KUENY ARCHITECTS

March 18, 2024

Huber Heights New Public Works Facility

ADDENDUM #1

BIDS DUE: March 26, 2024 AT 1:00 Local Time at The City of Huber Heights locate at 6131 Taylorsville Rd, Huber Heights, Ohio 45424 at that time Bids will be opened publicly for consideration by the Owner.

To all Contract Bidders of record.

This Addendum is issued to modify, explain or correct the original Drawings and Specifications as noted below, and is hereby made a part of the Contract documents. Please attach this Addendum to the Specifications in your possession. Acknowledge receipt of this Addendum in the space provided on the Bid Form. Failure to do so may subject Bidder to disqualification.

This Addendum consists of (7) written pages, (56) Attachments, and (2) sign in sheets.

CLARIFICATIONS / GENERAL NOTES

1. The last day for addendum questions is March 21, 2024
2. ConstructConnect has to update their drawing with February 6, 2024 bid-set.

APPROVED MANUFACTURERS

All the following Acceptable Manufacturer's products below **must meet or exceed** written specifications:

1. Section 07 27 26 - Fluid-Applied Membrane Air Barrier
    a. Carlisle Coating & Waterproofing

2. Section 07 60 00 - Flashing and Sheet Metal
    a. Dimensional Metals Inc.

QUESTIONS AND ANSWERS

1. ***What is the budget?***
    a. The project estimate for the Base Bid is $17,500,000.

2. ***There is equipment still shown on the HVAC equipment schedules associated with the Storage building which looks to be deleted from the project. MAU-3, UH-6A thru 6D, Detail 8 Tox-alert alarm and sensors, exhaust fans EF-13, 14, etc. Please confirm that we are not to furnish and/or install any items associated with the Storage Building. Please advise.?***
    a. MC to not include any items associated with the Storage Building. MUA-3, UH6A-6D, Detail 8 Tox alert, EF-13 and 14, not included in the scope.

3. ***Detail 7 on drawing 1M202. Note : Indicates the CO/No2 control alarm system is to be provided and installed by MC. Electrically connected by EC. Complete and ready to use. Question: Is the electrical contractor responsible for all wiring. Power to panel and connection on C/NO2 devices, horns, strobes, etc. Please advise.?***
    a. MC is responsible for all low voltage control wiring for CO/NO2 alarm system between panel and sensors, horn/strobes, etc. EC is responsible for any 120V and higher electrical connections.

4. ***Specification Section 233400 HVAC Fans refers you to Specification 23 00 01 for approved manufacturers but there is not a specification section in the bid documents. Please advise.?***
    a. See attached added Specification 23 00 01 for approved manufacturers.

5. ***On drawing 1M201 and 1M106 added the DSF Ceiling fans and speed controllers. Is the electrical contractor required to power the controllers and wire between the controller and the fans as needed. Please advise.?***
    a. Electrical contractor is responsible for power between speed controllers and fans.

6. ***Drawing Sheet 1MEP101: Are there any other conduits required, for example power, to be included as future for Building #2/#3 besides the 2" conduit for future Fire Alarm. Also, Detail on IE401 shows the conduit to be 1" PVC not 2". Please clarify.?***
    a. Yes, include (4) 2" Conduits for future/owners use between main building an future development. Refer to 1MEP101 and 1E501.

7. ***Drawing Sheet S1IT101: Sheet references stub piping for future development, what size and quantity of piping is required? Please provide information.***
    a. See the attached Base Bid site plan drawing for added notes and clarity.

8. ***Is there a budget for this project? Does that budget include the alternates? Does the City of Huber Heights have any rules or requirements for awarding if the bids come in over budget?***
    a. As noted above, the basement alternate is 17.5 million and the city does follow a 25% rule.

9. ***Drawing Sheet 1M103 & 1M104: These two drawings show a total of (14) DSF Fans which have been added to the Mechanical scope of work and the equipment requirements for the DSF fans was added to drawing 1M201. Please provide this scope of work with the required circuitry on the electrical drawings.?***
    a. Refer to sheet 1E302/1E303 for electrical scope for DSF Fans.

10. ***Drawing Sheet 1E301: Electrical sheet does not show the IDU-1-9 unit any longer on the drawing, but this unit is still on Mechanical drawing 1M102 and on equipment schedule drawing 1M203. If this unit is required, please provide this scope of work information on the electrical drawings.***
    a. EC shall connect IDU-1-9 to panel GPA, circuit 25,27 refer to panel schedule on sheet 1E602.

11. ***Drawing 1P410 indicates 5- HR-PW and 5- HR-PW hose reels but the plan drawing 1P102 only shows 4 for the Wash Bay. Which is correct? If 5, where is the other one located?***
    a. Refer to sheet 1P600 detail 9. 1 set of hose reels are located up on the balcony in the wash bay. The other 4 are located on the first floor.

12. ***We are looking at rebid the fencing for the 'Huber Heights / Public Works Facility – REBID' job. On the new drawings there is a retention wall on the east side of the proposed building. In looking for details of the retention wall, the drawing refers to contacting the architect for details. Would you be able to clarify the retaining wall for us (drawings and specs)? Thank you?***
    a. The wall is noted on the civil drawings and the specification is 04 20 00 for the material to be used.

13. ***Sheet 1E501: The feed from the Utility Transformer to the CT Cabinet, and from the CT Cabinet to 'MDP' shows three parallel runs of 600MCM. Two parallel runs of 600MCM would be sufficient for the 800A service per NEC. Please advise.***
    a. Include (2) 4" C w/ 4-600MCM, include spare 4" conduit.

14. ***The location of branch panels 'LPC', 'SP2', & 'GP2' as well as transformers 'TC1' & 'TS' are not shown on the electrical drawings. Where are these located?***
    a. LPC/TC1 to be located next to panel RPC on sheet 1E303. TS, SP2, and GP2 removed from scope. Refer to updated sheet 1E501.

15. ***Panel Schedules are missing for 'FUEL' and 'LPC', please provide?***
    a. See sheet 1E601 for panel LPC schedule. Fuel Panel to be 30 space with 30 1P 20A breakers, panel reserved for Fuel vendor.

16. ***Is MC Cable permitted to be used in office areas?***
    a. MC cable is not permitted, refer to specifications 26 05 33.

17. ***Drawing 1MEP101 does not show the primary conduits coming to the primary transformer. What location are these conduits supposed to originate from, the property line or another location? Please advise.***
    a. Conduits to originate from property line at Taylorsville Road. Coordinate conduits with electrical utility.

18. ***The plans to reference 420000 for the retaining wall. However, this spec section does not appear to exist?***
    a. 420000 is a typo spec section is 04 20 00 Unit Masonry references retaining wall starting on page 7.

19. ***Is there a specific fire treatment solution needed for the lumber used for the Salt Storage building?***
    a. The fire treatment should be resistant to salt.

20. ***Is there a specific coating required on the metal gusset plates being used for the trusses for the Salt Storage building?***
    a. All Exposed plates to be coated with United 303 Triumph Rust Convertor and Primer Coat by United Laboratory.

21. Division 26 Electrical Specifications: Multiple times throughout the electrical specifications, section 26 00 01 is referenced, there is no Section 26 00 01 found in the specifications. Please provide specification section for bidding.

a. Refer to added section 26 00 01.

22. Is the MDP Shunt Trip 120V?

a. Yes, MDP Shunt Trip to be 120V.

23. Panel SPA schedule shows MCB, but the one-line shows MLO. Please advise?

a. Panel SPA to be MLO as noted in one-line on sheet 1E501.

24. Panel GBP schedule shows this as a 225A, but the one-line shows it to be 100A. Please advise.

a. Panel GBP to be 225A MCB as shown on panel schedule. TB1 to be 75kVA, refer to 1E501.

25. Need more information on Power Washer circuit and disconnect.

a. Power washer to be 20HP 480V, connect to panel LPB. Include 60A breaker and disconnect. Wire to pressure washer to be #6.

26. Need more information on the Cord Reels shown on 1E301 unless provided by others.

a. Cord Reels to be 45' long 3/12 AWG reels with GFCI duplex, Reelcraft L 4545 123 7A or equal.

27. There is no Motor Equipment Schedule provided with the Electrical Drawings?

a. EC shall refer to mechanical/plumbing drawings for mechanical/plumbing equipment schedules. EC to connect as detailed in Starter/Disconnect and equipment connection scope of work on 1E401

28. Need more information on the IR-1, IR-2, & IR-3 fixtures in the shops and vehicle bay areas.

a. Refer to infrared heater schedule on 1M201

29. Need the locations of Speed Controllers, Starters, and Time Clocks for roof equipment.

a. Speed Controllers, Starters, and Time Clocks shall be located next to the panel that the circuit is coming from. Time clock for EF-3/EF-7/EF-8, speed controllers for EF-2B/EF-12 shall be located by panel group 'B'. Starter for EF-1A and speed controller for EF-2A shall be located by panel group 'A'.

30. Is Cat-6A cable acceptable in lieu of Cat-6?

a. Yes, Cat-6A is required not Cat-6.

31. Huber Heights installs General Cable and Panduit termination material (Jacks, faceplates, path panels, etc.) Will this be acceptable for this project?

a. Yes, General cable and Panduit termination materials are acceptable.

32. Sheet 1IT202, Diagram #2 [Typical TV Mounting Detail] depicts a Recessed TV Box, Wall Outlet, and "Floor Box" containing Data Cabling.
Do all TV locations contain a Data/HDMI Outlet behind the TV and a Data/HDMI Outlet directly under the TV?

a. Yes, all TV locations get a data and an HDMI outlet.

33. Sheet 1IT202 Room 122 [Break Room], North Wall has a TV shown on the drawing. Do we treat this location as a Typical TV Mounting Detail cabling installation?

a. Yes, this location should be treated as a typical TV location

34. Specs for Division 27 00 00-5, states that "Two voice jacks are to be wired at every location." Although, the IT drawings and legends do not show voice to be included at the outlets?
Is the intent to provide (2)-Data AND (2)-Voice at every data symbol?

a. Each triangle location depicts a number, that's the number of cables required to be installed to each pulled and terminated at that location.

35. What are the requirements and dimensions of the New Wall Mount Data Rack being installed in Room 129? (e.g., Enclosure/Cabinet or open rack, RU spaces, depth)?

a. The cabinet rack should be 12U or a minimum of 19" tall.

36. Can you supply a closet layout drawing or specifications with directions to build the communication rooms (113 and 129)? (e.g., Plywood Backboards, Ladder Tray)

a. The west wall of 113 will have (1) 4'x8' sheet of plywood mounted on the wall and the rack will be 2' off the west wall and 3' off the south wall. The ladder tray will connect to the west wall and the rack. The cabinet rack in 129 will be mounted on the west wall in the southwest corner.

37. What type of wire management (Vertical and Horizontal) will be required for the 2-Post rack, if any?

a. The wire management will be 'J' hooks horizontally within the ceilings and within conduit vertically down to the termination point.

38. The Plant Key shows you DFY as Taxus Densiformis Yew but I do not see this on the site map, could this be in error?

a. Disregard, No DFY plants are needed.

39. Grass Seeded areas are to be re graded and re seeded for all disturbed area is it safe to say all the area is disturbed or is this something I should measure by hand?

a. Yes, it is safe to say all areas are disturbed.

40. Per the "Supplementary General Conditions" article 3 section 3.7.1 the contractor is responsible for securing and paying for all building construction permits, other permits, and governmental fees.
Could you please provide a detailed fee schedule for the City of Huber Heights building department and a fee schedule for the Montgomery County Water and Sewer?

As permit fees are often based on many factors and can be difficult to accurately estimate could the permit fees be stated as a set allowance not to exceed?

a. The permit fees will be paid for by the City. The contractors will be responsible for securing all permits and providing the City with the final permit amount and the City will arrange for payment.

41. General note 13 on civil plan C1 mentions that the contractor is responsible for verifying soil conditions prior to commencement of construction. Please, provide site geotechnical report.

a. See attached Report Soil Study (Retaining Wall).

42. Will the new retaining wall have to factor in future building loads.

a. No, the future structure will be 24-foot east of the wall and should not contribute load to the wall based on the distance.

43. The precast mix calls out white cement is that correct?

a. Yes, that's correct white cement should be used.

44. If bed rock is encountered when installing the tiebacks for the retaining wall, what should be done?

a. The contractor should assume using any encountered bedrock as part of the tieback system, or use a gravity style retaining wall.

45. For the main road what asphalt specification should be used?

a. The road asphalt should be the DOT mix as noted on sheet C4.

46. Is construction testing by the owner ?

a. Yes, construction testing is by the owner.

47. Does the monument sign match any other sign within the city?

a. No, this is a custom site for this site.

48. Does the city have a need for any of the excess soil?

a. No, the city does not have a place or need for the excess soil.

49. The overhead door specifications calls for R-17 doors is that correct?

a. Yes, the overhead doors should meet or exceed the R 17. The door should also have heavy duty hinges.

50. Does the fuel island area need any special containment?

a. The fuel area should be constructed per state and local regulations.

51. If the fuel island and salt structure alternates are not taken, what should be left for the building pad areas

a. The pad areas should be 8 inches of stone tapered to meet the adjacent asphalt or paving at the fuel island and the salt structure should be graded per the attached phasing site plan.

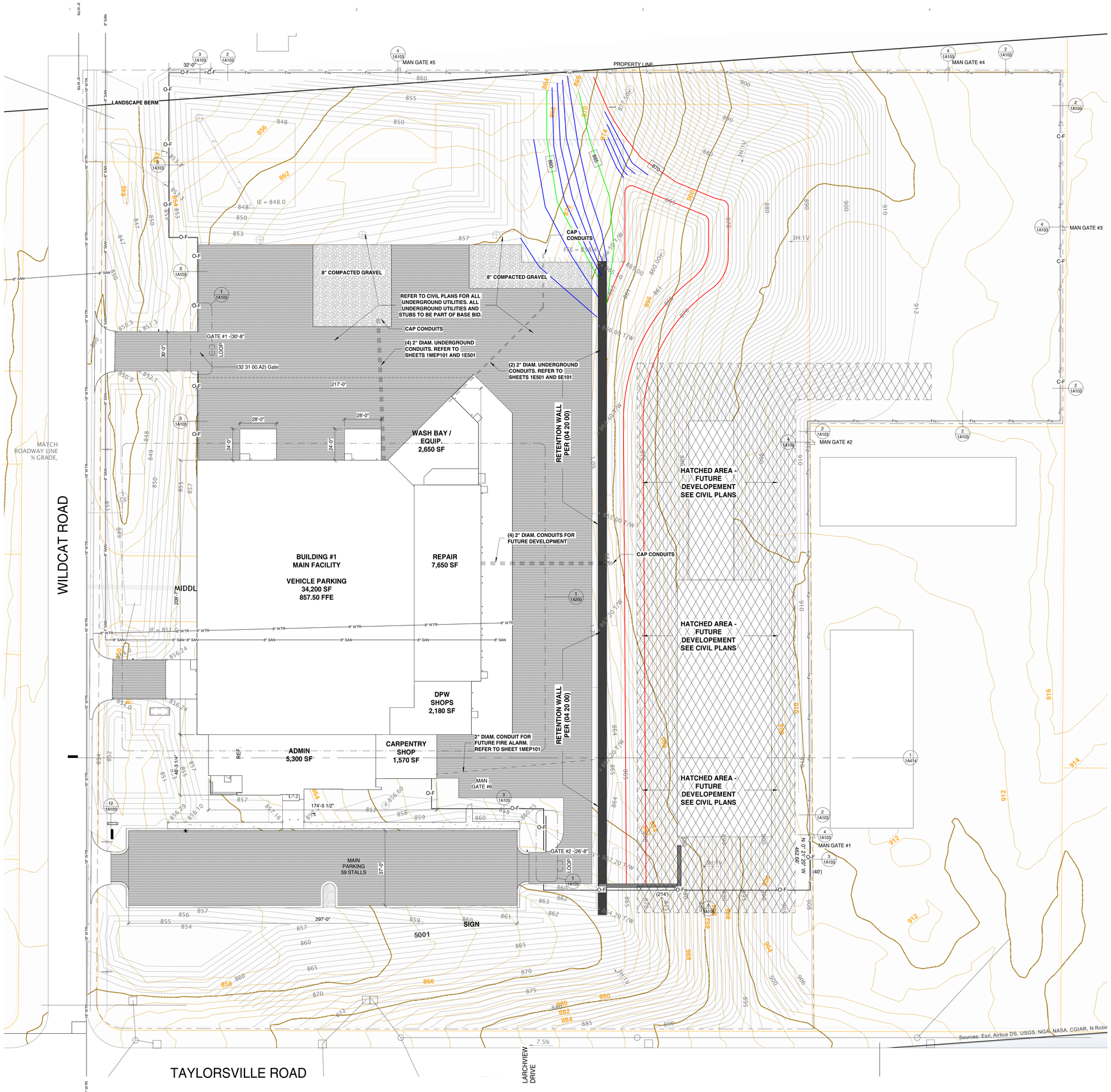
REVISED / ADDED SPECIFICATION / REPORTS

1. Final Report Soil Study (Retaining Wall)
2. Section 22 00 01 – Plumbing Approved Manufactures
3. Section 23 00 01 – HVAC Approved Manufacturers
4. Section 26 00 01 – Electrical Approved Manufactures

REVISIONS TO THE DRAWINGS

1. Sheet – 1A101.1 – Architectural Site Plan Base Bid
2. Sheet – 1E302 - Repair Bay Power Plan
3. Sheet – 1E303 – Vehicle Storage Power Plan
4. Sheet – 1E501 – Electrical Riser
5. Sheet – 1Mep101 – MEP Site Plan

KEYNOTE LEGEND



PROJECT

PROJECT:

New DPW Facility and Support Buildings

5001 Taylorsville Road, Huber Heights, Ohio 45424

OWNER:

City of Huber Heights

PROJECT ISSUE DATE:

February 6, 2024

KUENY ARCHITECTS

10505 Corporate Drive, Pleasant Prairie, WI 53158
phone: 262.857.8101 web: www.kuenyarch.com

CONSULTANTS

ARCHITECT

Kueny Architects
Phone: (262) 857-8101
Address: 10505 Corporate Drive, Suite 100
Pleasant Prairie, Wisconsin 53158

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Gurnee, Illinois 60031

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CIVIL

TerraTec Engineering
Phone: (262) 377-0905
Address: W67N222 Evergreen Blvd., Suite 205
Cedarburg, WI 53012

Engineer of Record - Linda Johnson

REVISIONS

REV.	DESCRIPTION	DATE

PLAN NORTH
SCALE: 1" = 30'-0"

