OhioCAT Compact Rental Store – 490 Byers Road, Miamisburg, OH 45342

CHECK ATTACHMENTS

Request for Information, 10/23/2026

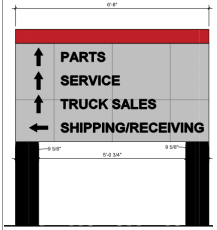
RFI #	Sheet No.	Question	Response
GENERAL			
1		Is there a Geotech Report available?	See attached Geotech Report.
2		Is there a Statement of Special Inspections and a schedule of required special inspections?	See attached Special Inspections List
3		Who pays for special inspections: Owner, or Contractor within the GC price.	PSI hired by OMCO will provide specical inspections. Final Special inspections list to be provided on next drawing issuance
4		Who should pay for the water and sanitary tap and capacity fees, impact fees, and electric and gas utility service or meter charges. Would the Owner state a dollar allowance to be carried in the cost of work?	OMCO will pay for Fees
5	Spec 01 1000	Per 011000 1.4.6 says the GC is responsible for "any and all permits." It also says the GC must pay "any and all fees in connection with the required permits and permit applications", please confirm if this includes any zoning permit fees?	Zoning Review and Approval already completed. Start with allowance for general building permit.
6		Please confirm who should carry any cost for Aid To Construction from local utility providers? Would the Owner be open to state a dollar allowance to be carried in the cost of work?	Any temporary utility costs shall be provided by the GC.
7		Please confirm the contract versions to be utilized for the project? AIA101 & A201	Owners Attorny will provide a contract based on choosen form: CMGMP or Stipulated Sum. AIA A201 should be used as basis.
8		Is the Owner open to accepting Substitution Request? If so, is there a specific form suppliers should use?	Price Specification, provide alternate price for subsitutions. Selected GC can further submit substitions requests. Once selected Substitutions shall be handled as RFIs per specification manual.
9	C200, C005, C002	Please clarify: C200 says to see C005 for the heavy-duty concrete detail – there is no Heavy Duty Concrete detail on C005 – please provide. There is a heavy duty concrete detail on Sheet C002 – please confirm if this is the correct detail for the parking lot area.	The heavy duty concrete detail on sheet C002 is the correct detail for heavy duty concrete.
10	C200, C002, C005	In general, it appears like most of the area identified on C200 should refer to the details on C002 in lieu of C005. Please confirm if this is accurate.	The standard duty asphalt pavement detail is on sheet C005, but the light and heavy duty concrete details are on sheet C002
11	AS.01, C201	Please confirm the "Land Bridge" as label on AS.01 should be constructed per the Easement Crossing Details on C201.	Yes, Refer to C201 for details.
12	C202	On C202 sheet of 9 of 10 shows a Heavy Duty Concrete detail – please confirm if this detail is for the parking lot or just for the drive over and through the gas line easement.	This detail is specific to the land bridge and different from the heavy duty concrete detail on page C002
13	C202	On Easement Crossing #5 (Sheet C202) the detail states "REINFORCED CONCRETE SHIELD SEE SHEET 10 FOR STRUCTURAL DETAILS AND SPECIFICATION". Easement Crossing Sheet 10/10 is not included in the documents. Please provide or clarify.	Sheet 10 will be provided
14		Does Ohio Fuel and Gas have any special requirements – ie daily work sheets, safety watch, etc. when working in or around the easement?	At this time, there have been no extraordinary requirements requested from CenterPoint Energy regarding work in or around the gas easements. Such requirements are to be met if requested by the gas company at a later date.
15		Will Temporary easements required on adjacent properties required, near Settling Pit for example.	GC may need a temporary easement to complete work. Final design to have about 10'-0" from setteling pit to property line.
16	C200	On sheet C200 – near new entry there is a call out "decorative rock wall" – there are no details shown on the civil drawings and this does not show up on the landscape drawings. Please confirm if there should be a decorative rock wall and provide details.	Details to be provided in subsequent drawing submissions. There will be a decorative rock wall at this location
17	AS.01, C200	The architectural site plan AS.01 and C200 call out two (2) gates – graphically, one gate looks like a swing gate and one looks like a sliding gate. Please provide details and specifications for these gates? Should they have card access, CAT-6E cable, detection loops, or other requirements to function properly?	Sliding Gates to be provided. Each Gate will need power data, Card Reader. Additional details to be provided. Detection Loops will be needed at exit.
18		Will specifications for the 8' Vinyl Coated Chain Link Fence be provided? Clarify the extents of the Ornamental and Chain link fences.	Fencing Will be further detailed on future Civil Drawings.
19	C200, AS.01	Curbs or Parking Bumpers – on C200 is shows curbs, then on AS.01 is shows bumper blocks, can you confirm which is the correct scope.	Curbs are the correct scope to be provided. Bumper Blocks are not to be provided and shall be removed from Architectural Plans.
20		Please confirm the grit and gloss for the Polished Concrete floors? Will a specification section be issued?	Polished Floors to specifiy the following: 1. "Cream Polished" Floors to be considerd a "Burnished Finish with: E-Cure Water Based Curing Compound and Prosoco Consolideck BD1. Floor to have "Light Grind" the goal is NOT to expose the aggregrate.
21		Please clarify the "Owner Provided Equipment Scope" and the CM/GC responsibility (ie. Unloading/installation/startup).	GC will manage receipt delevery and coordination and utility connections to all equipment. Otherwise Owner to Furish, Contractor to install. Full equipment list to be provided once final list is completed by Owner.
22	S1.03, Spec 12 3216	Per Sheet S1.03 Bridge Cranes are by Others. Please confirm or clarify the scopes of work required for these: a. Who should supply and install the crane support structure(s) including runway beams, rails, end stops, bridge, hoist, festoon or conductor bars, and controls)? b. Who commissions and load-tests them? Is it an Owner-retained vendor or a CCG subcontract? c. Could rail or crane-load designs be furnished if PEMB contractor should furnish and install? d. Please confirm who paints the crane rails and bridge, given the "crane bridge safety yellow" paint note in specification section 123216 – page 423.	A. By PEMB per crane specs. B. Crane Vendor to Commission. C. Crane loads by Owner (Refer to drawings for lifting weights), design by PEMB D. GC determination.
23	C200	On Sheet C200, could additional clarification be provided on what should be Heavy Duty Concrete Pavement, base: heavy duty concrete pavement that should have a bid alternate: roller-compacted?	Yes, these shades will be revised to alleviate the confusion
24		Can you provide a complete owner-equipment matrix that will define OFOI, OFCI, and CFCI items.	GC will manage receipt delevery and coordination and utility connections to all equipment. Otherwise Owner to Furish, Contractor to install. Full equipment list to be provided once final list is completed by Owner.
25		What is the Contractors low-voltage scope? Rough-in only (conduit, boxes, backboards, pathways), cabling and devices, or full turnkey. Who furnishes and installs the data cabling, racks, wireless access points, cameras, access control and intrusion systems, and the A/V system?	Conduit and Boxes by GC (all pathways by GC) Cabiling and wires by OMCO (Capital/Premis/Root). Rough in and coordiantion of Access controls by GC.
26		Will the Owner's low-voltage consultant issue technology drawings and specifications? If so, do we have an idea on timing?	Yes we will coordiante and issue as an appendix to the drawing set when finalized. This also includes furniture plans.
27		Is the BDA / emergency responder radio system in Contractors scope? If it is, who designs it? Should we carry an allowance to test after dry-in?	GC to provide an allowance for (1) Test.
28		Does the door contact switch sit in the Owner's scope while Contractor provides the mortar box and conduit?	Yes
29		Is Toledo Sign Co. an Owner-direct vendor or a Contractor subcontractor? Does "provided by" mean furnish only, or furnish and install? Who installs, who supplies blocking and anchors?	Contractor can choose any sign company, OMCO to review designs.

RFI #	Sheet No.	Question	Response
30		Is the Toledo scope only the building letters, or does it also include the highway sign, monument sign, wayfinding and retail entry signs?	Contractor can choose any sign company, OMCO to review designs.
31		For the highway and monument signs, who furnishes the sign, and who designs and builds the foundation, structure and conduit? Is the allowance on budget line 21 meant to cover the sign, the foundation, or both? Will the Owner issue the sign shop drawings and a loading requirement?	GC to provide all required signs in drawings.
32	A8.02, Spec 10 1423	Who furnishes and installs the interior glass decals on A8.02? Is that in 101423 or is it by others?	By GC, typically the interior signage contractor. Owner to provide room names.
33		Is the highway sign height or location subject to a zoning or sign permit? The GC is responsible for all permits and fees.	OMCO shall pay for any permitting fees required for highway sign.
34		Is Falk or Petersen PAC-CLAD the basis of design for the vertical insulated panel? Drawings indicate Falk and specifications call for Petersen PAC-CLAD. Are the other manufacturer's panels acceptable?	Yes as long as design intent is maintained. Contractor to provide substitute with color and texture samples. Products noted are preformance and basis of design.
35		Please provide a basis-of-design manufacturer and model for the unitized skylights. Please also give the glazing makeup, U-value and SHGC, and the wind or impact rating.	Skylights should be compatiable with Roofing Manufacturer. Basis of Design Sunweld Plus Conventional Skylight. Self Flashed and Curb Mounted. Maximum U Value of .5. Max SHGC of .49.
36	C200	Will erosion control matting be required at basin slopes?	Yes
37		Are PVC and/or KEE membrane roof systems an acceptable alternate for the TPO roofing system specified? Most 60-mil TPO systems do not offer a 30-year warranty.	GC to provide a 20 Year Roof as base bid. 20 Year Roof to have: -60 TPO over Polyiso. GC to provide an add alternate for 30 year Roof with: -80 Mil TPO, 1/2" Cover Board over Polyiso.
38		Is Polyiso roof insulation an acceptable alternate for XPS insulation?	Yes
39		The drawings specify Carlisle for roofing materials but the specifications state that Firestone and Johns Manville are acceptable as well. Please confirm that the latter two are acceptable to use.	Yes
40		On sheet C200, both heavy duty concrete legend items and the easement look to be shaded similarly. Please confirm that all of the site concrete outside of the front parking lot should be heavy duty and specify which areas you'd like to see the alternate system covered. On the plan view, the "ready equipment yard" and "new equipment yard" look to be a different shade.	These shades will be revised to alleviate confusion. The ready equipment yard and new equipment yard should have the bid alternate provided in addition to the base scope.
41		Please confirm that all concrete areas are to have a curb around them.	Yes
42		Please confirm the pavement detail for the utility easement area.	Please refer to Sheets C201-202 for gas easement requirements.
43	G1.01, A1.03, A1.04, A2.02, A4.10, A4.14	Spec requires a 30-year warranty and A4.14 details call for '30-year TPO', while G1.01 and keynote 07.16 call for a 20-year minimum warranty. Spec also lists 60-mil membrane; most manufacturers require 80-mil (plus enhanced attachment/cover board) to issue a 30-year warranty. Please confirm warranty term and membrane thickness.	GC to provide a 20 Year Roof as base bid. 20 Year Roof to have: -60 TPO over Polyiso. GC to provide an add alternate for 30 year Roof with: -80 Mil TPO, 1/2" Cover Board over Polyiso.
44	G0.02, G1.01	Spec lists only extruded polystyrene (XPS) Type IV insulation. G0.02 energy calculation is based on R-5.77/inch (polyisocyanurate). XPS is not typical below an adhered TPO system and would require greater thickness. Please confirm polyiso is acceptable.	Yes
45	G0.02, A1.03, P2.01, A4.14	G0.02 indicates a full tapered system (1" at drains to 11-5/8" high point), while A1.03 indicates 1/4":12 slopes with crickets only (07.22) and may imply PEMB structural slope. Please confirm whether the PEMB roof is dead-level or sloped, confirm the tapered layout, and confirm drain/overflow drain locations (A1.03 shows (4) drains; P2.01 shows (4) RD + (4) ORD).	Intent is PEMB is sloped structure. 4 drains plus 4 overflow drains.
46	G1.01	Spec lists three different substrate boards (5/8" Type X, 1/2" glass-mat, 1/2" gypsum-fiber) and a 1/2" glass-mat cover board; G1.01 roof assemblies show neither. Please confirm if either a deck-level substrate/thermal barrier and/or roof insulation coverboard board are required.	Current Intent (Drawings and specs will be coordianted). 5/8" Type X required at all interior Drywall. (not including moisture and mold resesitant drywall behind tile and wet areas). 5/8" DensElement with integral air and moisture barrier as exterior wall sheating between column lines 1 - 14. Cover board only per Roofing RFI response.
47	S0.00	Roof zone uplift pressures and coping design pressure are left blank, and the standing seam guide spec references obsolete codes (SBC/BOCA/UBC). Please provide design pressures per OBC/ASCE 7 for field, perimeter and corner zones, or confirm the roofing contractor/manufacturer is to determine them.	Roof Uplift Loads are provided on Sheet S0.00 under components and cladding loads.
48		Spec includes hot-asphalt insulation attachment, concrete deck priming, tie-in to existing roofing, and unedited bracketed/placeholder text. Project is new construction on steel deck. Please confirm these provisions do not apply and that mechanically fastened underlayment with adhered membrane application is acceptable.	They do not apply. Adhered is to be base bid. GC to provide deduct alternate to do mechanical fasteners.
49	A1.04, A2.02, A4.02, A3.01, G1.01, G0.02	Wash Bay roof is keynoted as TPO on a 4":12 / 2":12 gable with eave gutters, but A4.02 Det 1 and A3.01 Sec. 7 reference undefined Roof Type 'F', A3.01 Sec. 7 shows PEMB purlins (05.05) with 15'-1" and 10'-10" eave overhangs and no deck, and G0.02 states Building 2 is a pre-engineered metal building using a liner-system roof assembly (typical of a PEMB metal roof). Please define the Wash Bay roof assembly (membrane vs PEMB metal roof, deck, insulation type/R-value, vapor retarder, eave and rake edge details).	Roof Type E: Metal Roof Construction to be Revised at Retail Store and Wash Bay: Details to follow manufacturer warrantied details. 1. BOD PAC-Clad T-250 24 Ga with Striations. 2. BOD PAC-Clad HT Self Adhering Underlayment 3. 5" of Polyiso Insulation (R-30 Minimum) 4. Metal Deck per Structural Drawings/PEMB
50	G1.01, A4.11, G0.02	(2) 2.5" layers of polyiso equal approx. R-28.9 at the R-5.77/inch used on G0.02, which does not achieve the R-30 noted, and no nailable substrate is shown for panel clip attachment over 5" of foam. Please confirm insulation thickness and substrate (plywood vs nailbase vs direct-to-deck clips with bearing plates).	Roof Type E: Metal Roof Construction to be Revised at Retail Store and Wash Bay: Details to follow manufacturer warrantied details. 1. BOD PAC-Clad T-250 24 Ga with Striations. 2. BOD PAC-Clad HT Self Adhering Underlayment 3. 5" of Polyiso Insulation (R-30 Minimum) 4. Metal Deck per Structural Drawings/PEMB
51		The PAC-CLAD guide spec was not edited: panel width, profile finish, gauge and color are not selected, and both Tite-Loc and Tite-Loc Plus are named. Please confirm panel type, width, thickness, finish and color.	Design Selections of Metal panels shall be revised. -Roof metal panel to be T-250 24 ga with Striations. 16" Wide
52	P5.01, P2.01, P5.02	Gas piping is routed up the exterior wall and over the parapet coping onto the TPO roof. Please confirm the method of crossing the coping (sleeve/goose-neck through parapet vs over coping) and confirm who furnishes the walk pads under each Dura-Blok support. Support locations/quantity are not shown.	Gas piping shown routed through exterior wall and into ceiling space. Gas piping shown up through roof with curb at Shop roof. Walking pads should be provided by the PC. The locations and quantities of gas pipe roof supports shall be determined by the PC using the support interval requirements listed in the specifications.
53	A2.01, A4.01, A4.02, A4.10	Three different coping bases are indicated: DMI, Carlisle SecurEdge, and shop-fabricated aluminum or stainless. Please confirm the coping basis of design, material and finish (Kynar color 'match MWP-1').	Metal Panels and Coping to match colors and be from the same product family (included metal roof at wash bay).
54		Drawings call for a 6" x 6" beveled gutter; spec calls for Style K. Downspout is called '3"' without a second dimension, and spec 0.024" is light for a commercial downspout. Spec requires connection to underground drainage, but no downspout boots/storm connections are identified. Please confirm profile, downspout size (3" x 4"?), and discharge (splash block vs underground).	Drawings and specifications to coordinate to match the following: -Gutters 7X7 -Downspouts 5x4 or 5inch round -All are to be underground, refer to civil drawings for storm water connections.
55	A2.01	AL-5 gutters/downspouts are to match 'MWP 4', but the schedule only defines MWP-1, 2 and 3. Please confirm AL-5 color.	Gutter to match metal panels. Finish Schedule to be revised.

RFI #	Sheet No.	Question	Response
56	P2.01, P5.02	P2.01 shows the water heater flue and intake through the standing seam roof on curbs, while P5.02 Det 1 shows a field-supplied roof boot, and Det 14 references a shingle roof. Please confirm the penetration method through the standing seam roof and who furnishes the curb/boot.	No Shingle Roof, update note detail. The water heater selection will be updated to an electric tank water heater, shelf mounted above the mop sink. 20 gallons, 15 kw power input, AO Smith model DSE-20-15. 480v/3ph power.
57	A4.14, M2.01, P5.02	Loose wood blocking over sheathing on top of the membrane is not a typical manufacturer-approved support, may not be covered by the roof warranty, and conflicts with P5.02 Det 10 Note 2, which prohibits wood block supports for rooftop piping. Please consider manufacturer-approved equipment supports/rails or pedestals, and confirm which trade furnishes the supports.	Refer to A4.14 for roof details. All Roofing details must met selected manufactures warrrrenty details.
58	A4.10	No specification sections are provided for skylights, roof hatch, roof curbs or rough carpentry. Please confirm who furnishes and installs skylights, hatch and curbs, and who provides roof-related wood blocking/nailers.	To be compatiable with the roofing system, GC to determine scope and sub contractor. Roof Hatch BOD Design in Nystrom SRBAY36x36SG.
59	M7.01, P5.01, M5.01	MEP notes use tenant/landlord and existing-roof language that does not apply to this new owner-occupied building. Please confirm whether penetration flashing is to be carried in the roofing base bid or back-charged to the requesting trade (mechanical/plumbing/electrical).	Roof Penetrations are all by GC. GC to coordiante all trade penetrations.
60	M2.01, M6.01, M5.01, P2.01, A4.14	Multiple curbs and penetrations occur through the standing seam roof, but all roof details (A4.14) are for TPO. Please provide or approve metal-roof curb details (curb flashing integrated with panel seams, upslope diverter/cricket, curb sizes) confirm EF-15/EF-16 curbs will be built to the 1-1/2":12 roof slope, and confirm whether curbs are to be coordinated with / supplied by the panel manufacturer to suit the Tite-Loc Plus profile.	Metal Roof Details to follow manufacturer approved details. For Example PAC Clad T-250 Metal roof to follow T-250 Flashing Details for Metal Deck ISO. See attached for reference. These details will be incorperated into project specific Applications.
61	A4.11	Please confirm which trade provides the canopy rear gutter/leader and specialty wall flashing at the Mapes canopies.	To be determined by GC.
62	A2.01, G1.01	Wall panel product, material (steel vs aluminum), manufacturer and profile conflict across schedule, assemblies and specifications. The ACM spec title calls for a PE core while the body calls for FR core (NFPA 285 required). EW06 standing seam wall panel has no specification; the Board & Batten cut sheet is not referenced. Please confirm basis of design for each wall type. Panel trim interfaces with roof edges, copings and gutters.	Board and Batten: The intent is to match the roof system with the board and batten. Per other RFI responses, the basis of design will be clarfied to provide Pac Cald T-250 as the wall panel. ACM Panel: FR core is to be provided. Specifications will be revised accordingly.
63	G1.01, A4.02, A2.02	Please confirm soffit material (ACM vs aluminum soffit panel vs insulated panel) at office overhangs and wash bay eaves, and which trade furnishes it.	Exterior Soffits on Retail building to be ACM Metal Panels.
64	G1.01, A1.04	No vapor retarder is shown in any roof assembly. The Wash Bay is a high-humidity space. Please confirm whether a vapor retarder (and substrate board) is required.	Roof Type E: Metal Roof Construction to be Revised at Retail Store and Wash Bay: Details to follow manufacturer warrantied details. 1. BOD PAC-Clad T-250 24 Ga with Striations. 2. BOD PAC-Clad HT Self Adhering Underlayment 3. 5" of Polyiso Insulation (R-30 Minimum) 4. Metal Deck per Structural Drawings/PEMB Drawings to specifiy that all iso board joints are tapped.
65		Please confirm: (a) related roofing section is 07 5423 TPO, (b) no sustainable design / LEED submittals required, (c) no scuppers or conductor heads are required (P2.01 shows internal overflow drains).	There are no Green Requirements for this project in addition to Base IBC and IECC requirements. Overflow drains shall lead to a cows tough discharge near gound level, above CMU base. To be coordianted on Archtiectural Elevations.
66	A4.10, A4.01, A4.11, A3.01	No flashing is shown where the office standing seam roof terminates against the shop dividing CMU wall (EW02 panels above), and no rake, ridge or Wash Bay eave/rake edge details are provided. Please provide details or confirm manufacturer's standard details are acceptable.	Metal Roof Details to follow manufacturer approved details. For Example PAC Clad T-250 Metal roof to follow T-250 Flashing Details for Metal Deck ISO. See attached for reference. These details will be incorperated into project specific Applications.
67		Aluminum Manufacturer: I wanted to ask if YKK is an acceptable Aluminum Manufacture for this project. I noticed that Kawneer is the basis of design and Tubelite, Wausau and EFCO can be used so I wanted to see if YKK can be as well due to it's comparable products.	Yes as long as design intent is maintained. Contractor to provide substitute with color and texture samples. Products noted are preformance and basis of design.
68		Electric: Is 3/0 CU ground necessary for the feeds from MDP to HW, and HW to HS or can those be dropped to #6 CU and #8 CU per code?	3/0 is sized per NEC 250.32 and 250.64-(D)
69		Electric: Is the 4" PVC a requirement for the MDP to HW and HW to HS feeds?	Yes-sized at 4" to provide spare capacity for any future electrical needs.
70		Electric: Fiberberglass Panels, do you happen to have a specification for those? The one listed under 08 shows as FRP doors. I want to make sure these are in our scope of work.	Unsure of question in regardes to electrical. What section is Fiberglass Panels listed under? There are exterior insulated FRP Doors in the scope.
71		Canopy: A few questions for this project regarding the canopy: a) per spec only (Mapes)? b) specs call for cantilever, drawings show hanger rod suppports? c) specs call for 12" flat fascia, drawings appear to show a trim/extension along the top? d) renderings show a red canopy and white panels, is this correct or one solid color? Is there a spec reference color for the red?	a. Mapes is Basis of Design b. Cantilevered preferred but hanger rods may be needed pending PEMB design by GC. C. Facsica Profile by canopy manufacture. Typically a continouse extrusion around the permieter. Each manufacture has different depths and profiles. 12" by Mapes is the basis of design. d. for pricing assume a custom red color. to match RGB of owner standards
72	A4.01	Exterior Framing: There are some discrepancies in the drawings for the exterior framing. It looks like the design team has some coordination to finalize. I am going to work off some assumptions, but can you clarify the following: The arch. floor plan calls out EW-02 as the wall type for the south wall between column line 14 & 8. Wall type EW-02 is not clearly defined in the partitions schedule, but it appears to be referencing the PEMB wall structure/Girts. Typical parts section 4/A4.01 shows similar. This appears to be a mistake. In reviewing the structural documents, the PEMB structure stops at the CMU wall along column line 14, and the structural sections through the "office" walls (west of 14) all show the heavy gauge 6" studs. Additionally, the arch. floorplans do not call out the west and south exterior wall type, but we can assume those are also all 6" CFS studs (600S162-54) based on the sections and elevations. Can you please verify.	Wall Type Ew-02 to apply only to PEMB structural backup. This includes the washbay and Between Column 14 and 18. South Wall between 7 and 14 to be revised to match wall type EW-06 including the 6" cold form framing.
73		Landscaping: Needs irrigation? If so will it require boring?	Yes, delegated design by GC. (Backflow per Plumbing Drawings)
74		Landscaping: Will onsite soils be used?	That is the current intent
75		Landscaping: Will lawn soil be respread by other?	Grading and Landscaping by GC. Existing Top soil stored and reused.
76		Landscaping: Should we provide a price for the gravel lot?	G.C. to determine
77		Landscaping: Will we need to seed the detention ponds or will that be done by site contractor?	G.C. to determine
78		Landscaping: If we seed the detention ponds is there is a specified mixture to be used? Should this be a seed and straw or a blanket straw price?	Specific mixture to be provided in subsequent submittal.
79		Landscaping: Will there be post substantial completion maintenance needed? If so for how long?	Yes, 1 Year
80		Landscaping: Is there an anticipated start date for landscaping?	No based on proposed GC construction Schedule.

