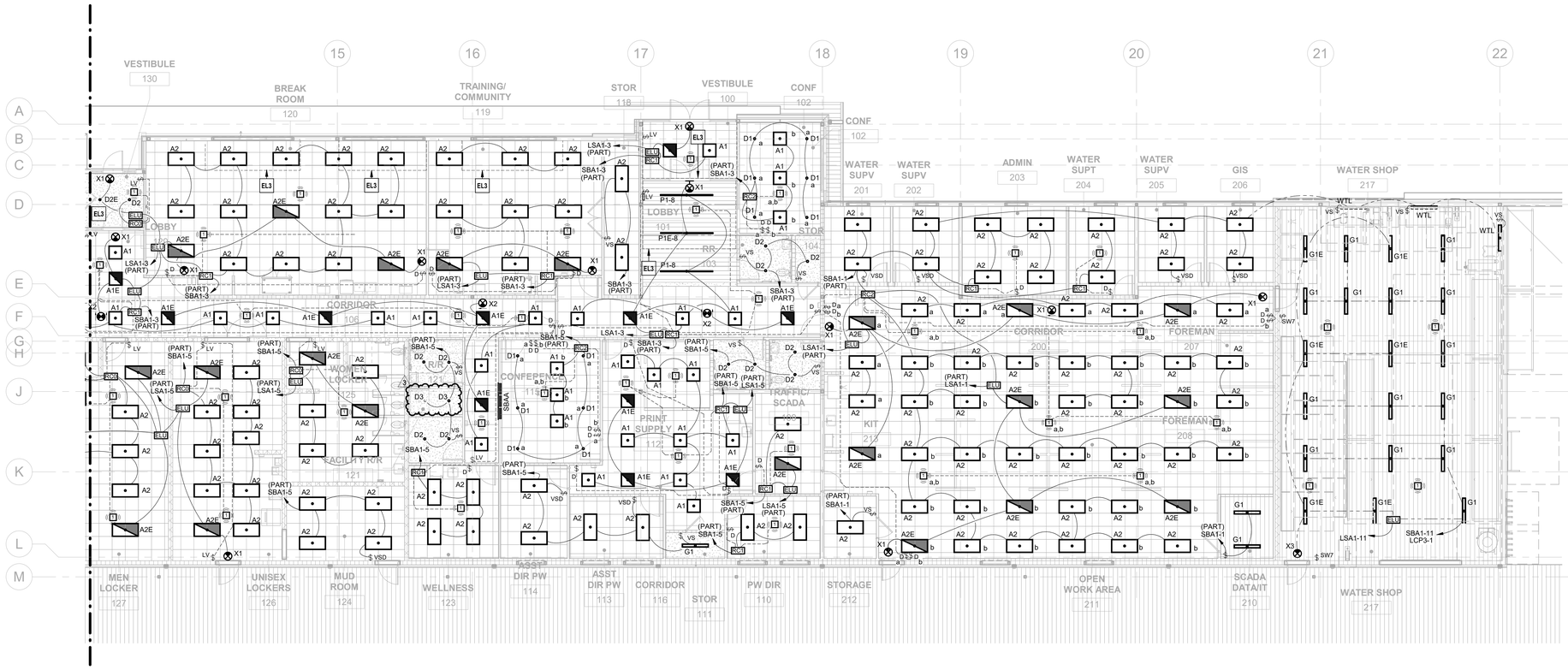
1. REFER TO THE ARCHITECTURAL DRAWINGS FOR LIGHT FIXTURE LOCATIONS, MOUNTING HEIGHTS, TRACK LENGTHS AND ADDITIONAL MOUNTING INFORMATION. CONTRACTOR SHALL BE RESPONSIBLE FOR INSURING THAT COORDINATION AND CONFLICT ISSUES ARE RESOLVED PRIOR TO INSTALLATION OF LIGHT FIXTURES. CONTACT ARCHITECT/ENGINEER IMMEDIATELY IF THERE ARE DISCREPANCIES.
2. THROUGH WIRING OF RECESSED LIGHT FIXTURES, IN SUSPENDED CEILINGS, IS NOT PERMITTED. CONNECT EACH LIGHT FIXTURE BY A WHIP TO A JUNCTION BOX. PROVIDE CABLE WHIPS OF SUFFICIENT LENGTHS TO ALLOW FOR RELOCATING EACH LIGHT FIXTURE WITHIN A 5'-0" RADIUS OF ITS INDICATED LOCATION. CABLE WHIPS SHALL NOT EXCEED 6'-0" OF UNSUPPORTED LENGTHS.
3. ALL EMERGENCY LIGHTS AND EXIT SIGNS WITH INTEGRAL BATTERY BACK-UP SHALL BE CONNECTED TO A SEPARATE UNSWITCHED CONDUCTOR BYPASSING ALL OTHER CONTROLS AND CONTACTORS, UNLESS NOTED OTHERWISE. EXIT SIGNS SHALL NOT BE SWITCHED. REFER TO MANUFACTURER'S WRITTEN INSTRUCTIONS FOR PROPER INSTALLATION AND TESTING. ALLOW BATTERY TO CHARGE FOR A MINIMUM OF 48 HOURS BEFORE LIGHT LEVEL TESTING. IN ORDER TO PREVENT BATTERY DAMAGE, DO NOT TURN OFF POWER FOR EXTENDED PERIODS OF TIME AFTER EMERGENCY LIGHT HAS BEEN POWERED.
4. PROVIDE A NEUTRAL CONDUCTOR TO ALL WALL MOUNTED LINE VOLTAGE LIGHT SWITCHES, UNLESS NOTED OTHERWISE. IF NEUTRAL TERMINATION IS NOT REQUIRED FOR THE DEVICE THEN CAP CONDUCTOR AND TAG AS "NEUTRAL FOR FUTURE USE".
5. COORDINATE ALL OCCUPANCY/VACANCY SENSOR SETTINGS WITH OWNER AND ADJUST AS NECESSARY FOR PROPER OPERATION. SETTINGS MUST COMPLY WITH AHJ AND LOCAL ENERGY CODE REQUIREMENTS.
6. DO NOT INSTALL OCCUPANCY/VACANCY SENSORS WITHIN 48" OF AIR DIFFUSER OR SIMILAR OBSTRUCTION THAT MAY ADVERSLY AFFECT THE SENSOR PERFORMANCE. COORDINATE FINAL SENSOR LOCATIONS WITH OTHER TRADES AND INSTALL IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.

☐ ELECTRICAL PLAN NOTES:

EL3 DAYLIGHT ZONE INDICATED BY LINE HAS LESS THAN 150W OF GENERAL LIGHTING WITHIN THE PRIMARY SIDELIT DAYLIGHT ZONE AND THUS DOES NOT REQUIRE SEPARATE DAYLIGHT CONTROLS.



KEY PLAN



1 LIGHTING LEVEL 1 RCP - AREA A
1/8" = 1'-0"

N

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LIGHTING LEVEL 1 RCP - AREA A

SHEET
E101A

DOUGLAS M. EVERHART

ELECTRICAL SYSTEMS SUPPLEMENTAL SPECIFICATIONS:

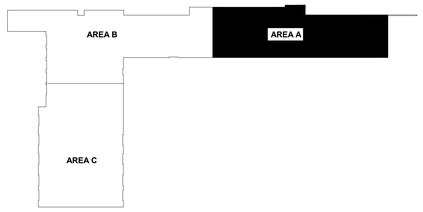
1. PROVIDE NECESSARY BOXES AND CONDUIT FOR MECHANICAL SYSTEM CONTROL DEVICES. THIS INCLUDES BUT IS NOT LIMITED TO: MAIN CONTROL PANELS, THERMOSTATS, HUMIDISTATS, AC SOLENOIDS, HEAT RECLAIM WIRING, AHU CONTROL WIRING, DUCT FURNACE CONTROL WIRING, TIMERS, AND SIMILAR EQUIPMENT. PROVIDE BOX, (FLUSH MOUNT WHEREVER PRACTICABLE), AND 3/4" CONDUIT FOR ALL WIRING WITHIN WALLS AND SIMILAR UNACCESSIBLE LOCATIONS. PROVIDE CONTROL AND INTERLOCK WIRING WHEN NOT PROVIDED BY OTHER TRADES. COORDINATE REQUIREMENTS WITH EQUIPMENT SUPPLIERS AND OTHER TRADES PRIOR TO ROUGH-IN.
2. PROVIDE LINE VOLTAGE WIRING AND MAKE FINAL CONNECTIONS TO ALL DUCT-MOUNTED SMOKE DETECTORS, FIRE/SMOKE AND SMOKE DAMPERS WHERE APPLICABLE. COORDINATE REQUIREMENTS WITH OTHER TRADES PRIOR TO INSTALLATION.
3. DEVICES MOUNTED ON ACOUSTICAL TILE CEILINGS SHALL BE CENTERED ON THE TILE, UNO.
4. PROVIDE BOXES AND CONDUITS FOR THE FIRE PROTECTION SYSTEM LOW VOLTAGE WIRING AS REQUIRED. THIS INCLUDES EXPOSED WIRING LESS THAN 96" AFF. AT A MINIMUM, PROVIDE 3/4" CONDUIT, UNLESS NOTED OTHERWISE. COORDINATE REQUIREMENTS AND LOCATIONS WITH SYSTEM INSTALLER AND FIRE ALARM SPECIFICATIONS.
5. AT A MINIMUM, PROVIDE EXTRA DEEP, DOUBLE GANG COMMUNICATION OUTLET BOXES, (FLUSH MOUNTED WHEREVER PRACTICABLE), WITH SINGLE-GANG PLASTER RING AND 1" CONDUIT STUBBED-UP CONCEALED TO ACCESSIBLE CEILING SPACE, UNLESS NOTED OTHERWISE. PROVIDE SURFACE MOUNTED DATA BOXES WITHIN CABINETRY, AND SELECT OTHER LOCATIONS AS INDICATED ON THE DRAWINGS. COORDINATE TELEPHONE/DATA BOX AND CONDUIT LOCATIONS AND SIZES WITH OWNER AND OTHER TRADES PRIOR TO ROUGH-IN.
6. PROVIDE NYLON BUSHINGS FOR ALL COMMUNICATIONS AND LOW VOLTAGE WIRING CONDUITS AND SLEEVES, UNLESS NOTED OTHERWISE.
7. ALL COMMUNICATIONS AND LOW VOLTAGE WIRING CONDUIT SHALL BE INSTALLED WITH AN ACCESSIBLE PULLBOX BETWEEN EVERY 180 DEGREE CHANGE IN DIRECTION AND AT 100' INTERVALS OF CONTINUOUS RUNS.
8. MINIMUM BEND RADIUS FOR COMMUNICATIONS CONDUIT IS 6 TIMES THE INSIDE DIAMETER FOR CONDUITS 2" IN DIAMETER AND SMALLER AND 10 TIMES THE INSIDE DIAMETER FOR CONDUITS GREATER THAN 2" IN DIAMETER, UNLESS NOTED OTHERWISE.
9. PROVIDE BOXES AND CONDUIT IN FINISHED AND RATED FLOORS/WALLS/CEILINGS TO ACCESSIBLE LOCATIONS FOR ALL LOW VOLTAGE COMMUNICATION, ENERGY MANAGEMENT, SOUND SYSTEM, SECURITY AND RELATED WIRING. PROVIDE ALL LINE VOLTAGE CIRCUITRY (120V AND HIGHER) AND LOW VOLTAGE STEP-DOWN TRANSFORMERS AS REQUIRED. COORDINATE ELECTRICAL REQUIREMENTS AND LOCATIONS WITH SYSTEM INSTALLER AND OWNER.
10. ALL LOW VOLTAGE CLASS 2 OR 3 WIRING NOT IN CONDUIT SHALL BE PLENUM RATED WHERE APPLICABLE.
11. LOW VOLTAGE CABLE SHEATH LABELS AND RELATED MANUFACTURER INFO SHALL REMAIN APPARENT IN ALL EXPOSED APPLICATIONS. PROTECT ALL EXPOSED CABLING FROM PAINTING AND OVERSPRAY (INCLUDES CABLE NOT ROUTED IN CONDUIT AND THAT IS IN CABLE TRAY).
12. CABLES SHALL BE ROUTED THROUGH THE BUILDING CABLE TRAY/RACEWAY SYSTEM, UNLESS NOTED OTHERWISE. EXPOSED CABLING SHALL NOT BE ROUTED IN AREAS EXPOSED TO STRUCTURE UNLESS SPECIFICALLY PERMITTED BY THE OWNER. IN AREAS WHERE EXPOSED CABLES ARE ALLOWED, IT SHALL BE INSTALLED IN A NEAT AND WORKMAN LIKE MANNER IN ACCORDANCE WITH THE OWNER'S REQUIREMENTS. WHERE REQUIRED, PROVIDE CONDUIT TO ROUTE LOW VOLTAGE CABLING TO THE CABLE TRAY OR NEAREST ACCESSIBLE CEILING SPACE.
13. CONDUITS FOR COMMUNICATIONS OUTLETS SERVING ELEVATOR EQUIPMENT ROOMS, FACP, AND SIMILAR CRITICAL EQUIPMENT AS DESIGNATED BY THE OWNER SHALL BE CONTINUOUS ("HOMERUN") FROM OUTLET TO SERVING COMMUNICATIONS ROOM.

ELECTRICAL GENERAL NOTES:

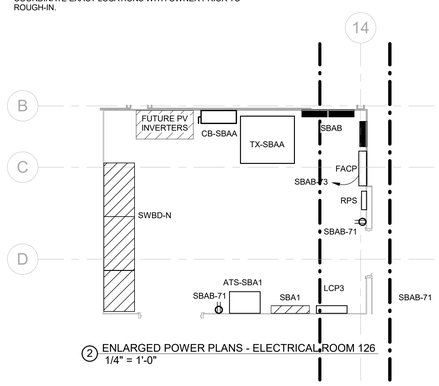
1. PRIOR TO SUBMITTING BID, VISIT THE JOB SITE AND BECOME FULLY ACQUAINTED WITH THE EXISTING CONDITIONS. AS APPLICABLE, REVIEW OWNER CRITERIA, GENERAL NOTES, OTHER TRADE DRAWINGS AND SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS THAT MAY NOT BE CALLED OUT IN THIS PORTION OF THE CONSTRUCTION DOCUMENTS. NOTIFY ARCHITECT AND ENGINEER OF ANY CONFLICTS OR DISCREPANCIES PRIOR TO SUBMITTING BID.
2. ALL WORK SHALL CONFORM TO ALL LOCAL CODES AND ORDINANCES AS WELL AS APPLICABLE INDUSTRY STANDARDS. ALL EQUIPMENT SHALL BEAR LABELS FOR THE USE INTENDED BY AN AHJ ACCEPTED NATIONALLY RECOGNIZED TESTING LABORATORY (NRTL), SUCH AS UL OR ETL. THE FINAL ELECTRICAL INSTALLATION OF THE FACILITY OCCUPIED BY OWNER SHALL BE FREE FROM ELECTRICAL DEFECTS TO THE SATISFACTION OF THE AHJ, OWNER, ARCHITECT AND ENGINEER.
3. COORDINATE FINAL LOCATION AND INSTALLATION REQUIREMENTS OF ALL LIGHT FIXTURES, ELECTRICAL EQUIPMENT AND ELECTRICAL DEVICES WITH ARCHITECTURAL DRAWINGS, EXISTING CONDITIONS AND OTHER TRADES PRIOR TO ROUGH-IN. PROVIDE ALL NECESSARY DEVICES, CORDS, PLUGS, DISCONNECTS AND FINAL CONNECTIONS TO ELECTRICAL EQUIPMENT FOR PROPER OPERATION IN ACCORDANCE WITH CODE, OWNER AND MANUFACTURER REQUIREMENTS.
4. ELECTRICAL DRAWINGS ARE DIAGRAMMATIC/SCHEMATIC IN NATURE AND REPRESENT THE GENERAL SCOPE OF WORK. IT IS NOT WITHIN THE SCOPE OF THE ELECTRICAL DRAWINGS TO SHOW ALL NECESSARY RACEWAY ROUTING, BENDS, OFFSETS, PULL BOXES AND OBSTRUCTIONS. CONTRACTOR SHALL COORDINATE THE FINAL LOCATION OF EQUIPMENT AND WIRING DEVICES WITH OTHER TRADES PRIOR TO INSTALLATION AND INSTALL ALL WORK TO CONFORM TO THE OWNER REQUIREMENTS.
5. ALL CONDUCTOR AND CONDUIT LENGTHS SHOWN IN THESE DESIGN DOCUMENTS ARE INTENDED SOLELY FOR USE IN THE DESIGN CALCULATIONS BY THE DESIGN PROFESSIONAL, UNLESS NOTED OTHERWISE. LENGTHS SHOWN SHALL NOT BE USED TO ASSIST IN THE BIDDING TAKEOFF PROCESS. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR THE MATERIAL QUANTITIES REQUIRED TO BID AND CONSTRUCT THE COMPLETE PROJECT.
6. PROVIDE PROPER FIRE PROOFING AND SEALANT FOR PENETRATIONS THROUGH FIRE RATED ASSEMBLIES. THE FIRE STOPPING METHOD, MATERIAL AND ITS APPLICATION SHALL BE NRTL LISTED, CODE COMPLIANT AND APPROVED BY AHJ.
7. FOR CAST-IN-PLACE CONCRETE, TILT-UP WALLS, PRECAST OR SIMILAR PRE-ENGINEERED WALL SYSTEMS: COORDINATE THE FINAL LOCATION OF ALL ELECTRICAL DEVICES, RACEWAYS, LIGHT FIXTURES AND PENETRATIONS WITH ARCHITECT, WALL SUPPLIER AND OTHER TRADES PRIOR TO WALL CONSTRUCTION. CONDUIT/RACEWAY IMBEDDED IN CONCRETE WALLS SHALL BE SCHEDULE 80 PVC OR LFMC; OTHER TYPES MAY BE ALLOWED IF APPROVED BY WALL SYSTEM MANUFACTURER AND ENGINEER.
8. WHEN CONCRETE TRENCHING/CORING IS REQUIRED, THE METHODS, DEPTHS, AND LOCATIONS SHALL BE PRE-APPROVED BY OWNER, ARCHITECT, AND STRUCTURAL ENGINEER PRIOR TO THE START OF WORK. X-RAY SLAB AS NECESSARY TO AVOID DAMAGING ANY UNDER-SLAB UTILITIES OR STRUCTURE. SLAB REPLACEMENT SHALL BE INSTALLED WITH DOWELLING AND REINFORCED CONCRETE AS DIRECTED BY THE STRUCTURAL ENGINEER. WHERE SLAB ON GRADE IS SAW-CUT AND REMOVED FOR TRENCHING THE CONTRACTOR SHALL INSTALL MOISTURE BARRIER PER OWNER'S REQUIREMENTS. PROVIDE 3/4" MINIMUM CONDUITS ROUTED THROUGH SLAB AND STUBBED UP INTO DEVICES. FOR SLAB ON DECK, THE FLOOR SHALL BE SLEEVED AND EQUIPPED WITH THE APPROPRIATE LISTED ASSEMBLY. PROVIDE 3/4" MINIMUM CONDUITS ROUTED BELOW SLAB, TIGHT TO STRUCTURE, AND STUBBED UP INTO DEVICES.
9. ALL APPLICABLE SWITCHES, RECEPTACLES, OUTLETS, AND CONTROLS SHALL BE PLACED AT HEIGHTS THAT ARE IN ACCORDANCE WITH ADA ACCESSIBILITY GUIDELINES.
10. COORDINATE FLOOR MOUNTED BOX, RECEPTACLE, AND COVER PLATE TYPES WITH ARCHITECT AND OWNER PRIOR TO ORDER.
9. WIRING DEVICES ADJACENT TO EACH OTHER SHALL BE INSTALLED UNDER A SINGLE COVER PLATE, UNO.
10. WIRING DEVICES SHOWN BACK-TO-BACK ON A COMMON WALL SHALL BE OFFSET A MINIMUM OF 12" HORIZONTALLY TO REDUCE SOUND TRANSMISSION BETWEEN ROOMS, UNO.
11. ALL WP OUTLET BOX HOODS SHALL BE "EXTRA-DUTY" AND "WHILE-IN-USE COVER" TYPE. OUTLET BOX HOODS SHALL BE LOW PROFILE WHEREVER PRACTICABLE, UNLESS NOTED OTHERWISE. THE USE OF LARGE BUBBLE COVERS SHALL BE AVOIDED ON THE EXTERIOR OF THE BUILDING OR BEHIND EQUIPMENT IN ORDER TO PREVENT DAMAGE TO THE COVER AND TO ALLOW THE EQUIPMENT TO BE LOCATED CLOSE TO THE WALL.
12. ALL RECEPTACLES AND APPLIANCES SHALL BE GFCI PROTECTED IN LOCATIONS REQUIRED BY CODE; THIS INCLUDES BATHROOMS, KITCHENS/FOOD PREP AREAS, EXTERIOR LOCATIONS AND RECEPTACLES WITHIN 6 FEET OF A SINK. GFCI DEVICES SHALL BE READILY ACCESSIBLE AND SHALL NOT BE LOCATED BEHIND OBSTACLES. LABEL WIRING DEVICES PROTECTED BY AN UPSTREAM GFCI DEVICE.
13. PROVIDE TAMPER-RESISTANT (TR) TYPE RECEPTACLES AT ALL CODE REQUIRED LOCATIONS AND AT LOCATIONS WHERE RECEPTACLES ARE MOUNTED LESS THAN 5'-6" AFF AND ARE EASILY ACCESSIBLE BY CHILDREN, UNLESS NOTED OTHERWISE.
14. FLEXIBLE CONDUIT IS ONLY PERMITTED WHERE SPECIFICALLY ALLOWED IN THE CONSTRUCTION DOCUMENTS, WHERE CONCEALED FROM VIEW OR EXPOSED FINAL CONNECTIONS TO LIGHT FIXTURES AND EQUIPMENT IN LENGTHS OF 6'-0" OR LESS.
15. ALL EMPTY CONDUIT/RACEWAY SHALL BE INSTALLED WITH PULL STRINGS. TERMINATE CONDUIT STUB-UP WITH A NYLON BUSHING.
16. EXPOSED CONDUIT/RACEWAY SHALL BE PAINTED TO MATCH ADJACENT SURFACE, UNLESS NOTED OTHERWISE. COORDINATE REQUIREMENTS WITH ARCHITECT AND OWNER PRIOR TO INSTALLATION.
17. CONDUITS/RACEWAYS SHALL BE CONCEALED FROM VIEW WHEREVER PRACTICABLE, UNLESS NOTED OTHERWISE. ROUTE CONDUITS SERVING ROOFTOP EQUIPMENT CONCEALED INSIDE EQUIPMENT CURB AND MINIMIZE ROOF PENETRATIONS AND EXTERIOR CONDUIT RUNS WHERE PRACTICABLE. SUPPORT RACEWAY FROM STRUCTURE, NOT ROOF DECK. MAINTAIN 2" MIN SPACING FROM BOTTOM OF ROOF DECK TO PREVENT ROOFING SCREWS FROM PENETRATING RACEWAY. DO NOT ROUTE CONDUITS ACROSS SKYLIGHTS, ACCESS PANELS, HATCHED TILES, HVAC DIFFUSERS, OR EQUIPMENT WORKING CLEARANCE SPACE. ROUTE ALL EXPOSED NON-FLEXIBLE CONDUITS TIGHT TO STRUCTURE, PARALLEL TO BUILDING LINES AND IN STRUT OR CABLE/PIPE TRAY WHERE PRACTICABLE. INSTALL CONDUITS PLUMB/LEVEL WHERE EXPOSED TO VIEW. COORDINATE RACEWAY ROUTING AND INSTALLATION WITH OTHER TRADES PRIOR TO ROUGH-IN.
18. WHERE PRACTICABLE, ALL UNDER-FLOOR/UNDER-GROUND CONDUITS/RACEWAY SHALL BE INSTALLED A MINIMUM OF 24" BELOW BOTTOM OF SLAB/PAVING/GRADE, UNLESS NOTED OTHERWISE. NOTE: THE DESIGN INTENT FOR INSTALLING ELECTRICAL CIRCUITRY AT THIS DEPTH IS TO PROTECT THE ELECTRICAL CIRCUITRY FROM DAMAGE DUE TO FUTURE WORK.
19. PROVIDE LABEL AT EACH RECEPTACLE COVER PLATE WITH THE RESPECTIVE "PNLBD-CKT#" DESIGNATION. COORDINATE LABEL REQUIREMENTS WITH THE OWNER PRIOR TO INSTALLATION. REFER TO THE SPECIFICATIONS FOR MORE INFORMATION.
20. MULTIWIRE BRANCH CIRCUITS ARE NOT ALLOWED, UNLESS NOTED OTHERWISE.
21. PROVIDE INSULATED EQUIPMENT GROUNDING CONDUCTOR FOR ALL CIRCUITS, UNLESS NOTED OTHERWISE.
22. COORDINATE ALL STARTUP TESTING AND COMMISSIONING WITH OWNERS THIRD PARTY COMMISSIONING AGENT: FAITH GROUP, 3101 S. HANLEY RD, ST LOUIS MO 314-991-2228.