SHEET

SHEET TITLE:

Architectural Site Plan - Base Bid

1A101.1

Project Status

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ELECTRICAL SYMBOL LEGEND

SYMBOL	DESCRIPTION
	MOTOR, HP OR FLA AS INDICATED
	DISCONNECT SWITCH, SIZE AS NOTED.
	MOTOR STARTER, AS NOTED
	COMBINATION MOTOR STARTER/ DISCONNECT SWITCH, AS NOTED
	INCANDESCENT OR HID WALL WASH FIXTURE, CEILING MOUNTED CLEAR SIDE INDICATES DIRECTION OF WASH.
	LED FIXTURE, CEILING OR WALL MOUNTED, SUBSCRIPT INDICATES ASSOCIATED FIXTURE TYPE, SWITCHING, AND CIRCUIT ADDRESS.
	UNSWITCHED (NIGHT LIGHT) FIXTURE; TYPICAL.
	EXIT LIGHT, BATTERY TYPE WITH CHARGER.
	EMERGENCY LIGHT, BATTERY TYPE WITH CHARGER
	TRANSFORMER AS INDICATED
	HOMERUN SYMBOL. THIS EXAMPLE SHOWS TWO POLES
	PANELBOARD (SEE SCHEDULE)
	PLYWOOD TELEPHONE BACKBOARD, 4'X4'X3/4" THICK WITH TWO COATS OF INSULATING VARNISH
	JUNCTION BOX
$\$_x$	DUPLEX RECEPTACLE WITH CIRCUIT ADDRESS NOTED, 16" AFF UNLESS OTHERWISE NOTED: WP=WEATHERPROOF, IG=ISOLTED GRND, E=EXISTING, USB=USB RECEP
	DUPLEX GFI RECEPTACLE WITH CIRCUIT ADDRESS NOTED, 16" AFF UNLESS OTHERWISE NOTED.
	DOUBLE DUPLEX (QUADRUPLEX) RECEPTACLE 16" AFF UNLESS OTHERWISE NOTED
$\$_x$	TELEPHONE/DATA OUTLET IN WALL 16" AFF. UNLESS OTHERWISE NOTED. C=CAMERA, AP=ACCESS POINT
	CEILING MOUNTED RECEPTACLE
TV	TELEVISION
CR	CARD READER ACCESS
AP	ACCESS POINT
MIC	MICROPHONE J-BOX. FLOOR MOUNTED W/ BLANK BRASS COVER, 3/4" C TO ACCESSIBLE AREA WIRING BY OTHERS.
TC	TIME CLOCK
S_x	LIGHT SWITCH 120/277V, 48"AFF UNLESS OTHERWISE NOTED: REF LIGHTING CONTROL SCHEDULE
S_M	MOTOR RATED SWITCH
SD	SMOKE DETECTOR
HD	HEAT DETECTOR
SDx	DUCT MOUNTED, FURNISHED BY MECH SUB, CONNECTED BY ELECT.
CD	CARBON MONOXIDE DETECTOR
F	MANUAL FIRE ALARM PULL STATION, 48" AFF, ADA COMPLIANT W/ PLASTIC COVER
FAVC	FIRE ALARM AUDIO-VISUAL ANNUNCIATOR, AT 80" AFF, ADA COMPLIANT, W/ W/REGUARD.
FSVC	FIRE ALARM SPEAKER-VISUAL ANNUNCIATOR, AT 80" AFF, ADA COMPLIANT, W/ W/REQUARD.
	DOOR HOLD OPEN DEVICES
FS	FLOW SWITCH
TS	TAMPER SWITCH
FACP	FIRE ALARM CONTROL PANEL
FAAP	FIRE ALARM ANNUNCIATOR PANEL
RACP	REMOTE ALARM CONTROL PANEL
FAA	FIRE ALARM VISUAL ANNUNCIATOR, 80" AFF, ADA COMPLIANT
	HAND DRYER
OS	OCCUPANCY SENSOR - CEILING MOUNT

PANELBOARD: MDP

LOCATION: vehicle parking 227
SUPPLY FROM:
MOUNTING: Surface
ENCLOSURE: 1

VOLTS: 480Y/277V
PHASES: 3
WIRES: 4
SUBFEED LUGS:

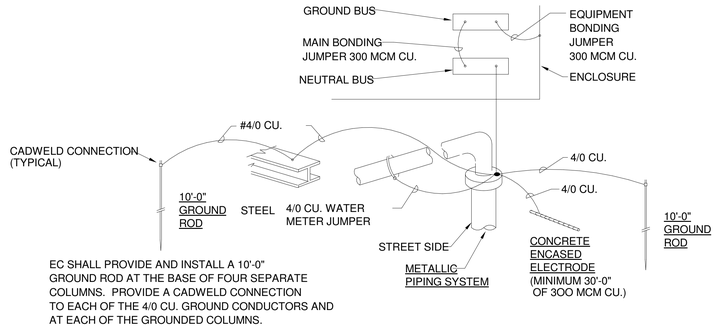
A.I.C. RATING: 65k
MAIN BUS RATING: 800A
MCB RATING: 800A (SHUNT)

NOTES:

C...	NO...	CIRCUIT DESCRIPTION	TRIP	POLES	WIRE	A		B		C		WIRE	POLES	TRIP	CIRCUIT DESCRIPTION	NO...	C...
1		SPA	400 A	3	600M	8011...	791...					6	3	50 A	EM		2
3	--	--	--	--	--			7853...	810...			--	--	--	--	--	4
5	--	--	--	--	--					7561...	20 VA	--	--	--	--	--	6
7		DPA	250 A	3	250M	1730...	0 VA					--	3	250 A	Spare	--	8
9	--	--	--	--	--			1493...	0 VA			--	--	--	--	--	10
11	--	--	--	--	--					1577...	0 VA	--	--	--	--	--	12
13		DPB	250 A	3	250M	4804...	0 VA					--	3	250 A	Spare	--	14
15	--	--	--	--	--			3351...	0 VA			--	--	--	--	--	16
17	--	--	--	--	--					3557...	0 VA	--	--	--	--	--	18
19	--	Spare	100 A	3	--	0 VA	0 VA					--	3	100 A	Spare	--	20
21	--	--	--	--	--			0 VA	0 VA			--	--	--	--	--	22
23	--	--	--	--	--					0 VA	0 VA	--	--	--	--	--	24
25	--	Space	--	3	--	--	--					--	3	--	Space	--	26
27	--	--	--	--	--			--	--			--	--	--	--	--	28
29	--	--	--	--	--					--	--	--	--	--	--	--	30
					TOTAL LOAD:	146165 VA		127698 VA		126826 VA							
					TOTAL AMPS:	528 A		461 A		458 A							

LEGEND:

LOAD CLASSIFICATION	CONNECTED LOAD	DEMAND FACTOR	CALCULATED LOAD	PANEL TOTALS	
HVAC	42900 VA	100.00%	42900 VA		
HEATING	23000 VA	100.00%	23000 VA	TOTAL CONNECTED LOAD:	400670 VA
LIGHTING	22796 VA	125.00%	28495 VA	TOTAL CALCULATED...	384968 VA
Motor	63529 VA	105.90%	67279 VA	TOTAL CONNECTED AMPS.:	482 A
Other	64551 VA	100.00%	64551 VA	TOTAL CALCULATED...	463 A
POWER	113050 VA	100.00%	113050 VA		
RECEPTACLE	60340 VA	58.29%	35170 VA		
Spare	15000 VA	100.00%	15000 VA		

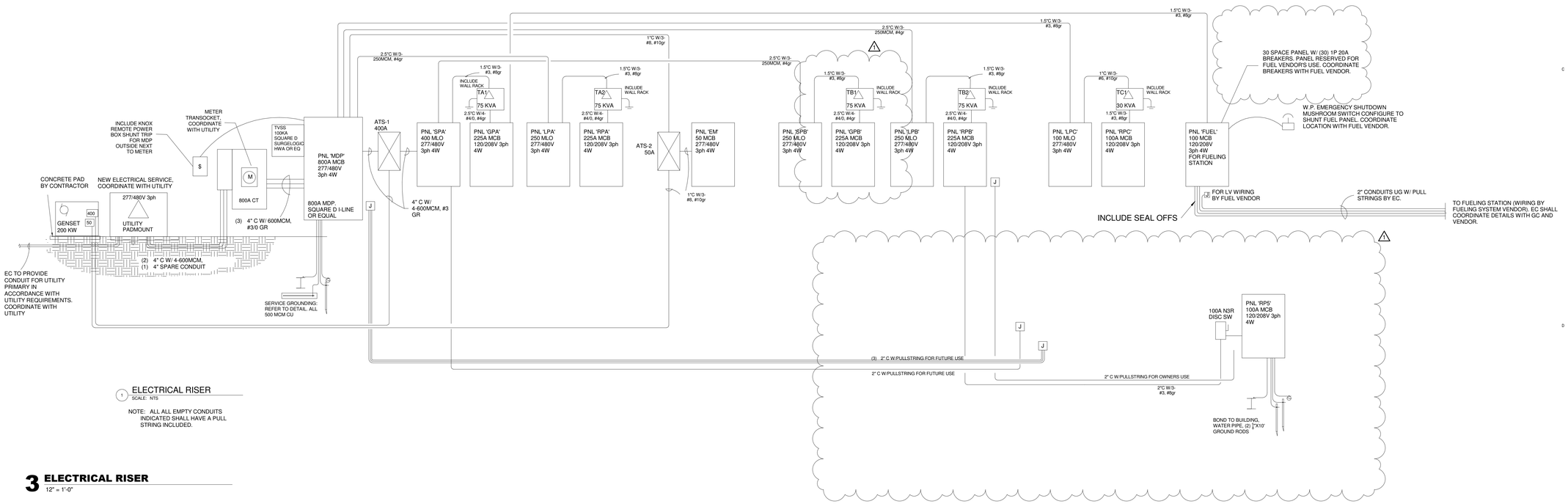


EC SHALL PROVIDE AND INSTALL A 10'-0" GROUND ROD AT THE BASE OF FOUR SEPARATE COLUMNS. PROVIDE A CADWELD CONNECTION TO EACH OF THE 4/0 CU. GROUND CONDUCTORS AND AT EACH OF THE GROUNDED COLUMNS.

1 GROUNDING DETAIL
NTS

ARC FLASH/COORDINATION STUDY.
-THE EC SHALL ENGAGE THE GEAR SUPPLIER TO PRODUCE AN ARC FLASH AND COORDINATION STUDY FOR ALL PANELS/SWITCHBOARDS.
-THIS STUDY SHALL INCLUDE CALCULATION OF ARC FLASH LEVELS IN ACCORDANCE WITH IEEE1584/NFPA 70E WHICH SHALL BE SUBMITTED TO THE ENGINEER. SHALL ALSO INCLUDE SELECTIVE COORDINATION STUDY, WITH BREAKER SETTING RECOMMENDATIONS.
-INCLUDE A WRITTEN ARC FLASH/COORDINATION REPORT, AND THE GENERATION AND INSTALLATION OF APPROPRIATE ARC FLASH WARNING STICKERS ON NEW PANELS IN COMPLIANCE WITH NEC 110 AND NFPA 70E.

2 Arc Flash Study Scope of Work
NTS



1 ELECTRICAL RISER
SCALE: NTS

NOTE: ALL ALL EMPTY CONDUITS INDICATED SHALL HAVE A PULL STRING INCLUDED.

3 ELECTRICAL RISER
12" = 1'-0"

PROJECT

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OWNER:
City of Huber Heights

PROJECT ISSUE DATE:
02/06/2024

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CONSULTANTS

ARCHITECT

Kueny Architects
Phone: (262) 857-8101
Address: 10505 Corporate Drive, Suite 100
Pleasant Prairie, Wisconsin 53158

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REVISIONS

REV.	DESCRIPTION	DATE
1	Addendum #1	2024-03-06
	Addendum #1	2024-03-06

SCALE: 12" = 1'-0"

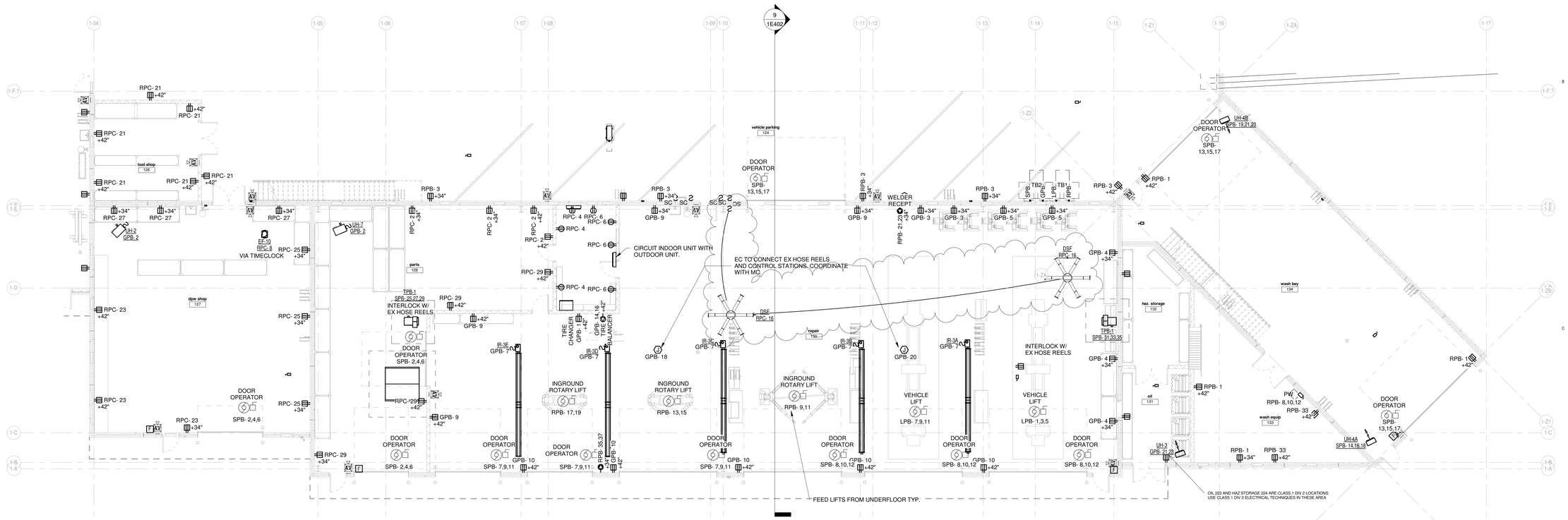
SHEET

SHEET TITLE:

Electrical Riser

1E501

3/18/2024 1:51:01 PM



1 Power Plan - Repair Shops Area
1/8" = 1'-0"

PLAN NORTH
SCALE: 1/8" = 1'-0"

3/7/2024 6:46:03 PM

PROJECT

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New Public Works Facility

5001 Taylorsville Road, Huber Heights, OH 45424

OWNER:
City of Huber Heights

PROJECT ISSUE DATE:
02/06/2024

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CONSULTANTS

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Pleasant Prairie, Wisconsin 53158

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MEP

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CIVIL

TerraTec Engineering
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REVISIONS

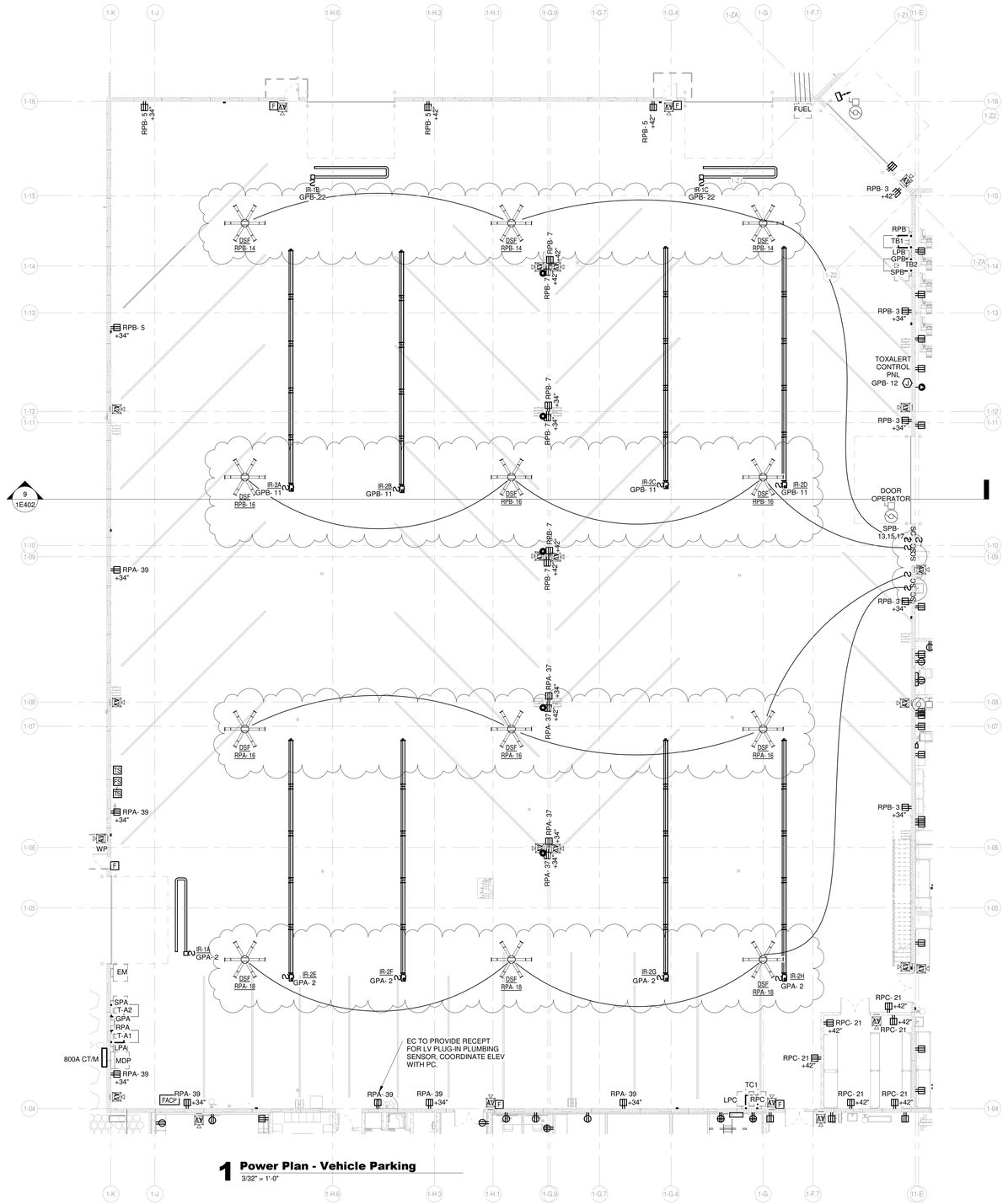
REV.	DESCRIPTION	DATE
1	Addendum #1	2024-03-06