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81	C201, C202	Easement/Landbridge Crossing: Sheets C201 and C202 include 9 of the 10 easement detail drawings, but Detail 10, which contains the reinforced concrete shield details, is missing. Could you please provide that sheet?	Sheet 10 will be provided
82		Are there soil borings available for the site?	See attached Geotech Report.
83	C200	Retaining Wall Detail: Sheet C200 references a decorative rock wall. Please provide details of materials and heights.	Not a retaining wall, just decorative rocks(boulders) around display.
84		Monument Sign: Please provide details.	G.C. to Provide an allowance for the following: (2) OhioCAT Compact signs on a masonry base. (1) Directional Sign
85		Monument Sign: What is the construction type and materials?	Monument signs to have masonry stone base to match cultured stone, approx. 20" high with a stone cap. Aluminum Extruded Sign for CAT Compact on top. Direction sign to have two painted steel posts with metal sign with desired information adhered to surface. Examples only to the right. Final these may not reflect final logos and wording.
86	C003	Concrete Curbs: Sheet C003 indicates both Type 2 and Type 3 curb to be used. Please clarify where these curbs are to be used.	Type 3 curbs will be provided at all edges of pavement on the west side of the gas easement. Type 6 curbs will be provided along the stone yard to the east of the gas easement.
87		Polished and Burnished Concrete Finishes: CF-1 and CF-2 are identified as polished and burnished concrete finishes, but no additional specifications were found. Polished - Aggregate Exposure: Cream, Salt and Pepper, or Nickel and Dime? (Salt and Pepper typical)	Polished Floors to specifiy the following: 1. "Cream Polished" Floors to be considerd a "Burnished Finish with: E-Cure Water Based Curing Compound and Prosoco Consolideck BD1. Floor to have "Light Grind" the goal is NOT to expose the aggregate.
88		Polished and Burnished Concrete Finishes: Sheen - Matte, Satin, Gloss, or High Gloss? (400 Grit Satin/Gloss is typical)	Polished Floors to specifiy the following: 1. "Cream Polished" Floors to be considerd a "Burnished Finish with: E-Cure Water Based Curing Compound and Prosoco Consolideck BD1. Floor to have "Light Grind" the goal is NOT to expose the aggregate.
89		Polished and Burnished Concrete Finishes: Burnished - Are you looking for a densify, guard and burnish AFTER the finisher provides a slick trowel finish?	Polished Floors to specifiy the following: 1. "Cream Polished" Floors to be considerd a "Burnished Finish with: E-Cure Water Based Curing Compound and Prosoco Consolideck BD1. Floor to have "Light Grind" the goal is NOT to expose the aggregate.
90		Masonry: What color selection of ground block and mortar should be used for pricing?	LDA basis of Design: Oberfields, Split Face texture, Aspen White #4303 with SM100 Grey Mortar. Please note color is subject to change.
91		Masonry: What type of Arriscraft stone is to be used?	Basis of Design to be revised. Stone to be: Cultured Stone Pro Fit Ledgestone - Color Platinum. Provide pre shapped corner returns.
92		Sliding Window: Are there specifications available for horizontal sliding windows?	Basis of design: Kawneer Trifab 450 Prehinished Aluminum
93		Door Hardware: Will a hardware schedule be released?	Included as an attachment to this response.
94		Room Finishes: There are some material differences between the Room Finish Schedule and the Enlarged Floor Plans, specifically Rooms 116 & 117. Which should we follow?	Refer to Floor Plans, Location Coloumn in finish schedule to be revised accordingly. Please note room 116 and 117 are to be rervised to welded Sheet vinyl flooring.
95		PEMB: Assume to be provided by GC.	PEMB is to be provided by the GC.
96		Cranes: Please clarify the note "by others" for the two (2) cranes. Are the cranes provided by GC?	Cranes are to be provided by the GC.
97		Flagpoles: Are specifications available for the flagpole?	Flag Poles to be added to the specification manual. Basis of Design: Concord American Flag Pole: Estate Series - ESS. 30'-0" Cone/Tapered.
98		Racks: Racks are shown on the floor plans. Will these be provided by the Owner?	Racks Furished by Owner, Installed by Contractor.
99	A2.01, A801	Signage: Sheets A2.01 and A801 state by Toledo Sign Company. Will they be providing directly to the Owner or the General Contractor?	G.C. May select their own Signage Vender. References to Toledo Sign shall be removed from the drawings.
100		Oil Storage Tanks: Is the oil vendor providing a proposal directly to the Owner, or is the GC to include the oil storage tanks in pricing?	Oil Vender to provide Tanks (GC to coordiante) Piping by GC per Plumbing Plans, break out as separate price.
101		Fire Suppression: Does the outside canopy on Building 1 need fire protection?	Yes the canopy over the main entrance will require fire supression system.
102	C200	Fence: There are three gates indicated on the plans; however, the drawings do not provide specific dimensions or specifications for these gates. Could you please clarify the required gate dimensions and opening widths, as well as identify which type of gate is intended for each location?	Gate width and type will be clarified on the drawings. 40 Foot openings to have a sliding gate on each side (20'-0" each). Clear Opening of 30'-0"
103	C200	Fence: Sheet C200 shows two drive slide gates with what appear to be 40-foot openings. Would these gates be intended to be swing gates instead? Cantilever gates would not be feasible in these locations due to insufficient clearance for the gates to open fully. Please confirm whether slide gates are still required for these two locations or if an alternative gate style should be considered for pricing.	Power to both sides, Electrical Drawings to ensure. 40 Foot openings to have a sliding gate on each side (20'-0" each). Clear Opening of 30'-0"
104	C005	Asphalt: Please provide section detail for heavy duty asphalt pavement section – missing from Sheet C005.	The heavy duty concrete detail is located on sheet C002. No Heavy Duty Asphalt in scope. (Drive in front is passenger cars only).
SUBSTITUTION REQUEST			
		Garage Doors	Price Specification, provide alternate price for subsitutions. Selected GC can further submit substitions requests. Once selected Substitutions shall be handled as RFIs per specification manual.
		Lockers	Price Specification, provide alternate price for subsitutions. Selected GC can further submit substitions requests. Once selected Substitutions shall be handled as RFIs per specification manual.

Examples ONLY







PROJECT MANUAL

10.26.2026 Bulletin #1

LDA Project No. 2026.11

OhioCAT Compact Rental Store

490 Byers Road
Miamisburg, Ohio 45342

Ohio CAT

Ohio Machine Company

3993 E. Royalton Road
Broadview Height, Ohio 44147

LDA ARCHITECTS

The Offices at the Agora, 5000 Euclid Avenue, Suite 104
Cleveland, Ohio 44103

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REFER TO DRAWINGS FOR CIVIL SPECIFICATIONS

APPENDIX A THESE ITEMS ARE COMPONENTS OF THE CONTRACT DOCUMENTS
01 OHIO MACHINE COMPANY STANDARD INTERIOR FINISHES LIST
02 KEYED NOTES FOUND IN CONSTRUCTION DRAWINGS. ALL ITEMS LISTED IN DRAWINGS AND IN LIST ARE BASIS OF DESIGN FOR PERFORMANCE AND AESTHETICS.

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SECTION 07410

PREFORMED METAL STANDING SEAM ROOFING

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. This section covers the pre-finished, pre-fabricated Architectural standing seam roof system. All metal trim, accessories, fasteners, insulation and sealants indicated on the drawings as part of this section.

B. Drawings and general provisions of the Contract, including general and Supplementary Conditions and Division 01 Specifications, apply to this section.

C. Related Work Specified Elsewhere

1. Roof Deck structural steel, flat roof systems, perimeter edge systems. Roof hatches, firestopping not included in this section.

1.2 SUMMARY

A. Section Includes

1. Factory formed Standing Seam metal roof panels

B. Related work specified elsewhere. (Note: select from the below or add appropriate sections)

1. Section 05100 - Structural Steel
2. Section 05200 or 05400 - Steel Joists
3. Section 07600 - Flashing and Sheet Metal

1.3 DEFINITIONS

A. Metal Roof Panel Assembly: Metal roof panels, attachment system components, miscellaneous metal framing, thermal, and accessories necessary for a complete weathertight roofing system.

B. References:

1. American Society for Testing Materials (ASTM)
   - **a.** ASTM B209 Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate
2. American Society for Testing and Materials (ASTM)
   - **a.** ASTM A 792: Steel Sheet, Aluminum-Zinc Alloy Coated by the Hot Dip Process
3. Sheet Metal and Air Conditioning Contractors National Association
   - **a.** SMACNA Architectural Sheet Metal Manual, 1993 edition
4. American Iron and Steel Institute (AISI)
   - **a.** AISI Cold Formed Steel Design Manual
5. Aluminum Association
   - **a.** Aluminum Design Manual
6. Metal Construction Association
   - **a.** Preformed metal Wall Guidelines
7. Code References
   - **a.** ASCE, Minimum Loads for Buildings and Other Structures
   - **b.** BOCA National Building Codes

c. UBC Uniform Building Code
d. SBC Standard Building Code

1.4 QUALITY ASSURANCE

A. Petersen Aluminum Corporation products establish a minimum of quality required.
a. Petersen Aluminum Corp, Elk Grove Village, IL, 800-323-1960
b. Petersen Aluminum Corp, Annapolis Junction, MD, 800-344-1400

B. Manufacturer and erector shall demonstrate experience of a minimum of five (5) years in this type of project.
C. Panels shall be factory or field produced by manufacturer owned roll-forming equipment.

1.5 SUBSTITUTIONS

A. The material, products and equipment specified in this section establish a standard for required function, dimension, appearance and quality to be met by any proposed substitution.

1.6 SYSTEM DESCRIPTION

- Material to comply with: ASTM A792/A792M Standard Specification for Sheet Steel, 55% Aluminum-Zinc Alloy Coated by the Hot-Dip process - 22 GA
- Material to comply with ASTM B209 Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate - .032 or .040

1.7 ROOF SYSTEM PERFORMANCE TESTING

A. General Performance: Metal roof panels shall comply with performance requirements without failure due to defective manufacture, fabrication, installation or other defects in construction.
B. Roof System shall be designed to meet Standard Building Code Wind Load requirements.
C. Panels to meet:
1. Water Penetration: When tested per ASTM E-283/1680 and ASTM E-331/1646 there shall be no uncontrolled water penetration or air infiltration through the panel joints.
2. Roof System shall be designed to meet a UL Class 90 wind uplift in accordance with UL standard 580 and panel system shall be ASTM 1592 Tested and approved
3. UL 2218 - Impact Resistance rated.
4. ASTM E 2140 - Standard Test Method for Water Penetration

1.8 WARRANTIES

A. Weathertight warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace standing seam metal roof panel

assemblies that fail to remain weathertight, including leaks, within specified warranty period.

1. Warranty Period: 20 Years from date of Substantial Completion

B. Finish warranty: Manufacturer's standard form in which manufacturer agrees to repair finish or replace standing seam metal roof panels that show evidence of deterioration of factory-applied finish within specified warranty period.

1. Exposed Panels Finish - deterioration includes the following:
   - **a.** Color fading more than 5 hunter units when tested according to ASTM D **2244**
   - **b.** Chalking in excess of a No. 8 rating when tested according to ASTM D 4214
   - **c.** Cracking, checking, peeling or failure of a paint to adhere to a bare metal.
2. Warranty Period: 30 Years from the date of substantial completion

C. Applicator shall furnish written warranty for a two (2) year period from date of substantial completion of building covering repairs required to maintain roof and flashings in watertight condition

1.9 SUBMITTALS

A. Furnish detailed drawings showing profile and gauge of exterior sheets, location and type of fasteners, location, gauges, shape and method of attachment of all trim locations and types of sealants, and any other details as may be required for a weather-tight installation.

B. Provide finish samples of all colors specified.

C. Shop drawings: Show fabrication and installation layouts of metal roof panels, metal wall panels or metal soffit panels, details of edge conditions, side-seam joints, panel profiles, corners, anchorages, trim, flashings, closures and accessories, and special details. Distinguish between factory and field-assembled work

D. Coordination Drawings: Roof plans, drawn to scale, on which the following are shown and coordinated with each other, based on input from installer of the items involved:

1. Roof panels and attachments
2. Metal trusses, bracings and supports
3. Roof-mounted items including snow guards and items mounted on roof curbs.

E. LEED Submittals

1. Product Test reports for Credit SS 7.2. For roof panels, indicating that the panels comply with Solar Reflective Index requirement
2. Product data for Credit MR 4.1 and credit MR 4.2: Indicating the percentages by weight of postconsumer and preconsumer recycled content for products having recycled content.

1.10 DELIVERY, STORAGE AND HANDLING

A. Ordering: Comply with manufacturer's ordering instruction and lead time requirements to avoid construction delays.

B. Deliver components, sheets, metal roof panels and other manufactured

items so as not to be damaged or deformed. Package metal roof panels for protection during transportation and handling.

C. Unload, store and erect metal roof panels in a manner to prevent bending, warping, twisting and surface damage.

D. Stack metal roof panels on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal roof panels to ensure dryness. Do not store metal roof panels in contact with other materials that might cause staining, denting or other surface damage.

E. Protect strippable protective coating on any metal coated product from exposure to sunlight and high humidity, except to the extent necessary for material installation.

1.11 PROJECT CONDITIONS

A. Weather Limitations: proceed with installation only when existing and forecasted weather conditions permit metal roof panel work to be performed.

B. Field Measurements: Verify actual dimensions of construction contiguous with metal roof panels by field measurements before fabrication.

1.12 COORDINATION

A. Coordinate sizes and locations of roof curbs, equipment supports and roof penetrations with actual equipment provided.

B. Coordinate metal roof panels with rain drainage work, flashing, trim and construction of decks, parapet walls and other adjoining work to provide a leakproof, secure and noncorrosive installation.

PART 2 - PRODUCTS

2.1 PANEL DESIGN

A. General: Provide factory-formed metal roof panels designed to be installed by lapping and interconnecting raised side edges of adjacent panels with joint type indicated and mechanically attaching panels to supports using concealed clips inside laps. Include clips, cleats, pressure plates and accessories required for a weathertight installation.

B. Roof panels shall be standing seam T-250, in {Specifier choose from) 18" or 16" width with 2 5/8" nominal seam height from the substrate. The seam cap is to be mechanically seamed in the field.

C. Seam Covers to be Factory produced with 2 beads of sealant

D. Panels to be produced:

- With Striations - Note this is factory standard if other not indicated

E. Panels to be designed for attachment with concealed fastener clips, spaced as required by the manufacturer to provide for both positive and negative design loads, while allowing for the expansion and contraction of the entire roof system resulting from variations in temperature.
F. Forming: Use continuous end rolling method. No end laps on panels.

2.2 ACCEPTABLE MANUFACTURERS

A. This project is detailed around the T-250 Panel of Petersen Aluminum Corporation.

2.3 MATERIALS AND FINISHES

A. Preformed roofing panels shall be fabricated o\ 22 GA Galvalume Steel
B. Color shall be PAC-CLAD Refer to drawings
C. Finish shall be Kynar 500 or Hylar 5000 Fluorocarbon coating with a top side film thickness of 0.70 to 0.90 mil over a 0.25 to 0.3 mil prime coat to provide a total dry film thickness of 0.95 to 1.25 mil, to meet AAMA 621. Bottom side shall be coated with a primer with a dry film thickness of 0.25 mil. Finish shall conform to all tests for adhesions, flexibility and longevity as specified by Kynar 500 or Hylar 5000 finish supplier.
D. Trim: Trim shall be fabricated of the same material and finish to match the profile, and will be press broken in lengths of 10 to 12 feet. Trim shall be formed only by the manufacturer or their approved dealer. Trim to be erected in overlapped condition. Use lap strips only as indicated on drawings.
E. Closures: use composition or metal profiled closures at the top of each elevation to close ends of the panels. Metal closures to be made in the same material and finish as face sheet.
F. Accessories/Fasteners: Fasteners shall be of type, material, size, corrosion resistance, holding power and other properties required to fasten miscellaneous framing members to substrates. Accessories and their fasteners shall be capable of resisting the specified design wind uplift forces and shall allow for thermal movement of the roof panel system. Exposed fasteners shall not restrict free movement of the roof panel system resulting from thermal forces, except at designed points of roof panel fixity
G. Substrate shall be:
    - ISO
H. Roofing Underlayment
    1. On all surfaces to be covered with roofing material, furnish and install a 40 mil "Peel & Stick membrane", required as outlined by metal panel manufacturer. Membrane to be a minimum of 40 mil thickness, smooth, non-granular, high temperature. **Basis of design:** Carlisle WIP 300 HT High Temperature Protection Self Adhering Roofing

Underlayment.

Underlayment shall be laid in horizontal layers with joints lapped toward the eaves a minimum of 6", and well secured along laps and at ends as necessary to properly hold the felt in place. All underlayment shall be preserved unbroken and whole.

2. Peel and Stick Underlayment shall lap all hips and ridges at least 12" to form double thickness and shall be lapped 6" over the metal of any valley or built-in gutters and shall be installed as required by the Standing Seam Panel Manufacturer to attain the desired 20 Year Weathertightness Warranty.

J. Sealants
1. Provide two-part polysulfide class B non-sag type for vertical and horizontal joints or
2. One part polysulfide not containing pitch or phenolic extenders or
3. Exterior grade silicone sealant recommended by roofing manufacturer or
4. One part non-sag, gun grade exterior type polyurethane recommended by the roofing manufacturer.

2.4 FABRICATION

A. Comply with dimensions, profile limitations, gauges and fabrication details shown and if not shown, provide manufacturer's standard product fabrication.
B. Fabricate components of the system in factory, ready for field assembly.
C. Fabricate components and assemble units to comply with fire performance requirements specified.
D. Apply specified finishes in conformance with manufacturer's standard, and according to manufacturer's instructions.

PART 3 - EXECUTION

3.1 INSPECTION

A. Examine alignment of structural steel and related supports, primary and secondary roof framing, solid roof sheathing, prior to installation.
8. For the record, prepare written report, endorsed by installer, listing conditions detrimental to performance of the Work.
C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 FASTENERS

A. Secure units to supports
8. Place fasteners as indicated in manufacturer's standards.

3.3 INSTALLATION

A. Panels shall be installed plumb and true in a proper alignment and in relation to the structural framing. The erector must have at least five years successful experience with similar applications.
B. Install metal panels, fasteners, trim and related sealants in accordance with approved shop drawings and as may be required for a weather-tight installation.
C. Remove all strippable coating and provide a dry-wipe down cleaning of the panels as they are erected.

3.4 DAMAGED MATERIAL

A. Upon determination of responsibility, repair or replace damaged metal panels and trim to the satisfaction of the Architect and Owner.

END OF SECTION

SECTION 087100 - DOOR HARDWARE

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:

1. Mechanical and electrified door hardware
2. Electronic access control system components

B. Section excludes:

1. Windows
2. Cabinets (casework), including locks in cabinets
3. Signage
4. Toilet accessories
5. Overhead doors

C. Related Sections:

1. Division 01 "General Requirements" sections for Allowances, Alternates, Owner Furnished Contractor Installed, Project Management and Coordination.
2. Division 06 Section "Rough Carpentry"
3. Division 06 Section "Finish Carpentry"
4. Division 07 Section "Joint Sealants" for sealant requirements applicable to threshold installation specified in this section.
5. Division 08 Sections:
   a. "Metal Doors and Frames"
   b. "Flush Wood Doors"
   c. "Stile and Rail Wood Doors"
   d. "Interior Aluminum Doors and Frames"
   e. "Aluminum-Framed Entrances and Storefronts"
   f. "Stainless Steel Doors and Frames"
   g. "Special Function Doors"
   h. "Entrances"
6. Division 26 "Electrical" sections for connections to electrical power system and for low-voltage wiring.
7. Division 28 "Electronic Safety and Security" sections for coordination with other components of electronic access control system and fire alarm system.

1.02 REFERENCES

A. UL LLC

1. UL 10B - Fire Test of Door Assemblies
2. UL 10C - Positive Pressure Test of Fire Door Assemblies
3. UL 1784 - Air Leakage Tests of Door Assemblies
4. UL 305 - Panic Hardware

B. DHI - Door and Hardware Institute

1. Sequence and Format for the Hardware Schedule
2. Recommended Locations for Builders Hardware
3. Keying Systems and Nomenclature
4. Installation Guide for Doors and Hardware

C. NFPA – National Fire Protection Association

1. NFPA 70 – National Electric Code
2. NFPA 80 – Standard for Fire Doors and Other Opening Protectives
3. NFPA 101 – Life Safety Code
4. NFPA 105 – Smoke and Draft Control Door Assemblies
5. NFPA 252 – Fire Tests of Door Assemblies

D. ANSI - American National Standards Institute

1. ANSI A117.1 – 2017 Edition – Accessible and Usable Buildings and Facilities
2. ANSI/BHMA A156.1 - A156.29, and ANSI/BHMA A156.31 - Standards for Hardware and Specialties
3. ANSI/BHMA A156.28 - Recommended Practices for Keying Systems
4. ANSI/WDMA I.S. 1A - Interior Architectural Wood Flush Doors
5. ANSI/SDI A250.8 - Standard Steel Doors and Frames

1.03 SUBMITTALS

A. General:

1. Submit in accordance with Conditions of Contract and Division 01 Submittal Procedures.
2. Prior to forwarding submittal:
   a. Review drawings and Sections from related trades to verify compatibility with specified hardware.
   b. Highlight, encircle, or otherwise specifically identify on submittals: deviations from Contract Documents, issues of incompatibility or other issues which may detrimentally affect the Work.

B. Action Submittals:

1. Product Data: Submit technical product data for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.
2. Riser and Wiring Diagrams: After final approval of hardware schedule, submit details of electrified door hardware, indicating:
   a. Wiring Diagrams: For power, signal, and control wiring and including:
      1) Details of interface of electrified door hardware and building safety and security systems.
      2) Schematic diagram of systems that interface with electrified door hardware.
      3) Point-to-point wiring.
      4) Risers.

3. Samples for Verification: If requested by Architect, submit production sample of requested door hardware unit in finish indicated and tagged with full description for coordination with schedule.
   a. Samples will be returned to supplier. Units that are acceptable to Architect may, after final check of operations, be incorporated into Work, within limitations of key coordination requirements.

4. Door Hardware Schedule:
   a. Submit concurrent with submissions of Product Data, Samples, and Shop Drawings. Coordinate submission of door hardware schedule with scheduling requirements of other work to facilitate fabrication of other work critical in Project construction schedule.
   b. Submit under direct supervision of a Door Hardware Institute (DHI) certified Architectural Hardware Consultant (AHC) or Door Hardware Consultant (DHC) with hardware sets in vertical format as illustrated by Sequence of Format for the Hardware Schedule published by DHI.
   c. Indicate complete designations of each item required for each opening, include:
      1) Door Index: door number, heading number, and Architect's hardware set number.
      2) Quantity, type, style, function, size, and finish of each hardware item.
      3) Name and manufacturer of each item.
      4) Fastenings and other pertinent information.
      5) Location of each hardware set cross-referenced to indications on Drawings.
      6) Explanation of all abbreviations, symbols, and codes contained in schedule.
      7) Mounting locations for hardware.
      8) Door and frame sizes and materials.
      9) Degree of door swing and handing.
      10) Operational Description of openings with electrified hardware covering egress, ingress (access), and fire/smoke alarm connections.

5. Key Schedule:
   a. After Keying Conference, provide keying schedule that includes levels of keying, explanations of key system's function, key symbols used, and door numbers controlled.
   b. Use ANSI/BHMA A156.28 "Recommended Practices for Keying Systems" as guideline for nomenclature, definitions, and approach for selecting optimal keying system.
   c. Provide 3 copies of keying schedule for review prepared and detailed in accordance with referenced DHI publication. Include schematic keying diagram and index each key to unique door designations.
   d. Index keying schedule by door number, keyset, hardware heading number, cross keying instructions, and special key stamping instructions.
   e. Provide one complete bitting list of key cuts and one key system schematic illustrating system usage and expansion. Forward bitting list, key cuts and key system schematic directly to Owner, by means as directed by Owner.
   f. Prepare key schedule by or under supervision of supplier, detailing Owner's final keying instructions for locks.

C. Informational Submittals:

1. Provide Qualification Data for Supplier, Installer and Architectural Hardware Consultant.
2. Provide Product Data:
   a. Certify that door hardware approved for use on types and sizes of labeled fire-rated doors complies with listed fire-rated door assemblies.
   b. Include warranties for specified door hardware.

D. Closeout Submittals:

1. Operations and Maintenance Data: Provide in accordance with Division 01 and include:
   a. Complete information on care, maintenance, and adjustment; data on repair and replacement parts, and information on preservation of finishes.
   b. Catalog pages for each product.
   c. Final approved hardware schedule edited to reflect conditions as installed.
   d. Final keying schedule

e. Copy of warranties including appropriate reference numbers for manufacturers to identify project.
f. As-installed wiring diagrams for each opening connected to power, both low voltage and 110 volts.

E. Inspection and Testing:

1. Submit written reports to the Owner and Authority Having Jurisdiction (AHJ) of the results of functional testing and inspection for:
   a. Fire door assemblies, in compliance with NFPA 80.
   b. Required egress door assemblies, in compliance with NFPA 101.

1.04 QUALITY ASSURANCE

A. Qualifications and Responsibilities:

1. Supplier: Recognized architectural hardware supplier with a minimum of 5 years documented experience supplying both mechanical and electromechanical door hardware similar in quantity, type, and quality to that indicated for this Project. Supplier to be recognized as a factory direct distributor by the manufacturer of the primary materials with a warehousing facility in the Project's vicinity. Supplier to have on staff, a certified Architectural Hardware Consultant (AHC) or Door Hardware Consultant (DHC) available to Owner, Architect, and Contractor, at reasonable times during the Work for consultation.
2. Installer: Qualified tradesperson skilled in the application of commercial grade hardware with experience installing door hardware similar in quantity, type, and quality as indicated for this Project.
3. Architectural Hardware Consultant: Person who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project and meets these requirements:
   a. For door hardware: DHI certified AHC or DHC.
   b. Can provide installation and technical data to Architect and other related subcontractors.
   c. Can inspect and verify components are in working order upon completion of installation.
   d. Capable of producing wiring diagram and coordinating installation of electrified hardware with Architect and electrical engineers.

4. Single Source Responsibility: Obtain each type of door hardware from single manufacturer.

B. Certifications:

1. Fire-Rated Door Openings:
   a. Provide door hardware for fire-rated openings that complies with NFPA 80 and requirements of authorities having jurisdiction.
   b. Provide only items of door hardware that are listed products tested by UL LLC, Intertek Testing Services, or other testing and inspecting organizations acceptable to authorities having jurisdiction for use on types and sizes of doors indicated, based on testing at positive pressure and according to NFPA 252 or UL 10C and in compliance with requirements of fire-rated door and door frame labels.

2. Smoke and Draft Control Door Assemblies:
   a. Provide door hardware that meets requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105

b. Comply with the maximum air leakage of 0.3 cfm/sq. ft. (3 cu. m per minute/sq. m) at tested pressure differential of 0.3-inch wg (75 Pa) of water.

3. Electrified Door Hardware
   a. Listed and labeled as defined in NFPA 70, Article 100, by testing agency acceptable to authorities having jurisdiction.