☐ ELECTRICAL PLAN NOTES:

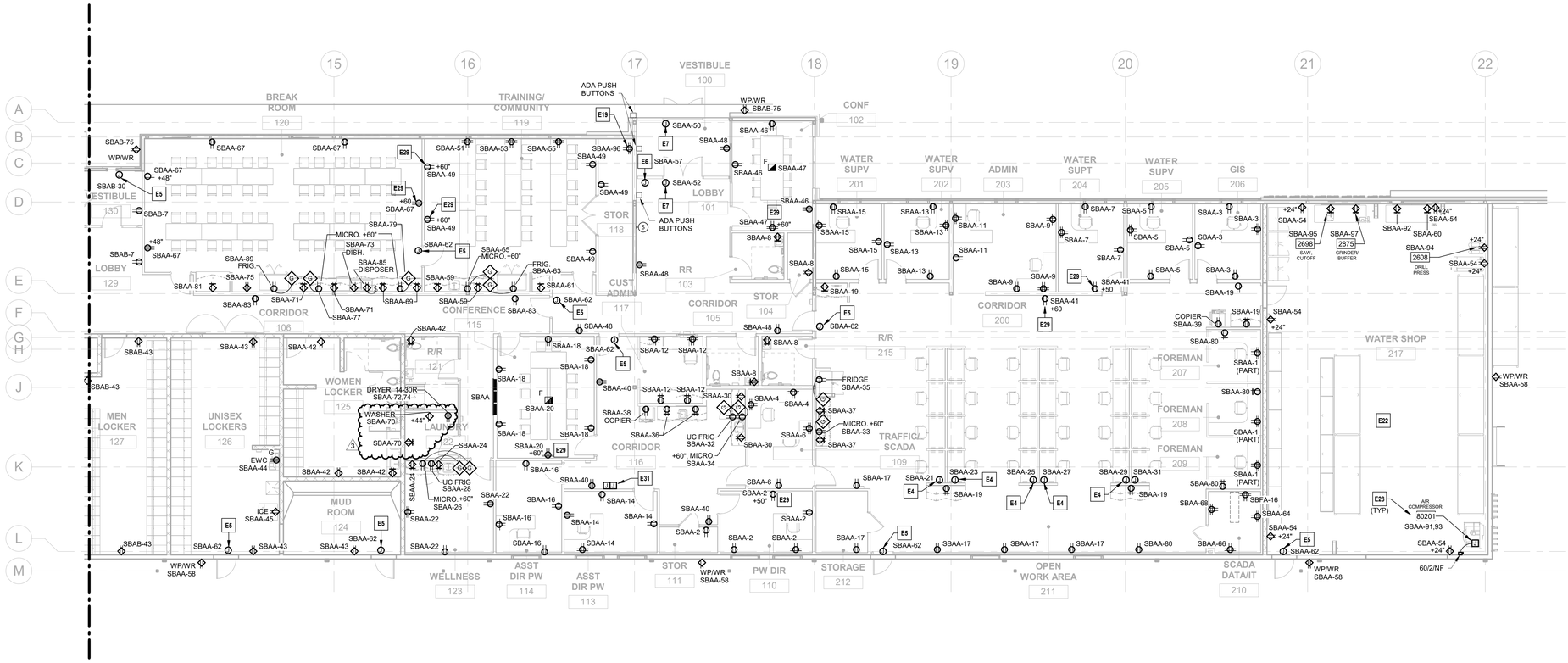
E4 PROVIDE CONNECTION TO SYSTEM FURNITURE WHIP. INSTALL PER MANUFACTURER'S RECOMMENDATIONS.
E5 MAKE FINAL CONNECTION TO ELECTRICAL DOOR STRIKE/CARD READER. VERIFY REQUIREMENTS WITH DOOR HARDWARE TO BE INSTALLED. PROVIDE TRANSFORMER AND PUSHBUTTON IF NOT FURNISHED WITH HARDWARE.
E6 PROVIDE LOW VOLTAGE TRANSFORMER MOUNTED AT 12'-0" AFF AND CONNECT TO WEATHERPROOF ADA PUSHBUTTON AT EXTERIOR BUILDING WALL. COORDINATE REQUIREMENTS WITH OWNER PRIOR TO ROUGH-IN
E7 PROVIDE POWER CONNECTION TO MOTORIZED DOORS. PROVIDE ALL ACCESSORIES AND COMPONENT TO TIE ADA PUSH BUTTON INTO DOOR OPERATIONS.
E19 RECEPTACLE FOR AV RACK, MOUNT RECEPTACLE BEHIND AV RACK COORDINATE FINAL MOUNTING WITH AV INSTALLER.
E22 ALL CONDUIT WITHIN ROOM TO BE ROUTED ABOVE 18" OF THE FLOOR LEVEL. NO CONDUIT BELOW 18" AFF.
E28 REFER TO SHEET E501 FOR EQUIPMENT CONNECTION SCHEDULE.
E29 RECEPTACLE LOCATED WITHIN WALL BOX, COORDINATE EXACT LOCATION WITH AV DRAWINGS.
E31 PROVIDE GENERATOR REMOTE ANNUNCIATOR PANEL AND TRANSFER SWITCH CONTROL PANEL ON WALL. COORDINATE EXACT LOCATIONS WITH OWNER PRIOR TO ROUGH-IN.



KEY PLAN



2 ENLARGED POWER PLANS - ELECTRICAL ROOM 126
1/4" = 1'-0"



1 POWER LEVEL 1 PLAN - AREA A
1/8" = 1'-0"

N

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EXPIRES 12/31/2023

REVISIONS

NO.	DESCRIPTION	DATE
2	ADD 02	01.25.23
3	ADD 03	02.09.23

PROJECT NO.: 19-040 DRAWN BY: NS
DATE: 12.15.22 REVIEWED BY: HEI

STATE OF MISSOURI
DOUGLAS M. EVERHART
NUMBER PE-2019007648
PROFESSIONAL ENGINEER
02/08/2023

DOUGLAS M. EVERHART
LICENSE # PE-2019007648

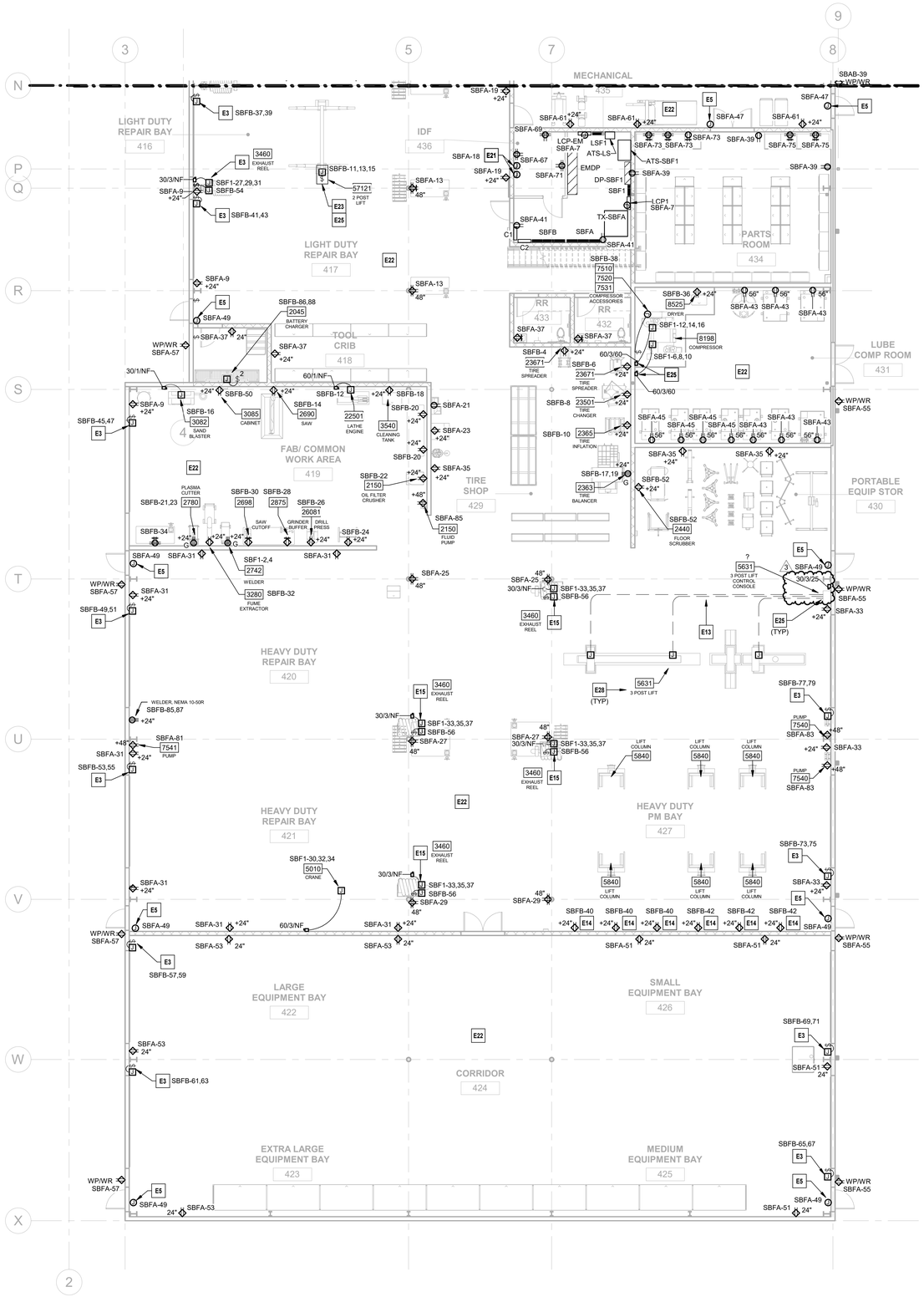
PROJECT TITLE
CITY OF WENTZVILLE, MO PUBLIC WORKS FACILITY

PROJECT ADDRESS:
1295 INTERSTATE DRIVE
WENTZVILLE, MO 63385

POWER LEVEL 1 PLAN - AREA A

SHEET
E201A

DOUGLAS M. EVERHART



1 POWER LEVEL 1 PLAN - AREA C
1/8" = 1'-0"

ELECTRICAL PLAN NOTES:

E3 PROVIDE LOCAL DISCONNECT SWITCH AND CONTACTOR FOR CONNECTION TO MOTOR OPERATED OVERHEAD DOOR. LOCATE DISCONNECT ON WALL AT 48" AND CONTACTOR ADJACENT TO DOOR MOTOR. REFER TO DETAIL 4 ON SHEET E600 FOR MORE INFORMATION. COORDINATE ADDITIONAL ELECTRICAL REQUIREMENTS FOR BUTTON OPERATOR LOCATION, CONTROLS, WIRING AND INSTALL PER MANUFACTURER'S RECOMMENDATIONS.

E5 MAKE FINAL CONNECTION TO ELECTRICAL DOOR STRIKE/CARD READER. VERIFY REQUIREMENTS WITH DOOR HARDWARE TO BE INSTALLED. PROVIDE TRANSFORMER AND PUSHBUTTON IF NOT FURNISHED WITH HARDWARE.

E13 PROVIDE FUSED DISCONNECT ADJACENT TO 3 POST LIFT CONTROL CONSOLE. PROVIDE (2) 2" CONDUITS BELOW SLAB FROM CONTROL PANEL TO EACH LIFT JACK WITH SEAL OFF FITTINGS. PROTECT MANUFACTURER SUPPLIED MC-HL CABLE FROM ABRASION AND INSTALL ASSOCIATED SEALS AND STRAIN RELIEF PER MANUFACTURERS RECOMMENDATIONS. COORDINATE EXACT REQUIREMENTS WITH LIFT MANUFACTURER PRIOR TO ROUGH-IN.

E14 RECEPTACLE DEDICATED FOR CHARGING 5840 LIFT COLUMN.

E15 PROVIDE CONNECTION TO HOSE REEL MOTOR AND CONNECTION TO HOSE REEL CONTROLS. COORDINATE ELECTRICAL REQUIREMENTS WITH MANUFACTURER FOR ANY ADDITIONAL WIRING REQUIREMENT.

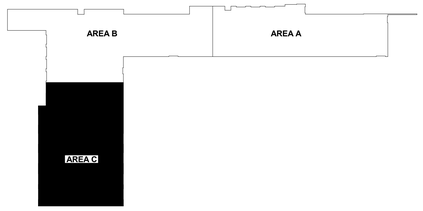
E21 POWER CONNECTION TO SECURITY PANEL. COORDINATE FINAL POWER CONNECTION LOCATION WITH SECURITY SYSTEM INSTALLER.

E22 ALL CONDUIT WITHIN ROOM TO BE ROUTED ABOVE 18" OF THE FLOOR LEVEL. NO CONDUIT BELOW 18" AFF.

E23 CONNECTION TO OVERHEAD SWITCH AND 3P DRUM SWITCH TO THE TWO POST LIFT COORDINATE FINAL MOUNTING LOCATION/BRACKET AND POWER CONNECTION LOCATION WITH MANUFACTURER REQUIREMENTS. POWER FEEDER TO COME FROM OVERHEAD.

E25 ANY CONNECTIONS ROUTED BELOW 18" AFF SHALL BE SUITABLE FOR CLASS 1 DIVISION 2 AREAS, AND SHALL INCLUDE IMC CONDUIT WITH THREADED FITTINGS AND CONDUIT SEAL OFF'S.

E28 REFER TO SHEET E501 FOR EQUIPMENT CONNECTION SCHEDULE.



KEY PLAN

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POWER LEVEL 1 PLAN - AREA C

SHEET
E201C

DOUGLAS M. EVERHART

LIGHTING CONTROL DEVICE SCHEDULE

LINE-VOLTAGE WALL SWITCH OCCUPANCY SENSORS

SYMBOL TAG	MANUFACTURER MODEL/SERIES	ALTERNATE MANUFACTURER	DEVICE DESCRIPTION	COVERAGE (W X D)	VOLTAGE	NOTES
$VSD	LEGRAND DW-100	ACUITY, COOPER CRESTRON, HUBBELL LEVITON, LUTRON	WALL MOUNT DUAL TECHNOLOGY OCCUPANCY SENSOR. INTEGRAL MANUAL OVERRIDE SWITCH. SINGLE RELAY. LINE-VOLTAGE. LOAD: 120V=800W, 277V=1200W.	PIR MAJOR 30' x 35' PIR MINOR 15' x 20' ULT MAJOR 20' x 20' ULT MINOR 15' x 15'	120/ 277	

LINE-VOLTAGE DIMMING WALL SWITCH OCCUPANCY SENSORS

SYMBOL TAG	MANUFACTURER MODEL/SERIES	ALTERNATE MANUFACTURER	DEVICE DESCRIPTION	COVERAGE (W X D)	VOLTAGE	NOTES
$ VS	LEGRAND DW-311	ACUITY, CRESTRON HUBBELL, LUTRON	WALL MOUNT DUAL TECHNOLOGY OCCUPANCY SENSOR. MULTI-WAY. INTEGRAL MANUAL OVERRIDE SWITCH. SINGLE RELAY. LINE-VOLTAGE. 0-10V DIMMING. 50mA SINK. LOAD: 120V=1000W, 277V=1200W.	PIR MAJOR 30' x 35' PIR MINOR 15' x 20' ULT MAJOR 20' x 20' ULT MINOR 15' x 15'	120/ 277	

STAND-ALONE LOW-VOLTAGE LIGHTING CONTROL SYSTEMS

STAND-ALONE LOW-VOLTAGE OCCUPANCY SENSORS

SYMBOL TAG	MANUFACTURER MODEL/SERIES	ALTERNATE MANUFACTURER	DEVICE DESCRIPTION	COVERAGE (W X D)	VOLTAGE	NOTES
2	LEGRAND HBL2W	ACUITY, COOPER HUBBELL, LEVITON	CEILING MOUNT PASSIVE INFRARED OCCUPANCY SENSOR. WEL LOCATION RATED. 360 DEGREE COVERAGE. LOW-VOLTAGE.	48' Ø (8' MOUNTING)	24	
3	LEGRAND HBL3W	ACUITY, COOPER HUBBELL, LEVITON	CEILING MOUNT PASSIVE INFRARED OCCUPANCY SENSOR. WEL LOCATION RATED. 360 DEGREE COVERAGE. LOW-VOLTAGE.	40' Ø (20' MOUNTING)	24	
4	LEGRAND HBL7W	ACUITY, COOPER HUBBELL, LEVITON	CEILING MOUNT PASSIVE INFRARED OCCUPANCY SENSOR. WEL LOCATION RATED. 360 DEGREE COVERAGE. LOW-VOLTAGE.	100' Ø (40' MOUNTING)	24	

STAND-ALONE LOW-VOLTAGE PHOTOELECTRIC SWITCHES

SYMBOL TAG	MANUFACTURER MODEL/SERIES	ALTERNATE MANUFACTURER	DEVICE DESCRIPTION	VOLTAGE	NOTES
PS1	LEGRAND EM-24D2	ACUITY HUBBELL LEVITON	EXTERIOR LOW-VOLTAGE PHOTOELECTRIC SWITCH. FACE SENSOR NORTH AND ORIENT VERTICALLY. 0-15 FC.	24	

STAND-ALONE LOW-VOLTAGE POWER PACKS

SYMBOL TAG	MANUFACTURER MODEL/SERIES	ALTERNATE MANUFACTURER	DEVICE DESCRIPTION	VOLTAGE	NOTES
PP	LEGRAND BZ-250	ACUITY, COOPER HUBBELL, LEVITON	POWER PACK FOR LOW-VOLTAGE OCCUPANCY SENSORS. 20A LOAD. (1) RELAY. MANUAL- AND AUTO-ON MODES. HOLD-ON AND -OFF INPUTS. LOAD: 16A AT 120V OR 277V. OUTPUT: 225mA AT 24V. PLENUM RATED.	120/ 277	

STAND-ALONE LOW-VOLTAGE SWITCHES

SYMBOL TAG	MANUFACTURER MODEL/SERIES	ALTERNATE MANUFACTURER	DEVICE DESCRIPTION	VOLTAGE	NOTES
$ OR	LEGRAND DDC2	ACUITY, COOPER HUBBELL, LEVITON	MOMENTARY 1-BUTTON DECORATOR SWITCH FOR MANUAL ON/OFF CONTROL OF STAND-ALONE LOW-VOLTAGE OCCUPANCY SENSORS. INTEGRAL LED ILLUMINATES WHEN LOAD IS ON.	24	

NETWORK LIGHTING CONTROL SYSTEMS

NETWORK OCCUPANCY SENSORS

SYMBOL TAG	MANUFACTURER MODEL/SERIES	ALTERNATE MANUFACTURER	DEVICE DESCRIPTION	COVERAGE (W X D)	VOLTAGE	NOTES
1	LEGRAND LMDC-100	ACUITY, CRESTRON ETC, HUBBELL	CEILING MOUNT DUAL TECHNOLOGY OCCUPANCY SENSOR. 360 DEGREE COVERAGE, DIGITAL. (2) RJ45 PORTS. IR TRANSCEIVER FOR WIRELESS SETUP.	PIR MAJOR 32' Ø PIR MINOR 15' Ø ULT MAJOR 25' x 25'	24	

NETWORK DAYLIGHT SENSORS

SYMBOL TAG	MANUFACTURER MODEL/SERIES	ALTERNATE MANUFACTURER	DEVICE DESCRIPTION	VOLTAGE	NOTES
D	LEGRAND LMLS-400	ACUITY, CRESTRON ETC, HUBBELL	CLOSED LOOP DAYLIGHT SENSOR FOR (1) ZONE. ON/OFF SWITCHING, BI-LEVEL, TRI-LEVEL, OR CONTINUOUS DIMMING. CEILING MOUNTED. 0-6,500 FC. DIGITAL. (1) RJ45 PORT. IR TRANSCEIVER FOR WIRELESS SETUP.	24	

NETWORK ROOM CONTROLLERS (POWER PACK)

SYMBOL TAG	MANUFACTURER MODEL/SERIES	ALTERNATE MANUFACTURER	DEVICE DESCRIPTION	VOLTAGE	NOTES
RC0	LEGRAND LMRC-101 (NON-DIM)	ACUITY, CRESTRON ETC, HUBBELL	DIGITAL ROOM CONTROLLER FOR ON/OFF CONTROL OF LIGHTING LOADS. (1) 20A LOAD INPUT, (1) RELAY OUTPUT. MANUAL- AND AUTO-ON MODES.	120/ 277	
RC1	LEGRAND LMRC-211 (0-10V)	ACUITY, CRESTRON ETC, HUBBELL	DIGITAL ROOM CONTROLLER FOR ON/OFF/0-10V DIMMING CONTROL OF LIGHTING LOADS. (1) 20A LOAD INPUT, (1) RELAY OUTPUT. 100mA SINK PER RELAY. MANUAL-, PARTIAL-, AND AUTO-ON MODES.	120/ 277	
RC2	LEGRAND LMRC-212 (0-10V)	ACUITY, CRESTRON ETC, HUBBELL	DIGITAL ROOM CONTROLLER FOR ON/OFF/0-10V DIMMING CONTROL OF LIGHTING LOADS. (1) 20A LOAD INPUT, (2) RELAY OUTPUTS. 100mA SINK PER RELAY. MANUAL-, PARTIAL-, AND AUTO-ON MODES.	120/ 277	
RC3	LEGRAND LMRC-213 (0-10V)	ACUITY, CRESTRON ETC, HUBBELL	DIGITAL ROOM CONTROLLER FOR ON/OFF/0-10V DIMMING CONTROL OF LIGHTING LOADS. (1) 20A LOAD INPUT, (3) RELAY OUTPUTS. 100mA SINK PER RELAY. MANUAL-, PARTIAL-, AND AUTO-ON MODES.	120/ 277	

NETWORK LIGHTING SWITCHES

SYMBOL TAG	MANUFACTURER MODEL/SERIES	ALTERNATE MANUFACTURER	DEVICE DESCRIPTION	VOLTAGE	NOTES
$ D	LEGRAND LMSW-102 SERIES	ACUITY, CRESTRON ETC, HUBBELL	2- BUTTON DIGITAL SWITCH FOR MANUAL ON/OFF/DIMMING. EACH BUTTON HAS INTEGRAL LED THAT ILLUMINATES WHEN LOAD IS ON. (2) RJ45 PORTS.	24	
$ LV	LEGRAND LMSW-102 SERIES	ACUITY, CRESTRON ETC, HUBBELL	2- BUTTON DIGITAL SWITCH FOR MANUAL ON/OFF. EACH BUTTON HAS INTEGRAL LED THAT ILLUMINATES WHEN LOAD IS ON. (2) RJ45 PORTS.	24	
$SW#	LEGRAND LMSW SERIES	ACUITY, CRESTRON ETC, HUBBELL	DIGITAL SWITCH FOR MANUAL ON/OFF. EACH BUTTON HAS INTEGRAL LED THAT ILLUMINATES WHEN LOAD IS ON. (2) RJ45 PORTS. REFER TO MULTI-BUTTON SWITCH SCHEDULE ON SHEET E401 FOR PROGRAMMING AND NUMBER OF BUTTONS REQUIRED.	24	

AUXILIARY EQUIPMENT

SYMBOL TAG	MANUFACTURER MODEL/SERIES	ALTERNATE MANUFACTURER	DEVICE DESCRIPTION	VOLTAGE	NOTES
ELB	SIGNIFY BLCD16DIM	SEE DESCRIPTION	AUTOMATIC LOAD CONTROL RELAY WITH 0-10V OVERRIDE. UL924 LISTED. OPERATES AS CONTROL DEVICE OR BYPASS PER SEQUENCE OF OPERATIONS. INTEGRAL TEST BUTTON. ALTERNATE MANUFACTURERS: EATON/COOPER, ETC (REQUIRES ENCLOSURE), ACUITY/IOTA, LUTRON, LVS CONTROLS. EMERGENCY LIGHT FIXTURE MUST BE UL924 LISTED ALSO.	120/ 277	

GENERAL NOTES:

A. OCCUPANCY SENSOR LAYOUT DESIGNED FROM BASIS-OF-DESIGN COVERAGE PATTERNS. IF SUBMITTING ALTERNATE PER 'EQUIVALENT MANUFACTURER' COLUMN, ADJUST SENSOR QUANTITIES AND LOCATIONS PER MANUFACTURER-SPECIFIC SPACING CRITERIA.
B. PROVIDE SHOP DRAWINGS FOR ENGINEER AND ARCHITECT REVIEW THAT INCLUDE PRODUCT CUTSHEETS AND PROJECT-SPECIFIC LAYOUTS. LAYOUTS MUST INCLUDE SENSOR LOCATIONS, HEIGHTS, ORIENTATION, AND COVERAGE AREAS. SHOW COORDINATION WITH ALL OTHER CEILING DEVICES INCLUDING BUT NOT LIMITED TO HVAC SUPPLY AND RETURN GRILLES, SPRINKLERS, LIGHT FIXTURES, AND OTHER OWNER-PROVIDED CEILING MOUNTED DEVICES SUCH AS SPEAKERS, SECURITY CAMERAS, PROJECTORS, ETC. (SENSORS MAY BE ADVERSELY AFFECTED IF LOCATED TOO CLOSE TO OTHER CEILING MOUNTED DEVICES). ALSO PROVIDE SCHEMATICS AND SCHEDULES WHEN APPLICABLE.
C. LIGHTING CONTROLS PRICING SHALL BE COMPLETELY SEPARATE OF ANY LIGHT FIXTURE PRICING.
D. VERIFY COLOR(S) FOR ALL WALL AND CEILING MOUNTED DEVICES WITH THE ARCHITECT.
E. ALL WALL SWITCH AND CEILING SENSORS SHALL HAVE AN ADJUSTABLE TIME DELAY RANGE OF 0-30 MIN, UNO. CONFIRM SENSOR SETTINGS WITH SEQUENCE OF OPERATIONS AND OWNER PRIOR TO SYSTEM COMMISSIONING.
F. PROVIDE COPIES OF OPERATION AND MAINTENANCE INSTRUCTIONS FOR ALL DEVICES TO OWNER.
G. PROVIDE A NEUTRAL CONDUCTOR TO ALL WALL SWITCH LOCATIONS PER NEC REQUIREMENTS.
H. DO NOT SHARE NEUTRAL CONDUCTOR ON LOAD SIDE OF DIMMERS.