SHEET

SHEET TITLE:

Repair Bay Power Plan

1E302



1 Power Plan - Vehicle Parking

3/32" = 1'-0"

3/7/2024 6:46:05 PM

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New Public Works Facility

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City of Huber Heights

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ARCHITECT

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Pleasant Prairie, Wisconsin 53158

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MEP

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Gurnee, Illinois 60031

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CIVIL

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Phone: (262) 377-9905
Address: W67N222 Evergreen Blvd., Suite 205
Cedarburg, WI 53012

Engineer of Record - Linda Johnson

REVISIONS

REV.	DESCRIPTION	DATE
1	Addendum #1	2024-03-06

PLAN NORTH

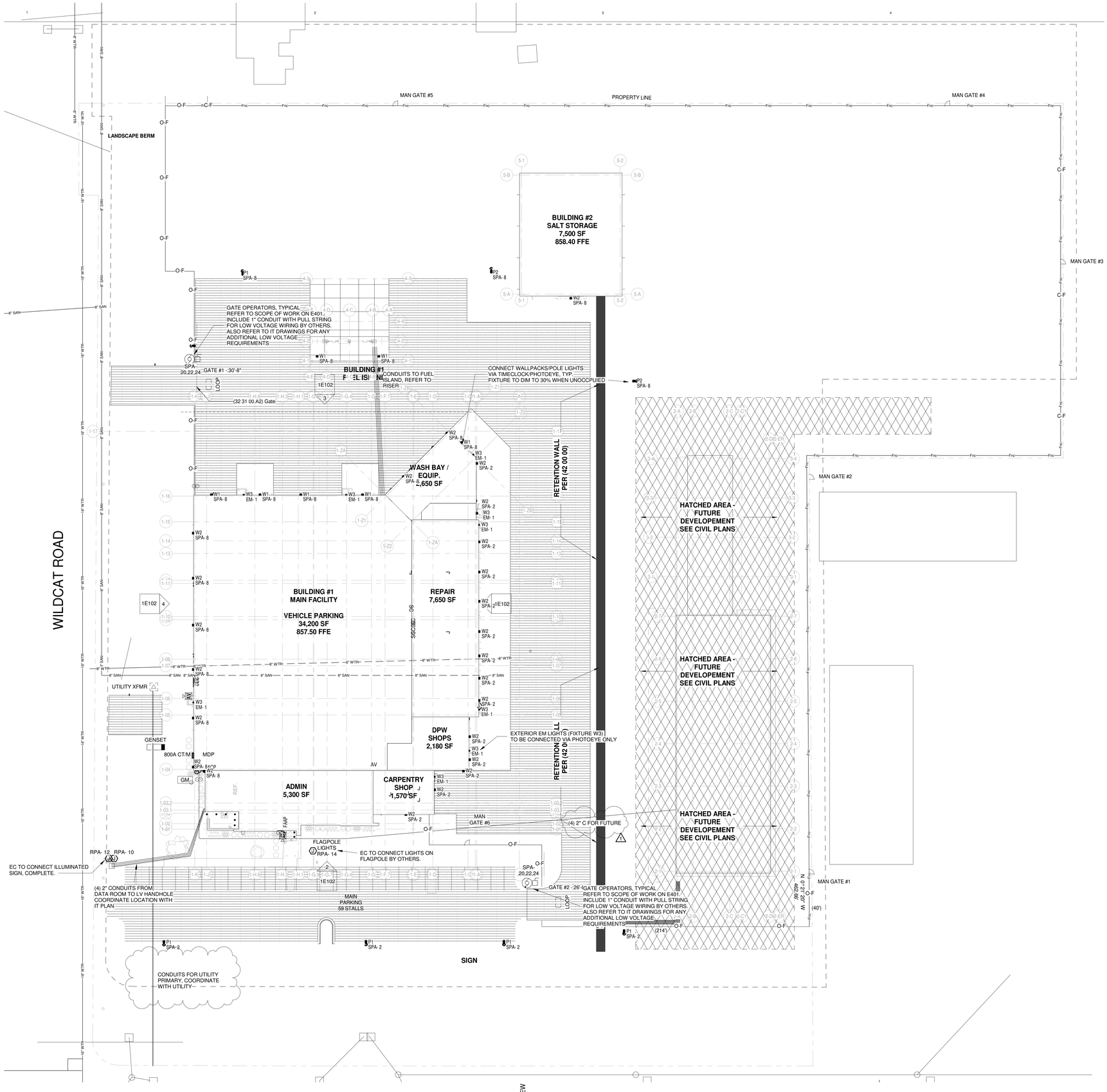
SCALE: 3/32" = 1'-0"

SHEET

SHEET TITLE:

Vehicle Storage Power Plan

1E303



1 Site Plan
1" = 30'-0"

3/7/20024 6:46:12 PM

PROJECT

PROJECT:

New Public Works Facility

5001 Taylorsville Road, Huber Heights, OH 45424

OWNER:
City of Huber Heights

PROJECT ISSUE DATE:
02/06/2024

KUENY ARCHITECTS

10505 Corporate Drive, Pleasant Prairie, WI 53158
phone: 262.857.8101 web: www.kuenyarch.com

CONSULTANTS

ARCHITECT

Kueny Architects
Phone: (262) 857-8101
Address: 10505 Corporate Drive, Suite 100
Pleasant Prairie, Wisconsin 53158

Architect of Record - Jon P. Wallenkamp

MEP

Root Engineering Services, P.C.
Phone: (847) 249-8398
Address: 4215 Grove Avenue
Gurnee, Illinois 60031

Engineer of Record - Richard Root

CIVIL

TerraTec Engineering
Phone: (262) 377-9905
Address: W67N222 Evergreen Blvd., Suite 205
Cedarburg, WI 53012

Engineer of Record - Linda Johnson

REVISIONS

REV.	DESCRIPTION	DATE
1	Addendum #1	2024-03-06
	Addendum #1	2024-03-06

PLAN NORTH
SCALE: 1" = 30'-0"

SHEET

SHEET TITLE:

MEP Site Plan

1MEP101

SECTION 22 00 01

PLUMBING APPROVED MANUFACTURERS

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes list of approved plumbing item manufacturers.

PART 2 - PRODUCTS

2.01 SECTION 22 00 00 Penetration Firestopping for Plumbing
- A. Hilti, Inc.
- B. 3M

2.02 SECTION 22 05 29 Pipe Hanger & Supports
- A. Hilti, Inc.
- B. nVent CADDY
- C. Anvil
- D. Eaton B-Line
- E. Mapa Products

2.03 SECTION 22 05 53 Identification for Plumbing Piping and Equipment
- A. Nameplates:
  1. Craftmark Identification Systems
  2. Safety Sign Co.
  3. Seton Identification Products
  4. Kolbi
- B. Tags:
  1. Craftmark Identification Systems
  2. Safety Sign Co.
  3. Seton Identification Products
- C. Pipe Markers
  1. Kolbi
  2. Equals Accepted

2.04 SECTION 22 07 00 Plumbing Insulation
- A. CertainTeed
- B. Knauf
- C. Jonhs Manville
- D. Owens-Corning

2.05 SECTION 22 11 00 Facility Water Distribution
- A. Three-Piece, Copper-Alloy Ball Valves:
  1. DynaQuip Controls
  2. Grinnell Corporation
  3. Hammond Valve
  4. Jamesbury, Inc.
  5. Kitz Corporation of America
  6. Nibco Inc.
  7. PBM, Inc.
  8. Red-White Valve Corp.
  9. Worcester Controls

2.06 SECTION 22 11 19 Plumbing Specialties
- A. Backflow Preventers
  1. Ames Co., Inc.
  2. B & K Industries, Inc.

3. Cla-Val Co.
4. CMB Industries, Inc.; Febco Backflow Preventers
5. Conbraco Industries, Inc.
6. FLOMATIC Corp.
7. IMI Cash Valve
8. Mueller Co.; Hersey Meters Div.
9. Sparco, Inc.
10. Watts Industries, Inc.; Water Products Div.
11. Zurn Industries, Inc.; Wilkins Div.

B. Thermostatic Water Mixing Valves:
1. Watts
2. Leonard Valve Company
3. Symmons Industries, Inc.
4. Lawler Manufacturing Company, Inc.
5. Mark Controls Corp.; Powers Process Controls
6. T & S brass and Bronze Works, Inc.

C. Sleeve Penetration Systems:
1. ProSet Systems, Inc.

D. Cleanouts:
1. Josam Co.
2. Josam Co., Blucher-Josam Div.
3. LSP Products Group
4. Sioux Chief Manufacturing Co., Inc.
5. Smith, Jay R. Mfg. Co.
6. Sioux Chief
7. Tyler Pipe, Wade Div.
8. Watts Industries, Inc., Drainage Products Div.
9. Zurn Industries, Inc., Jonespec Div.
10. Zurn Industries, Inc., Specification Drainage Operation

E. Floor Drains:
1. Josam Co.
2. Josam Co., Blucher-Josam Div.
3. Sioux Chief Manufacturing Co., Inc.
4. Jay R. Smith Mfg. Co.
5. Tyler Pipe, Wade Div.
6. Sioux Chief
7. Watts Industries, Inc., Drainage Products Div.
8. Zurn Industries, Inc., Jonespec Div.
9. Zurn Industries, Inc., Specification Drainage Operation

F. Roof Drains:
1. Josam Co.
2. Sioux Chief Manufacturing Co., Inc.
3. Smith, Jay R. Mfg. Co.
4. Tyler Pipe, Wade Div.
5. Watts Industries, Inc., Drainage Products Div.
6. Zurn Industries, Inc.,

G. Adjustable Thermal Balancing Valve:
1. Caleffi
2. Viega

2.07 SECTION 22 13 00 Facility Sanitary Sewage

A. Pipe Hangers and Supports
1. Carpenter & Paterson Inc.
2. Creative Systems Inc.
3. Flex-Weld, Inc.
4. Globe Pipe Hanger Products Inc. Michigan Hanger Co.

5. Michigan Hanger Co.
6. Superior Valve Co.

2.08 SECTION 22 14 00 Facility Storm Drainage

A. Pipe Hangers and Supports:
   1. Carpenter & Paterson Inc. Model.
   2. Creative Systems Inc. Model.
   3. Flex-Weld, Inc. Model.
   4. Globe Pipe Hanger Products Inc. Model.
   5. Michigan Hanger Co. Model.
   6. Superior Valve Co. Model

B. Roof Drains
   1. Zurn
   2. JR Smith
   3. Sioux Chief
   4. Watts

C. Downspout Nozzles
   1. Zurn
   2. JR Smith
   3. Sioux Chief

2.09 SECTION 22 14 26.19 Facility Trench Drains
   1. ACO
   2. Eric'sons Inc. Dura Trench
   3. JR Smith
   4. Zurn

2.10 SECTION 22 15 00 General Service Compressed-Air Systems

A. Ball Valves
   1. Crane Valve, North America
   2. Hammond Valve
   3. Milwaukee Valve Company
   4. Stockham Valves & Fittings

B. Check Valves
   1. Crane Valve, North America
   2. Hammond Valve
   3. Milwaukee Valve Company
   4. Stockham Valves & Fittings

C. Strainers
   1. Mueller Steam Specialty
   2. O.C. Keckley Company
   3. Spirax Sarco, Inc.

D. Pipe Hangers and Supports
   1. Carpenter & Paterson Inc.
   2. Flex-Weld, Inc.
   3. Globe Pipe Hanger Products Inc.

E. Flexible Connectors
   1. Flex-Hose Co., Inc.
   2. Flex-Weld, Inc./Keflex
   3. The Metraflex Company
   4. Twin City Hose, Inc.
   5. USHose Corp.

2.11 SECTION 22 34 00 Fuel-Fired Domestic Water Heaters

A. Commerical, High-Efficiency, Sealed-Combustion-Chamber, Gas Water Heaters
   1. Lochinvar Corp.
   2. AO Smith
   3. Trianco-Heatmaker, Inc.
   4. Bradford White

5. Rheem

2.12 SECTION 22 40 00 Plumbing Fixtures

A. Water Closets
   i. Water Closets:Vitreous-China Fixture Designed for Flushometer Valve Operation
      1. American Standard, Inc.
      2. Crane Plumbing/Fiat Products
      3. Kohler Co.
      4. TOTO USA, Inc.
      5. U.S. Industries, Elijer Plumbingware Div
   ii. Water Closet Carriers
      1. JR Smith
      2. Watts
      3. Zurn
      4. Josam

B. Urinal
   i. American Standard, Inc.
   ii. Crane Plumbing/Fiat Products
   iii. Kohler Co.
   iv. TOTO USA, Inc.
   v. U.S. Industries, Eljer Plumbingware Div

C. Lavatories
   i. Lavatories
      1. American Standard, Inc.
      2. Crane Plumbing/Fiat Products
      3. Kohler Co.
      4. TOTO USA, Inc.
      5. U.S. Industries, Eljer Plumbingware Div
   ii. Bar Sinks
      1. Dayton Products, Inc
      2. Elkay Manufacturing Co.
      3. Franke Consumer Products, Inc., Federal Home Products Div.
      4. Just Manufacturing Co.
      5. Moen, Inc
      6. Sterling Plumbing Group, Inc.

D. Kitchen Sinks
   i. Elkay Manufacturing Co.
   ii. Franke Consumer Products, Inc., Federal Home Products Div.
   iii. Just Manufacturing Co.
   iv. Moen, Inc.
   v. Sterling Plumbing Group, inc.

E. Service Basins
   i. Acorn Engineering Co.
   ii. Crane Plumbing/Fiat Products
   iii. Florestone Products Co.
   iv. Precast Terrazzo Enterprises, Inc.
   v. Stern-Williams Co.
   vi. Jonespec Speciality Plumbing Products
   vii. Mustee, E.L. & Sons, Inc.
   viii. American Standard
   ix. Swan Corp. (The)

2.13 SECTION 22 45 00 Emergency Plumbing Fixtures

A. Freestanding, Plumbed Emergency Showers
   i. Freestanding, Plumbing Emergency Showers
      1. Acorn Safety; a division of Acorn Engineering Company.

2. Bradley Corporation.
3. Encon Safety Products.
4. Guardian Equipment Co.
5. Haws Corporation.
6. Sellstrom Manufacturing Company.
7. Speakman Company.
8. WaterSaver Faucet Co.

ii. Freeze-Protected, Plumbed Emergency Showers

1. B-L-S Industries, Inc.
2. Bradley Corporation.
3. Encon Safety Products.
4. Guardian Equipment Co.
5. Haws Corporation.
6. Speakman Company.

B. Eyewash Equipment

i. Standard, Freestanding, Plumbed Eyewash Units

1. Acorn Safety; a division of Acorn Engineering Company.
2. Bradley Corporation.
3. Encon Safety Products.
4. Guardian Equipment Co.
5. Haws Corporation.
6. Sellstrom Manufacturing Company.
7. Speakman Company.
8. WaterSaver Faucet Co.

ii. Accessible, Freestanding, Plumbed Eyewash Units

1. Acorn Safety; a division of Acorn Engineering Company.
2. Bradley Corporation.
3. Encon Safety Products.
4. Guardian Equipment Co.
5. WaterSaver Faucet Co.

C. Eye/Face Wash Equipment

i. Standard, Freestanding, Plumbed, Eye/Face Wash Units

1. Acorn Safety; a division of Acorn Engineering Company.
2. Bradley Corporation.
3. Encon Safety Products.
4. Guardian Equipment Co.
5. Haws Corporation.
6. Sellstrom Manufacturing Company.
7. Speakman Company.
8. WaterSaver Faucet Co.

ii. Accessible, Freestanding, Plumbed, Eye/Face Wash Units

1. Acorn Safety; a division of Acorn Engineering Company.
2. Bradley Corporation.
3. Encon Safety Products.
4. Guardian Equipment Co.
5. WaterSaver Faucet Co.

D. Combination Units

i. Standard, Plumbed Emergency Shower with Eyewash Combination Units

1. Acorn Safety; a division of Acorn Engineering Company.
2. Bradley Corporation.
3. Encon Safety Products.
4. Guardian Equipment Co.
5. Haws Corporation.
6. Sellstrom Manufacturing Company.
7. Speakman Company.

8. WaterSaver Faucet Co.

ii. Accessible, Plumbed Emergency Shower with Eyewash Combination Units
1. Acorn Safety; a division of Acorn Engineering Company.
2. Bradley Corporation.
3. Encon Safety Products.
4. Guardian Equipment Co.
5. Haws Corporation.
6. Sellstrom Manufacturing Company.
7. Speakman Company.
8. WaterSaver Faucet Co.

iii. Standard, Plumbed Emergency Shower with Eye/Face Wash Combination Units
1. Acorn Safety; a division of Acorn Engineering Company.
2. Bradley Corporation.
3. Encon Safety Products.
4. Guardian Equipment Co.
5. Haws Corporation.
6. Sellstrom Manufacturing Company.
7. Speakman Company.
8. WaterSaver Faucet Co.

iv. Accessible, Plumbed Emergency Shower with Eye/Face Wash Combination Units
1. Acorn Safety; a division of Acorn Engineering Company.
2. Bradley Corporation.
3. Encon Safety Products.
4. Guardian Equipment Co.
5. Haws Corporation.
6. Sellstrom Manufacturing Company.
7. Speakman Company.
8. WaterSaver Faucet Co.
9. Haws Corporation.

v. Freeze-Protected, Plumbed Emergency Shower with Eyewash Combination Units
1. B-L-S Industries, Inc.
2. Bradley Corporation.
3. Encon Safety Products.
4. Guardian Equipment Co.
5. Haw Corporation.
6. Speakman Company.

2.14SECTION 22 47 00 Drinking Fountains and Water Coolers

A. Water Coolers: Accessible, ARI 1010, Type PB, pressure with bubbler, Style W, wall-hanging fixture.
1. Elkay Manufacturing Co.
2. Halsey Taylor;
3. Haws Corporation;
4. Oasis Corp.;
5. Sunroc Corp.

B. Water Coolers: ARI 1010, Type PB, pressure with bubbler, Style RE, recessed fixture.
1. Elkay Manufacturing Co.;
2. Halsey Taylor;
3. Haws Corporation;
4. Oasis Corp.;

END OF SECTION

SECTION 22 00 01

HVAC APPROVED MANUFACTURERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes list of approved mechanical item manufacturers.