4. Accessibility Requirements:
   a. Comply with governing accessibility regulations cited in "REFERENCES" article 087100, 1.02.D3 herein for door hardware on doors in an accessible route. This project must comply with all Federal Americans with Disability Act regulations and all Local Accessibility Regulations.

C. Pre-Installation Meetings

1. Keying Conference
   a. Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system including:
      1) Function of building, flow of traffic, purpose of each area, degree of security required, and plans for future expansion.
      2) Preliminary key system schematic diagram.
      3) Requirements for key control system.
      4) Requirements for access control.
      5) Address for delivery of keys.

2. Pre-installation Conference
   a. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
   b. Inspect and discuss preparatory work performed by other trades.
   c. Inspect and discuss electrical roughing-in for electrified door hardware.
   d. Review sequence of operation for each type of electrified door hardware.
   e. Review required testing, inspecting, and certifying procedures.
   f. Review questions or concerns related to proper installation and adjustment of door hardware.

3. Electrified Hardware Coordination Conference:
   a. Prior to ordering electrified hardware, schedule and hold meeting to coordinate door hardware with security, electrical, doors and frames, and other related suppliers.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up for hardware delivered to Project site. Promptly replace products damaged during shipping

B. Tag each item or package separately with identification coordinated with final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package. Deliver each article of hardware in manufacturer's original packaging.

C. Maintain manufacturer-recommended environmental conditions throughout storage and installation periods.

D. Provide secure lock-up for door hardware delivered to Project. Control handling and installation of hardware items so that completion of Work will not be delayed by hardware losses both before and after installation.

E. Handle hardware in manner to avoid damage, marring, or scratching. Correct, replace or repair products damaged during Work. Protect products against malfunction due to paint, solvent, cleanser, or any chemical agent.

F. Deliver keys to manufacturer of key control system for subsequent delivery to Owner.

1.06 COORDINATION

A. Coordinate layout and installation of floor-recessed door hardware with floor construction. Cast anchoring inserts into concrete.

B. Installation Templates: Distribute for doors, frames, and other work specified to be factory or shop prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

C. Security: Coordinate installation of door hardware, keying, and access control with Owner's security consultant.

D. Electrical System Roughing-In: Coordinate layout and installation of electrified door hardware with connections to power supplies and building safety and security systems.

1.07 WARRANTY

A. Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within published warranty period.

1. Warranty does not cover damage or faulty operation due to improper installation, improper use or abuse.
2. Warranty Period: Beginning from date of Substantial Completion, for durations indicated in manufacturer's published listings.
    a. Mechanical Warranty
        1) Locks
            a) Schlage L Series: 10 years
            b) Schlage ND Series: 10 years
        2) Exit Devices
            a) Falcon: 10 years
        3) Closers
            a) LCN 4050 Series: 25 years
    b. Electrical Warranty
        1) Locks
            a) Schlage: 3 years
        2) Exit Devices
            a) Falcon: 1 Year
        3) Closers
            a) LCN: 2 years

1.08 MAINTENANCE

A. Furnish complete set of special tools required for maintenance and adjustment of hardware, including changing of cylinders.

B. Turn over unused materials to Owner for maintenance purposes.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. The Owner requires use of certain products for their unique characteristics and project suitability to ensure continuity of existing and future performance and maintenance standards. After investigating available product offerings, the Awarding Authority has elected to prepare proprietary specifications. These products are specified with the notation: "Owner's Standard."

1. Where "Owner's Standard" is noted, submittals and substitution requests for other products will not be considered.

B. Approval of alternate manufacturers and/or products other than those listed as "Scheduled Manufacturer" or "Acceptable Manufacturers" in the individual article for the product category are only to be considered by official substitution request in accordance with section 01 25 00.

C. Approval of products from manufacturers indicated in "Acceptable Manufacturers" is contingent upon those products providing all functions and features and meeting all requirements of scheduled manufacturer's product.

D. Where specified hardware is not adaptable to finished shape or size of members requiring hardware, furnish suitable types having same operation and quality as type specified, subject to Architect's approval.

2.02 MATERIALS

A. Fabrication

1. Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. provide screws according to manufacturer’s recognized installation standards for application intended.
2. Finish exposed screws to match hardware finish, or, if exposed in surfaces of other work, to match finish of this other work including prepared for paint surfaces to receive painted finish.
3. Provide concealed fasteners wherever possible for hardware units exposed when door is closed. Coordinate with “Metal Doors and Frames”, “Flush Wood Doors”, “Stile and Rail Wood Doors” to ensure proper reinforcements. Advise the Architect where visible fasteners, such as thru bolts, are required.

B. Provide screws, bolts, expansion shields, drop plates and other devices necessary for hardware installation.

1. Where fasteners are exposed to view: Finish to match adjacent door hardware material.

2.03 HINGES

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
   a. Ives 5BB series

2. Acceptable Manufacturers and Products:
   a. Hager BB1191/1279 series
   b. Best FBB series

B. Requirements:

1. Provide hinges conforming to ANSI/BHMA A156.1.
2. Provide five knuckle, ball bearing hinges.
3. 1-3/4 inch (44 mm) thick doors, up to and including 36 inches (914 mm) wide:
   a. Interior: Standard weight, steel, 4-1/2 inches (114 mm) high
   b. Interior: Heavy weight, steel, 4-1/2 inches (127 mm) high
4. 1-3/4 inch (44 mm) thick doors over 36 inches (914 mm) wide:
   a. Interior: Heavy weight, steel, 5 inches (127 mm) high
5. Adjust hinge width for door, frame, and wall conditions to allow proper degree of opening.
6. Provide three hinges per door leaf for doors 90 inches (2286 mm) or less in height, and one additional hinge for each 30 inches (762 mm) of additional door height.
7. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:
   a. Steel Hinges: Steel pins
   b. Non-Ferrous Hinges: Stainless steel pins
   c. Out-Swinging Interior Lockable Doors: Non-removable pins
   d. Interior Non-lockable Doors: Non-rising pins
8. Provide hinges with electrified options as scheduled in the hardware sets. Provide with number and gage of wires enough to accommodate electric function of specified hardware. Locate electric hinge at second hinge from bottom or nearest to electrified locking component. Provide mortar guard for each electrified hinge specified.

2.04 CONTINUOUS HINGES

A. Manufacturers:

1. Scheduled Manufacturer:
   a. Ives
2. Acceptable Manufacturers:
   a. Select

B. Requirements:

1. Provide aluminum geared continuous hinges conforming to ANSI/BHMA A156.26, Grade 1.
2. Provide aluminum geared continuous hinges, where specified in the hardware sets, fabricated from 6063-T6 aluminum.
3. Provide split nylon bearings at each hinge knuckle for quiet, smooth, self-lubricating operation.
4. Provide hinges capable of supporting door weights up to 450 pounds, and successfully tested for 1,500,000 cycles.
5. On fire-rated doors, provide aluminum geared continuous hinges classified for use on rated doors by testing agency acceptable to authority having jurisdiction.
6. Provide aluminum geared continuous hinges with electrified option scheduled in the hardware sets. Provide with number and gage of wires enough to accommodate electric function of specified hardware.

7. Provide hinges 1 inch (25 mm) shorter in length than nominal height of door, unless otherwise noted or door details require shorter length and with symmetrical hole pattern.

2.05 FLUSH BOLTS

A. Manufacturers:

1. Scheduled Manufacturer:
   a. Ives

2. Acceptable Manufacturers:
   a. Burns
   b. Trimco

B. Requirements:

1. Provide automatic, constant latching, and manual flush bolts with forged bronze or stainless-steel face plates, extruded brass levers, and with wrought brass guides and strikes. Provide 12 inch (305 mm) steel or brass rods at doors up to 90 inches (2286 mm) in height. For doors over 90 inches (2286 mm) in height increase top rods by 6 inches (152 mm) for each additional 6 inches (152 mm) of door height. Provide dust-proof strikes at each bottom flush bolt.

2.06 SURFACE BOLTS

A. Manufacturers:

1. Scheduled Manufacturer:
   a. Ives

2. Acceptable Manufacturers:
   a. Burns
   b. Trimco

B. Requirements:

1. Surface bolt s to have 1" throw for maximum security with concealed mounting that prevents vandalism. Units to be constructed of heavy-duty steel and UL listed up to three (3) hours when used on the inactive door of a pair up to 8' in height.

2.07 COORDINATORS

A. Manufacturers:

1. Scheduled Manufacturer:
   a. Ives

2. Acceptable Manufacturers:
   a. Burns
   b. Trimco

B. Requirements:

1. Where pairs of doors are equipped with automatic flush bolts, an astragal, or other hardware that requires synchronized closing of the doors, provide bar-type coordinating device, surface applied to underside of stop at frame head.
2. Provide filler bar of correct length for unit to span entire width of opening, and appropriate brackets for parallel arm door closers, surface vertical rod exit device strikes, or other stop mounted hardware. Factory-prepared coordinators for vertical rod devices as specified.

2.08 MORTISE LOCKS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
   a. Schlage L9000 series

2. Acceptable Manufacturers and Products:
   a. Owner's Standard

B. Requirements:

1. Provide mortise locks conforming to ANSI/BHMA A156.13 Series 1000, Grade 1, and UL Listed for 3-hour fire doors.
2. Indicators: Where specified, provide indicator window measuring a minimum 2-inch x 1/2 inch with 180-degree visibility. Provide messages color-coded with full text and/or symbols, as scheduled, for easy visibility.
3. Provide locks manufactured from heavy gauge steel, containing components of steel with a zinc dichromate plating for corrosion resistance.
4. Provide lock case that is multi-function and field reversible for handing without opening case. Cylinders: Refer to “KEYING” article, herein.
5. Provide locks with standard 2-3/4 inches (70 mm) backset with full 3/4 inch (19 mm) throw stainless steel mechanical anti-friction latchbolt. Provide deadbolt with full 1-inch (25 mm) throw, constructed of stainless steel.
6. Provide standard ASA strikes unless extended lip strikes are necessary to protect trim.
7. Provide electrified options as scheduled in the hardware sets. Where scheduled, provide switches and sensors integrated into the locks and latches. Provide motor based electrified and motor based latch retraction locksets that comply with the following requirements:
   a. Low holding current (Lever control or latch retraction) – maximum 0.01 amps to produce minimal heat, eliminate “hot levers” in electrically locked applications and motorized latch retraction applications, and to provide reliable operation in wood doors that provide minimal ventilation and air flow.
   b. Universal input voltage – single chassis accepts 12 or 24VDC to allow for changes in the field without changing lock chassis.
   c. Fail Safe/Fail Secure – changing mode between electrically locked (fail safe) and electrically unlocked (fail secure) is field selectable without opening the lock case
   d. Low maximum current draw – maximum 0.4 amps (Lever control) and maximum 2.0 amps (Latch retraction) to allow for multiple locks on a single power supply.
   e. Connections – provide quick-connect Molex system standard.

8. Lever Trim: Solid brass, bronze, or stainless steel, cast or forged in design specified, with wrought roses and external lever spring cages. Provide thru-bolted levers with 2-piece spindles.
   a. Lever Design: 06A.

2.09 CYLINDRICAL LOCKS – GRADE 1

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
   a. Schlage ND series

2. Acceptable Manufacturers and Products:
   a. Owner's Standard

B. Requirements:

1. Provide cylindrical locks conforming to ANSI/BHMA A156.2 Series 4000, Grade 1, and UL Listed for 3-hour fire doors.
2. Indicators: Where specified, provide escutcheon with lock status indicator window on top of lockset rose:
   a. Escutcheon height (including rose) 6.05 inches high by 3.68 inches wide.
   b. Indicator window measuring a minimum 3.52-inch by .60 inch with 1.92 square-inches of front facing viewing area and 180-degree visibility with a total of .236 square-inches of total viewable area.
   c. Provide snap-in serviceable window to prevent tampering. Lock must function if indicator is compromised.
   d. Provide messages color-coded with full text and symbol, as scheduled, for easy visibility.
   e. Unlocked and Unoccupied message will display on white background, and Locked and Occupied message will display on red background.
3. Cylinders: Refer to "KEYING" article, herein.
4. Provide locks with standard 2-3/4 inches (70 mm) backset, unless noted otherwise, with 1/2-inch latch throw. Provide proper latch throw for UL listing at pairs.
5. Provide locksets with separate anti-rotation thru-bolts, and no exposed screws.
6. Provide independently operating levers with two external return spring cassettes mounted under roses to prevent lever sag.
7. Provide standard ASA strikes unless extended lip strikes are necessary to protect trim.
8. Provide electrified options as scheduled in the hardware sets.
9. Lever Trim: Solid cast levers without plastic inserts and wrought roses on both sides.
   a. Lever Design: Rhodes.

2.10 DEADBOLTS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
   a. Schlage B600/B700/B800 Series

2. Acceptable Manufacturers and Products:
   a. Owner's Standard

B. Requirements:

1. Provide grade 1 deadbolt series conforming to ANSI/BHMA A156.
2. Cylinders: Refer to "KEYING" article, herein.
3. Provide deadbolts with standard 2-3/4 inches (70 mm) backset. Provide 2-3/8 inches (60 mm) where noted or if door or frame detail requires. Provide deadbolt with full 1-inch (25 mm) throw, constructed of steel alloy.

4. Provide manufacturer's standard strike.
5. Lock Status Indicator Trim: Where specified, provide escutcheon with lock status indicator widow.
   a. Escutcheon height 4.125 inches, width 2.54 inches. Projection 1.32 inches on thumbturn side and 1.28 inches on cylinder side.
   b. Unlocked and Unoccupied message will display on white background, and Locked and Occupied message will display on red background.
   c. Provide snap-in serviceable window to prevent tampering. Lock must function if indicator is compromised.
   d. Indicator window to provide 180-degree visibility.

2.11 EXIT DEVICES

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
   a. Falcon 24/25 series

2. Acceptable Manufacturers and Products:
   a. Owner's Standard

B. Requirements:

1. Provide exit devices tested to ANSI/BHMA A156.3 Grade 1 and UL listed for Panic Exit or Fire Exit Hardware.
2. Cylinders: Refer to "KEYING" article, herein.
3. Provide touchpad type exit devices, fabricated of brass, bronze, stainless steel, or aluminum, plated to standard architectural finishes to match balance of door hardware.
4. Touchpad must extend a minimum of one half of door width. No plastic inserts are allowed in touchpads.
5. Provide exit devices with deadlatching feature for security and for future addition of alarm kits and/or other electrified requirements.
6. Provide flush end caps for exit devices.
7. Provide exit devices with manufacturer's approved strikes.
8. Install exit devices at height recommended by exit device manufacturer, allowable by governing building codes, and approved by Architect.
9. Mount mechanism case flush on face of doors or provide spacers to fill gaps behind devices. Where glass trim or molding projects off face of door, provide glass bead kits.
10. Provide cylinder or hex-key dogging as specified at non fire-rated openings.
11. Removable Mullions: 2 inches (51 mm) x 3 inches (76 mm) steel tube. Where scheduled as keyed removable mullion, provide type that can be removed by use of a keyed cylinder, which is self-locking when re-installed.
12. Provide factory drilled weep holes for exit devices used in full exterior application, highly corrosive areas, and where noted in hardware sets.
13. Provide electrified options as scheduled.
14. Provide exit devices with optional trim designs to match other lever and pull designs used on the project.

2.12 ELECTRIC STRIKES

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
   a. Von Duprin 6000 Series

2. Acceptable Manufacturers and Products:
   a. Folger Adam 300 Series

B. Requirements:

1. Provide electric strikes designed for use with type of locks shown at each opening.
2. Provide electric strikes UL Listed as burglary resistant that are tested to a minimum endurance test of 1,000,000 cycles.
3. Where required, provide electric strikes UL Listed for fire doors and frames.
4. Provide transformers and rectifiers for each strike as required. Verify voltage with electrical contractor.

2.13 PASSIVE INFRARED MOTION SENSORS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
   a. Schlage SCAN II Series

2. Acceptable Manufacturers and Products:
   a. RCI 915 Series

B. Requirements:

1. Provide motion sensors as specified in hardware groups.

2.14 POWER SUPPLIES

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
   a. Schlage/Von Duprin PS900 Series

2. Acceptable Manufacturers and Products:
   a. Owner's Standard

B. Requirements:

1. Provide power supplies approved by manufacturer of supplied electrified hardware.
2. Provide appropriate quantity of power supplies necessary for proper operation of electrified locking components as recommended by manufacturer of electrified locking components with consideration for each electrified component using power supply, location of power supply, and approved wiring diagrams. Locate power supplies as directed by Architect.
3. Provide regulated and filtered 24 VDC power supply, and UL class 2 listed.
4. Provide power supplies with the following features:
   a. 12/24 VDC Output, field selectable.
   b. Class 2 Rated power limited output.
   c. Universal 120-240 VAC input.
   d. Low voltage DC, regulated and filtered.
   e. Polarized connector for distribution boards.
   f. Fused primary input.
   g. AC input and DC output monitoring circuit w/LED indicators.
   h. Cover mounted AC Input indication.

i. Tested and certified to meet UL294.
j. NEMA 1 enclosure.
k. Hinged cover w/lock down screws.
l. High voltage protective cover.

2.15 CYLINDERS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
   a. Schlage Everest 29 T

2. Acceptable Manufacturers and Products:
   a. Owner's Standard

B. Requirements:

1. Provide cylinders/cores compliant with ANSI/BHMA A156.5; latest revision; cylinder face finished to match lockset; manufacturer’s series as indicated. Refer to “KEYING” article, herein.
2. Provide cylinders in the below-listed configuration(s), distributed throughout the Project as indicated.
   a. Patented Restricted: cylinder with interchangeable core with patented, restricted keyway.

3. Patent Protection: Cylinders/cores requiring use of restricted, patented keys, patent protected.
4. Nickel silver bottom pins.

2.16 KEYING

A. Scheduled System:

1. New factory registered system:
   a. Provide a factory registered keying system, complying with guidelines in ANSI/BHMA A156.28, incorporating decisions made at keying conference.

B. Requirements:

1. Construction Keying:
   a. Replaceable Construction Cores.
      1) Provide temporary construction cores replaceable by permanent cores, furnished in accordance with the following requirements.
         a) 3 construction control keys
         b) 12 construction change (day) keys.
      2) Owner or Owner’s Representative will replace temporary construction cores with permanent cores.

2. Permanent Keying:
   a. Provide permanent cylinders/cores keyed by the manufacturer according to the following key system.
      1) Master Keying system as directed by the Owner.

b. Forward bitting list and keys separately from cylinders, by means as directed by Owner. Failure to comply with forwarding requirements will be cause for replacement of cylinders/cores involved at no additional cost to Owner.
c. Provide keys with the following features:
   1) Material: Nickel silver; minimum thickness of .107-inch (2.3mm)
   2) Patent Protection: Keys and blanks protected by one or more utility patent(s).
d. Identification:
   1) Mark permanent cylinders/cores and keys with applicable blind code for identification. Do not provide blind code marks with actual key cuts.
   2) Identification stamping provisions must be approved by the Architect and Owner.
   3) Stamp cylinders/cores and keys with Owner's unique key system facility code as established by the manufacturer; key symbol and embossed or stamped with "DO NOT DUPLICATE" along with the "PATENTED" or patent number to enforce the patent protection.
   4) Failure to comply with stamping requirements will be cause for replacement of keys involved at no additional cost to Owner.
   5) Forward permanent cylinders/cores to Owner, separately from keys, by means as directed by Owner.
e. Quantity: Furnish in the following quantities.
   1) Permanent Control Keys: 3.
   2) Master Keys: 6.
   3) Change (Day) Keys: 3 per cylinder/core that is keyed differently
   4) Key Blanks: Quantity as determined in the keying meeting.

2.17 KEY CONTROL SYSTEM

A. Manufacturers:

1. Scheduled Manufacturer:
   a. Telkee

2. Acceptable Manufacturers:
   a. HPC
   b. Lund

B. Requirements:

1. Provide key control system, including envelopes, labels, tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers, permanent markers, and standard metal cabinet, all as recommended by system manufacturer, with capacity for 150% of number of locks required for Project.
   a. Provide complete cross index system set up by hardware supplier, and place keys on markers and hooks in cabinet as determined by final key schedule.
   b. Provide hinged-panel type cabinet for wall mounting.

2.18 DOOR CLOSERS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
   a. LCN 4050A series (Owner's Standard)

2. Acceptable Manufacturers and Products:
   a. Owner's Standard

B. Requirements:

1. Provide door closers conforming to ANSI/BHMA A156.4 Grade 1 requirements by BHMA certified independent testing laboratory. ISO 9000 certify closers. Stamp units with date of manufacture code.
2. Provide door closers with fully hydraulic, full rack and pinion action with cast aluminum cylinder.
3. Closer Body: 1-1/2-inch (38 mm) diameter with 11/16-inch (17 mm) diameter heat-treated pinion journal and full complement bearings.
4. Hydraulic Fluid: Fireproof, passing requirements of UL10C, and all weather requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.
5. Spring Power: Continuously adjustable over full range of closer sizes, and providing reduced opening force as required by accessibility codes and standards.
6. Hydraulic Regulation: By tamper-proof, non-critical valves, with separate adjustment for latch speed, general speed, and back check.
7. Pressure Relief Valve (PRV) Technology: Not permitted.
8. Provide stick on templates, special templates, drop plates, mounting brackets, or adapters for arms as required for details, overhead stops, and other door hardware items interfering with closer mounting.

2.19 DOOR CLOSERS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
   a. Falcon SC70A series

2. Acceptable Manufacturers and Products:
   a. Owner's Standard

B. Requirements:

1. Provide door closers conforming to ANSI/BHMA A156.4 Grade 1 requirements by BHMA certified independent testing laboratory. ISO 9000 certify closers. Stamp units with date of manufacture code.
2. Provide door closers with fully hydraulic, full rack and pinion action with aluminum cylinder.
3. Closer Body: 1-1/2-inch (38 mm) diameter with 5/8-inch (16 mm) diameter heat-treated pinion journal.
4. Hydraulic Fluid: Fireproof, passing requirements of UL10C, and requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.
5. Spring Power: Continuously adjustable over full range of closer sizes, and providing reduced opening force as required by accessibility codes and standards.
6. Hydraulic Regulation: By tamper-proof, non-critical valves, with separate adjustment for latch speed, general speed, and backcheck.
7. Pressure Relief Valve (PRV) Technology: Not permitted.
8. Provide special templates, drop plates, mounting brackets, or adapters for arms as required for details, overhead stops, and other door hardware items interfering with closer mounting.

2.20 DOOR TRIM

A. Manufacturers:

1. Scheduled Manufacturer:
   a. Ives

2. Acceptable Manufacturers:
   a. Burns
   b. Trimco

B. Requirements:

1. Provide push plates, push bars, pull plates, pulls, and hands-free reversible door pulls with diameter and length as scheduled.

2.21 PROTECTION PLATES

A. Manufacturers:

1. Scheduled Manufacturer:
   a. Ives

2. Acceptable Manufacturers:
   a. Burns
   b. Trimco

B. Requirements:

1. Provide protection plates with a minimum of 0.050 inch (1 mm) thick, beveled four edges as scheduled. Furnish with sheet metal or wood screws, finished to match plates.
2. Sizes plates 2 inches (51 mm) less width of door on single doors, pairs of doors with a mullion, and doors with edge guards. Size plates 1 inch (25 mm) less width of door on pairs without a mullion or edge guards.
3. At fire rated doors, provide protection plates over 16 inches high with UL label.

2.22 OVERHEAD STOPS AND OVERHEAD STOP/HOLDERS

A. Manufacturers:

1. Scheduled Manufacturers:
   a. Glynn-Johnson

2. Acceptable Manufacturers:
   a. Rixson

B. Requirements:

1. Provide overhead stop at any door where conditions do not allow for a wall stop or floor stop presents tripping hazard.

2.23 DOOR STOPS AND HOLDERS

A. Manufacturers:

1. Scheduled Manufacturer:
   a. Ives

2. Acceptable Manufacturers:
   a. Burns
   b. Trimco

B. Provide door stops at each door leaf:

1. Provide wall stops wherever possible. Provide concave type where lockset has a push button of thumbturn.
2. Where a wall stop cannot be used, provide universal floor stops.
3. Where wall or floor stop cannot be used, provide overhead stop.
4. Provide roller bumper where doors open into each other and overhead stop cannot be used.

2.24 SILENCERS

A. Manufacturers:

1. Scheduled Manufacturer:
   a. Ives

2. Acceptable Manufacturers:
   a. Burns
   b. Trimco

B. Requirements:

1. Provide "push-in" type silencers for hollow metal or wood frames.
2. Provide one silencer per 30 inches (762 mm) of height on each single frame, and two for each pair frame.
3. Omit where gasketing is specified.

2.25 THRESHOLDS, SEALS, DOOR SWEEPS, AUTOMATIC DOOR BOTTOMS, AND GASKETING

A. Scheduled Manufacturer:

1. Zero International

B. Acceptable Manufacturers:

1. National Guard
2. Reese

C. Seals and Gasketing: Provide continuous gasketing on exterior openings, to the head and jambs, forming a continuous seal between the door and the frame. Provide smoke, light, or sound gasketing on interior doors where indicated.

1. Provide self-tapping fasteners for aluminum extruded gasketing being applied to hollow metal frames.
   a. Provide non-corrosive fasteners for all exterior applications.
   b. Provide security fasteners where indicated.

2. Provide neoprene, EPDM, silicone, or nylon brush inserts as specified in hardware sets. Provide non brush inserts of solid or sponge cell, as specified in hardware sets. Vinyl inserts are not allowed except where specified in hardware sets.

D. Smoke Labeled Gasketing: At all smoke labeled openings, provide smoke listed perimeter gasketing assemblies complying with NFPA 105 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.

E. Fire Listed Gasketing: Assemblies complying with NFPA 80 that are listed by a testing and inspecting agency acceptable to authorities having jurisdiction for fire ratings indicated based on testing according to UL-10C.

1. Where frame-applied intumescent seals are required by the manufacturer, provide gaskets that comply with UL10C Standard for Positive Pressure Fire Tests of Door Assemblies and UBC 7-2, Fire Tests of Door Assemblies.