VERSION 4.06

LIGHT FIXTURE SCHEDULE

TYPE	MANUFACTURER	MODEL	APPROVED EQUIVALENTS	LAMPS NO.	LAMPS TYPE	LAMPS VOLT	BALLAST TYPE	BALLAST INPUT WATTS	BALLAST INPUT VA	DESCRIPTION	NOTES
A1	HE WILLIAMS	AT1-2-2-L30-8-35-D-DIM-UNV	XTRALIGHT ART UTOPIA	1	INTEGRAL LED 3,000 LUMENS 3,500K 80 CRI	277	0-10V (STANDARD)	30	33	NOMINAL 2'W x 2'L x 4-3/8"D RECESSED ARCHITECTURAL TROFFER, PRECISION DIE-FORMED 22-GAUGE COLD ROLLED STEEL HOUSING, ALUMINUM DOOR FRAME WITH OPTICAL ASSEMBLY, DIFFUSE POLYCARBONATE LENSING WITH ACRYLIC CENTER, REFLECTIVE WHITE POLYESTER POWDER COAT FINISH WITH PAINT AFTER FABRICATION, UNIVERSAL VOLTAGE DRIVER, UL DAMP LOCATION LISTED.	
A1E	HE WILLIAMS	AT1-2-2-L30-8-35-D-DIM-UNV	XTRALIGHT ART UTOPIA	1	INTEGRAL LED	277	0-10V	30	33	SIMILAR TO A1 EXCEPT CONNECTED TO EMERGENCY GENERATOR	
A2	HE WILLIAMS	AT1-2-4-L40-8-35-D-DIM-UNV	XTRALIGHT ART UTOPIA	1	INTEGRAL LED 4,000 LUMENS 3,500K 80 CRI	277	0-10V (STANDARD)	35	38	NOMINAL 2'W x 4'L x 4-3/8"D RECESSED ARCHITECTURAL TROFFER, PRECISION DIE-FORMED 22-GAUGE COLD ROLLED STEEL HOUSING, ALUMINUM DOOR FRAME WITH OPTICAL ASSEMBLY, DIFFUSE POLYCARBONATE LENSING WITH ACRYLIC CENTER, REFLECTIVE WHITE POLYESTER POWDER COAT FINISH WITH PAINT AFTER FABRICATION, UNIVERSAL VOLTAGE DRIVER, UL DAMP LOCATION LISTED.	
A2E	HE WILLIAMS	AT1-2-4-L40-8-35-D-DIM-UNV	XTRALIGHT ART UTOPIA	1	INTEGRAL LED 4,000 LUMENS 3,500K 80 CRI	277	0-10V (STANDARD)	35	38	SIMILAR TO A2 EXCEPT CONNECTED TO EMERGENCY GENERATOR	
D1	HE WILLIAMS	4DR-L15-8-35-DIM-UNV-O-M-OF-WH-MWT-N-WE T/CC	PRESCOLITE LIGHTOLIER	1	INTEGRAL LED 1,500 LUMENS 3,500K 80 CRI	277	0-10V (STANDARD)	18	20	NOMINAL 4"DIA x 5"H LED DOWNLIGHT, DIE-CAST ALUMINUM HOUSING WITH FORGED ALUMINUM HEAT SINK, DIE-CAST ALUMINUM LENSED TRIM, UNIVERSAL VOLTAGE DRIVER, UL LISTED FOR DRY AND DAMP LOCATIONS.	
D2	HE WILLIAMS	4DR-L15-8-35-DIM-UNV-O-M-OF-WH-MWT-N-WE T/CC	PRESCOLITE LIGHTOLIER	1	INTEGRAL LED	277	0-10V	18	20	SIMILAR TO D1 FOR GYP. CEILINGS	
D2E	HE WILLIAMS	4DR-L15-8-35-DIM-UNV-O-M-OF-WH-MWT-N-WE T/CC	PRESCOLITE LIGHTOLIER	1	INTEGRAL LED	277	0-10V	18	20	SIMILAR TO D2 EXCEPT CONNECTED TO EMERGENCY GENERATOR	
D3	HE WILLIAMS	4DR-L15-8-35-DIM-UNV-S-W-OF-WH-MWT-N-IP T/CC	PRESCOLITE LIGHTOLIER	1	INTEGRAL LED	277	0-10V	18	20	SIMILAR TO D2 WITH NON-CONDUCTIVE SHOWER TRIM	
DW1	WAC	WP-LEB929-30	-	2	INTEGRAL LED 1000 LM/HEAD 4000K 80 CRI	120	NON-DIMMING	30	34	STEM MOUNTED SIGN LIGHT WITH 60 DEGREE DUAL AIMABLE HEADS MOUNTED 2'-6" ABOVE CENTERLINE OF LETTERING	
G1	HE WILLILAMS	75S-4-L30-835-[VBY-2]-DIM-UNV	COLUMBIA UTOPIA	1	INTEGRAL LED 3,200 LUMENS 3,500K 80 CRI	277	0-10V (STANDARD)	23	25	NOMINAL 3W" x 3"H x 4'L CHAIN HUNG OR SURFACE/WALL MOUNTED LED STRIP FIXTURE WITH COLD ROLLED STEEL HOUSING AND DIFFUSED ACRYLIC LENS, REFER TO PLANS FOR MOUNTING. WHITE POLYESTER POWDER COAT FINISH APPLIED AFTER FABRICATION OF ALL PARTS. UNIVERSAL VOLTAGE DRIVER. UL LISTED FOR DRY OR DAMP LOCATIONS.	
G1AB	HE WILLILAMS	75S-4-L30-835-[VBY-2]-DIM-UNV	COLUMBIA UTOPIA	1	INTEGRAL LED 3,200 LUMENS 3,500K 80 CRI	120	0-10V (STANDARD)	23	25	NOMINAL 3W" x 3"H x 4'L CHAIN HUNG OR SURFACE/WALL MOUNTED LED STRIP FIXTURE WITH COLD ROLLED STEEL HOUSING AND DIFFUSED ACRYLIC LENS, REFER TO PLANS FOR MOUNTING. WHITE POLYESTER POWDER COAT FINISH APPLIED AFTER FABRICATION OF ALL PARTS. UNIVERSAL VOLTAGE DRIVER. UL LISTED FOR DRY OR DAMP LOCATIONS.	
G1E	HE WILLILAMS	75S-4-L30-835-[VBY-2]-DIM-UNV	COLUMBIA UTOPIA	1	INTEGRAL LED	277	0-10V	23	25	SIMILAR TO G1 EXCEPT CONNECTED TO EMERGENCY GENERATOR	
G1EB	HE WILLIAMS	75S-4-L30-835-[VBY-2]-DIM-UNV-EM/10WLP	COLUMBIA UTOPIA	1	INTEGRAL LED	277	0-10V	23	25	SIMILAR TO G1 WITH 10W EMERGENCY BATTERY PACK.	
G2	HE WILLIAMS	96-4-L40-8-HIAFR-DIM-UNV	COLUMBIA UTOPIA	1	INTEGRAL LED 4,000 LUMENS 3,500K 80 CRI	277	0-10V (STANDARD)	30	33	NOMINAL 7-3/8W" x 4"H x 4'L CHAIN HUNG OR SURFACE/WALL MOUNTED FULLY SEALED AND GASKETED LED STRIP FIXTURE WITH FIBERGLASS AND ALUMINUM HOUSING, STAINLESS STEEL LATCHES, CLOSED-CELL POLYURETHANE GASKET, FROSTED AND RIBBED IMPACT RESISTANT ACRYLIC. POLYESTER POWDER COAT REFLECTOR, IP65, IP66, IP67 RATED, PAINTED AFTER FABRICATION, UNIVERSAL VOLTAGE DRIVER, UL LISTED FOR DRY AND DAMP LOCATION.	
G2E	HE WILLIAMS	96-4-L40-8-HIAFR-DIM-UNV	COLUMBIA UTOPIA	1	INTEGRAL LED 3,200 LUMENS 3,500K 80 CRI	277	0-10V (STANDARD)	23	25	SIMILAR TO G2 EXCEPT CONNECTED TO EMERGENCY GENERATOR	
G3	HE WILLILAMS	96-4-L81-8-HIAFR-DIM-UNIV	COLUMBIA UTOPIA	1	INTEGRAL LED 8000 LUMENS 3,500K 80 CRI	120	0-10V (STANDARD)	61	63	NOMINAL 7-3/8W" x 4"H x 4'L CHAIN HUNG OR SURFACE/WALL MOUNTED FULLY SEALED AND GASKETED LED STRIP FIXTURE WITH FIBERGLASS AND ALUMINUM HOUSING, STAINLESS STEEL LATCHES, CLOSED-CELL POLYURETHANE GASKET, FROSTED AND RIBBED IMPACT RESISTANT ACRYLIC. POLYESTER POWDER COAT REFLECTOR, IP65, IP66, IP67 RATED, PAINTED AFTER FABRICATION, UNIVERSAL VOLTAGE DRIVER, UL LISTED FOR DRY AND DAMP LOCATION.	
H1	HE WILLIAMS	GL-4-L150-8-35-VBY-2-DIM-UNV	COLUMBIA DAYBRITE	1	INTEGRAL LED 15,000 LUMENS 3,500K 80 CRI	277	0-10V (STANDARD)	90	99	NOMINAL 14"W x 48"L x 4"H SUSPENDED HIGH-BAY INDUSTRIAL TROFFER , DIE-FORMED ALUMINUM HOUSING, WHITE POLYESTERDAY POWDER COAT, PAINTED AFTER FABRICATION, UNIVERSAL VOLTAGE DRIVER, UL DRY OR DAMP LOCATION LISTED.	
H1E	HE WILLIAMS	GL-4-L150-8-35-VBY-2-DIM-UNV	COLUMBIA DAYBRITE	1	INTEGRAL LED 15,000 LUMENS 3,500K 80 CRI	277	0-10V (STANDARD)	90	99	SIMILAR TO H1 EXCEPT CONNECTED TO EMERGENCY GENERATOR	
H2	HE WILLIAMS	PT-24-L90-8-35-RA	COLUMBIA DAYBRITE	1	INTEGRAL LED 15,000 LUMENS 3,500K 80 CRI	277	0-10V (STANDARD)	71	74	2X4 LED RECESSED TROFFER	
H2E	HE WILLIAMS	PT-24-L90-8-35-RA	COLUMBIA DAYBRITE	1	INTEGRAL LED 15,000 LUMENS 3,500K 80 CRI	277	0-10V (STANDARD)	71	74	SIMILAR TO H2 EXCEPT CONNECTED TO EMERGENCY GENERATOR	
P1-8	FOCAL POINT	FSM2BS-BWFL-500DN-250UP-35K-1C-UNV-LD1-C##-BKCD-WH-##	LUX, LITECONTROL	1	INTEGRAL LED 250 LUMENS UP 500 LUMENS DN 3500K 80 CRI	277	0-10V, 10%	60	66	NOMINAL 2-1/2"W x 4-1/2"H x 8'L LINEAR DIRECT/INDIRECT LED PENDANT, EXTRUDED ALUMINUM HOUSING FINISHED IN MATTE WHITE POWDER COAT OR AS SELECTED BY ARCHITECT FROM MANUFACTURER'S STANDARD OPTIONS, FROSTED ACRYLIC FLUSH SATIN LENSING DOWN, BATWING OPTICS UP	
P1E-8	-	-	LUX, LITECONTROL	1	-	277	-	60	66	SIMILAR TO P1-8 EXCEPT CONNECTED TO EMERGENCY GENERATOR	
S3-1	COOPER	GLEON-SA3B-740-U-SL3	LITHONIA DSX1 LED BEACON VIPER LSI	1	INTEGRAL LED 17,200 LUMENS 4,000K 80 CRI 416,000 HRS	480	NON-DIMMING	124	131	SINGLE HEAD SITE LIGHT FIXTURE. TYPE III WITH SPILL CONTROL DISTRIBUTION. EXTRUDED ALUMINUM DRIVER ENCLOSURE THERMALLY ISOLATED. HIGH-EFFICIENCY LED OPTICS. STANDARD ARM MOUNT WITH EXTRUDED ALUMINUM ARM WITH INTERNAL BOLT GUIDES. POWDER COATED HEAT SINK, BRONZE FINISH. 800mA DRIVER RATING. 5" SQUARE, 22' TALL STEEL POLE, DARK BRONZE FINISH WITH 2' ARM LENGTH AND VIBRATION DAMPENER.	
S4-1	COOPER	GLEON-SA3B-740-U-SL4	LITHONIA DSX1 LED BEACON VIPER LSI	1	INTEGRAL LED 16,500 LUMENS 4,000K 80 CRI 416,000 HRS	480	NON-DIMMING	124	131	SINGLE HEAD SITE LIGHT FIXTURE. TYPE IV WITH SPILL CONTROL DISTRIBUTION. EXTRUDED ALUMINUM DRIVER ENCLOSURE THERMALLY ISOLATED. HIGH-EFFICIENCY LED OPTICS. STANDARD ARM MOUNT WITH EXTRUDED ALUMINUM ARM WITH INTERNAL BOLT GUIDES. POWDER COATED HEAT SINK, BRONZE FINISH. 800mA DRIVER RATING. 5" SQUARE, 22' TALL STEEL POLE, DARK BRONZE FINISH WITH 2' ARM LENGTH AND VIBRATION DAMPENER.	
S4-2	COOPER	(2) GLEON-SA3B-740-U-SL4	LITHONIA DSX1 LED BEACON VIPER LSI	2	INTEGRAL LED 16,500 LUMENS 4,000K 80 CRI 416,000 HRS	480	NON-DIMMING	248	262	DUAL HEAD 180 DEGREE HEAD SITE LIGHT FIXTURE. TYPE IV WITH SPILL CONTROL DISTRIBUTION. EXTRUDED ALUMINUM DRIVER ENCLOSURE THERMALLY ISOLATED. HIGH-EFFICIENCY LED OPTICS. STANDARD ARM MOUNT WITH EXTRUDED ALUMINUM ARM WITH INTERNAL BOLT GUIDES. POWDER COATED HEAT SINK, BRONZE FINISH. 800mA DRIVER RATING. 5" SQUARE, 22' TALL STEEL POLE, DARK BRONZE FINISH WITH 2' ARM LENGTH AND VIBRATION DAMPENER.	
SC1	KIM LIGHTING	PGL8-SQ-128L-110-4K8-UNV-NXSP-30F	GARDCO	1	INTEGRAL LED 11,500 LUMENS 4,000K 80 CRI	277	NON-DIMMING	111	122	ARCHITECTURAL SURFACE MOUNTED GARAGE LIGHT, COORDINATE AND VERIFY MOUNTING METHOD REQUIRED PRIOR TO ORDERING. TWO-PIECE HINGED DIE-CAST ALUMINUM ENCLOSURE, INTEGRAL DIE-CAST ALUMINUM HEAT SINK AND PASSIVE LED THERMAL MANAGEMENT. TYPE V SQUARE DISTRIBUTION, CLEAR TEMPERATED GLASS LENS, POLYESTER POWDER COAT FINISH, PROVIDED WITH UNIVERSAL VOLTAGE DRIVER, IP66 WET LOCATION LISTED.	
W1	MCGRAW-EDISON	IST-SA1-A-740-U-T4FT	GARDCO HUBBELL LITHONIA BEACON	1	INTEGRAL LED 2,530 LUMENS 4,000K 70 CRI	277	NON-DIMMING	20	21	NOMINAL 16-1/2" x 9"D x 7"H LED FULL CUTOFF WALL SCONCE DOWNLIGHT FIXTURE WITH SINGLE PIECE DIE-CAST ALUMINUM HOUSING, TYPE IV FORWARD THROW OPTICS WITH INTEGRAL UNIVERSAL VOLTAGE DRIVER, CONFIRM FINISH WITH ARCHITECT PRIOR TO ORDER. MOUNT FIXTURE +9' AFF TO BOTTOM OF FIXTURE. IP66 WET LOCATION LISTED.	
W1E	MCGRAW-EDISON	IST-SA1-A-740-U-T4FT	GARDCO HUBBELL LITHONIA BEACON	1	INTEGRAL LED 2,530 LUMENS 4,000K 70 CRI	277	NON-DIMMING	20	21	EXTERIOR WALL PACK. NOMINAL 16-1/2" x 9"D x 7"H LED FULL CUTOFF WALL SCONCE DOWNLIGHT FIXTURE WITH SINGLE PIECE DIE-CAST ALUMINUM HOUSING, TYPE IV FORWARD THROW OPTICS WITH INTEGRAL UNIVERSAL VOLTAGE DRIVER, CONFIRM FINISH WITH ARCHITECT PRIOR TO ORDER. MOUNT FIXTURE +9' AFF TO BOTTOM OF FIXTURE. IP66 WET LOCATION LISTED.	
W1EB	MCGRAW-EDISON	IST-SA1-A-740-U-T4FT-CBP	GARDCO HUBBELL LITHONIA BEACON	1	INTEGRAL LED 2,530 LUMENS 4,000K 70 CRI	277	NON-DIMMING	20	21	EXTERIOR WALL PACK WITH EMERGENCY BATTERY PACK. NOMINAL 16-1/2" x 9"D x 7"H LED FULL CUTOFF WALL SCONCE DOWNLIGHT FIXTURE WITH SINGLE PIECE DIE-CAST ALUMINUM HOUSING, TYPE IV FORWARD THROW OPTICS WITH INTEGRAL UNIVERSAL VOLTAGE DRIVER, CONFIRM FINISH WITH ARCHITECT PRIOR TO ORDER. INTEGRAL MOTION SENSOR, TO DIM FIXTURE TO 20% OUTPUT, WHEN AREA IS UNOCCUPIED FOR AT LEAST 10-MINUTES. MOUNT FIXTURE +9' AFF TO BOTTOM OF FIXTURE. IP66 WET LOCATION LISTED.	
WTL	HE WILLIAMS	AX2W-4-L33-8-40	LITECONTROL LEDALITE	1	INTEGRAL LED	277	0-10V	23	25	WALL MOUNTED LED TASK LIGHT, MOUNTED 7' AFF	
X1	EXITRONIX	902-R-LB-RM-BA	DUALITE EMERGILITE	1	INTEGRAL LED	277	NON-DIMMING	5	5	RECESSED CEILING, WALL, OR END MOUNT EDGE LIT LED EXIT SIGN. BRUSHED ALUMINUM TRIM FINISH WITH RED LETTERS ON MIRROR ACRYLIC PANEL. UNIVERSAL VOLTAGE 120/277 VAC OPERATION. CHEVRON ARROWS AS INDICATED ON DRAWINGS. WHERE SHOWN CEILING MOUNTED WITHOUT LAY-IN/GYP CEILING, PROVIDE PENDANT MOUNTING KIT TO MOUNT +9'-6" AFF TO TOP OF FIXTURE. UL 924 COMPLIANT, UL LISTED.	
X2	-	-	-	1	-	277	NON-DIMMING	5	5	SIMILAR TO X1 EXCEPT DOUBLE SIDED	
X3	EXITRONIX	QXT-R-WH-WG-S	DUALITE EMERGILITE	1	-	277	NON-DIMMING	5	5	UNIVERSAL MOUNT LED EXIT SIGN. THERMOPLASTIC HOUSING WITH RED LETTERS. UNIVERSAL VOLTAGE 120/277 VAC OPERATION. CHEVRON ARROWS AS INDICATED ON DRAWINGS. WHERE SHOWN CEILING MOUNTED WITHOUT LAY-IN/GYP CEILING, PROVIDE PENDANT MOUNTING KIT TO MOUNT +9'-6" AFF TO TOP OF FIXTURE. UL 924 COMPLIANT, UL LISTED.	

LIGHT FIXTURE SCHEDULE GENERAL NOTES:

A. VERIFY QUANTITIES, MODEL NUMBERS, AND DESCRIPTIONS WITH MANUFACTURER PRIOR TO PLACING ORDER.
B. VERIFY FINISH AND COLOR WITH ARCHITECT PRIOR TO PLACING ORDER.
C. REFER TO ARCHITECTURAL DRAWINGS AND DETAILS FOR EXACT LOCATIONS, MOUNTING HEIGHTS, AND ADDITIONAL MOUNTING INFORMATION. CONTACT ARCHITECT IMMEDIATELY IF THERE ARE DISCREPANCIES BETWEEN THE ARCHITECTURAL AND ELECTRICAL LIGHTING PLANS.
D. CATALOG NUMBERS SHALL NOT BE CONSIDERED COMPLETE AND MATERIAL SHALL NOT BE ORDERED BY THE MANUFACTURER AND CATALOG NUMBERS ONLY. FIRST READ THE COMPLETE DESCRIPTION, NOTES, AND SPECIFICATIONS IN CONJUNCTION WITH THE CATALOG NUMBER TO DETERMINE THE EXACT MATERIAL AND ACCESSORIES TO BE ORDERED. THE MANUFACTURERS LISTED ARE THE BASIS FOR THE DESIGN.
E. CONTRACTOR SHALL PROVIDE ALL LIGHT FIXTURES UNLESS NOTED OTHERWISE.
F. REFER TO DIVISION 26 SPECIFICATIONS FOR ACCEPTABLE LED AND RIVER MANUFACTURERS AND ADDITIONAL INFORMATION.
G. FOR DIMMABLE LIGHT FIXTURES, REFER TO DIVISION 26 SPECIFICATIONS FOR MORE INFORMATION REGARDING CONTROL WIRING AND COMPATIBILITY.

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EXPIRES 12/31/2023

REVISIONS

NO.	DESCRIPTION	DATE
2	ADD 02	01.25.23
3	ADD 03	02.09.23

PROJECT NO.: 19-040 DRAWN BY: NS
DATE: 12.15.22 REVIEWED BY: HEI

STATE OF MISSOURI
DOUGLAS M. EVERHART
NUMBER PE-2019007648
PROFESSIONAL ENGINEER

02/08/2023

DOUGLAS M. EVERHART
LICENSE # PE-2019007648

PROJECT TITLE
CITY OF WENTZVILLE, MO PUBLIC WORKS FACILITY

PROJECT ADDRESS:
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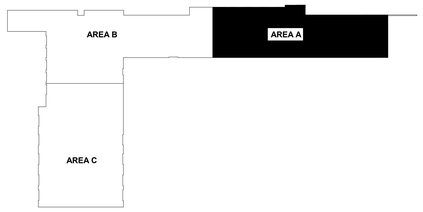
WENTZVILLE, MO 63385

LIGHTING SCHEDULES

SHEET
E400

DOUGLAS M. EVERHART



KEY PLAN

MECHANICAL PLAN NOTES:

M4 PROVIDE FRAMED OPENING IN WALL ABOVE CEILING.

M5 REFRIGERANT PIPE ROUTING SHOWN IS DIAGRAMMATIC. FINAL SIZING AND ROUTING OF REFRIGERANT LINES SHALL BE DETERMINED PER THE MANUFACTURER'S INSTRUCTIONS.

M6 ROUTE REFRIGERANT PIPING DOWN WITHIN STUD WALL AND PENETRATE THE EXTERIOR WALL 1'-0" AFF.

M19 TERMINATE 6 INCH DRYER VENT WITH THRU WALL VENT CAP.

M22 ALL EXPOSED DUCTWORK SHALL BE PROVIDED WITH PAINT GRIP FINISH FOR FIELD PAINTING. REFER TO SPECIFICATIONS FOR MORE INFORMATION.

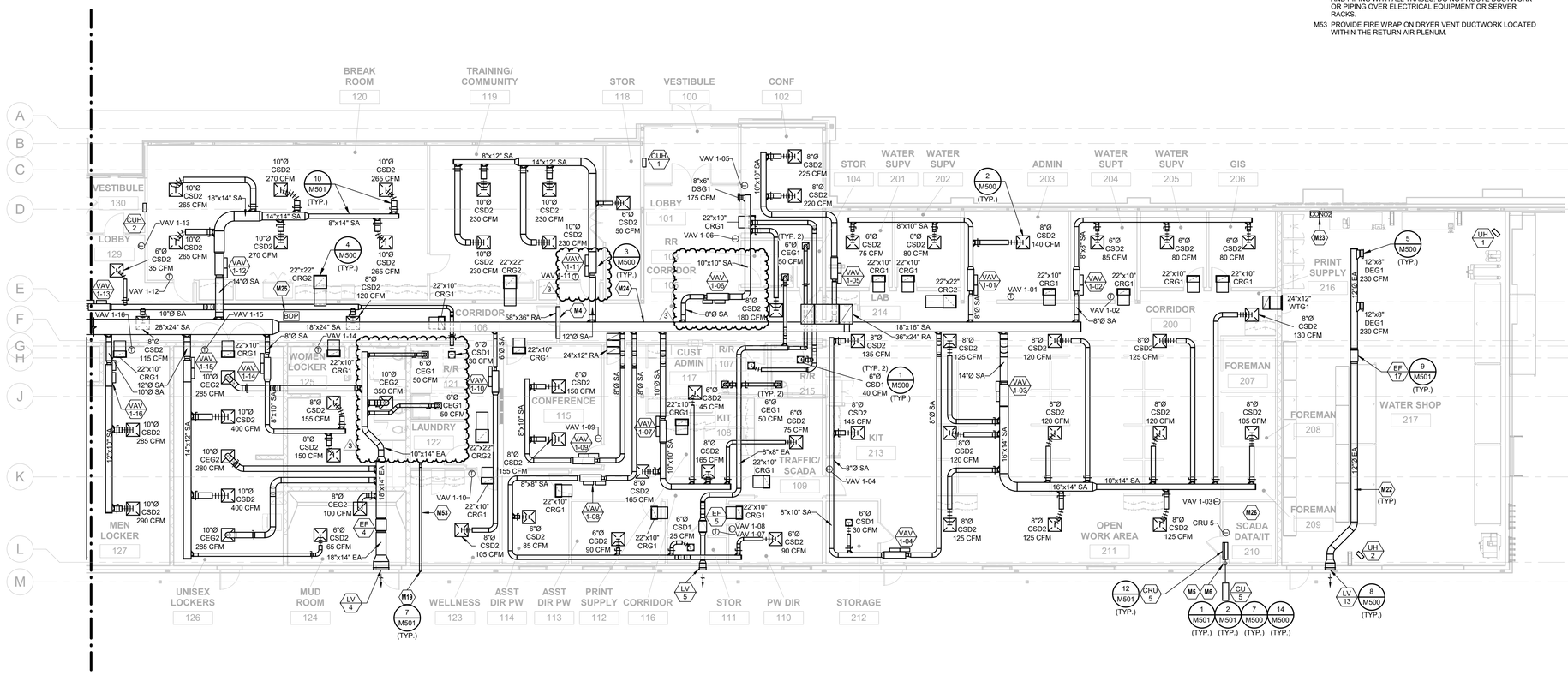
M23 MOUNT CO SENSOR AND NO2 SENSOR AT 4 FEET AFF. SENSORS SHALL PROVIDE AN AUDIBLE ALARM TO THE OCCUPANTS IF THEIR SETPOINT IS EXCEEDED. REFER TO CONTROLS SHEET M702 FOR SETPOINTS.

M24 LOCATION OF SUPPLY AIR DUCT STATIC PRESSURE SENSOR. REFER TO CONTROLS SHEET M701 FOR MORE INFORMATION.

M25 LOCATION OF BUILDING DIFFERENTIAL PRESSURE SENSOR. REFER TO CONTROLS SHEETS FOR MORE INFORMATION.

M26 COORDINATE INSTALLATION OF EQUIPMENT, DUCTWORK, AND PIPING WITH ALL TRADES. DO NOT ROUTE DUCTWORK OR PIPING OVER ELECTRICAL EQUIPMENT OR SERVER RACKS.

M53 PROVIDE FIRE WRAP ON DRYER VENT DUCTWORK LOCATED WITHIN THE RETURN AIR PLENUM.



1 HVAC LEVEL 1 PLAN - AREA A
1/8" = 1'-0"

N

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REVISIONS

NO.	DESCRIPTION	DATE
2	ADD 02	01.25.23
3	ADD 03	02.09.23

PROJECT NO.: 19-040 DRAWN BY: MJS
DATE: 12.15.22 REVIEWED BY: CJH

STATE OF MISSOURI
CARL J. HOLDEN
NUMBER PE-2020016283
PROFESSIONAL ENGINEER

02/08/2023

CARL J. HOLDEN
LICENSE # PE-2020016283

PROJECT TITLE
CITY OF WENTZVILLE, MO PUBLIC WORKS FACILITY

PROJECT ADDRESS:
1296 INTERSTATE DRIVE
WENTZVILLE, MO 63385

HVAC LEVEL 1 PLAN - AREA A

SHEET
M101A

CARL J. HOLDEN

ROOFTOP UNIT SCHEDULE (DX COOLING, NATURAL GAS HEAT)

				SUPPLY FAN								RELIEF FAN						COOLING									GAS HEAT EXCHANGER								ELECTRICAL					
																				EAT	LAT		MIN EFF																		
MARK	MANUFACTURER	MODEL	UNIT TYPE	QUANTITY	FAN TYPE	TOTAL CFM	ESP (IN)	TSP (IN)	TOTAL BHP	TOTAL NOM HP	VFD (Y/N)	QUANTITY	TOTAL CFM	ESP (IN)	TOTAL BHP	TOTAL NOM HP	VFD (Y/N)	TH (MBH)	SH (MBH)	(°F DB)	(°F WB)	(°F DB)	(°F WB)	REFR TYPE	(EER)	IEER	MIN NO COMPRESSORS	MAX VEL (FPM)	MIN OUT (MBH)	NOM INPUT (MBH)	MIN EFF (%)	EAT (°F DB)	LAT (°F DB)	MIN NO STAGES	MAX VEL (FPM)	MIN O/A CFM	V/PH	MCA	MOCP	DISC TYPE	WEIGHT (LBS)	NOTES
RTU 1	TRANE	RF0603443	MZ VAV	2	AF	15900	2.40	4.75	18.83	20.00	Yes	2	7000	0.50	1.495	16.00	Yes	735.6	526.8	83.4	68.2	53.5	53.4	R410A	10.7	16.3	3	350	405	500.0	80	50.0	76.6	16:1 MODULATING	600	5520	460/3	161.4	175	NF	10700	ALL

MODEL NUMBERS AND NOMINAL TONS LISTED SHALL NOT BE CONSIDERED COMPLETE AND MATERIAL SHALL NOT BE ORDERED BY MANUFACTURER, MODEL NUMBERS, OR NOMINAL TONS ONLY. REVIEW THE COMPLETE DESCRIPTION, NOTES AND SPECIFICATIONS TO DETERMINE THE EXACT MATERIAL AND ACCESSORIES TO BE ORDERED. THE MANUFACTURERS LISTED ARE THE BASIS FOR THE DESIGN.