PART 2 – Products

2.1 SECTION 23 05 13 COMMON MOTOR REQUIREMENTS FOR HVAC EQUIPMENT

A. Cooper Industries Inc.
B. Eaton Corp.
C. General Electric Co.

2.2 SECTION 23 07 00 HVAC INSULATION

A. Manufacturers for Glass Fiber and Mineral Fiber Insulation Products:
   1. CertainTeed.
   2. Knauf.
   3. Manville.
   4. Owens-Corning.
   5. Manufacturers for Closed Cell Elastomeric Insulation Products:
   6. Aeroflex. Aerocell.
   7. Armacell, LLC. Armaflex.
   8. Nomaco. K-flex.

B. Manufacturers for Polyisocyanurate Foam Insulation Products:
   1. Dow Chemical Company.

C. Manufacturers for Extruded Polystyrene Insulation Products:
   1. Dow Chemical Company.

2.3 SECTION 23 09 01 HVAC BUILDING MASTER CONTROL FRONT END

A. Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work.

2.4 SECTION 23 09 23 DIRECT-DIGITAL CONTROL SYSTEM FOR HVAC

A. Company specializing in manufacturing products specified in this section with minimum three years experience, and with service facilities within 100 miles of Project.

2.5 SECTION 23 23 00 REFRIGERANT PIPING

A. Refrigerants:
   1. Allied Signal, Inc./Fluorine Products; Genetron Refrigerants.
   2. DuPont Company; Fluorochemicals Div.
   3. Elf Atochem North America, Inc.; Fluorocarbon Div.
   4. ICI Americas Inc./ICI KLEA; Fluorochemicals Bus.

B. Refrigerant Valves and Specialties:
   1. Climate & Industrial Controls Group; Parker-Hannifin Corp.; Refrigeration & Air Conditioning Division.
   2. Danfoss Electronics, Inc.
   3. Emerson Electric Company; Alco Controls Div.
   4. Henry Valve Company.

5. Sporlan Valve Company.

2.6 SECTION 23 34 00 HVAC FANS

A. Acme Engineering and Manufacturing Corp. Model.
B. Greenheck Corp.
C. Loren Cook Company
D. Penn Ventilation
E. Twin Cities

2.7 SECTION 23 55 00 MAKE UP AIR UNIT

A. TITAN AIR
B. GREENHECK
C. REZNOR
D. MODINE
E. STERLING
F. RUPP

2.8 SECTION 23 74 33 PACKAGED DEDICATED OUTDOOR AIR UNITS

A. AAON
B. ADDISON
C. MUNTERS CORPORATION, DEHUMIDIFICATION DIVISION; DES CHAMPS PRODUCTS
D. GREENHECK
E. LENNOX
F. PETRA
G. RENEWAIRE

END OF SECTION

SECTION 26 00 01

ELECTRICAL APPROVED MANUFACTURERS

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes list of approved electrical item manufacturers.

PART 2 - PRODUCTS

2.01 SECTION 26 00 00 Penetration Firestopping For Electrical
- A. Hilti, Inc.
- B. 3M

2.02 SECTION 26 05 19 Low Voltage Electrical Power Conductors and Cables
- A. Building Wire
  - i. AETNA
  - ii. American Insulated Wire Corp.
  - iii. Colonial Wire
  - iv. Encore Wire
  - v. General Cable Co. Republic Wire
  - vi. Rome Cable
  - vii. Service Wire Co.
  - viii. Southwire Model
  - ix. Superior Essex
- B. Service Entrance Cable
  - i. Diamond Wire & Cable Co.
  - ii. Essex Group Inc.
  - iii. General Cable Co.

2.03 SECTION 26 05 26 Grounding and Bonding for Electrical Systems
- A. Rod Electrodes
  - i. Erico, Inc.
  - ii. O-z Gedney Co.
  - iii. Thomas & Betts, Electrical
- B. Mechanical Connectors
  - i. Erico, Inc.
  - ii. ILSCO Corporation
  - iii. O-Z Gedney Co.
  - iv. Thomas & betts, Electrical
- C. Exothermic Connections
  - i. Copperwld, Inc.
  - ii. Erico, Inc.
  - iii. ILSCO Corporation
  - iv. O-Z Gedney Co.
  - v. Thomas & Betts, Electrical

2.04 SECTION 26 05 29 Hangers and Supports for Electrical Systems
- A. Conduit Supports
  1. Allied Tube & Conduit Corp.
  2. Electroline Manufacturing Company
  3. O-Z Gedney Co. Hanger Rods: Threaded high tensile strength galvanized carbon steel with free running threads.

B. Formed Steel Channel
   1. Allied Tube & Conduit Corp.
   2. B-Line Systems
   3. Midland Ross Corporation, Electrical Products Division
   4. Unistrut Corp.

C. Mechanical Sleeve Seals
   1. Thunderline Link-Seal, Inc.
   2. NMP Corporation

B. Firestopping
   1. Dow Corning Corp.
   2. Fire Trak Corp.
   3. Hilti Corp.
   4. International protective Coating Corp.
   5. 3M fire Protection Products
   6. Specified Technology, Inc.

2.05 SECTION 26 05 33 Raceway and Boxes for Electrical Systems

A. Allied Tube & Conduit
B. Wheatland Tube Company
C. American Conduit
D. Carlon Electrical Products
E. Hubbell Wiring Devices
F. Thomas & Betts Corp.
G. Walking Systems Inc.
H. The Wiremold Co.

2.06 SECTION 26 09 23 Lighting Control Devices

A. Photoelectric Sensors:
   1. Allen-Bradley/Rockwell Automation
   2. Area Lighting Research, Inc.
   3. Fisher Pierce
   4. Grasslin Controls, Corp.
   5. Intermatic, Inc.
   6. Paragon Electric Co., Inc.
   7. Rhodes: M H Rhodes, Inc.
   8. SSAC, Inc.
   9. Tork, Inc.
   10. Lithonia Control Systems
   11. Watt Stopper
   12. Cooper Lighting Solutions

B. Occupancy Sensors:
   1. Arrow Hart Wiring Devices
   2. BRK Electronics
   3. Bryant Electric
   4. Honeywell, Inc.; Home and Building Controls
   5. Hubbell Lighting, Inc.
   6. Lightolier
   7. Lithonia Control Systems
   8. MyTech Corporation
   9. Novitas, Inc.
   10. RAB Electric Manufacturing Co., Inc.
   11. SenTec, Inc.
   12. Sterner Lighting System, Inc.
   13. Tork, Inc.
   14. Touchplate
   15. Unenco Electronics (A Hubbell Co.)
   16. Watt Stopper, Inc. (The)

17. Cooper Lighting Solutions

C. Time Clocks:
1. Intematric, Inc.
2. Paragon Electric Co., Inc.

2.07 SECTION 26 14 10 Wiring Devices

A. Wiring Devices
i. Bryant Electric, Inc.
ii. Eagle Electric Manufacturing Co., Inc.
iii. GE Company; GE Wiring Devices
iv. Hubbell, Inc.; Wiring Devices Div.
v. Killark Electric Manufacturing Co.
vi. Pass & Seymour/Legrand; Wiring Devices Div.

B. Wiring Devices for Hazardous (Classified) Locations
i. Crouse-Hinds Electrical Co.; Distribution Equipment Div.
ii. Killark Electric Manufacturing Co.
iii. Pyle-National, Inc.; an Amphenol Co.
iv. Appleton Electric

C. Multi-outlet Assemblies:
i. Airey-Thompson Co.
ii. Wiremold

2.08 SECTION 26 24 16 Panelboards

A. Distribution Panelboards
i. GE Electrical
ii. Siemens
iii. Square D
iv. Cutler Hammer

B. Branch Circuit Panelboards:
i. GE Electrical
ii. Siemens
iii. Square D
iv. Cutler Hammer

2.09 SECTION 26 28 19 Enclosed Switches

A. Fusible Switch Assemblies:
i. GE Electrical Model
ii. Bubbell Inc. Model
iii. Westinghouse Electric Corp.
iv. Square D

B. Nonfusible Switch Assemblies:
i. GE Electrical Model
ii. Bubbell Inc. Model
iii. Westinghouse Electric Corp.
iv. Square D

2.10 SECTION 26 28 26 Transfer Switches

A. Caterpillar, Inc.; Engine Division.
B. Cummins
C. Emerson Electric Co.; Automatic Switch Co. Subsidiary.
D. Generac Corp.
E. Kholer Co.
F. Onan Corp.; Electrical Products Division.
G. Spectrum Detroit Diesel.
H. Russelectric, Inc.
I. Zenith Controls, Inc.

2.11 SECTION 26 29 13 Enclosed Controllers

A. Square D
B. Cutler Hammer
C. General Electric

2.12 SECTION 26 29 23 Variable Frequency Controllers

A. ABB Power Distribution, Inc.; ABB Control, Inc. Subsidiary.
B. Baldor Electric Company (Graham).
C. Danfoss Inc.; Danfoss Electronic Drives Div.
D. Eaton Corp.; Cutler-Hammer Products.
E. General Electrical Distribution & Control.
F. MagneTec Drives and Systems.
G. Rockwell Automation Allen-Bradley Co.; Industrial Control Group.
H. Siemens Energy and Automation; Industrial Products Division.
I. Square D Co.
J. Toshiba International Corporation.

2.13 SECTION 26 32 13 Packaged Engine Generators

A. Caterpillar, Inc.; Engine Div.
B. Generac Corp. Kohler Co; Generator Division.
C. MagneTek, Inc.
D. Cummins.
E. Detroit Diesel.

2.14 SECTION 26 43 15 Surge Protective Devices (SPDs) Externally Mounted For Low-Voltage (electrical and emergency power circuits), PLCs, Fire, and Security

A. Siemens Industry
B. Square D
C. Eaton

2.15 SECTION 26 51 00 Interior Lighting

A. Lithonia
B. H.E. Williams
C. Cooper Group
D. Signify Group/Phillips
E. Cree

2.16 SECTION 26 51 00 Interior Lighting

A. Lithonia
B. H.E. Williams
C. Cooper Group
D. Signify Group/Phillips
E. Cree

2.17 SECTION 26 56 00 Exterior Lighting

A. Lithonia
B. LSI
C. Cooper

2.18 SECTION 26 56 00 Lighting Poles

A. Parking Lot Light Poles
   i. Lithonia
   ii. LSI
   iii. Cooper

B. Street and Roadway
   i. Lithonia
   ii. LSI
   iii. Cooper

END OF SECTION

Soil Study for Proposed Retaining Wall, Wildcat Road, Huber Heights, Ohio

Submitted To:

City of Huber Heights
Attn: Mr. Russ Bergman
6131 Taylorsville Road
Huber Heights, Ohio 45424

Report No. 213502-0224-030
February 22, 2024

BOWSER MORNER®

4518 Taylorsville Road—Dayton, Ohio 45424—937.236.8805
www.bowser-morner.com

DAYTON ENGINEERING SERVICES
P.O. Box 51
Dayton, Ohio 45401-0051
P. 937.236.8805 **F.** 937.233.2016
www.bowser-morner.com

February 22, 2024

City of Huber Heights
6131 Taylorsville Road
Huber Heights, Ohio 45424

Attention: Mr. Russ Bergman, P.E.,
City Engineer

Re: Report No. 213502-0224-030; Soil Study for Proposed Retaining Wall, Wildcat Road, Huber Heights, Ohio

Dear Mr. Bergman:

Bowser-Morner, Inc. is pleased to submit our report of the soil study for the above-referenced project. The purpose of this study is to determine the physical characteristics of the soil strata and allowable bearing capacity for the proposed proposed retaining wall. Also noted are other conditions that could affect the design and/or construction of the structure.

The samples collected that were not used to perform the laboratory tests will be kept in our laboratory for 30 days unless you advise us otherwise. If you have any questions or if we can help you in any way on this project or future work, please call us.

Sincerely,
BOWSER-MORNER, INC.

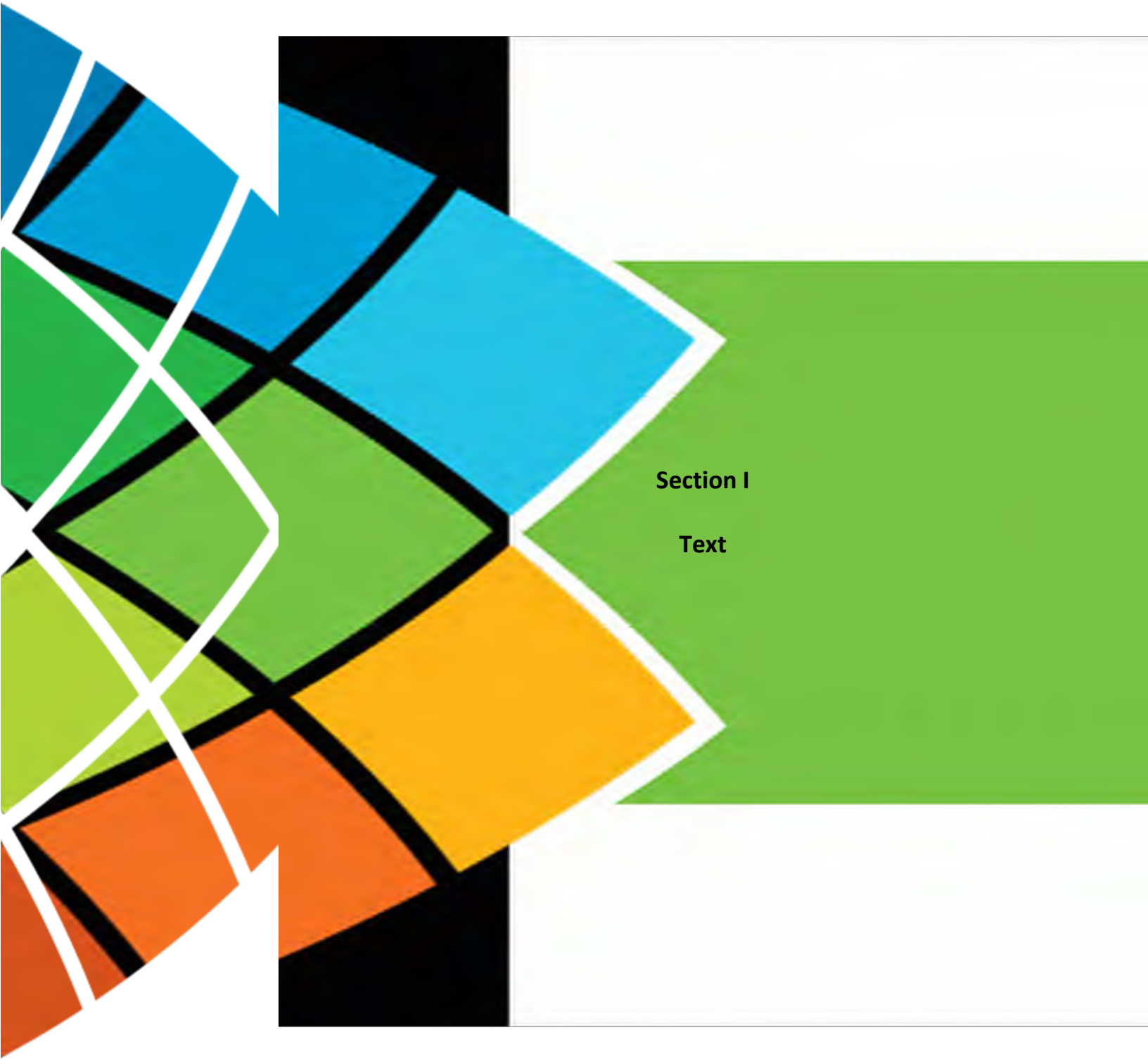
"This document was originally issued by Chris R. Ryan, M.S.C.E., P.E. and Daniel Otieno on February 22, 2024. This document is not considered a sealed document."

Daniel M. Otieno.
Geotechnical Engineer

Chris R. Ryan, M.S.C.E., P.E.
Sr. Geotechnical Engineer

DMO/CRR/an
3-Client
2-File

TABLE OF CONTENTS



Section I

Text

1.0 INTRODUCTION

A proposed retaining wall will be constructed as part of the development of the property on the northeast corner of the intersection of Wildcat Road and Taylorsville Road in Huber Heights, Ohio. A vicinity map (Figure 1) is included in Section III of this report. Our findings on the soil conditions, depth to bedrock, and groundwater levels with respect to the potential construction problems, and recommendations for the allowable bearing capacity for the construction of the proposed retaining wall are given in this report.

Authorization to proceed with this soil study was given by City of Huber Heights in a signed proposal acceptance sheet dated January 31, 2024. The work was to proceed in accordance with our proposal and agreement, Quotation No. 24-2771-010 dated January 31, 2024.

The draft soil boring logs and preliminary foundation recommendations were emailed to Mr. Russ Bergman of the City of Huber Heights, and Mr. Jon Wallenkamp of Kueny Architects, LLC on February 8, 2024.

Bowser-Morner, Inc. Report No. 208890-0223-038, dated February 23, 2023 discusses the soil conditions at this site. A total of six soil borings were performed for that study. The study was performed for the City of Huber Heights. We reviewed the relevant soil boring and laboratory data from the previous study to assist in the evaluation of this project.

2.0 WORK PERFORMED

2.1 Field Work

Two (2) soil borings were made at the locations shown on the boring location plan, Figure 2 in Section III. The boring logs and boring location plan are included in Section III. The borings were made with an ATV boring rig using hollow-stem augers and standard penetration resistance methods. The standard penetration tests were performed in accordance with ASTM D1586, which includes a 140-pound hammer, 30-inch drops, and two-inch-O.D. split-spoon samplers driven at maximum depth intervals of five feet or at major changes in stratum, whichever occurred first. The disturbed split-spoon samples were visually classified, logged, sealed in moisture-proof jars, and taken to the Bowser-Morner, Inc. laboratory for study. The depths where these "SS"-type split-spoon samples were collected are noted on the corresponding boring logs.

2.2 Laboratory Work

Two (2) Atterberg limits tests were performed in accordance with ASTM D4318 to determine the liquid and plastic limits on the most visibly plastic cohesive soil or as needed for soil classification. In addition, 12 moisture content determinations were made in accordance with ASTM D2216. The moisture contents ranged from 7.9% to 13.8% for the brown or gray silty lean clay with sand, and from 8.8% to 15.1% for the gray weathered shale. The moisture content was 11.7% for the brown silty sand with gravel, and 25.3% for the brown fat clay with silt. The results of the laboratory tests are summarized in Table 2-1 and included in Section III of this report.