F. Sound-Rated Gasketing: Provide acoustic gasketing to meet Sound Transmission Class (STC) rating required.

G. Meeting-Stile Gasketing: Provide meeting-stile gasketing that fastens to the meeting stiles forming a continuous seal when doors are closed.

H. Door Sweeps or Shoes: Apply to the bottom of the door to close the gap between the door bottom and finished floor or saddle threshold.

1. Provide solid neoprene, EPDM, silicone, or nylon brush type of seal as specified in hardware sets. Vinyl inserts are not allowed except where specified in hardware sets.

I. Automatic Door Bottoms:

1. Provide closed cell sponge, bulb neoprene. or EPDM type of seal as specified in hardware sets.
2. Door bottom to be mortised, semi mortised, or surface mount as with a minimum thickness as specified in hardware sets.

J. Rain Drips:

1. Provide overhead rain drips for out-swinging hollow metal doors that are not covered against 45 degree blowing rain. Aluminum extrusion to be a minimum of .088 inches thick and extend 2.50 inches from the face of the frame, in anodized finish to match door.
2. Door sweeps or shoes with integral rain drip must meet ADA requirements

K. Thresholds: Provide threshold units not less than 4 inches wide, formed to accommodate change in floor elevation where indicated, and fabricated to accommodate door hardware and fit door frames.

1. Threshold extrusion to be a minimum thickness as specified in hardware sets.

2.26 DOOR POSITION SWITCHES

A. Manufacturers:

1. Scheduled Manufacturer:
   a. Schlage

2. Acceptable Manufacturers:
   a. GE-Interlogix

B. Requirements:

1. Provide recessed or surface mounted type door position switches as specified.
2. Coordinate door and frame preparations with door and frame suppliers. If switches are being used with magnetic locking device, provide minimum of 4 inches (102 mm) between switch and magnetic locking device.

2.27 FINISHES

A. FINISH: BHMA 626/652 (US26D); EXCEPT:

1. Hinges at Exterior Doors: BHMA 630 (US32D)
2. Aluminum Geared Continuous Hinges: BHMA 628 (US28)
3. Push Plates, Pulls, and Push Bars: BHMA 630 (US32D)
4. Protection Plates: BHMA 630 (US32D)
5. Overhead Stops and Holders: BHMA 630 (US32D)
6. Door Closers: Powder Coat to Match
7. Wall Stops: BHMA 630 (US32D)
8. Latch Protectors: BHMA 630 (US32D)
9. Weatherstripping: Clear Anodized Aluminum
10. Thresholds: Mill Finish Aluminum

PART 3 - EXECUTION

3.01 EXAMINATION

A. Prior to installation of hardware, examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance. Verify doors, frames, and walls have been properly reinforced for hardware installation.

B. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.

C. Submit a list of deficiencies in writing and proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. Mount door hardware units at heights to comply with the following, unless otherwise indicated or required to comply with governing regulations.

1. Standard Steel Doors and Frames: ANSI/SDI A250.8.
2. Custom Steel Doors and Frames: HMMA 831.
3. Interior Architectural Wood Flush Doors: ANSI/WDMA I.S. 1A
4. Installation Guide for Doors and Hardware: DHI TDH-007-20

B. Install door hardware in accordance with NFPA 80, NFPA 101 and provide post-install inspection, testing as specified in section 1.03.E unless otherwise required to comply with governing regulations.

C. Install each hardware item in compliance with manufacturer's instructions and recommendations, using only fasteners provided by manufacturer.

D. Do not install surface mounted items until finishes have been completed on substrate. Protect all installed hardware during painting.

E. Set units level, plumb and true to line and location. Adjust and reinforce attachment substrate as necessary for proper installation and operation.

F. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.

G. Install operating parts so they move freely and smoothly without binding, sticking, or excessive clearance.

H. Hinges: Install types and in quantities indicated in door hardware schedule but not fewer than quantity recommended by manufacturer for application indicated.

I. Lock Cylinders:

1. Install construction cores to secure building and areas during construction period.
2. Replace construction cores with permanent cores as indicated in keying section.
3. Furnish permanent cores to Owner for installation.

J. Wiring: Coordinate with Division 26, ELECTRICAL and Division 28 ELECTRONIC SAFETY AND SECURITY sections for:

1. Conduit, junction boxes and wire pulls.
2. Connections to and from power supplies to electrified hardware.
3. Connections to fire/smoke alarm system and smoke evacuation system.
4. Connection of wire to door position switches and wire runs to central room or area, as directed by Architect.
5. Connections to panel interface modules, controllers, and gateways.
6. Testing and labeling wires with Architect's opening number.

K. Key Control System: Tag keys and place them on markers and hooks in key control system cabinet, as determined by final keying schedule.

L. Continuous Hinges: Re-locate the door and frame fire rating labels where they will remain visible so that the hinge does not cover the label once installed.

M. Door Closers & Auto Operators: Mount closers/operators on room side of corridor doors, inside of exterior doors, and stair side of stairway doors from corridors. Mount closers/operators so they are not visible in corridors, lobbies and other public spaces unless approved by Architect.

N. Overhead Stops/Holders: Mount overhead stops/holders on room side of corridor doors, inside of exterior doors, and stair side of stairway doors.

O. Power Supplies: Locate power supplies as indicated or, if not indicated, above accessible ceilings or in equipment room, or alternate location as directed by Architect.

P. Thresholds:

1. Set thresholds in full bed of sealant complying with requirements specified in Division 07 Section "Joint Sealants."
2. Aluminum thresholds to be cut-in, and scribed around mullions, frame members, and stops. Do not butt to thresholds. Provide a continuous surface across full width of opening from jamb to jamb.
3. Where aluminum panic-type (rabbeted) thresholds with neoprene inserts are specified, undercut doors as required to properly mate with seal in threshold.

Q. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they may impede traffic or present tripping hazard.

R. Perimeter Gasketing:

1. Apply to head and jamb, forming seal between door and frame.
2. Install gasketing in a manner eliminating need to cut any seal to install surface mounted hardware. Install compatible mounting bracket for surface mounted hardware unless minimum 1/4 inch thick solid aluminum seals are provided for mounting of surface applied hardware.

S. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.

T. Door Bottoms and Sweeps: Apply to bottom of door, forming seal with threshold when door is closed.

3.03 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.

1. Spring Hinges: Adjust to achieve positive latching when door can close freely from an open position of 30 degrees.
2. Electric Strikes: Adjust horizontal and vertical alignment of keeper to properly engage lock bolt.
3. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.

B. Occupancy Adjustment: Approximately three to six months after date of Substantial Completion, examine and readjust each item of door hardware, including adjusting operating forces, as necessary to ensure function of doors and door hardware.

3.04 CLEANING AND PROTECTION

A. Clean adjacent surfaces soiled by door hardware installation.

B. Clean operating items per manufacturer's instructions to restore proper function and finish.

C. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of Substantial Completion.

3.05 DOOR HARDWARE SCHEDULE

A. The intent of the hardware specification is to specify the hardware for interior and exterior doors, and to establish a type, continuity, and standard of quality. However, it is the door hardware supplier's responsibility to thoroughly review existing conditions, schedules, specifications, drawings, and other Contract Documents to verify the suitability of the hardware specified.

B. Discrepancies, conflicting hardware, and missing items are to 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.

C. Hardware items are referenced in the following hardware schedule. Refer to the above specifications for special features, options, cylinders/keying, and other requirements.

D. Hardware Sets:

Hardware Group No. 001
For use on Door #(s):
101A
Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	CONT. HINGE	112HD		CPC	IVE
1	EA	KEYED REM. MULLION	KR4023 STAB		SP28	FAL
1	EA	PANIC HARDWARE	LD-25-R-EO-LS		626	FAL
1	EA	PANIC HARDWARE	LD-25-R-NL-OP-LS		626	FAL
1	EA	RIM CYLINDER	20-057 ICX - BLOCKING RING AS REQUIRED		626	SCH
1	EA	PERMANENT CORE	23-030 EV29 T		626	SCH
1	EA	FSIC CONST. CORE	23-030-ICX			SCH
1	EA	ELECTRIC STRIKE	6300 FSE 24VDC	✓	630	VON
2	EA	OFFSET DOOR PULL	8190HD 12" - (Type "O" Mounting)		630	IVE
2	EA	OVERHEAD STOP	100S		630	GLY
2	EA	SURFACE CLOSER	4050A REG MC RAL-TBD PULL-SIDE MOUNT TOP-JAMB MOUNT		RAL	LCN
2	EA	MOUNTING PLATE	4050A-18G RAL-TBD		TBD	LCN
1	EA	DOOR SEAL	FURNISHED UNDER SECTION 08_41_00.		AL	B/O
1	EA	MEETING STILE ASTRAGAL	FURNISHED UNDER SECTION 08_41_00.		AL	B/O
2	EA	DOOR SWEEP	8198AA		AA	ZER
1	EA	THRESHOLD	654A-E		A	ZER
1	EA	MULTITECH READER	FURNISHED UNDER DIVISION #28.	✓	BLK	SCE
2	EA	DOOR POS. SWITCH	679-05HM	✓	BLK	SCE
1	EA	MOTION SENSOR	SCAN II 24VDC	✓	WHT	SCE
1	EA	POWER SUPPLY	SPECIFIED & FURNISHED UNDER DIVISION 28.	✓		VON
1	EA		RISER/ELEVATION DRAWING	✓		
1	EA		POINT TO POINT DIAGRAM			

NOTES:
1. WIRE THE 679-05 DOOR POSITION SWITCH TO THE 'DPS' TERMINALS OF THE ACCESS CONTROL SYSTEM.
2. WIRE THE SCAN II MOTION SENSOR TO THE 'RX' TERMINALS OF THE ACCESS CONTROL SYSTEM.

OPERATIONAL DESCRIPTION:
1. THE DOOR SHALL BE NORMALLY CLOSED AND LOCKED.
2. FREE EGRESS SHALL BE POSSIBLE AT ALL TIMES.
3. PRESENTING A VALID CREDENTIAL TO THE CARD READER SHALL CAUSE THE FOLLOWING SIMULTANEOUS ACTIONS TO OCCUR:
A. POWER WILL BE APPLIED TO THE ELECTRIC STRIKE, UNLOCKING THE DOOR TO ALLOW ACCESS.
B. ANY ALARMS ASSOCIATED WITH THE OPENING OF THE DOOR SHALL BE SHUNTED.
4. THE DOOR WILL RETURN TO A CLOSED AND LOCKED STATE ONCE THE STRIKE TIME ON THE CARD READER EXPIRES.
5. APPROACHING THE OPENING AND PUSHING ON THE TOUCHPAD OF THE EXIT DEVICE IN AN ATTEMPT TO EGRESS WILL CAUSE THE FOLLOWING ACTIONS TO OCCUR.
A. THE LATCHBOLT WILL MECHANICALLY RETRACT.
B. ANY ALARMS ASSOCIATED WITH THE OPENING OF THE DOOR WILL BE SHUNTED.
6. THE DOOR WILL RETURN TO A CLOSED AND LOCKED STATE ONCE THE DOOR COMPLETES ITS OPENING CYCLE.

Hardware Group No. 002
For use on Door #(s):
101B
Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	112HD		CPC	IVE
1	EA	DUMMY PUSH BAR	250		626	FAL
1	EA	OFFSET DOOR PULL	8190HD 12" - (Type "O" Mounting)		630	IVE
1	EA	SURFACE CLOSER	4050A REG MC RAL-TBD PULL-SIDE MOUNT TOP-JAMB MOUNT		RAL	LCN
1	EA	MOUNTING PLATE	4050A-18G RAL-TBD		TBD	LCN
1	EA	WALL STOP	WS406/407CVX		630	IVE
1	EA	DOOR SEAL	FURNISHED UNDER SECTION 08_41_00.		AL	B/O

Hardware Group No. 003
For use on Door #(s):
103
Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	112HD		CPC	IVE
1	EA	ENTRANCE/OFFICE LOCK	ND50TD RHO		626	SCH
1	EA	PERMANENT CORE	23-030 EV29 T		626	SCH
1	EA	WALL STOP	WS406/407CCV		630	IVE
1	EA	DOOR SEAL	FURNISHED UNDER SECTION 08_41_00.		AL	B/O

Hardware Group No. 004
For use on Door #(s):
104
Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP		652	IVE
1	EA	ENTRANCE/OFFICE LOCK	ND50TD RHO		626	SCH
1	EA	PERMANENT CORE	23-030 EV29 T		626	SCH
1	EA	WALL STOP	WS406/407CVX		630	IVE
3	EA	SILENCER	SR64		GRY	IVE

Hardware Group No. 005
For use on Door #(s):
105 106 107
Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	ENTRANCE/OFFICE LOCK	ND50TD RHO		626	SCH
1	EA	PERMANENT CORE	23-030 EV29 T		626	SCH
1	EA	WALL STOP	WS406/407CCV		630	IVE
3	EA	SILENCER	SR64		GRY	IVE

Hardware Group No. 006
For use on Door #(s):
109 110 111 W03A W03B
Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	ENTRANCE/OFFICE LOCK W/ INSIDE INDICATOR	ND50TD RHO OS-OCC		626	SCH
1	EA	PERMANENT CORE	23-030 EV29 T		626	SCH
1	EA	DOOR CLOSER	SC71A REG - (PULL SIDE MOUNT)		689	FAL
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS		630	IVE
1	EA	WALL STOP	WS406/407CCV		630	IVE
3	EA	SILENCER	SR64		GRY	IVE

Hardware Group No. 007
For use on Door #(s):
103A 118B
Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	224HD		628	IVE
1	EA	PANIC HARDWARE	LD-25-R-EO-LS		626	FAL
1	EA	RIM CYLINDER	20-057 ICX - BLOCKING RING AS REQUIRED		626	SCH
1	EA	PERMANENT CORE	23-030 EV29 T		626	SCH
1	EA	FSIC CONST. CORE	23-030-ICX			SCH
1	EA	ELECTRIC STRIKE	6300 FSE 24VDC	✓	630	VON
1	EA	DOOR PULL	VR810 NL V		US32D	IVE
1	EA	DOOR CLOSER	SC71A SS		689	FAL
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS		630	IVE
1	EA	RAIN DRIP	142AA		AA	ZER
1	EA	GASKETING	429AA-S		AA	ZER
1	EA	DOOR SWEEP	8198AA		AA	ZER
1	EA	THRESHOLD	655A-E		A	ZER
1	EA	MULTITECH READER	FURNISHED UNDER DIVISION #28.	✓	BLK	SCE
1	EA	DOOR POS. SWITCH	679-05HM	✓	BLK	SCE
1	EA	MOTION SENSOR	SCAN II 24VDC	✓	WHT	SCE
1	EA	POWER SUPPLY	SPECIFIED & FURNISHED UNDER DIVISION 28.	✓		VON
1	EA		RISER/ELEVATION DRAWING	✓		
1	EA		POINT TO POINT DIAGRAM			

NOTES:
1. WIRE THE 679-05 DOOR POSITION SWITCH TO THE 'DPS' TERMINALS OF THE ACCESS CONTROL SYSTEM.
2. WIRE THE SCAN II MOTION SENSOR TO THE 'RX' TERMINALS OF THE ACCESS CONTROL SYSTEM.

OPERATIONAL DESCRIPTION:
1. THE DOOR SHALL BE NORMALLY CLOSED AND LOCKED.
2. FREE EGRESS SHALL BE POSSIBLE AT ALL TIMES.
3. PRESENTING A VALID CREDENTIAL TO THE CARD READER SHALL CAUSE THE FOLLOWING SIMULTANEOUS ACTIONS TO OCCUR:
A. POWER WILL BE APPLIED TO THE ELECTRIC STRIKE, UNLOCKING THE DOOR TO ALLOW ACCESS.
B. ANY ALARMS ASSOCIATED WITH THE OPENING OF THE DOOR SHALL BE SHUNTED.
4. THE DOOR WILL RETURN TO A CLOSED AND LOCKED STATE ONCE THE STRIKE TIME ON THE CARD READER EXPIRES.
5. APPROACHING THE OPENING AND PUSHING ON THE TOUCHPAD OF THE EXIT DEVICE IN AN ATTEMPT TO EGRESS WILL CAUSE THE FOLLOWING ACTIONS TO OCCUR.
A. THE LATCHBOLT WILL MECHANICALLY RETRACT.
B. ANY ALARMS ASSOCIATED WITH THE OPENING OF THE DOOR WILL BE SHUNTED.
6. THE DOOR WILL RETURN TO A CLOSED AND LOCKED STATE ONCE THE DOOR COMPLETES ITS OPENING CYCLE.

Hardware Group No. 008
For use on Door #(s):
103.1
Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	224HD		628	IVE
1	EA	PASSAGE SET	ND10S RHO		626	SCH
1	EA	DOOR CLOSER	SC71A SS		689	FAL
1	EA	ARMOR PLATE	8400 34" X 1 1/2" LDW B-CS		630	IVE
1	EA	GASKETING	429AA-S		AA	ZER
1	EA	DOOR BOTTOM	364AA		AA	ZER
1	EA	THRESHOLD	63A-223		A	ZER

Hardware Group No. 009
For use on Door #(s):
112 113
Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5		652	IVE
1	EA	PASSAGE SET	ND10S RHO		626	SCH
1	EA	DOOR CLOSER	SC71A REG - (PULL SIDE MOUNT)		689	FAL
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS		630	IVE
1	EA	WALL STOP	WS406/407CVX		630	IVE
3	EA	SILENCER	SR64		GRY	IVE

Hardware Group No. 010
For use on Door #(s):
108
Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	STOREROOM LOCK	ND80TD RHO		626	SCH
1	EA	PERMANENT CORE	23-030 EV29 T		626	SCH
1	EA	DOOR CLOSER	SC71A REG - (PULL SIDE MOUNT)		689	FAL
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS		630	IVE
1	EA	WALL STOP	WS406/407CCV		630	IVE
3	EA	SILENCER	SR64		GRY	IVE

Hardware Group No. 011
For use on Door #(s):
114 W03
Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5		652	IVE
1	EA	PASSAGE SET	ND10S RHO		626	SCH
1	EA	OVERHEAD STOP	100S		630	GLY
1	EA	DOOR CLOSER	SC71A REG - (PULL SIDE MOUNT)		689	FAL
1	EA	NARROW FRM BACK PLT	SC70A-18 FASTEN WITH BOTTOM HOLES ONLY.		689	FAL
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS		630	IVE
3	EA	SILENCER	SR64		GRY	IVE

Hardware Group No. 012
For use on Door #(s):
115
Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	ENTRANCE/OFFICE LOCK	ND50TD RHO		626	SCH
1	EA	PERMANENT CORE	23-030 EV29 T		626	SCH
1	EA	OVERHEAD STOP	100S		630	GLY
3	EA	SILENCER	SR64		GRY	IVE

Hardware Group No. 013
For use on Door #(s):
116
Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	ENTRANCE/OFFICE LOCK	ND50TD RHO		626	SCH
1	EA	PERMANENT CORE	23-030 EV29 T		626	SCH
1	EA	OVERHEAD STOP	100S		630	GLY
1	EA	DOOR CLOSER	SC71A REG - (PULL SIDE MOUNT)		689	FAL
1	EA	NARROW FRM BACK PLT	SC70A-18 FASTEN WITH BOTTOM HOLES ONLY.		689	FAL
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS		630	IVE
3	EA	SILENCER	SR64		GRY	IVE

Hardware Group No. 014
For use on Door #(s):
117 201A
Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	224HD		628	IVE
1	EA	CLASSROOM LOCK	ND70TD RHO		626	SCH
1	EA	PERMANENT CORE	23-030 EV29 T		626	SCH
1	EA	DOOR CLOSER	SC71A SS		689	FAL
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS		630	IVE
3	EA	SILENCER	SR64		GRY	IVE

Hardware Group No. 015
For use on Door #(s):
118A 119A
Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	224HD		628	IVE
1	EA	CLASSROOM LOCK	ND70TD RHO		626	SCH
1	EA	PERMANENT CORE	23-030 EV29 T		626	SCH
1	EA	OVERHEAD STOP	100S		630	GLY
1	EA	DOOR CLOSER	SC71A REG - (PULL SIDE MOUNT)		689	FAL
1	EA	NARROW FRM BACK PLT	SC70A-18 FASTEN TO DOOR WITH BOTTOM HOLES ONLY.		689	FAL
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS		630	IVE
3	EA	SILENCER	SR64		GRY	IVE

Hardware Group No. 016
For use on Door #(s):
119B 120
Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	224HD		628	IVE
1	EA	STOREROOM LOCK	L9080T LLL 06A L283-150		626	SCH
1	EA	PERMANENT CORE	23-030 EV29 T		626	SCH
1	EA	DOOR PULL	VR900		630	IVE
1	EA	DOOR CLOSER	SC71A SS		689	FAL
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS		630	IVE
1	EA	RAIN DRIP	142AA		AA	ZER
1	EA	GASKETING	429AA-S		AA	ZER
1	EA	DOOR SWEEP	8198AA		AA	ZER
1	EA	THRESHOLD	655A-E		A	ZER
1	EA	DOOR POS. SWITCH	679-05HM		BLK	SCE
1	EA	MOTION SENSOR	SCAN II 24VDC		WHT	SCE
1	EA		RISER/ELEVATION DRAWING			
1	EA		POINT TO POINT DIAGRAM			

NOTES:
1. WIRE THE SCAN II MOTION SESNSOR TO THE 'REQUEST TO EXIT' TERMINALS OF THE ACCESS CONTROL SYSTEM.
2. WIRE THE 679-05 DOOR POSITION SWITCH TO THE 'DPS' TERMINALS OF THE ACCESSS CONTROL SYSTEM.

OPERATIONAL DESCRIPTION:
1. THE DOORS SHALL BE NORMALLY CLOSED AND LOCKED.
2. FREE EGRESS SHALL ALWAYS BE POSSIBLE.
3. APPROACHING THE OPENING AND OPERATING THE INSIDE LEVER WILL MECHANICALLY RETRACT THE LATCHBOLT TO ALLOW THE OCCUPANT TO EGRESS.
4. THE SCAN II MOTION SENSOR WILL DETECT THE OCCUPANT AND SUBSEQUENTLY SHUNT ANY ALARMS ASSOCIATED WITH THE OPENING OF THE DOOR.

Hardware Group No. 017
For use on Door #(s):
118C
Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5		652	IVE
1	EA	CLASSROOM LOCK	ND70TD RHO		626	SCH
1	EA	PERMANENT CORE	23-030 EV29 T		626	SCH
1	EA	DOOR CLOSER	SC71A REG - (PULL SIDE MOUNT)		689	FAL
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS		630	IVE
1	EA	WALL STOP	WS406/407CVX		630	IVE
3	EA	SILENCER	SR64		GRY	IVE

Hardware Group No. 018
For use on Door #(s):
121
Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER			FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5			652	IVE
1	EA	STOREROOM LOCK	ND80TD RHO			626	SCH
1	EA	PERMANENT CORE	23-030 EV29 T			626	SCH
1	EA	ELECTRIC STRIKE	6211 FSE 24VDC		✓	630	VON
1	EA	DOOR CLOSER	SC71A REG - (PULL SIDE MOUNT)			689	FAL
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS			630	IVE
1	EA	WALL STOP	WS406/407CVX			630	IVE
3	EA	SILENCER	SR64			GRY	IVE
1	EA	MULTITECH READER	FURNISHED UNDER DIVISION #28.		✓	BLK	SCE
1	EA	DOOR POS. SWITCH	679-05WD		✓	BLK	SCE
1	EA	MOTION SENSOR	SCAN II 24VDC		✓	WHT	SCE
1	EA	POWER SUPPLY	SPECIFIED & FURNISHED UNDER DIVISION 28.		✓		VON
1	EA		RISER/ELEVATION DRAWING		✓		
1	EA		POINT TO POINT DIAGRAM				

NOTES:
1. WIRE THE 679-05 DOOR POSITION SWITCH TO THE 'DPS' TERMINALS OF THE ACCESS CONTROL SYSTEM.
2. WIRE THE SCAN II MOTION SENSOR TO THE 'RX' TERMINALS OF THE ACCESS CONTROL SYSTEM.

OPERATIONAL DESCRIPTION:
1. THE DOOR SHALL BE NORMALLY CLOSED AND LOCKED.
2. FREE EGRESS SHALL BE POSSIBLE AT ALL TIMES.
3. PRESENTING A VALID CREDENTIAL TO THE CARD READER SHALL CAUSE THE FOLLOWING SIMULTANEOUS ACTIONS TO OCCUR:
A. POWER WILL BE APPLIED TO THE ELECTRIC STRIKE, UNLOCKING THE DOOR TO ALLOW ACCESS.
B. ANY ALARMS ASSOCIATED WITH THE OPENING OF THE DOOR SHALL BE SHUNTED.
4. THE DOOR WILL RETURN TO A CLOSED AND LOCKED STATE ONCE THE STRIKE TIME ON THE CARD READER EXPIRES.
5. APPROACHING THE OPENING AND PUSHING ON THE TOUCHPAD OF THE EXIT DEVICE IN AN ATTEMPT TO EGRESS WILL CAUSE THE FOLLOWING ACTIONS TO OCCUR.
A. THE LATCHBOLT WILL MECHANICALLY RETRACT.
B. ANY ALARMS ASSOCIATED WITH THE OPENING OF THE DOOR WILL BE SHUNTED.
6. THE DOOR WILL RETURN TO A CLOSED AND LOCKED STATE ONCE THE DOOR COMPLETES ITS OPENING CYCLE.