NOTES:

A. REFER TO SHEET M701 FOR PACKAGED MULTI-ZONE VAV ROOFTOP UNIT CONTROL DRAWING, POINTS LIST, AND SEQUENCE.
B. EQUIPMENT SIZED FOR 100 °F AMBIENT TEMPERATURE.
C. PROVIDE 2" MERV 8 PLEATED THROWAWAY PRE-FILTERS AND 4" MERV 13 PLEATED THROWAWAY AIR FILTERS.
D. DISCONNECT SWITCH PROVIDED BY DIVISION 26 CONTRACTOR.
E. STARTERS FOR ALL MOTORS SHALL BE FURNISHED INTEGRAL WITH UNIT.
F. PROVIDE FACTORY MOUNTED VARIABLE FREQUENCY DRIVE TO FACILITATE MODULATING FAN SPEED CONTROL.
G. PROVIDE SHAFT GROUNDING SYSTEM ON MOTOR. REFER TO MOTOR SPECIFICATION FOR ADDITIONAL INFORMATION.
H. PROVIDE SINGLE POINT POWER CONNECTION.
J. COORDINATE SIZE OF CONDUCTOR TERMINATION LUGS WITH CONDUCTOR SIZES SHOWN ON ELECTRICAL DRAWINGS.
K. PROVIDE 125 VAC, 20 AMP DUPLEX CONVENIENCE RECEPTACLE MOUNTED TO UNIT READY FOR FIELD WIRING WITH A COVER UL LISTED FOR WET AND DAMPER LOCATIONS WHEN IN USE.
L. SPECIFIED FAN ESP ACCOUNTS FOR DUCT LOSSES EXTERNAL TO UNIT.
M. SPECIFIED FAN TSP INCLUDES EXTERNAL DUCT AND INTERNAL FILTER, COIL, AND CASING LOSSES. FILTER LOSS IS AT A MAXIMUM OF 400 FPM FACE VELOCITY.
N. PROVIDE MOTOR HORSEPOWER TO OVERCOME INTERNAL UNIT STATIC PRESSURE DROP PLUS SPECIFIED EXTERNAL STATIC PRESSURE DROP. NOMINAL MOTOR HP SHALL BE NO LARGER THAN THE FIRST AVAILABLE NOMINAL MOTOR SIZE GREATER THAN THE REQUIRED BHP.
P. PROVIDE INSULATED ROOF CURB WITH MINIMUM HEIGHT REQUIRED TO MAINTAIN BOTTOM OF EQUIPMENT A MINIMUM OF 8 INCHES ABOVE FINISHED ROOF SURFACE. COORDINATE WITH ROOF INSULATION THICKNESS AND ROOF TAPER AT INSTALLED LOCATION. COORDINATE CURB TYPE WITH DRAWINGS.
Q. SCHEDULED WEIGHT IS THE MAXIMUM ALLOWABLE OPERATING WEIGHT OF THE EQUIPMENT. CURB IS NOT INCLUDED.
R. COOLING COIL LAT IS LEAVING AIR TEMPERATURE OF COIL.
S. PROVIDE GUARDS TO PROTECT CONDENSER COIL FROM HAIL OR OTHER DAMAGE.
T. PROVIDE HEATER TO MEET OR EXCEED SCHEDULED MINIMUM MBH OUTPUT. NOMINAL INPUT IS BASED ON LISTED MANUFACTURER'S STANDARD PRODUCT. COORDINATE EQUIPMENT GAS LOAD WITH PLUMBING CONTRACTOR IF DIFFERENT FROM THAT SCHEDULED. MEET MINIMUM EFFICIENCY SCHEDULED.
U. PROVIDE DIFFERENTIAL ENTHALPY ECONOMIZER.
V. PROVIDE WITH VARIABLE SPEED LEAD COMPRESSOR.
W. PROVIDE WITH STAINLESS STEEL HEAT EXCHANGER.
X. DIVISION 28 CONTRACTOR SHALL PROVIDE SMOKE DETECTORS IN RETURN AIR DUCT.

MAKEUP AIR UNIT SCHEDULE (NATURAL GAS HEAT)

				SUPPLY FAN								GAS HEAT EXCHANGER									ELECTRICAL				
MARK	MANUFACTURER	MODEL	AREA SERVED	CFM	ESP (IN)	NO OF FANS	BHP PER FAN	NOM HP PER FAN	VFD (Y/N)	V/PH	MCA	MOCP	MIN OUT (MBH)	NOM INPUT (MBH)	MIN EFF (%)	EAT (°F)	LAT (°F DB)	MIN NO STAGES	V/PH	MCA	MOCP	DISC TYPE	STARTER TYPE	WEIGHT (LBS)	NOTES
MAU 1	TRANE	CSAA035	FLEET MAINTENANCE	15100	1.2	2	5.17	7.50	Yes	460/3	26.25	45	1500.0	1875.0	80	0	90.0	10:1 MODULATING	120/1	5.26	15	NF	VFD	5900	ALL

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NOTES:

A. EQUIPMENT PROVIDED BY DIVISION 23.
B. PROVIDE 2" MERV 8, EFFICIENT PLEATED THROWAWAY AIR FILTERS.
C. DISCONNECT SWITCH PROVIDED BY DIVISION 26 CONTRACTOR.
D. STARTERS FOR ALL MOTORS SHALL BE FURNISHED INTEGRAL WITH UNIT.
E. SPECIFIED FAN ESP ACCOUNTS FOR DUCT LOSSES EXTERNAL TO UNIT. FILTER LOSS IS AT A MAXIMUM OF 400 FPM FACE VELOCITY.
F. PROVIDE MOTOR HORSEPOWER TO OVERCOME INTERNAL UNIT STATIC PRESSURE DROP PLUS SPECIFIED EXTERNAL STATIC PRESSURE DROP. NOMINAL MOTOR HP SHALL BE NO LARGER THAN THE FIRST AVAILABLE NOMINAL MOTOR SIZE GREATER THAN THE REQUIRED BHP.
G. DIVISION 28 CONTRACTOR SHALL PROVIDE SMOKE DETECTORS IN SUPPLY AIR DUCT(S).
H. SCHEDULED WEIGHT IS THE MAXIMUM ALLOWABLE OPERATING WEIGHT OF THE EQUIPMENT.
J. PROVIDE WITH STAINLESS STEEL HEAT EXCHANGER.
K. MAKE UP AIR UNIT DESIGNED FOR NATURAL GAS AT 972 BTU PER CUBIC FOOT AT A GAS SUPPLY PRESSURE OF 7-10" W.C. PROVIDE HIGH ALTITUDE GAS CONVERSION KIT AS REQUIRED.
L. PROVIDE HEATER TO MEET OR EXCEED SCHEDULED MINIMUM MBH OUTPUT. NOMINAL INPUT IS BASED ON LISTED MANUFACTURER'S STANDARD PRODUCT. COORDINATE EQUIPMENT GAS LOAD WITH PLUMBING CONTRACTOR IF DIFFERENT FROM THAT SCHEDULED. MEET MINIMUM EFFICIENCY SCHEDULED.
M. PROVIDE UNIT WITH END SUPPLY AIR DUCT DISCHARGE.
N. PROVIDE UNIT WITH MOTORIZED OUTSIDE AIR DAMPER.
P. CONTROLS CONTRACTOR SHALL PROVIDE MULTIPLE SPACE TEMPERATURE SENSORS AS SHOWN ON THE PLANS FOR AVERAGING CONTROL. REFER TO CONTROLS SHEET M701 FOR MORE INFORMATION.
Q. DIVISION 26 SHALL PROVIDE TWO POWER CONNECTIONS, ONE FOR THE SUPPLY FAN AND ONE FOR THE GAS HEAT CONTROL.

GRILLE, REGISTER AND DIFFUSER SCHEDULE

MARK	MANUFACTURER	SERVICE	MODEL	FACE TYPE	MOUNTING LOCATION	FACE SIZE (IN)	MAX NC	MAX PRESS DROP (IN W.C.)	NOTES
CEG1	PRICE	EXHAUST	80	EGGCRATE	CEILING	12"x12"	25	0.05	B, C, F, H, J, K
CEG2	PRICE	EXHAUST	80	EGGCRATE	CEILING	24"x24"	25	0.05	B, C, F, H, J, K
CRG1	PRICE	RETURN	80	EGGCRATE	CEILING	24"x12"	25	0.05	B, C, F, H, J
CRG2	PRICE	RETURN	80	EGGCRATE	CEILING	24"x24"	25	0.05	B, C, F, H, J
CSD1	PRICE	SUPPLY	SPD	PLAQUE	CEILING	12"x12"	25	0.08	A, B, C, F, H, K
CSD2	PRICE	SUPPLY	SPD	PLAQUE	CEILING	24"x24"	25	0.08	A, B, C, F, H, K
DEG1	PRICE	EXHAUST	630	LOUVERED	DUCT	REFER TO PLANS	25	0.05	B, D, E, G, H
DSG1	PRICE	SUPPLY	620	LOUVERED	DUCT	REFER TO PLANS	25	0.08	B, D, E, G, H
WTG1	PRICE	TRANSFER	630	LOUVERED	WALL	REFER TO PLANS	25	0.05	B, D, E, H

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NOTES:

A. 4-WAY THROW PATTERN UNLESS OTHERWISE INDICATED BY FLOW ARROWS ON DRAWINGS.
B. NECK SIZE SHOWN ON DRAWINGS. PROVIDE BRANCH DUCT TO MATCH NECK SIZE UNLESS OTHERWISE SHOWN ON DRAWINGS.
C. BAKED ENAMEL FINISH, WHITE TO MATCH CEILING COLOR.
D. FRONT BLADES PARALLEL TO LONG DIMENSION.
E. DOUBLE DEFLECTION BARS SHALL BE ADJUSTABLE
F. FRAME TYPE TO MATCH CEILING/WALL CONSTRUCTION, COORDINATE WITH ARCHITECTURAL REFLECTED CEILING/WALL PLAN.
G. PROVIDE OPPOSED BLADE DAMPER ADJUSTABLE FROM FACE OF DEVICE.
H. PROVIDE DIFFUSERS, LINEAR SLOTS, AND GRILLES WITH NO EXPOSED MOUNTING SCREWS.
J. PAINT ALL INTERIOR SURFACES SLOTS, GRILLES AND PLENUMS FLAT BLACK.
K. WHEN LOCATED IN INACCESSIBLE CEILING AND THE BRANCH DUCT TO THE DEVICE SHOWS A DAMPER ON THE PLANS, CONTRACTOR SHALL PROVIDE REMOTE CABLE-OPERATED VOLUME DAMPER BY METROPOLITAN AIR TECHNOLOGIES MODEL RT-250 WITH EXTERNAL WORM GEAR OPERATOR OR EQUIVALENT YOUNG REGULATOR BUTTERFLY DAMPER WITH 270-275 CONTROLLER. OPERATOR SHALL HAVE A SQUARE DRIVE FOR 1/4" NUT DRIVER, DAMPER ASSEMBLY SHALL INCLUDE GALVANIZED STEEL DUCT WITH ROLLED BEAD STIFFENERS, REINFORCED BLADE, SELF LUBRICATING BEARING AND WORM GEAR MOUNTING PLATE. DAMPER SHALL BE INSTALLED IN BRANCH DUCT NOT INLET OF DIFFUSER.

LOUVER SCHEDULE

MARK	SERVICE	MANUFACTURER	MODEL	CFM	WIDTH (IN)	LENGTH (IN)	MIN FREE AREA (SF)	MAX VELOCITY	MAX APD (IN W.C.)	NOTES
LV 1	MAU-1 INTAKE	GREENHECK	ESD-435	15100	96	78	30.70	500	0.04	A-D 3
LV 2	EF-2 EXHAUST	GREENHECK	ESD-435	470	22	14	0.70	700	0.06	A - D
LV 3	EF-3 EXHAUST	GREENHECK	ESD-435	945	24	20	1.40	700	0.06	A - D
LV 4	EF-4 EXHAUST	GREENHECK	ESD-435	1350	28	22	1.90	700	0.07	A - D
LV 5	EF-5 EXHAUST	GREENHECK	ESD-435	200	12	12	0.30	700	0.06	A - D
LV 6	EF-6 EXHAUST	GREENHECK	ESD-202	100	10	10	0.10	700	0.07	A - D
LV 7	MAKE UP AIR	GREENHECK	ESD-435	4860	48	48	8.92	540	0.05	A - C, E
LV 8	MAKE UP AIR	GREENHECK	ESD-435	4860	48	48	8.92	540	0.05	A - C, E
LV 9	MAKE UP AIR	GREENHECK	ESD-435	3100	40	40	5.95	530	0.05	A - C, E
LV 10	MAKE UP AIR	GREENHECK	ESD-435	3100	40	40	5.95	530	0.05	A - C, E
LV 11	MAKE UP AIR	GREENHECK	ESD-435	4860	48	48	8.92	540	0.05	A - C, E
LV 12	MAKE UP AIR	GREENHECK	ESD-435	4860	48	48	8.92	540	0.05	A - C, E
LV 13	EF-17 EXHAUST	GREENHECK	ESD-435	460	18	16	1.50	700	0.07	A - D
LV 14	EF-18 EXHAUST	GREENHECK	ESD-435	1000	22	22	1.50	700	0.07	A - D

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NOTES:

A. PROVIDE 1/4" MESH ALUMINUM BIRD SCREEN.
B. PROVIDE ANODIZED FINISH. COLOR AS SELECTED BY ARCHITECT.
C. FRAME TYPE SHALL MATCH WALL CONSTRUCTION, COORDINATE WITH ARCHITECT.
D. PROVIDE WITH INTEGRAL LOW-LEAKAGE BACKDRAFT DAMPER.
E. PROVIDE WITH MOTORIZED CLASS I LOW-LEAKAGE DAMPER.

UVC ULTRAVIOLET EMITTER

MARK	MANUFACTURER	MOUNTING	AIRFLOW (CFM)	DESIGNED AVERAGE INTENSITY IN KILL BOX (µWsec/cm^2)	ELECTRICAL V/PH	ELECTRICAL AMPS	NOTES
UV 1	UVDI	RTU-1 SA DUCT	15900	1940	120/1	17.3	A-D

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NOTES:

A. PROVIDE UVC CONTROLLER WITH BACNET CAPABILITY FOR MONITORING OF EMITTER INTENSITY, ON/OFF, DOOR SWITCH, ETC.
B. PROVIDE ADJUSTABLE LEVEL INTERLOCK SWITCH FOR DOOR SAFETY ON EACH DOOR TO THE COOLING COIL SECTION.
C. PROVIDE RIGID MOUNTING RACK WITH POWER CONNECTIONS FOR MOUNTING OF UV-C EMITTERS.
D. PROVIDE INSTALLATION CLEANING KIT AND WIPES FOR EMITTER INSTALLATION.

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MECHANICAL SCHEDULES

SHEET
M600

CARL J. HOLDEN

VARIABLE AIR VOLUME TERMINAL SCHEDULE (ELECTRIC HEAT)

MARK	SERVED FROM	MANUFACTURER	MODEL	INLET SIZE (IN)	PRIMARY CFM	MIN PRIM CFM	MIN HEAT CFM	MAX HEAT CFM	HEATING COIL EAT	LAT	MBH	KW	STEPS	V/PH	CP TRANS V/PH	NOTES
VAV 1-01	RTU-1	PRICE	SDV	5"	295	90	90	195	55.0	90.0	7.2	2.5	SCR	277/1	INTEGRAL	ALL
VAV 1-02	RTU-1	PRICE	SDV	5"	245	65	65	185	55.0	90.0	6.9	2.5	SCR	277/1	INTEGRAL	ALL
VAV 1-03	RTU-1	PRICE	SDV	12"	1340	540	540	605	55.0	85.0	19.5	6.0	SCR	480/1	INTEGRAL	ALL
VAV 1-04	RTU-1	PRICE	SDV	5"	310	140	140	140	55.0	85.0	4.5	1.5	SCR	277/1	INTEGRAL	ALL
VAV 1-05	RTU-1	PRICE	SDV	7"	445	115	115	225	55.0	90.0	8.4	2.5	SCR	277/1	INTEGRAL	ALL
VAV 1-06	RTU-1	PRICE	SDV	6"	435	90	90	200	55.0	85.0	6.3	2.0	SCR	277/1	INTEGRAL	ALL
VAV 1-07	RTU-1	PRICE	SDV	7"	450	160	160	160	55.0	85.0	5.1	1.5	SCR	277/1	INTEGRAL	ALL
VAV 1-08	RTU-1	PRICE	SDV	5"	290	75	75	205	55.0	90.0	7.7	2.5	SCR	277/1	INTEGRAL	ALL
VAV 1-09	RTU-1	PRICE	SDV	5"	305	155	155	155	55.0	85.0	4.9	1.5	SCR	277/1	INTEGRAL	ALL
VAV 1-10	RTU-1	PRICE	SDV	4"	105	30	30	45	55.0	90.0	1.6	0.5	SCR	277/1	INTEGRAL	ALL
VAV 1-11	RTU-1	PRICE	SDV	9"	920	460	460	460	55.0	85.0	14.9	4.5	SCR	480/1	INTEGRAL	ALL
VAV 1-12	RTU-1	PRICE	SDV	12"	1600	800	800	800	55.0	85.0	25.9	8.0	SCR	480/3	INTEGRAL	ALL
VAV 1-13	RTU-1	PRICE	SDV	5"	300	90	90	900	55.0	85.0	2.9	1.0	SCR	277/1	INTEGRAL	ALL
VAV 1-14	RTU-1	PRICE	SDV	5"	305	65	65	125	55.0	90.0	4.6	1.5	SCR	277/1	INTEGRAL	ALL
VAV 1-15	RTU-1	PRICE	SDV	9"	865	175	175	390	55.0	85.0	12.6	4.0	SCR	277/1	INTEGRAL	ALL
VAV 1-16	RTU-1	PRICE	SDV	7"	575	115	115	205	55.0	85.0	6.5	2.0	SCR	277/1	INTEGRAL	ALL
VAV 1-17	RTU-1	PRICE	SDV	8"	615	125	125	310	55.0	90.0	11.6	3.5	SCR	277/1	INTEGRAL	ALL
VAV 1-18	RTU-1	PRICE	SDV	5"	300	75	75	240	55.0	90.0	9.1	3.0	SCR	277/1	INTEGRAL	ALL
VAV 1-19	RTU-1	PRICE	SDV	7"	580	205	205	320	55.0	90.0	12.1	4.0	SCR	277/1	INTEGRAL	ALL
VAV 1-20	RTU-1	PRICE	SDV	9"	895	405	405	405	55.0	85.0	13.0	4.0	SCR	277/1	INTEGRAL	ALL
VAV 1-21	RTU-1	PRICE	SDV	9"	945	475	475	475	55.0	90.0	17.9	5.5	SCR	480/1	INTEGRAL	ALL
VAV 1-22	RTU-1	PRICE	SDV	6"	320	65	65	160	55.0	90.0	6.0	2.0	SCR	277/1	INTEGRAL	ALL
VAV 1-23	RTU-1	PRICE	SDV	8"	630	130	130	315	55.0	90.0	11.9	3.5	SCR	277/1	INTEGRAL	ALL
VAV 1-24	RTU-1	PRICE	SDV	12"	1445	290	290	795	55.0	90.0	30.0	9.0	SCR	480/3	INTEGRAL	ALL
VAV 1-25	RTU-1	PRICE	SDV	10"	1165	410	410	585	55.0	90.0	22.0	6.5	SCR	480/1	INTEGRAL	ALL
VAV 1-26	RTU-1	PRICE	SDV	4"	85	30	30	80	55.0	90.0	2.9	1.0	SCR	277/1	INTEGRAL	ALL
VAV 1-27	RTU-1	PRICE	SDV	4"	110	30	30	80	55.0	90.0	2.9	1.0	SCR	277/1	INTEGRAL	ALL
VAV 1-28	RTU-1	PRICE	SDV	4"	125	25	25	75	55.0	90.0	2.8	1.0	SCR	277/1	INTEGRAL	ALL

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3 NOTES:

A. HEATING COIL BASED ON 45 °F MAX. AIR TEMPERATURE RISE, AND 450 FPM MINIMUM COIL FACE VELOCITY.
B. INSTALL FLEXIBLE DUCT CONNECTOR AT INLET CONNECTION.
C. PROVIDE INTEGRAL DISCONNECT SWITCH.
D. PROVIDE FACTORY INSTALLED CONTROL TRANSFORMER. COORDINATE PRIMARY POWER WITH ELECTRICAL DRAWINGS.
E. PROVIDE FACTORY-INSTALLED, PRESSURE INDEPENDENT, DDC CONTROL PACKAGE.
F. PROVIDE BOX WITH EITHER RIGHT HAND OR LEFT HAND CONFIGURATION AS SHOWN ON DRAWINGS.
G. PROVIDE BOX WITH MAGNETIC CONTACTORS FOR NON-HORIZONTAL MOUNTING.
H. PROVIDE HEATER TO MEET OR EXCEED SCHEDULED MBH OUTPUT. NOMINAL KW IS BASED ON LISTED MANUFACTURER'S STANDARD PRODUCT. COORDINATE EQUIPMENT POWER SUPPLY WITH ELECTRICAL CONTRACTOR IF DIFFERENT FROM THAT SCHEDULED.
J. INLET SIZE SHOWN IS THE MINIMUM ALLOWABLE INLET SIZE. NO SMALLER SIZES SHALL BE ACCEPTED.
K. VAV BOXES SHALL BE SIZED TO MEET THE SCHEDULED VALUES BASED ON THE FOLLOWING PRIORITIES: 1 - HEATING COIL CAPACITY, 2 - LEAVING AIR TEMPERATURE.

FAN SCHEDULE

MARK	LOCATION	MANUFACTURER	MOUNTING	MODEL	CFM	MAX CFM	ESP (IN)	NOM HP	FAN RPM	DRIVE (BELT/DIRECT)	ECM (Y/N)	ELECTRICAL V/PH	DISC TYPE	STARTER TYPE	WEIGHT (LBS)	NOTES
EF 1	401 - RESTROOM	GREENHECK	CEILING	SP-A90	70	-	0.28	0.01	900	DIRECT	No	120/1	NF	MAG	15	C, D, E, H, J, K
EF 2	RESTROOMS/LOCKERS	GREENHECK	INLINE	SQ-90-VG	470	-	0.44	0.10	1609	DIRECT	Yes	120/1	NF	ECM	70	C, D, E, F, H, J
EF 3	RESTROOMS/LOCKERS	GREENHECK	INLINE	SQ-100-VG	945	-	0.50	0.25	1472	DIRECT	Yes	120/1	NF	ECM	65	C, D, E, F, H, J
EF 4	RESTROOMS/LOCKERS	GREENHECK	INLINE	SQ-120-VG	1350	-	0.48	0.50	1420	DIRECT	Yes	120/1	NF	ECM	75	C, D, E, F, H, J
EF 5	RESTROOMS/LOCKERS	GREENHECK	INLINE	SQ-80-VG	200	-	0.41	0.10	1442	DIRECT	Yes	120/1	NF	ECM	70	C, D, E, F, H, J
EF 6	RESTROOMS	GREENHECK	INLINE	SQ-70-VG	100	-	0.26	0.07	1364	DIRECT	Yes	120/1	NF	ECM	45	C, D, E, F, H, J
EF 7	FLEET MAINTENANCE BAY	GREENHECK	ROOF	G-200-VG	1900	5300	1.11	3.00	1233	DIRECT	Yes	208/3	NF	ECM	210	A, B, D, E, F, G, J
EF 8	FLEET MAINTENANCE BAY	GREENHECK	ROOF	G-200-VG	1900	5300	1.11	3.00	1233	DIRECT	Yes	208/3	NF	ECM	210	A, B, D, E, F, G, J
EF 9	FLEET MAINTENANCE BAY	GREENHECK	ROOF	G-240-C-VGD	2500	6665	0.45	2.00	824	DIRECT	Yes	208/3	NF	ECM	260	A, B, D, E, F, G, J
EF 10	FLEET MAINTENANCE BAY	GREENHECK	ROOF	G-240-C-VGD	2500	6665	0.45	2.00	824	DIRECT	Yes	208/3	NF	ECM	260	A, B, D, E, F, G, J
EF 11	FLEET MAINTENANCE BAY	GREENHECK	ROOF	G-200HP-VG	1800	5000	1.01	3.00	1486	DIRECT	Yes	208/3	NF	ECM	215	A, B, D, E, F, G, J
EF 12	FLEET MAINTENANCE BAY	GREENHECK	ROOF	G-200HP-VG	1800	5000	1.01	3.00	1486	DIRECT	Yes	208/3	NF	ECM	215	A, B, D, E, F, G, J
EF 13	COMMON WORK AREA	GREENHECK	ROOF	G-180-VG	1000	2800	0.68	1.00	954	DIRECT	Yes	120/1	NF	ECM	130	A, B, D, E, F, G, J
EF 14	TIRE SHOP	GREENHECK	ROOF	G-140-VG	1000	2500	0.37	1.00	1477	DIRECT	Yes	120/1	NF	ECM	80	A, B, D, E, F, G, J
EF 15	PARTS ROOM	GREENHECK	ROOF	G-095-VG	750	-	0.58	0.17	1725	DIRECT	Yes	120/1	NF	ECM	50	A, B, D, E, F, H, J
EF 16	LUBE/COMPRESSOR	GREENHECK	ROOF	G-095-VG	750	-	0.58	0.17	1725	DIRECT	Yes	120/1	NF	ECM	50	A, B, D, E, F, H, J
EF 17	WATER SHOP	GREENHECK	INLINE	SQ-90-VG	460	-	0.44	0.10	1398	DIRECT	Yes	120/1	NF	ECM	60	C, D, E, F, H, J
EF 18	FACILITIES WAREHOUSE	GREENHECK	INLINE	SQ-120-VG	1000	-	0.48	0.50	1072	DIRECT	Yes	120/1	NF	ECM	75	C, D, E, F, H, J
EF 19	BATTERY STORAGE	GREENHECK	ROOF	G-060-VG	100	-	0.25	0.07	1486	DIRECT	Yes	120/1	NF	ECM	20	A, B, D, E, F, H, J
EF 20	401 - RESTROOM	GREENHECK	CEILING	SP-A90	70	-	0.28	0.01	900	DIRECT	No	120/1	NF	MAG	15	C, D, E, H, J, K

MODEL NUMBERS SHALL NOT BE CONSIDERED COMPLETE AND MATERIAL SHALL NOT BE ORDERED BY MANUFACTURER AND MODEL NUMBERS ONLY. REVIEW THE COMPLETE DESCRIPTION, NOTES AND SPECIFICATIONS TO DETERMINE THE EXACT MATERIAL AND ACCESSORIES TO BE ORDERED. THE MANUFACTURERS LISTED ARE THE BASIS FOR THE DESIGN.