Table 2-1. Summary of Laboratory Test Results

Boring No.	Depth (ft.)	Moisture Content (%)	Atterberg Limits LL	PL	PI
1	1.0 – 2.5	11.7			
	6.0 – 7.5	13.8	21	15	6
	13.5 – 15.0	10.2			
	23.5 – 25.0	15.1			
2	1.0 – 2.5	25.3	52	27	25
	3.5 – 5.0	7.9			
	6.0 – 7.5	10.4			
	13.5 – 15.0	7.9			
	23.5 – 25.0	12.2			
	28.5 – 30.0	8.8			
	33.5 – 35.0	8.9			
	38.5 – 38.9	10.5			

3.0 SOIL AND GROUNDWATER CONDITIONS

Based on the information from the two borings made for this study, the subgrade soil conditions are described in descending order below:

- In Boring 1, three feet of dense, brown silty sand with gravel underlain by 2.5 feet of medium dense brown silty sand.
- In Boring 2, a foot of brown silty lean clay underlain by two feet of medium stiff, brown fat clay with silt.
- In Boring 1 and below the brown silty sand layer and in Boring two and below the brown fat clay with silt layer, 15 to 17.5 feet of medium stiff-to-very stiff, brown or gray silty lean clay with sand.
- In Boring 2 and below the brown or gray silty lean clay with sand layer, five feet of medium dense, brown silty sand. Below the brown silty sand layer, five feet of very stiff, gray, silty lean clay with sand.
- In Borings 1 and 2 and below the gray, silty lean clay with sand layer, 5.9 to 10.9 feet of gray, highly weathered shale. The layer extends to the bottom of both borings upon auger refusal at a depth of 28.9 and 38.9 feet below the existing grade in Boring 1 and 2 respectively.

Free groundwater was encountered during the advancement of the borings at the depths and elevations summarized in Table 3-1.

Table 3-1. Summary of Groundwater Observations

Boring No.	Depth Groundwater First Observed (ft)		Groundwater Observations at Completion of Boring	
	Depth	Elevation*	Depth	Elevation*
1	13.5	864.2	No Water	
2	18.0	860.3	No Water	

*In reference to surface elevation based on Ohio South State Plane Coordinate System.

Free groundwater is defined as water that seeps into an open borehole before it is backfilled. Groundwater observations were made during the boring operations by noting the depth of water on the boring tools and in the open boreholes following withdrawal of the boring augers. However, it should be noted that short-term water level readings are not necessarily a reliable indication of the groundwater level and that significant fluctuations may occur due to variations in rainfall and other factors. For specific questions on the soil conditions, please refer to the individual boring logs in Section III.

4.0 DISCUSSION AND RECOMMENDATIONS

4.1 Project Description

A proposed retaining wall will be constructed as part of the development of the property on the northeast corner of the intersection of Wildcat Road and Taylorsville Road in Huber Heights, Ohio. The proposed retaining wall will be approximately 25 feet in height and will be approximately 475 feet long. No design design or loading information for the proposed retaining wall was provided for this report.

The following recommendations are based on this information. If the above statements are incorrect or changes are made, Bowser-Morner, Inc. should be notified so that the new data can be reviewed and additional recommendations and services can be given if required to meet the needs of your project.

4.2 Foundation Recommendations

4.2.1 Foundation Subgrade Preparation

Based on the information from the borings made for this study, auger refusal occurred in both borings. The depths and elevations to the top of the apparent bedrock and depths to auger refusal are tabulated in Table 4-1.

Table 4-1. Depths to Bottoms of Unreliable Soil Layer

Boring No.	Depth to Top of Bedrock (ft)	Elevation* at Top of Bedrock (ft)	Depth to Auger Refusal (ft)	Elevation* at Auger Refusal (ft)
1	23.0	854.7	28.9	848.8
2	28.0	850.3	38.9	839.4

*In reference to surface elevation based on Ohio South State Plane Coordinate System.

Based on the results of the standard penetration tests (SPT) in the borings, the depths and elevations to bearing strata at those boring locations and the recommended net

allowable bearing capacities on the original soil strata and/or on bedrock are outlined in Table 4-2.

Table 4-2. Depths to Bottoms of Unreliable Soil Layer

Boring No.	Depth to Bottom of Unreliable Soil (ft)	Elevation* at Bottom of Unreliable Soil (ft)	Fat Clay, Weak Soil, and/or Rock	Allowable Bearing Capacity (psf)
1	1.0	876.7	Weak Soil	2,000
	8.5	869.2	Weak Soil	4,000
	28.9	848.8	Rock	10,000
2	1.0	877.3	Weak Soil	1,500
	3.5	874.8	Fat Clay and Weak Soil	4,000
	38.9	839.4	Rock	10,000

* In reference to surface elevation based on Ohio South State Plane Coordinate System.

The fat clay at the depths outlined in Table 4-2 is not reliable to support the proposed retaining wall and should be removed. The fat clay will shrink or swell when dry or wet. Based on the soil conditions indicated in the two borings made for this study, the fat clay layer or pocket was encountered in Boring 2 to a depth of 3.0 feet below the existing grade. Fat clay has very high moisture content. Any structure supported on fat clay layer will settle and crack due to volume changes in the fat clay. If the fat clay will be removed and reused as construction material or as backfill, the fat clay should be dried and mixed with lime to change the characteristics of the fat clay. The determination of the required amount of lime to treat the fat clay to be used as construction material is beyond the scope of this study.

The foundation excavations should be extended through the weak soil layers to be extended onto the suitable depths and elevations with the desired bearing capacity outlined above. Any non-organic soil removed from the site can be stock-piled to be used as backfill for the preparation of the subgrade for the retaining wall. The soil backfill behind the retaining wall should be a free drain sand and gravel to prevent the accumulation of water behind the wall. Consequently, the silty and clayey soil should not place directly behind the proposed retaining wall. However, the silty and clayey soil can be used as the seal layer over the top of the granular backfill behind the wall to reduce the surface water infiltration into the granular backfill.

The bottoms of retaining wall foundation/base should be placed at least 36 inches below the final adjacent grades to protect against frost penetration and any potential heaving problem.

After the excavation extends to the desired grade, the top foot at the bottom of the excavation on soil, should be compacted to at least 90% of the maximum dry-unit weight as defined by the modified Proctor test (ASTM D1557) before any new fill or foundation is placed. Any soft soil pockets should be undercut and replaced with compacted fill. After the bottoms of the excavations have been compacted, structural fill, if needed, can be placed to bring the bottom of the excavations to the desired grade. The fill placed below the bottoms of the foundations should be placed in eight-inch-thick horizontal lifts

and compacted to at least 95% of the maximum dry-unit weight with moisture contents within 2% of the optimum moisture content as determined by the modified Proctor test (ASTM D1557). Fill placed above the bottoms of the foundations should be compacted to at least 90% of the maximum dry-unit weight with moisture contents within 2% of the optimum moisture content as determined by the modified Proctor test (ASTM D1557) to minimize the potential settlement of the ground surface around the wall foundation. The granular backfill to be placed within two feet behind the retaining wall should be hand tamped to reduce the lateral pressure against the newly constructed wall.

Again, the undocumented and uncontrolled non-organic soil removed from this site that is free of organic or objectionable materials as defined by a field technician who is qualified in soil material identification and compaction procedures can be reused as fill or backfill below the bottom of the wall foundation or as the seal layer over the granular backfill behind the newly constructed wall. Objectionable or undesirable soils are defined as those materials that cannot meet design placement specifications or materials that will deteriorate with time.

The wall foundations can be supported on the original subgrade soil, newly compacted backfill, or bedrock extending to the depths outlined in Table 4-2. The foundations can be designed with the corresponding net allowable bearing capacities outlined in Table 4-2. For the recommended allowable bearing capacities outlined in Table 4-2 for the original soil layer or for the newly compacted backfill, the total estimated amount of settlement of the foundations will be about one inch.

The retaining-wall backfill should consist of free-draining sand and gravel backfill that will keep water from accumulating behind the wall. A drainage collection pipe that provides positive discharge away from the wall should be installed at the bottom of the backfill along the full length of the foundation. Weep holes should also be provided on the face a concrete retaining wall. A layer of non-woven, needle-punched, filter fabric should be placed behind the retaining wall before the granular fill is placed. If water is allowed to accumulate behind the wall, full hydrostatic pressures should be included in the design of the retaining wall.

The base of the retaining wall should be at least 36 inches below the final grade, and the free-draining granular backfill should be more than three feet thick to protect against frost penetration and heaving from the front face of the retaining wall.

Soil and/or rock anchors can be installed to provide the lateral resistance to prevent the sliding of the wall. A global-stability analyses should be performed by the wall designer, and is beyond the scope of our study.

4.2.2 Lateral Earth Pressure for the Retaining Wall

The retaining wall should be designed to resist the lateral earth pressure. Free-draining granular materials should be placed behind the retaining wall. Water should not be allowed to accumulate behind the retaining wall. With the retaining walls to be backfilled with free-draining granular backfill, an “at-rest,” lateral earth-pressure coefficient of 0.5 should be used to compute the lateral earth pressure against the retaining wall. A lateral

soil pressure of 63 pounds per square foot per foot depth can be used in the design of the retaining wall. If water will be allowed to accumulate behind the retaining wall, a static water pressure of 62.4 psf per foot depth should be added onto the design lateral pressure against the retaining wall. The design of the retaining wall is beyond the scope of the study.

4.2.3 Site Classification For Seismic Design

Based on the results of the standard penetration tests (SPT) in the borings made for this study, the average "N" is 28 to 31 blows per foot for the soil layer within 28.9 to 38.9 feet of the existing grade. Bedrock was encountered at depths of 23.0 to 28.0 feet below the existing grade in these borings. Because the bedrock was encountered within relatively shallow depths, we have the opinion that the site will be classified as a "C" type in accordance with the *Ohio Building Code*. If the proposed wall foundation will be supported directly on bedrock, the site can be re-classified as a "B" type.

4.3 Compaction Requirements

Structural fill placed below the foundation bearing elevation should be compacted to at least 95% of the maximum dry unit weight with moisture contents within 2% of the optimum moisture content as determined by the modified Proctor test (ASTM D1557). Fill placed above the bottoms of the foundations or under pavement areas should be compacted to at least 90% of the maximum dry unit weight with moisture contents within 2% of the optimum moisture content as determined by the modified Proctor test (ASTM D1557). The compaction should be accomplished by placing the fill in successive, horizontal, approximately six- to eight-inch-thick loose lifts and mechanically compacting each lift to at least the specified minimum dry density. Field density tests should be performed at a minimum rate of one per 2,500 square feet of fill area and for each lift to verify that adequate compaction is achieved. Backfill for utility trenches, foundation excavations, etc., within structures or paved areas, is considered structural fill and should be placed in accordance with these recommendations.

It must be emphasized that the excavation and compaction of soil fill are highly influenced by weather conditions. Performing the earthwork under wet and frozen conditions is generally very difficult. As a result, compaction of wet silty and clayey soil should be avoided during wet and frozen conditions because the wet soil cannot be compacted to the required unit weight without drying or other soil stabilization methods. Alternatively, granular soil can be used as backfill to facilitate the backfill and compaction work during winter and wet weather conditions. The construction cost during the winter and wet weather conditions will be higher by the purchase of granular soil from the sand and gravel pits.

Puddling or jetting of the backfill material, including the utility trenches, should not be allowed as a compaction method. Silty or clayey soils encountered above foundation depth will often soften, and the bearing capacity may be reduced if water ponds in the excavation.

Lean concrete that is placed below the bottom of foundation should have a minimum 28-day compressive strength of 2,000 pounds per square inch (psi).

4.4 Foundation Excavations

During the foundation excavations, the subsurface conditions should be verified. Changes in subsurface conditions other than what are shown on the boring logs warrant additional subsurface investigation before the retaining wall foundations are constructed.

The foundation excavations should be observed to ensure that the loose, soft, or otherwise undesirable materials are removed and that the foundations will be supported directly on an acceptable surface. At the time of this observation, it may be necessary to use a hand penetration device in the base of the foundation excavation to ensure that the soils immediately below the foundation base are satisfactorily prepared to support the foundations. Please note that such shallow observations do not replace an adequate deep-boring program and structural fill compaction QA/QC records. The overall performance of the foundations is governed by the soils below the bottom of the footing foundation.

If pockets of soft, loose, or otherwise unsuitable materials are encountered in the footing excavations and it is inconvenient to lower the footings, the proposed footing elevations may be reestablished by backfilling after the undesirable materials have been removed. The excavation under each footing should extend to suitable soils, and the base of the excavation should extend one lateral foot for every foot of excavation below the bottom of the footing foundation as shown in Figure 3 in Section III. The entire excavation should then be refilled with well-compacted, engineered fill. Special care should be taken to remove the sloughed, loose, or soft materials near the base of the excavation slopes. Extra care should also be taken to tie-in the compacted fill with the excavation slopes, with benches as necessary, to ensure that no pockets of loose or soft materials are left along the excavation slopes below the foundation bearing level. The contractor should maintain temporary cut slopes in accordance with the current OSHA regulations governing trenching and slope stability.

Soils exposed at the bases of satisfactory foundation excavations should be protected against any detrimental change in condition such as from construction disturbances, rain, and freezing. Surface runoff should be drained away from the excavation and not allowed to pond. If possible, foundation concrete should be placed the same day the excavation is made. If this is not practical, the foundation excavations should be adequately protected. Also, for this reason, proper drainage should be maintained after construction. It must be emphasized that all excavations must conform to all state, federal, and local regulations relative to slope geometry.

4.5 Construction Dewatering

At the time of our study, free groundwater was encountered in both borings at depths of 13.5 to 18 feet below the existing grade as outlined in Table 3-1. Any groundwater encountered in the excavations should be lowered to the bottom of the maximum excavation using sumps and pumps. Alternatively, the horizontal drains can be installed for the water from the excavation to be channeled to the down slope direction. Sumps can consist of perforated pipes or drums installed vertically in the relatively permeable granular soils and surrounded with free-draining sand and gravel. The perforations of the pipe should be covered with a layer of filter fabric to keep silt and fine sand from pumping through the sumps. Care must be exercised when pumping from sumps that extend into silts or other granular soils since general deterioration of the bearing soils and a localized “quick” condition could result. The groundwater should be kept at a level

below the fill operation during the placement and compaction of the backfill materials during the construction of the foundations.

The amount and type of dewatering required during construction will depend on groundwater levels and surface water flow from top of the slope toward the excavation at the time of construction. Typically, groundwater levels are highest during winter and spring, and lower in summer and early fall.

4.6 Drainage

Adequate drainage should be provided at the site to minimize any increase in moisture content of the foundation soils during and after construction. The exterior grade including all pavements or parking areas should be sloped away from the new retaining wall foundations to keep water from ponding.

5.0 CLOSURE

5.1 Basis of Recommendations

The evaluations, conclusions, and recommendations in this report are based on our interpretation of the field and laboratory data obtained during the exploration, our understanding of the project and our experience with similar sites and subsurface conditions. Data used during this exploration included, but were not necessarily limited to:

- Two exploratory borings performed during this study.
- Observations of the project site by our staff.
- Previous geotechnical soil study for a public works facility. Bowser-Morner, Inc. Report No. 208890-0223-038, dated February 23, 2023. That report was prepared for the City of Huber Heights.
- The results of the laboratory soil tests.
- The site plan provided by City of Huber Heights.
- Published soil or geologic data of this area.

In the event that changes in the project characteristics are planned, or if additional information or differences from the conditions anticipated in this report become apparent, Bowser-Morner, Inc. should be notified so that the conclusions and recommendations contained in this report can be reviewed and, if necessary, modified or verified in writing.

5.2 Limitations and Additional Services

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.

Regardless of the thoroughness of a subsurface exploration, there is the possibility that conditions between borings will differ from those at the boring locations, that conditions are not as anticipated by designers, or that the construction process has altered the soil conditions. As variations in the soil profile are encountered, additional subsurface sampling and testing may be necessary to provide data required to reevaluate the recommendations of this report. Consequently, after submission of this report, it is recommended that Bowser-Morner, Inc. be authorized to perform additional services to work with the designer(s) to minimize errors and omissions regarding the interpretation and implementation of this report.

Before construction begins, we recommend that Bowser-Morner, Inc.:

- Work with the designers to implement the recommended geotechnical design parameters into plans and specifications.
- Consult with the design team regarding interpretation of this report.
- Establish criteria for the construction observation and testing for the soil conditions encountered at this site.
- Review final plans and specifications pertaining to geotechnical aspects of design.

During construction, we recommend that Bowser-Morner, Inc.:

- Observe the construction, particularly the site preparation, fill placement, and foundation excavation or installation.
- Perform in-place density testing of all compacted fill.
- Perform materials testing of soil and other materials as required.
- Consult with the design team to make design changes in the event that differing subsurface conditions are encountered.

If Bowser-Morner, Inc. is not retained for these services, we shall assume no responsibility for construction compliance with the design concepts, specifications or recommendations.

5.3 Warranty

Our professional services have been performed, our findings obtained and our recommendations prepared in accordance with generally accepted geotechnical engineering principles and practices. No other warranty, express or implied, is made.

The scope of this study did not include an environmental assessment for the presence or absence of hazardous or toxic materials in the soil, surface water, groundwater or air, on, within or beyond the site studied. Any statements in the report or on the boring logs regarding odors, staining of soils or other unusual items or conditions observed are strictly for the information of our client.

To evaluate the site for possible environmental liabilities, we recommend an environmental assessment, consisting of a detailed site reconnaissance, a record review, and report of findings. Additional subsurface drilling and sampling, including groundwater sampling, may be required.

Bowser-Morner, Inc. can provide this service and would be pleased to provide a cost proposal to perform such a study, if requested.

This report has been prepared for the exclusive use of City of Huber Heights for specific application to the proposed retaining wall on Wildcat Road in Huber Heights, Ohio (see Figure 1 in Section III of this report). Specific design and construction recommendations have been provided in the various sections of the report. The report shall therefore, be used in its entirety. This report is not a bidding document and shall not be used for that purpose. Anyone reviewing this report must interpret and draw their own conclusions regarding specific construction techniques and methods chosen. Bowser-Morner, Inc. is not responsible for the independent conclusions, opinions or recommendations made by others based on the field exploration and laboratory test data presented in this report.

Section II

Specifications

CLEARING AND GRADING SPECIFICATIONS

I. GENERAL CONDITIONS

The contractor shall furnish all labor, materials, and equipment, and perform all work and services necessary to complete in a satisfactory manner the site preparation, excavation, filling, compaction and grading as shown on the plans and as described therein.