Hardware Group No. 019
For use on Door #(s):
202
Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
6	EA	HINGE	5BB1 4.5 X 4.5 NRP		652	IVE
1	SET	CONSTANT LATCHING FLUSH BOLTS	FB51P/FB61P - AS APPROVED BY DOOR MFGR.		630	IVE
1	EA	DUST PROOF STRIKE	DP2		626	IVE
1	EA	STOREROOM LOCK	ND80TD RHO 1" STRIKE LIP LENGTH		626	SCH
1	EA	PERMANENT CORE	23-030 EV29 T		626	SCH
1	EA	COORDINATOR	COR X FL		628	IVE
2	EA	MOUNTING BRACKET	MB		689	IVE
2	EA	DOOR CLOSER	SC71A SS		689	FAL
2	EA	KICK PLATE	8400 10" X 1" LDW B-CS		630	IVE
2	EA	SILENCER	SR64		GRY	IVE

Hardware Group No. 020
For use on Door #(s):
201B
Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	CONT. HINGE	224HD		628	IVE
2	EA	SURFACE BOLT	SB1630 B		652	IVE
1	EA	DBL CYL DEADBOLT	B662T		626	SCH
2	EA	PERMANENT CORE	23-030 EV29 T		626	SCH
2	EA	PUSH BAR	9100HD-L		630	IVE
2	EA	OH STOP & HOLDER	100F		630	GLY
2	EA	SILENCER	SR64		GRY	IVE

Hardware Group No. 021
For use on Door #(s):
122A 122B 122C W04A W05
Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER			FINISH	MFR
1	EA	CONT. HINGE	224HD			628	IVE
1	EA	PANIC HARDWARE	LD-25-R-NL-OP-LS			626	FAL
1	EA	RIM CYLINDER	20-057 ICX - BLOCKING RING AS REQUIRED			626	SCH
1	EA	PERMANENT CORE	23-030 EV29 T			626	SCH
1	EA	FSIC CONST. CORE	23-030-ICX				SCH
1	EA	ELECTRIC STRIKE	6300 FSE 24VDC			630	VON
1	EA	ADA FLUSH PULL	FURNISHED BY THE DOOR SUPPLIER.			BLK	SPE
1	EA	DOOR CLOSER	SC71A SS			689	FAL
1	EA	RAIN DRIP	142AA			AA	ZER
1	EA	GASKETING	429AA-S			AA	ZER
1	EA	DOOR SWEEP	8198AA			AA	ZER
1	EA	THRESHOLD	655A-E			A	ZER
1	EA	MULTITECH READER	FURNISHED UNDER DIVISION #28.			BLK	SCE
1	EA	DOOR POS. SWITCH	679-05HM			BLK	SCE
1	EA	MOTION SENSOR	SCAN II 24VDC			WHT	SCE
1	EA	POWER SUPPLY	SPECIFIED & FURNISHED UNDER DIVISION 28.				VON
1	EA		RISER/ELEVATION DRAWING				
1	EA		POINT TO POINT DIAGRAM				

NOTES:
1. WIRE THE 679-05 DOOR POSITION SWITCH TO THE 'DPS' TERMINALS OF THE ACCESS CONTROL SYSTEM.
2. WIRE THE SCAN II MOTION SENSOR TO THE 'RX' TERMINALS OF THE ACCESS CONTROL SYSTEM.

OPERATIONAL DESCRIPTION:
1. THE DOOR SHALL BE NORMALLY CLOSED AND LOCKED.
2. FREE EGRESS SHALL BE POSSIBLE AT ALL TIMES.
3. PRESENTING A VALID CREDENTIAL TO THE CARD READER SHALL CAUSE THE FOLLOWING SIMULTANEOUS ACTIONS TO OCCUR:
A. POWER WILL BE APPLIED TO THE ELECTRIC STRIKE, UNLOCKING THE DOOR TO ALLOW ACCESS.
B. ANY ALARMS ASSOCIATED WITH THE OPENING OF THE DOOR SHALL BE SHUNTED.
4. THE DOOR WILL RETURN TO A CLOSED AND LOCKED STATE ONCE THE STRIKE TIME ON THE CARD READER EXPIRES.
5. APPROACHING THE OPENING AND PUSHING ON THE TOUCHPAD OF THE EXIT DEVICE IN AN ATTEMPT TO EGRESS WILL CAUSE THE FOLLOWING ACTIONS TO OCCUR.
A. THE LATCHBOLT WILL MECHANICALLY RETRACT.
B. ANY ALARMS ASSOCIATED WITH THE OPENING OF THE DOOR WILL BE SHUNTED.
6. THE DOOR WILL RETURN TO A CLOSED AND LOCKED STATE ONCE THE DOOR COMPLETES ITS OPENING CYCLE.

Hardware Group No. 022
For use on Door #(s):
W01 W02
Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
6	EA	HINGE	5BB1 4.5 X 4.5 NRP		652	IVE
1	SET	CONSTANT LATCHING FLUSH BOLTS	FB51P/FB61P - AS APPROVED BY DOOR MFGR.		630	IVE
1	EA	DUST PROOF STRIKE	DP2		626	IVE
1	EA	STOREROOM LOCK	ND80TD RHO 1" STRIKE LIP LENGTH		626	SCH
1	EA	PERMANENT CORE	23-030 EV29 T		626	SCH
1	EA	COORDINATOR	COR X FL		628	IVE
2	EA	OVERHEAD STOP	100S		630	GLY
2	EA	DOOR CLOSER	SC71A REG - (PULL SIDE MOUNT)		689	FAL
2	EA	NARROW FRM BACK PLT	SC70A-18 FASTEN TO THE DOOR WITH BOTTOM HOLES ONLY.		689	FAL
2	EA	KICK PLATE	8400 10" X 1" LDW B-CS		630	IVE
2	EA	SILENCER	SR64		GRY	IVE

Hardware Group No. 023
For use on Door #(s):
W10
Provide each CO door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	CASED OPENING	NO HARDWARE REQUIRED		EXI

Hardware Group No. 024
For use on Door #(s):
W04B
Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	224HD		628	IVE
1	EA	PUSH PLATE	8200 4" X 16"		630	IVE
1	EA	PULL PLATE	8303 10" 4" X 16"		630	IVE
1	EA	DOOR CLOSER	SC71A REG - (PULL SIDE MOUNT)		689	FAL
1	EA	WALL STOP	WS33/WS33X		626	IVE
1	EA	WEATHERSTRIP	188SBK PSA		BK	ZER

END OF SECTION

Door Numbers	HwSet#
101A	001
101B	002
103	003
103.1	008
103A	007
104	004
105	005
106	005
107	005
108	010
109	006
110	006
111	006
112	009
113	009
114	011
115	012
116	013
117	014
118A	015
118B	007
118C	017
119A	015
119B	016
120	016
121	018
122A	021
122B	021
122C	021
201A	014
201B	020
202	019
W01	022
W02	022
W03	011
W03A	006
W03B	006
W04A	021
W04B	024
W05	021
W10	023

SECTION 107516 - GROUND-SET FLAGPOLES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Aluminum flagpole.

B. Products Installed, but Not Furnished, under This Section:

1. Flag(s); furnished by Owner.

C. Related Requirements:

1. Section 033000 "Cast-In-Place Concrete" for concrete footings for flagpole.
2. Section 264113 "Lightning Protection for Structures" for connecting metal flagpole to lightning protection system.

1.2 ACTION SUBMITTALS

A. Product Data: For each specified system and assembly, including components and accessories.

1. Include construction details, material descriptions, dimensions of individual components and profiles, operating characteristics, fittings, accessories, and finishes for flagpole.

B. Shop Drawings: Include plans, elevations, and attachment details. Show general arrangement, fittings, accessories, grounding, anchoring, and support details.

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

D. Samples for Verification: For each type of exposed finish, in manufacturer's standard sizes.

E. Delegated Design Submittals: For flagpoles, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.3 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For flagpoles.

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1.4 QUALITY ASSURANCE

A. Delegated Design Engineer Qualifications: A professional engineer who is legally qualified to practice in [state]<Insert jurisdiction> where Project is located and who is experienced in providing engineering services of the type indicated.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Spiral wrap flagpole with heavy paper and enclose in a hard fiber tube or other protective container.

B. Unload, store, and erect flagpole in a manner to prevent bending and surface damage.

1.6 FIELD CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit installation of flagpole and accessories in accordance with manufacturers' written installation instructions.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

A. Obtain flagpole as complete unit, including fittings and accessories, from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Seismic Performance: Flagpole assemblies to withstand the effects of earthquake motions determined in accordance with [ASCE/SEI 7]<Insert requirement> .

B. Structural Performance: Flagpole assemblies, including anchorages and supports, to withstand design loads within limits and under conditions indicated.

1. Wind Loads: Determine in accordance with NAAMM FP 1001. Basic wind speed for Project location as indicated on Drawings.
2. Base flagpole design on [polyester][nylon or cotton] flags of maximum standard size suitable for use with flagpole or flag size indicated, whichever is more stringent.

2.3 GROUND-SET FLAGPOLES

A. Aluminum Flagpole: Fabricated from extruded tubing complying with ASTM B221 (ASTM B221M), Alloy 6063, minimum wall thickness of 3/16 inch, without visible seam.

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1. Basis-of-Design Product: Subject to compliance with requirements, provide Concord American Flagpole: Independence Series - IRW or comparable product by one of the following:

    a. Concord American Flagpole: Estate Series - ESS

2. Shape: Cone tapered.
3. Exposed Height: 30 ft. 35 ft. .
4. Construct flagpole in one piece if possible. If more than one piece is necessary, comply with the following:

    a. Fabricate shop and field joints without using fasteners, screw collars, or lead caulking.
    b. Provide flush hairline joints using self-aligning, snug-fitting, internal sleeves.

5. Natural Satin Finish: AA-M32, fine, directional, medium satin polish ; seal aluminum surfaces with clear, hard-coat wax.
6. Clear Anodic Finish: AAMA 611, AA-M12C22A31, Class II, 0.010 mm .
7. Color Anodic Finish: AAMA 611, AA-M12C22A32/A34, Class II, 0.010 mm .

    a. Color: As selected by Architect from manufacturer's full range .

8. Gold Anodic Finish: AAMA 611, AA-M32C22A43, Class I, 0.018 mm; gold color.
9. Baked-Enamel or Powder-Coat Finish: AAMA 2603 except with a minimum dry film thickness of 1.5 mils. Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.

    a. Color and Gloss: As selected by Architect from manufacturer's full range .

10. High-Performance Organic Finish: Two-coat fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

    a. Color and Gloss: As indicated by manufacturer's designations .

11. Metal Foundation Tube: Manufacturer's standard corrugated-steel foundation tube, 0.060-inch wall thickness with 3/16-inch steel bottom plate and support plate; 3/4-inch diameter, steel ground spike; and steel centering wedges welded together. Galvanize foundation tube after assembly. Furnish loose hardwood wedges at top of foundation tube for plumbing pole.

    a. Flashing Collar: Same material and finish as flagpole.

12. Foundation Sleeve: [Fiberglass][or][PVC pipe] foundation sleeve, made to fit flagpole, for casting into concrete foundation.

    a. Flashing Collar: Same material and finish as flagpole.

13. Cast-Metal Shoe Base: Made from aluminum with same finish and color as

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flagpoles for anchor-bolt mounting; furnish with anchor bolts.

a. Furnish ground spike.

14. Hinged Baseplate: Cast-metal tilting hinged base and anchor plate joined by permanently secured pivot rod. Furnish with stainless steel screws for securing tilting base to anchor plate when not tilted; furnish with anchor bolts.

a. Finish: Same as flagpole.
b. Furnish aluminum base or aluminum flashing collar finished to match flagpole.
c. Furnish ground spike.

15. Pivoting Tilt Base: Steel baseplate with channel or rectangular tube uprights, pivot bolt, and locking device for tilting flagpole. Furnish tilting flagpole with steel counterweight box and weights, or furnish with internal counterweight. Furnish base with anchor bolts.

a. Finish: Same as flagpole.
b. Furnish ground spike.

2.4 FITTINGS

A. Finial Ball: Flush-seam ball, sized as indicated or, if not indicated, to match flagpole-butt diameter.

1. 0.063-inch spun aluminum [, finished to match flagpole][with gold anodic finish] .
2. 20-oz. copper with 23-karat, gold-leaf finish.
3. Spun stainless steel, finished to match flagpole.
4. Spun copper alloy, finished to match flagpole.

B. Finial Eagle: Sized [as indicated][as standard with manufacturer for flagpole size indicated]<Insert size> .

1. Cast aluminum [, finished to match flagpole][with gold anodic finish] .
2. 20-oz. copper with 23-karat, gold-leaf finish.

C. Internal Halyard, Winch System: Manually operated winch with control stop device and removable handle, stainless steel cable halyard, and concealed revolving truck assembly with plastic-coated counterweight and sling. Furnish flush access door secured with cylinder lock. Finish truck assembly to match flagpole.

1. Halyard Flag Snaps: [Chromium-plated bronze][Stainless steel][Bronze][Nylon] swivel snap hooks [with neoprene or vinyl covers] . Furnish two per halyard.
2. Plastic Halyard Flag Clasps for Internal Halyard, Winch System: Made from injection-molded, UV-stabilized, acetal resin (Delrin). Clasps attach to flag and have two eyes for inserting both runs of halyards. Furnish two per halyard.

D. Internal Halyard, Cam Cleat System: [5/16-inch diameter, braided polypropylene]<Insert type> halyard; cam cleat; and concealed revolving truck

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assembly with plastic-coated counterweight and sling. Furnish flush access door secured with cylinder lock. Finish truck assembly to match flagpole.

1. Halyard Flag Snaps: [**Chromium-plated bronze**][**Stainless steel**][**Bronze**][**Nylon**] swivel snap hooks [**with neoprene or vinyl covers**] . Furnish two per halyard.
2. Plastic Halyard Flag Clasps for Internal Halyard, Cam Cleat System: Made from injection-molded, UV-stabilized, acetal resin (Delrin). Clasps attach to flag and have two eyes for inserting both runs of halyards. Furnish two per halyard.

E. External Halyard: Ball-bearing, nonfouling, revolving truck assembly of cast metal with continuous [5/16-inch **diameter, braided polypropylene halyard**]<**Insert type**> and 9 inches cast-metal cleats with fasteners. Finish exposed metal surfaces to match flagpole.

1. Halyards and Cleats: [**One**][**Two**] at each flagpole.
2. Cleat Covers: Cast metal, finished to match flagpole, secured with cylinder locks.
3. Halyard Covers: 2 inches channel, 60 inches long, finished to match flagpole.
4. Halyard Flag Snaps: [**Chromium-plated bronze**][**Stainless steel**][**Bronze**][**Nylon**] swivel snap hooks [**with neoprene or vinyl covers**] . Furnish two per halyard.
5. Plastic Halyard Flag Clasps for External Halyard, Ball-Bearing System: Made from injection-molded, UV-stabilized, acetal resin (Delrin). Clasps attach to flag and have two eyes for inserting both runs of halyards. Furnish two per halyard.

2.5 MISCELLANEOUS MATERIALS

A. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C1107/C1107M.

B. Drainage Material: Crushed stone, or crushed or uncrushed gravel; coarse aggregate.

C. Sand: ASTM C33/C33M, fine aggregate.

D. Elastomeric Joint Sealant: [**Multicomponent nonsag urethane**][**Single-component nonsag urethane**][**Single-component neutral-curing silicone**] joint sealant complying with requirements in Section 079200 "Joint Sealants."

E. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D1187/D1187M.

PART 3 - EXECUTION

3.1 PREPARATION

A. Prepare uncoated metal flagpoles that are set in foundation tubes by painting below-grade portions with a heavy coat of bituminous paint.

B. Foundation Excavation: Excavate to neat clean lines in undisturbed soil. Remove loose soil and foreign matter from excavation and moisten earth before placing concrete.

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Place and compact drainage material at excavation bottom.

C. Provide forms where required due to unstable soil conditions and for perimeter of flagpole base at grade. Secure and brace forms to prevent displacement during concrete placement.

D. Foundation Tube: Place foundation tube, center, and brace to prevent displacement during concreting. Place concrete. Plumb and level foundation tube and allow concrete to cure.

E. Sleeves: Locate and secure sleeves in forms by bracing to concrete reinforcement and forms.

F. Anchor Bolts: Locate and secure anchor bolts in forms with templates and by tying to concrete reinforcement steel.

G. Place concrete as specified in Section 033000 "Cast-in-Place Concrete." Compact concrete in place by using vibrators. Moist-cure exposed concrete for no fewer than seven days or use nonstaining curing compound.

H. Trowel exposed concrete surfaces to a smooth, dense finish, free of trowel marks, and uniform in texture and appearance. Provide positive slope for water runoff to perimeter of concrete base.

3.2 INSTALLATION OF GROUND-SET FLAGPOLES

A. General: Install flagpoles where indicated on Drawings and in accordance with approved Shop Drawings and manufacturer's written instructions.

B. Foundation Tube: Place flagpole in tube, seated on bottom plate between steel centering wedges, and install hardwood wedges to secure flagpole in place. Place and compact sand in foundation tube and remove hardwood wedges. Seal top of foundation tube with a 2-inch layer of elastomeric joint sealant and cover with flashing collar.

C. Baseplate: Cast anchor bolts in concrete foundation. Install baseplate on washers placed over leveling nuts on anchor bolts and adjust until flagpole is plumb. After flagpole is plumb, tighten retaining nuts and fill space under baseplate solidly with nonshrink, nonmetallic grout. Finish exposed grout surfaces smooth and slope 45 degrees away from edges of baseplate.

END OF SECTION 107516

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PRELIMINARY GEOTECHNICAL INVESTIGATION REPORT

OHIO CAT – MIAMISBURG
490 BYERS ROAD, MIAMISBURG, OHIO
MSG PROJECT NO. 401.2500964.000

AUGUST 2025

PREPARED FOR:
OHIO CAT
3993 EAST ROYALTON ROAD
BROADVIEW HEIGHTS, OHIO 44147

PREPARED BY:
THE MANNIK & SMITH GROUP, INC.
20600 CHAGRIN BOULEVARD, SUITE 500,
SHAKER HEIGHTS, OHIO 44122

August 27, 2025

Mr. Chris Auvil
Ohio CAT
3993 East Royalton Road
Broadview Heights, Ohio 44147

RE: Preliminary Geotechnical Investigation Report
Ohio CAT – Miamisburg
490 Byers Road, Miamisburg, Ohio
MSG Project No. 401.2300964.000

Dear Mr. Auvil:

This report presents the results of our preliminary geotechnical investigation for the Ohio CAT Rental Site at 490 Byers Road, Miamisburg, Ohio. We completed this preliminary investigation in accordance with our proposal No. 401.2500735.0P0 dated May 28, 2025.

We trust that this report addresses your current project needs. We appreciate the opportunity to work with you on this very important project. Please contact us if you have any questions or if we can be of further assistance.

Sincerely,

The Mannik & Smith Group, Inc.

Gabriel Van Arcken
Geotechnical Engineer

Greg Buhoveckey, PE
Associate / Geotechnical Engineer

20600 Chagrin Boulevard, Suite 500, Shaker Heights, Ohio 44122 Tel: 216.378.1490 Fax: 216.378.1497 www.MannikSmithGroup.com

EXECUTIVE SUMMARY

The Mannik & Smith Group, Inc. was retained by Ohio CAT to complete a preliminary geotechnical investigation for a proposed Ohio CAT Rental Site at 490 Byers Road, Miamisburg, Ohio. The scope of the preliminary geotechnical investigation is to provide a basic understanding of the geologic conditions within the developable areas of the site. The site is generally undeveloped and includes an area of approximately 17.6 acres.

The subsurface investigation consisted of completing seven (7) soil borings designated B-01 to B-07 extending to a depth of 12.5 feet below the existing surface. The drilling operations were completed on July 30, 2025.

Approximately 6 to 7 inches of topsoil was encountered at the surface at the soil boring locations. Stratum 1 was encountered below the topsoil and consisted of soft to hard lean clay extending to depths ranging from 8.5 to 12.5 feet below grade. Stratum 2 consisting of loose to medium dense clayey sand was encountered within Stratum 1 between a depth of 4 and 6 feet below grade in B-01 and below Stratum 1 in boring B-07 from 8.5 feet to the termination depth at 12.5 feet below grade.

We recommend that the shallow foundations be designed for maximum net allowable bearing capacity of 2,000 psf. Soft clay soils, such as those encountered in boring B-02, B-04 and B-06, will require complete removal and replacement with engineered or lean concrete fill in order to achieve the above bearing capacity. Should loose granular soils be encountered at the bearing depth during construction, they can be reworked in place. By utilizing proper construction techniques, the total settlement underneath the proposed shallow foundations in the native clay soil is anticipated to be less than 1 inch and the differential settlement is expected to be ¾ of the total settlement.

An estimated modulus for subgrade reaction on top of the existing subgrade of 120 pounds per cubic inch (pci) may be used for slab-on-grade design. For a subgrade composed of well-compacted engineered fill, a modulus of subgrade reaction of 175 pci may be used.

Our analysis indicates that approximately 30 percent of the project pavement area contains soils that will require remediation due to low N_{60} values and high moisture content at the estimated subgrade elevation. Based on our evaluation, an excavation and replacement of approximately 12 to 14 inches will be required in some areas.

An estimated design CBR value of 4 and resilient modulus of 4,800 pci were assumed for the prepared subgrade. Traffic design information was not provided for this project. Pavement design was developed based on the procedures contained in the 1993 Guide for Design of Pavement Structures by AASHTO.

According to ASCE 7-22 Table 20.2-1, the proposed site is designated as “Site Class D” based on the average number of the Standard Penetration Test N values, the soil shear strength of the upper 12.5 feet of soil (the maximum depth for which we have soil information) and assumed subsurface conditions to a depth of 100 feet.

For standard shallow excavations, issues associated with groundwater seepage into the excavation are not anticipated; however, the Contractor should be prepared to address localized groundwater accumulation, perched groundwater, or surface run off (i.e., pumping water from prepared sumps).

This summary briefly discusses major findings covered within the body of the report. The intent of this executive summary is to provide a general summary. The report must be read carefully in its entirety before using any recommendations described herein.

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1.0 INTRODUCTION

1.1 General

The Mannik & Smith Group, Inc., (MSG) was retained by Ohio CAT (OCAT) to complete a preliminary geotechnical investigation for a proposed Ohio CAT Rental Site at 490 Byers Road, Miamisburg, Ohio. The site location is depicted in Figure 1 in Appendix A. The preliminary geotechnical investigation was performed in accordance with our proposal No. 401.2500735.0P0 dated May 28, 2025.

This preliminary geotechnical investigation report addresses feasible options for foundation design and pavement support. Once additional design details become available, including the depth and configurations of proposed structures, a supplemental geotechnical investigation should be completed to confirm encountered conditions and finalize the preliminary recommendations contained herein.

1.2 Project Information and Site Conditions

As we understand, the overall proposed project consists of the development and construction of a new OCAT Rental Site. The scope of the preliminary geotechnical investigation is to provide a basic understanding of the geologic conditions within the developable areas of the site. The site is located on the east side of Byers Road just north of Lyons Road. The site is generally undeveloped and includes an area of approximately 17.6 acres.

The existing site topography elevation varied across the site ranging from approximately 1015 feet to 1030 feet. At the time of the preliminary investigation, detailed site grading plans and structural loading information for the proposed development were not available; however, we assume no significant grading (greater than 3 feet cut/fill) is anticipated at the site associated with this project.

2.0 SUBSURFACE INVESTIGATION

2.1 Field Exploration

The subsurface investigation consisted of completing seven (7) soil borings designated B-01 to B-07 extending to a depth of 12.5 feet below the existing surface. The approximate soil boring locations were field marked by MSG personnel by measuring from existing site features. Coordinates and elevations of the soil boring locations were obtained from Google Earth and provided on the logs. The boring locations are shown in Figure 2 of Appendix A.

The drilling operations were completed on July 30, 2025. All borings were advanced using a track-mounted Geoprobe 7822DT drill rig and advanced using direct push technology methods in general accordance with ASTM D6151. Upon completion, the boreholes were backfilled to the surface with bentonite chips mixed with auger cuttings.

Standard Penetration Tests (SPT) were conducted in accordance with ASTM D1586 (“Standard Method for Penetration Tests and Split Barrel Sampling of Soils”) procedures and were generally completed at continuous intervals for the top 5.5 feet, then at 2.5 feet intervals thereafter for all soil borings. Soil samples were recovered using the split-spoon sampling procedure. All soil samples were sealed in glass jars in the field to protect the soil and maintain the soil’s natural moisture content, and the jars were labeled with the soil boring designation and a unique sample number. All samples were transferred to MSG’s laboratory for further analysis. The soil samples collected from this investigation will be retained in our laboratory for a period of 30 days after the date of submission of the final report, after which they will be discarded unless we are notified otherwise.

Whenever possible, groundwater level observations made during the drilling operations and are shown in the Soil Boring Logs. Prior to backfilling, each open borehole was observed again for groundwater. During drilling, the depth at

which free water was observed, where drill cuttings became saturated or where saturated samples were collected, was indicated as the groundwater level during drilling. In particular, in pervious soils (granular soils), water levels are considered relatively reliable when solid or hollow-stem augers are used for drilling. However, in cohesive soils, groundwater observations are not necessarily indicative of the static water table due to low permeability rates of the soils and due to the sealing off of natural paths of groundwater during drilling operations. It should be noted that seasonal variations and recent rainfall conditions may influence the groundwater table significantly.

Soil boring logs are included in Appendix B. Also included in Appendix B are General Soil Sample Notes, and a Boring/Well Log Key that illustrates the soil classification criteria and terminology used on the Soil Boring Logs.

2.2 Laboratory Testing

Each sample recovered from the borings was examined and visually classified. This examination was performed to verify conditions identified within field boring logs, to select samples for further laboratory evaluation, and to perform visual-manual classification of samples not subject to further laboratory testing. During the examination process, the geotechnical engineer finalized the soil boring logs.

Representative soil samples were subjected to laboratory tests consisting of pocket penetrometer tests, sieve and hydrometer analysis (ASTM D422), Atterberg Limits (ASTM D4318), natural moisture content (ASTM D2216) and unconfined compression test (ASTM D2166). A brief description of each test performed by MSG is provided in Laboratory Test Procedures in Appendix C.

All soil samples were classified in general accordance with the Unified Soil Classification System (USCS). The USCS group symbol determined from the visual-manual classification is shown in parentheses at the end of the sample description for each layer shown on the Soil Boring Logs. The results of the soil classification and the laboratory test results are included on the Soil Boring Logs and Soil Laboratory Test Data, which are presented in Appendices B and C, respectively.