NOTES:

A. PROVIDE INSULATED ROOF CURB WITH MINIMUM HEIGHT REQUIRED TO MAINTAIN BOTTOM OF EQUIPMENT A MINIMUM OF 8 INCHES ABOVE FINISHED ROOF SURFACE. PROVIDE SLOPED CURB IF NEEDED TO MATCH ROOF SLOPE. COORDINATE WITH ROOF INSULATION THICKNESS AND ROOF TAPER AT INSTALLED LOCATION. COORDINATE CURB TYPE WITH DRAWINGS.
B. PROVIDE BIRDSCREEN AND GRAVITY BACKDRAFT DAMPER.
C. PROVIDE WITH SPRING VIBRATION ISOLATION AND ALL-THREAD HANGING RODS.
D. DIVISION 26 CONTRACTOR SHALL PROVIDE DISCONNECT SWITCH.
E. STARTER FURNISHED INTEGRAL WITH UNIT.
F. PROVIDE WITH MANUFACTURER'S ELECTRONICALLY COMMUTATED (EC) MOTOR.
G. SCHEDULED MAX CFM IS THE EXHAUST FAN CFM DURING EMERGENCY MODE. REFER TO CONTROLS FOR MORE INFORMATION.
H. EXHAUST FAN IS CONSTANT VOLUME.
J. REFER TO CONTROLS SHEET M702 FOR FAN OPERATION CONTROLS.
K. INTERLOCK FAN WITH LOCAL LIGHT SWITCH.

INDUSTRIAL CEILING FAN SCHEDULE

MARK	LOCATION	MANUFACTURER	MODEL	MOUNTING	DIAMETER (FT)	BLADES	DRIVE (BELT/DIRECT)	MIN WATTS	FAN RPM	VFD (Y/N)	ELECTRICAL VOLTS	PH	NOTES
ICF 1	MAINTENANCE BAY	MARLEY	60001HP	SUSPENDED	5	3	DIRECT	70	315	No	120	1	A-D
ICF 2	MAINTENANCE BAY	MARLEY	60001HP	SUSPENDED	5	3	DIRECT	70	315	No	120	1	A-D
ICF 3	MAINTENANCE BAY	MARLEY	60001HP	SUSPENDED	5	3	DIRECT	70	315	No	120	1	A-D
ICF 4	MAINTENANCE BAY	MARLEY	60001HP	SUSPENDED	5	3	DIRECT	70	315	No	120	1	A-D
ICF 5	MAINTENANCE BAY	MARLEY	60001HP	SUSPENDED	5	3	DIRECT	70	315	No	120	1	A-D
ICF 6	MAINTENANCE BAY	MARLEY	60001HP	SUSPENDED	5	3	DIRECT	70	315	No	120	1	A-D
ICF 7	MAINTENANCE BAY	MARLEY	60001HP	SUSPENDED	5	3	DIRECT	70	315	No	120	1	A-D
ICF 8	MAINTENANCE BAY	MARLEY	60001HP	SUSPENDED	5	3	DIRECT	70	315	No	120	1	A-D
ICF 9	MAINTENANCE BAY	MARLEY	60001HP	SUSPENDED	5	3	DIRECT	70	315	No	120	1	A-D
ICF 10	MAINTENANCE BAY	MARLEY	60001HP	SUSPENDED	5	3	DIRECT	70	315	No	120	1	A-D
ICF 11	MAINTENANCE BAY	MARLEY	60001HP	SUSPENDED	5	3	DIRECT	70	315	No	120	1	A-D
ICF 12	MAINTENANCE BAY	MARLEY	60001HP	SUSPENDED	5	3	DIRECT	70	315	No	120	1	A-D

MODEL NUMBERS SHALL NOT BE CONSIDERED COMPLETE AND MATERIAL SHALL NOT BE ORDERED BY MANUFACTURER AND MODEL NUMBERS ONLY. REVIEW THE COMPLETE DESCRIPTION, NOTES AND SPECIFICATIONS TO DETERMINE THE EXACT MATERIAL AND ACCESSORIES TO BE ORDERED. THE MANUFACTURERS LISTED ARE THE BASIS FOR THE DESIGN.

NOTES:

A. PROVIDE WITH MANUFACTURER'S WALL SPEED CONTROLLER WITH ON/OFF CONTROL AND REVERSIBLE FUNCTION.
B. MOUNT FAN TO STRUCTURE. COORDINATE ATTACHMENTS TO STRUCTURE WITH STRUCTURAL ENGINEER.
C. COORDINATE FAN INSTALLATION WITH GC AND ALL OTHER TRADES. MAINTAIN MANUFACTURER RECOMMENDED CLEARANCES FOR PROPER OPERATION AND MAINTENANCE.
D. PROVIDE WITH 24 INCH DOWNROD.

COMPUTER ROOM UNIT SCHEDULE

MARK	MANUFACTURER	MODEL	REFR TYPE	EVAPORATOR SECTION CFM	TC (MBH)	V/PH	MCA	CU MARK	CONDENSING SECTION AMB (°F)	V/PH	MCA	MOCP	NOTES
CRU 1	MITSUBISHI	PKA-A24/PUY-A24	R410A	700	24.0	208/1	1.0	CU 1	105	208/1	19.0	26	ALL
CRU 2	MITSUBISHI	PKA-A24/PUY-A24	R410A	700	24.0	208/1	1.0	CU 2	105	208/1	19.0	26	ALL
CRU 3	MITSUBISHI	PKA-A24/PUY-A24	R410A	700	24.0	208/1	1.0	CU 3	105	208/1	19.0	26	ALL
CRU 4	MITSUBISHI	PKA-A24/PUY-A24	R410A	700	24.0	208/1	1.0	CU 4	105	208/1	19.0	26	ALL
CRU 5	MITSUBISHI	PKA-A12/PUY-A12	R410A	425	12.0	208/1	1.0	CU 5	105	208/1	11.0	28	ALL

MODEL NUMBERS SHALL NOT BE CONSIDERED COMPLETE AND MATERIAL SHALL NOT BE ORDERED BY MANUFACTURER AND MODEL NUMBERS ONLY. REVIEW THE COMPLETE DESCRIPTION, NOTES AND SPECIFICATIONS TO DETERMINE THE EXACT MATERIAL AND ACCESSORIES TO BE ORDERED. THE MANUFACTURERS LISTED ARE THE BASIS FOR THE DESIGN.

NOTES:

A. CONTRACTOR SHALL VERIFY WITH EQUIPMENT SUPPLIER EXACT ROUTING AND SIZE OF INSULATED REFRIGERANT PIPING. INSTALL PER MANUFACTURERS RECOMMENDATIONS.
B. DIVISION 26 CONTRACTOR TO PROVIDE DISCONNECT SWITCH FOR EVAPORATOR SECTION AND CONDENSING SECTION.
C. PROVIDE WITH WALL MOUNTED THERMOSTAT BY UNIT MANUFACTURER.
D. PROVIDE WITH INTEGRAL CONDENSATE PUMP.
E. PROVIDE CONDENSER COIL HAIL GUARDS.
F. PROVIDE WITH EQUIPMENT SUPPORT RAILS. INSTALL OUTDOOR UNIT ON RAILS AND ANCHOR TO EXTERIOR CONCRETE PAD.
G. INDOOR UNIT POWERED THROUGH OUTDOOR UNIT. WIRING BETWEEN INDOOR AND OUTDOOR UNITS PROVIDED BY DIVISION 26 CONTRACTOR. COORDINATE CONDUCTOR QUANTITY WITH MANUFACTURER'S REQUIREMENTS.
H. PROVIDE WITH WIND BAFFLE AND LOW AMBIENT OPERATION DOWN TO 0°F.

NATURAL GAS-FIRED INFRARED HEATERS SCHEDULE

MARK	LOCATION	MANUFACTURER	MODEL	NOM INPUT (MBH)	MIN NO STAGES	MOUNTING MIN HEIGHT A.F.F. (FT)	ANGLE	ELECTRICAL VOLTS	PH	WEIGHT (LBS)	NOTES
RH 01	MAINTENANCE BAY	MODINE	IHR60	60	1	20	20°	120	1	60	ALL
RH 02	MAINTENANCE BAY	MODINE	IHR60	60	1	20	20°	120	1	60	ALL
RH 03	MAINTENANCE BAY	MODINE	IHR60	60	1	20	20°	120	1	60	ALL
RH 04	MAINTENANCE BAY	MODINE	IHR60	60	1	20	20°	120	1	60	ALL
RH 05	MAINTENANCE BAY	MODINE	IHR60	60	1	20	20°	120	1	60	ALL
RH 06	MAINTENANCE BAY	MODINE	IHR60	60	1	20	20°	120	1	60	ALL
RH 07	MAINTENANCE BAY	MODINE	IHR60	60	1	20	20°	120	1	60	ALL
RH 08	MAINTENANCE BAY	MODINE	IHR60	60	1	20	20°	120	1	60	ALL
RH 09	MAINTENANCE BAY	MODINE	IHR60	60	1	20	20°	120	1	60	ALL
RH 10	MAINTENANCE BAY	MODINE	IHR60	60	1	20	20°	120	1	60	ALL
RH 11	MAINTENANCE BAY	MODINE	IHR60	60	1	18	20°	120	1	60	ALL
RH 12	MAINTENANCE BAY	MODINE	IHR60	60	1	18	20°	120	1	60	ALL
RH 13	MAINTENANCE BAY	MODINE	IHR60	60	1	18	20°	120	1	60	ALL
RH 14	MAINTENANCE BAY	MODINE	IHR60	60	1	18	20°	120	1	60	ALL
RH 15	MAINTENANCE BAY	MODINE	IHR60	60	1	18	20°	120	1	60	ALL
RH 16	MAINTENANCE BAY	MODINE	IHR60	60	1	18	20°	120	1	60	ALL

MODEL NUMBERS SHALL NOT BE CONSIDERED COMPLETE AND MATERIAL SHALL NOT BE ORDERED BY MANUFACTURER AND MODEL NUMBERS ONLY. REVIEW THE COMPLETE DESCRIPTION, NOTES AND SPECIFICATIONS TO DETERMINE THE EXACT MATERIAL AND ACCESSORIES TO BE ORDERED. THE MANUFACTURERS LISTED ARE THE BASIS FOR THE DESIGN.

NOTES:

A. PROVIDE WITH PARABOLIC REFLECTOR.
B. PROVIDE WITH HEAT DEFLECTOR.
C. PROVIDE WITH WIRE GRID.
D. PROVIDE WITH NECESSARY MOUNTING BRACKET AND ACCESSORIES TO RIGIDLY MOUNT FROM STRUCTURE.
E. DIVISION 26 CONTRACTOR SHALL PROVIDE DISCONNECT INSTALLED ON SERVICE SIDE OF UNIT.
F. PROVIDE GAS FLEXIBLE CONNECTOR AND SHUTOFF VALVE.
G. CONTRACTOR SHALL COORDINATE FINAL INSTALLATION LOCATION WITH OTHER DISCIPLINES. MAINTAIN RECOMMENDED CLEARANCES AS REQUIRED BY THE MANUFACTURER.

UNIT HEATER SCHEDULE (ELECTRIC)

MARK	MANUFACTURER	MODEL	MIN OUT (MBH)	NOM (KW)	CFM	MOTOR HP	V/PH	DISC TYPE	NOTES
UH 1	QMARK	MUH03-81	10.2	3.0	350	0.01	208/1	NF	B, D-G
UH 2	QMARK	MUH03-81	10.2	3.0	350	0.01	208/1	NF	B, D-G
UH 3	QMARK	MUH05-81	17.0	5.0	350	0.01	208/1	NF	B, D-G
UH 4	QMARK	MUH05-81	17.0	5.0	350	0.01	208/1	NF	A, D-G
UH 5	QMARK	MUH05-81	17.0	5.0	350	0.01	208/1	NF	A, D-G
UH 6	QMARK	MUH05-81	17.0	5.0	350	0.01	208/1	NF	A, D-G
UH 7	QMARK	MUH07-8	25.6	7.5	650	0.03	208/1	NF	B, D-G
UH 8	QMARK	MUH05-81	17.0	5.0	350	0.01	208/1	NF	B, D-G
UH 9	QMARK	MUH05-81	17.0	5.0	350	0.01	208/1	NF	B, D-G
UH 10	QMARK	MUH15-4	51.2	15.0	910	0.05	480/3	NF	C-G
UH 11	QMARK	MUH15-4	51.2	15.0	910	0.05	480/3	NF	C-G
UH 12	QMARK	MUH05-81	17.0	5.0	350	0.01	208/1	NF	B, D-G
UH 13	QMARK	MUH15-8	51.2	15.0	910	0.05	208/3	NF	C-G
UH 14	QMARK	MUH15-8	51.2	15.0	910	0.05	208/3	NF	C-G
UH 15	QMARK	MUH05-81	17.0	5.0	350	0.01	208/1	NF	B, D-G

MODEL NUMBERS SHALL NOT BE CONSIDERED COMPLETE AND MATERIAL SHALL NOT BE ORDERED BY MANUFACTURER AND MODEL NUMBERS ONLY. REVIEW THE COMPLETE DESCRIPTION, NOTES AND SPECIFICATIONS TO DETERMINE THE EXACT MATERIAL AND ACCESSORIES TO BE ORDERED. THE MANUFACTURERS LISTED ARE THE BASIS FOR THE DESIGN.

NOTES:

A. MOUNT 8.5 FEET ABOVE FINISHED FLOOR WITHOUT OBSTRUCTING AIRFLOW.
B. MOUNT 10 FEET ABOVE FINISHED FLOOR WITHOUT OBSTRUCTING AIRFLOW.
C. MOUNT 14 FEET ABOVE FINISHED FLOOR WITHOUT OBSTRUCTING AIRFLOW.
D. PROVIDE WITH UNIT MOUNTED THERMOSTAT.
E. PROVIDE NECESSARY MOUNTING BRACKET AND ACCESSORIES FOR HORIZONTAL MOUNTING.
F. DISCONNECT SWITCH PROVIDED BY DIVISION 26 CONTRACTOR.
G. MAINTAIN MANUFACTURER'S MINIMUM REQUIRED CLEARANCES ON ALL SIDES.

CABINET UNIT HEATER SCHEDULE (ELECTRIC)

MARK	MANUFACTURER	MODEL	MIN OUT (MBH)	NOM (KW)	MOUNTING TYPE	V/PH	MCA	DISC TYPE	NOTES
CUH 1	QMARK	MCSSAR4808	13.6	4.0	RECESSED WALL	208/1	19.2	NF	A-D
CUH 2	QMARK	MCSSAR4808	13.6	4.0	RECESSED WALL	208/1	19.2	NF	A-D
CUH 3	QMARK	MCSSAR4808	13.6	4.0	RECESSED WALL	208/1	19.2	NF	A-D
CUH 4	QMARK	MCSSAR4808	13.6	4.0	RECESSED WALL	208/1	19.2	NF	A-D
CUH 5	QMARK	MCSSAR1802	6.1	1.8	RECESSED WALL	120/1	15.0	NF	A-D

MODEL NUMBERS SHALL NOT BE CONSIDERED COMPLETE AND MATERIAL SHALL NOT BE ORDERED BY MANUFACTURER AND MODEL NUMBERS ONLY. REVIEW THE COMPLETE DESCRIPTION, NOTES AND SPECIFICATIONS TO DETERMINE THE EXACT MATERIAL AND ACCESSORIES TO BE ORDERED. THE MANUFACTURERS LISTED ARE THE BASIS FOR THE DESIGN.

NOTES:

A. MOUNT 1 FOOT ABOVE FINISHED FLOOR WITHOUT OBSTRUCTING AIRFLOW.
B. PROVIDE WITH UNIT MOUNTED THERMOSTAT.
C. PROVIDE NECESSARY MOUNTING BRACKET AND ACCESSORIES FOR MOUNTING SPECIFIED.
D. PROVIDE FACTORY MOUNTED DISCONNECT.

UNIT HEATER SCHEDULE (NATURAL GAS)

MARK	MANUFACTURER	MODEL	NOM INPUT (MBH)	MIN OUT (MBH)	MIN EFF (%)	CFM	MOTOR HP	THROW (FT)	V/PH	DISC TYPE	NOTES
GUH 1	MODINE	HDS125	125	102.5	80	1980	0.13	56	120/1	NF	ALL
GUH 2	MODINE	HDS125	125	102.5	80	1980	0.13	56	120/1	NF	ALL
GUH 3	MODINE	HDS125	125	102.5	80	1980	0.13	56	120/1	NF	ALL

MODEL NUMBERS SHALL NOT BE CONSIDERED COMPLETE AND MATERIAL SHALL NOT BE ORDERED BY MANUFACTURER AND MODEL NUMBERS ONLY. REVIEW THE COMPLETE DESCRIPTION, NOTES AND SPECIFICATIONS TO DETERMINE THE EXACT MATERIAL AND ACCESSORIES TO BE ORDERED. THE MANUFACTURERS LISTED ARE THE BASIS FOR THE DESIGN.

NOTES:

A. MOUNT 14 FEET ABOVE FINISHED FLOOR WITHOUT OBSTRUCTING AIRFLOW.
B. PROVIDE WITH WALL MOUNTED THERMOSTAT.
C. PROVIDE NECESSARY MOUNTING BRACKET AND ACCESSORIES FOR HORIZONTAL WALL MOUNTING. INSTALL SUCH THAT ALL REQUIRED CLEARANCES ARE MAINTAINED.
D. PROVIDE FACTORY MOUNTED DISCONNECT SWITCH INSTALLED ON SERVICE SIDE OF UNIT.
E. PROVIDE WITH STAINLESS STEEL HEAT EXCHANGER.
F. PROVIDE WITH TWO-STAGE ELECTRONIC OPERATED GAS CONTROL VALVE.

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EXPIRES 12/31/2023

REVISIONS

NO.	DESCRIPTION	DATE
2	ADD 02	01.25.23
3	ADD 03	02.09.23

PROJECT NO.: 19-040 DRAWN BY: MJS
DATE: 12.15.22 REVIEWED BY: CJH

STATE OF MISSOURI
CARL J. HOLDEN
NUMBER PE-2020016283
PROFESSIONAL ENGINEER

02/08/2023

CARL J. HOLDEN
LICENSE # PE-2020016283

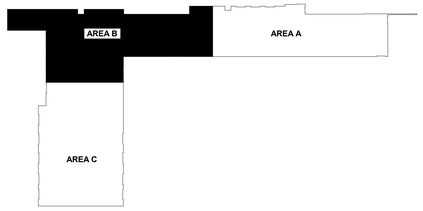
PROJECT TITLE
CITY OF WENTZVILLE, MO PUBLIC WORKS FACILITY

PROJECT ADDRESS:
1295 INTERSTATE DRIVE
WENTZVILLE, MO 63385

MECHANICAL SCHEDULES

SHEET
M601

CARL J. HOLDEN



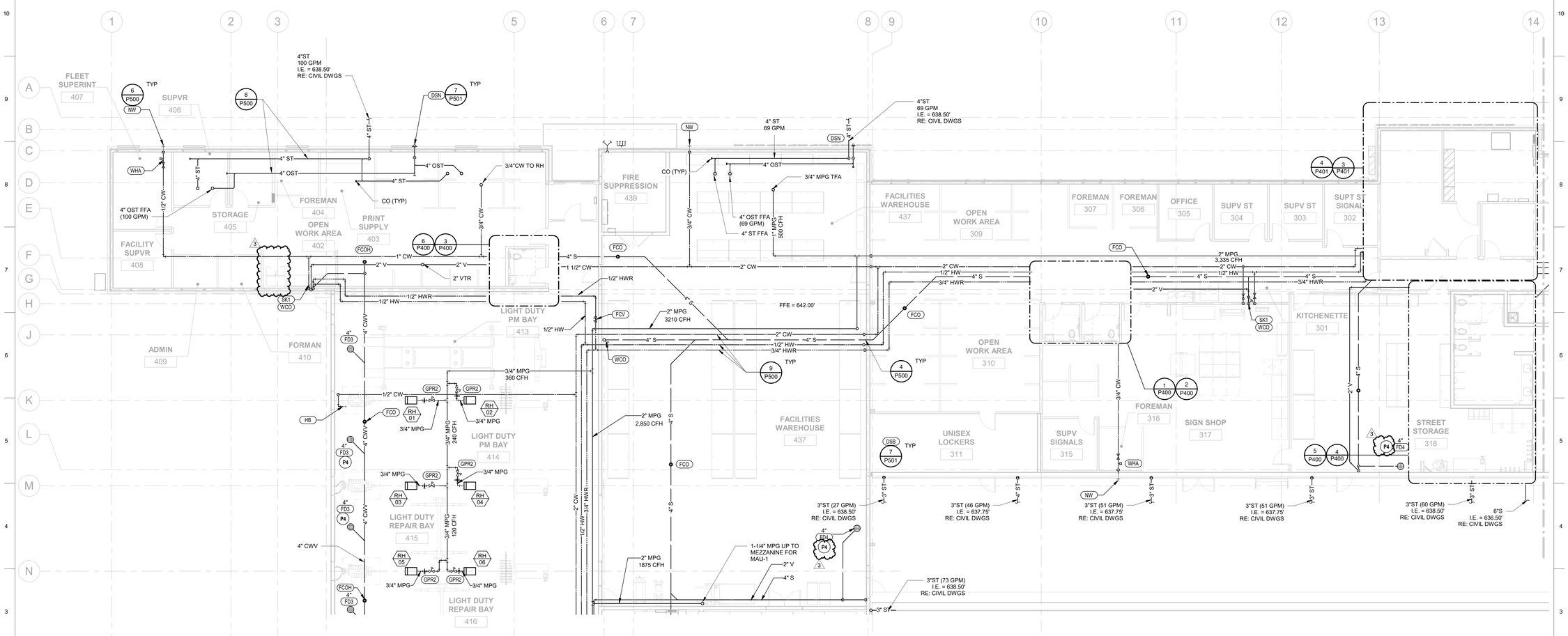
KEY PLAN

RADIANT HEATER COORDINATION:
ALL CONTRACTORS SHALL COORDINATE ROUTING OF DUCTWORK, PIPING, CONDUIT, WIRING AND OTHER ELEMENTS WITH OVERHEAD RADIANT HEATER REQUIRED CLEARANCES. COORDINATE WITH DIVISION 23 CONTRACTOR TO MAINTAIN HEATER MANUFACTURER'S REQUIRED CLEARANCES TO COMBUSTIBLES. CONTRACTORS ARE RESPONSIBLE FOR RESOLVING CONFLICTS AS THEY ARISE.

PLUMBING PLAN NOTES:

P4 CONTRACTOR TO REFER TO STRUCTURAL DRAWINGS FOR INSTALLATION OF NEW TRENCH DRAIN. REF: DETAIL 1/S201

3



1 PLUMBING LEVEL 1 PLAN - AREA B
1/8" = 1'-0"

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EXPIRES 12/31/2023

REVISIONS

NO.	DESCRIPTION	DATE
2	ADD 02	01.25.23
3	ADD 03	02.09.23

PROJECT NO.: 19-040 DRAWN BY: MJ
DATE: 12.15.22 REVIEWED BY: HEI

STATE OF MISSOURI
CARL J. HOLDEN
NUMBER PE-2020016283
PROFESSIONAL ENGINEER

02/08/2023

CARL J. HOLDEN
LICENSE # PE-2020016283

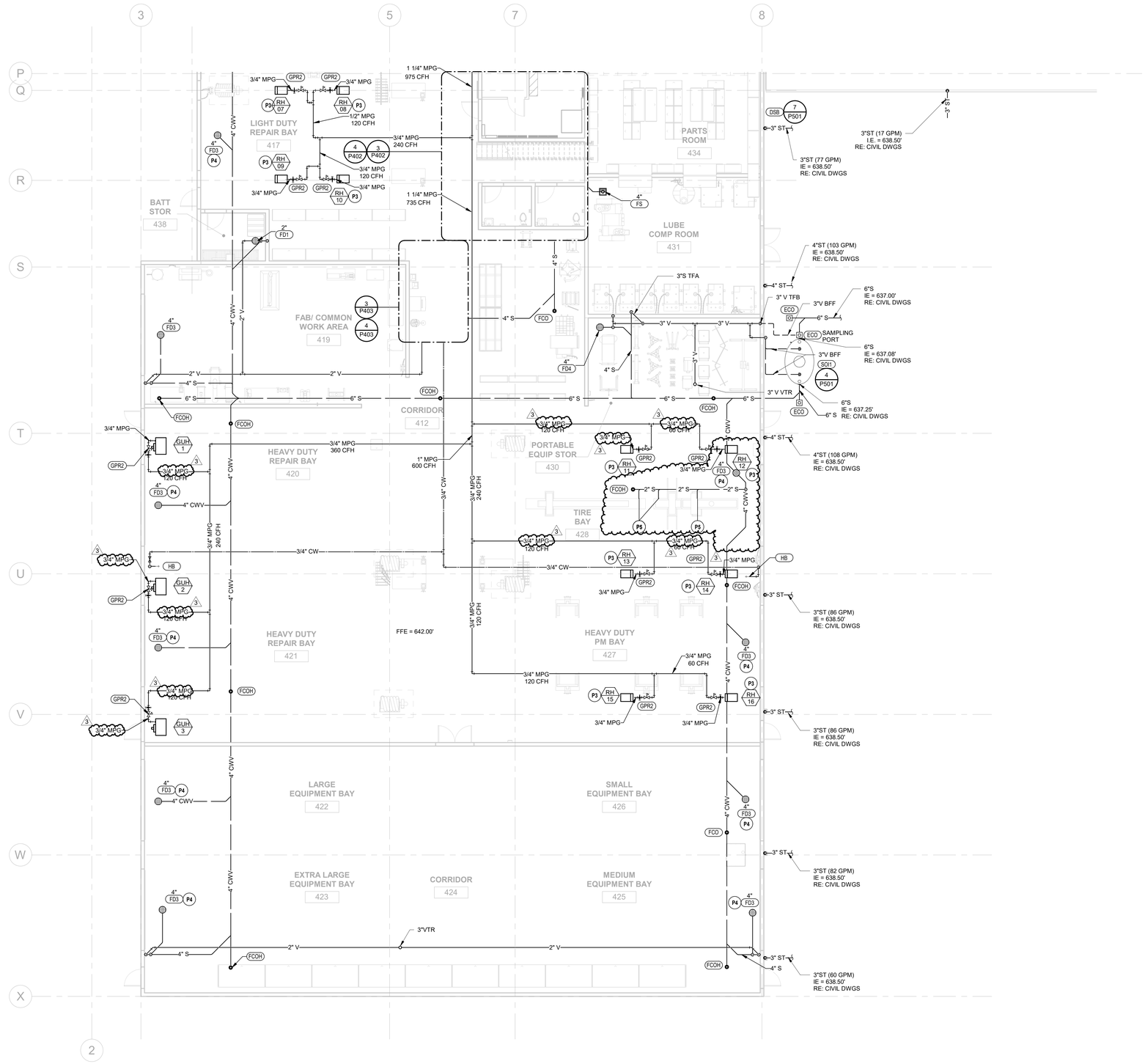
PROJECT TITLE
CITY OF WENTZVILLE, MO PUBLIC WORKS FACILITY

PROJECT ADDRESS:
1295 INTERSTATE DRIVE
WENTZVILLE, MO 63385

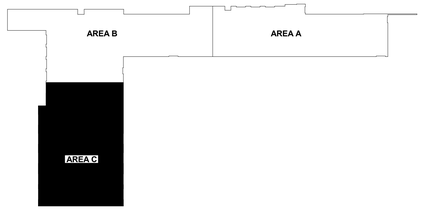
PLUMBING LEVEL 1 PLAN - AREA B

SHEET
P101B

CARL J. HOLDEN



1 PLUMBING LEVEL 1 PLAN - AREA C
1/8" = 1'-0"



KEY PLAN

RADIANT HEATER COORDINATION:
ALL CONTRACTORS SHALL COORDINATE ROUTING OF DUCTWORK, PIPING, CONDUIT, WIRING AND OTHER ELEMENTS WITH OVERHEAD RADIANT HEATER REQUIRED CLEARANCES. COORDINATE WITH DIVISION 23 CONTRACTOR TO MAINTAIN HEATER MANUFACTURER'S REQUIRED CLEARANCES TO COMBUSTIBLES. CONTRACTORS ARE RESPONSIBLE FOR RESOLVING CONFLICTS AS THEY ARISE.