This work shall consist of all clearing and grading, removal of existing structures unless otherwise stated, preparation of the land to be filled, filling of the land, spreading and compaction of the fill, and all subsidiary work necessary to complete the grading of the cut and fill areas to conform with the lines, grades, slopes, and specifications.

This work is to be accomplished under the constant and continuous supervision of the Owner or his designated representative.

In these specifications the terms "approved" and "as directed" shall refer to directions to the Contractor from the Owner or his designated representative.

II. SUBSURFACE CONDITIONS

Prior to bidding the work, the Contractor shall examine, investigate and inspect the construction site as to the nature and location of the work, and the general and local conditions at the construction site, including, without limitation, the character of surface or subsurface conditions and obstacles to be encountered on and around the construction site; and shall make such additional investigation as he may deem necessary for the planning and proper execution of the work. Borings and/or soil investigations shall have been made. Results of these borings and studies will be made available by the Owner to the Contractor upon his request, but the Owner is not responsible for any interpretations or conclusions with respect thereto made by the Contractor on the basis of such information, and the Owner further has no responsibility for the accuracy of the borings and the soil investigations.

If conditions other than those indicated are discovered by the Contractor, the Owner should be notified immediately. The material which the Contractor believes to be a changed condition should not be disturbed so that the Owner can investigate the condition.

III. SITE PREPARATION

Within the specified areas, all trees, brush, stumps, logs, tree roots, and structures scheduled for demolition shall be removed and disposed of.

All cut and fill areas shall be properly stripped. Topsoil will be removed to its full depth and stockpiled for use in finish grading. Any rubbish, organic and other objectionable soils, and other deleterious material, shall be disposed of off the site, or as directed by the Owner or his designated representative if on site disposal is provided. In no case shall such objectionable material be allowed in or under the fill unless specifically authorized in writing.

Prior to the addition of fill, the original ground shall be compacted to job specifications as outlined below. Special notice shall be given to the proposed fill area at this time. If wet spots, spongy conditions, or ground water seepage is found, corrective measures must be taken before the placement of fill.

IV. FORMATION OF FILL AREAS

Fills shall be formed of satisfactory materials placed in successive horizontal layers of not more than eight (8) inches in loose depth for the full width of the cross section. The depth of lift may be increased if the Contractor can demonstrate the ability to compact a larger lift. If compaction is accomplished using hand-tamping equipment, lifts will be limited to 4-inch lose lifts.

All material entering the fill shall be free of organic matter such as leaves, grass, roots, and other objectionable material.

The operations on earth work shall be suspended at any time when satisfactory results cannot be obtained because of rain, freezing weather, or other unsatisfactory conditions. The Contractor shall keep the work areas graded to provide the drainage at all times.

The fill material shall be of the proper moisture content before compaction efforts are started. Wetting or drying of the material and manipulation to secure a uniform moisture content throughout the layer shall be required. Should the material be too wet to permit proper compaction or rolling, all work on all portions of the embankment thus affected shall be delayed until the material has dried to the required moisture content. The moisture content of the fill material should be no more than two (2) percentage points higher or lower than optimum unless otherwise authorized. Sprinkling shall be done with equipment that will satisfactorily distribute the water over the disced area.

Compaction operations shall be continued until the fill is compacted to not less than 90% above foundation elevation and 95% below foundation elevation, of the maximum density as determined in accordance with the latest ASTM D-1557 (Modified). Any areas inaccessible to a roller shall be consolidated and compacted by mechanical tampers. The equipment shall be operated in such a manner that hardpan, cemented gravel, clay or other chunky soil material will be broken up into small particles and become incorporated with the other material in the layer.

In the construction of filled areas, starting layers shall be placed in the deepest portion of the fill, and as placement progresses, additional layers shall be constructed in horizontal planes. If directed, original slopes shall be continuously, vertically benched to provide horizontal fill planes. The size of the benches shall be formed so that the base of the bench is horizontal and the back of the bench is vertical. As many benches as are necessary to bring the site to final grade shall be constructed. Filling operations shall begin on the lowest bench, with the fill being placed in horizontal eight (8) inch loose lifts unless otherwise authorized. The filling shall progress in this manner until the entire first bench has been filled, before any fill is placed on the succeeding benches. Proper

drainage shall be maintained at all times during benching and filling of the benches, to insure that all water is drained away from the fill area.

When rock and other embankment material are excavated at approximately the same time, the rock shall be incorporated into the outer portion of the areas. Stones or fragmentary rock larger than four (4) inches in their greatest dimensions will not be allowed in the fill unless specifically authorized in writing. Rock fill shall be brought up in layers as specified or as directed, and every effort shall be exerted to fill the voids with the finer material to form a dense, compact mass. Rock or boulders shall be disposed of as deleterious material per Item III.

Frozen material shall not be placed in the fill nor shall the fill be placed upon frozen material.

The Contractor shall be responsible for the stability of all fills made under the contract, and shall replace any portion, which in the opinion of the Owner or his designated representative, has become displaced due to carelessness or negligence on the part of the Contractor. Fill damaged by inclement weather shall be repaired at the Contractor's expense.

V. SLOPE RATIO AND STORM WATER RUN-OFF

Slopes shall not be greater than 2 (horizontal) to 1 (vertical) in both cut and fill, and storm water shall not be drained over the slopes.

VI. GRADING

The Contractor shall furnish, operate, and maintain such equipment as is necessary to construct uniform layers, and control smoothness of grade for maximum compaction and drainage.

VII. COMPACTING

The compaction equipment shall be approved equipment of such design, weight, and quantity to obtain the required density in accordance with these specifications.

VIII. TESTING AND INSPECTION SERVICES

Testing and inspection services will be provided by the Owner.

IX. SPECIAL CONDITIONS

Section III

Boring Log Terminology, Boring Logs, Laboratory Data, And Prints

BORING LOG TERMINOLOGY

Stratum Depth:

Distance in feet and/or inches below ground surface.

Stratum Elevation:

Elevation in feet below ground surface elevation.

Description of Materials:

Major types of soil material existing at boring location. Soil classification based on one of the following systems: Unified Soil Classification System., Ohio State Highway Classification System, Highway Research Board Classification System, Federal Aviation Authority Classification System, Visual Classification.

Sample No.:

Sample numbers are designated consecutively, increasing with depth for each boring.

Sample Type:

"A" Split spoon, 2" O.D., 1-3/8" I.D., 18" in length.

"B" Rock Core

"C" Shelby Tube 3" O.D. except where noted

"D" Soil Probe

"E" Auger Cuttings

"F" Sonic

Sample Depth:

Depth below top of ground at which appropriate sample was taken.

Blows per 6" on Sampler:

The number of blows required to drive a 2" O.D., 1-3/8" I.D., split spoon sampler, using a 140 pound hammer with a 30-inch free fall, is recorded for 6" drive increments. (Example: 3/8/9).

"N" Blows/Ft.:

Standard penetration resistance. This value is based on the total number of blows required for the last 12" of penetration. (Example: 3/8/9: N = 8 + 9 = 17)

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Water Observations:

Depth of water recorded in test boring is measured from top of ground to top of water level. Initial depth indicates water level during boring, completion depth indicates water level immediately after boring, and depth after "X" number hours indicates water level after letting water rise or fall over a time period. Water observations in pervious soil are considered reliable ground water levels for that date. Water observations in impervious soils can not be considered accurate ground water measurements for that date unless records are made over several days' time. Factors such as weather, soil porosity, etc., will cause the ground water level to fluctuate for both pervious and impervious soils.

SOIL DESCRIPTION

Color:

When the color of the soil is uniform throughout, the color recorded will be such as brown, gray, or black and may be modified by adjectives such as light and dark. If the soil's predominant color is shaded by a secondary color, the secondary color precedes the primary color, such as: gray-brown, yellow-brown. If two major and distinct colors are swirled throughout the soil, the colors will be modified by the term mottled, such as: mottled brown and gray.

Particle Size	Visual
Boulders	Larger than 8"
Cobbles	8" to 3"
Gravel – Coarse	3" to 3/4"
– Fine	2 mm. To 3/4"
Sand – Coarse	2 mm. – 0.6 mm. (Pencil lead size)
– Medium	0.6 mm. – 0.2mm. Table sugar and salt size)
– Fine	0.2 mm. – 0.06 mm. (Powdered sugar and human hair size)
Silt	0.06 mm. – 0.002 mm.
Clay	0.002 and smaller (Particle size of both Silt and Clay not visible To naked eye

Soil Components

Major Component:	Minor Component Term
Gravel	Trace 1-10%
Sand	Some 11-35%
Silt	And 36-50%
Clay	

Moisture Content

Term	Relative Moisture
Dry	Powdery
Damp	Moisture content below plastic limit
Moist	Moisture content above plastic limit but below liquid limit
Wet	Moisture content Above liquid limit

Condition of Soil Relative to Compactness Granular Material

Very Loose	5 blows/ft. or less
Loose	6 to 10 blows/ft.
Medium Dense	11 to 30 blows/ft.
Dense	30 to 50 blows/ft.
Very Dense	51 blows/ft. or more

Condition of Soil Relative to Consistency Cohesive Material

Very Soft	3 blows/ft. or less
Soft	4 to 5 blows/ft.
Medium Stiff	6 to 10 blows/ft.
Stiff	11 to 15 blows/ft.
Very stiff	16 to 30 blows/ft.
Hard	31 blows/ft. or more

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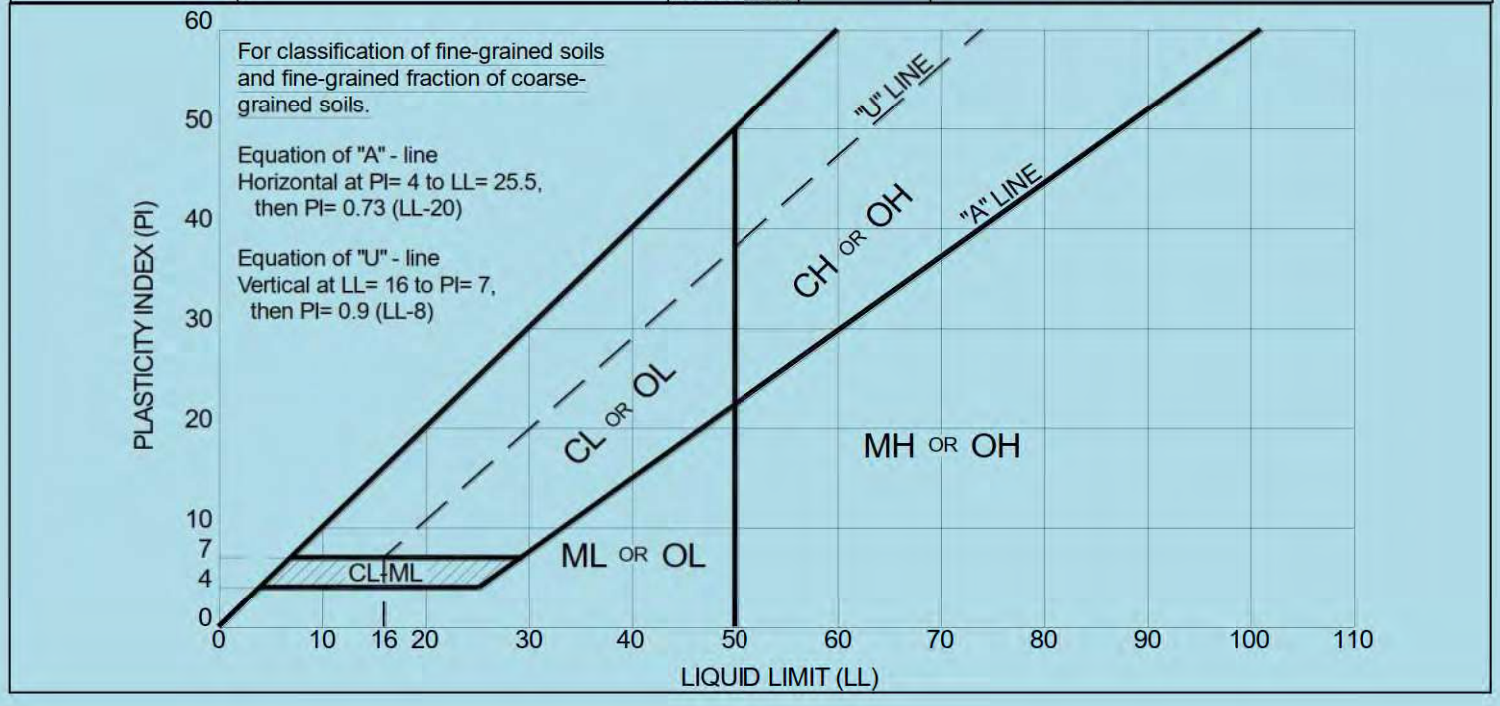
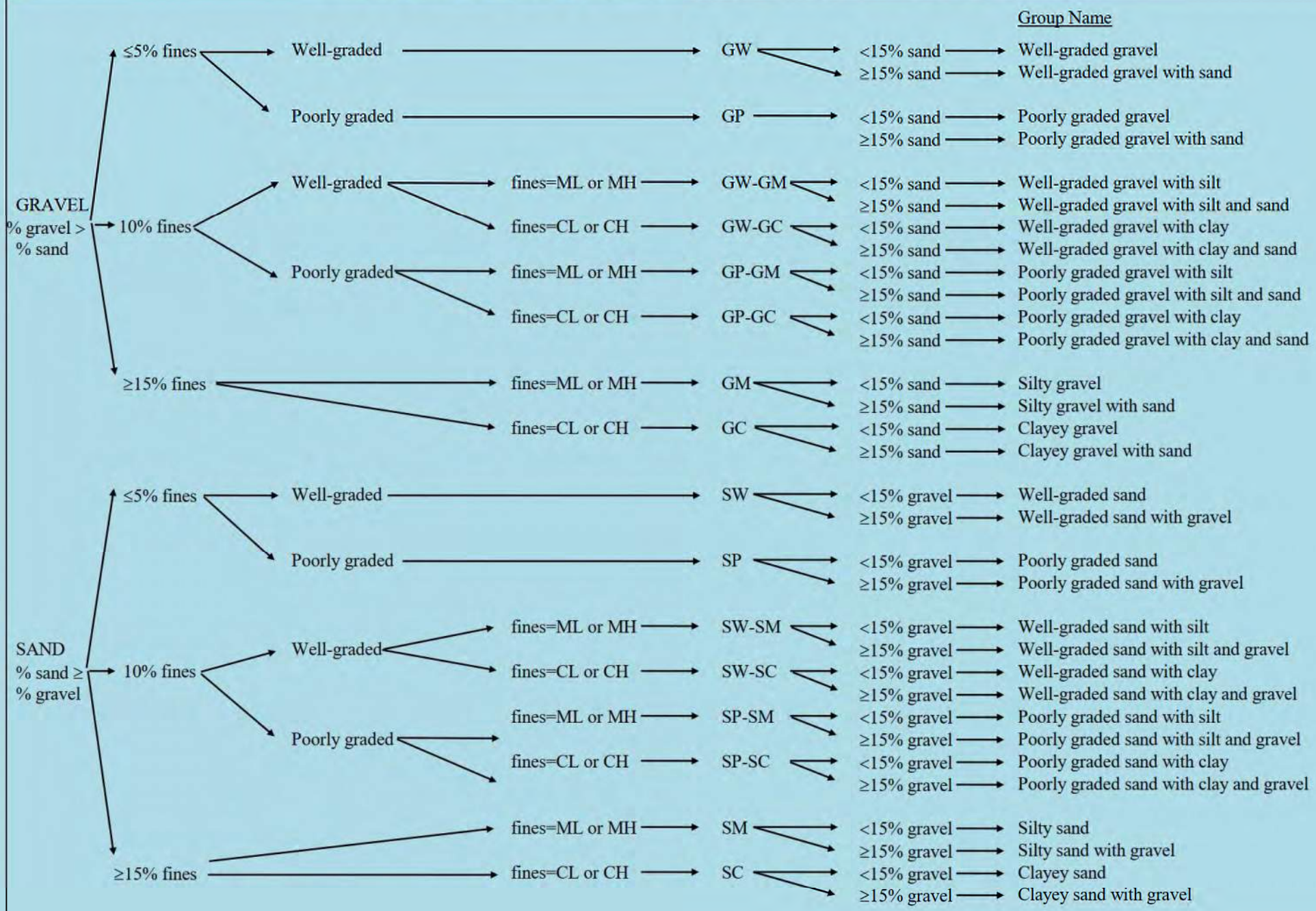
UNIFIED CLASSIFICATION SYSTEM