3.0 SUBSURFACE CONDITIONS

3.1 Subsurface Classification

The following sections describe the subsurface conditions in terms of major soil strata for the purposes of geotechnical exploration. The soil boundaries indicated are inferred from non-continuous sampling and observations of the drilling operations and/or sampling resistance. The subsurface conditions discussed in the following sections and those shown on the boring logs represent an evaluation of the subsurface conditions based on interpretation of the field and laboratory data using normally accepted geotechnical engineering judgement and common engineering practice standards. The subsurface conditions described herein may vary beyond the boring locations and at different times of the year. A generalized soil profile of the subsurface conditions encountered across the sites, beginning at the ground surface, and extended downward is as follows:

Surficial Materials

Approximately 6 to 7 inches of topsoil was encountered at the surface at all boring locations.

Stratum 1 – Lean Clay (CL)

Lean clay with variable amounts of sand and gravel was encountered at all boring locations below the surface material and extended to depths ranging from 8.5 to 12.5 feet below the existing ground surface. This stratum was typically encountered as follows:

- Soft to stiff up to depths ranging from 2.5 to 8.5 feet below grade. The standard penetration N value ranged from 4 to 14 and averaged 8 blows per foot (bpf).
- Stiff to hard up to depths ranging from 6 to 12.5 feet below grade. The standard penetration N value ranged from 10 to 23 and averaged 16 bpf.
- Soft to stiff up to depths of 12.5 feet below grade. The standard penetration N value ranged from 4 to 11 and averaged 8 bpf.

Stratum 2 – Clayey Sand (SC)

Loose to medium dense clayey sand was encountered at boring locations B-01 and B-07. In boring B-01, the clayey sand was encountered between 4 and 6 feet below grade and had a standard penetration N value of 8 bpf. In boring B-07, the clayey sand was encountered from 8.5 feet and extended to the termination depth of the boring at 12.5 feet; the standard penetration N value ranged from 16 to 20 and averaged 18 bpf.

3.2 Groundwater Observations

During drilling operations, groundwater was encountered in boring B-07 at a depth of 11 feet below grade. No groundwater was encountered in any other boring during the drilling operations. The lack of groundwater encountered in the borings is not necessarily an indicator of the actual water levels due to the presence of cohesive soils and their inherent property of low permeability. Typically, the level where the soil color changes from brown to gray is generally indicative of the long-term groundwater level. Notable transitions from brown to gray generally occurred at a depth of about 11 feet below ground surface.

Water levels reported are accurate only for the time and date the borings were drilled. The borings were backfilled and sealed the same day that they were completed. Long-term monitoring of the boreholes was not included as part of the scope of our subsurface investigation.

It should be noted that the elevation of the natural groundwater table, and the elevation and quantity of the perched groundwater, is likely to vary throughout the year depending on the amount of precipitation, runoff, evaporation and percolation in the area, as well as on the water level in the surface water bodies in the vicinity affecting the groundwater flow pattern. Long-term monitoring with monitoring wells or piezometers such is necessary to accurately assess the groundwater levels and fluctuation patterns at the site.

4.0 ANALYSES AND RECOMMENDATIONS

4.1 Preliminary Structure Recommendations

The following sections discuss in detail the results of our analyses and preliminary geotechnical recommendations with respect to the construction of the proposed facility.

4.1.1 STRUCTURAL INFORMATION

Structural loading information was not available at the time this report was prepared. Once structural loading information is available, MSG should be permitted to review such information and their effects to our recommendations in this report.

MSG has developed the foundation recommendations presented herein based on the above project's background information, the subsurface conditions encountered during our field investigation, the results of our laboratory testing, and the results of our geotechnical analyses.

4.1.2 SHALLOW FOUNDATIONS

Based upon our review of the existing soil conditions in the planned footprint areas at the anticipated bearing depths, the bearing soils generally consist of medium stiff to stiff clay (Stratum 1). We recommend a net allowable bearing capacity of 2,000 psf in the Stratum 1 material. Soft clay soils, such as those encountered in boring B-02, B-04 and B-06, will require complete removal and replacement with engineered or lean concrete fill to a depth of approximately 2 feet below the foundation subgrade in order to achieve the above bearing capacity. Should loose granular soils be encountered at the bearing depth during construction, such as those encountered in B-01, they can be reworked in place or be completely removed and replaced with a well-compacted engineered fill or lean concrete. The on-site Geotechnical Engineer or their designated representative should determine the exact depth of any undercuts during construction.

By utilizing proper construction techniques, the total settlement underneath the proposed shallow foundations in the native clay soil is anticipated to be less than 1 inch and the differential settlement is expected to be ¾ of the total settlement.

The recommended soil bearing capacity and the associated settlement estimation are based on footing elevations with regards to existing preliminary site elevations. The required footing sizes are dependent on the column and wall loads in comparison to the above recommended net allowable bearing capacity of the bearing soil. However, wall footings should be at least 18 inches wide and column footings should have a minimum dimension of 30 inches. Exterior footing bottoms and footings in unheated areas should be no less than 32 inches below final exterior grade for protection against possible frost damage. This is the typical frost depth for central Ohio; however, local building codes may vary and will govern the footing depth. Interior footings, which should not be subject to frost action, may bear at shallower depths, provided they are supported on native compact soil or engineered fill capable of supporting the design load.

Prior to the placement of reinforcing steel and concrete, an MSG geotechnical engineer or their designated representative should evaluate foundation excavations to verify that an adequate bearing material is present and that all debris, mud, loose, frozen or water-softened soils, and unsuitable soils are removed. All footings should bear in the undisturbed natural soils or in well-compacted engineered fill. In addition, MSG recommends that a dynamic cone penetrometer (DCP) test or Housel Penetrometer Test, or similar field testing, be performed by the geotechnical engineer representative to assure a suitable bearing capacity for all foundations prior to concrete placement.

If unsuitable materials are suspected at the subgrade elevation during construction, the project Geotechnical Engineer or their designated on-site representative should be contacted, and additional soils laboratory testing may be required. Where foundation subgrade undercutting and replacement with engineered fill is required, the undercuts should extend laterally at a slope of 1(Horizontal):2(Vertical) from the edge of the footing as shown in the typical undercutting diagram below:

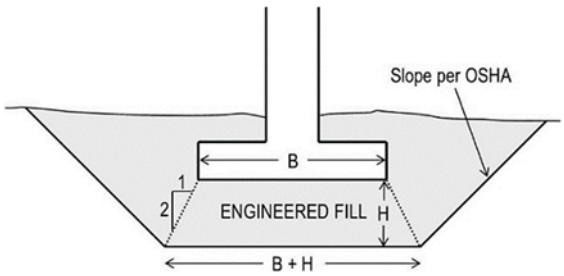


Figure 4.1.2-1 - Undercutting Diagram

Foundations should be constructed as soon as is practical after foundation excavation activities. If the foundation excavations will be left open for an extended period of time, a thin mat of lean concrete should be placed over the bottom to minimize damage to the bearing surface from weather or construction activities. Water should not be allowed to pond in any excavation. Foundation concrete should not be placed on frozen or flooded subgrade.

The final grade adjacent to the building exterior should be sloped at a minimum 2 percent grade away from the building foundations and roof drains should be routed away from the foundation soils. Foundation drains will assist in ensuring the foundation subgrade soils are not adversely impacted by moisture changes that could result in differential settlement of the foundations. To prevent moisture against the exterior footings, a perforated matted edge drain may be used around the perimeter of the footings and placed at the base of the footings. The underdrain should be backfilled with free draining material. A waterproofing membrane with a protection layer should extend from the top to the base of the footings along the exterior edge where the concrete is in direct contact with the natural or backfilled material.

If a two-pour system is used for footings and slab, the cold joint at the interface of the exterior footings and slab on grade should be located at least 4 inches above the adjacent finish exterior grade. As an alternative, the use of a waterstop between the two pours will minimize the moisture penetration through the cold joint and migration of water under the slab. A monolithic pour will eliminate the need for a waterstop.

4.1.3 SLAB-ON-GRADE

Based upon our review of the existing soil conditions in the planned foundation areas, an estimated modulus for subgrade reaction on top of the existing subgrade of 120 pounds per cubic inch (pci) may be used for slab-on-grade design. For a subgrade composed of well-compacted engineered fill, a modulus of subgrade reaction of 175 pci may be used. The final design thickness of the floor slabs, the joint spacing and slab reinforcement should be determined by the structural engineer based on the above recommended subgrade modulus, the floor loading conditions and local building code requirements.

The subgrade of the slab-on-grade areas should be inspected and tested to assure proper preparation. The subgrade soils should be protected against frost action if construction takes places during the winter. Frozen soils should be thawed, moisture conditioned and recompacted or undercut and replaced prior to commencement of slab-on-grade construction. We recommend that the floor slabs-on-grade bear directly on a minimum of 6 inches of capillary resistant granular engineered fill (well graded granular material or engineer approved equivalent) compacted to 98 percent of Standard Proctor or 95 percent of Modified Proctor Maximum Dry Density (MDD) within 2 percent of the Optimum Moisture Content (OMC).

A waterproof membrane (vapor retarder) should be placed directly beneath the concrete to minimize infiltration of water and delamination of the concrete floor slab. The moisture condition of the floor slab should be tested prior to placement of floor coverings to verify they are within tolerable limits for the floor coverings.

In order to minimize the potential impacts caused by differential settlement, the slab-on-grade should be kept structurally separate from walls and columns and saw cut control joints should be provided at suitable intervals. A minimum of 6 inches of engineered fill should be placed between the slab bottom and the top of the footings below.

4.2 Pavement Recommendation

4.2.1 SUBGRADE ANALYSIS AND REMEDIATION RECOMMENDATIONS

Based on MSG's experience, if it is determined that 30 percent or more of the pavement subgrade area requires remediation, then consideration should be given to performing a global remediation of the subgrade within the entire project pavement limits. Our analysis indicates that approximately 30 percent of the project pavement area contains soils that will require remediation due to low N_{60} values and high moisture content at the estimated subgrade elevation. Based on our evaluation, an excavation and replacement of approximately 12 to 14 inches will be required in some areas.

Please note that these depths are based on current existing site elevations and may vary depending upon the final grading plan. Final pavement grades should be evaluated with respect to the excavation and replacement depths to more accurately estimate rework and/or undercut depths and areas.

If excavating and replacement with imported granular material is preferred or required, then the natural filter criteria for the subgrade must be met or a geotextile filter fabric is required for undercut areas. The following criteria are considered:

1. (D_{15} granular fill) / (D_{85} subgrade) is less than or equal to 5; and
2. (D_{50} granular fill) / (D_{50} subgrade) is less than or equal to 25.

Based on our laboratory testing results, both the above criteria are generally not met for this site based on typical granular fill materials. Therefore, a geotextile filter fabric is recommended for the pavement section at the interface of the subgrade and granular fill materials. If a different gradation of granular material is specified for use, then the use of a geotextile filter fabric should be re-evaluated.

Detailed site grading plans should be reviewed to accurately assess the need for global pavement subgrade stabilization. If it is determined that global stabilization of the pavement subgrade is preferred, consideration should be given to global chemical stabilization using cement. The depth of chemical stabilization is 14 inches. Additional soil samples will be required for laboratory sulfate testing if chemical stabilization is determined to be necessary and preferred. It should be noted that MSG does not recommend chemical stabilization if the number of sulfates present in the subgrade soils exceeds 5,000 parts per million (ppm).

The actual depths and limits of subgrade stabilization, excavate and replacement, should be determined during proof-rolling operations and should be performed under the direction of the project geotechnical engineer or his/her designated on-site representative. Final proof-rolling of the subgrade surface can be used to determine acceptability. For global stabilization, only final proof-rolling shall be performed after the stabilization has been implemented.

MSG recommends that construction traffic be minimized once the proposed subgrade level has been attained. If construction traffic is allowed to traverse over the exposed subgrades, the quantity of soil identified as potentially requiring remediation based on proof rolling operations may increase.

4.2.2 PAVEMENT SECTION RECOMMENDATION

Based on the soil characteristics from the preliminary geotechnical investigation, a design California Bearing Ratio (CBR) value of 4 and resilient modulus of 4,800 psi was estimated using parameters obtained from field and laboratory testing. Field CBR testing was not performed. The pavement design input parameters are established based on the procedures contained in the 1993 Guide for Design of Pavement Structures by AASHTO. For the basis of the design, MSG assumed the following input parameters:

Table 4.2.2-1 Assumed Pavement Design Parameters

Design Life	20 Years
Design ESAL	100,000 (Light Duty); 300,000 (Heavy Duty)
Reliability	80 %
Original Serviceability Index	4.2 (Flexible Paving); 4.5 (Rigid Paving)
Terminal Serviceability Index	2.0
Overall Standard Deviation	0.45 (Flexible Paving); 0.35 (Rigid Paving)

Ohio CAT Facilities are either designated as Power System Division or other non-heavy equipment/non-grouser-tracked vehicle use sites which only handle rubber tired vehicles or are designated as Heavy Equipment (grouser tracked vehicle use) Sites which handles tracked equipment. The preliminary pavement sections outlined in Tables 4.2.2-2 and 4.2.2-3, and the gravel section outlined in Table 4.2.2-4 are to be used in non-heavy equipment/non-grouser-tracked areas. Tables 4.2.2-5 and 4.2.2-6 outline the pavement and gravel sections to be used on Heavy Equipment grouser tracked vehicle areas.

For flexible pavement design in non-heavy equipment/non-grouser- tracked areas, MSG assumed structural number coefficients of 0.42, 0.14 and 0.16 for asphalt concrete, dense graded aggregate base and crushed stone base, respectively. Based on the above assumptions, recommended flexible pavement sections (in inches) are provided in the following table.

Table 4.2.2-2 Recommended Flexible Pavement Sections

Pavement Materials*	ODOT Specification	Light Duty (in.)**	Heavy Duty (in.)
Surface Course (ODOT Item 441.02)	(Type I, (448) PG 64-22)	1.50	1.75
Intermediate Course (ODOT Item 441.02)	(Type 2, (448) PG 64-22)	2.00	2.25*
Aggregate Base (ODOT Item 304)	(ODOT Item 304)	8.0	10.0

*May require two courses to achieve the minimum required thickness.
** Local codes may require a thicker light duty pavement section.

For rigid pavement design, MSG assumed a concrete elastic modulus (E_c) of 5,000,000 psi, a concrete rupture modulus (S'_c) of 700 psi and a load transfer coefficient (J) of 2.7. Based on the above assumptions, recommended rigid pavement sections are provided in the following table.

Table 4.2.2-3 Recommended Rigid Pavement Sections

Pavement Materials*	Light Duty (in.)	Heavy Duty (in.)
Portland Cement Concrete	6.0	6.0
Aggregate Base	6.0	8.0

* Use pavement materials as outlined above, or engineer/owner approved equivalent.

For an aggregate storage lot in non-heavy equipment/non-grouser-tracked areas, Ohio CAT typical details and subsurface conditions are used for the design parameters. The Ohio Department of Transportation equivalents are listed below. AASHTO M288 Class 1 Woven Geotextile should be installed beneath the Crushed Stone Base.

Table 4.2.2-4 Recommended Gravel Lot Section

Materials*	Typical (in.)
Dense Graded Aggregate	6.0
Crushed Stone Base (1.5"-3.5" Diameter)	8.0

* Use pavement materials as outlined above, or engineer/owner approved equivalent.

For rigid pavement design in Heavy Equipment/grouser- tracked areas, MSG assumed a concrete elastic modulus (E_c) of 5,000,000 psi, a concrete rupture modulus (S'_c) of 700 psi and a load transfer coefficient (J) of 2.7. Based on the above assumptions, recommended rigid pavement sections are provided in the following table, using a mix that is designed sufficiently to withstand the anticipated grouser-impact loads and provide resistance to the determination of slab joints by the grouser loading. Similarly, joint spacing should be optimized to reduce the frequency of grouser-to-joint contact.

Table 4.2.2-5 Recommended Rigid Pavement Section

Pavement Materials*	Typical (in.)
Portland Cement Concrete	10.0
Dense Graded Aggregate	4.0

* Use pavement materials as outlined above, or engineer/owner approved equivalent.

For an aggregate storage lot in Heavy Equipment/grouser tracked areas, Ohio CAT typical details and subsurface conditions are used for the design parameters. The Ohio Department of Transportation equivalents are listed below. AASHTO M288 Class 1 Woven Geotextile should be installed beneath the Crushed Stone Base.

Table 4.2.2-6 Recommended Aggregate Storage Lot Section

Materials*	Typical (in.)
Crushed Stone Base (1.5"-3.5" Diameter)	14.0

* Use pavement materials as outlined above, or engineer/owner approved equivalent.

Site preparation recommendations presented in Section 4.3 shall be followed to provide subgrade conditions suitable for pavement or gravel section support. Adequate drainage should be provided to ensure a successful service life is achieved. MSG highly recommends that underdrains be utilized around catch basins and in other low areas to limit the accumulation of water below the these sections.

4.3 Site Preparation

Before proceeding with construction, surface soils, vegetation, topsoil, root systems, refuse, asphalt, concrete including any existing abandoned buried foundations, and other deleterious materials should be stripped from the proposed development/construction areas. Depending on the time of year of construction and the Contractor's Means and Methods at controlling surface water, it may be possible that portions of the upper 6 to 21 inches of the site material within development/construction areas will be considered unsuitable (topsoil) and/or unstable and will be required to be stripped during site preparation activities.

Cohesive soils are moisture sensitive and could become unstable if proper site water controls are not implemented and/or if they are subject to construction traffic. Every effort should be taken to minimize disturbance during compaction or over excavation. Where possible, free-standing water should be diverted away from the construction perimeters or pumped out using a sump to accommodate the proper compaction techniques.

Generally, areas exposed by stripping operations on which subgrade preparations are to be performed should be compacted in place to 98 percent of Standard Proctor or 95 percent of Modified Proctor MDD within 2 percent of the OMC. If there are areas where the building floor slabs will be located partially on a fill area and partially on a cut area, it is recommended that the depth of subgrade compaction in the cut area be increased to 18 inches, in order to provide uniform support of the rigid slab.

It is recommended that the prepared subgrade for pavement and slab-on-grade areas be proof-rolled to detect any unstable areas. Proof-rolling should be accomplished by making a minimum of two complete passes in each of two perpendicular directions with a fully loaded tandem-axle dump truck, or other approved pneumatic-tired vehicle, with a minimum weight of 20 tons. If proof-rolling reveals the presence of unstable areas within the subgrade, certain remedial measures will be required to stabilize the subgrade. Depending on the severity of distress encountered during proof-rolling, undercutting of 12 inches below subgrade and backfilling with engineered fill as outlined in Section 4.4 may be performed. If an undercut and replacement of the top 12 inches fails to stabilize the subgrade, use of granular backfill with geogrid stabilization may be required. Undercuts may be reduced 6 inches if geogrid and granular backfill is utilized. Granular soils at the subgrade surface may be reworked in place in order to pass a proof-roll. Alternately, chemical stabilization of the upper 14 inches with cement may be performed. It should be noted that MSG does not recommend chemical stabilization if the number of sulfates present in the subgrade soils exceeds 5,000 ppm. The actual undercut depths and/or subgrade remediation measures required should be determined by the on-site Geotechnical Engineer or a designated representative.

Existing abandoned utilities or underground structures within the proposed location were not identified but may be present. If such utilities are present, they should be removed and relocated or abandoned in place. If abandoned in place, it is recommended that the utility pipe be filled with cement grout to mitigate the potential for collapse in the future. Should the utility lines be removed from the site, the resultant trench excavations should be backfilled with well-compacted granular material, placed and compacted in accordance with the recommendations of Section 4.4.

4.4 Fill Placement and Engineered Fill Requirements

All new fill should consist of inorganic soil that is free from all deleterious materials and construction debris. Fill materials should not be placed in a frozen condition or upon frozen subgrades. Proper drainage should be maintained during and after fill placement to prevent water from impacting compaction efforts or long-term fill integrity. All fine-grained fill soils should be checked for plasticity index and liquid limit before placement. Cohesive fill materials should have a liquid limit less than 50 percent (i.e., non-expansive). The on-site cohesive soils should be evaluated prior to reuse as structural fill by a qualified geotechnical engineer.

Coarse crushed granular material (ODOT 304) is preferred as fill for replacement of undercut areas, utility trench backfill and as aggregate base material for pavement and slab-on-grade areas. The coarse crushed granular material may consist of natural aggregate materials or geotechnical engineer approved equivalent. Typical lift thickness utilized for this material is 8 inches. In utility trenches, granular backfill material should extend at least two pipe diameters above the pipe's crown. If a working platform for the new building construction is needed, and prior to footing excavation, it is recommended that at least 6 inches of granular base material meeting the gradation requirements ODOT Item 304 aggregate be placed and compacted. As an alternative to imported granular fill, excavated soil material may be recompacted back in place so long as the excavated soil material is determined to be suitable.

Fill should be compacted to 98 percent of the Standard Proctor or 95 percent of Modified Proctor MDD and should be compacted within 2 percent of OMC. Fill materials should be placed in horizontal lifts and adequately keyed into stripped and scarified subgrade soils and adjacent fill. A qualified geotechnical consultant should be retained to monitor fill placement in order to assure compaction requirements are achieved. Soil density testing should be performed during fill placement activities to assure proper fill compaction. A commonly used testing criterion is one test per 2,500 square feet

per lift in areas to support proposed structures and one test per 5,000 square feet in parking lots, driveways, exterior slabs, etc., with a minimum of three tests per lift. Areas that do not achieve compaction requirements after initial placement should be recompacted to meet project requirements.

The actual lift thickness suitable for fill placement is dependent upon the soil type, compaction equipment, and the compaction specification. In general, fill should be placed in a 9-inch loose lift thickness (8-inch compacted); assuming appropriately weighted and ballasted compaction equipment is utilized. In confined areas where hand operated compaction equipment is required, 4-inch and 6-inch loose lift thickness should be utilized for hand operated vibratory plate compactors and hand operated vibratory drum rollers weighing at least 1,000 pounds, respectively. Sand fills should be compacted using smooth vibratory rollers. Clay fills should be compacted using a sheep foot compactor. The geotechnical engineer, as part of the construction monitoring, should review the equipment utilized for compaction to confirm suitability relative to the specified loose lift thickness. If necessary, the geotechnical engineer will recommend a revised lift thickness suitable to the equipment performing compaction.

4.5 Lateral Earth Pressures & Retaining Walls

Lateral earth pressures (horizontal stresses) are developed during soil displacements (strains). Lateral earth pressure for design is determined utilizing an earth pressure coefficient to relate horizontal stress to vertical stress. Three separate earth pressure coefficients are used to determine lateral earth pressure: at-rest; active; and passive.

Applied horizontal stress can be determined by multiplying the appropriate earth pressure coefficient by the applied vertical stress. Earth pressure coefficients are a direct function of the internal friction of a soil. Laboratory testing to determine internal friction angles for soil was not performed. However, index laboratory and field data obtained can be utilized to approximate earth pressure coefficients based upon empirical relationships. Lateral earth pressure coefficients for soils encountered during this investigation are provided in Table 4.5-1.

Table 4.5-1 Recommended Lateral Earth Parameters

Soil Parameters	Engineered Granular Soil	Existing Soils	
		Stiff Lean Clay (Stratum 1)	Clayey Sand (Stratum 2)
Total Unit Weight (pcf)	125	135	120
Internal Friction Angle (°)	30.0	25.0	28.0
At-rest Pressure Coefficient, K_o	0.50	0.58	0.55
Active Pressure Coefficient, K_a	0.33	0.40	0.35
Passive Pressure Coefficient, K_p	3.0	2.5	2.8
Concrete/Soil Friction Coefficient	0.5	0.0	0.5
Concrete/Soil Adhesion Factor	0.0	0.2	0.0

For retaining walls, to minimize lateral earth pressures, MSG recommends the zone adjacent to any walls be backfilled with granular fill. To provide effective drainage, a zone of free-draining gravel (similar to AASHTO No. 57 stone) should be used directly adjacent to the walls with a minimum thickness of 18 inches. This granular zone should drain to weepholes or a pipe drainage system to prevent hydrostatic pressures from developing against the walls.

The type of backfill beyond the free-draining granular zone will govern the magnitude of the pressure to be used for structural design. Clean granular soil is recommended as the backfill material against retaining structures to minimize lateral earth pressure. Lateral earth pressure coefficients for engineered fill are provided in Table 4.5-1.

The coefficients of friction between concrete and soil subgrade were also provided in the table above. These coefficients can be used for evaluating the factor of safety against sliding of foundations. The recommended minimum safety factor against sliding is 1.5. Passive pressure resistance of the top 3 feet below final grade should generally be neglected in designing the retaining walls to resist sliding failure due to the freeze-thaw cycle that can significantly weaken soils and the potential for the material to be removed at a future date for installation of utilities or other construction-related activities.

Any additional lateral earth pressure due to surcharge loading conditions including, but not limited to, floor loads, column loads, sloping backfill, traffic loading, and construction loads, should be incorporated into the wall design. MSG should be retained to perform other detailed geotechnical evaluations for retaining walls, as necessary, including but not limited to, settlement and global stability. A detailed geotechnical evaluation and structural design of retaining walls is beyond the scope of this report.

4.6 Site Seismic Classification

According to ASCE 7-22 Table 20.2-1, the proposed site is designated as "Site Class D" based on the average number of the Standard Penetration Test N values, the soil shear strength of the upper 12.5 feet of soil (the maximum depth for which we have soil information) and assumed subsurface conditions to a depth of 100 feet.

5.0 CONSTRUCTION CONSIDERATIONS

5.1 Groundwater Control

Groundwater was encountered in only one boring (B-07) at a depth of 11 feet below grade during drilling operations. The long-term groundwater level may be estimated at 11 feet below existing grade based on notable color transitions of the cohesive soil from brown to gray, which may indicate the presence of a long-term groundwater table.

The location of the level of groundwater is of importance in shallow foundations for a number of reasons. Most importantly, the bearing capacity of the soil is affected by the presence of a high-water table, decreasing the bearing capacity. Typically, the groundwater elevation fluctuates and is higher during the winter and spring and lower in summer and early fall. It should be noted that groundwater seepage will have a significant impact on construction activities.