PLUMBING PLAN NOTES:

P3 1/2" MPG GAS PIPE DOWNSTREAM OF GAS PRESSURE REGULATOR TO MECHANICAL EQUIPMENT.

P4 CONTRACTOR TO REFER TO STRUCTURAL DRAWINGS FOR INSTALLATION OF NEW TRENCH DRAIN. REF: DETAIL 1/S201

P5 CONNECT 2"S TO LIFT AT APPROXIMATELY 15" BFF. REFER TO MANUFACTURER FOR CONNECTION DETAILS.

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OWNER
CITY OF WENTZVILLE, MISSOURI
1001 SCHROEDER CREEK BLVD
WENTZVILLE, MO 63385
636.327.5101

PROJECT TEAM
CIVIL ENGINEER
PREMIER DESIGN GROUP
100 MIDLAND PARK DRIVE
WENTZVILLE, MO 63385
314.925.7444

MAINTENANCE CONSULTANT
HDR ENGINEERING, INC.
17725 KATY FREEWAY SUITE 102
HOUSTON, TX 77094
816.360.2700

STRUCTURAL ENGINEER
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1950004840
EXPIRES 12/31/2023

REVISIONS

NO.	DESCRIPTION	DATE
2	ADD 02	01.25.23
3	ADD 03	02.09.23

PROJECT NO.: 19-040 DRAWN BY: MJ
DATE: 12.15.22 REVIEWED BY: HEI

STATE OF MISSOURI
CARL J. HOLDEN
NUMBER PE-2020016283
PROFESSIONAL ENGINEER

02/08/2023

CARL J. HOLDEN
LICENSE # PE-2020016283

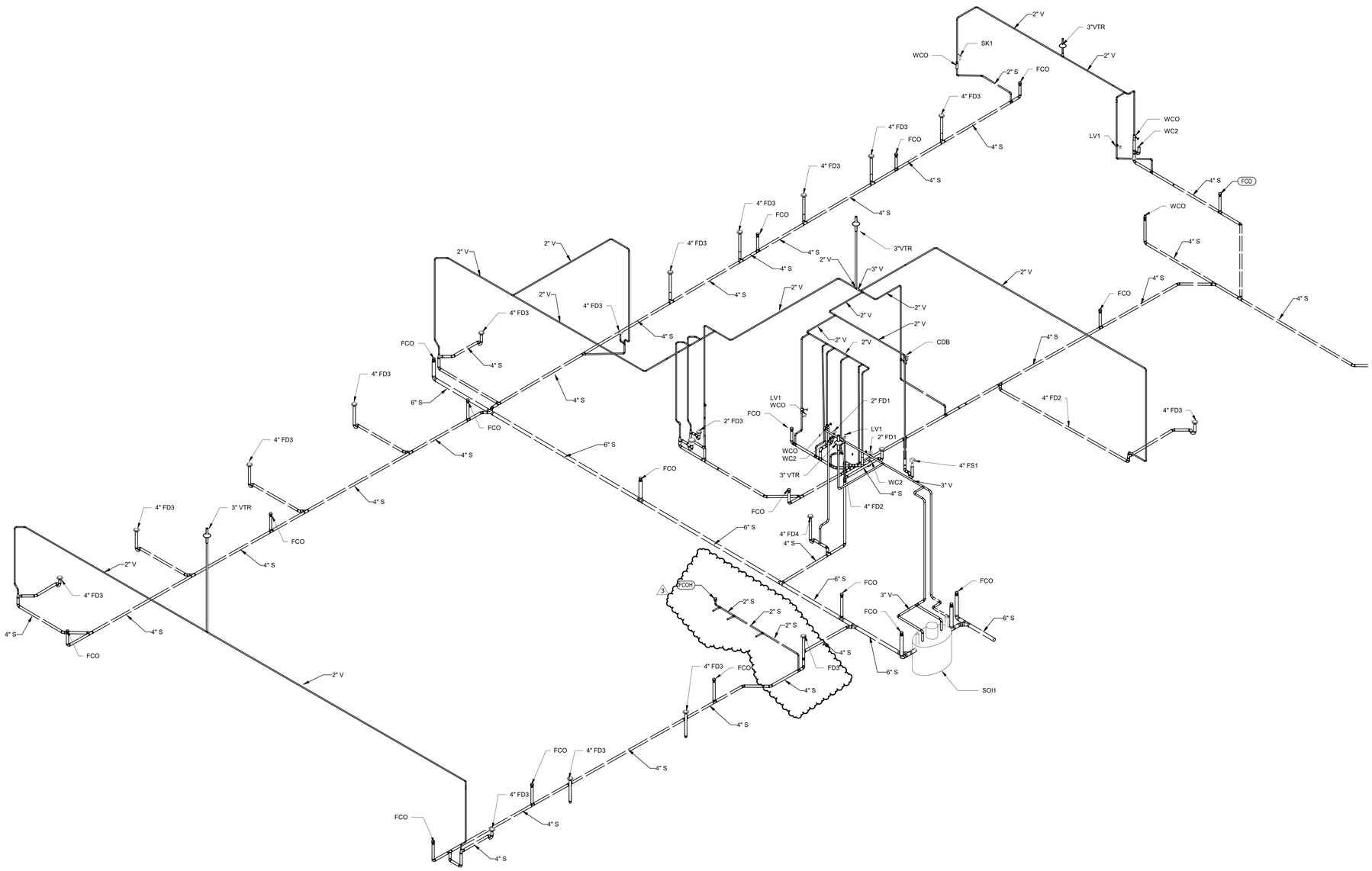
PROJECT TITLE
CITY OF WENTZVILLE, MO PUBLIC WORKS FACILITY

PROJECT ADDRESS:
1295 INTERSTATE DRIVE
WENTZVILLE, MO 63385

PLUMBING LEVEL 1 PLAN - AREA C

SHEET
P101C

CARL J. HOLDEN



1 PLUMBING RISER - AREA B & C
NTS

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STATE OF MISSOURI
CARL J. HOLDEN
NUMBER
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02/08/2023

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LICENSE # PE-2020016283

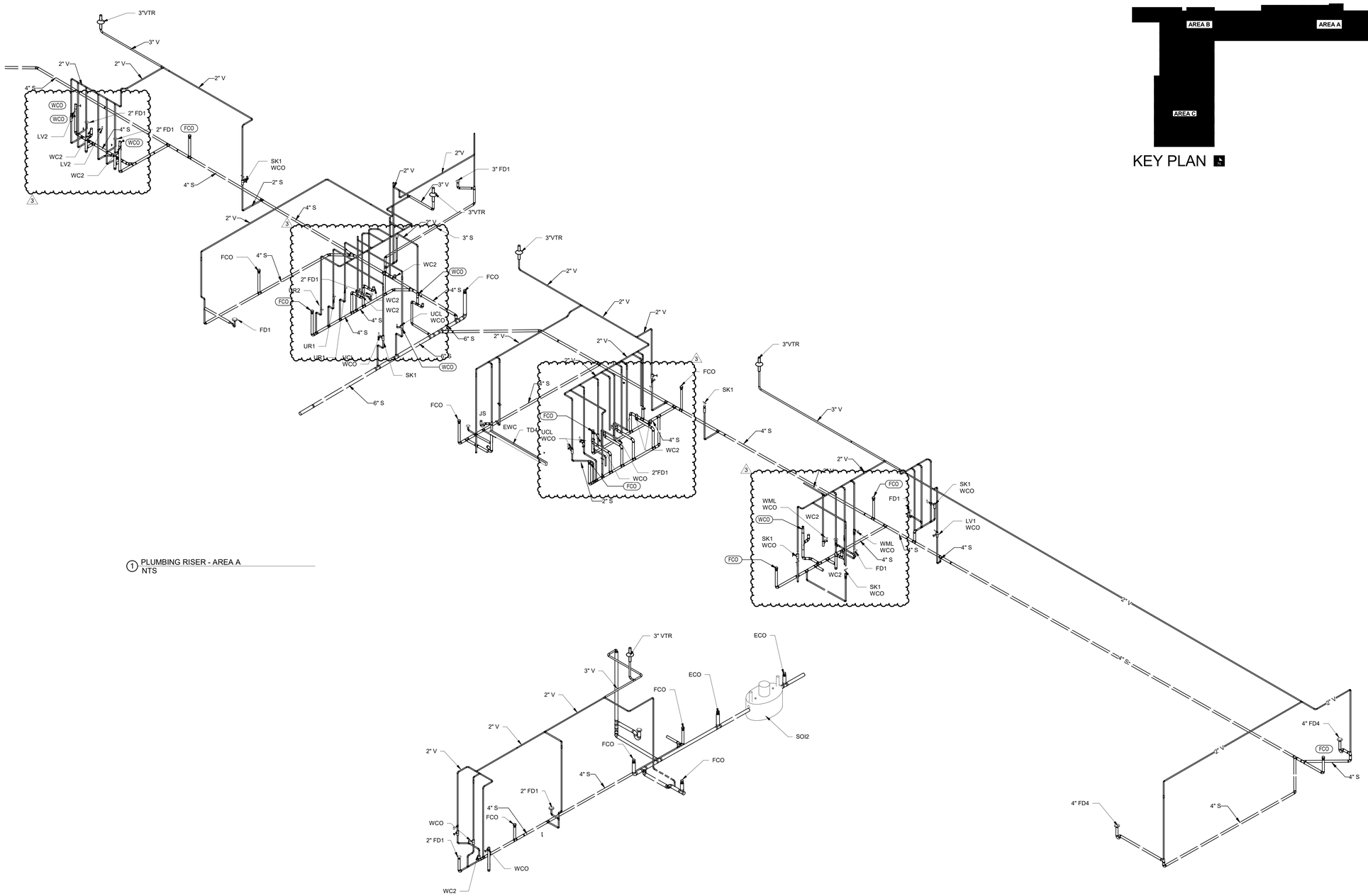
PROJECT TITLE
CITY OF WENTZVILLE, MO PUBLIC WORKS FACILITY

PROJECT ADDRESS:
1296 INTERSTATE DRIVE
WENTZVILLE, MO 63385

PLUMBING SANITARY RISER

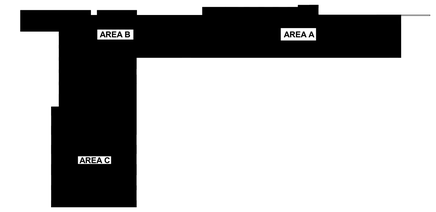
SHEET
P300

CARL J HOLDEN



1 PLUMBING RISER - AREA A
NTS

2 PLUMBING RISER - AREA D
NTS



KEY PLAN

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PROJECT ADDRESS:
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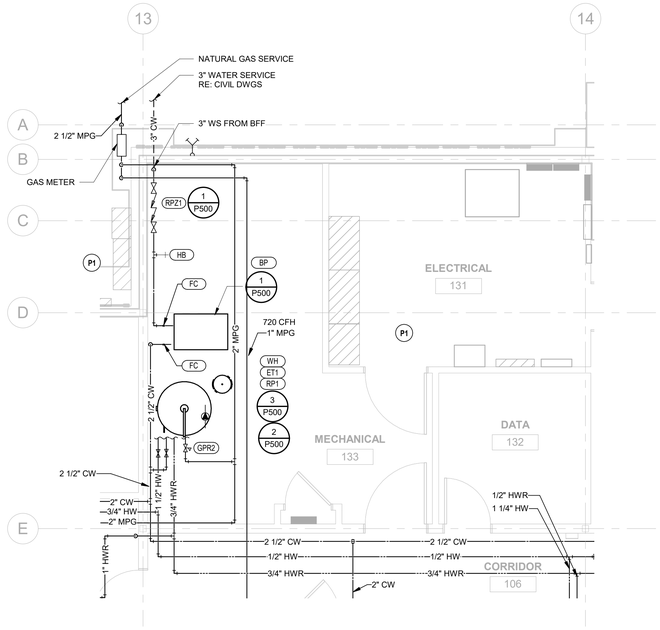
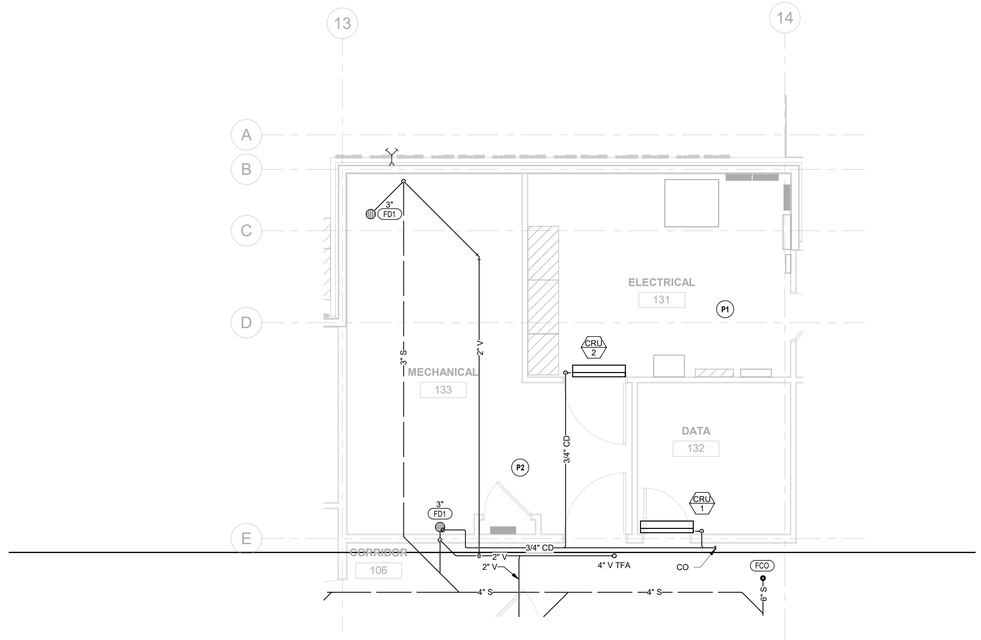
PLUMBING SANITARY RISER

SHEET
P301

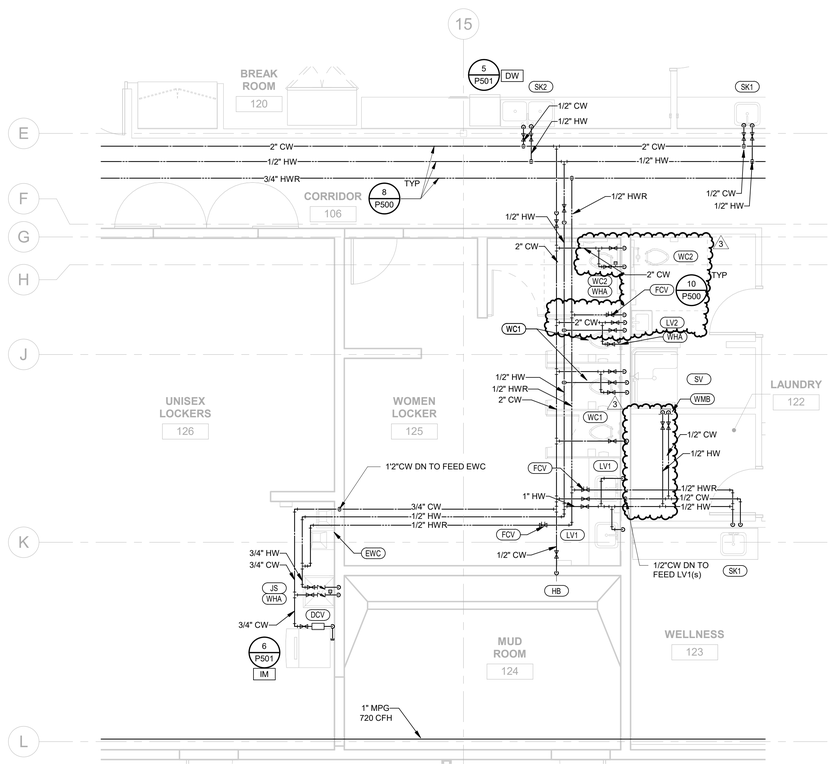
CARL J. HOLDEN



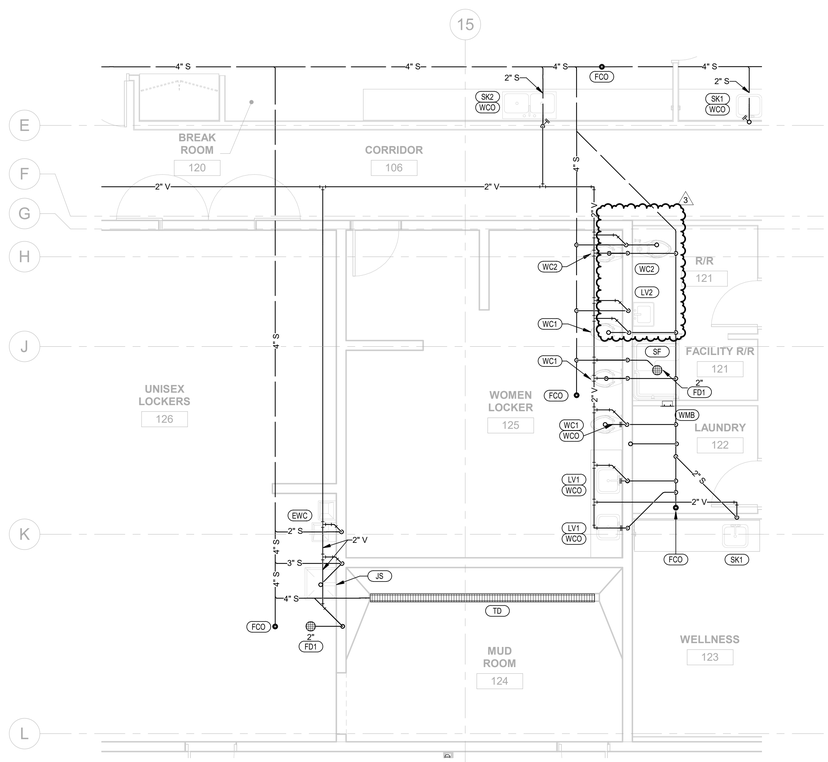
4 PLUMBING LEVEL 1 WATER AND GAS ENLARGED PLAN
1/4" = 1'-0"



3 PLUMBING LEVEL 1 WATER AND GAS ENLARGED PLAN
1/4" = 1'-0"



2 PLUMBING LEVEL 1 WATER AND GAS ENLARGED PLAN
1/4" = 1'-0"



1 PLUMBING LEVEL 1 WASTE AND VENT ENLARGED PLAN
1/4" = 1'-0"

PLUMBING PLAN NOTES:

P1 DO NOT INSTALL PLUMBING PIPING OVER ELECTRICAL PANELS OR EQUIPMENT.

P2 DO NOT ROUTE ANY PLUMBING PIPING OVERHEAD IN THE IDF OR MDF (DATA) ROOMS. ANY PIPING ABOVE THIS AREA SHALL BE PROTECTED WITH DRIP PAN AS PER THE SPECIFICATIONS.

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PROJECT TEAM

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STATE OF MISSOURI
CARL J. HOLDEN
NUMBER PE-2020016283
PROFESSIONAL ENGINEER

02/08/2023

CARL J. HOLDEN
LICENSE # PE-2020016283

PROJECT TITLE
CITY OF WENTZVILLE, MO PUBLIC WORKS FACILITY

PROJECT ADDRESS:
1295 INTERSTATE DRIVE
WENTZVILLE, MO 63385

PLUMBING ENLARGED PLANS

SHEET
P401

CARL J. HOLDEN

TECHNOLOGY PLAN NOTES:

TN16 PROVIDE (3) 2" ENTRANCE CONDUITS FOR INCOMING SERVICE PROVIDER CABLING. COORDINATE WITH OWNER AND CIVIL DRAWINGS.

TN25 PROVIDE 2" CONDUIT FOR FIBER FROM SCADA DATA/IT 210 IN THE MAIN BUILDING TO STORAGE 602 IN WASH BUILDING. SEE CIVIL PLANS FOR SITE ROUTING.

3

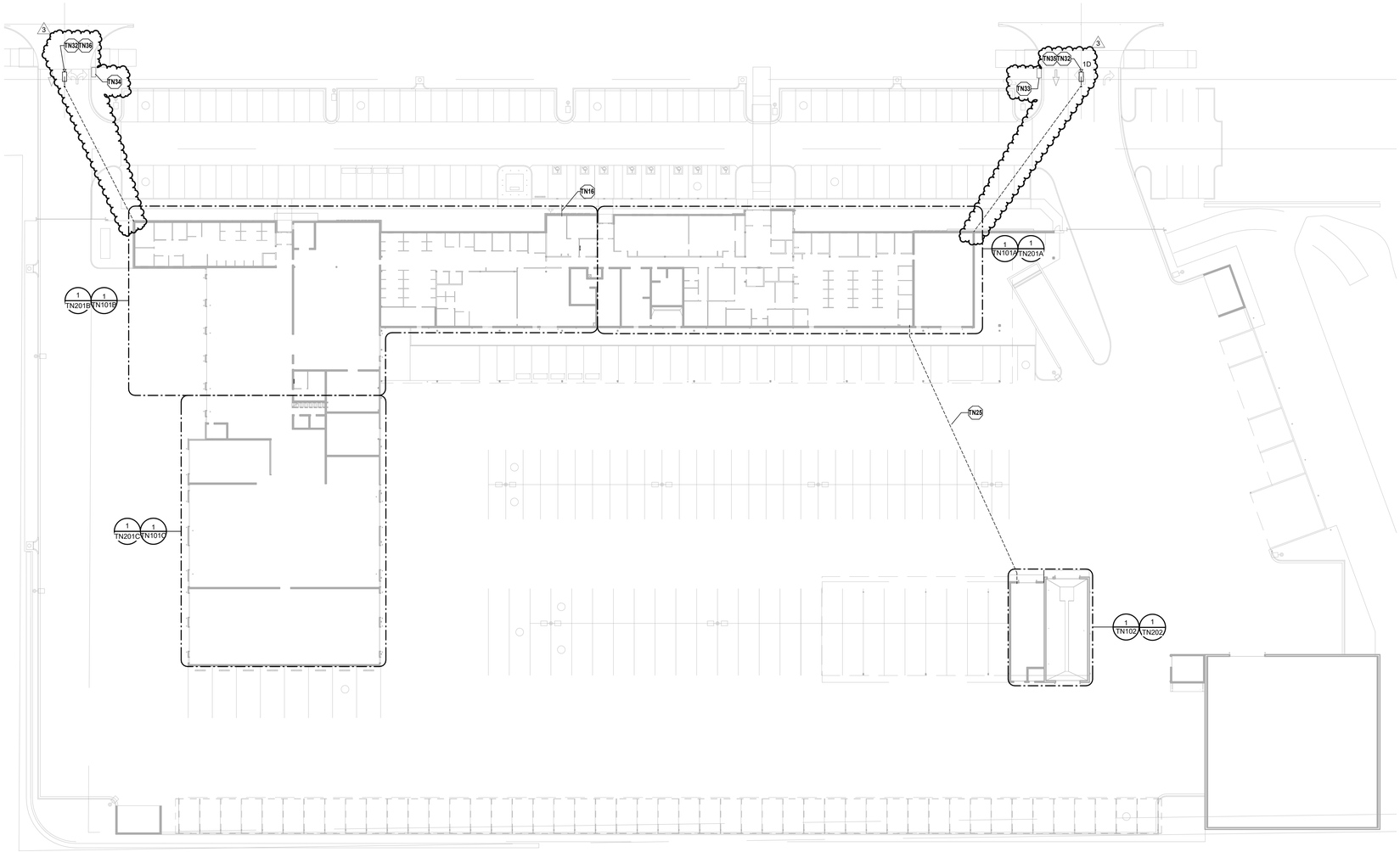
TN32 REFER TO TY SERIES SECURITY SITE PLAN FOR CABLE REQUIREMENTS AT GATE.

TN33 PROVIDE 12"X12"X6" NEMA 3R ENCLOSURE TO HOUSE FIBER CONVERTER. ROUTE 2 STRANDS SINGLE MODE FIBER FROM SCADA DATA/IT 210 IN THE MAIN BUILDING TO FIBER CONVERTER IN EAST GATE AS NOTED IN RISER DIAGRAM. ROUTE (1) AUGMENTED CATEGORY 6 CABLE TO SECURITY CAMERA. REFER TO SHEETS TN800 AND TY100 FOR ADDITIONAL INFORMATION.

TN34 PROVIDE 12"X12"X6" NEMA 3R ENCLOSURE TO HOUSE FIBER CONVERTER. ROUTE 2 STRANDS SINGLE MODE FIBER FROM IDF 436 IN THE MAIN BUILDING TO FIBER CONVERTER IN WEST GATE AS NOTED IN RISER DIAGRAM. ROUTE (1) AUGMENTED CATEGORY 6 CABLE TO SECURITY CAMERA. REFER TO SHEETS TN800 AND TY100 FOR ADDITIONAL INFORMATION.

TN35 PROVIDE 2" CONDUIT FOR FIBER FROM SCADA DATA/IT 210 IN THE MAIN BUILDING TO EAST GATE LOCATION. SEE CIVIL PLANS FOR SITE ROUTING.

TN36 PROVIDE 2" CONDUIT FOR FIBER FROM IDF 436 IN THE MAIN BUILDING TO WEST GATE LOCATION. SEE CIVIL PLANS FOR SITE ROUTING.