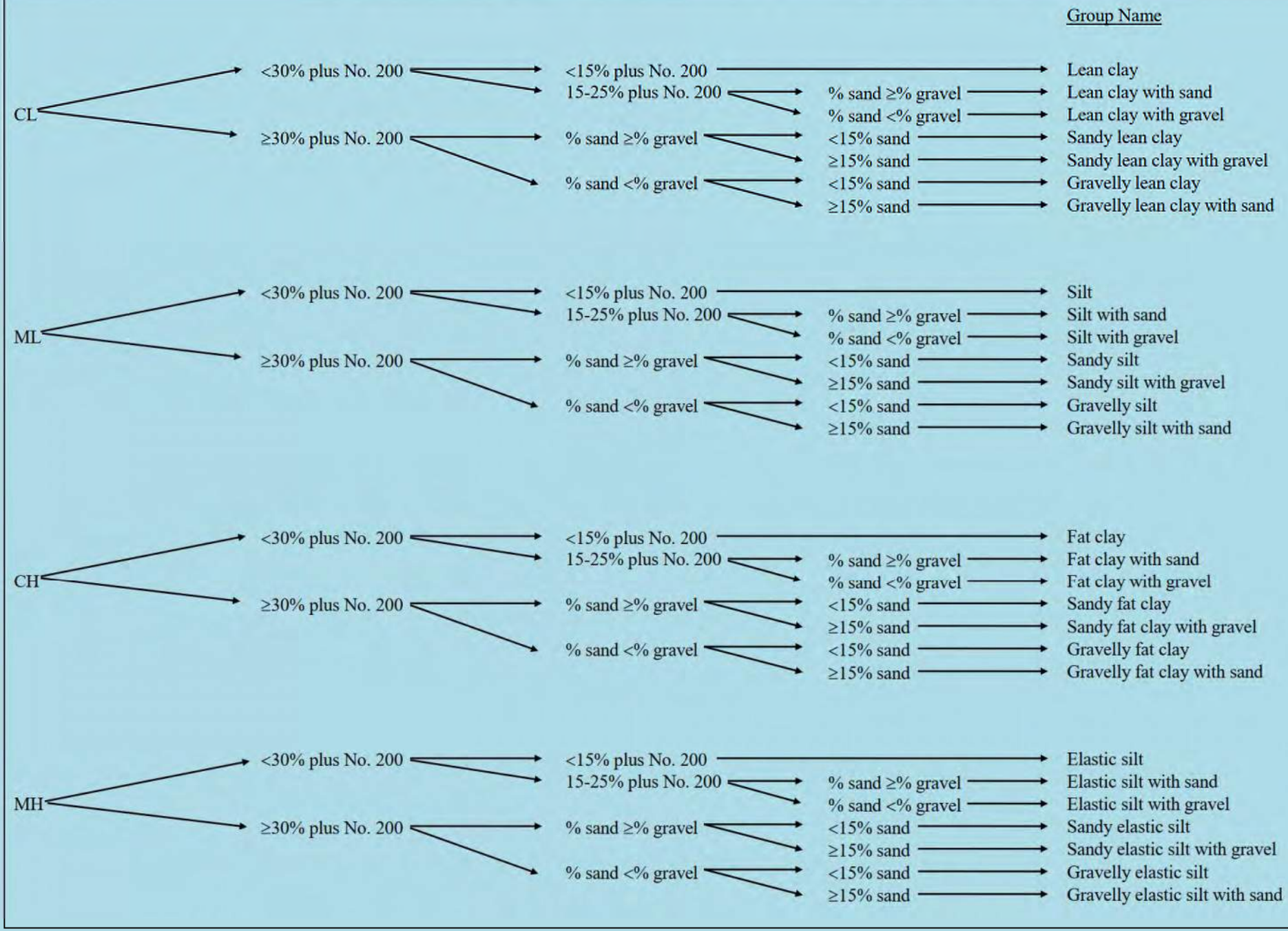
MAJOR DIVISIONS			GRAPH SYMBOL	LETTER SYMBOL	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVEL WELL-GRADED GRAVEL WITH SAND
				GP	POORLY GRADED GRAVEL POORLY GRADED GRAVEL WITH SAND
		GRAVELS WITH FINES APPRECIABLE AMT. OF FINES)		GM	SILTY GRAVEL SILTY GRAVEL WITH SAND
				GC	CLAYEY GRAVEL CLAYEY GRAVEL WITH SAND
	SAND AND SANDY SOILS	CLEAN SAND (LITTLE OR NO FINES)		SW	WELL-GRADED SAND WELL-GRADED SAND WITH GRAVEL
				SP	POORLY GRADED SAND POORLY GRADED SAND WITH GRAVEL
	MORE THAN 50% OF COARSE FRACTION PASSING NO. 4 SIEVE	SANDS WITH FINES (APPRECIABLE AMT. OF FINES)		SM	SILTY SAND SILTY SAND WITH GRAVEL
				SC	CLAYEY SAND CLAYEY SAND WITH GRAVEL
FINE GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILT AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	SILT, SILT WITH SAND, SANDY SILT GRAVELLY SILT, GRAVELLY SILT WITH SAND
				CL	LEAN CLAY WITH SAND, SANDY LEAN CLAY GRAVELLY LEAN CLAY WITH SAND
				OL	ORGANIC CLAY, SANDY ORGANIC CLAY ORGANIC SILT, SANDY ORGANIC SILT WITH GRAVEL
	SILT AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	ELASTIC SILT WITH SAND, SANDY ELASTIC SILT GRAVELLY ELASTIC SILT WITH SAND
				CH	FAT CLAY WITH SAND, SANDY FAT CLAY GRAVELLY FAT CLAY WITH SAND
				OH	ORGANIC CLAY WITH SAND, SANDY ORGANIC CLAY, ORGANIC SILT, SANDY ORGANIC SILT
	HIGHLY ORGANIC SOILS			PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS



Flow Chart for Visually Identifying Soils Based on ASTM D-2488



Flow Chart for Visually Identifying Soils Based on ASTM D-2488



STANDARD PENETRATION RESISTANCE (ASTM D1586)

The purpose of this test is to determine the relative consistency of the soils in a boring, or from boring over the site. This method consists of making a hole in the ground and driving a 2-inch O.D. split spoon sampler into the soil with a 140-pound hammer dropped from a height of 30 inches. The sampler is driven 18 inches and the number of blows recorded for each 6 inches of penetration. Values of standard penetration (N) are determined in blows per foot, summarizing the flows required for the last two 6-inche increments of penetration.

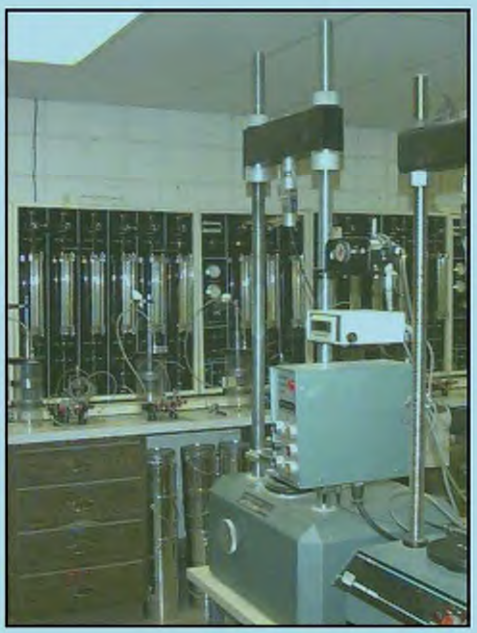
Example : 2-6-8; N = 14

THIN-WALLED SAMPLER (ASTM D1587)

The purpose of the thin-walled sampler is to recover a relatively undisturbed soil sample for laboratory tests. The sampler is a thin-walled seamless tube with a 3-inch outside diameter, which is hydraulically pressed into the ground, at a constant rate. The ends are then sealed to prevent soil moisture loss, and the tube is returned to the laboratory for tests.

BOWSER MORNER

UNCONFINED COMPRESSION OR TRIAXIAL TESTS (ASTM D 2166)



The unconfined compression test and the triaxial tests are performed to determine the shearing strength of the soil, to use in establishing its safe bearing capacity. In order to perform the unconfined compression test, it is necessary that the soil exhibit sufficient cohesion to stand in an unsupported cylinder. These tests are normally performed on samples which are 6.0 inches in height and 2.85 inches in diameter. In the triaxial test, various lateral stresses can be applied to more closely simulate the actual field conditions. There are several different types of triaxial tests. These are, however, normally performed on constant strain apparatus with a deformation rate of 0.05 inches per minute.

CONSOLIDATION TEST (ASTM D 2435)

The purpose of this test is to determine the compressibility of the soil. This test is performed on a sample of soil which is 2.5 inches in diameter and 1.0 inch in height, and has been trimmed from relatively "undisturbed" samples. The test is performed with a lever system or an air activated piston for applying load. The loads are applied in increments and allowed to remain on the sample for a period of 24 hours. The consolidation of the sample under each individual load is measured and a curve of void ratio vs. Pressure is obtained. From the information obtained in this manner and the column loads of the structure, it is possible to calculate the settlement of each individual building column. This information, together with the shearing strength of the soil, is used to determine the safe bearing capacity for a particular structure.

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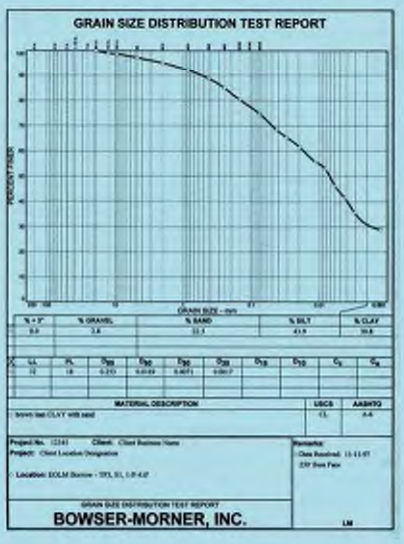
REVISED TO ASTM D4318

ATTERBERG LIMITS (ASTM D423 AND D424)

These tests determine the liquid and plastic limits of soils having a predominant percentage of fine particle (silt and clay) sizes. The liquid limit of a soil is the moisture content expressed as a percent at which the soil changes from a liquid to a plastic state, and the plastic limit is the moisture content at which the soil changes from a plastic to a semi-solid state. Their difference is defined as the plasticity index (P.I. = L.L. - P.L.), which is the change in moisture content required to change the soil from a "semi-solid" to a liquid. These tests furnish information about the soil properties which is important in determining their relative swelling potential and their classifications.

MECHANICAL ANALYSIS (ASTM D422)

This test determines the percent of each particle size of a soil. A sieve analysis is conducted on particle sizes greater than a No. 200 sieve (0.074 mm), and a hydrometer test on particles smaller than the No.200 sieve. The gradation curve is drawn through the points of cumulative percent of particle size, and plotted on semi-logarithmic paper for the combined sieve and hydrometer analysis. This test, together with the Atterberg Limits tests, is used to classify a soil.



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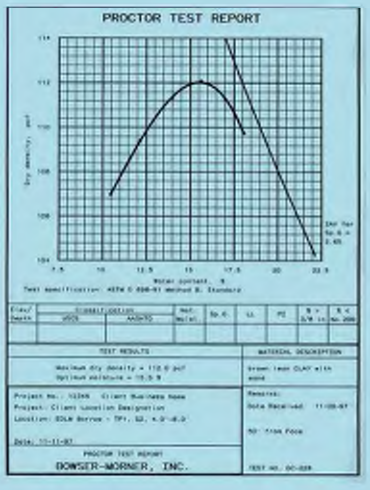
NATURAL MOISTURE CONTENT (ASTM D2216)

The purpose of this test is to indicate the range of moisture contents present in the soil. A wet sample is weighed, placed in the constant temperature oven at 105° for 24 hours, and re-weighed. The moisture content is the change in weight divided by the dry weight.

PROCTOR TESTS

The purpose of these tests is to determine the maximum density and optimum moisture content of a soil. The Modified Proctor test is performed in accordance with ASTM D1557. The test is performed by dropping a 10-pound hammer 25 times from an 18-inch height on each of 5 equal layers of soil in a 1/30 cubic foot mold, which represents a compaction effort of 56,250 foot pounds per cubic foot. The moisture content is then raised, and this procedure is repeated. A moisture density curve is then plotted, with the density on the ordinate axis and the moisture on the abscissa axis. The moisture content at which the maximum density requirement can be achieved with a minimum compactive effort is designated as the optimum moisture content (O.M.C.). The Standard Proctor test is performed in accordance with ASTM D698. This test is similar to the Modified Proctor test and is performed by dropping a 5.5 pound hammer 25 times from a height of 12 inches on 3 equal layers of soil in a 1/30 cubic foot mold, which represents a compaction effort of 12,375 foot pounds per cubic foot. This test gives proportionately lower results than the Modified Proctor test.


PROCTOR TEST REPORT

BOWSER-MORNER, INC.

BOWSER MORNER

CLIENT
City of Huber Heights

PROJECT
Soil Study for Proposed Retaining Wall

JOB NO. **213502**

BORING STARTED **2/5/24** | BORING COMPLETED **2/5/24**

DRILLER **Central Star** | METHOD **2 1/4" HSA**

TYPED BY **dmo**

1 Boring No.

Sheet 1 of 2

PROJECT LOCATION
LAT. **39°51'52"N** LONG. **84°08'46"W**

SURFACE ELEVATION **877.7***

BORING LOCATION
As shown on Boring Location Plan.

It has been necessary to interpolate between samples. Therefore, the contacts between the various soil strata should not be taken as absolute.

COMMENTS
***Surface elevation based on Ohio South State Plane Coordinate System.**

DEPTH (ft. BGL)	SAMPLE NO.	SAMPLER TYPE / RECOVERY	GRAPHIC LOG	VISUAL CLASSIFICATION OF THE MATERIAL	BLOW COUNTS	N VALUE, blows/ft.	REMARKS
1.0	SS1			Dense, brown silty SAND with gravel (trace limestone) - moist	3, 17, 17	◇34	
3.0	SS2			Medium dense, brown silty SAND (trace gravel, trace limestone) - damp	7, 6, 6	◇12	
6.0	SS3			Medium stiff, brown, silty lean CLAY with sand (trace gravel, trace cobbles, trace limestone) - moist	3, 4, 5	◇9	
8.5				(Very stiff at 8.5')			
9.0	SS4			(Thin sand layer encountered at 9.0')	4, 6, 10	◇16	
13.5				(Thin wet sand layer encountered. Hard at 13.5')			▽
14.0	SS5				5, 16, 20	◇36	
18.0				(Gray and very stiff at 18.0')			
19.0	SS6				10, 11, 13	◇24	
22.0							

Continued Next Page

WATER LEVEL MEASUREMENTS

	DEPTH	DATE
INITIAL	13.5 ▽	2/5/2024
AT COMPLETION	NONE ▼	2/5/2024
OTHER	N/A ▼	N/A

SS — SPLIT SPOON
SL — SPLIT SPOON W/SOIL LINER
NQ— ROCK CORE
ST — SHELBY TUBE
AS — AUGER CUTTINGS
SC — SONIC

BOWSER MORNER

GINT Report Used: NEWLOGIN Report No.: 213502.GPJ GINT Template Used: OH DOT.GDT Date Printed: 2/21/24

CLIENT
City of Huber Heights

PROJECT
Soil Study for Proposed Retaining Wall

JOB NO.
213502

BORING STARTED **2/5/24** | BORING COMPLETED **2/5/24**

DRILLER **Central Star** | METHOD **2 1/4" HSA**

TYPED BY **dmo**

1 Boring No.

Sheet 2 of 2

PROJECT LOCATION
LAT. **39°51'52"N** LONG. **84°08'46"W**

SURFACE ELEVATION **877.7***

BORING LOCATION
As shown on Boring Location Plan.

It has been necessary to interpolate between samples. Therefore, the contacts between the various soil strata should not be taken as absolute.

VISUAL CLASSIFICATION OF THE MATERIAL

COMMENTS
***Surface elevation based on Ohio South State Plane Coordinate System.**

DEPTH (ft. BGL)	SAMPLE NO.	SAMPLER TYPE / RECOVERY	GRAPHIC LOG	VISUAL CLASSIFICATION OF THE MATERIAL	BLOW COUNTS	N VALUE, blows/ft. (10 20 30 40 50 60 70 80 90)	REMARKS
23.0				Gray, highly weathered SHALE - wet			
24.0	SS7				50/5"	◇ 50	
25.0							
26.0							
27.0							
28.0							
29.0	SS8			(Auger refusal at 28.9')	50/5"	◇ 50	
				Bottom of boring at 28.9 feet			
30.0							
31.0							
32.0							
33.0							
34.0							
35.0							
36.0							
37.0							
38.0							
39.0							
40.0							
41.0							
42.0							
43.0							
44.0							
45.0							
46.0							
47.0							
48.0							

CLIENT
City of Huber Heights

PROJECT
Soil Study for Proposed Retaining Wall

JOB NO.
213502

BORING STARTED **2/5/24** | BORING COMPLETED **2/5/24**

DRILLER **Central Star** | METHOD **2 1/4" HSA**

TYPED BY **dmo**

2 Boring No.

Sheet 1 of 2

PROJECT LOCATION
LAT. **39°51'52"N** LONG. **84°08'46"W**

SURFACE ELEVATION **878.3***

BORING LOCATION
As shown on Boring Location Plan.

It has been necessary to interpolate between samples. Therefore, the contacts between the various soil strata should not be taken as absolute.

COMMENTS
***Surface elevation based on Ohio South State Plane Coordinate System.**

DEPTH (ft. BGL)	SAMPLE NO.	VISUAL CLASSIFICATION OF THE MATERIAL	BLOW COUNTS	N VALUE, blows/ft. (10 20 30 40 50 60 70 80 90)	REMARKS
0.0		Brown, silty lean CLAY - moist			
1.0	SS1	Medium stiff, brown fat CLAY with silt (trace sand, trace root hairs) - moist	3 3 4	◇7	
3.0	SS2	Very stiff, brown, very silty lean CLAY with sand (some gravel, trace cobbles, trace limestone) - moist	11 13 15	◇28	
6.0	SS3		10 9 10	◇19	
8.0	SS4		13 11 13	◇24	
13.0	SS5	(Gray at 13.0') (Possible large cobble at 13.5')	50/5"	◇50	
18.0	SS6	Medium dense, brown, coarse silty SAND (trace gravel) - wet	7 9 10	◇19	▽
22.0					

Continued Next Page

WATER LEVEL MEASUREMENTS

	DEPTH	DATE
INITIAL	18.0	2/5/2024
AT COMPLETION	NONE	2/5/2024
OTHER	N/A	N/A

SS — SPLIT SPOON
SL — SPLIT SPOON W/SOIL LINER
NQ— ROCK CORE
ST — SHELBY TUBE
AS — AUGER CUTTINGS
SC — SONIC

BOWSER MORNER

GINT Report Used: NEWLOGIN Report No.: 213502.GPJ GINT Template Used: OH DOT.GDT Date Printed: 2/21/24

CLIENT
City of Huber Heights

PROJECT
Soil Study for Proposed Retaining Wall

JOB NO.
213502

BORING STARTED **2/5/24** | BORING COMPLETED **2/5/24**

DRILLER **Central Star** | METHOD **2 1/4" HSA**

TYPED BY **dmo**

2 Boring No.

Sheet 2 of 2

PROJECT LOCATION
LAT. **39°51'52"N** LONG. **84°08'46"W**

SURFACE ELEVATION **878.3***

BORING LOCATION
As shown on Boring Location Plan.

It has been necessary to interpolate between samples. Therefore, the contacts between the various soil strata should not be taken as absolute.