For standard shallow excavations, significant problems associated with groundwater seepage into the excavation are not anticipated, provided the Contractor be prepared to address localized groundwater accumulation, perched groundwater, or surface run off (i.e., pumping water from prepared sumps). The amount and type of dewatering required during construction will be further impacted by the weather, groundwater levels at the time of construction, the effectiveness of the Contractor's techniques in preventing surface water runoff from entering open excavations, and their ability to lower the groundwater table. The final design of any temporary earth support structures for excavations, as well as the associated dewatering and groundwater control plan, will be completed by the Contractor.

To manage surface water, slopes in pavement areas should consist of 1.5 percent slopes towards inlets or drainage structures, building exteriors should have a minimum of 2 percent slopes away from the building and discharge points (i.e., roof down spouts) should consist of closed conduits and divert away from the buildings to inlets or drainage structures. The use of perimeter drains and/or sub-drains may be necessary on approval of the site civil design engineer. The project civil engineer is responsible for designing the surface drainage improvements.

5.2 Excavations and Slope

Familiarity with applicable local, state and federal safety regulations, including current OSHA excavation and trench safety is vital. Therefore, it should be a requisite for both the Owner and Contractor with the Contractor by and large

being responsible for the safety of the site. Activities at the site, such as utilities or building demolition and site preparation, may require excavations at significant depths below the ground surface. Slope height, slope inclination, and excavation depth (including utility trench excavations) should in no case exceed those specified in local, state, or federal safety (OSHA Health and Safety Standards for Excavations, 29 CFR Part 1926 Subpart P) regulations. Such regulations are strictly enforced and, if not followed, the Owner, Contractor, or earthwork or utility Subcontractors could be liable for substantial penalties.

The overburden soils encountered during our investigation were generally composed of soft to very stiff clay and some loose granular material. Based upon the data obtained, we anticipate OSHA will classify the clay soils as Type C soil, which will be limited to a maximum temporary excavation slope of 1.5(H):1(V). Flatter slopes are required where soils are stockpiled or in the vicinity of existing structures. If sufficient room is not available for sloping the excavation walls, temporary shoring will be required. It is our recommendations that any excavation in excess of 5 feet in depth, extending into bedrock, or excavations requiring temporary shoring should be designed by a professional engineer.

6.0 GENERAL QUALIFICATIONS AND LIMITATIONS

The evaluations, conclusions and recommendations in this report are based on our interpretation of the field and laboratory data obtained during the preliminary geotechnical investigation, our understanding of the project and our experience during previous work, with similar sites and subsurface conditions. Data used during this limited exploration included:

- Seven (7) soil borings performed during this investigation;
- Observations of the project site by our staff;
- Results of laboratory soil testing; and,
- Results of the geotechnical analyses.

The subsurface conditions discussed in this report and those shown on the boring logs represent an estimate of the subsurface conditions based on interpretation of the boring data using normally accepted geotechnical engineering judgments. Although individual test borings are representative of the subsurface conditions at the boring locations on the dates shown, they are not necessarily indicative of subsurface conditions at other locations or at other times. MSG is not responsible for independent conclusions, opinions, or recommendations made by others based upon information presented in this report.

We strongly recommend the final project plans and specifications be reviewed by MSG's geotechnical engineer to confirm that the geotechnical aspects are consistent with the recommendations of this report. In particular, the specifications for excavation and foundation construction should be prepared and/or reviewed by MSG's Geotechnical Engineer of Record. In addition, we recommend site subgrade preparation, fill compaction activities, and foundation installation activities should be monitored by MSG's geotechnical engineer or his/her representative.

This report and evaluation reflect the geotechnical aspects of the subsurface conditions at the site. Review and evaluation of environmental aspects of subsurface conditions are beyond the scope of this report.

APPENDIX A

FIGURE 1 – SITE LOCATION MAP

FIGURE 2 – SOIL BORING LOCATION PLAN



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Figure 1: Site Location Map
OCAT-Miamisburg, OH Rental Site
490 Byers Road, Miamisburg, Ohio
MSG Project Number: 401.2500964.000

Map Adapted from
Google Earth 2025 ®

N



Mannik Smith GROUP

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Figure 2: Boring Location Map
OCAT-Miamisburg, OH Rental Site
490 Byers Road, Miamisburg, Ohio
MSG Project Number: 401.2500964.000

Map Adapted from
Google Earth 2025 ®

N

APPENDIX B

SOIL BORING LOGS

GENERAL SOIL SAMPLE NOTES

Unless noted, all terms utilized herein refer to the Standard Definitions presented in ASTM D653.

Standard Penetration Test (ASTM D1586): A 2.0-inch outside-diameter (O.D.), 1-3/8-inch inside-diameter (I.D.) split barrel sampler is driven into undisturbed soil by means of a 140-pound weight falling freely through a vertical distance of 30 inches. The sampler is normally driven three successive 6-inch increments. The total number of blows required for the final 12 inches of penetration is the Standard Penetration Resistance (N).

COHESIVE SOILS			COHESIONLESS SOILS	
Consistency	Approximate Range of N	Unconfined Compressive Strength (psf)	Density Classification	Approximate Range of N
Very Soft	0 – 1	Below 500	Very Loose	0 – 4
Soft	2 – 4	500 – 1,000	Loose	5 – 10
Medium Stiff	5 – 8	1,000 – 2,000	Medium Dense	11 – 30
Stiff	9 – 15	2,000 – 4,000	Dense	31 – 50
Very Stiff	16 – 30	4,000 – 8,000	Very Dense	Over 50
Hard	31 – 50	8,000 – 16,000		
Very Hard	Over 50	Over 16,000		

CLASSIFICATION

The major soil constituent is the principal noun, i.e. sand, silt, gravel. The second major soil constituent and other minor constituents are reported as follows:

Second Major Constituent (percent by weight)	Minor Constituents (percent by weight)
Trace – 1% to 11%	Trace – 1% to 11%
Adjective – 12% to 35% (clayey, silty, etc.)	Little – 12% to 22%
	Some – 23% to 33%
And – Over 35%	

PARTICLE SIZES

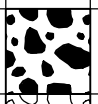
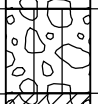
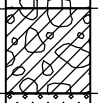
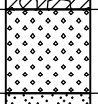
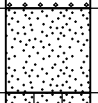
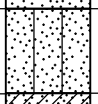
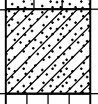
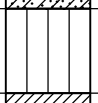
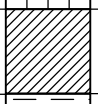
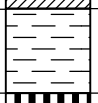
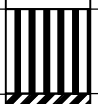
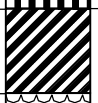
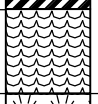
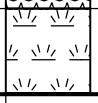
Boulders		- Greater than 12 inches (305 mm)
Cobbles		- 3 inches (76.2 mm) to 12 inches (305 mm)
Gravel:	Coarse	- ¾ inches (19.05 mm) to 3 inches (76.2 mm)
	Fine	- No.4 (4.75 mm) to ¾ inches (19.05 mm)
Sand:	Coarse	- No. 10 (2.00 mm) to No. 4 (4.75 mm)
	Medium	- No. 40 (0.425 mm) to No. 10 (2.00 mm)
	Fine	- No. 200 (0.074 mm) to No. 40 (0.425 mm)
Silt		- 0.005 mm to 0.074 mm
Clay		- Less than 0.005 mm

If clay content is sufficient so that clay dominates soil properties, clay becomes the principal noun with the other major soil constituent as modifier: i.e., silty clay. Other minor soil constituents may be included in accordance with the classification breakdown for cohesionless soils: i.e., silty clay, trace sand, little gravel.

If sand particle size is greater than 11% by weight of the total sample weight, the adjective (i.e., fine, medium or coarse) is added to the soil description for the sand portion of the sample, provided sand is the major or second major constituent.

SAMPLE DESIGNATIONS

AS	Auger Sample - directly from auger flight	ST	Shelby Tube Sample - 3-inch diameter unless otherwise noted
BS	Miscellaneous Samples - Bottle or Bag	PS	Piston Sample - 3-inch diameter unless otherwise noted
MC	Macro-Core Sample - 2.25-inch O.D., 1.75-inch I.D., 5 feet long polyethylene liner	RC	Rock Core - NX core unless otherwise noted
LB	Large-Bore (Micro-Core) Sample - 1-inch diameter, 2 feet long polyethylene liner	CS	CME Continuous Sample - 5 feet long, 3-inch diameter unless otherwise noted
SS	Split Spoon Sample - 1-inch or 2-inch O.D.	HA	Hand Auger
LS	Split Spoon (SS) Sampler with 3 feet long liner insert	DP	Drive Point
NR	No Recovery	CM	Coring Machine

MAJOR DIVISIONS					TYPICAL NAMES
COARSE-GRAINED SOILS MORE THAN HALF IS COARSER THAN NO. 200 SIEVE	GRAVELS MORE THAN HALF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE	CLEAN GRAVELS WITH LESS THAN 15% FINES	GW		WELL-GRADED GRAVELS WITH OR WITHOUT SAND
			GP		POORLY-GRADED GRAVELS WITH OR WITHOUT SAND
		GRAVELS WITH 15% OR MORE FINES	GM		SILTY GRAVELS WITH OR WITHOUT SAND
			GC		CLAYEY GRAVELS WITH OR WITHOUT SAND
	SANDS MORE THAN HALF COARSE FRACTION IS FINER THAN NO. 4 SIEVE SIZE	CLEAN SANDS WITH LESS THAN 15% FINES	SW		WELL-GRADED SANDS WITH OR WITHOUT GRAVEL
			SP		POORLY-GRADED SANDS WITH OR WITHOUT GRAVEL
		SANDS WITH 15% OR MORE FINES	SM		SILTY SANDS WITH OR WITHOUT GRAVEL
			SC		CLAYEY SANDS WITH OR WITHOUT GRAVEL
FINE-GRAINED SOILS MORE THAN HALF IS FINER THAN NO. 200 SIEVE	SILTS AND CLAYS LIQUID LIMIT 50% OR LESS		ML		INORGANIC SILTS OF LOW TO MEDIUM PLASTICITY WITH OR WITHOUT SAND OR GRAVEL
			CL		INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY WITH OR WITHOUT SAND OR GRAVEL
			OL		ORGANIC SILTS OR CLAYS OF LOW TO MEDIUM PLASTICITY WITH OR WITHOUT SAND OR GRAVEL
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50%		MH		INORGANIC SILTS OF HIGH PLASTICITY WITH OR WITHOUT SAND OR GRAVEL
			CH		INORGANIC CLAYS OF HIGH PLASTICITY WITH OR WITHOUT SAND OR GRAVEL
			OH		ORGANIC SILTS OR CLAYS OF HIGH PLASTICITY WITH OR WITHOUT SAND OR GRAVEL
HIGHLY ORGANIC SOILS			PT		PEAT AND OTHER HIGHLY ORGANIC SOILS

SYMBOLS KEY

SAMPLE TYPES

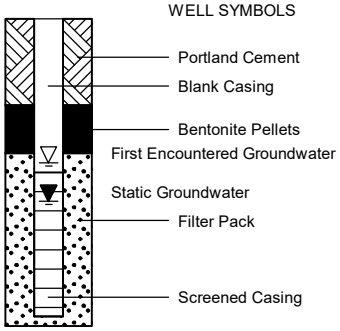

Grab Sample


Rock Core

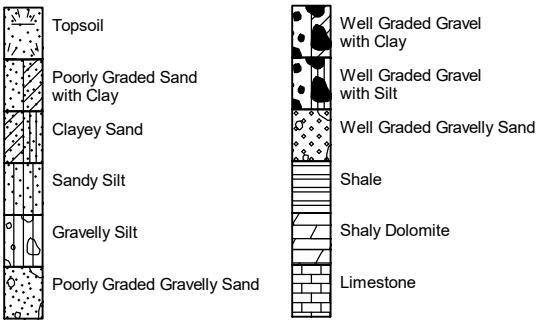

Split Spoon sample, 1 inch or 2 inch outer-diameter.


Shelby Tube sample - 3 inch diameter unless otherwise noted.

WELL SYMBOLS



OTHER MATERIAL SYMBOLS



Mannik Smith GROUP

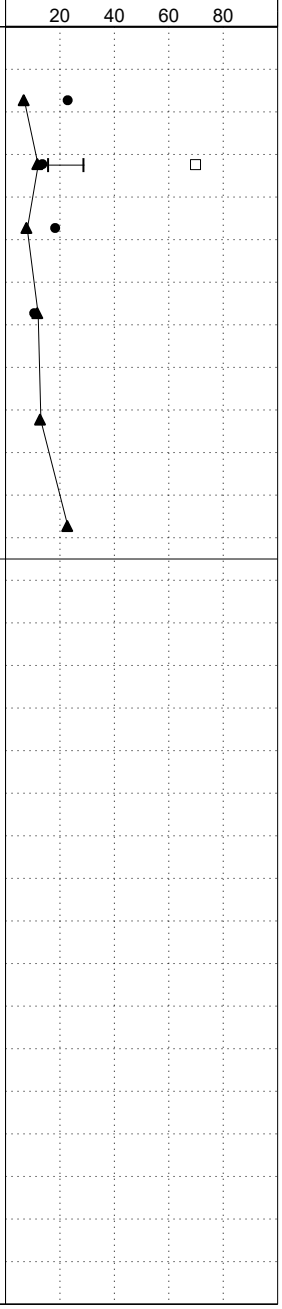
BORING / WELL LOG KEY

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BOREHOLE NUMBER B-01

CLIENT Ohio CAT
PROJECT NAME OCAT - Miamisburg OH Rental Site
PROJECT NUMBER 401.2500964.000
PROJECT LOCATION Miamisburg, Ohio
DATE STARTED 07-30-2025 **COMPLETED** 07-30-2025
POSITION Lat.: 39.636434° Long.: -84.232488°
DRILLING CONTRACTOR The Mannik & Smith Group, Inc.
SURFACE ELEVATION 1022.0 ft **FINAL DEPTH** 12.5 ft
DRILLING METHOD Direct Push
LOGGED BY JT **CHECKED BY** GVA
EQUIPMENT Geoprobe 7822DT **Operator** MH
REMARKS Elevations & coordinates estimated from Google Earth®.

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)
		0.6 TOPSOIL - 7 INCHES 1021.4				
		Lean CLAY with sand (CL): medium stiff to stiff; brown; moist to damp.	SPT SS-1	72	2-3-4 (7)	2.00
		- At 2.5 feet, stiff to very stiff	SPT SS-2	100	4-5-7 (12)	4.00
		4.0 1018.0 Clayey SAND (SC): loose; brown; moist.	SPT SS-3	100	4-6-2 (8)	
5	1017	6.0 1016.0 Sandy Lean CLAY (CL): stiff to very stiff; brown; moist; trace gravel.	SPT SS-4	22	3-6-6 (12)	3.00
			SPT SS-5	22	4-5-8 (13)	4.00
10	1012	11.0 1011.0 Sandy Lean CLAY (CL): very stiff to hard; gray; moist; trace gravel.	SPT SS-6	22	4-11-12 (23)	4.50
		12.5 1009.5 Terminated at 12.50 ft. Reached Target Depth.				
15	1007					
20	1002					
25	997					



LEGEND:

- ▽ AT TIME OF DRILLING
- ▼ AT END OF DRILLING
- ⧩ AFTER DRILLING

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BOREHOLE NUMBER B-02

CLIENT Ohio CAT
PROJECT NAME OCAT - Miamisburg OH Rental Site
PROJECT NUMBER 401.2500964.000
PROJECT LOCATION Miamisburg, Ohio
DATE STARTED 07-30-2025 **COMPLETED** 07-30-2025
POSITION Lat.: 39.635844° Long.: -84.232632°
DRILLING CONTRACTOR The Mannik & Smith Group, Inc.
SURFACE ELEVATION 1026.0 ft **FINAL DEPTH** 12.5 ft
DRILLING METHOD Direct Push
LOGGED BY JT **CHECKED BY** GVA
EQUIPMENT Geoprobe 7822DT **Operator** MH
REMARKS Elevations & coordinates estimated from Google Earth®.

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)
			0.5 TOPSOIL - 6 INCHES 1025.5				
			Lean CLAY with sand (CL): stiff to very stiff; brown; moist to damp.	SPT SS-1	78	4-4-5 (9)	3.00
			- At 2.5 feet, soft to medium stiff	SPT SS-2	78	1-0-4 (4)	1.00
			- At 4 feet, stiff to very stiff	SPT SS-3	89	4-7-7 (14)	3.75
5	1021		6.0 1020.0				
			Sandy Lean CLAY (CL): medium stiff to stiff; brown; moist.	SPT SS-4	100	4-3-3 (6)	1.50
			- At 8.5 feet, stiff to very stiff	SPT SS-5	100	4-6-7 (13)	2.75
10	1016		11.0 1015.0				
			Sandy Lean CLAY (CL): stiff to very stiff; gray; moist; trace gravel.	SPT SS-6	100	4-7-7 (14)	4.00
			12.5 1013.5				
			Terminated at 12.50 ft. Reached Target Depth.				
15	1011						
20	1006						
25	1001						

▲ N Value
● Moisture Content (%)
I Plastic/Liquid Limit (%)
□ Fines Content (%)
20 40 60 80

LEGEND:

▽ **AT TIME OF DRILLING**
▼ **AT END OF DRILLING**
▼ **AFTER DRILLING**

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www.manniksmithgroup.com

BOREHOLE NUMBER B-03

CLIENT Ohio CAT
PROJECT NAME OCAT - Miamisburg OH Rental Site
PROJECT NUMBER 401.2500964.000
PROJECT LOCATION Miamisburg, Ohio
DATE STARTED 07-30-2025 **COMPLETED** 07-30-2025
POSITION Lat.: 39.635207° Long.: -84.232883°
DRILLING CONTRACTOR The Mannik & Smith Group, Inc.
SURFACE ELEVATION 1023.0 ft **FINAL DEPTH** 12.5 ft
DRILLING METHOD Direct Push
LOGGED BY JT **CHECKED BY** GVA
EQUIPMENT Geoprobe 7822DT **Operator** MH
REMARKS Elevations & coordinates estimated from Google Earth®.

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)
			0.5 TOPSOIL - 6 INCHES 1022.5				
			Sandy Lean CLAY (CL): stiff to very stiff; brown; moist; trace gravel.	SPT SS-1	100	3-4-5 (9)	3.50
				SPT SS-2	78	2-7-15 (22)	4.00
5	1018			SPT SS-3	11	8-8-9 (17)	4.00
			- At 6 feet, medium stiff to stiff	SPT SS-4	11	2-3-3 (6)	2.00
			- At 8.5 feet, stiff to very stiff	SPT SS-5	100	2-4-7 (11)	3.00
10	1013		11.0 1012.0				
			Sandy Lean CLAY (CL): stiff to very stiff; gray; moist; trace gravel.	SPT SS-6	100	4-4-5 (9)	3.00
			12.5 1010.5				
			Terminated at 12.50 ft. Reached Target Depth.				
15	1008						
20	1003						
25	998						

▲ N Value
● Moisture Content (%)
I Plastic/Liquid Limit (%)
□ Fines Content (%)
20 40 60 80

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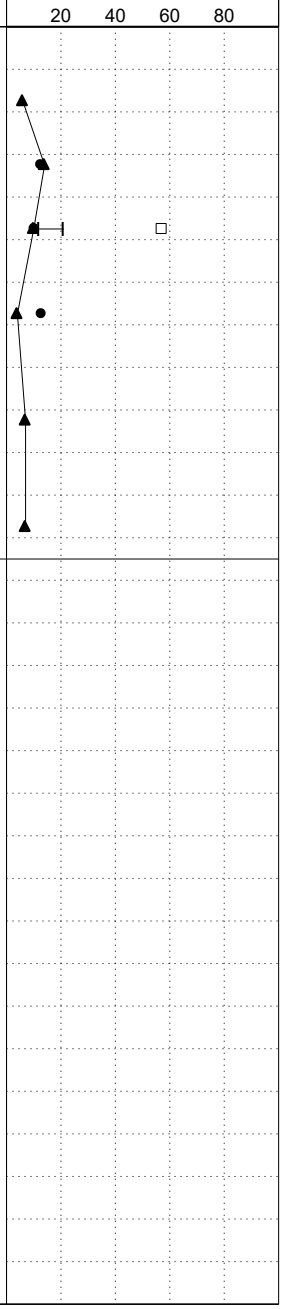
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▼ **AT END OF DRILLING**
▼ **AFTER DRILLING**

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www.manniksmithgroup.com

BOREHOLE NUMBER B-04

CLIENT Ohio CAT
PROJECT NAME OCAT - Miamisburg OH Rental Site
PROJECT NUMBER 401.2500964.000
PROJECT LOCATION Miamisburg, Ohio
DATE STARTED 07-30-2025 **COMPLETED** 07-30-2025
POSITION Lat.: 39.635323° Long.: -84.233674°
DRILLING CONTRACTOR The Mannik & Smith Group, Inc.
SURFACE ELEVATION 1022.0 ft **FINAL DEPTH** 12.5 ft
DRILLING METHOD Direct Push
LOGGED BY JT **CHECKED BY** GVA
EQUIPMENT Geoprobe 7822DT **Operator** MH
REMARKS Elevations & coordinates estimated from Google Earth®.

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)
		0.5 TOPSOIL - 6 INCHES 1021.5				
		Sandy Lean CLAY (CL): medium stiff to stiff; brown; moist; trace gravel.	SPT SS-1	100	2-2-4 (6)	2.00
		- At 2.5 feet, stiff to very stiff	SPT SS-2	100	3-6-8 (14)	4.00
		- Qu = 6,900 psf	SPT SS-3	100	4-5-5 (10)	3.50
5	1017	6.0 1016.0				
		Sandy Lean CLAY (CL): soft to medium stiff; brown; moist; trace gravel.	SPT SS-4	100	2-2-2 (4)	1.00
			SPT SS-5	100	2-3-4 (7)	1.00
10	1012	11.0 1011.0				
		Sandy Lean CLAY (CL): medium stiff to stiff; gray; moist; trace gravel.	SPT SS-6	100	3-3-4 (7)	1.50
		12.5 1009.5				
		Terminated at 12.50 ft. Reached Target Depth.				
15	1007					
20	1002					
25	997					



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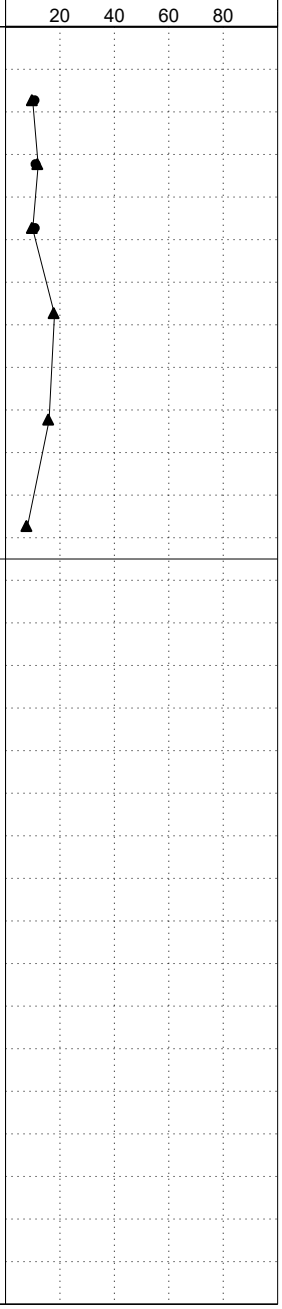
▽ AT TIME OF DRILLING
▼ AT END OF DRILLING
▼ AFTER DRILLING

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BOREHOLE NUMBER B-05

CLIENT Ohio CAT
PROJECT NAME OCAT - Miamisburg OH Rental Site
PROJECT NUMBER 401.2500964.000
PROJECT LOCATION Miamisburg, Ohio
DATE STARTED 07-30-2025 **COMPLETED** 07-30-2025
POSITION Lat.: 39.635751° Long.: -84.233866°
DRILLING CONTRACTOR The Mannik & Smith Group, Inc.
SURFACE ELEVATION 1022.0 ft **FINAL DEPTH** 12.5 ft
DRILLING METHOD Direct Push
LOGGED BY JT **CHECKED BY** GVA
EQUIPMENT Geoprobe 7822DT **Operator** MH
REMARKS Elevations & coordinates estimated from Google Earth®.

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)
		0.5 TOPSOIL - 6 INCHES 1021.5				
		Sandy Lean CLAY (CL): stiff to very stiff; brown; moist; trace gravel.	SPT SS-1	100	2-4-6 (10)	3.50
			SPT SS-2	100	3-5-7 (12)	4.00
5	1017		SPT SS-3	100	3-4-6 (10)	4.00
			SPT SS-4	22	9-8-10 (18)	2.50
		8.5 1013.5				
		Sandy Lean CLAY (CL): very stiff; gray; damp; trace gravel.	SPT SS-5	100	3-7-9 (16)	2.50
10	1012	- At 11 feet, medium stiff to stiff	SPT SS-6	100	2-3-5 (8)	2.00
		12.5 1009.5				
		Terminated at 12.50 ft. Reached Target Depth.				
15	1007					
20	1002					
25	997					



LEGEND:

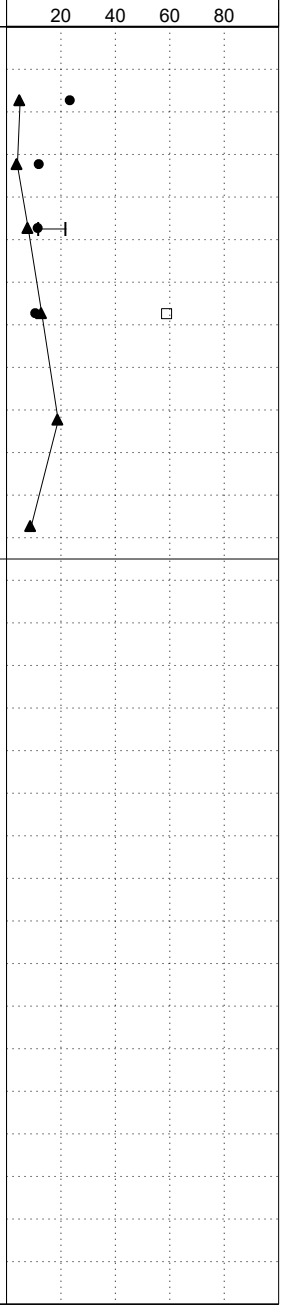
▽ AT TIME OF DRILLING
▼ AT END OF DRILLING
▽ AFTER DRILLING

The Mannik & Smith Group, Inc.
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BOREHOLE NUMBER B-06

CLIENT Ohio CAT
PROJECT NAME OCAT - Miamisburg OH Rental Site
PROJECT NUMBER 401.2500964.000
PROJECT LOCATION Miamisburg, Ohio
DATE STARTED 07-30-2025 **COMPLETED** 07-30-2025
POSITION Lat.: 39.636148° Long.: -84.234173°
DRILLING CONTRACTOR The Mannik & Smith Group, Inc.
SURFACE ELEVATION 1018.0 ft **FINAL DEPTH** 12.5 ft
DRILLING METHOD Direct Push
LOGGED BY JT **CHECKED BY** GVA
EQUIPMENT Geoprobe 7822DT **Operator** MH
REMARKS Elevations & coordinates estimated from Google Earth®.