1 TECHNOLOGY SITE PLAN
1" = 30'-0"

N

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PROJECT NO.: 19-040 DRAWN BY: KZ
DATE: 12.15.22 REVIEWED BY: RLR

STATE OF MISSOURI
DOUGLAS M. EVERHART
NUMBER PE-2019007648
PROFESSIONAL ENGINEER

02/08/2023

DOUGLAS M. EVERHART
LICENSE # PE-2019007648

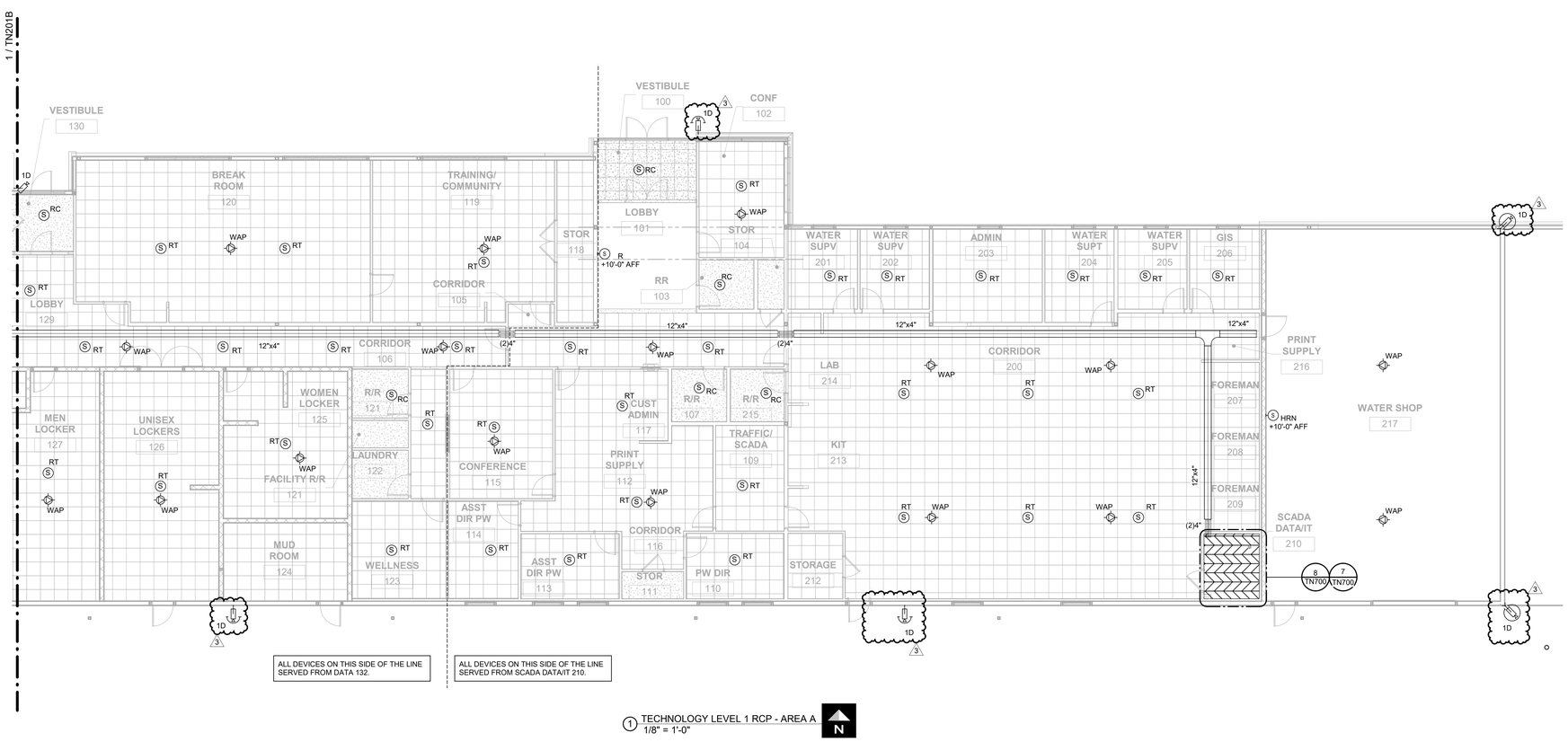
PROJECT TITLE
CITY OF WENTZVILLE, MO PUBLIC WORKS FACILITY

PROJECT ADDRESS:
1295 INTERSTATE DRIVE
WENTZVILLE, MO 63385

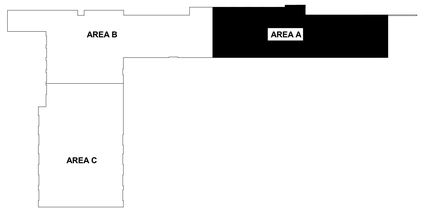
TECHNOLOGY SITE PLAN

SHEET
TN100

DOUGLAS M. EVERHART



1 TECHNOLOGY LEVEL 1 RCP - AREA A
1/8" = 1'-0"



KEY PLAN

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TECHNOLOGY LEVEL 1 RCP - AREA A

SHEET
TN201A

DOUGLAS M. EVERHART

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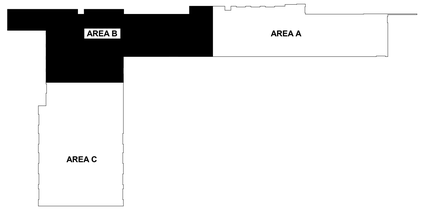
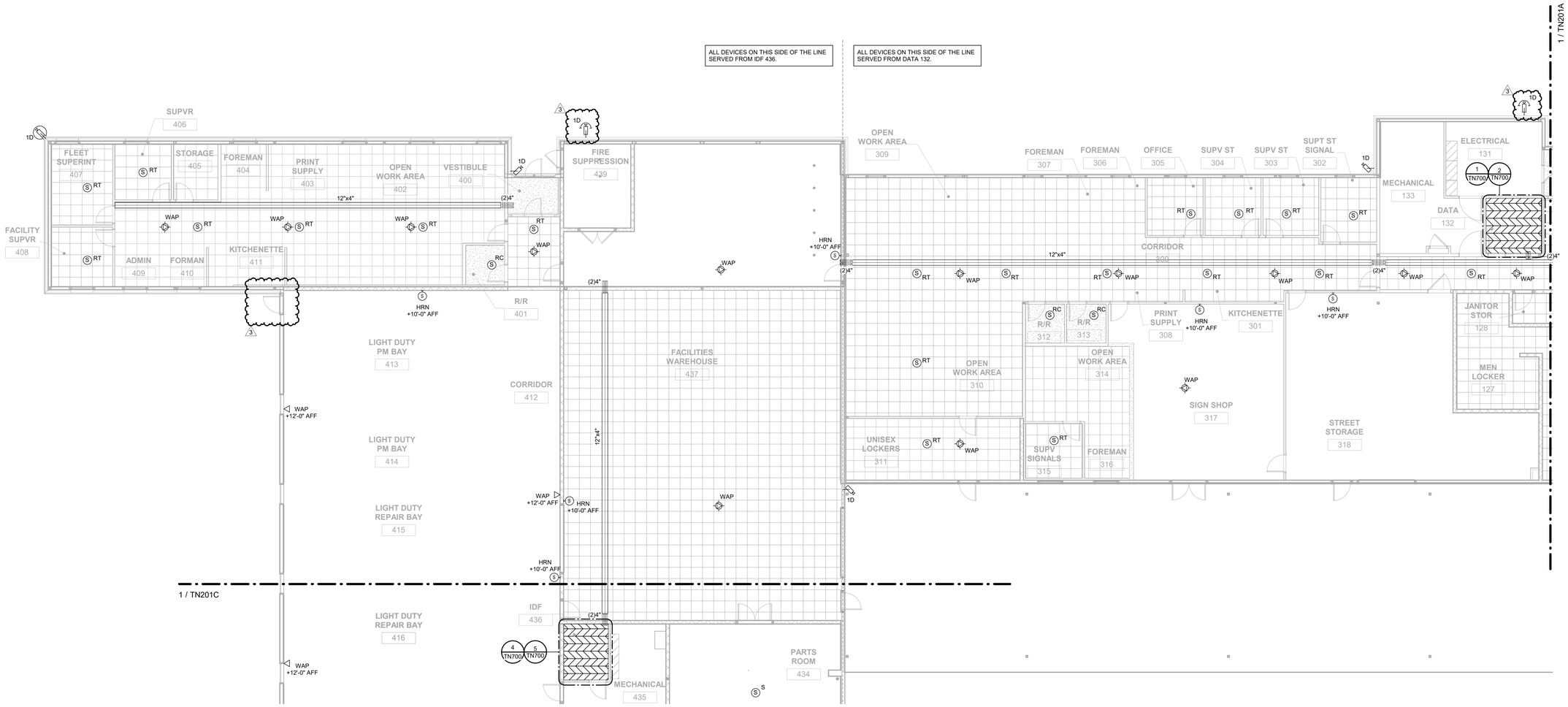


KEY PLAN

ALL DEVICES ON THIS SIDE OF THE LINE SERVED FROM IDF 436.

ALL DEVICES ON THIS SIDE OF THE LINE SERVED FROM DATA 132.



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1/8" = 1'-0"

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TECHNOLOGY LEVEL 1 RCP - AREA B

SHEET
TN201B

DOUGLAS M. EVERHART

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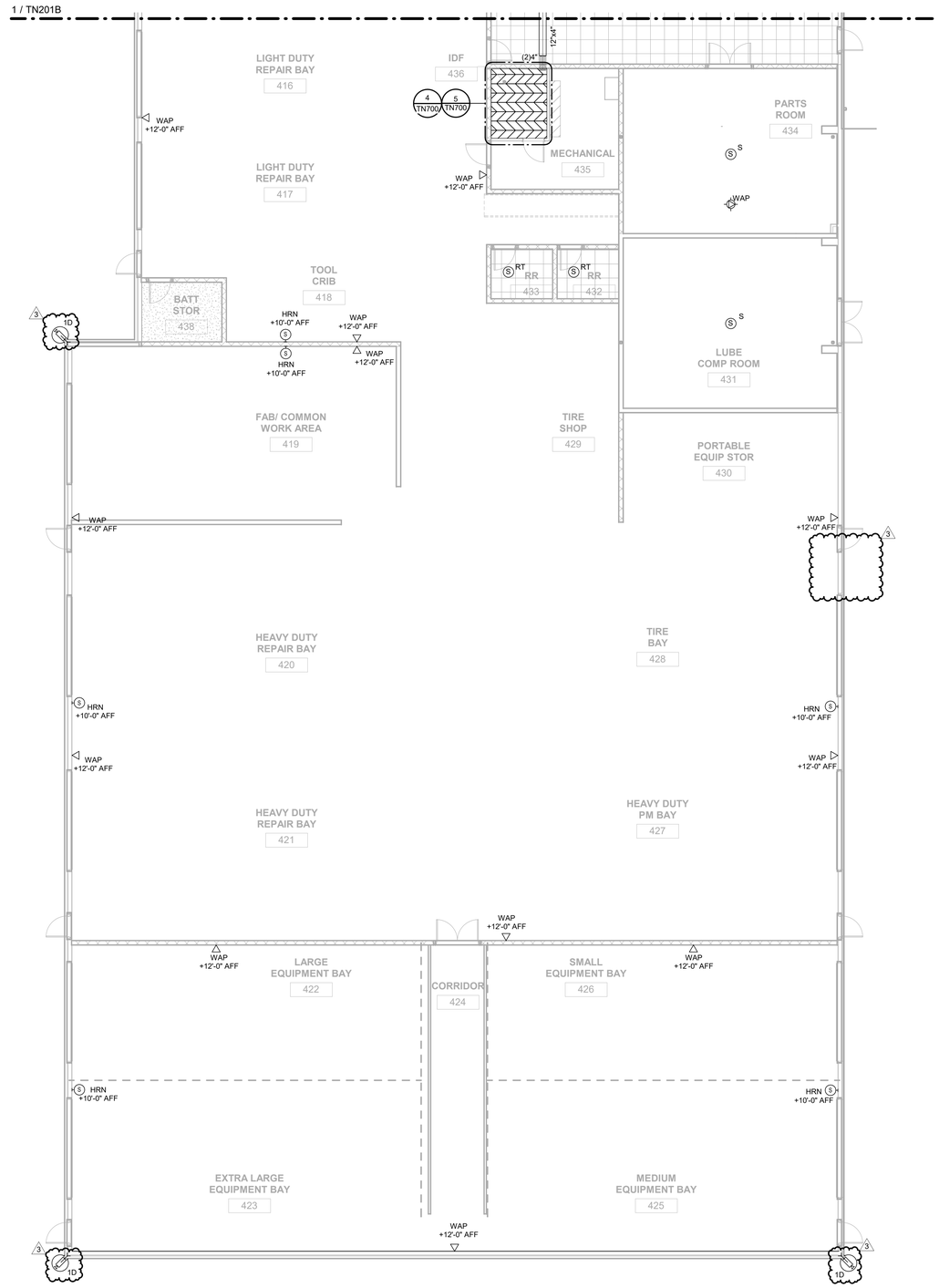
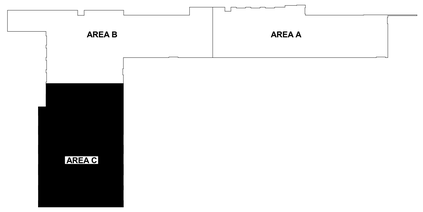


ALL DEVICES ON THIS SHEET SERVED FROM IDF 436.

1 TECHNOLOGY LEVEL 1 RCP - AREA C
1/8" = 1'-0"

N



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PROJECT NO.: 19-040 DRAWN BY: KZ
DATE: 12.15.22 REVIEWED BY: RLR

STATE OF MISSOURI
DOUGLAS M. EVERHART
NUMBER PE-2019007648
PROFESSIONAL ENGINEER
02/08/2023

DOUGLAS M. EVERHART
LICENSE # PE-2019007648

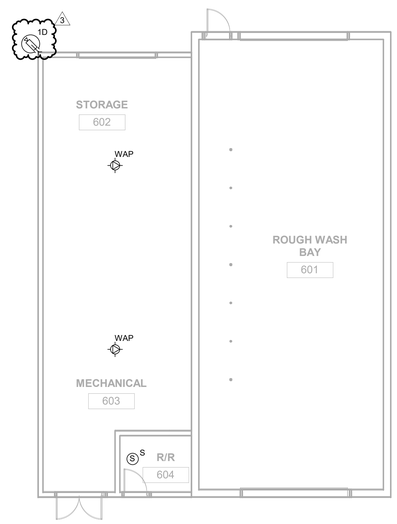
PROJECT TITLE
CITY OF WENTZVILLE, MO PUBLIC WORKS FACILITY
PROJECT ADDRESS:
1295 INTERSTATE DRIVE
WENTZVILLE, MO 63385

TECHNOLOGY LEVEL 1 RCP - AREA C

SHEET
TN201C

DOUGLAS M. EVERHART

ALL DEVICES ON THIS SHEET SERVED FROM STORAGE 602.



1 TECHNOLOGY LEVEL 1 RCP - WASH & SALT STORAGE BUILDINGS
1/8" = 1'-0"

N

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architecture + design

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OWNER

CITY OF WENTZVILLE, MISSOURI
1001 SCHROEDER CREEK BLVD
WENTZVILLE, MO 63385
636.327.5101

PROJECT TEAM

CIVIL ENGINEER
PREMIER DESIGN GROUP
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WENTZVILLE, MO 63385
314.925.7444

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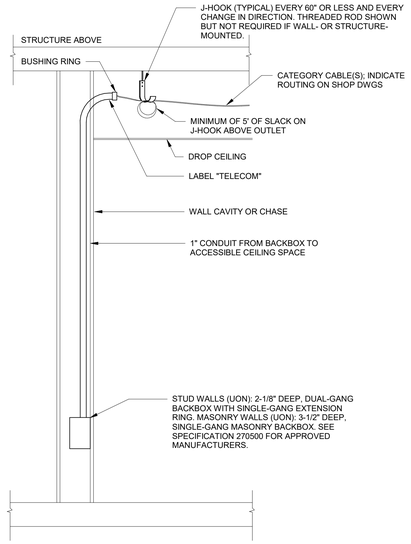
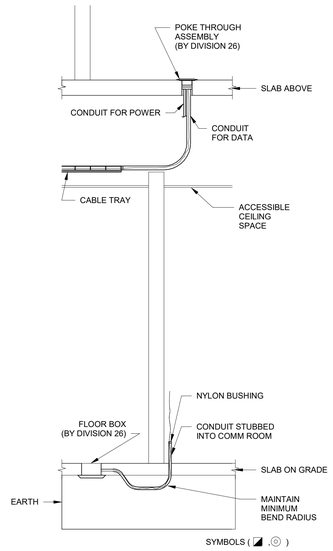
TECHNOLOGY LEVEL 1 RCP - WASH & SALT STORAGE BUILDINGS

SHEET
TN202

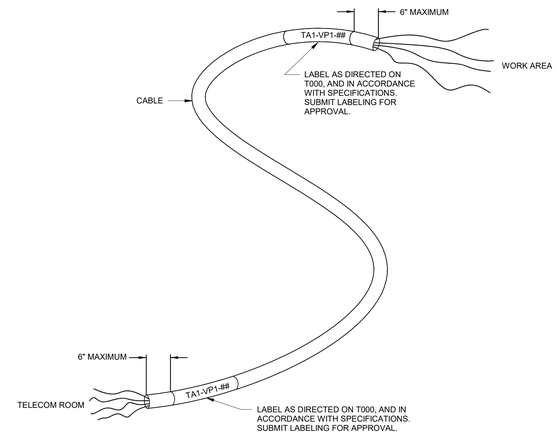
DOUGLAS M. EVERHART



1 COMMUNICATIONS OUTLET MOUNTING
NTS

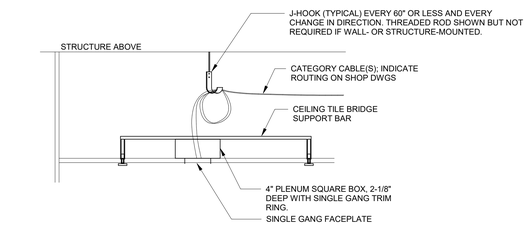


2 CABLE ROUTING FOR POKE THROUGHS AND FLOOR BOXES
NTS

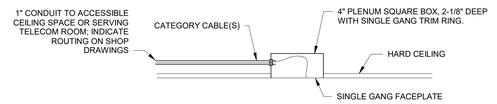


3 LABELING OF HORIZONTAL CABLE
NTS

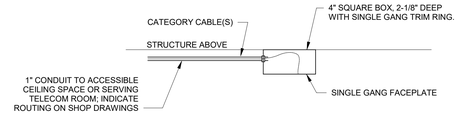
FOR OUTLETS IN SUSPENDED CEILING TILES



FOR OUTLETS IN GYPSUM BOARD CEILINGS



FOR OUTLETS IN EXPOSED TO STRUCTURE AREAS



4 CEILING COMM OUTLET
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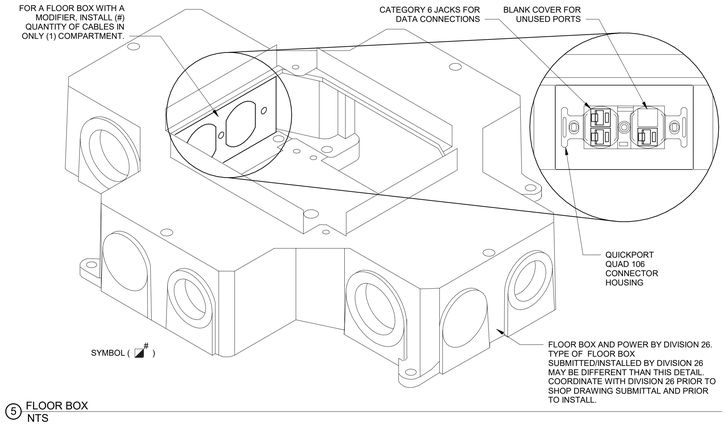
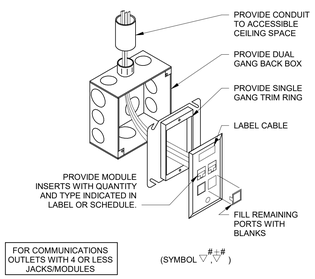


5 FLOOR BOX
NTS



6 SINGLE GANG COMM OUTLET
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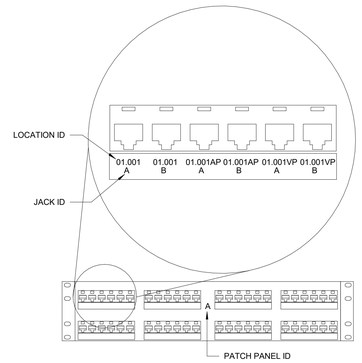

7 TYPICAL PATCH PANEL LABELING DETAIL
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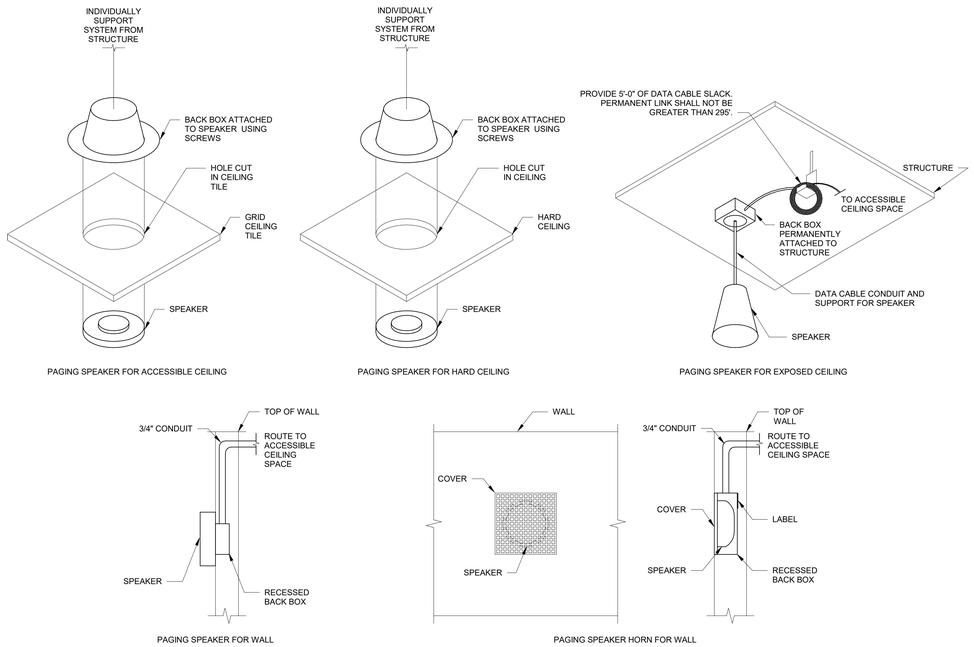

8 SPEAKER INSTALLATION
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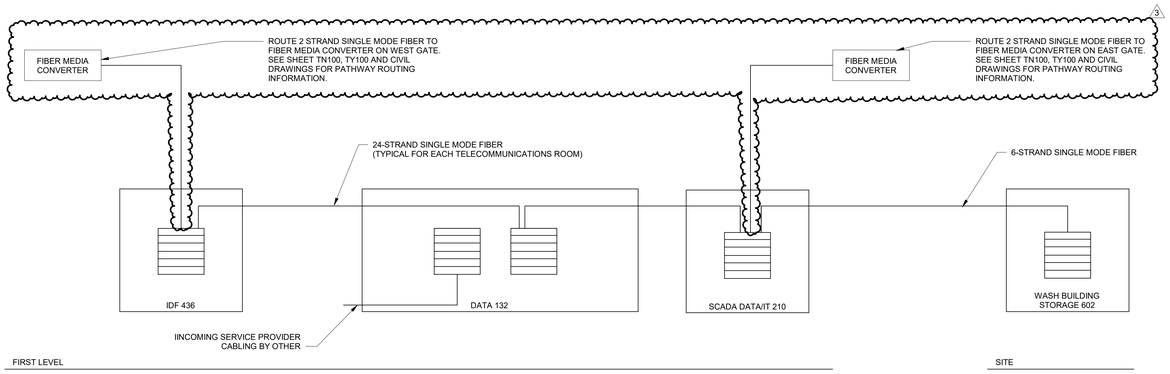
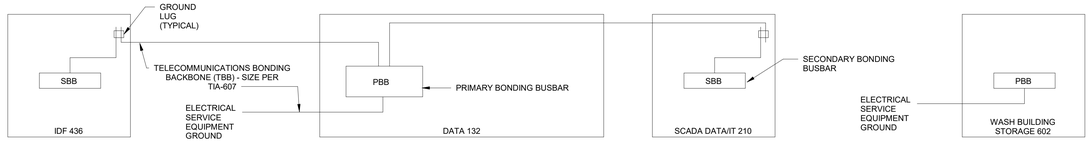


9 RISER DIAGRAM - TELECOMMUNICATIONS BACKBONE
NTS



10 RISER DIAGRAM - GROUNDING AND BONDING
NTS

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TECHNOLOGY DETAILS

SHEET
TN800

DOUGLAS M. EVERHART

SECURITY SYMBOLS

ABBREVIATIONS

AC	ALTERNATING CURRENT
ACP	ACCESS CONTROL PANEL
ADA	AMERICANS WITH DISABILITIES ACT
AFC	ABOVE FINISHED CEILING
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AWG	AMERICAN WIRE GAUGE
BAS	BUILDING AUTOMATION SYSTEM
BFC	BELOW FINISHED CEILING
BR	BIOMETRIC READER
C	CONDUIT
CMP	COMMUNICATIONS PLENUM JACKET
CMR	COMMUNICATIONS RISER
DEMO	DEMOLITION
DC	DIRECT CURRENT
DVR	DIGITAL VIDEO RECORDER
(E)	EXISTING DEVICE
EC	ELECTRICAL CONTRACTOR
(ETR)	EXISTING TO REMAIN
FC	FLEXIBLE CONDUIT
GC	GENERAL CONTRACTOR
IP	INTERNET PROTOCOL
ISP	INSIDE PLANT CABLE
KVM	KEYBOARD VIDEO MOUSE SWITCH
LAN	LOCAL AREA NETWORK
LED	LIGHT-EMITTING DIODE
LF	LINEAR FEET
MDF	MAIN DISTRIBUTION FRAME
MFR	MANUFACTURER
MNT	MOUNT
N/A	NOT APPLICABLE
NVR	NETWORK VIDEO RECORDER
OC	ON CENTER
OSP	OUTSIDE PLANT
POE	POWER OVER ETHERNET
QTY	QUANTITY
(R)	RELOCATED EXISTING DEVICE
(RE)	REMOVE EXISTING DEVICE AND INSTALL AT ANOTHER LOCATION, SEE (R)
RMC	RIGID METAL CONDUIT
RU	RACK UNIT
SF	SQUARE FEET
TGB	TELECOMMUNICATIONS GROUND BUS BAR
TMGB	TELECOMMUNICATIONS MAIN GROUND BUS BAR
TR	TELECOMMUNICATIONS ROOM
TYP	TYPICAL
UNO	UNLESS NOTED OTHERWISE
UPS	UNINTERRUPTIBLE POWER SUPPLY
V	VOLT(S)
VMS	VIDEO MANAGEMENT SYSTEM

ANNOTATION

- 1 — SECURITY PLAN CALLOUT
- CONNECTION POINT OF NEW WORK TO EXISTING
- 1 / TY1 — DETAIL REFERENCE UPPER NUMBER INDICATES DETAIL NUMBER. LOWER NUMBER INDICATES SHEET NUMBER
- 1 / TY1 — SECTION CUT DESIGNATION
- DEDICATED EQUIPMENT ACCESS TILE
- ACCESS PANEL