VISUAL CLASSIFICATION OF THE MATERIAL

COMMENTS
***Surface elevation based on Ohio South State Plane Coordinate System.**

DEPTH (ft. BGL)	SAMPLE NO.	BLOW COUNTS	N VALUE, blows/ft. (10 20 30 40 50 60 70 80 90)	REMARKS
23.0				
24.0	SS7	6 7 9	◇16	
25.0				
26.0				
27.0				
28.0				
29.0	SS8	25 50/6"	◇50	
30.0				
31.0				
32.0				
33.0				
34.0	SS9	37 50/3"	◇50	
35.0				
36.0				
37.0				
38.0				
39.0	SS10	50/4"	◇50	
40.0				
41.0				
42.0				
43.0				
44.0				
45.0				
46.0				
47.0				
48.0				

Very stiff, gray, silty lean CLAY with sand (trace gravel, trace cobbles) - moist

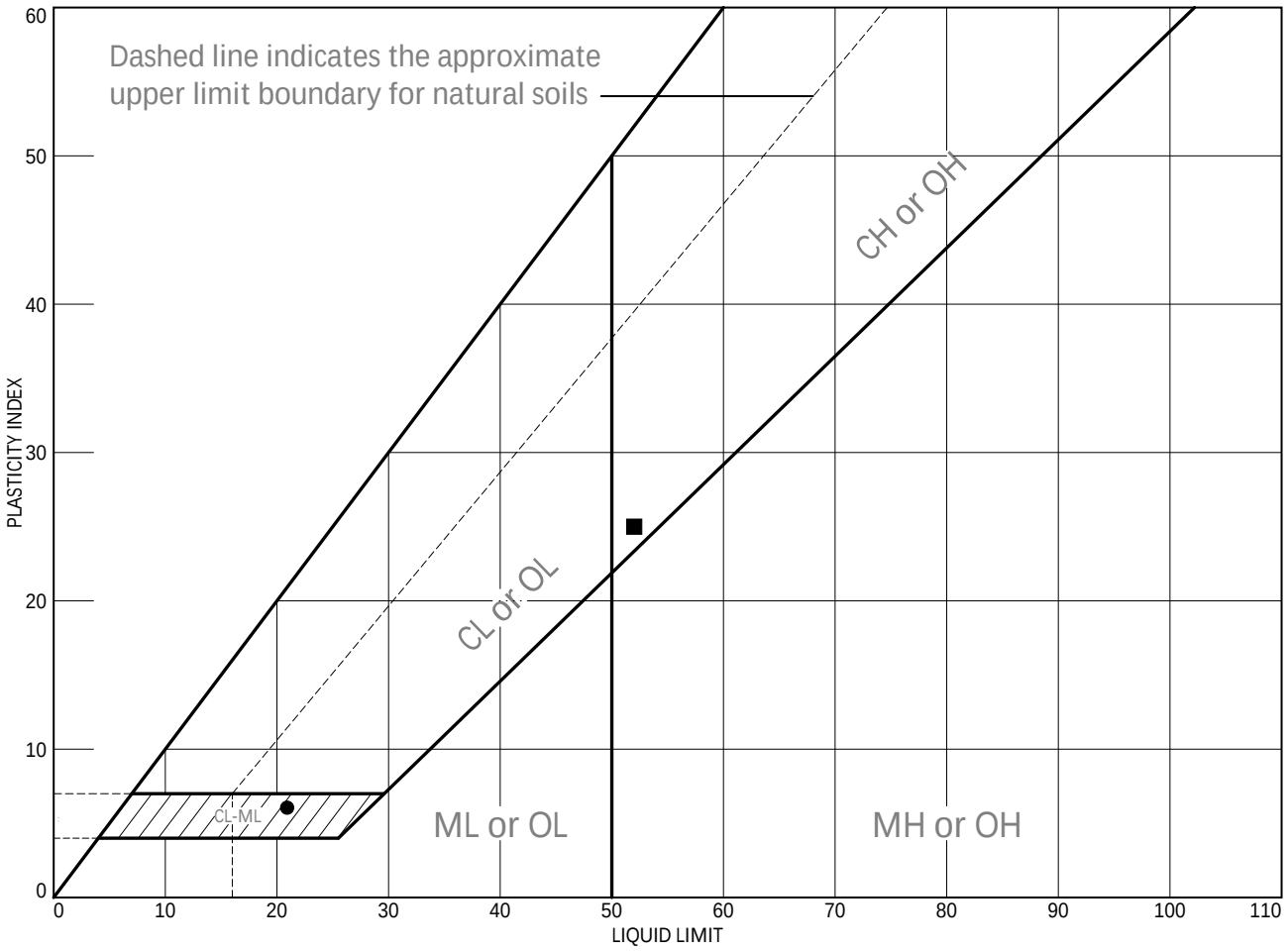
Gray, highly weathered SHALE - moist

(Auger refusal at 38.9')

Bottom of boring at 38.9 feet

GINT Report Used: NEWLOGIN Report No.: 213502.GPJ GINT Template Used: OH DOT.GDT Date Printed: 2/21/24

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	B-1, SS 3	21	15	6			
■	B-2, SS 1	52	27	25			

Project No. 213502 Client: City of Huber Heights

Project: Proposed Retaining Wall

●Location: B-1 Depth: 6.0' - 7.5' Sample Number: SS 3

■Location: B-2 Depth: 1.0' - 2.5' Sample Number: SS 1

BOWSER-MORNER, INC.

Dayton, Ohio

Remarks:

●As Received Moisture Content: 13.8%

■As Received Moisture Content: 25.3%

Tested By: MR Checked By: BLC

Moisture Content of Soil

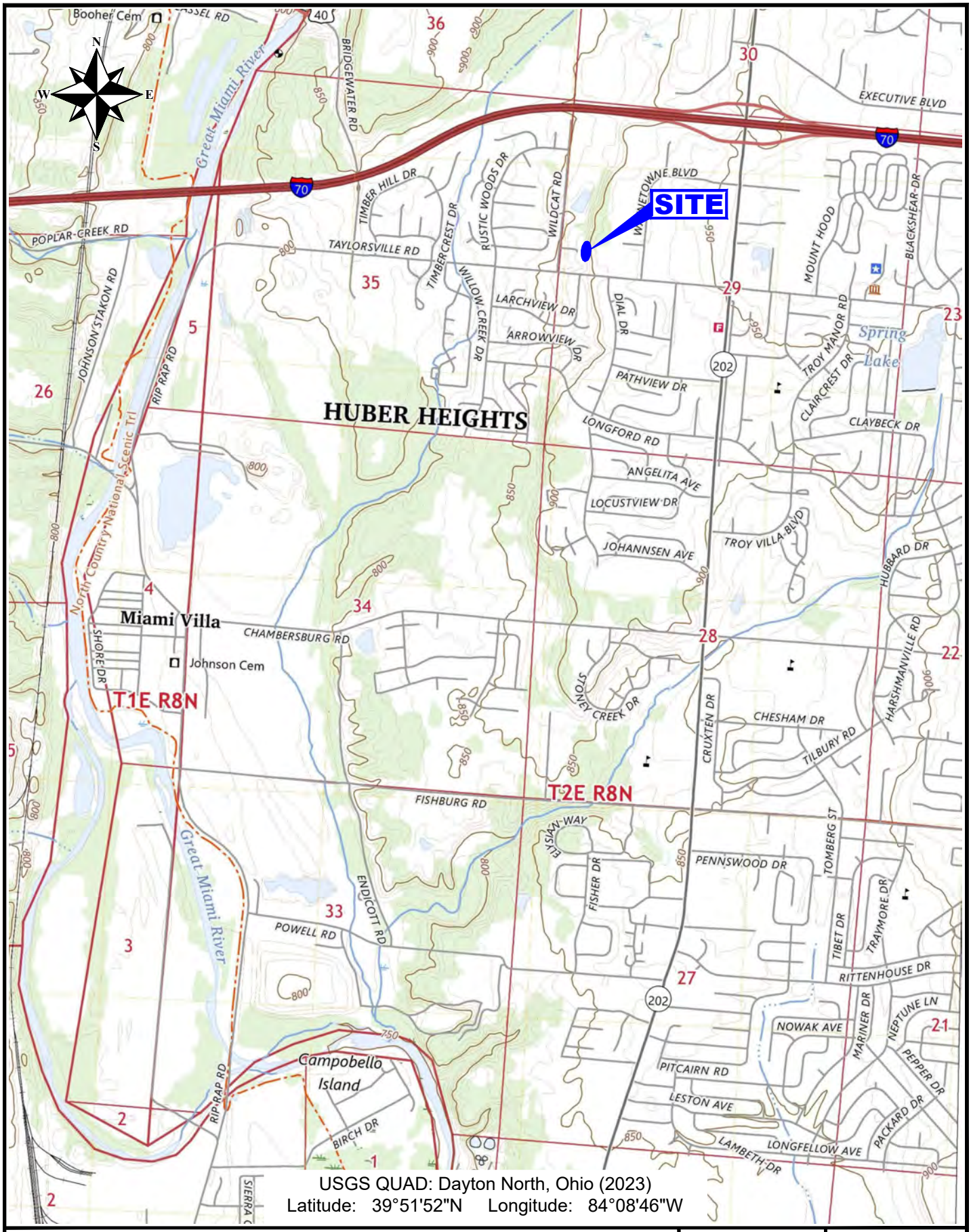
ASTM (D-2216)

BOWSER MORNER

Client: City of Huber Heights
Project: Proposed Retaining Wall

Work Order No.: 213502
Date: 02/21/24

Boring Number	Sample Number	Depth, (ft)	Depth, (m)	Moisture Content, (%)
B-1	SS 1	1.0 - 2.5	0.3 - 0.8	11.7
	SS 2	3.5 - 5.0	1.1 - 1.5	Not Tested
	SS 3	6.0 - 7.5	1.8 - 2.3	13.8
	SS 4	8.5 - 10.0	2.6 - 3.0	Not Tested
	SS 5	13.5 - 15.0	4.1 - 4.6	10.2
	SS 6	18.5 - 20.0	5.6 - 6.1	Not Tested
	SS 7	23.5 - 25.0	7.2 - 7.6	15.1
	SS 8	28.5 - 30.0	8.7 - 9.1	Not Tested
B-2	SS 1	1.0 - 2.5	0.3 - 0.8	25.3
	SS 2	3.5 - 5.0	1.1 - 1.5	7.9
	SS 3	6.0 - 7.5	1.8 - 2.3	10.4
	SS 4	8.5 - 10.0	2.6 - 3.0	Not Tested
	SS 5	13.5 - 15.0	4.1 - 4.6	7.9
	SS 6	18.5 - 20.0	5.6 - 6.1	Not Tested
	SS 7	23.5 - 25.0	7.2 - 7.6	12.2
	SS 8	28.5 - 30.0	8.7 - 9.1	8.8
	SS 9	33.5 - 35.0	10.2 - 10.7	8.9
	SS 10	38.5 - 40.0	11.7 - 12.2	10.5



USGS QUAD: Dayton North, Ohio (2023)
Latitude: 39°51'52"N Longitude: 84°08'46"W

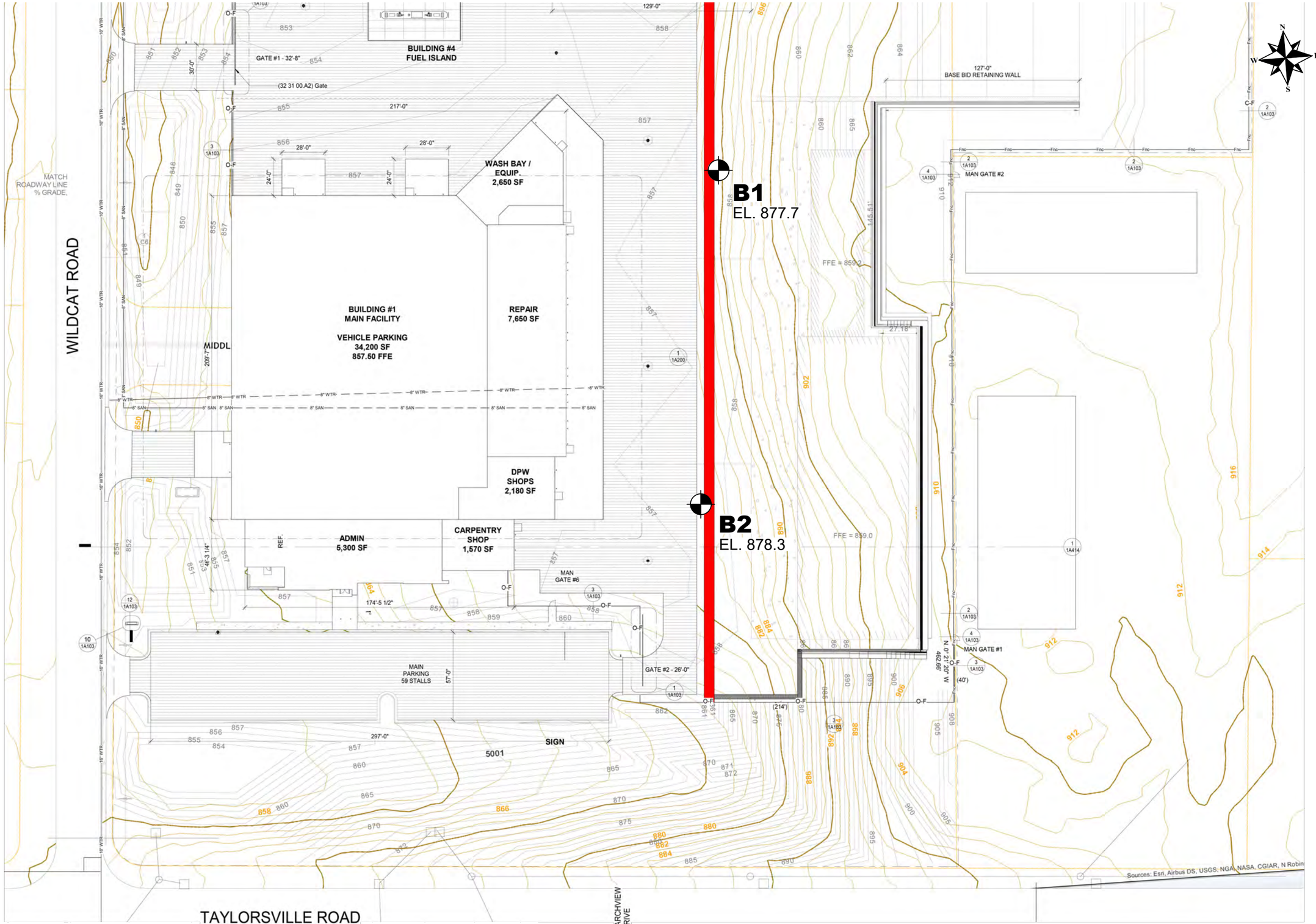
VICINITY MAP

Soil Study for Proposed Retaining Wall
Taylorsville Road and Wildcat Road
Huber Heights, Ohio
For: City of Huber Heights

02-2024 EM

PROJECT NO.	213502
SCALE	1" = 2000'
FIGURE NO.	1

BOWSER MORNER



BOWSER MORNER

PROJECT NO. 213502

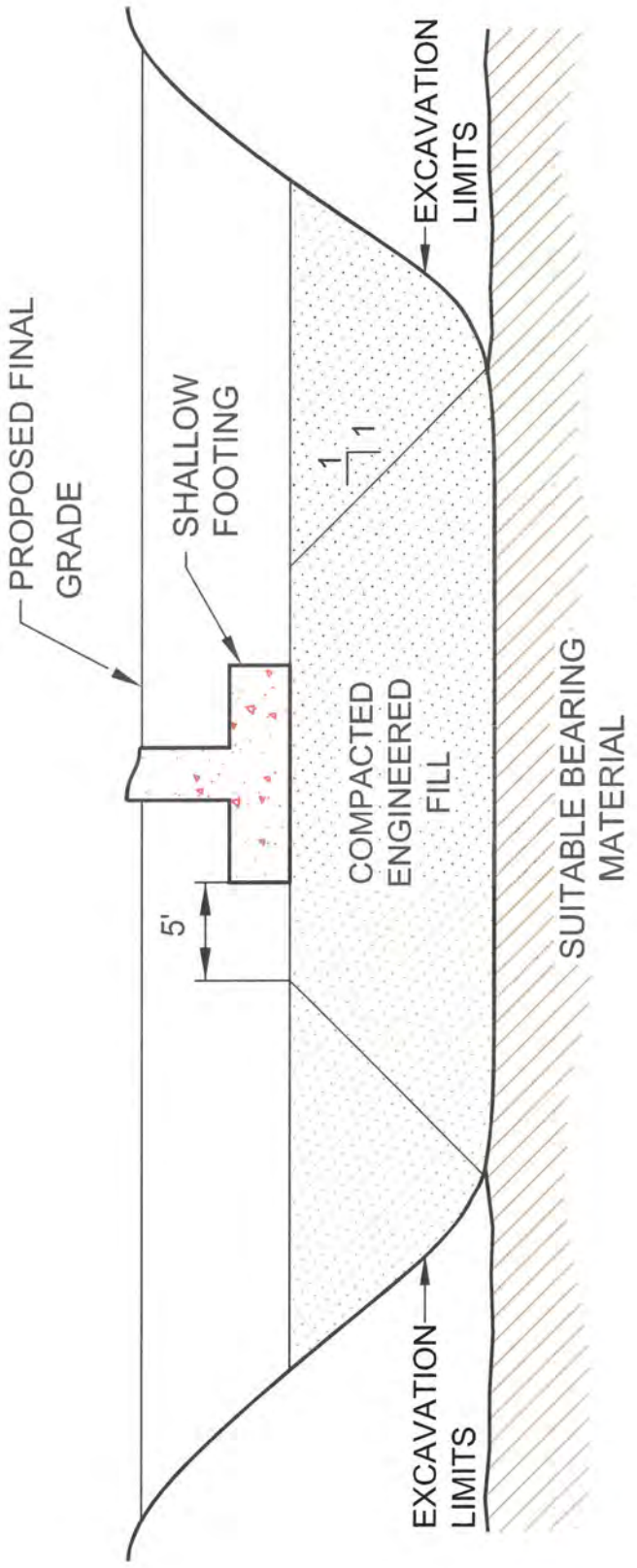
SCALE 1" = 60'

FIGURE NO. 2

02-2024 EM

BORING LOCATION PLAN

Soil Study for Proposed Retaining Wall
Taylorsville Road and Wildcat Road
Huber Heights, Ohio
For: City of Huber Heights



DESIGN ILLUSTRATION SHALLOW FOOTINGS IN AN UNDERCUT AREA

SCALE
NONE

FIGURE NO.
3

BOWSER MORNER

ENGINEERING & ENVIRONMENTAL SERVICES:

Geotechnical Engineering
Subsurface Exploration
Civil Engineering
Environmental Services
Due Diligence
Permitting

LABORATORY SERVICES:

Geotechnical Laboratories
Construction Materials Laboratories
Mineral Aggregates
Concrete
Stone & Masonry
Asphalt
Analytical Services Laboratories
Industrial Minerals
Product Testing
Mechanical/Metallurgical Testing
Calibration Services
Chemistry Laboratory
Consulting Geology
Radon Reference Laboratory

CONSTRUCTION SUPPORT SERVICES:

General Construction
Construction Quality Assurance
Building Code Special Inspections
Transportation Projects:
- Contractor QA/QC
- Material Supplier QA/QC
- Owner Quality Assurance

Materials Consulting:
- Construction Engineering

Dayton, OH • Toledo, OH
Springfield, IL
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