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)
		0.5 TOPSOIL - 6 INCHES 1017.5				
		Sandy Lean CLAY (CL): medium stiff to stiff; dark brown; moist.	SPT SS-1	83	3-3-2 (5)	2.00
		2.5 1015.5				
		Sandy Lean CLAY (CL): soft to medium stiff; brown; moist; trace gravel.	SPT SS-2	100	1-1-3 (4)	1.00
		- At 4 feet, medium stiff to stiff	SPT SS-3	100	5-4-4 (8)	2.00
5	1013					
		6.0 1012.0				
		Sandy Lean CLAY (CL): stiff to very stiff; brown; moist; trace gravel.	SPT SS-4	100	3-5-8 (13)	3.50
			SPT SS-5	100	4-9-10 (19)	4.00
10	1008					
		11.0 1007.0				
		Sandy Lean CLAY (CL): stiff to very stiff; gray; moist; trace sand, trace gravel.	SPT SS-6	100	2-4-5 (9)	2.50
		12.5 1005.5				
		Terminated at 12.50 ft. Reached Target Depth.				
15	1003					
20	998					
25	993					



LEGEND:

▽ AT TIME OF DRILLING
▼ AT END OF DRILLING
▼ AFTER DRILLING

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BOREHOLE NUMBER B-07

CLIENT Ohio CAT
PROJECT NAME OCAT - Miamisburg OH Rental Site
PROJECT NUMBER 401.2500964.000
PROJECT LOCATION Miamisburg, Ohio
DATE STARTED 07-30-2025 **COMPLETED** 07-30-2025
POSITION Lat.: 39.635008° Long.: -84.234215°
DRILLING CONTRACTOR The Mannik & Smith Group, Inc.
SURFACE ELEVATION 1021.0 ft **FINAL DEPTH** 12.5 ft
DRILLING METHOD Direct Push
LOGGED BY JT **CHECKED BY** GVA
EQUIPMENT Geoprobe 7822DT **Operator** MH
REMARKS Elevations & coordinates estimated from Google Earth®.

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)
			0.5 TOPSOIL - 6 INCHES 1020.5				
			Sandy Lean CLAY (CL): medium stiff to stiff; brown; moist; trace gravel.	SPT SS-1	22	4-3-5 (8)	2.00
			- At 2.5 feet, stiff to very stiff	SPT SS-2	17	4-6-7 (13)	4.00
5	1016			SPT SS-3	17	3-4-5 (9)	3.50
			- At 6 feet, medium stiff	SPT SS-4	22	2-3-4 (7)	3.00
			8.5 1012.5				
			Clayey SAND (SC): medium dense; gray; moist to wet; little gravel.	SPT SS-5	17	4-8-12 (20)	
10	1011		▽				
			12.5 1008.5	SPT SS-6	22	5-7-9 (16)	
			Terminated at 12.50 ft. Reached Target Depth.				
15	1006						
20	1001						
25	996						

▲ N Value
● Moisture Content (%)
I Plastic/Liquid Limit (%)
□ Fines Content (%)
20 40 60 80

LEGEND:

▽ **AT TIME OF DRILLING** 11.00 ft
▼ **AT END OF DRILLING**
▼ **AFTER DRILLING**

APPENDIX C

SOIL LABORATORY TEST DATA

LABORATORY TEST PROCEDURES

A brief description of the most common laboratory tests performed at the Geotechnical Engineering Laboratory at the Mannik Smith Group is provided in the following sections.

DESCRIPTION OF SOILS (VISUAL-MANUAL PROCEDURE) (ASTM D2488)
The visual classification of soil samples are performed in accordance with ASTM D2488 standard. Our engineers use this test method to describe each soil sample using visual examination and simple manual tests. Visual classification helps grouping similar soil samples so that only a minimum number of laboratory tests are required for positive soil classification.

POCKET PENETROMETER
In the pocket penetrometer test, the unconfined compressive strength of a cohesive soil sample is estimated by measuring the resistance of the sample to the penetration of a small, calibrated spring-loaded cylinder. The maximum capacity of the penetrometer is 4.5 tons per square foot.

NATURAL MOISTURE CONTENT (ASTM D2216)
Natural moisture content represents the ratio of the weight of water in a given amount of soil to the weight of solid particles. Natural moisture content is expressed as a percentage (%). In this test method the water content is measured in the laboratory by noting the weight loss after drying the soil at specific temperature for 24 hours.

ATTERBERG LIMITS (ASTM D4318)
The Atterberg Limits test is performed in accordance with ASTM D4318. Liquid Limit (LL), Plastic Limit (PL) and Plasticity Index (PI) of the soil sample are determined using this test method. The Liquid Limit is the moisture content at which the soil begins to behave as a liquid material and starts to flow. The Plastic Limit is the moisture content at which the soil changes from plastic to semi-solid stage. The Plasticity Index (PI = LL - PL) is the range of moisture content at which the soil is in a plastic stage. Typically, a soil's potential for volume change increases with increase of plasticity indices.

PARTICLE SIZE ANALYSIS (ASTM D421, D422 and D1140)
These tests are performed to determine the partial soil particle size distribution. The soil sample is prepared according to ASTM D421 test method. The amount of material finer than the openings on the No. 200 sieve (0.075 mm) is determined by wash sieve method according to ASTM D1140. The hydrometer test is used to determine particle size distribution of material finer than 0.075 mm according to ASTM D422 test method.

STANDARD PROCTOR COMPACTION TEST (ASTM D698)
The Standard Proctor compaction test is used to determine maximum dry density and optimum moisture content of the soil sample. In this test, the soil is compacted in the Proctor mold in three lifts of equal volume using a standard effort by the free falling of a 5.5 lb rammer from 12 inches above soil surface. The test procedure is repeated on samples at several different moisture contents and a parabolic graph showing the relationship between moisture content and dry density of the soil is established. The maximum dry unit weight of the compacted sample and the respective moisture content is reported as maximum dry density and optimum moisture content of the soil sample.

MODIFIED PROCTOR COMPACTION TEST (ASTM D1557)
Modified Proctor compaction is similar to the Standard Proctor test. In this test, the soil is compacted in the Proctor mold in five lifts of equal volume using a standard effort by the free falling of a 10 lb rammer from 18 inches above the soil surface. The maximum dry unit weight of the compacted sample and the respective moisture content is reported as maximum dry density and optimum moisture content of the soil sample.

LABORATORY CALIFORNIA BEARING RATIO (ASTM D1883)
The CBR value is the ratio of forces required for 0.1-inch penetration of a 2-inch diameter circular plunger at the rate of 0.05 inch/min into a compacted soil sample compared to the same penetration in a certain standard crushed stone.

LOSS ON IGNITION TEST (LOI) (ASTM D2974)
LOI tests are performed on peat or suspected organic soils. An oven-dried sample is ignited in a furnace at 440°C (Method C) or 750°C (Method D). The ash content of the soil sample is determined as a percentage of the weight of the oven-dried sample. The organic content is the loss of weight due to ignition and reported as a percentage of the weight of the oven-dried sample.

ONE-DIMENSIONAL CONSOLIDATION TEST (ASTM D2435)
The consolidation test data is used to estimate the magnitude and rate of both differential and total settlement of a structure. A one-dimensional consolidation test is performed in a consolidation ring that does not allow lateral displacement of the sample. The sample is subjected to various vertical loading and unloading cycles. The deformation of the sample due to loading and unloading is recorded and used for the plotting a void ratio-applied pressure graph. The pre-consolidation pressure for the soil can also be determined from this test.

UNCONFINED COMPRESSION TEST ON ROCK SAMPLES (ASTM D7012)
In the unconfined compression test, the unconfined compressive strength (q_u) of a rock sample is estimated by measuring the resistance of the sample in compression when an axial loading is applied to the cylindrical specimen (with a height to diameter ratio of approximately 2) to reach the failure condition.

UNCONFINED COMPRESSION TEST ON SOIL SAMPLES (ASTM D2166)
In the unconfined compression test, the unconfined compressive strength (q_u) of a cohesive soil sample is estimated by measuring the resistance of the sample in compression when an axial loading is applied to the cylindrical specimen (with a height to diameter ratio of 2 to 2.5) to reach the failure condition or 15 percent (%) of axial deformation, whichever is secured first.

UNCONSOLIDATED-UNDRAINED (UU) TRIAXIAL COMPRESSION TEST (ASTM D2850)
Triaxial Shear tests are used to determine the shear strength of soil samples under various loading conditions. The test is performed on a relatively undisturbed sample extruded from a Shelby tube. In this test method, fluid flow is not permitted into or out of the soil specimen as the load is applied (undrained condition), therefore pore pressure builds up in the sample. The compressive strength of a soil is determined in terms of the total stress. The various confining pressures help determining the shear strength of the soil at different depths.

CONSOLIDATED-UNDRAINED (CU) TRIAXIAL COMPRESSION TEST (ASTM D4767)
The shear characteristics of cohesive samples (collected from relatively undisturbed sample extruded from a Shelby tube) are measured in this test under undrained conditions. This test represents field conditions where fully consolidated soils under one set of stresses are subjected to a sudden change in stress without sufficient time for further consolidation (undrained condition). The data from this test is used to analyze the shear strength parameters of the soil at different depths. The compressive strength of a soil is reported in terms of the effective stress.

WATER SOLUBLE SULFATE, RESISTIVITY AND PH
To evaluate the corrosion potential of the site, MSG performs sulfates (Ohio DOT Supplement 1122), resistivity (ASTM G187), and pH tests (ASTM D4972) on select soil samples.

SPECIFIC GRAVITY (ASTM D854)
Specific gravity is defined as the ratio of the unit weight of soil solids only to unit weight of water at a specific temperature. MSG performs specific gravity tests for soils according to ASTM D854 test procedure.

PERMEABILITY (ASTM D2434 and ASTM D5084)
This test method covers laboratory measurements of the hydraulic conductivity (the coefficient of permeability) of water-saturated granular and cohesive materials. MSG performs multiple methods for permeability tests according to ASTM D2434 and ASTM D5084.

DIRECT SHEAR TEST (ASTM D3080)
The direct shear tests are performed to determine the maximum and residual shear strength. A horizontal load is applied at a constant rate of strain. The soil sample is placed in a box where the lower half of the box is mounted on rollers and is pushed forward at a uniform rate by a motorized apparatus. The upper half of the box bears against a steel proving ring, the deformation of which is shown on a dial gauge indicating the shear force. The various information that can be obtained from the results includes the maximum (peak) shear strength and the ultimate (residual) shear strength.

SUMMARY OF LABORATORY RESULTS

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AASHTO R18

CLIENT Ohio CAT **PROJECT NAME** OCAT-Miamisburg OH Rental Site

PROJECT NUMBER 401.2500964.000 **PROJECT LOCATION** Miamisburg, Ohio

Boring No. / Sample No.	Depth	Liquid Limit	Plastic Limit	Plasticity Index	Maximum Size (mm)	%<#200 Sieve	Class-ification	Water Content (%)	Bulk Density (pcf)	Satur-ation (%)	Specific Gravity
B-01 / SS-1	1.0							23.2			
B-01 / SS-2	2.5	29	16	13	9.525	70	CL	13.9			
B-01 / SS-3	4.0							18.6			
B-01 / SS-4	6.0							10.9			
B-03 / SS-1	1.0	28	15	13	19	64	CL	13.2			
B-03 / SS-2	2.5							12.5			
B-03 / SS-3	4.0							8.5			
B-04 / SS-2	2.5							12.7			
B-04 / SS-3	4.0	21	12	9	19	57	CL	10.3	146.2		
B-04 / SS-4	6.0							12.9			
B-05 / SS-1	1.0							11.0			
B-05 / SS-2	2.5							11.4			
B-05 / SS-3	4.0							11.1			
B-06 / SS-1	1.0							23.6			
B-06 / SS-2	2.5							12.2			
B-06 / SS-3	4.0							11.8			
B-06 / SS-4	6.0	22	12	10	19	59	CL	10.9			
B-07 / SS-1	1.0							23.8			
B-07 / SS-2	2.5							11.8			
B-07 / SS-3	4.0							12.0			

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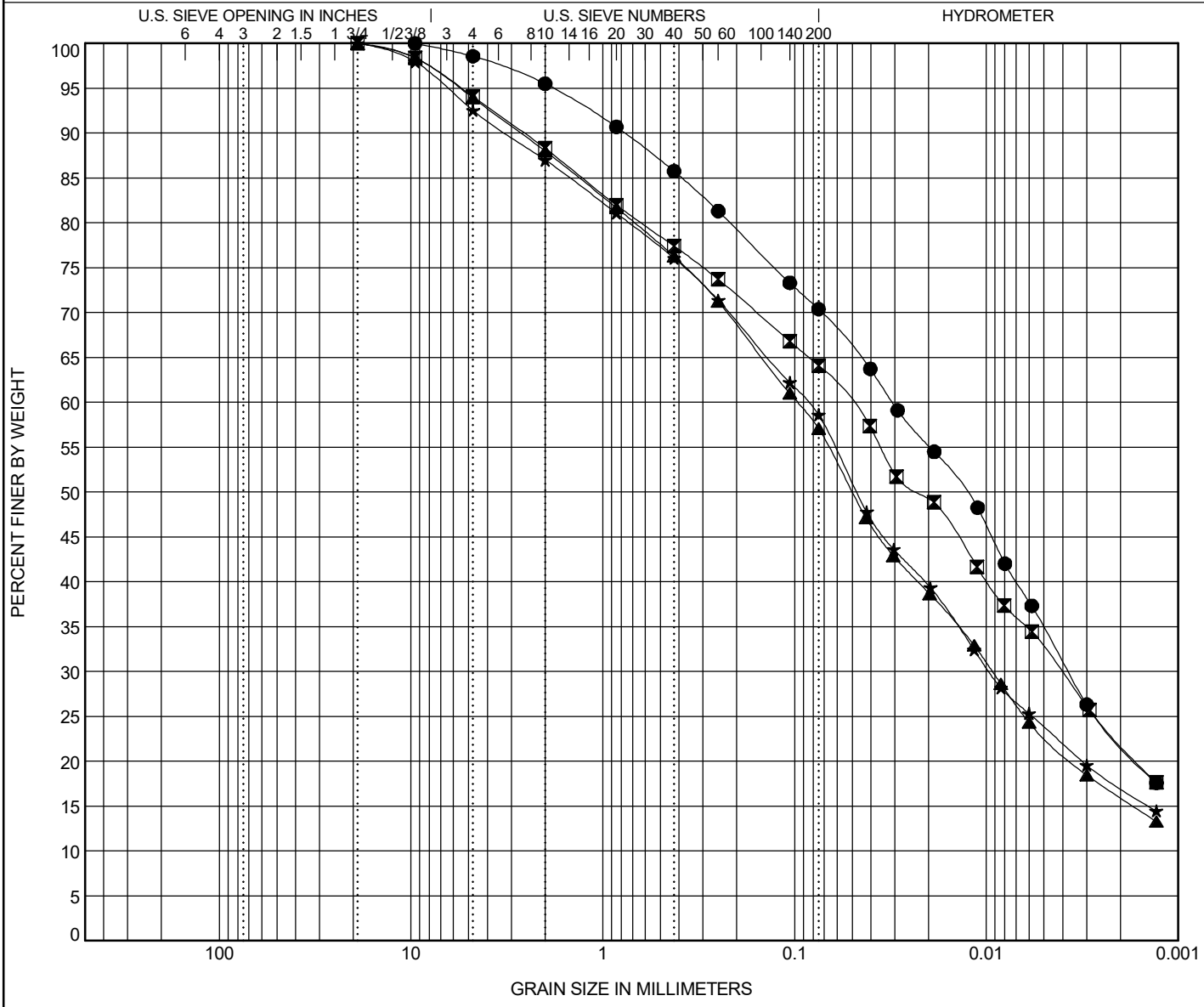
GRAIN SIZE DISTRIBUTION

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PROJECT NUMBER 401.2500964.000 **PROJECT LOCATION** Miamisburg, Ohio



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification			Classification	LL	PL	PI	Cc	Cu
●	B-01 / SS-2	2.5	LEAN CLAY with SAND (CL)	29	16	13		
⊠	B-03 / SS-1	1.0	SANDY LEAN CLAY (CL)	28	15	13		
▲	B-04 / SS-3	4.0	SANDY LEAN CLAY (CL)	21	12	9		
★	B-06 / SS-4	6.0	SANDY LEAN CLAY (CL)	22	12	10		

Specimen Identification			D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-01 / SS-2	2.5	9.525	0.031	0.004		1.4	28.2	48.3	22.1
⊠	B-03 / SS-1	1.0	19	0.051	0.004		5.9	30.0	42.1	22.0
▲	B-04 / SS-3	4.0	19	0.097	0.009		6.1	36.8	41.1	16.0
★	B-06 / SS-4	6.0	19	0.086	0.01		7.4	33.9	41.5	17.1

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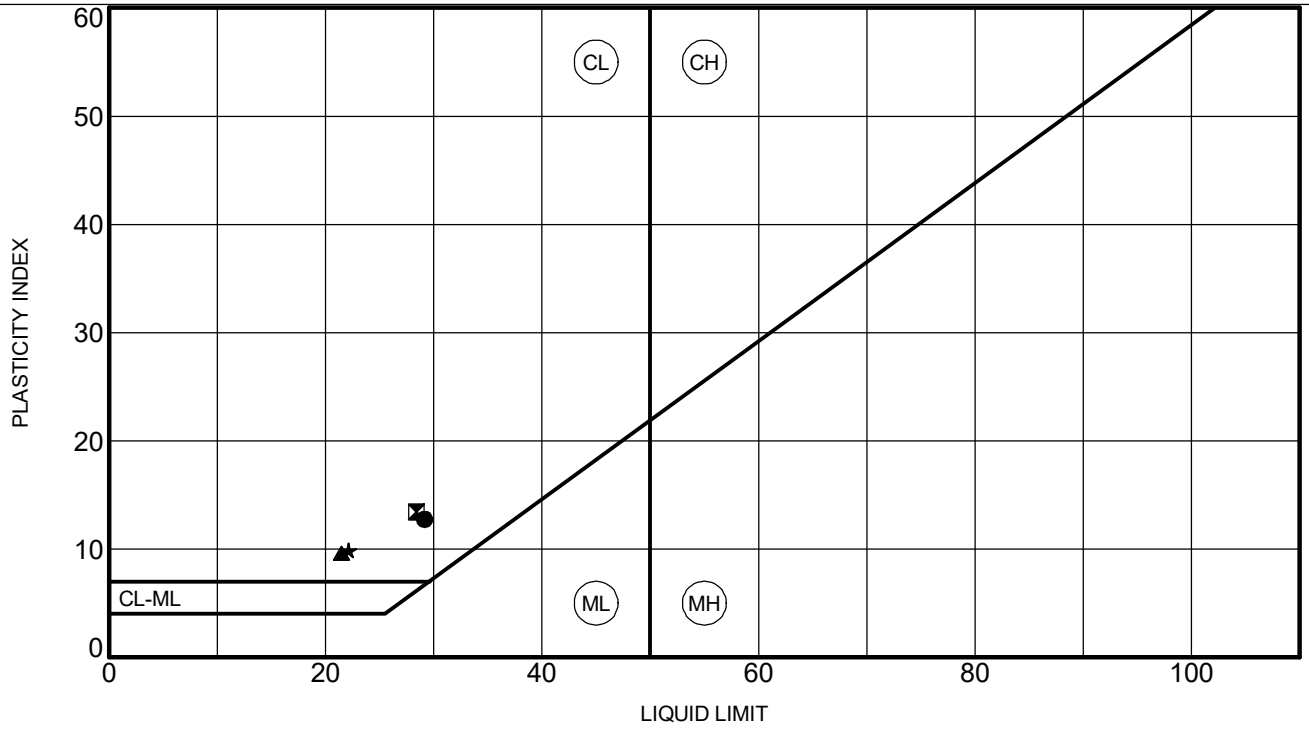
ATTERBERG LIMITS' RESULTS

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AASHTO R18

CLIENT Ohio CAT **PROJECT NAME** OCAT-Miamisburg OH Rental Site

PROJECT NUMBER 401.2500964.000 **PROJECT LOCATION** Miamisburg, Ohio



	Specimen Identification		LL	PL	PI	Fines	Classification
●	B-01 / SS-2	2.5	29	16	13	70	LEAN CLAY with SAND (CL)
⊠	B-03 / SS-1	1.0	28	15	13	64	SANDY LEAN CLAY (CL)
▲	B-04 / SS-3	4.0	21	12	9	57	SANDY LEAN CLAY (CL)
★	B-06 / SS-4	6.0	22	12	10	59	SANDY LEAN CLAY (CL)

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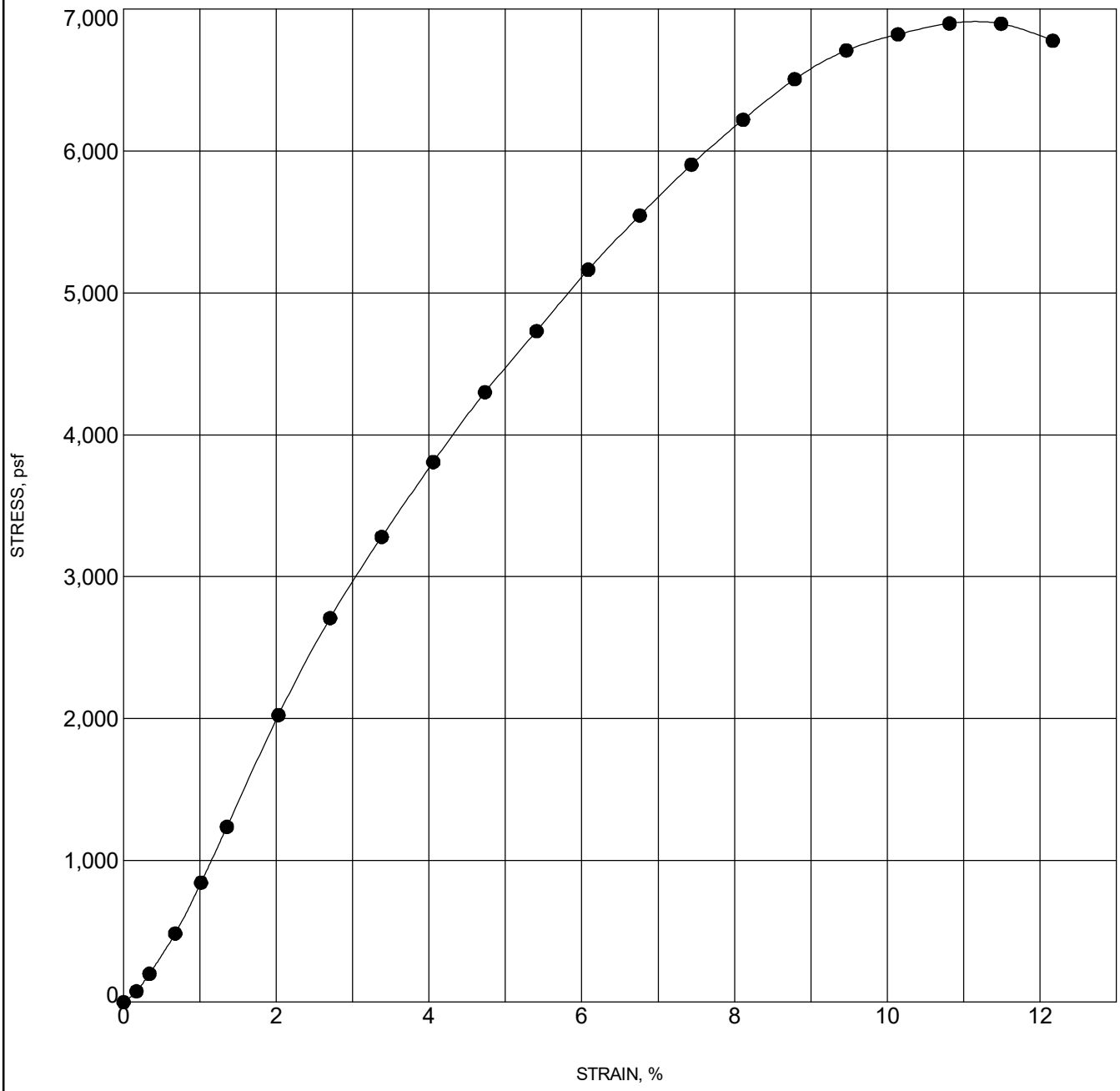
UNCONFINED COMPRESSION TEST

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AASHTO R18

CLIENT Ohio CAT **PROJECT NAME** OCAT-Miamisburg OH Rental Site

PROJECT NUMBER 401.2500964.000 **PROJECT LOCATION** Miamisburg, Ohio



Specimen Identification		Classification	UCS (psf)	γ_d	MC%
● B-04 / SS-3 4.0		**SANDY LEAN CLAY (CL)**	**6900**	**132.5**	**10.3**

UNCONFINED - GINT STD US LAB.GDT - 8/22/25 10:45 - W:\PROJECTS\2025\800-999\2500964\ADMIN\GEOTECH\LAB\2500964.GPJ