LINETYPE LEGEND

DIRECT WIRE CONNECTION	GROUPED FUNCTIONALITY

HATCHING LEGEND

- HEADEND ROOM
- NOT IN SCOPE (NIS)

SECURITY SYMBOLS

- CR — PROXIMITY CARD READER
- DM — DOOR POSITION SWITCH ONLY SEE ARCHITECTURAL DOOR HARDWARE SCHEDULE
- DB — DOOR BELL. "C" INDICATES CHIME LOCATION.
- EL — ELECTRIFIED LOCKING DEVICE, REQUEST TO EXIT, DOOR POSITION SWITCH, AND LATCH BOLT MONITOR SEE ARCHITECTURAL DOOR HARDWARE SCHEDULE
- KP — KEYPAD - INTRUSION
- MD — MOTION DETECTOR
- PB — PANIC/DURESS BUTTON
- RO — REMOTE UNLOCK/OPEN BUTTON

SECURITY CAMERA SENSOR SYMBOLS

SINGLE SENSOR	CORRIDOR CAMERA
180°	PAN, TILT, ZOOM
270° / 360°	

SECURITY CAMERA MOUNTING TYPE SYMBOLS (APPLIES TO ANY SECURITY DEVICE SYMBOL)

- CEILING MOUNT
- WALL MOUNT
- POLE / BOLLARD MOUNT
- CORNER MOUNT
- PENDANT MOUNT
- WALL MOUNT PENDANT ARM

LABELING SCHEME

SECURITY DEVICES (TYPICAL)

A XX — XX: MODIFIER FOR SPECIAL OPERATION IF APPLICABLE

SEE MATCHING SCHEDULES ON THIS SHEET (IF APPLICABLE)

SECURITY CAMERAS (TYPICAL)

AA — AA: CAMERA TYPE

AFF/AFG — FOR WALL MOUNTED CAMERAS, NON-TYPICAL HEIGHT ABOVE FINISHED FLOOR OR FINISHED GRADE

SEE MATCHING SCHEDULES ON THIS SHEET (IF APPLICABLE)

GENERAL NOTES

1. CONTRACTOR SHALL SUPPORT ALL CABLE WITH APPROVED PATHWAY.
2. ALL CABLES SHALL BE ROUTED PARALLEL AND PERPENDICULAR TO THE BUILDING STRUCTURE, UNLESS OTHERWISE NOTED.
3. DOOR HARDWARE AND OPENING CONDITIONS SHOULD BE EVALUATED PRIOR TO CONDUIT AND CABLING INSTALLATION AND COORDINATED WITH DIVISION 08.
4. PROVIDE CONDUIT SLEEVE WITH NYLON BUSHINGS FOR NON-RATED WALL PENENTRATIONS FOR COMMUNICATIONS CABLES. PATHWAYS SHALL BE SIZED FOR NO MORE THAN FOURTY (40) PERCENT FILL.
5. PROVIDE CONDUIT SLEEVE WITH NYLON BUSHINGS FOR OVERHEAD CEILINGS THAT BLOCK ACCESS FOR MOVE/ADD/CHANGES TO CABLE PATHWAY, LIKE HARD GYPSUM CEILING. PATHWAYS SHALL BE SIZED FOR NO MORE THAN FOURTY (40) PERCENT FILL.
6. PROVIDE UL LISTED FIRESTOP ASSEMBLY AT FIRE WALL PENETRATIONS FOR COMMUNICATIONS CABLES. MATERIAL AND INSTALLATION SHALL MAINTAIN THE RATED CAPACITY OF WALL AND MEET ALL APPLICABLE CODES.
7. CONTRACTOR SHALL COORDINATE ALL COMMUNICATIONS AND CABLING PATHWAYS WITH OTHER DIVISIONS (08, 21, 22, 23, 26, AND 27) PRIOR TO INSTALL OF DUCTWORK, PIPING, CONDUITS, AND ETC.
8. FULLY COORDINATE ALL CONDUIT ROUTING WITH STRUCTURAL ELEMENTS. COORDINATE CONDUIT INSTALLATIONS WITH ARCHITECT, STRUCTURAL ENGINEER, STRUCTURAL CONTRACTOR, AND GENERAL CONTRACTOR PRIOR TO INSTALLATION. ROUTING IN OR UNDER THE SLAB FLOOR REQUIRES THE USE OF CABLE RATED FOR A WET ENVIRONMENT.
9. VERIFY ALL CAMERA LOCATIONS PRIOR TO ROUGH-IN. FIELD OF VIEW SHALL NOT BE OBSTRUCTED BY OTHER ELEMENTS INCLUDING, BUT NOT LIMITED TO, EXIT SIGNS, LIGHT FIXTURES, MILLWORK, SPRINKLERS, CURTAINS, AND SIGNAGE.
10. ALL WIRING SHALL BE INSTALLED COMPLETE AND UNSPLICED FROM THE SERVING EQUIPMENT PANEL TO DEVICE.
11. REFER TO TN000 FOR TECHNOLOGY GENERAL NOTES THAT ALSO DESCRIBES SECURITY COMPONENTS.

CAMERA TYPE SCHEDULE

TYPE	SYMBOL	FORM FACTOR	DESCRIPTION	BACK BOX	CONDUIT	CABLE	MOUNTING HEIGHT UNO	MODEL	COMMENTS
	SEE CAMERA SYMBOLS		SURFACE MOUNT DOME CAMERA	2 GANG W/ MUD RING	(1) 3/4" EMT	A - WHITE	9' AFF / CLG	DETERMINED BY C&C	

CARD READER TYPE SCHEDULE

TYPE	SYMBOL	FORM FACTOR	DESCRIPTION	BACK BOX	CONDUIT	CABLE	MOUNTING HEIGHT UNO	MODEL	COMMENTS
	CR		STANDARD CARD READER	1 GANG W/ MUD RING	(1) 1/2" EMT	B - YELLOW	46" AFF	DETERMINED BY C&C	
	EL		ELECTRIFIED LOCK	1 GANG W/ MUD RING	(1) 1/2" EMT	SHARED WITH CARD READER	REFER TO ARCH	DETERMINED BY C&C	COORDINATE WITH DIVISION 08 DOOR HARDWARE
	DM		DOOR MONITOR ONLY	1 GANG W/ MUD RING	(1) 1/2" EMT	C- 1 LEAF D - 2 LEAF	DOOR FRAME	DETERMINED BY C&C	COORDINATE WITH DIVISION 08 DOOR HARDWARE

3

DIVISION 28 CONTRACTOR SHALL BE C&C GROUP (ERIC ECKERT 314-650-7207). C&C GROUP IS RESPONSIBLE FOR COORDINATING WITH OWNER TO DETERMINE DEVICE MODELS AND LOCATIONS PRIOR TO PROVIDING AND INSTALLING DEVICES.

3

CABLE TYPES (TYP UNO)

A	(1) CATEGORY 6 CABLE WHITE
B	(1) COMPOISITE CABLE WHITE
C	(1) 18 AWG, 2C UNSHIELDED WHITE
D	(1) 18 AWG, 4C UNSHIELDED WHITE

CABLE TYPES SHOWN ABOVE ARE TYPICAL FOR CABLE DISTANCES LESS THAN 500 FEET. REFER TO DEVICE MANUFACTUERER'S INSTALLATION REQUIREMENTS FOR LONGER DISTANCES. COORDINATE WITH DOOR HARDWARE PROVIDER TO CONFIRM CABLING REQUIREMENTS FOR LOCK POWER.

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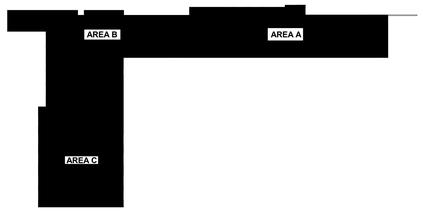
SECURITY GENERAL NOTES AND LEGEND

SHEET
TY000

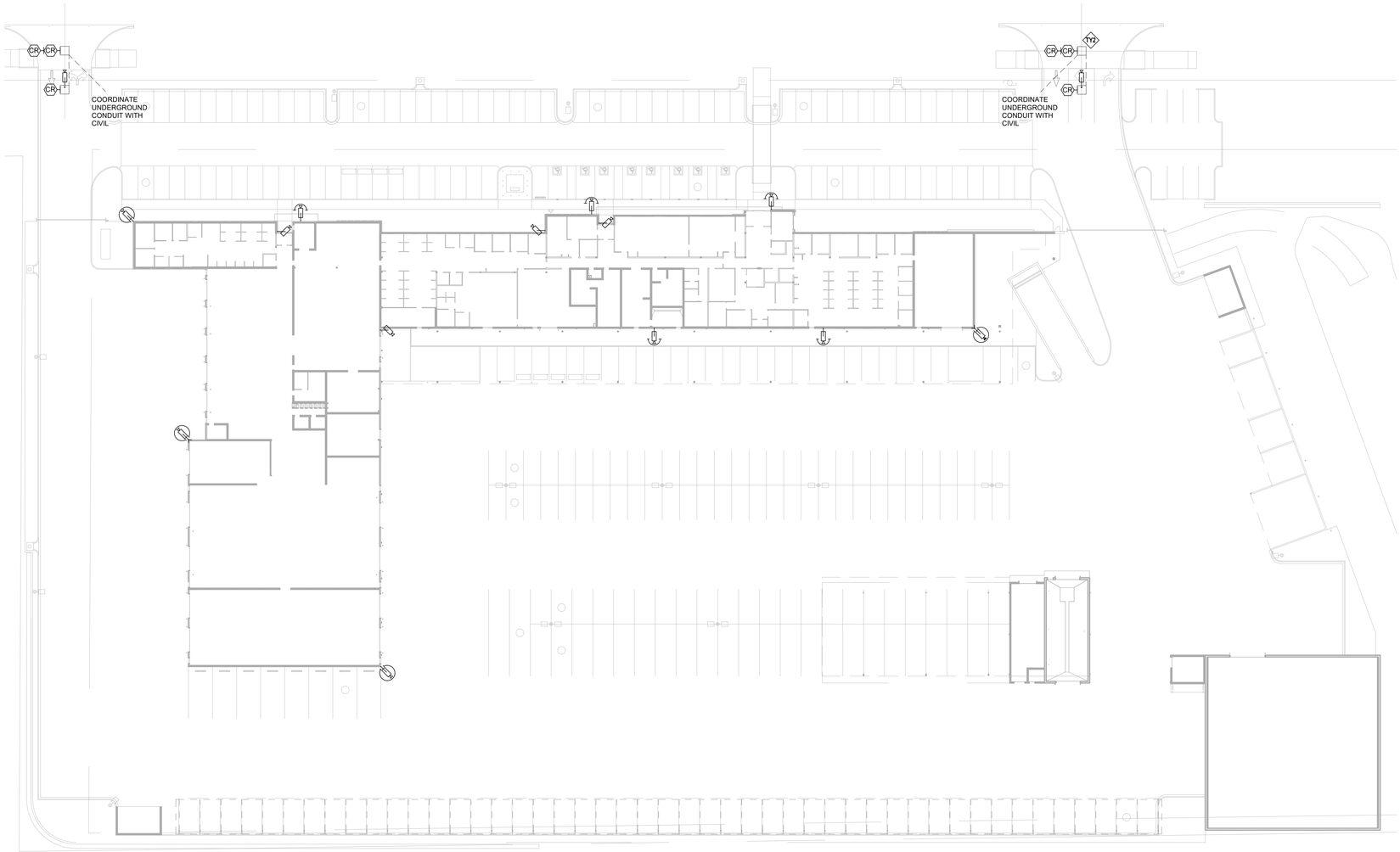
DOUGLAS M. EVERHART

SECURITY PLAN NOTES:

TY2 GATE PEDESTAL LOCATION. PULL (3) 22/6 SHIELDED, (2) 18/2 UNSHIELDED, (1) 22/4 UNSHIELDED, AND (1) CAT6 UNSHIELDED CABLE FROM ACCESS CONTROL AND NETWORK HEAD ENDS TO THIS LOCATION. PROVIDE MINIMUM 1.5" CONDUIT FROM THIS PEDESTAL TO GATE CONTROLLER AND LONG RANGE READER. COORDINATE WITH C&C GROUP FOR ADDITIONAL INFORMATION.



KEY PLAN



1 SECURITY SITE PLAN
1" = 30'-0"

N

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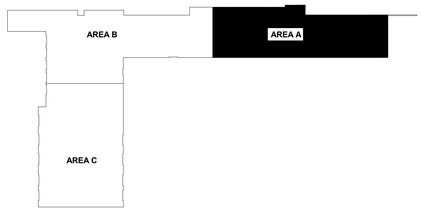
SECURITY SITE PLAN

SHEET
TY100

DOUGLAS M. EVERHART

1 SECURITY LEVEL 1 PLAN - AREA A
1/8" = 1'-0"



KEY PLAN

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architecture + design
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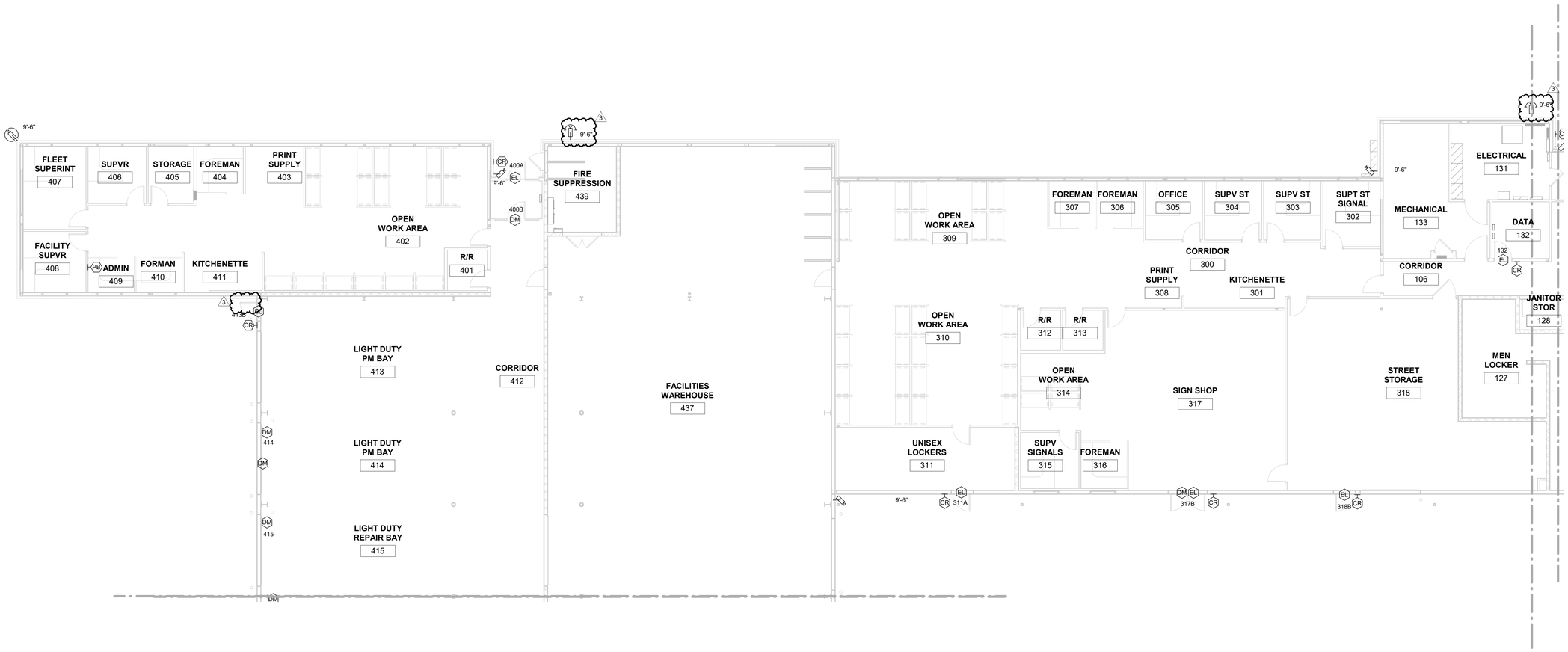
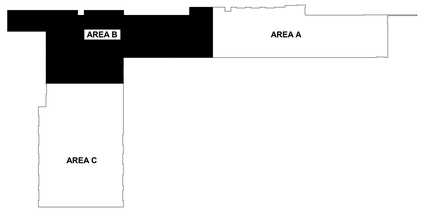
SECURITY - LEVEL 1 PLAN - AREA A

SHEET
TY101A

DOUGLAS M. EVERHART



1 SECURITY LEVEL 1 PLAN - AREA B
1/8" = 1'-0"



KEY PLAN

hdesigngroup
architecture + design

5039 S National Avenue | Springfield, MO 65810 | 417.887.6595

OWNER
CITY OF WENTZVILLE, MISSOURI
1001 SCHROEDER CREEK BLVD
WENTZVILLE, MO 63385
636.327.5101

PROJECT TEAM

CIVIL ENGINEER
PREMIER DESIGN GROUP
100 MIDLAND PARK DRIVE
WENTZVILLE, MO 63385
314.925.7444

MAINTENANCE CONSULTANT
HDR ENGINEERING, INC.
17725 KATY FREEWAY SUITE 102
HOUSTON, TX 77094
816.360.2700

STRUCTURAL ENGINEER
METTEMEYER ENGINEERING
2225 W CHESTERFIELD BLVD., SUITE 300
SPRINGFIELD, MO 65807
417.890.8002

MEP ENGINEER
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8345 LENEXA DR., #300
LENEXA, KS 66214
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TEL 913.742.5000 FAX 913.742.5001
WWW.HENDERSONENGINEERS.COM
1950004840
EXPIRES 12/31/2023

REVISIONS

NO.	DESCRIPTION	DATE
3	ADD 03	02.09.23

PROJECT NO.: 19-040 DRAWN BY: RG
DATE: 12.15.22 REVIEWED BY: MM

STATE OF MISSOURI
DOUGLAS M. EVERHART
NUMBER PE-2019007648
PROFESSIONAL ENGINEER

02/08/2023

DOUGLAS M. EVERHART
LICENSE # PE-2019007648

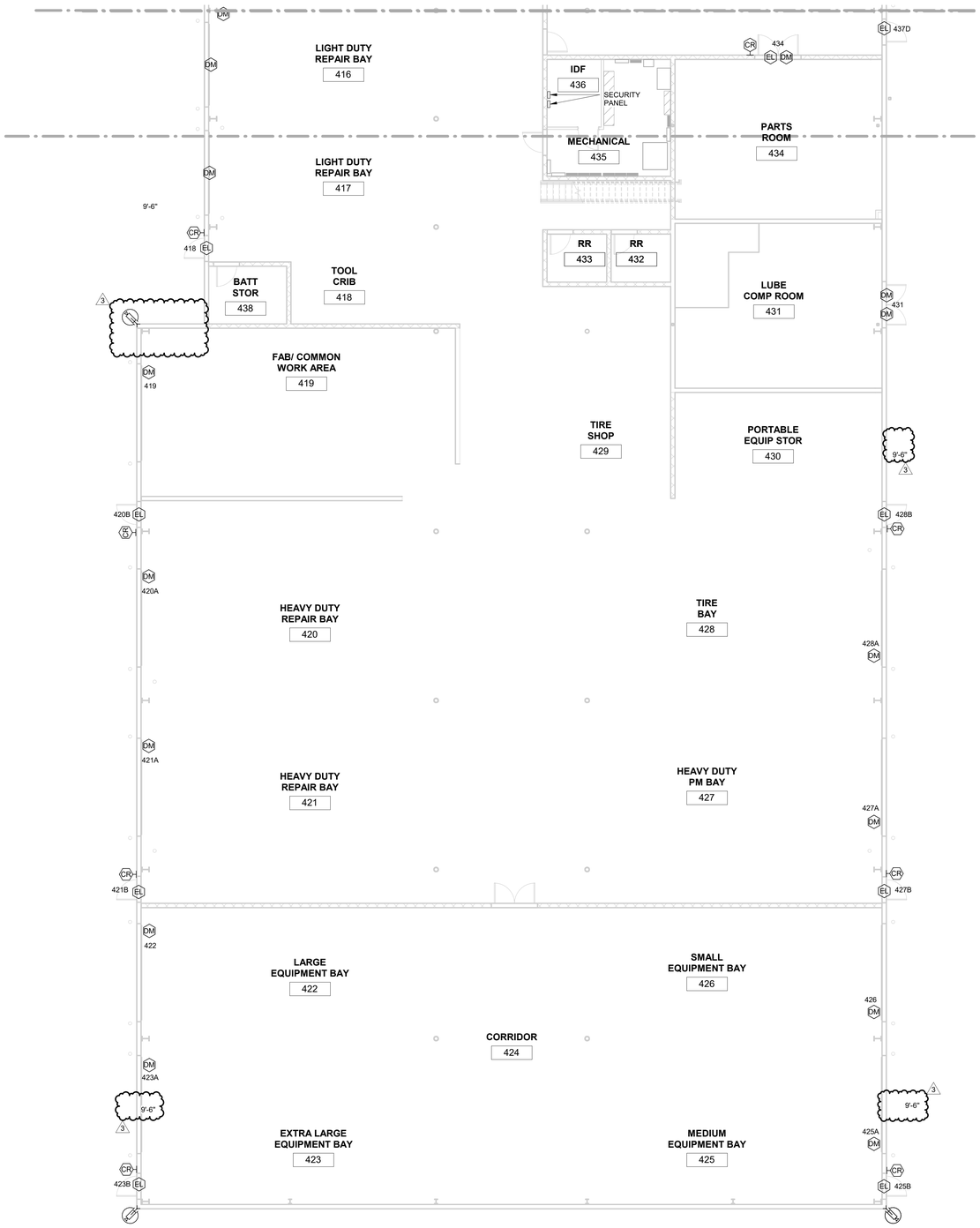
PROJECT TITLE
CITY OF WENTZVILLE, MO PUBLIC WORKS FACILITY

PROJECT ADDRESS:
1295 INTERSTATE DRIVE
WENTZVILLE, MO 63385

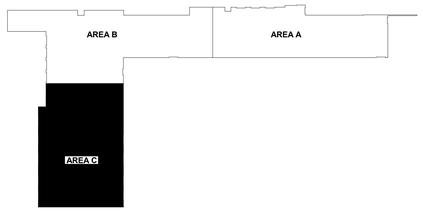
SECURITY - LEVEL 1 PLAN - AREA B

SHEET
TY101B

DOUGLAS M. EVERHART



1 SECURITY LEVEL 1 PLAN - AREA C
1/8" = 1'-0"



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hdesigngroup
architecture + design

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NUMBER PE-2019007648
PROFESSIONAL ENGINEER

02/08/2023

DOUGLAS M. EVERHART
LICENSE # PE-2019007648

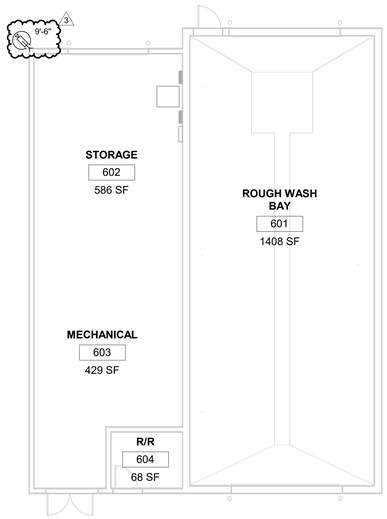
PROJECT TITLE
CITY OF WENTZVILLE, MO PUBLIC WORKS FACILITY

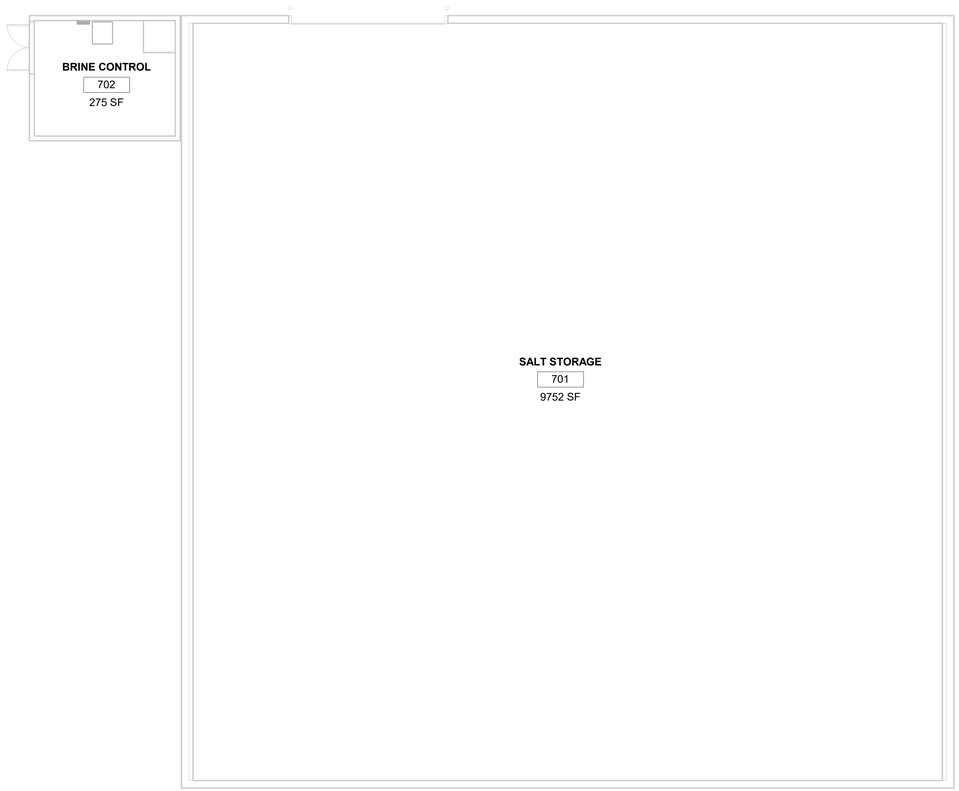
PROJECT ADDRESS:
1296 INTERSTATE DRIVE
WENTZVILLE, MO 63385

SECURITY - LEVEL 1 PLAN - AREA C

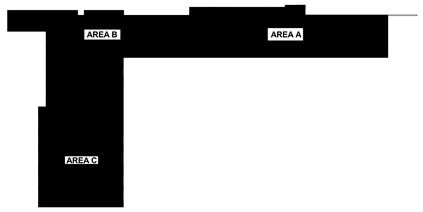
SHEET
TY101C

DOUGLAS M. EVERHART





1 SECURITY LEVEL 1 PLAN - AREA D
1/8" = 1'-0"



KEY PLAN

hdesigngroup
architecture + design
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STATE OF MISSOURI
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NUMBER PE-2019007648
PROFESSIONAL ENGINEER

02/08/2023

DOUGLAS M. EVERHART
LICENSE # PE-2019007648

PROJECT TITLE
CITY OF WENTZVILLE, MO PUBLIC WORKS FACILITY

PROJECT ADDRESS:
1295 INTERSTATE DRIVE
WENTZVILLE, MO 63385

SECURITY - LEVEL 1 PLAN - WASH & SALT STORAGE BUILDINGS

SHEET
TY102

DOUGLAS M. EVERHART